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MINISTRY OF WORKS

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CONSTRUCTION OF DAR ES SALAAM BUS RAPID TRANSIT (BRT) SYSTEM - PHASE 4, IN DAR ESA SALAAM CITY, TANZANIA

Environmental and Social Impact Assessment (ESIA) Report

18th December 2023

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ABBREVIATIONS AND ACRONYMS

AIDS : Acquired Immunodeficiency Syndrome
BRT : Bus Rapid Transport
BS : British Standards
CBD : Central Business District
CBOs : Community Based Organisations
CEEST : Centre for Energy, Environment, Science and Technology
C-ESMP : Contractor's ESMP
COPD : Chronic Obstructive Pulmonary Disease
DART: Dar Es Salaam Rapid Transit Agency
DAWASA : Dar Es Salaam Water and Sewerage Authority
DBRT : Dar Es Salaam Bus Rapid Transit
DOE-VPO : Division of Environment in the Vice President's Office
DUTIP : Dar Es Salaam Urban Transport Improvement Project
EHSO : Environmental, Health and Safety Officer
EIA : Environmental Impact Assessment
EMA Cap 191 : Environmental Management Act Cap 191
EMA : Environmental Management Act
EMOs : Environmental Management Officers
ESH&S : Environmental, Social, Health, and Safety
ESIA : Environmental and Social Impact Assessment
ESMP : Environmental and Social Management Plan
ESMoP : Environmental and Social Monitoring Plan
ESU : Environmental and Social Unit
GBV : Gender-Based Violence
GN : Government Notice
GOT : Government of the United Republic of Tanzania
GRM : Grievances Redress Mechanism
GRP : Grievance Redress Plan
HAVS : Hand Arm Vibration Syndrome
HIV : Human Immunodeficiency Virus
HQ : Headquarters
HSMP : Health and Safety Management Plan
IBRD : International Bank for Reconstruction and Development
IDA : International Development Association
ICC : Ilala City Council
Jc : Junction
JICA : Japan International Cooperation Agency
KMC : Kinondoni Municipal Council
kN : kilo Newton
LAA : Local Assessment Area
LGAs : Local Government Authorities
LHS : Left Hand Side
LTD : Limited
MCDOs: Municipal Community Development Officers
MoW : Ministry of Works
NEMC : National Environment Management Council
NEP : National Environmental Policy
NGOs: Non-Governmental Organisations
NMT : Non-Motorised Transport
PAPs : Project Affected Personnel
PDA : Project Development Area
P-ESMP : Project ESMP
PM_{10} : Particulate Matter with diameters that are generally 10 micrometres and smaller.
$PM_{2.5}$: Particulate Matter with diameters that are generally 2.5 micrometres and small
PMDM : Tanzania Pavement and Materials Design Manual
R/A : Roundabout
RAA : Regional Assessment Area
RAP : Resettlement Action Plan
RHS : Right Hand Side
SBOs : Small Business Operators
SDP : Sustainable Dar Es Salaam Project
SEA : Sexual Exploitation and Abuse
SEU : Safety and Environment Unit
SGO : Social / Gender Officer
SH : Sexual Harassment
SIA : Social Impact Assessment
STIs : Sexually Transmitted Infections
TAC : Technical Advisory Committee
TANROADS : Tanzania National Roads Agency
TMA : Tanzania Meteorological Authority
TARURA : Tanzania Rural and Urban Roads Agency
TFS : Tanzania Forest Services
TFV : Ten Percent Fines Value
TOR : Terms of Reference
TPDF : Tanzania Peoples Defence Force
UDART: Usafiri Dar Es Salaam Rapid Transit
UNECE: United Nations Economic Commission for Europe
UTM : Universal Transverse Mercator
UMC : Ubungo Municipal Council
VECs : Valued Environmental Components
WB : World Bank
WHO : World Health Organisation

THE STUDY TEAM

NAME	SIGNATURES
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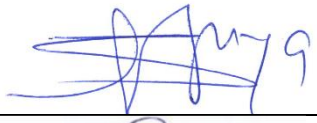
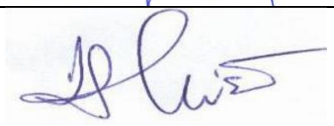
Eng. Samwel Maguya (Assistant Environmental Expert)	
Mr Huruma Kisaka (Sociologist / Resettlement Expert)	

In this study the Environmental Expert was a Team Leader responsible for conducting biophysical survey, preparation of EIA report and integration of Social Impact Assessment (SIA) report with EIA report to produce consolidated ESIA report assisted by Eng. Samwel Maguya. The Team Leader was assisted by Mr Huruma Kisaka as a Sociologist-responsible for conducting Socio-economic baseline survey, stakeholder consultations and preparation of SIA report.

[1] Mr Akonaay M.L. Ako is a Registered EIA Expert by the National Environment Management Council (NEMC) of Tanzania, with Registration Certificate No. NEMC / EIA / 0051.

ACKNOWLEDGEMENT

The Project Proponent would like to acknowledge the contribution made by various stakeholders during the EIA study and finally during preparation of this ESIA report. The assistance provided by the local authorities during the field work is highly appreciated. Apart from providing access to useful documents they were able to assist the Consultant during the field work.

The cooperation from the infrastructure/utility authorities is also highly appreciated. The utility authorities helped the Consultant in identifying location of infrastructure/utilities that are likely to be affected during construction. Finally, but not least the Project Proponent appreciates the opinions / concerns from various stakeholders. All relevant issues /concerns raised during stakeholder consultations have been considered and incorporated into the ESIA Report and ultimately have been reflected in the Design Report.

EXECUTIVE SUMMARY

E1. PROJECT INFORMATION

E1.1 Project Title

Detailed Environmental and Social Impact Assessment (ESIA and Resettlement Action Plan (RAP) for Dar Es Salaam Bus Rapid Transit (BRT) System -Phase 4.

E1.2 Name of the Project Proponent and Contact Address

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E2.0 PROJECT DESCRIPTION

The objective of this project is to undertake the construction of BRT Infrastructure System in the Dar Es Salaam City. Currently, the traffic flow along the Sam Nujoma and Bagamoyo Road Sections is constrained by lack of dedicated lanes to bypass peak-hour congestion with allowed speed to reach destinations faster. The construction of BRT infrastructure will reduce traffic congestion and reduce travel time along the road sections.

The project involves construction of BRT Infrastructure Systems, which is comprised of about 30.12 Km Roads. These include (i) A Section Bibi Titi Mohamed Road from Maktaba Street junction to Ohio Street junction (0.23km); (ii) Ali Hassan Mwinyi road (from the junction of Ohio Street to Morocco) (5.92 km); (iii) New Bagamoyo Road from Morocco junction to Tegeta (DAWASA Daladala Bus Station) (20 km); and A spur on Sam Nujoma Road from its junction with New Bagamoyo Road to Simu 2000 (3.2 km).

In addition, the project includes other components such as Bus Terminal, Feeder Bus Terminal, Park and Ride complexes, Depot and Bus stations, The BRAT phase 4 is also provided with critical intersections at the junctions between Bagamoyo Road and Kawawa Road (km 5+100)) and between Bagamoyo Road and Sam Nujoma Road (km 9+400).

The BRT is being implemented jointly by Tanzania National Roads Agency (TANROADS) and Dar Rapid Transit (DART) Agency, whereby TANROADS is responsible for Design, construction and management of BRT infrastructures, and DART Agency is responsible for BRT system operations.

The project will be funded by the Government of the United Republic of Tanzania through TANROADS in collaboration with the World Bank Group (IBRD/IDA). The construction cost of the BRT road infrastructure is estimated to be TZS 225,019,713,710.00 (225 billion).

The construction period is estimated to be 4 years, whereby 1 month is mobilization period, 46 months will be construction period and 1 month will be demobilization period. After construction period, the BRT infrastructure will be operated for an estimated period of 20 years. Thereafter, the BRT infrastructure will have to undergo new construction and expansion depending on the future transport demand.

E3.0 DESCRIPTION OF THE PROJECT ENVIRONMENT

The road sections traverse through built up environment with high rise buildings in the Central Business District (CBD) and become dominated by ordinary buildings as you move away from the CBD. There is no significant natural vegetation cover expect within the major river crossings, particularly in the upstream and downstream of the Msimbazi River Creek. Most of the vegetation is comprised of planted ornamental and shade trees and grass along the road corridor and in the median of the road section.

The road corridor is congested by numerous small business operations, parking of Bajaj and Bodaboda. It is also common to find small business operators close to the road (e.g., km 0+000 along Bibi Titi-Ali Hassan Mwinyi Road Section) and some of them doing business over storm water drainages (e.g., km 16+500 on the LHS along Bagamoyo Road) and within the road median. All these small business operations and parking of Bodaboda and Bajaj will have to be removed before commencement of construction works.

The road corridor is occupied by numerous public service infrastructure such as electricity power lines (underground/overhead), telephone cables (underground/overhead), water supply pipelines and sewer pipelines, which can be found to be crossing or running parallel to the road corridor. In addition, there are several traffic lights and street lights in the median of road sections. All these public service infrastructure / utilities, traffic lights and street lights will have to be relocated before commencement of construction works.

E4.0 STAKEHOLDER CONSULTATION AND THEIR INVOLVEMENT

E4.1 Identified Stakeholders

The following are the identified stakeholders during the EIA study:

- Ministry of Works (MoW)
- Division of Environment in the Vice President's Office (VPO-DOE)
- National Environment Management Council (NEMC)
- Tanzania National Roads Agency Headquarters (TANROADS HQ) and TANROADS Regional Manager-Dar Es Salaam.
- Tanzania Rural and Urban Riads Agency (TARURA)
- Dar Es Salaam Bus Rapid Transit (DART) Agency
- Embassy of France, Japan, and Indonesia
- Dar Es Salaam City Council (DCC), Ubungo Municipal Council (UMC) and Kinondoni Municipal Council (KMC).
- Ward and Mtaa Development Committees
- Infrastructure / Utility Companies / Authorities (TANESCO, TTCL, Mobile Phone Companies, DAWASA)
- Commuter Transport Operators
- Small Business Operators, Petrol Station Operators, Retail and Whole Sale Shops Operators.
- Local Community Members

E4.2 Results of Stakeholder Consultations

In general, the stakeholders appreciate that the project will be economically beneficial and will stimulate economic development and investment opportunities in the project area. Notwithstanding the mentioned benefits, the stakeholders raised some issues / concerns regarding the project.

E4.2.1 Consultation with Stakeholder Representatives

The consultation with stakeholder representatives indicates the stakeholders were more concerned on the effect/impacts of the project on land use and public service infrastructure/utilities. The stakeholder officials have also made some recommendations to be considered by the project proponent during the project implementation. The raised issues/concerns and recommendations will be taken into consideration and incorporated into the project design, whenever feasible.

E4.2.2 Consultation with Small Business Operators

The consultation with stakeholder officials was carried out on 22nd August 2020. The results indicate Most of the issues/concerns raised by stakeholders were focused on displacement from their areas due to land acquisition and loss of livelihood due to displacement from the road reserve. The effect of land acquisition will be minimized through payment of compensation and has been addressed through the formulation of Resettlement Action Plan (RAP). The displacement of small business operators from road reserve will be addressed through identification of new areas in collaboration with respective Local Government Authorities (LGAs).

E5.0 IDENTIFIED IMPACTS AND /MITIGATION MEAUSURES

The findings indicate the project will have beneficial and adverse (negative) impacts. However, the beneficial (positive) impacts are expected to be long term and will to occur after construction or during operational phase. In order to maximize the project benefits the enhancement measures for the identified positive impacts have been outlined in the report. The following are the identified beneficial (positive) impacts:

- Reduced emission of air pollutants and greenhouse gas.
- Reduced road traffic accidents.
- Increased employment opportunities for local people.
- Increased income generation opportunities for local people.
- Increased productivity and stimulation of economic growth.
- Employment creation and economic improvement of households.
- Increased Revenue Collection by Local and Central Government
- Reduced Transportation Costs and Improved Access to Social Services.
- Reduced risk of traffic accidents and improved environmental quality.
- Increased comfortability for passengers.

The negative impacts will be short-term and will occur mainly during construction phase. The mitigation measures for the identified negative impacts have already been outlined in the report and elaborated in the corresponding ESMP schedule. The following are the identified negative impacts:

- Loss of land ownership, properties and economic displacement by local residents
- Creation of air pollution due to dust emission from construction activities.
- Noise and vibrations emission during construction.
- Illegal dumping of solid wastes on the road during operation, such as plastic bottles, food remnants and packaging materials.
- Increased risk of traffic accidents due to construction activities.
- Increased HIV/AIDS prevalence due to interaction between construction workers and local community members.
- Increased risk of Covid-19 transmission due to influx of people into the project sites.
- Increased emergence of GBV/SEA and SH due to influx of job seekers into the project area.

E6.0 CONSIDERED ALTERNATIVES

The three alternatives have been considered in this study based on technical, economic, environmental, and social point of view. The following are the considered project alternatives:

- **No Project Alternative VS Project Alternative:** The No Project Alternative was found to have less environmental effects/impacts than the Project Alternative. However, on the long-term the Project Alternative was found to have more socio-economic and environmental benefits than the "No Project Alternative". Therefore, the "Project Alternative" should be selected and "No Project Alternative should be rejected.

- **Labour-Intensive Construction Method VS Machine-Intensive Methods:** The "Labour-Intensive Construction Method" was found to be favourable than "Machine-Intensive Construction Method". However, due to the nature of the project the labour-intensive method has been found to have some limitations, and therefore the combination of the two methods should be considered. However, during construction more emphasis will be given on the labour-intensive method in order to promote employment of the local people. For example, excavation of storm water drainages, relocation of utilities, etc.

- **Asphalt Pavement VS Concrete Pavement Alternatives:** The comparison was made between the asphalt pavement and concrete pavement based on their disadvantages and disadvantages. It was not easy to derive a conclusion on which pavement type is the most preferable. However, based on the type of the project the concrete pavement alternative was found to be preferable.

E7.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The purpose of ESMP is to ensure that the project is being implemented with minimum adverse environmental and social impacts. The ESMP focuses on avoidance or mitigation of potential impacts associated with the project related activities and enhancement of project benefits. It specifies mitigation and institutional measures to be taken during construction and operation phases, to eliminate any adverse environmental and social impacts, offset them or reduce them to acceptable levels.

In order to be effective, the ESMP has specified roles and responsibilities of various stakeholders during implementation. The identified stakeholders include the Ministry of Works (MoWT), President's Office, Regional Administration and Local Government (PO-RALG), Dar Es Salaam Rapid Transit DART, Tanzania National Roads Agency (TANROADS); Tanzania Rural and Urban Roads Agency (TARURA), National Environment Management Council (NEMC); Division of Environment in the Vice President's Office (DOE-VPO); Dar Es Salaam City Council (DCC)[2], Ubungo Municipal Council (UMC), Kinondoni Municipal Council (KMC); Tanzania Telecommunications Limited (TTCL), Tanzania Forest Services Agency (TFS); Tanzania Electric Supply Company Limited (TANESCO), Dar ES Salaam Water and Sewerage Authority (DAWASA); Ward and Street ("Mtaa") Development Committees; and Local NGOs / CBOs dealing with project related environmental and social aspects in the project area.

The successful implementation of ESMP also requires financial commitment. In this regard, cost estimates for implementation of mitigation measures have been taken into consideration. Therefore, the cost of implementation of mitigation measures has been estimated to be TZS 220,000,000.00. These costs will be included in the Bill of Quantities during preparation of Bidding Document.

E8.0 RESOURCE EVALUATION OR COST BENEFIT ANALYSIS

E8.1 Project Benefits and Costs

[2] Initially it was known as "Ilala Municipal Council (IMC)".

The project has been found to have short and long-term benefits which outweigh the project costs, estimated to be TZS 225,019,713,710.00. The following are the short-term and long-term benefits:

- **Short-term Benefits**
  - Creation of temporary employment due to recruitment of construction workers.
  - Increased income generation opportunities to the local people due to increased demand for food and other items from construction workers.

- **Long-term**
  - Benefits Increased productivity and stimulation of economic growth
  - Employment creation and economic improvement of households.
  - Increased Revenue Collection by Local and Central Government.
  - Creation of employment and income generation opportunities
  - Reduced Transportation Costs and Improved Access to Social Services.
  - Reduced risk of traffic accidents and improved environmental quality.
  - Increased comfortability of passengers.

E8.2 Benefit/Cost Ratio

The Benefit/Cost Ratio before including environmental costs is 2.1 and after including environmental costs it is 2.0. Therefore, there is no any significant difference in Benefit/Cost Ratio before and after incorporating environmental costs. This indicates the environmental costs are negligible or very small and do not have any effects on the project costs. Since the Benefit/Ratio is greater than 1 the project should be considered to be economically viable, and therefore it should be implemented without delay.

E9.0 DEMOBILIZATION PLAN

The demobilization plan will involve site rehabilitation and restoration of disturbed areas due to construction activities. It is the responsibility of the Contractor to undertake rehabilitation and restoration works to ensure that the environmental value of the project site is maintained for the present and future generations.

The purpose of site rehabilitation is to ensure that all disturbed areas caused by construction activities are restored, leaving a stable environment that is conducive to the establishment of landscapes characteristic to the area.

The rehabilitation and restoration works will be done in accordance with the approved Contractor's Environmental and Social Management Plan (C-ESMP). Those areas that require rehabilitation and restoration works include the borrow pits; quarry pits; materials storage yard; workshop area, cement/asphalt batch plant area; soil/spoil materials dumping site; and camp site.

During demobilization phase all work areas, campsite/offices, workshops /garages, and other temporary installations will be cleaned up and the site will be restored. These includes removal of temporary buildings, equipment, surplus materials, pieces of wood, pieces of bricks or any other material that was not in the area before construction works.

The site will be cleared of overburden resulting from construction works. Natural drainages will be restored and damaged areas will be rehabilitated to make them compatible with the surrounding landscape. Permanent installations will be restored / repaired to their initial state. The compacted soils will be scarified to at least 15 cm deep to loosen it in order to facilitate vegetation growth.

Monitoring will be carried out by the Supervision Consultant's Environmental Expert to ensure the activities specified in the contract are being adhered to by the Contractor. During

monitoring the Supervision Consultant's Environmental Expert will undertake assessment of the site conditions and recommend the restoration / rehabilitation requirements for implementation by the Contractor. Emphasis will be placed on the continuity between site characteristics and the adjacent landscapes.

E10.0 CONCLUSION AND RECOMMENDATIONS

E10.1 Conclusion

In general, the stakeholders do support the project because they know it will contribute to improved transportation in the Dar Es Salaam City, as already note in the BRT Phase 1. The scoping study indicates the project will have significant and long-term socio-economic benefits to the local residents, especially the low-income group. The identified benefits include:

- Increased productivity and stimulation of economic growth
- Employment creation and economic improvement of households
- Increased Revenue Collection by Local and Central Government
- Creation of employment and income generation opportunities
- Reduced Transportation Costs and Improved Access to Social Services
- Reduced risk of traffic accidents and improved environmental quality due to reduced exhaust emissions.
- Increased comfortability of passengers using BRT transport.

However, the project is expected to have some adverse effects/impacts on the livelihood of the local residents in terms of displacement from the road reserve and BRT project sites such as Car Park and Ride Buildings, Depots, and Terminals. However, the problem will be mitigated through payment of compensation to affected persons (PAPs). Another adverse impacts will be on the disruption of public service infrastructure / utilities and transportation. However, these effects/impacts will be short-term and temporary.

Moreover, the mitigation measures for the identified negative impacts could be easily implemented through good engineering practice with minimum costs to the project. The planned mitigation measures in the ESMP will be incorporated into the Bidding Document and Contract Specifications.

The sustainability of this project has been ensured through institutional capacity building, by establishment of Environmental and Social Unit (ESU); provision of on-the-job training for ESU personnel during construction phase. The ESU personnel will be responsible for overseeing implementation of outlined enhancement/mitigation measures in the ESMP and compliance with EH&S and GBV/SEA issues during Operation Phase.

Finally, the cost-benefit analysis indicates the project benefits outweighs the project costs, whereby the Benefit/Cost Ratio (B/C) was found to be 2.1 before incorporating environmental costs and 2.0 after incorporating environmental costs. Therefore, the environmental costs were found to have no any significant effect on the B/C Ratio. This indicates the environmental costs are negligible and can be tolerated for this project; and since the B/C ratio were more than 1 indicates the project is economically viable and should be implemented without delay.

E10.2 Recommendations

The project has been found to have long-term environmental and socio-economic benefits and its adverse (negative impacts), are temporary and short-term as they occur during construction phase. In addition, the cost/benefit analysis and economic analysis have already found the project to be highly beneficial and economically viable, respectively. It is therefore, recommended that the project should be implemented immediately to avoid increased construction costs due to increasing inflation rate.

In order to ensure the successful implementation and sustainability of the project, the Consultant provides the following recommendations:

- TANROADS should consider the climate change factor during the design and construction phase to ensure the long-term durability of the road pavement and associated bridge structures.

- TANROADS should collaborate with Local Government Authorities (LGAs) to relocate small business operators before commencement of the construction works.

- TANROADS should promote awareness and education campaign among the road users on the importance of avoiding the use of dedicated BRT lane to minimize the risk of traffic accidents.

- TANROADS should promote awareness and education campaign among the small business operators to avoid encroachment into the road reserve.

- TANROADS should ensure that the design incorporates the provision of parking areas for Bodaboda and Bajaj Operators.

In addition to the Consultant's recommendations the consulted stakeholders had the following recommendations:

- The project proponent has to ensure the design of flyover at Selander Bridge incorporates the protection of mangrove vegetation on the upstream side. That means the construction of the flyover must be on the downstream of the Selander Bridge.

- The project implementer has to provide a reasonable timeframe for relocating the utilities since relocation involves use of money and getting money for such huge work needs a budget and approval from the management, this sometimes is a source of delaying in relocation works. The joint work for mapping the utilities is of very important before starting construction works to avoid disrupting the utilities and deny the services to the public. The project implementer should share the work program for the whole construction works for the utility owner to know where exactly the relocation works has to start immediately.

- The stations along the BRT road should be provided with sanitary facility to improve the quality of provided services. For example, travelling from Kivukoni to Tegeta without having the sanitary facilities is a problem for vulnerable groups like children and the elderly people.

- The Design should consider provision of shops for soft drink and pharmacy within the stations to improve the quality of services

1.0 INTRODUCTION

1.1 Background

The Government of the United Republic of Tanzania has received a loan from the World Bank (WB) to finance Dar Es Salaam Urban Transport Improvement Project (DUTIP) and intends to apply a portion of the proceeds of the credit for eligible payments under the contract for provision the Consultancy Services for Environmental and Social Impact Assessment and Resettlement Action Plan for Dar Es Salaam Bus Rapid Transit (BRT) System, Phase 4.

The BRT system is comprised of two-lane, two-way road dedicated to buses only, that enables buses to bypass peak-hour congestion with allowed speed to reach destinations faster. In addition, the BRT system caters for the needs of bus users by providing safe and dedicated access to pedestrians and cyclists who form the bulk of bus users. This is achieved through provision of bicycle paths and their parking areas, and walkways at the bus terminals and stations. The BRT is basically promoted as a cheaper option to Mass Rapid Transit System. All other road-based vehicles (mixed traffic) are not allowed to travel on dedicated BRT lanes. There are two lanes in each direction dedicated for mixed traffic to make a total of six lanes road i.e., three in each direction.

The BRT Phase 4 is part of the planned BRT infrastructure system, which is comprised of about 137 km networks of bus ways, with about 220 km of feeder roads to be developed in six phases. The BRT Phase 4 corridor comprising about 30.12 Km covers: (i) A Section Bibi Titi Mohamed Road from Maktaba Street junction to Ohio Street junction (0.23km); (ii) Ali Hassan Mwinyi road (from the junction of Ohio Street to Morocco) (5.92 km); (iii) New Bagamoyo Road from Morocco junction to Tegeta (DAWASA Daladala Bus Station) (20 km); and A spur on Sam Nujoma Road from its junction with New Bagamoyo Road to Ubungo junction (4 km). The map showing the locations of BRT Phase 4 Corridor in relation to other phases is provided in **APPENDIX 1.**

In addition, along the proposed road corridor the project will contain other components such as Bus Terminal, Feeder Bus Terminal, Park and Ride Complexes, Depot and Bus stations, the detailed information of the project components has been provided in Chapter 2 of this report. The BRT Phase 4 is also provided with critical intersections at the junctions between Bagamoyo Road and Kawawa Road (km 5+100)) and between Bagamoyo Road and Sam Nujoma Road (km 9+400). The critical intersections are located at intersections where turning movements of the BRT is required, the design has proposed flyovers for the said intersections. The aim is to ensure provision of good level of service for the BRT and mixed traffic.

The BRT is being implemented jointly by Tanzania National Roads Agency (TANROADS) and Dar Rapid Transit (DART) Agency, whereby TANROADS is responsible for design, construction and management of BRT infrastructures, and DART Agency is responsible for BRT system operations. The DART Agency was established in May 2007 under the Executive Agencies Act No. 30 of 1997. The Agency is responsible for the establishment and operation of the Bus Rapid Transit (BRT) system for Dar Es Salaam. Specifically, DART Agency is responsible for procurement of services, bus operators (private), fare collection system and ITS systems as well as overseeing operations of the BRT system.

Tanzania National Roads Agency (TANROADS) is a semi-autonomous road agency of the Ministry of Works established in year 2000 under the Executive Agencies Act No. 30 of 1997 with the responsibility for development and maintenance of classified trunk and regional road networks. TANROADS as an executing agency has the requisite organizational capacity to develop and maintain the classified trunk and regional road network in Tanzania. It has a wealth of experience in management of IDA funded projects and other Development Partners projects as well. TANROADS has proper procedures for procurement, accounting and

management. In the light of the foregoing, TANROADS has been entrusted to develop the BRT infrastructure in the City of Dar Es Salaam.

Therefore, in order to carry out this assignment, the Chief Executive Officer of TANROADS (Hereinafter referred to as the Client) commissioned NIMETA Consult (T) LTD of Dar Es Salaam (Hereinafter referred to as the Consultant) to conduct Environmental and Social Impact Assessment (ESIA) and Preparation of Resettlement Action Plan (RAP) for Dar Es Salaam Bus Rapid Transit (BRT) System, Phase 4.

1.2 The Need and Justification for the Project

The need for the project is justified by the fact that currently the traffic flow along the Sam Nujoma and Bagamoyo Road Sections is constrained by lack of dedicated lanes to bypass peak-hour congestion with allowed speed to reach destinations faster. The construction of BRT infrastructure will reduce traffic congestion and reduce travel time along the road sections. In addition, the construction of BRT infrastructure will reduce risk of traffic accidents to pedestrians, especially the vulnerable groups such as persons with disabilities, the elderly, sick persons, and school children.

1.3 Project Costs and Source of Funding

The construction costs of the BRT road infrastructure were estimated to be United States Dollars (US D) 97.9 million in 2017, which was equivalent to Tanzania Shillings (TZS) 213,420,042,000 (213.4 billion)[3]. Due to increasing inflation rate the construction cost is expected to have increased to TZS 225,019,713,710 as of 1st January 2021[4]. However, according to TANROADS the direct costs related to construction works is estimated to be TZS 25 billion. These costs exclude indirect costs related to design, supervision, laboratory tests, labour, and contingencies.

The project will be funded by the World Bank Group (IBRD/IDA) and the Government of the United Republic of Tanzania (GOT). However, most of the construction costs will be financed by the World Bank, and the GOT will be responsible mainly for compensation of affected people due to land acquisition.

1.4 Project Life Span

The construction period is estimated to be 4 years, whereby 1 months is mobilization period, 46 months will be construction period and 1 month will be demobilization period. After construction period, the BRT infrastructure will be operated for an estimated period of 20 years. Thereafter, the BRT infrastructure will have to undergo new construction and expansion depending on the future transport demand.

1.5 The Purpose and Scope of the Assignment

The purpose of this assignment is to conduct detailed Environmental and Social Impact Assessment (ESIA), development of the Environmental and Social Management Plan (ESMP) and Health and Safety Management Plan (HSMP) as well as Resettlement Action Plan (RAP) for construction of infrastructure for BRT System Phase 4 in the Dar Es Salaam City. The ESIA will address environmental and social impacts which may arise from mobilization, construction, operation and decommissioning activities and provide mitigation measures to prevent or minimize adverse impacts.
Ultimately, ESMP, HSMP and RAP will be developed as tools of which its recommendations will be used by the Design Consultant in the finalization of road designs and be included in the

[3] INTERNATIONAL DEVELOPMENT ASSOCIATION. PROJECT APPRAISAL DOCUMENT ON A PROPOSED CREDIT IN THE AMOUNT OF SDR 316.2 MILLION (US$425 MILLION EQUIVALENT) TO THE UNITED REPUBLIC OF TANZANIA FOR A DAR ES SALAAM URBAN TRANSPORT IMPROVEMENT PROJECT. February 14, 2017. http://documents1.worldbank.org/curated/en/794251489201242940/pdf/TZ-PAD-02162017.pdf
[4] US D = TZS 2298.4649 BOT Exchange Rate as at 1st January 2021. https://www.bot.go.tz/ExchangeRate/previous_rates?

Tender Documents. The detailed scope of the assignment is provided in the Client's Terms of Reference.

According to the TOR, the assignment shall be carried out in accordance with the requirements of the applicable national legislations and World Bank Policy requirements. The applicable national legislations include the Environmental Management Act Cap 191; Environmental Impact Assessment and Audit Regulations (2005); and Environmental Impact Assessment and Audit (Amendment) Regulations (2018). The applicable Word Bank Safeguard Policies include OP/BP 4.01 - Environmental Assessment; and OP/BP 4.12 - Involuntary Resettlement. Therefore, before undertaking ESIA study, the project will be subject to Environmental Screening in accordance with the requirements of the OP/BP 4.01-Environmental Assessment and Environmental Impact Assessment and Audit (Amendment) Regulations (2018), to determine the appropriate extent and type of the Environmental Assessment to be conducted.

1.6 Nature and Category of the Project

The project involves upgrading of the municipal roads by widening of the existing lanes, and changing the road surface into concrete pavement. Therefore, the road should be considered to be **Type II** according to Environmental and Social Management Framework (ESMF) for Dar Es Salaam Urban Transport Project (DUTP) environmental and social classification.

The project is being implemented in highly congested urban area with many commercial and business activities and is likely to affect more than 200 people such small business operators, Bajaj / Bodaboda Operators, Flowers Garden Operators, etc. Therefore, the site sensitivity should be considered to be **High** in accordance with ESMF definition of site sensitivity. Therefore, by considering that the project is Type II and is being implemented in HIGH sensitivity area, then the project should be considered to be **Category A** in accordance with ESMF categorization.

According to the FIRST SCHEDULE of the Environment Management (Environmental Impact Assessment and Audit) (Amendment) Regulations (2018), those projects with **Medium** to **High** impacts are considered to be **Type B1**, then the Screening process shall be used by NEMC to categorize them either as Type "A" or "B2" project. Therefore, the project requires preparation of Environmental Scoping Report with Terms of Reference and EIA Registration Form No. 4 for submission to NEMC in accordance with Regulation 8(1).

1.7 EIA Requirements

According to Regulation 8(1), an application for environmental impact assessment certificate shall be made by submitting to the Council a Scoping Report in the format set out in the Third Schedule to the Environmental Management (Environmental Impact Assessment and Audit Regulations) (Amendment) Regulations (2018).

The FOURTH SCHEDULE (Made under Regulation 15) to the Environmental Impact Assessment and Audit Regulations GN No. 349 of 2005 outlines the EIA stages. The first stage is project registration by submitting a Scoping Report and Registration Form No. 4 to the National Environment Management Council (NEMC).

The submission of Scoping Report and Form No. 4 is supposed to be accompanied by payment of registration fees. To-date the Scoping Report and Terms of Reference have been approved by NEMC as indicated in the Letter Ref. No. EC/EIA/2022/0233/01, Dated 21st February 2022 **(APPENDIX 2).**

1.8 The Objective and Scope of EIA Study

The overall objective of EIA is to identify potential environmental and social impacts (both positive and negative) associated with upgrading of the road section, and thereafter propose appropriate enhancement and mitigation measures for positive and negative impacts, respectively.

The intention is to ensure that the project is not only technically feasible and economically viable but also environmentally friendly and socially acceptable. The detailed on the scope of work for conducting ESIA study is outlined in the approved Terms of Reference by NEMC.

1.9 The Study Approach and Methodology

1.9.1 The Study Approach

1.9.1.1 Scoping of the Assessment

The study approach involved scoping of the environmental assessment by selecting relevant Valued Environmental Components (VECs). Valued Environmental Components (VECs are defined as broad components of the biophysical and human environments that, if altered by the Project, would be of concern to regulatory agencies, indigenous persons, resource managers, scientists, stakeholders, and/or the general public.

The approach also involved defining the assessment boundaries in terms of spatial, temporal, administrative and technical boundaries; and establishing the baselines conditions. This was followed by assessment of project related environmental effects/impacts and assessment of cumulative effects/impacts based on the determined significance criteria.

1.9.1.2 Definition of Assessment Boundaries

The assessment boundaries include spatial, temporal, administrative, and technical boundaries. These are defined as follows:

- **Spatial boundaries** are referred to as the Project Development Area (PDA), the Local Assessment Area (LAA), and the Regional Assessment Area (RAA). The details on the definition of these terms are provided in the TOR (See APPENDIX 3).

- **Temporal boundaries** include the various phases of a Project, which can be identified as: Construction; Demobilization; Operation; and Decommissioning. Phase. However, the Decommissioning phase is not considered because the road is not expected to be decommissioned, instead it will be undergoing improvement depending on the future requirements.

- **Administrative boundaries** include specific aspects of national legislative or regulatory requirements; standards, objectives, or guidelines, policy objectives; as well as regional planning initiatives that are relevant to the assessment of the Project's environmental effects on the VECs.

- **Technical boundaries** are the technical limitations or considerations for the evaluation of potential environmental effects of the Project, and may include limitations in scientific and social information, data analyses, and data interpretation, or uncertainties in the assessment.

1.9.1.3 Establishment of the Baseline Conditions

Existing (baseline) environmental conditions were established for each VEC. These include those environmental effects that may have been or may be caused by other past or present projects or activities that have been or are being carried out.
The description of existing baseline conditions for each VEC include:

- the status and characteristics of the VEC within its defined spatial and temporal boundaries for the assessment;
- information from past research conducted in the region;
- traditional and ecological knowledge (if applicable or available); and

- knowledge gained from the collection of baseline data through literature review, qualitative and quantitative analyses, and field work carried out as part of the EIA.

1.9.1.4 Assessment of Project-Related Environmental Effects

The assessment covered descriptions of how an environmental effect will occur or how the Project will interact with the environment, the mitigation and environmental protection measures proposed to reduce or eliminate the environmental effect, and the characterization of the residual environmental effects of the Project. The focus was on residual environmental effects, *i.e.,* the environmental effects that remain after planned mitigation has been applied. All mandatory factors were assessed for all phases of the Project (*i.e.,* Construction, Operation, and Demobilization Phase), as well as, for Accidents, Malfunctions and Unplanned Events. The assessment also considered the effects of the environment on the Project.

1.9.1.5 Assessment of Cumulative Environmental Effects

Cumulative environmental effects of the Project were identified in consideration of other past, present or reasonably foreseeable future projects or activities that have been or will be carried out, for all phases of the Project (*i.e.,* Construction, Operation, and Demobilization Phase). A screening of potential interactions was done to determine if an assessment of cumulative environmental effects is required (*i.e.,* there is potential for substantive interaction) for that specific Project-related environmental effect that overlaps with those of other projects or activities that have been or will be carried out. The residual cumulative environmental effects of the Project in combination with other projects or activities that have been or will be carried out were then evaluated, including the contribution of the Project to those cumulative environmental effects (as applicable).

1.9.1.6 Determination of Significance

The significance of project-related and cumulative environmental effects, were determined, in consideration of the significance criteria. The significance determination for project-related environmental effects is based on significance criteria that reflect a variety of considerations based on direction, magnitude, geographic extent, duration, frequency, reversibility, and ecological/socioeconomic context) and other relevant considerations.

Where the environmental effects are determined to be significant, there is further consideration of the likelihood of occurrence of that significant environmental effect, based on past experience and the professional judgment of the Study Team.

1.9.2 Methodology

1.9.2.1 Baseline Data Collection

The baseline data collection involved conducting biophysical and socio-economic baseline surveys by Environmental Expert and Sociologist, respectively. The baseline surveys involved collection of both primary data through field work and secondary data through reviews of relevant documents from various sources, including internet websites.

Biophysical surveys involved recording of any significant features and land use along the road corridor with a width about 60 m. Socio-economic survey involved interviews with relevant stakeholders. Whenever necessary, during the survey some photographs were also being taken for illustrations.

1.9.2.2 Stakeholder Consultations

The term 'stakeholder consultation', in this study means 'consultations with interested parties' or with 'affected parties', whether directly or indirectly, positively, or negatively. The purpose of stakeholder consultation is to obtain their concerns and feedback to improve the project design and help the project proponent to identify and mitigate any potential adverse impacts. The consultation process involved face to face interviews with Ward and Mtaa Government Officials and conducting stakeholder consultation meetings with local community members of

the wards/streets ("mitaa") traversed by the road section. Before commencement of the consultation meeting the Sociologist appointed two persons among the local community members to take minutes of the consultation meetings. In addition, the interviewed officials and local community members were asked to write their names, signatures, and phone numbers on a special stakeholder consultation form.

1.9.2.3 Identification and Assessment of Impacts

The identification of impacts was based on the interaction between the project related activities and Valued Environmental Component (VECs) for each project phase (i.e., mobilization or pre-construction phase, construction phase, operation phase and demobilization phase).

The identified impacts were then assessed by using Environmental Impact Assessment Matrix. The assessment of impacts helped to determine the significance of impacts by considering the following factors:

- **Importance** of Effects/Impacts – whether important to national/International interest, national/regional interest, areas immediately outside local conditions, or important only to local conditions (site specific).
- **Magnitud**e of Effects/Impacts – whether Positive/Negative (Major, Moderate, Minor) or No change.
- **Duration of** Effects/Impacts –whether Permanent or Temporary.
- **Reversibility** of Effects/Impacts – whether Reversible or Irreversible.
- **Cumulative** Effects/Impacts – whether Cumulative of Not Cumulative.

The assessment of impacts also took into consideration existing by-laws, national and international environmental standards, legislation, treaties, and conventions that may affect the significance of identified impacts.

These techniques were used in order to have a logical and systematic way of identifying, analysing, and assessing environmental impacts. The techniques also allowed qualitative assessment to be quantitatively recorded and therefore make the assessment of impacts become more objective.

1.9.2.4 Analysis of Alternatives

The analysis of alternatives took into consideration the "No Action" or "No Project" Alternative to demonstrate environmental and social conditions without the project. The analysis of alternatives also considered the following:

- Construction Method Alternatives
- Alternative Pavement Structures
- Alternative Road Alignments

The Multi-Criteria Analysis Method was used for comparison of alternatives, based on technical, economic (techno-economic), environmental and social criteria. The focus was on environmental and social impacts, technical feasibility, and economic viability.

The intention was to select those alternatives with less adverse environmental and social impacts; technically suitable under the local conditions; and with less investment and operational costs.

1.9.2.5 Formulation of Mitigation Measures

This involved formulation of general and specific mitigation, contingency and compensation measures that are technically and economically feasible to avoid or minimize potentially significant adverse environmental effects. In formulating mitigation measures, emphasis has been on how the mitigation measures will help to reduce the environmental impacts. In most

case emphasis has been on avoidance and amelioration[5] rather than compensation or resettlement of people.

1.9.2.6 Preparation of ESMP and Monitoring Plan

The Environmental and Social Management Plans (ESMP) has been prepared to describe how project activities might impact on the environment in which it occurs and set out clear commitments on how those impacts will be avoided, minimised, and managed so that they are environmentally acceptable. The ESMP specifies institutional roles and responsibilities for implementation at each project phase and provides cost estimates for implementation of mitigation measures.

The monitoring plan has been prepared to verify the predictions of the EIA and/or the effectiveness of mitigation. The monitoring plan has been described in sufficient detail to allow Independent judgment as to the likelihood that it will deliver the type, quantity and quality of information required to reliably verify predicted environmental effects (or absence of them), and to confirm both the EIA predictions and/or the effectiveness of mitigation measures.

1.10 The ESIA Study Duration and Limitations

The details on the ESIA activities, submission of reports and overall duration of the ESIA study is provided in **Table 1-1** below. The table indicates the overall duration of the ESIA study is estimated to be 547 days (18 months). This does not include the time spent on the review and approval process by TANROADS and NEMC.

The major limitation to the study is the lack of recent socio-economic baseline information from the project area. Therefore, it was necessary rely on the Socio-economic Profiles and National Population Census Report of 2022 and recent Socio-economic profiles for the Municipalities.

Table 1-1: Conducted ESIA Activities, Submissions and Duration.

S/n	Activities	Start Date	Finish Date	Submission Letter Ref. No.	Duration (Days)
1.	Conducting Kick-Off Meeting.	5/06/2020	5/06/2020	-	1
2.	Conducting Reconnaissance Survey and Preparation of Inception Report.	13/06/2020	16/07/2020	-	42
3.	Submission of Draft Inception Report.	16/07/2020	-	CL/TRD-HQ/2020/ C/56/04	-
4.	Receiving Comments from TANROADS on Draft Inception Report.	28/07/2020	-	TRD/D/GEN/P.565/ Vol.01/8.	-
5.	Preparation of Revised Inception Report.	28/07/2020	05/10/2020	-	66
6.	Submission of Revised Inception Report to TANROADS.	5/10/2020	-	TRD/HQ/1045/ 2019-2020/C/09	-
7.	Approval of Revised Inception Report by TANROADS.	21/10/2020	-	TRD/D/GEN/ P.565/Vol.01/15.	-
8.	Preparation of Draft Scoping Report and	22/08/2020	10/12/2020	-	77

[5]According to dictionary definition, "A**meliorate"** means to make it better or become better, more tolerable (bearable), or more satisfactory.

S/n	Activities	Start Date	Finish Date	Submission Letter Ref. No.	Duration (Days)
	Terms of Reference (TOR).				
9.	Submission of Draft Scoping Report and TOR	11/12/2020	-	TRD/HQ/1045/2019-2020/11	-
10.	Receiving Comments on Scoping Report and TOR from TANROADS.	05/01/2021	-	TRD/D/GEN/P.565/ Vol. 01/16	-
11.	Preparation of Revised Scoping Report and TOR	06/01/2021	04/02/2021	-	28
12.	Submission of Revised Scoping Report and TOR to TANROADS.	04/02/2021	-	TRD/HQ/1045/2019-2020/C/14	-
13.	Approval of Scoping Report and TOR by NEMC.	27/04/2021	-	EC/EIA/2021/9377	-
14.	Conducting ESIA Study and Preparation of Draft ESIA Report	28/04/2021	21/12/2021	-	229
15.	Submission of Draft ESIA Report to TANROADS.	22/12/2021	-	TRD/HQ/1045/ 2019-2020/C/13	-
16.	Submission of Revised Draft ESIA Report to NEMC through TANROADS.	17/03/2022	-	TRD/HQ/1045/ 2019-2020/C/21	-
17.	Receiving Comments from WB and Preparation of Revised Draft ESIA Report.	14/04/2022	-	E-mail correspondence	
	Receiving Additional Comments from WB on the Revised Draft ESIA Report	16/05/2022	-	E-mail correspondence	
18.	Receiving Comments from NEMC on Revised Draft ESIA Report.	13/06/2022	-	EC/EIA/2021/ 9377	-
19.	Preparation of Final ESIA Report	14/06/2022	28/09/2022	-	104
				Total:	**547**

1.11 The Report Format

The preparation of this ESIA report has been carried out in accordance with the requirements of Sub-regulation 18(1), 18(2) and 18(3) of the Environmental Impact Assessment and Audit Regulations (2005). The table of concordance with Sub-regulation 18(1) indicating the sections of the ESIA report where the requirements of Sub-regulation 18(1) has been addressed is provided in **APPENDIX 3.**

The report is divided into two main parts, whereby Part I is Executive Summary and Part II is the Main Text. The main text is comprised of 13 Chapters, whereby Chapter One is Introduction, followed by Project Background and Description in Chapter 2.

Chapter 3 deals with Policy, Legal and Institutional Framework, followed by Description of Environmental Baseline Conditions in Chapter 4

The Stakeholder Consultations and Public Participation is provided in Chapter 5, which is followed by Assessment of Impacts and Analysis of Alternatives in Chapter 6. In Chapter 7, the report outlines Environmental Mitigation Measures, followed by Chapter 8 which outlines the Environmental and Social Management Plan (ESMP); which is immediately followed by Environmental Monitoring Plan in Chapter 9.

The report provides Resources Evaluation and Demobilization Plan in Chapter 10 and Chapter 11, respectively. Finally, the report ends up with Summary and Conclusion in Chapter 12, which is followed by References in Chapter 13 and Appendices.

2.0 PROJECT DESCRIPTION

2.1 Location

The proposed BRT Project is located within the Dar Es Salaam City Council, Kinondoni and Ubungo Municipal Councils of the Dar Es Salaam Region. The maps showing the location of Dar Es Salaam Region and Ilala City, and Kinondoni and Ubungo Municipalities are provided in **Figure 2-1, Figure 2-2,** and **Figure 2-3,** respectively.

The BRT Phase 4 Project is comprised of two road corridors:

- Bibi Titi Mohamed-Ali Hassan Mwinyi-Bagamoyo Road Corridor, which starts from Maktaba Street (km 0+000) to Tegeta-DAWASA Depot (km 24+570).
- Sum Nujoma Road Corridor, which starts from Mwenge (Bagamoyo Road/Coca Cola Road (km 0+000) to Simu 2000 at km 3+150. The map showing the location of the two BRT Road Corridors is provided in **Figure 2-4.**

The project involves construction of BRT Infrastructure Systems, which is comprised of about 30.12 Km Roads. These include (i) A Section Bibi Titi Mohamed Road from Maktaba Street junction to Ohio Street junction (0.23km); (ii) Ali Hassan Mwinyi road (from the junction of Ohio Street to Morocco) (5.92 km); (iii) New Bagamoyo Road from Morocco junction to Tegeta (DAWASA Daladala Bus Station) (20 km); and A spur on Sam Nujoma Road from its junction with New Bagamoyo Road to Simu 2000 (3.2 km).

In addition, the project includes other components such as Bus Terminal, Feeder Bus Terminal, Park and Ride complexes, Depot and Bus stations, The BRAT phase 4 is also provided with critical intersections at the junctions between Bagamoyo Road and Kawawa Road (km 5+100)) and between Bagamoyo Road and Sam Nujoma Road (km 9+400).

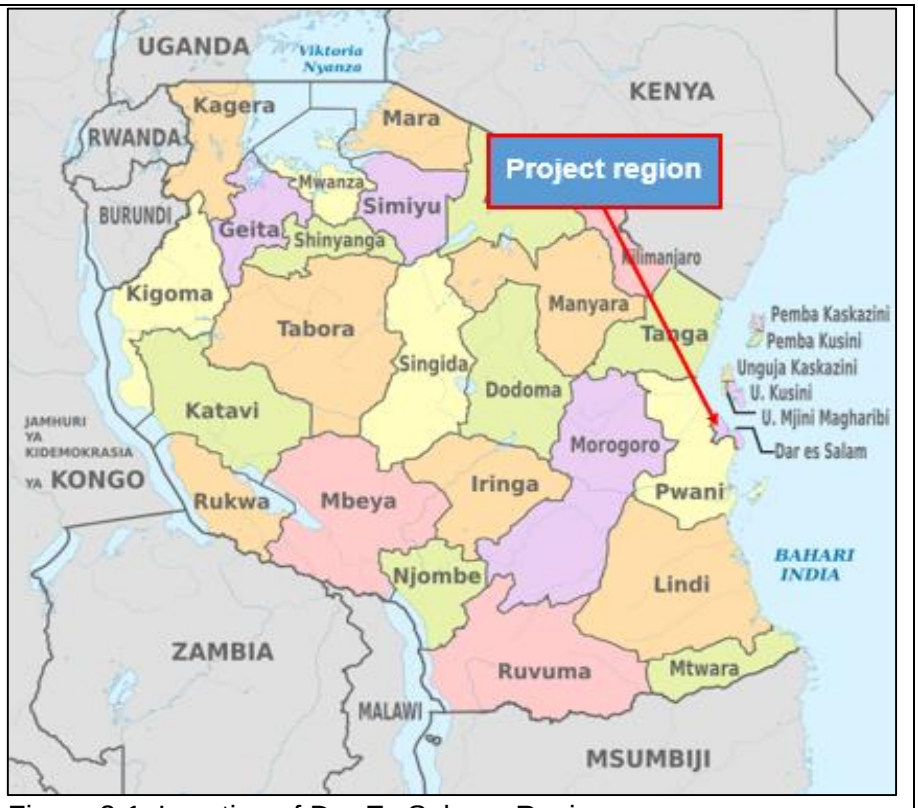

Figure 2-1: Location of Dar Es Salaam Region.

Source: https://sw.wikipedia.org/wiki/Picha:Tanzania,_administrative_divisions_-_sw_-_colored.svg

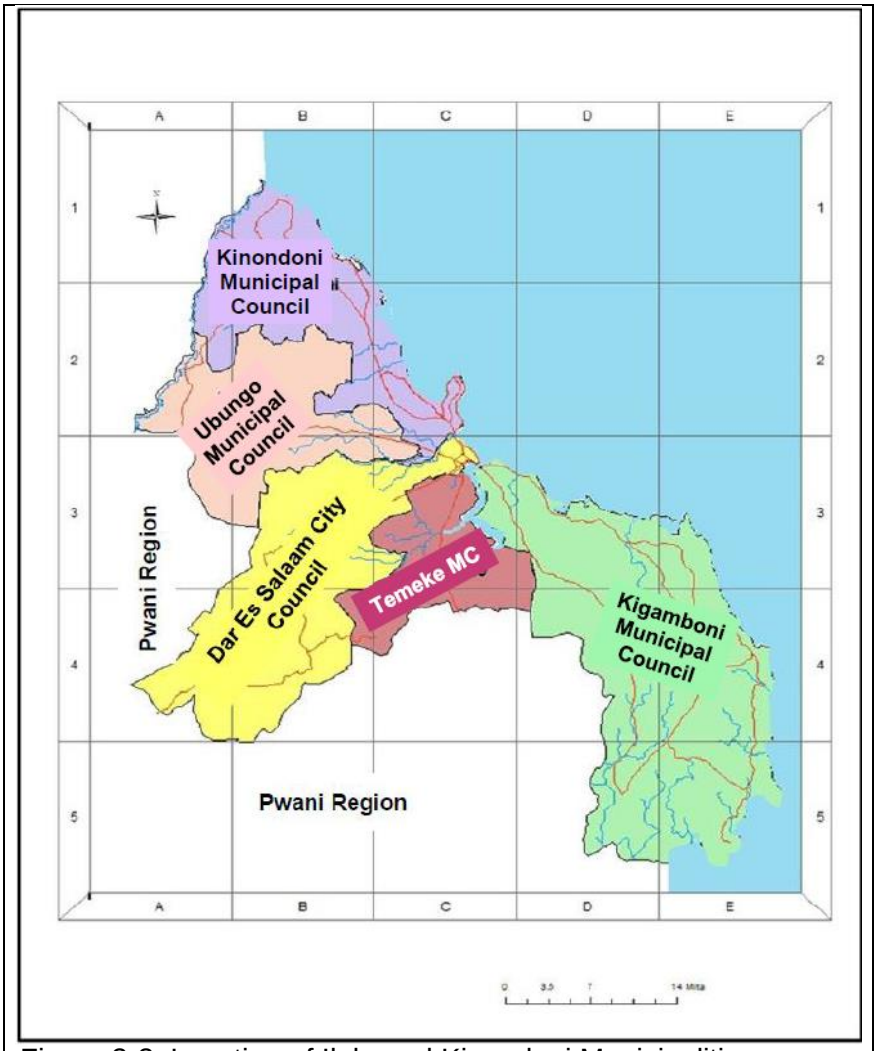

Figure 2-2: Location of Ilala and Kinondoni Municipalities.
Source: http://www.dcc.go.tz/city-profile

Figure 2-3: Location of BRT Phase 4 Road Corridors.

2.2 Project Boundaries

2.2.1 Spatial Boundaries

The spatial boundaries of the project environment have been divided into Project Development Area (PDA), Local Assessment Area (LAA), and Regional Assessment Area (RAA). The spatial boundaries of the project environment are illustrated in **Figure 2-4.**

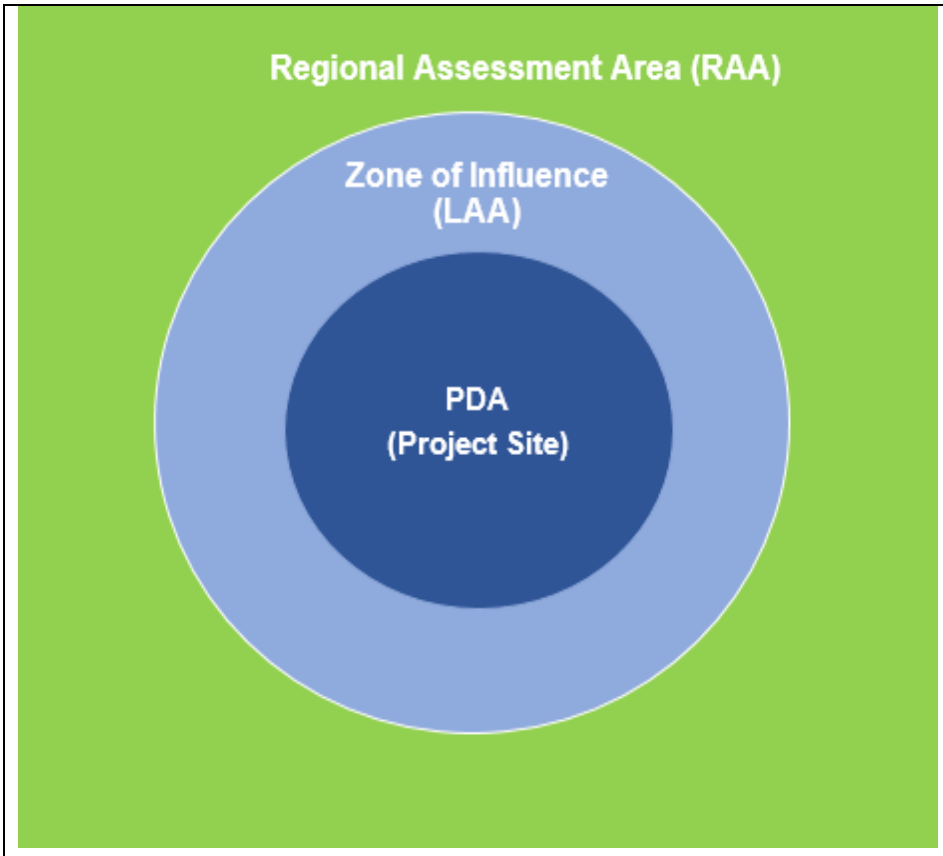

Figure 2-4: Spatial boundaries of the Project Environment.

(a) Project Development Area (PDA)

The Project Development Area (PDA) is the most basic and immediate are of the Project. The PDA is limited to the anticipated area of the physical disturbance associated with the Construction and Operation of the Project. For this Project, the PDA consists of the areas occupied by Road Corridors; Bus Terminals; Depots; and Car Park and Ride Buildings. The total area to be occupied by the Road Corridors is estimated to be about 1,645,220 Square Metres (SQM); and the total area to be acquired for construction of Bus Terminals, Depots and Car Park and Ride Buildings is estimated to be 97,920.02 SQM.

Therefore, the total area to be occupied by the PDA can be estimated to be more than 1,743,140.02 SQM. Note that the Bus Stop Areas are included in the area occupied by the Road Corridors.

(b) Local Assessment Area (LAA)

The Local Assessment Area (LAA) is the maximum area within which Project-related environmental effects can be predicted or measured with a reasonable degree of accuracy and confidence. The LAA is commonly referred to as the “Zone of Influence” of the Project and may include areas that could experience Project environmental effects that arise beyond the area of physical disturbance by the Project.

The LAA includes the PDA and any adjacent areas to the road section, where Project-related environmental effects may reasonably be expected to occur. The definition of LAA varies from one VEC to another, depending on the local conditions, biological characteristics, socio-economic factors, cultural values, and other factors.

(c) Regional Assessment Area

The Regional Assessment Area (RAA) is the area within which the Project's environmental effects may overlap or accumulate with the environmental effects of other projects or activities that have been or will be carried out such that cumulative environmental effects may potentially occur. The RAA are defined for each VEC depending on the physical and biological conditions and the type of and location of other past, present, or reasonably foreseeable projects or activities that have been or will be carried out

2.2.2 Temporal Boundaries

The temporal boundaries of the project refer to timing and duration of Project. The temporal boundaries of the project consist of the durations for mobilization, construction, and demobilisation phases of the project. In addition, the temporal boundaries are the design periods of the road pavement and its associated bridges and other drainages structures.

The following are the temporal boundaries of the project during mobilization, construction, and demobilisation phases:

Activities	Duration
Mobilization phase:	1 month
Construction phase:	3 Years[6]
Demobilization phase:	1 month
Operation phase:	40 years for Concrete Pavement[7]

The Decommissioning Phase of the project is not expected to occur so long as the need for BRT infrastructure continues. Instead, the BRT infrastructure will continue to be undergoing regular maintenance and improvement depending on the future requirements.

2.2.3 Institutional Boundaries

Institutional boundaries for the project refer to various institutions, government agencies, and local government authorities that are relevant to the project implementation. The institutional boundaries for implementation of the Project are illustrated in **APPENDIX 4.** It specifies the roles and responsibilities of each institution for environmental management at national, regional, district, and ward level. The following are the relevant institutions for implementation of this project:

- Ministry of Works (MoW)
- Tanzania National Roads Agency (TANROADS)
- Dar Es Salaam Rapid Transit Agency (DART Agency)
- Division of Environment (VPO-DOE)
- National Environment Management Council (NEMC)
- Regional Level
- Tanzania National Roads Agency (TANROADS) –Dar Es Salaam Regional Manager
- Municipal Level
- Dar Es Salaam City Council (DCC), Ubungo Municipal Council (UMC) and Kinondoni Municipal Council (KMC)
- Ward / Mtaa Level

[6] This is according to The World Bank Report No: PAD1464. http://documents1.worldbank.org/curated/en/794251489201242940/pdf/TZ-PAD-02162017.pdf

[7] THE IMPLICATIONS OF CLIMATE CHANGE ON ROAD INFRASTRUCTURE PLANNING, DESIGN AND MANAGEMENT By Paul Youman, GHD. https://www.coastalconference.com/2007/papers2007/Paul%20Youman.pdf

- Ward and Mtaa Development Committees

2.3 Description of the Road Corridors

The total length of BRT Phase 4 Road Corridor is about 30.12 Km, which is comprised of:

- Bibi Titi Mohamed - Ali Hassan Mwinyi - New Bagamoyo Road Corridor (24.57 km)
- Sam Nujoma Road Corridor (3.150 km)

2.3.1 Bibi Titi Mohamed-Ali Hassan Mwinyi Road Section (0.23km)

This corridor starts at Maktaba Street Junction at km 0+000 and runs towards north-east to Ohio Street Junction at km 0+240**.** The road section is comprised of dual carriage way with two lanes separated by a median**.**

2.3.2 Ali Hassan Mwinyi-New Bagamoyo Road (5.92 km)

The road section starts from the Ohio junction and runs towards north-west, ending up at Morocco/Old Bagamoyo Road Junction. The road section is comprised of dual carriage way with two lanes**.** The road crosses the Msimbazi River Creek through Selander Bridge at km 2+000.

There is mangrove vegetation on the upstream and downstream side of the bridge. The mangrove vegetation is considered as sensitive area under Section 2 of the Forest Act No. 14 of 2002, hence the need to make consultation with Tanzania Forest Services (TFS) Agency before commencement of construction works.

2.3.3 New Bagamoyo-Tegeta Road Section (20 km)

The road section starts at Morocco junction and runs towards north-west to Tegeta, ending up at the junction of access road to DAWASA Depot at km 24+570**.** From Km 0+000 to km 19+500 the road is comprised of two lanes double carriage and from km 19+500 to 24+570 the road is comprised of single carriage way with two lanes**.**

The existing Mwenge to Tegeta corridor may trigger some compensation issues due to being narrower that the required width for BRT. The road corridor has been invaded by small business operators in such a way that some of them are carrying out their business over storm water drainages.

The road section has eight (8) major junctions (Rose Garden and Kaijage roads junctions, Shekilango road junction, Sum Nujoma and Coca Cola roads junctions, Old Bagamoyo road junction, Goba road junction, Mwai Kibaki road junction, Salasala road junction, and Wazo Hill road junction) provided with traffic lights. The road section has two bridges crossing the river at Lugalo Barracks and the other near Bondeni Bus Stop all the rivers are discharging water to the Indian Ocean. Like other roads in the city, this also is being faced with traffic congestion during peak hours.

2.3.4 Sam Nujoma Road–Mwenge Road Corridor (3.150 km)

This road corridor starts from km 0+000 at the junction of access road to SIMU 2000 Bus Terminal and runs towards north-east to Mwenge at the junction of Bagamoyo Road and Coca Cola Road at km 3+700. The road is comprised of dual carriage way with two lanes with planted grass in the median, and intercepted by two roundabouts, the University Road Roundabout (R/A) at km 1+96 and Afrika Sana R/A at km 2+830.

The road linking with the ongoing construction of BRT Phase 3 from SIMU 2000 to Ubungo flyover. The road is provided with storm water drainage (both open and closed), paved walkway on both sides, and service road on other areas with traffic lights. Like other roads in the city, this road is also faced with traffic congestion during peak hours.

2.3.5 Major Junctions and Crossings

The inventory of major road junctions along Bibi Titi Mohamed-Ali Hassan Mwinyi-New Bagamoyo Road Corridor and Sam Nujoma Road Corridor is provided in **APPENDIX 5** and **APPENDIX 6,** respectively. The inventory shows there are 93 identified major junctions along Bibi Titi Mohamed-Ali Hassan Mwinyi-New Bagamoyo Road Corridor and 21 identified major junctions along Sam Nujoma Road Corridor. These major junctions and interchanges will be taken into consideration during preparation of traffic management plan.

2.3.6 Bust Stops along the Road Corridors

The inventory of existing bus stops indicates Bibi Titi Mohammed-Ali Hassan Mwinyi-New Bagamoyo Road Corridor has 28 Bus Stops and Sam Nujoma Road Corridor has been found to have 5 Bus Stops. The locations of bus stop along Bibi Titi Mohamed-Ali Hassan Mwinyi-New Bagamoyo Road Corridor and Sam Nujoma Road Corridor are provided in **Table 2-1** and **Table 2-2**, respectively.

However, this inventory has not taken into consideration informal bus stops, which are very important for identification of traffic related impacts. All informal bus stops will be identified during the detailed study.

Table 2-1: Location of Bus Stops along Bibi Titi-Bagamoyo Road Corridor.

S/n	Name of Bust Stop	Chainage	UTM Coordinates
1.	Aga Khan Bus Stop	0+850 on LHS	531619.55 m E * 9247798.20 m S
2.	Palm Beach	1+600 on LHS	531226.22 m E * 9248424.37 m S
3.	Mbuyuni Bus Stop	3+940 on RHS	530225.42 m E * 9250523.29 m S
4.	Mbuyuni Bus Stop	4+100 on LHS	530081.83 m E * 9250592.25 m S
5.	Morocco Bus Stop	5+000 on RHS	529245.32 m E * 9250883.74 m S
6.	Morocco Bus Stop	5+000 on LHS	529237.50 m E * 9250863.67 m S
7.	Victoria Bus Stop	6+370 on LHS	527897.18 m E * 9250729.42 m S
8.	Science Bus Stop	7+810 on LHS	526591.35 m E * 9251314.31 m S
9.	Bamaga Bus Stop	8+170 on RHS	526313.16 m E * 9251549.94 m S
10.	Bamaga Bus Stop	8+310 on LHS	526196.56 m E * 9251628.34 m S
11.	ITV Bus Stop	9+160 on RHS	525726.68 m E * 9251994.43 m S
12.	Mwenge Bus Stop	9+280 on LHS	525416.42 m E * 9252198.80 m S
13.	Makongo Bus Stop	10+590 on LHS	524728.64 m E * 9253296.64 m S
14.	Makongo Bus Stop	10+820 on RHS	524645.99 m E * 9253510.39 m S
15.	Lugalo Bus Stop	12+010 on RHS	524171.93 m E * 9254598.52 m S
16.	Bondeni Bus Stop	12+860 on RHS	523951.27 m E * 9255389.60 m S
17.	Tanki Bovu Bus Stop	13+710 on RHS	523759.05 m E * 9256218.66 m S
18.	Goig Bus Stop	14+540 on RHS	523515.78 m E * 9257023.94 m S
19.	Makonde Bus Stop	15+170 on RHS	523337.71 m E * 9257616.00 m S
20.	Interchick Bus Stop	15+580 on RHS	523224.56 m E * 9257984.39 m S
21.	Jogoo Bus Stop	15+950 on RHS	523129.03 m E * 9258323.21 m S
22.	Afrikana Bus Stop	16+980 on LHS	522888.51 m E * 9259328.10 m S
23.	Mbuyuni Bus Stop	18+320 on RHS	522563.17 m E * 9260646.97 m S
24.	Chanika Bus Stop	22+810 on RHS	519793.81 m E * 9264214.32 m S
25.	Chanika Njia Panda Bus Stop	23+000 on LHS	519671.25 m E * 9264336.73 m S
26.	Namanga Bus Stop	23+240 on RHS	519509.38 m E * 9264518.17 m S
27.	Tegeta Nyaishozi Bus Stop	23+880 on LHS	519081.13 m E * 9264985.54 m S
28.	DAWASA Bus Stop	24+570 on RHS	518605.35 m E * 9265510.15 m S

Table 2-2: Location of Bus Stops along Sam Nujoma Road Corridor.

S/n	Name of Bust Stop	Chainage	UTM Coordinates
1.	Kivulini Bus Stop	1+350 on RHS	524207.89 m E * 9250916.90 m S
2.	Kivulini Bus Stop	1+420 on LHS	524204.75 m E * 9251000.21 m S
3.	Mlimani Bus Stop	1+770 on LHS	524413.70 m E * 9251271.06 m S
4.	Lufungila Bus Stop	2+210 on RHS	524715.70 m E * 9251607.01 m S
5.	Lufungila Bus Stop	2+240 on LHS	524709.69 m E * 9251644.99 m S

2.4 Adjacent Land Use and On-gong Activities

2.4.1 New Bagamoyo Road Corridor (24.57 km)

The designated land use by the municipal authority is mainly commercial and institutional within the Central Business District (CBD) dominated by multi-storey buildings. However, as you move towards Tegeta the designated land use becomes dominated by mixture of residential, institutional, and commercial, whereby the road corridor become dominated by ordinary buildings.

The planted ornamental /shade trees and grass are common along the road and sometimes in the median**.** There is a Baobab tree with a circumference of about 15 m in the median along the New Bagamoyo Road at km 3+800 **(Photo No. 2.4-1).**

The Baobab Tree is being used by the local people as a sacred site. The Baobab Tree will be affected by the project because it will have to be removed from the road. Therefore, there will be a need to make consultation with local people before commencement of the construction works. The important on-going activities along the road corridor include flower gardens, small business operations **(Photo No. 2.4-2)** and Bodaboda / Bajaj Parking **(Photo No. 2.4-3)**. These activities are likely to be affected during the road construction.

Photo No. 2.4.1- 1: Baobab Tree (15 m circumference) at km 3+800 in the medina.

Photo No. 2.4.1-2: Small Business Operation at km 0+080 on the LHS.

Photo No. 2.4.1- 3: Baja and Bodaboda Parking at km 19+500 on the RHS.

2.4.2 Sam Nujoma Road Corridor (3.150 km)

The road passes through institutional, commercial, and residential land use. The road corridor is comprised of planted ornamental / shade trees, flowers, and grass and sometimes in the median**.** The adjacent on-going activities include small business operations **(Photo No. 2.4.2-1),** growing and selling of tree seedlings **(Photo No. 2.4.2-2),** selling of flower pots **(Photo No. 2.4-12),** and parking of Bajaj and Bodaboda adjacent to Bus Bays **(Photo No. 2.4-13).** All these activities are likely to be affected during the road construction.

Photo No. 2.4.2-1: Small business operations at km 2+700 on the RHS.

Photo No. 2.4.2-2: Growing and selling of tree seedlings at km 1+200 on the LHS.

Photo No. 2.4.2-3: Selling of Flower Pots at km 1+200 on the LHS.

Photo No. 2.4.2-4: Bajaj and Boda-Boda Parking at km 2+700 on the LHS.

2.5 DAWASA Bus Terminal / Depot at Tegeta

The proposed site is located at Tegeta, on the western side of the existing DAWASA Depot **(Photo No. 2.5-1** and **Photo No. 2.5-2).** The area is accessible by gravel road from the Bagamoyo Road **(Photo No. 2.5-3** and **Photo No. 2.5-4).** The total area to be acquired is estimated to be about 37,220 Square meters (m^2). The map showing the location of DAWASA Bus Terminal is provided in **Figure 2-5** and its boundaries are defined by the following UTM Coordinates:

- A (518340.05 m E * 9265811.71 m S)
- B (518576.05 m E * 9266018.88 m S)
- C (518634.11 m E * 9265966.88 m S)
- D (518677.71 m E * 9265953.68 m S)
- E (518750.02 m E * 9265873.87 m S)
- F (518500.74 m E * 9265636.06 m S)

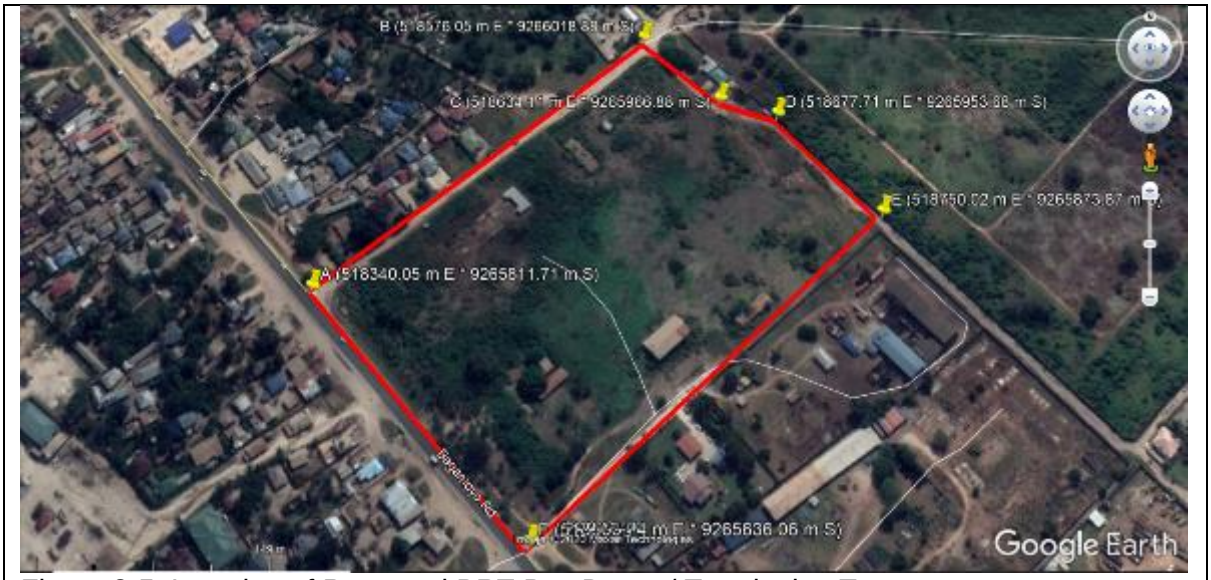

Figure 2-5: Location of Proposed BRT Bus Depot / Terminal at Tegeta.

The important features in the area include a flower garden flower garden and electricity power poles **(Photo No. 2.5-5)**, unoccupied building **(Photo No. 2.5-6)**, Otherwise the rest of the land area is covered by planted trees, grass and herbs **(Photo No. 2.5-7).** The topography of the area is characterized by a flat terrain, which is prone to flooding during rainy seasons.

Photo No. 2.5-1: DAWASA Depot Premises on the Eastern Side of BRT Terminal.

Photo No. 2.5-2: Signboard showing the location of DAWASA Depot.

Photo No. 2.5-3: View from the Junction along Access Road to DAWASA Depot.

Photo No. 2.5-4: Access Road on the eastern boundaries of Depot Area.

Photo No. 2.5-5: Flower Garden and Electricity Power Poles in the Proposed Site for Car Park and Ride Buildings.

Photo No. 2.5-6: Northern Boundaries of the Proposed Sire for Car Park and Ride Buildings (See Arrow) and Unoccupied Building in the foreground.

Photo No. 2.5-7: Planted Trees and Grass on the Proposed Site for Car Park and Ride Buildings.

2.6 Proposed Areas for Car Park and Ride Buildings

2.6.1 Mlalakua Car Park and Ride Buildings

The Site Plan and Surrounding Environment of Mlalakua Car Park is provided in **Figure 2-6.** The site has replaced the mwenge site, the proposed site is owned by to people as shown in the figure 2-6, but most of the huge area is dominated by one people. The proposed car park will have a total of about 335 parking slots, with the following specifications:

- Total Site Area = 8,485 m^2
- Built-Up Area = 4,200 m^2
- Gross Floor Area = 21,000 m^2
- Plot Coverage = 26%
- Plot Ratio = 1.3

The Site Layout of Mlalakua Car Park and Ride Building is provided in **APPENDIX 7.**

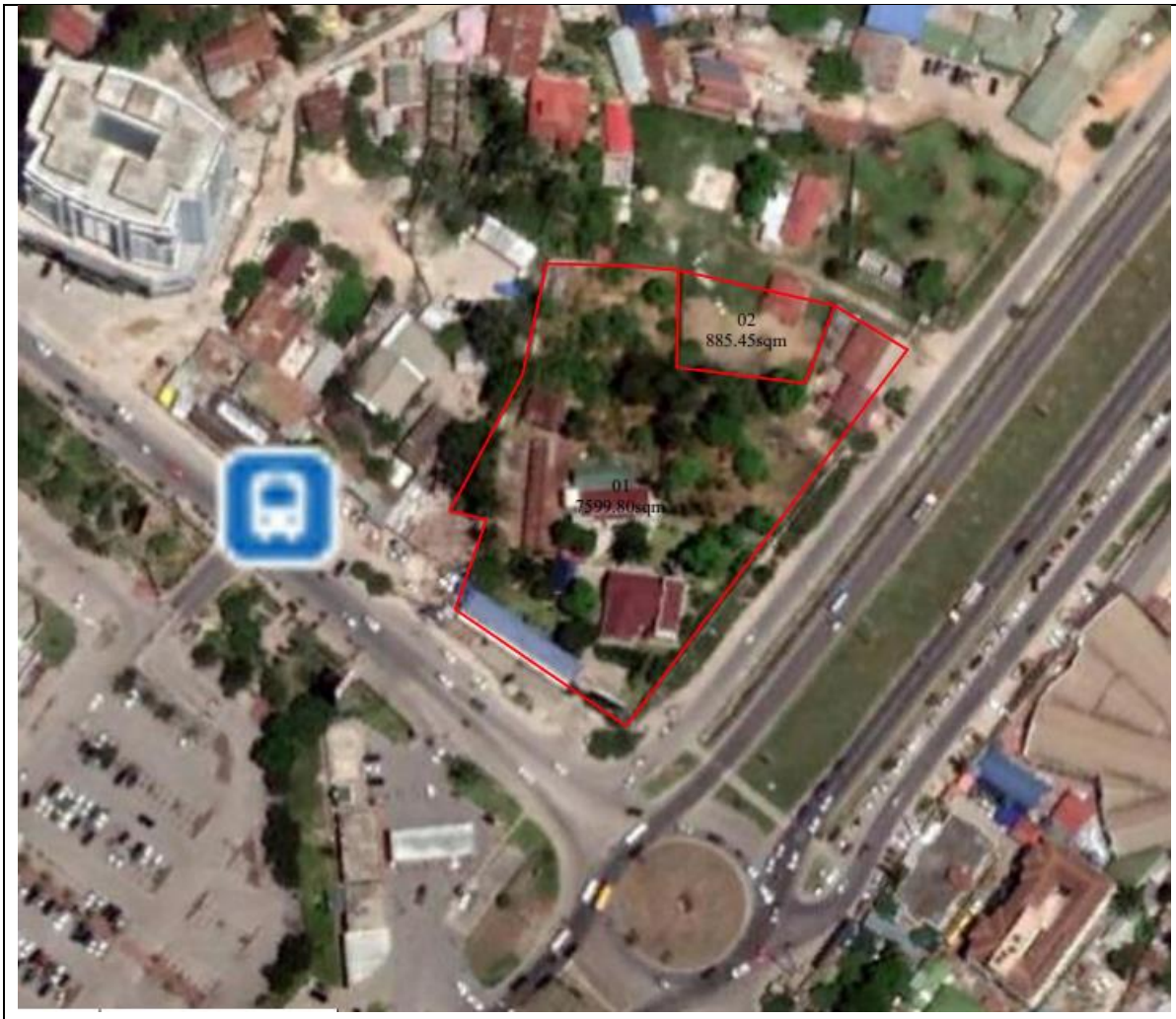

Figure 2-6: Mlalakua Car Park Site Plan and Surrounding Environment.

2.6.2 GOIG Car Park and Ride Buildings

The Site Plan and Surrounding Environment of GOIG Car Park is provided in **Figure 2-7**[8]. The Site Layout of GOIG Car Park and Ride Buildings is provided in **APPENDIX 8.**

[8] Consultancy Services for Detailed Engineering Design, Preparation of Bidding Documents the Dar es Salaam Bus Rapid Transit (BRT) Infrastructure – phase 4 (phase Ⅰ). (Contract No. TRD/HQ/1087/2018/19). PARK AND RIDE CONCEPT DESIGN DRAWINGS. (DRAFT DETAIL ENGINEERING DRAWINGS). JUNE, 2020. By Kunhwa Engineering & Consulting Co. Ltd, Dongsung Engineering Co. Ltd, Seoul Hosing & Communities Corporation, and AQGOLA Engineering & Management Services Ltd.

Figure 2-7: GOIG Car Park Site Plan and Surrounding Environment.
Source: PARK AND RIDE CONCEPT DESIGN DRAWINGS By Kunhwa Engineering & Consulting Co. Ltd[9].

2.6.3 Boko-Basihaya Car Park and Ride Buildings

The Site Plan and Surrounding Environment of Boko-Basihaya Car Park is provided in **Figure 2-8.** The plot area to be compensated is estimated to be about 37,220 m^2. The parking will have a total of 273 parking slots, with a total area of about 37,220 m^2. The Site Layout of Boko-Basihaya Car Park and Ride Building is provided in **APPENDIX 9.**

Figure 2-8: Boko Basihaya Site Plan and Surrounding Environment.
Source: PARK AND RIDE CONCEPT DESIGN DRAWINGS By Kunhwa Engineering & Consulting Co. Ltd[10].

2.7 Project Components

According to the Design Report[11], the BRT infrastructure consists of the following major components:

- Busway infrastructure;
- Mixed traffic infrastructure;

[9] Ibid.

[10] Ibid.

[11] Consultancy Services for Detailed Engineering Design, Preparation of Bidding Documents for the Dar es Salaam Bus Rapid Transit (BRT) infrastructure – Phase 4 (Phase I); (Contract No. TRD/HQ/1087/2018/19). Draft Detailed Engineering Report. (DRAFT DETAIL DESIGN REPORT). October, 2020. By Kunhwa Engineering & Consulting Co. Ltd.

- Stations;
- Intermediate transfer stations;
- Terminals;
- Depots;
- Control centres;
- Traffic control signals;
- Integration infrastructure;
- Park and ride facilities;
- Landscape; and
- Public utilities.

2.8 Geometric Design

2.8.1 Road Classification

The BRT Phase 4 Road Section have been classified as Trunk Roads as shown in the Table below. The minimum design criteria of these roads' sections in accordance with the RGDM, based on the above classification, are discussed below.

Road Section	Road Number	Classification
A section of Bibi Titi Mohamed Road from Maktaba Street junction to Ohio Street junction (0.23km).	T24	Trunk Road
Ali Hassan Mwinyi road (from the junction of Ohio Street to Morocco) (5.92 km).	T26	Trunk Road
New Bagamoyo Road from Morocco junction to Tegeta (DAWASA Daladala Bus Station) (20 km);	T26	Trunk Road
A spur on Sam Nujoma Road from its junction with New Bagamoyo Road to Ubungo junction (4 km).	T25	Trunk Road

2.8.2 Design Class and Dimensions

Road design classes are dependent of traffic volume AADT (veh/day) in the design year and function class. According to the Traffic volume (>8000 veh/day)) expected for the design period of 20 years for each road section the road sections fall within Design Class 1 (DC 1).

The road sections have been designed as dual carriageway roads with the following dimensions:

Design class	Surface	Road reserve width [m]	Roadway width [m]	Carriageway			Shoulder width [m]	Median width [m]
DC1	Paved	60	28-31	Width (m)	Lane (m)	Number of Lanes	2x2.5	9-12
				2x7.0	3.5	4		

2.8.3 Terrain

The terrain classification can be defined in the following cross slope ranges:

- Flat terrain: ≤ 10%
- Rolling terrain: > 10% and < 25%
- Hilly terrain: 25% to 60%
- Mountainous: > 60%

The BRT Road sections generally traverse in two terrain categories as shown in the table below

Road Section Name	Terrain

Bibi Titi Mohamed Road from Maktaba Street junction to Ohio Street junction (0.23km).	Flat
Ali Hassan Mwinyi road (from the junction of Ohio Street to Morocco) (5.92 km).	Flat
New Bagamoyo Road from Morocco junction to Tegeta (DAWASA Daladala Bus Station) (20 km);	Flat/Rolling
A spur on Sam Nujoma Road from its junction with New Bagamoyo Road to Ubungo junction (4 km).	Flat

2.8.4 Design Speed

The road sections are classified as Design Class 1 roads, a typical desirable design speed for a road of this nature is 120km/h in flat terrain. The desirable and minimum design speeds related to the design class versus type of terrain, are provide in Table below.

Design Class	Carriageway Width	Recommended design speed (km/hr)			Minimum design speed (km/hr)		
1	2 x 7.0	Flat to rolling	Rolling to hilly	Mountainous	Flat and rolling	Rolling to hilly	Mountainous
		120	90	70	120	90	70

2.8.5 Design Vehicle

Two vehicles have been recommended for use in the design of the proposed roads. The passenger car has been used for speed-related standards and the bus for standards relating to manoeuvrability, typically at intersections. All geometry and turning movements of the busways shall accommodate an AASHTO BUS-45 design vehicle. The bus also dictates the maximum permissible gradient. Designs, however will be checked to ensure that larger vehicles, such as WB-15 Semi-trailer vehicles, can be accommodated within the total width of the travelled way, even though they may encroach on adjacent or even opposing lanes.

2.9 Design Criteria for BRT Lanes

BRT lanes is the portion of the roadway that buses utilize for their operations. In this project the BRT lanes will be excluded from general traffic mixed lanes. This section establishes the basic criteria to be used for BRT running way design.

2.9.1 BRT Lane Width

Minimum cross-section widths are constrained by the physical width of the bus. Typically, the bus width constraint occurs at the mirror level, where bus mirror to mirror widths can be about 3.35 meters, hence a bus lane width of 3.5 m is recommended for this project. At stations, the lane width at a station platform may be reduced to 3.3 meters, where passing lane is provided.

2.9.2 Right of Way (ROW)

In this project the geometry of BRT Corridor is passing through two types of corridors: “Wider ROW 60m” in which the BRT corridor will be constructed with few limitations in terms of space, direct routes to the desired destinations, and require few if any expropriations. The second type of corridor, a “constrained corridor ROW 30m,” uses routes that are limited in width, located along routes that are not entirely direct and/or are constructed adjacent to or within developed areas. These factors will have a significant influence on the construction cost, convenience and travel time associated with the busway.

2.10 Roadway Geometry

2.10.1 Between Stations

In this project the BRT corridor is designed road-within-an existing road corridor i.e., introducing a two-lane road within the right-of-way of a larger existing road. As such, the geometry of the BRT lanes will almost always follow the geometry of the existing road, except where there is some very specific need for a separate layout. One example of this, is the

proposal at Selander, where the busway cross a major intersection with a grade separation, while the rest of the roadway uses an at-grade intersection.

2.10.2 Station Areas

The geometry of the busway and the surrounding roadway are given careful consideration at and approaching stations. Since the Stations will be located at the middle of the road the bus lanes and the mixed traffic lanes will be realigned to the outside to provide adequate space for the station.

The design of the tapers for this transition will consider the design speed for both the roadway and the busway, and any unique handling characteristics of the buses being used. Consideration will be given to providing an outside overtaking lane (located to the right of the stopping lane), to accommodate multiple services or to improve the overall level of service. This will increase the space required for the station, both laterally to accommodate the extra lane and longitudinally to accommodate the additional taper length for the main roadway.

2.11 Design of Road Sections

2.11.1 Bibi Titi Mohamed Road: Maktaba Street Junction--Ohio Street Jct (0.23km);

At this section BRT phase 4 will be connected to BRT Phase 2, The consultant has already established communication with the BRT Phase 2 consultant on harmonizing the design of the tie-in point.

This section is categorized as Central Business District (CBD) with narrow corridor of about 30m The Existing Road consists of dual carriageway of asphalt concrete, closed drain, curbed earth median ranging from 2m to 2.5m and walkway lane. The major challenges in this stretch are;

- Availability of ROW to Fit the BRT Corridor and NMT facilities
- Proximity of Traffic Signals i.e., short legs between Maktaba and Serena intersections
- Existing Storm Sewer Network
- Access to road side facilities

Cross section Elements Proposed during conceptual stage and detailed design stage are presented in the table below.

Cross section Element	Conceptual Design	Detailed Design	Remarks
Bike Way	NIL	NIL	Space availability
Walkway	3.0m	1.5m	Footpath have been provided with clear width at a height of 200mm from carriageway
Storm Water Drainage	Catch Basin 0.5m	Curb Inlet Drain 1.0m	Gutter drain replaced with Curb Inlet
Mixed Traffic Lanes	3.5m dual carriageway	3.5m dual carriageway	
Median Mix-T/BRT	0.5m	0.5m	
BRT Lane between Stations	3.5m	3.5m	
BRT Lane at Station	NIL	NIL	No station at this section
Median BRT/BRT	1.0m Wide Raised	0.5m Ghost	Allow overtaking

2.11.2 Ali Hassan Mwinyi Road: Ohio Jct-Selander Bridge) (1.30 km).

The Existing Road consists of dual carriageway of asphalt concrete road with 2 lanes of 3.5m on each side, 0.5m closed drain on each side, 3.0m continuous right turn lane separated with charter bars and 3.0m walkway on both sides and a small verge on each side making a total of 30m.

The major challenges in this stretch are;

- Availability of ROW to Fit the BRT Corridor and NMT facilities
- Narrow corridor to allow overtaking at Stations
- Access to road side houses

Cross section Elements Proposed during conceptual stage and detailed design stage are presented in the table below.

Cross section Element	Conceptual Design	Detailed Design	Remarks
Bike Way	NIL	NIL	Space availability
Walkway	3.0m	1.5 m	Footpath have been provided with clear width at a height of 200mm from carriageway
Storm Water Drainage	Catch Basin 0.5m	Curb Inlet Drain 1.0m	Gutter drain replaced with Curb Inlet
Mixed Traffic Lanes	3.5m dual carriageway	3.5m dual carriageway	
Median Mix-T/BRT	0.5m	0.5m	
BRT Lane between Stations	3.5m	3.5m	
BRT Lane at Station	2/1	1	No overtaking lane is provided, mountable curb to be adopted
Median BRT/BRT	1.0m Wide Raised	0.5m Ghost	Allow overtaking

2.11.3 Ali Hassan Mwinyi Road (from Selander Bridge to Morocco) (4.62 km).

This section has a Right of Way (ROW) of 60metres, the existing road cross section is comprised of two types of typical cross sections:
Selander Bridge to ST-Peter Junction
St Peters Junction to Morocco Junction

It is a dual carriageway of asphalt concrete road with 2 lanes of 3.5m on each side, 0.5m closed drain on each side, 3.0m continuous right turn lane separated with charter bars and 3.0m walkway on both sides and a small verge on each side making a total of 30m.

Cross section Elements Proposed during conceptual stage and detailed design stage are presented in the table below

Cross section Element	Conceptual Design	Detailed Design	Remarks
Bike Way/Service Rd	NIL	3.5	The road is passing on commercial plots; hence provision of

Cross section Element	Conceptual Design	Detailed Design	Remarks
			combined bikeway/service road is necessary. Service road will be limited in short segments by Bulbouts
Walkway	3.0m	2.0	Footpath have been provided with clear width at a height of 200mm from carriageway
Storm Water Drainage	Catch Basin 0.5m	Curb Inlet Drain 1.0m	Existing u-shape drains and open drains have been replaced with kerb inlet drain system
Mixed Traffic Lanes	3.5m dual carriageway	3.5m dual carriageway	
Median Mix-T/BRT	0.5m	0.5m	
BRT Lane between Stations	3.5m	3.5m	
BRT Lane at Station	2lanes of 3.5m each	2 lanes of 3.5m each	
Median BRT/BRT	7.0m Wide Raised	0.5m Ghost	This will save space for NMT facilities however it will require relocation of existing drain at the existing median

2.11.4 New Bagamoyo Road from Morocco junction to Mwenge (4.3km)

This section is currently under expansion which is undertaken by MS Nippo-Dai JV Construction Company. This section is widened to four lanes dual carriageway. This section is being constructed in line with the requirements of BRT corridor. The central median reserve is constructed wide enough to accommodate bus lanes and tapers have been provided

at location of bus station so as not to disturb the existing facilities during construction of BRT lanes. Proposed features of the BRT Corridor are shown in the table below

Cross section Element	Conceptual Design	Detailed Design	Remarks
Bike Way	NIL	4.5m to 6.0m	The road corridor between Morocco and Sayansi is narrow cannot fit Bike way. Bike way have been provided from Sayansi Junction to Mwenge.
Walkway	3.0m	2.5	NMT facilities are already under construction

Cross section Element	Conceptual Design	Detailed Design	Remarks
Storm Water Drainage	Catch Basin 0.5m	NIL	Catch basin drainage system is under construction BRT lanes will utilize the same. Open drains from Sayansi to Mwenge will be replaced with curb inlet drain system
Mixed Traffic Lanes	3.5m dual carriageway	3.5m dual carriageway	
Median Mix-T/BRT	0.5m	0.5m	
BRT Lane between Stations	3.5m	3.5m	
BRT Lane at Station	2lanes of 3.5m each	2 lanes of 3.5m each	
Median BRT/BRT	7.0m Wide Raised	0.5m Ghost	This will save space for NMT facilities however it will require relocation of existing drain at the existing median

2.11.5 New Bagamoyo Road from Mwenge -Tegeta -DAWASA Bust Station (16 km)

This section was already constructed with BRT in mind, the existing road is comprising of (7.0m) four lanes dual carriageway, 9.0median and 1.5m walkways on each side, this section is constructed with trapezoidal lined drainage system. Our proposal is to fit the bus lanes at the median without causing major disturbance to the existing facilities. The proposed cross-section elements are shown in the table below

Cross section Element	Conceptual Design	Detailed Design	Remarks
Bike Way	NIL	2.0	New bikeways to be constructed adjacent to new walkways
Walkway	3.0m	3.0	Footpath have been provided with clear width at a height of 200mm from carriageway
Service Road	NIL	5.0	New service roads will be constructed to replace the existing service roads
Storm Water Drainage	Catch Basin 0.5m	NIL	Existing system between station from Mwenge to Kawe will be retained closed new closed system with curb inlets will be constructed at stations.

Cross section Element	Conceptual Design	Detailed Design	Remarks
			New closed drain system with curb inlets will be constructed from Kawe to Tegeta
Mixed Traffic Lanes	3.5m dual carriageway	3.5m dual carriageway	
Median Mix-T/BRT	0.5m	0.5m	
BRT Lane between Stations	3.5m	3.5m	
BRT Lane at Station	2lanes of 3.5m each	2 lanes of 3.5m each	
Median BRT/BRT	7.0m Wide Raised	0.5m Ghost median	This will save space for NMT facilities however it will require relocation of existing drain at the existing median

2.11.6 Sam Nujoma Road from New Bagamoyo Road Jct-Ubungo Jct (4 km)

This section was already constructed with BRT in mind, the existing road is comprising of (7.0m) four lanes dual carriageway, 19.0median, 2.0m walkways on each side and 5.0m service road on each side, this section is constructed with trapezoidal lined drainage system. Our proposal is to fit the bus lanes at the median without causing major disturbance to the existing facilities. The proposed cross-section elements are shown in the table below

Cross section Element	Conceptual Design	Detailed Design	Remarks
Bike Way	NIL	NIL	Existing Service Road to be retained and utilized as bike lane
Walkway	3.0m	2.0	Existing walkway to be maintained
Storm Water Drainage	Catch Basin 0.5m	Curb Inlet Drain 1.0m	Existing system to be retained
Mixed Traffic	3.5m dual	3.5m dual	
Median Mix-T/BRT	0.5m	0.5m	
BRT Lane between Stations	3.5m	3.5m	
BRT Lane at Station	2lanes of 3.5m each	2 lanes of 3.5m each	
Median BRT/BRT	7.0m Wide Raised	Varies 3.0m to 5.0m	

2.12 Bridge Structures

2.12.1 Selander Bridge (km 1+600)

The consultant proposed to construct a new bridge (90m) to replace the old Selander bridge **(Figure 2-9).** This bridge will be used by mix traffic from CBD, the existing bridge which is currently being used by traffic from CBD will be fully used by BRT to/from CBD. To reduce number of conflicts stated above we will make the United Nations Rd intersection 2 phase only by restricting right turn movement from UN Rd to Ali Hassan MwinyiRoad and change the Barak Obama junction to left in left out only as we expect decrease in traffic after opening of Tanzanite Bridge. This option will save huge cost of building the elevated bridge for BRT corridor and also allow continuous flow of traffic by reducing number of stops.

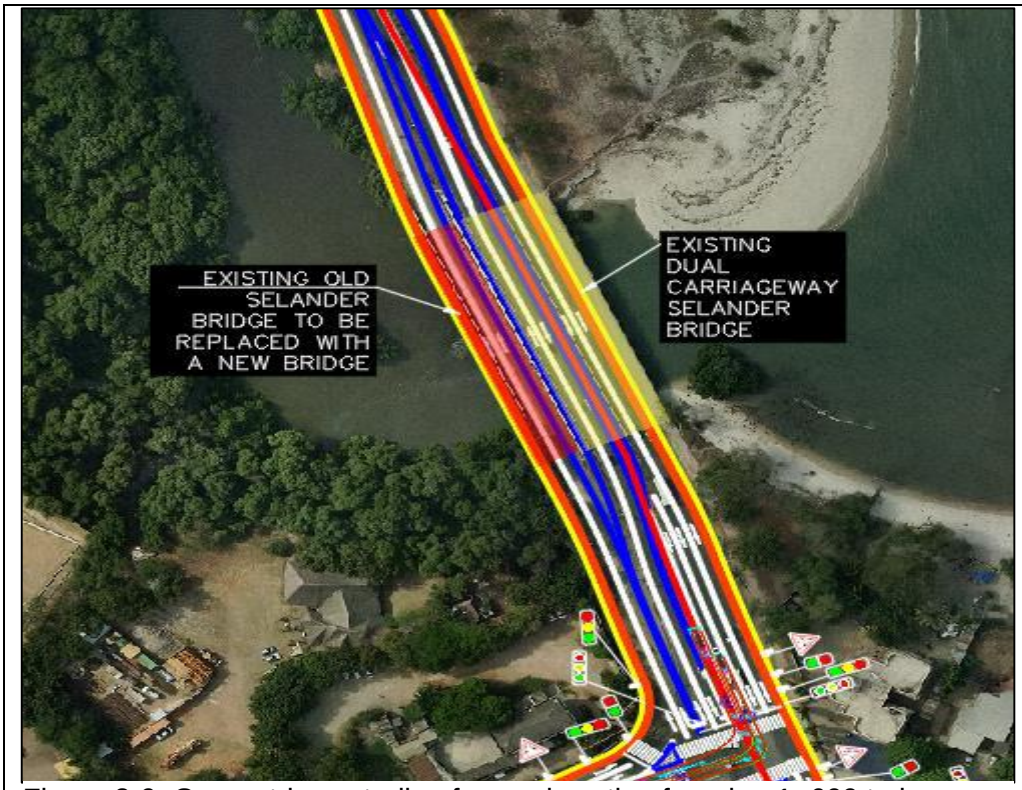

Figure 2-9: Geometric centreline for road section from km 1+600 to km 3+300.

2.12.2 Mlalakuwa Bridge (km 10+075)

A new bridge has been proposed in between the two-existing bridge across the Mlalakuwa River **(Figure 2-10).** This bridge will be exclusively used by BRT buses only.

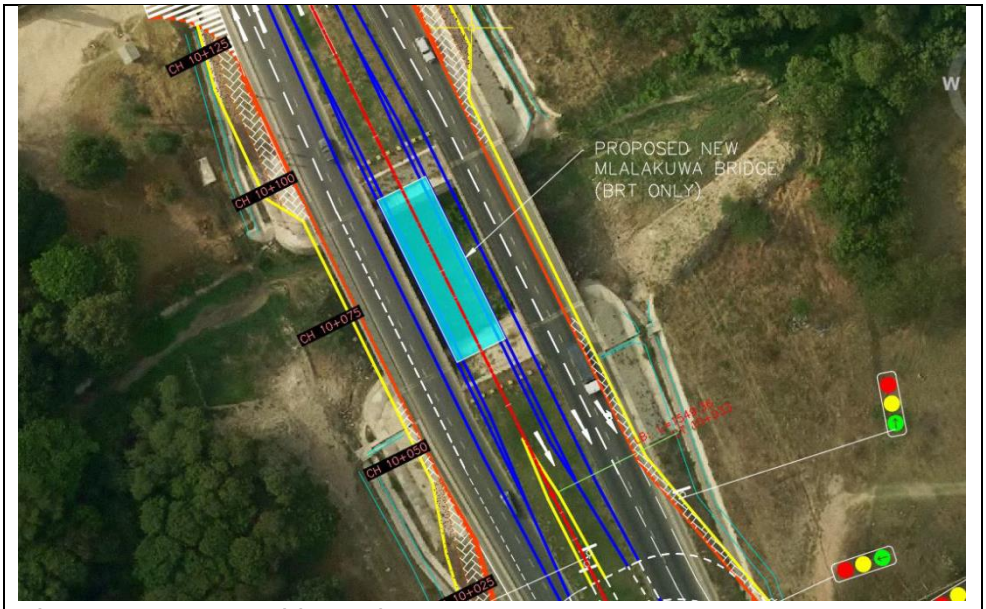

Figure 2-10: New Bridge at km 10+075

2.12.3 Bondeni Pedestrian Bridge (12+750)

The existing pedestrian bridge at Bondeni Bus station have been retained **(Figure 2-11).** The road has been designed to pass through the bridge openings. New pedestrian ramp will be constructed to connect with Bondeni BRT station.

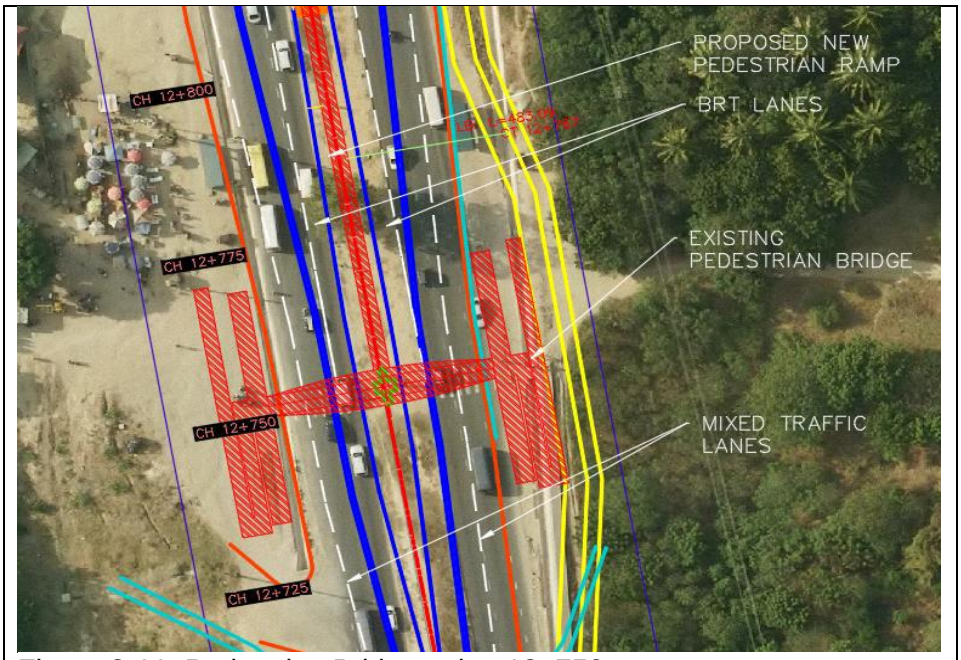

Figure 2-11: Pedestrian Bridge at km 12+750.

2.12.4 Bondeni Bridge (Km 12+975)

A new bridge has been designed between the two existing bridges **(Figure 2-12).** The bridge will be used exclusively by BRT buses Mixed traffic and NMT facilities have been maintained to the existing bridges.

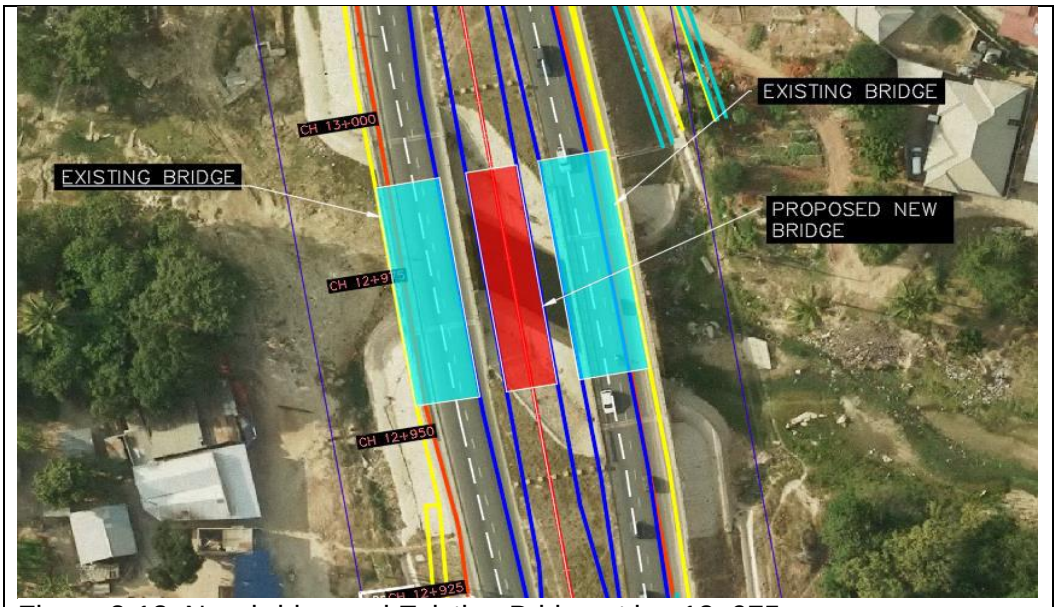

Figure 2-12: New bridge and Existing Bridge at km 12+975.

2.12.5 Underpass at Muyuni Depot (km 18+900)

An underpass has been designed at km 18+900 to link the BRT Terminal with the North BRT Depot **(Figure 2-13).** A maximum grade of 6% has been attained at the ramp and a clear height of 5.5m have been provided at the underpass tunnel.

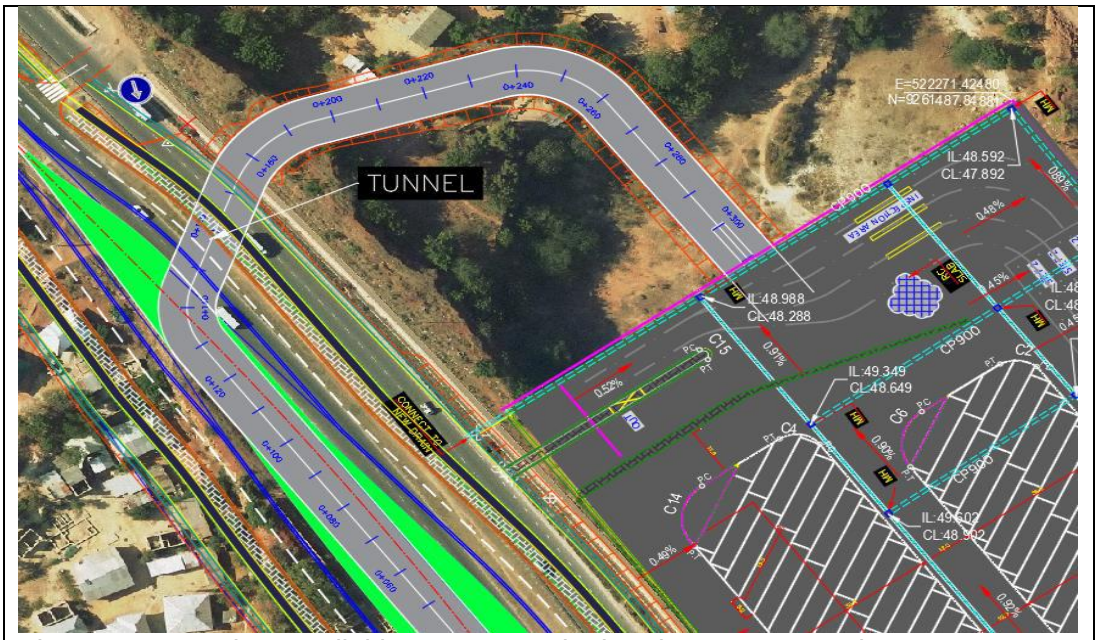

Figure 2-13: Underpass linking BRT Terminal and BRT Depot at km 18+900.

2.12.6 Tegeta River Bridge (Km 20+780)

A new 30m span bridge has been proposed between the existing two bridges **(Figure 2-13)**. The new bridge will be used exclusively for BRT buses. Mixed traffic and NMT has been retained to the existing bridges.

Figure 2-14: New Bridge at km 20+780.

2.12.7 Horizontal Alignment

The maximum super elevation and the minimum radius for the horizontal curves are defined based on the design speed of 50 km/h for the BRT Corridor. As recommended by the AASHTO Guide, the maximum super elevation should be 4.0% in urban areas, due to safety issues. The minimum radius that meets both super elevation and design speed requirements is provided and estimated to be between 98.4 and 100 m.

2.12.8 Drainage

The following table shows the main recommendation on the slopes for a good drainage on BRT lanes and BRT stations:

Components	Recommendations
Drainage at BRT Lanes	The gradient of BRT lanes should follow the profile of the mixed traffic and there is no problem to have gradients greater than 0,35%; The gradient of 0.35%, in fact, is the minimum gradient for the whole corridor, which is important to be considered for a proper drainage to avoid water puddles along the BRT lanes; In addition to that, it is also recommended a super elevation (transversal gradient) of 2% on BRT lanes to drainage the water towards the curb side on mixed traffic or to the shoulders.
Drainage at BRT stations	At stations, there is no reason to have stations in a steep portion, so the recommendation is to not exceed 4% of gradient at stations, if there is any case; 4% is related to the maximum gradient that should still be comfortable at stations in extreme situations.

2.12.8.1 Pedestrian Crossings

The concept designs consider that the traffic speed in mixed traffic lanes will be reduced to 50-60 km/h. Based on this assumption, it is proposed using elevated pedestrian crossings instead of having traffic signals on every crossing.

Other reasons for adopting this solution at the BRT stations are:

- Risk of vehicles not respecting traffic light control.
- Risk of pedestrian not respecting traffic light control, and being exposed to conflicts with car in a higher speed than they would be with the elevated crossings.
- Risk of traffic lights being out of operation by lack of electricity or maintenance.

This pedestrian crossing solution was implemented successfully in Phase 1. However, it was to be carefully implemented and effective enforcement needs to be provided in order to avoid accidents. This solution could be combined with a **pelican crossing (pedestrian light-controlled crossings)**, in which the pedestrians have a traffic light actuated by a button next to the pedestrian crossing.

Where traffic lights for U-turns are installed close to the station, it is recommended to stop the vehicles before the pedestrian crossing location in order to allow them to cross while vehicles are using the U-turn facilities.

Additional recommendation:
In the detailed designs, it is recommended to try to increase the width of the median between the mixed traffic and BRT lanes to up to 1.5 meters where the width available allows.

2.12.8.2 Design of Bus Stations

The Bus Stations will be comprised of the following facilities:

- ***Station:*** the infrastructure used by pedestrians to buy tickets, board and alight the buses.
- ***Ramp:*** the area used to access the elevated station, considering the slope that allows universal accessibility;
- ***Ticketing, fare collection or access control area:*** is the area where ticket booths, fare gates and security are located.
- ***Sub-stop/modules:*** is the area where buses of certain predefined routes dock at the stations. A station may have more than one sub-stop, each one serving specific routes. The sub-stops may be single, with space for one bus to dock, or double, with space for two buses to dock.
- ***Platform:*** is the area of the station where passengers board and alight, in sub-stops.
- ***Docking position:*** is the position where the bus stops at the station. In some sub-stops, there are 2 docking positions, meaning that the bus can stop in the first or second position.
- ***Connection area:*** is the area of the station between the sub-stops which is not a platform for passengers to board and alight, because it represents the length necessary for buses to manoeuvre and wait to dock at the station.

2.12.8.3 Design of the Road Sections

The following are the design assumptions for BRT Road Sections:

Assumptions	Observations
Ramp area	At-grade pedestrian crossing: 9,6 m, allowing a ramp of 8,33% (considering the height of 95 cm minus 15 cm of the median). Pedestrian bridges crossing: access on the connection between platforms.
Fare collection area	Considers off-board fare collection. Passengers buy and validate tickets before boarding the buses. At stations with at grade crossing, 9.6 meters of length was considered for fare collection areas, enough for a ticket booth, auto-service equipment, user information and turnstiles. These access control areas were considered on both sides of staggered and bi-directional stations, except for stations with length of 60 meters. At stations with pedestrian bridges, fare collection is installed on the bridge, before the ramp, escalator, and stairs to the platform.
Station width	3 m for staggered stations; 5 m for bi-directional stations; 5 meters or more for intermediary terminal stations with operational return.
Station height	Considered at level boarding, with a high platform 95 cm above the corridor surface level, for higher capacity and better accessibility.
Sub-stop/modules length	Considered 20.4 m for single (one docking position) and 40.8 m for double sub-stops (2 sub-stops), to serve 18.6 m articulated buses. These are considered as modules,

Assumptions	Observations
	because the stations might have from one to three of these structures depending on the demand.
Number of sub-stops and docking positions per direction	The number of sub-stops and docking positions per direction were defined based on the demand study and service plan, which indicated the level of saturation of each station.
Connection length between platforms	36 m, allowing good docking movement for independent sub-stop operation, and space for one bus to wait to dock at the next sub-stop without blocking the previous sub-stop.
Pedestrian bridge width	Equal or wider than 5 meters.
Pedestrian bridge access ramps width	3 meters, considering 1.5 m per direction
Pedestrian crossing	Elevated zebra crossing in most of the stations, signalized crossing where there are traffic lights for vehicles (discussed in specific topic below).
Fences/barriers to avoid pedestrians crossing away from crosswalks	Not considered, but could be proposed in locations with pedestrian bridges and other.
Toilets	Have been proposed only at terminals.
Distance between stations	600 m were considered as a base, but distances were adjusted to be close to intersections to improve access, ranging from 500 meters to 900 m in urban areas and higher along non-urban roads.

2.12.8.4 Design of Ali Hassan Mwinyi-New Bagamoyo Road Section (5.92 km)

Follows the main assumptions from Bagamoyo Rd. regarding type of station, cross section using the median and traffic circulation.

Starting from Morocco, a terminal-station was proposed at Mbuyuni, which may be used as terminal or serve as operational return for special situations;

At Selander Bridge, the solution proposed is to construct a new bridge to replace the existing bridge which will be dedicated for BRT buses. Conflicts with the mixed traffic by restricting right turn movement from UN Rd to Ali Hassan MwinyiRoad and change the Barak Obama junction to left in left out only as we expect decrease in traffic after opening of Tanzanite Bridge.

The Aga Khan Station (number 34, 1+620) has been proposed to be staggered to avoid expropriation. If expropriation is feasible, it could be substituted by a bidirectional station.

To the south of Ali Hassan, a new design was proposed for the intersections of Bibi Titi Rd with Ohio St. and Azikiwe St.

At the intersection of Azikiwe St and Bibi Titi, although Phase 3 will be implemented, it will be necessary to upgrade the layout of the intersection to allow the necessary turning movements.

2.12.8.5 Design of New Bagamoyo-Tegeta Road Section (20 km)

Starting from the North, to the north of Tegeta Nyuki, there is a terminal to integrate with buses from Bunju.
There are smaller feeder stations along the corridor, compatible with the demand of those lines;

The stations along this corridor are mostly bi-directional with passing lanes, 2 sub stops and 3 docking bays, which appears to be sufficient for the future demand.

Since there are no consolidated roads parallel to the corridor, the right turn movements are done using U-turns in most of the cases.

The cross section proposed uses mostly the right of way of the main road, avoiding changes in the service road/lanes, except where U-turns are proposed. The corridor is located on the centre of the road, which in many sections corresponds to a median or lanes for turning (between Sam Nujoma and Kawawa Rd.).

Next to Salasala Rd. there is the Salasala Terminal and the main depot for trunk and feeder buses.

There are 2 additional terminal-stations with operational return along the corridor: Goig and Lugalo Hospital.

At Mwenge intersection, where there is an on-going project from TANROADS to implement flyovers, a solution considering the necessary movements for the BRT was proposed.

At Mwenge also a Terminal has been proposed, with good capacity for the future, with entrance through pedestrian bridges.

At Morocco intersection, where there is an on-going project from TANROADS to implement flyovers, a solution considering the necessary movements for the BRT was proposed. The Morocco Terminal is proposed to be extended to increase capacity with the introduction of the future phases, in special with the current requirements of toilets and other support activities that consume part of the platform area. To improve the access for passengers of Bagamoyo Rd, a new bridge was proposed, with stairs, escalator, and ramps, to reduce the impedance to access the BRT.

2.12.8.6 Design of Sam Nujoma Road Corridor (SIMU 2000-Mwenge)

Follows the main assumptions from Bagamoyo Rd. regarding type of station and traffic circulation (U-turns);

Regarding the cross section, in the case of Sam Nujoma the central median is considerably wide. The BRT lanes were proposed to use the space from the median, reducing the green area, but avoiding changes in the drainage system and in the mixed traffic lanes along most of its extent.

The SIMU 2000 Station (number 35) is a terminal station where routes of Phases 4 and 5 may integrate. Also, feeder routes from the University integrate at this location.

At the intersection of Ubungo, the project under implementation was considering. However, it is absolutely necessary to have a U-turn to allow the feeder buses from North to go back to North under the bridge to access the University after the integration at the BRT station.

2.12.8.7 Design of Kivukoni Terminal

With the implementation of Phase 4, which will increase the transfers happening in Kivukoni Terminal, it will be necessary to upgrade that terminal, if not improved before. However, the upgraded design is proposed under this phase; The Layout of Kivukoni Terminal Depot showing the new extension is provided in **APPENDIX 10.**

If there are still feeder or Daladala services at this terminal when Phase 4 is implemented, for example connect passengers from Kigamboni to Ali Hassan Mwinyi and Bagamoyo Rd for

example, they would be replaced at this moment, because the coverage of the BRT would make them not necessary anymore.

2.12.8.8 Design of Critical Intersections

These are considered as critical intersections in the design because they are associated with flyovers, and are located at intersections where turning movements of the BRT are required, and therefore the design has proposed some special solutions with flyovers for this type of intersections. The objective is to ensure provision of good level of service for the BRT and other vehicles, and at the same time prioritizing the highest flows of people.

2.12.8.9 Bibi Titi Mohammed Street x Maktaba Street.

Stage 1: Construct the diversion roads near the existing property (alongside Kisutu Resident Magistrate) respective area across the median of Bibi Titi Mohamed Street to allow the possibility of right turning traffic from Posta to Tegeta

Stage 2: Improve the lanes for mixed traffic from JNIA by diverting the traffic to the constructed diversion and construct one lane for BRT. Road construction signs should be placed in proper locations to create smooth diversion of traffic to the designated zones

Stage 3: Improve the lanes for mixed traffic from Tegeta by diverting the traffic to the constructed BRT lane and one lane of the improved mixed traffic lanes, also construct the other BRT lane. Direct the traffic from Posta to use the service road and provide them with access to merge to the Bibi Titi Mohamed Street and to utilize the U -Turn. Road construction signs should be placed in proper locations to create smooth diversion of traffic to the designated zones. Figure 2-14 illustrates the proposed traffic control procedure.

Stage 4: Finally block the access of mixed traffic into dedicated BRT lanes. The Final Layout of the intersection will be as shown in the **Figure 2-15.**

Figure 2-15: Layout of Bibi Titi Mohamed-Maktaba Street

2.12.9 Design of Bus Terminals

The function of Bus terminal stations is to facilitate exchange of passengers from one transport mode to another, from the BRT transport mode to Daladala mode and other private transport modes. Thus, their designs have to incorporate feeder stations which convey or receive passengers from Daladala buses to or from BRT buses. There four (4) types of Bus terminals in BRT4 as follows:

- "Single platform at the centre" that is split between BRT and Feeders at Boko Basihaya (DAWASA Depot);
- "Inside terminal" with "two platforms at the centre"; - "BRT outside and Feeder Inside" at Sala-Sala;
- "Next to terminal" with "a single platform at the centre", at Mwenge and Morocco; and
- "Inside terminal" with "multiple platforms".

On the route to Boko Basihaya (BRT4), there are three (3) new Bus terminals, one at Mwenge, Mbuyuni/Sala-Sala and Boko Basihaya (DAWASA Depot) and two terminals of two BRT1 (Kivukoni and Morocco) which have to be extended in order to cater for more buses and passengers. All the terminals have been provided with additional washrooms to cater for the anticipated increased passengers. The detailed description and layout of each terminal is provided in the Design Report.

2.12.9.1 Boko Basihaya Terminal

Boko Basihaya Terminal **(Figure 2-16)** has "a single platform at the centre split between BRT and Feeders" is located at Boko Basihaya (DAWASA DEPOT) along the New Bagamoyo Road. It is a terminus of buses plying the BRT4 from Magogoni Ferry through Mwenge, Lugalo Barracks to Boko Basihaya. The terminal is the last of the terminals in this BRT4 route. When the future allows, the BRT4 can be extended to Bunju B in order to cover the whole of Dar es Salaam and its nearby environs to be served with a BRT system. This terminal also allows or provides flexibility in the scheduling and planning of the bus operations. The terminal also provides for Park-and-Ride parking facility where passengers with own private cars from within the neighbourhood of Boko, Ununio and part of Kunduchi can park in secured parking lots and ride into BRT.

The proposed BRT4 Terminal at DAWASA Boko is in a swampy area, which is periodically inundated during rainfalls and water can reach about 1.5m. The storm water from Wazo Hill factory area upstream collects here and trickles down a small underground pipe to the sea some 2 km away. The design has proposed to construct a double box culvert with a dimension of 4000mm x1200mm.

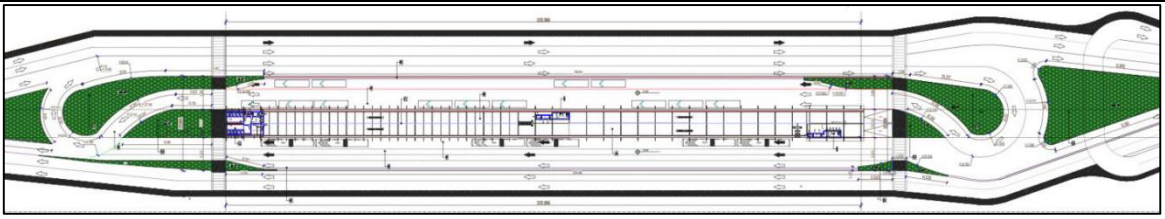

Figure 2-16: Boko Basihaya Bus Terminal.

2.12.9.2 Mbuyuni/Salasala Bus Terminal

Sala-Sala Bus Terminal **(Figure 2-17)** has "two platforms at the centre" with "BRT outside and Feeder inside", is located Mbuyuni/Sala-Sala on the New Bagamoyo Roads. It is a terminus of buses plying the BRT4 from Magogoni Ferry through Mwenge, Lugalo Barracks to Boko Basihaya. The station shall make it possible for DART buses to have short routes within the BRT system, allowing or providing flexibility in the scheduling and planning of the bus operations. The terminal also provides for Park-and-Ride parking facility where passengers with own private cars can park in secured parking lots and ride into BRT. The Park-and-Ride has a car parking capacity of 109 parking spaces.

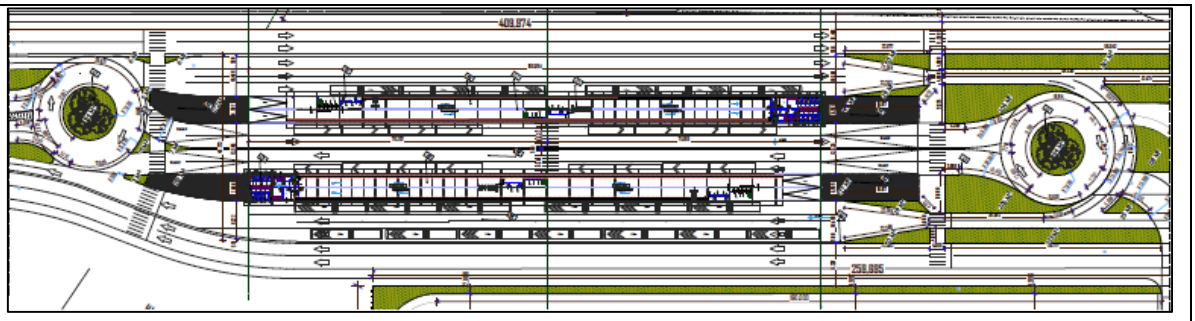

Figure 2-17: Mbuyuni/Sala Sala Bus Terminal.

2.12.9.3 Mwenge Bus terminal

Mwenge Bus Terminal (**Figure 2-18**), a single platform at the centre, is located close to the junction of Sam Nujoma and New Bagamoyo Roads. It is "a next to terminal station" of buses plying the BRT5 (Ubungo Bus Terminal) and BRT4 (Simu 2000 Bus Terminal). The station shall make it possible for DART buses to have short routes within the BRT system, allowing or providing flexibility in the scheduling and planning of the bus operations.

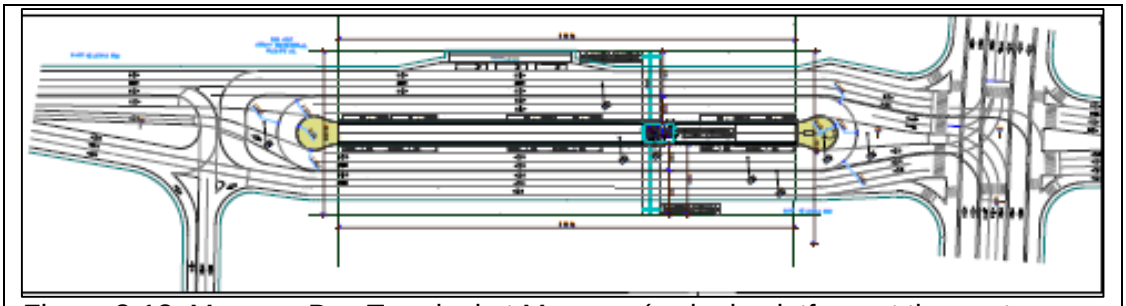

Figure 2-18: Mwenge Bus Terminal at Mwenge (a single platform at the centre.

2.12.9.4 Morocco Bus Terminal

Morocco Bus terminal **(Figure 2-19),** a single platform at the centre, is currently a terminus to BRT1 on the junction of Kawawa Road and New Bagamoyo/Ally Hassan Mwinyi Roads. The "next to terminal station" serves buses plying DART Buses from Mbezi Luis through Kimara, Ubungo, Manzese and Magomeni to the Terminus and from Gerezani Terminal through Msimbazi Street, Fire on Morogoro Road through Magomeni, Kinondoni to the terminal.

The terminal also receives passengers from all Daladala that traverse the Bagamoyo Road from Bunju through Tegeta, Mbuyuni, Mwenge, Simu 2000 and Makongo Juu. With the complete implementation of BRT4 and the expected BRT6, we anticipate that the terminal will be congested leading to inefficiency.

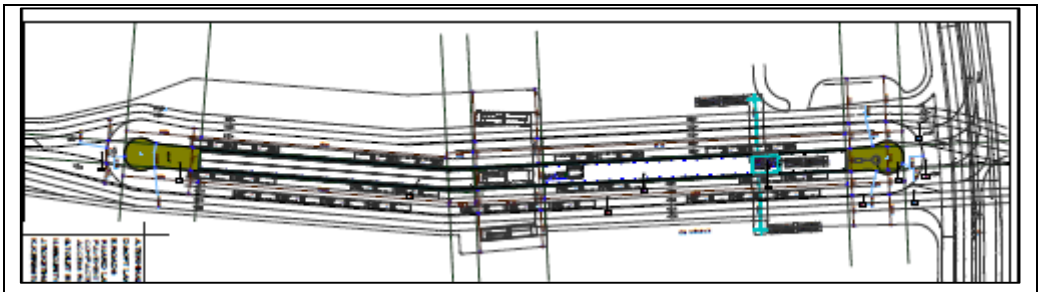

Figure 2-19: Morocco extended Bus Terminal (a single platform at the centre.

2.12.9.5 Kivukoni Bus Terminal

Kivukoni Bus terminal “an inside terminal” with “multiple platforms”, is currently a terminus to BRT1. The terminal serves buses plying DART Buses from Mbezi Luis through Kimara, Ubungo, Manzese and Magomeni; Morocco Terminal through Magomeni to Magogoni Ferry. The terminal also serves all Daladala that terminate at Magogoni Ferry. With the complete implementation of BRT2 and BRT3, we anticipate that the terminal will be congested. Under BRT 4, the Kivukoni Termina will be extended to accommodate the BRT buses for BRT 1 to BRT 4. The extension will use the existing area used by the Daladala and Bajaj (for special group)

2.12.9.6 Design of Feeder Stations

The feeder Stations do not have controlled access and the connection with the bus stations is through the walkways. The boarding and alighting platforms do not have walls and the access is at the edges through ramps designed in accordance with the universal accessibility norms.

The platforms have 45m length and have capacity for three (3) of the 12-metre-long buses each. The following is the locations and number of feeder stations along the BRT roads:

- Ali Hassan Mwinyi-New Bagamoyo Road -Boko Basihaya:
    - Rose Garden/Kajenge Road Feeder Stations (2 Nos.)
    - Goig/Africana Feeder Stations (2 Nos.))

- Sam Nujoma:
    - Kinondoni/Kenyatta Road Feeder Station (2 Nos.)
    - University/SIMU 2000 Feeder Station (2 Nos.)
    - Mwenge Feeder Station (1 No.)

All the feeders are single seating side, that is, seating platform is on side facing the road and the back of the seating platform is shielded for security purposes. The feeders are typical in design, varying only in length depending on the size of the plot assigned for it. All feeders are designed to include two toilets (male and female) for working staff and a ticketing booth. The details on the description and layout of each feeder station are provided in the Design Report.

2.12.9.7 Design of Bus Stations

According to the design report the following are the 6 types of bus stations depending on the size:

- Bus Station Type I: 62.4 metres in length and the width of 5 metres;
- Bus Station Type II: 136.4 metres in length and the width of 5 metres. Here, LOGIT proposed 136m;
- Bus Station Type III: 160.8 metres in length and the width of 5 metres with operational return as proposed by LOGIT;
- Bus Station Type VI: 160.8 metres in length and the width of 9 metres with operational return as proposed by LOGIT;

- Bus Station Type VII: 228.8 metres in length and the width of 9 metres with operational return. Here, LOGIT proposed 233m with operational return; and,
- Bus Station Type VIII: 273.6 metres in length and the width of 3.5 metres – Staggered station. Here, LOGIT proposed 269m with operational return.

All the station widths include boarding and alighting platforms of 500 mm wide at all entrances and alighting doors. Our designs are based on modular design with a basic design module of 2.4 m and standard ramp of 9.6 m long giving a slope ratio of 1:10.7. The detailed description and layout of each station type is provided in the design report.

2.12.9.8 Design of BRT Depots

There are two (2) BRT Depots, one at SIMU 2000 **(Figure 2-20),** and another at Mbuyuni **(Figure 2-21)**. Apart from accommodating the administration and maintenance functions, Depots serve as the main parking facilities for the BRT buses during the hours of recess or when the buses are not operating. In total the two depots provide for 759 places or spaces of parking lots as follows:

SIMU 2000 has 345 parking lots all accommodating 18m long buses, while Mbuyuni/Sala-Sala has 388 parking lots (that is 203 lots on one site to the left and 185 on the depot building site to the right). In addition, all the Depots have two mini petrol filling stations, one to each parking area, cleaning areas, tyre repairs area, tyre storage and two vehicle inspection areas, one to each parking area. The depot buildings are designed to provide a number of service pits, spares storage areas, and other maintenance functions.

It is assumed that the Depots will be in use from 04 00hrs to 0200hrs depending on the Bus Operator. Thus, adequate provision has been made for internal and external lighting. It is also assumed that the buses to be used for DART shall be Articulated Buses with 900mm floor deck height from the level of the road at the entrance. The design height of the bus is 3.05 and width of 2.5m and length of 18.0m.

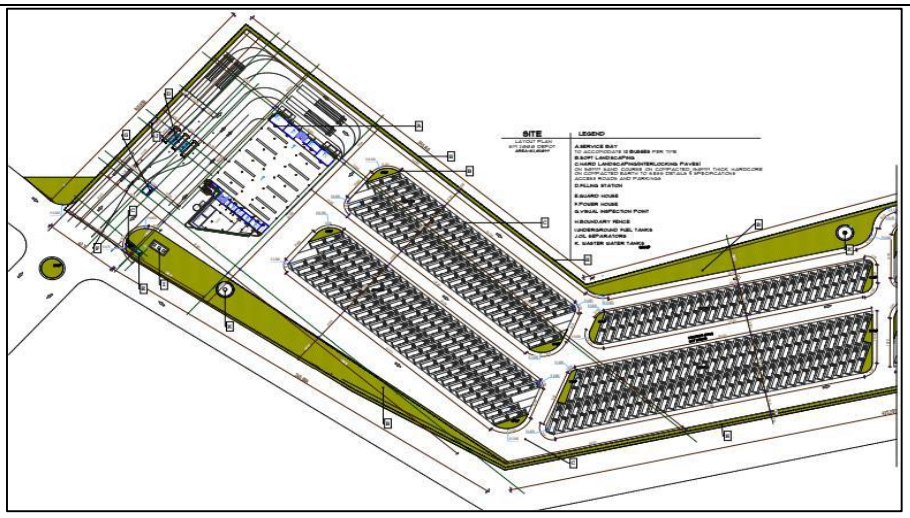

Figure 2-20: SIMU 2000 Depot Building with 345 parking.

Source: Design Report (October 2020).

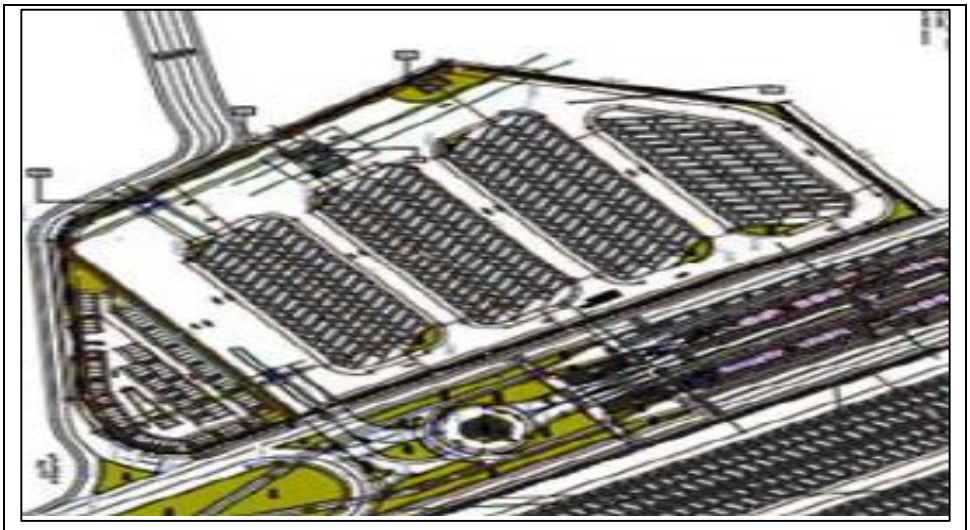

Figure 2-21: Vehicle Parking lots (203) at Sala-Sala B.

2.13 Project activities

2.13.1.1 Mobilization Phase

The mobilization phase is the initial stage of the project cycle, during which the Contractor will start to mobilize equipment and workforce for the project. For this project the following are some of the major activities to be carried out by the Contractor:

- Topographical survey and geotechnical investigations.
- Establishment of Contractor's Site Office / Camp Site and Materials Storage Yard.
- Recruitment of construction workers and administrative staff.
- Mobilization and transportation of construction equipment / machinery to the site.
- Transportation of construction materials (e.g., stone aggregates, sand, cement, gravel, etc) to the site.
- Installation of safety / security fence around the camp site and construction site.
- Removal of existing vegetation from the road medians and the proposed depot areas.
- Identification and relocation of public services infrastructure and utilities such as, water supply pipelines, sewer pipelines, and electricity power poles, and telephone cables.
- Relocation of traffic lights and street lights from the road junctions and road medians.
- Installation of temporary road traffic signs and road diversions signs.
- Demolition of existing building structures at the proposed depots.
- Collection and transportation of construction related solid wastes / spoil materials and demolition wastes to the dumping sites.

2.13.1.2 Construction Phase

The second stage is construction phase, overlaps with mobilization phase, whereby some of the activities from mobilization phase will continue during the construction phase. During construction the following activities will be performed:

- Earth works including vegetation clearance, removal of top soils, excavation of road bed and storm water drainages ditches.
- Filling of road bed with gravel / base course materials, compaction and laying of concrete materials.
- Transportation of construction materials, machinery, and equipment to new construction sites
- Collection and transportation of soil/spoilt materials and demolition wastes to the dumping site.
- Transportation of construction materials such as gravel, sand, aggregates, cement bags, reinforcement bars to the materials storage yards.

- Fabrication of concrete slabs, curb stones, and concrete lining of storm water drainages,
- Installation of permanent road signs, traffic lights and street lights.

2.13.1.3 Demobilization Phase

This is the third stage of the project cycle, which involves restoration of the project site at least to its original conditions. The following are some of the major activities to be carried out by the Contractor during demobilisation phase:

- Handing over of permanent structures and other facilities to local authorities (e.g., Permanent buildings);
- Removal of temporary infrastructure, installations and equipment from the workshop and campsite;
- Disposal of Contaminated Materials including used oil, sewage, solid wastes (plastics, wood, metal, papers etc.) to the authorized dumping place;
- Closure of temporary diversion roads, pedestrian crossings, and culverts.
- Disassembling and transportation of construction equipment/machinery from the construction sites.
- Levelling, compaction, and landscaping of the open areas around the car park and ride buildings, and depot areas.

2.13.1.4 Operation Phase

The operation phase is the fourth stage in the project cycle, which involves operation of the constructed infrastructure. The following are some of the major activities to be carried out during the operation phase:

- Operation of BRT infrastructure (i.e., median of the road sections, bus stops, terminals, depots.
- Operation of Car Park and Ride Buildings and associated infrastructure.
- Periodic maintenance of the BRT road sections and associated infrastructures,
- Periodic maintenance of the Car Park and Ride Buildings and associated infrastructure
- Awareness creation and education on proper use and protection of BRT infrastructure, including ticketing system, use of solid wastes disposal containers at the Bus Stops, etc.
- Regular maintenance and repair of BRT vehicles, machinery, equipment etc.

2.14 Project Requirements

2.14.1.1 Gravel/Fill Materials

The potential sources of gravel materials have been identified as shown in **Table 2-3.** The estimated quality and quantity of available materials is also provided. Borrow material will therefore be required to meet the contract requirement for:

- G3 material for fill
- G7 material for the lower improved subgrade layer
- G15 material for the upper improved subgrade layer
- G25 or superior for stabilised pavement layers as appropriate

In order to estimate requirements for natural gravel material, the following has been assumed:

- Carriageway width 7.0 m
- Shoulder width 1.5 m
- Base course thickness 150 mm
- Sub-base thickness 200 mm
- Upper Improved subgrade 150 mm (G15)
- Lower improved subgrade 150 mm (G7)
- Fill, average 1.0 m

For this project (assuming a total length of about 30 km) dual carriageway, including cycle tracks and walkways, a total of about 2,500,000 m^3 of gravel material is required, considering that the existing base and sub-base material will be reprocessed for reuse in the cycle tracks and walkways or as may be found otherwise during construction.

Table 2-3: Source and Quantities of Grave Materials.

S/n	Location/ID	Estimated Quantity (m3)	Material Class
1	BOKO	425,000	G15
2	MBUTU	500,000	G15
3	KAMBODIA B.PIT (EXISTING)	550,000	G25
4	VIGUNGU KWA PAZI	359,400	G7, G25
5	MABWE VIDUNDA	870,060	G7, G15
6	NGUGU DALU	132,590	G20

2.14.1.2 Crushed Stone Aggregates

The requirements for crushed stone aggregates will be highly significant because the road pavement will be of concrete standard. The crushed stone aggregates will also be required for concrete works during construction of car park and ride buildings; and other BRT facilities such as bus stops, terminals, and depots. Crushed stone aggregates will be required for concrete works, production of base course pavement layer, and production of bituminous surfacing pavement layer.

The potential source of crushed stones aggregates is located at Lugoba Village in the Coast Region about 140 km from Dar Es Salaam, along Chalinze –Segera Trunk Road on Left Hand Side (LHS). The source has fine grained weathered granite rock, and has been used to supply crushed aggregates and base course materials for a number of road projects in Dar Es Salaam, Coast, Tanga and Morogoro Regions. There are three licensed crusher sites in the area, owned by ESTIM CONTRACTORS LTD, NOREMCO A/S, and NCC. The source is estimated to yield more than 200,000 m^3 of crushed aggregates.

The aggregates from the source meet the required properties for crushed rock base course and concrete works in accordance with Tanzania Pavement and Materials Design Manual of 1999 (PMDM, 1999). In addition, the source meets requirements for surface dressing and asphalt concrete. The rock type is granite with the following properties:

- TFVdry (kN) = 200
- TFVwet (kN) = 170
- Ratio TFV wet/dry (%) = 85

2.14.1.3 Sand Materials

Two potential sources of sand identified were Kondo Sand Pit, about 30 km from the site, at an offset of about 2.5 km on the RHS along Tegeta -Bagamoyo Road and Buma Sand Pit, about 30 km from the site, at an offset of about km 10+200 LHS along Dar - Bagamoyo Road. The sources contain adequate quantity of material with respect to the project requirements.

The materials report has also suggested to use crushed rock sand for concrete works, provided it meets relevant specifications. This needs to be explored during construction. Samples should be taken for laboratory testing to determine suitability for use in the concrete works.

The grading of the samples in comparison with the grading specified in BS 882: 1992 should form the basis for recommending the use of these sources for concrete works.

2.14.1.4 Construction Water

There is limited availability of construction water in the project area. Therefore, the existing portable water from Dar Es Salaam Water and Sewerage Authority (DAWASA) at Boko, Mwenge, Tabata, and other locations around the project area has been recommended.

2.14.1.5 Manufactured Materials

The manufactured materials like cement, lime, bitumen, and steel bars will be required in the construction works. All these materials are available in bulk quantities from various dealers in the country.

2.14.1.6 Equipment

The type of equipment to be required will depend on the prevailing conditions on the site. However, the most common equipment for road works includes lorry tippers, bulldozers, asphalt plant, rollers and plate compactors, wheeled loaders, hydraulic excavators, vibrators, concrete mixers, fuel, and water tankers (bowsers), graders, pokers, vehicles, trucks, dewatering pumps, site dumper, hydraulic cranes, etc.

2.14.1.7 Labour Force

Based on the BRT Phase 1 and Phase 2 experience, the BRT Phase 4 is expected to create an employment of more than 800 people, of which 70% will be directly employed and 30% will be indirectly employed. In addition, it is estimated that up to 20% of the job positions may be filled by expatriate workers, coming from the country of origin of the company that wins the bid for the works.

However, the number of labourers to be employed will depend on the actual site work requirements, but employment priority for casual labour will be given to the local people. This will help to minimize the number of new comers into the project area, and therefore reduce incidence of HIV/AIDS transmission due to interaction between workers and local people.

2.15 Waste Management

2.15.1.1 Mobilization Phase

The most common types of solid wastes to be generated during mobilization phase will be mainly soil materials from site excavations. The amount and type of solid wastes will depend on the depth of the area to be excavated.

The Contractor's office is expected to generate sanitary wastes, mainly wastewater from kitchen, bath rooms, and toilets. Types of solid wastes to be generated include food residues, waste papers, plastic bottles, food cans, etc. The amount of waste water and solid wastes will depend on the number of people occupying the Contractor's Office. Other type of wastes will be generated from construction activities and operation of construction machinery/equipment. These include cement bags, pieces of bricks, wood, and metals, oils, grease, and paint containers.

Some of the solid wastes like cement bags, pieces of bricks and wood can be re-used during construction or handed over to local people. Non-re-usable wastes will be disposed into approved site by the Resident Engineer.

2.15.1.2 Construction Phase

During construction phase the operation of Contractor's Office is expected to generate wastewater from kitchen, bathrooms, and toilets. The type of solid wastes to be generated from camp site will be comprised of food residues, plastic bottles, plastic papers, food cans, broken glass, and waste papers, etc. The construction activities will result into generation of soil materials from excavations, cement bags, metals, waste oils, paint containers, pieces of bricks and wood. However, the quantity of solid wastes and wastewater to be generated during

construction phase is not expected to be significant compared to similar types of wastes being generated in the city.

Hazardous waste like wate oils, car batteries, scrap metals, used tyres, etc, will be collected and temporarily stored on-site on well covered (roofed with iron sheets or impermeable materials) concrete paved surface with bund walls to prevent spilled materials from escaping into the surrounding environment or get and later on handed over to the authorized hazardous waste dealers. Non-reusable solid wastes will be disposed of as prescribed by the Resident Engineer.

2.15.1.3 Demobilization Phase

The most important waste to be generated includes pieces of bricks, concrete rubbles, pieces of wood, scrap metals. All these wastes will be disposed into the approved dump site. However, the re-usable materials can be handed over to the local people.

3.0 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

Preamble

This Chapter provides the description of relevant National and World Bank Safeguard Policies, and Institutional Framework for environmental management in the country as well as relevant regulations, strategies, standards, international conventions and/or treaties/agreements. It also considers compliance with relevant National Policies and World Bank Safeguard Policies, legal requirements, and international conventions/agreements/treaties to which the country is a signatory.

3.1 WORLD BANK POLICIES AND GUIDELINES

3.1.1 World Bank Safeguard Policies

The review of the World Bank Safeguard Policies has been necessary because the project will receive funding from the World Bank. The Safeguard policies are used to ensure that all projects financed by the World Bank are developed and implemented in an environmentally and socially responsible manner. The Safeguard Policies ensure that environmental and social risks of a World Bank-funded projects are properly identified and evaluated, any significant environmental and social risks are reduced or mitigated, and that key information about the project is disclosed and shared with key stakeholders.

There are ten (10) World Bank (WB) operational policies on environmental and social safeguards. The review and screening of WB Safeguard Polices has been carried out to find out which of those ten policies are triggered as shown in **APPENDIX 11.** The results indicate the project is expected to trigger three safeguard policies, namely the Environmental Assessment (OP/BP 4.01) ; Natural Habitats (OP/BP 4.04); Involuntary Resettlement (OP/BP 4.12). The purpose of this section is to describe each triggered or relevant policies to the project and how the project proponent has complied or will comply with the triggered safeguard policies.

3.1.1.1 Environmental Assessment (OP/BP 4.01)

The policy[12] requires bank-financed projects to be subjected to environmental assessment to ensure that they are environmentally sound and sustainable, and to improve decision making. The policy, among other things, provides the scope of issues to be covered or to be considered during the environmental assessment and provides criteria for the categorization of the project. The policy requires ESMP to be prepared for Category A and Category B projects and provides guidelines for the preparation of ESMP (OP 4.01, Annex C)[13].

The policy requires stakeholder consultations to be carried out at the onset of the project implementation to obtain their views about the project's environmental aspects and takes their views into account.

Relevance/Compliance

The policy is triggered because the project is likely to have some adverse (negative) impacts. However, the project is expected to have more beneficial (positive) impacts.

The project has been subjected to environmental screening and found to fall under category A and therefore requires preparation of EIA following OP 4.01, Annex C-Environmental Management Plan. The project has complied with the requirements of the OP/BP 4.01 because stakeholder consultations were carried out during the environmental screening stage. Furthermore, the ESMP will be disclosed to the stakeholders for their comments before the commencement of the project.

[12] Operational Manual OP 4.01 - Environmental Assessment OP 4.01 January, 1999, Revised April 2013. https://policies.worldbank.org/sites/ppf3/PPFDocuments/090224b0822f7384.pdf

[13] OP 4.01, Annex C - Environmental Management Plan. OP 4.01 - Annex C January, 1999 https://policies.worldbank.org/sites/ppf3/PPFDocuments/3903Operational%20Manual%20-%20OP%204.pdf

3.1.1.2 Natural Habitats (OP/BP 4.04)

The policy[14] recognizes the importance of conservation of natural habitats for long-term sustainable development. The policy seeks to protect, maintain, and restore natural habitats and their biodiversity, particularly in protected areas or critical habitats, as well as to ensure the sustainability of services and products which natural habitats provide to human society.

The policy does not support projects that involve the significant conversion or degradation of critical natural habitats. Tanzania's critical habitats include estuaries, mangrove forests, and beaches, coral reefs, and sea grass beds. These areas are already under pressure due to population growth and emerging economic development[15].

The project road crosses the Msimbazi Creek which is comprised of mangrove vegetation on the upstream and downstream sides of the Selander Bridge at km 2+000. The mangrove vegetation provides a natural habitat and breeding ground for numerous marine faunae. The mangrove vegetation on the upstream of Selander Bridge also plays an important ecological function of being an interface between the terrestrial and marine ecosystems. They facilitate exchange of biological information and /or materials between the terrestrial and marine environments. The presence of mangrove vegetation on the downstream side helps to prevent or minimize soil erosion along the shorelines

Relevance / Compliance

This policy is triggered due to presence of mangrove vegetation on the upstream side of the Selander Bridge. However, the project is not likely to result into destruction of mangrove vegetation because the project will involve construction of a new bridge to replace the existing Selander Bridge, which is located about 10-30 m from the bridge centreline. Therefore, the bridge site will have a Right of Way (ROW) of about 20-60 m, which is adequate for construction works.

3.1.1.3 Involuntary Resettlement (OP/BP 4.12)

The policy[16] recognizes the adverse effects of involuntary resettlement on the livelihood, socio-economic, and cultural conditions of the project affected persons. Therefore, the overall objectives of the policy on involuntary resettlement are the following:

- To avoid involuntary resettlement where feasible, or minimized, by exploring all viable alternative project designs.

- To ensure the displaced persons do share in project benefits and are meaningfully consulted and get opportunities to participate in planning and implementing resettlement programs.

- To ensure displaced persons are assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing before the beginning of project implementation or whichever is higher.

This policy covers direct economic and social impacts that are caused by the involuntary taking of land and/or involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons.

[14] Operational Manual OP 4.04 - Natural Habitats
OP 4.04 June, 2001 Revised April 2013
https://policies.worldbank.org/sites/ppf3/PPFDocuments/090224b0822f74ac.pdf
[15] Options for a National Integrated Coastal Management Policy. Prepared by: Tanzania Coastal Management Partnership Support Unit. Dar Es Salaam. November 1999.
https://www.crc.uri.edu/download/TCM_004A.pdf
[16] Operational Manual OP 4.12 - Involuntary Resettlement. OP 4.12 December, 2001 Revised April 2013.
https://policies.worldbank.org/sites/ppf3/PPFDocuments/090224b0822f89db.pdf

Relevance/Compliance

The policy is relevant to this project because the project will involve land acquisition for construction of BRT Bus Terminals, Car Park and Ride Buildings, hence the need to compensate the affected persons. The baseline indicates less than 200 people will be displaced thus requiring an Abbreviated Resettlement Action Plan (ARAP).

Therefore, to minimize the impacts, an ARAP will be developed and implemented, and particular attention will be paid to the needs of vulnerable groups like women and disabled persons.

3.1.1.4 World Bank Group Environmental, Health, and Safety Guidelines

The World Bank Environmental, Health, and Safety General Guidelines[17] applies to projects that have either direct or indirect discharge of process wastewater, wastewater from utility operations or storm water to the environment. These guidelines are also applicable to industrial discharges to sanitary sewers that discharge to the environment without any treatment. Process wastewater may include contaminated wastewater from utility operations, storm water, and sanitary sewage. It provides information on common techniques for wastewater management, water conservation, and reuse that can be applied to a wide range of industry sectors. The guidelines require projects with the potential to generate process wastewater, sanitary (domestic) sewage, or storm water to incorporate the necessary precautions to avoid, minimize, and control adverse impacts to human health, safety, or the environment.

Relevance/Compliance

The EHS Guidelines are relevant to this project because the project is likely to trigger Environmental, Health and Safety (EHS) Issues during construction. These include emission of air pollutants; emission of noise nuisance; handling of hazardous wastes; accumulation of construction and domestic solid wastes. The details on the compliance by the project with the World Bank Group EHS Guidelines is provided in **APPENDIX 12.**

3.2 NATIONAL POLICIES

3.2.1 National Development Vision 2025

The vision of the National Development Vision 2025 is focused on Tanzania having graduated from a least developed country to a middle-income country by the year 2025 with a high level of human development.

The Tanzania Vision 2025 aims at achieving a high-quality livelihood for its people. attain good governance through the rule of law and develop a strong and competitive economy. It is envisioned that the following specific achievements would be attainable by the year 2025:

- High quality livelihood.
- Peace, stability, and unity.
- Good governance,
- A well-educated and learning society; and
- A competitive economy capable of producing sustainable growth and shared benefits.

Infrastructural development is one of the relevant strategies to achieve competitive economy. The strategy is focused on the development of road network for promotion of rural development; investment in energy, water, and telecommunication as being central to the stimulation of local and foreign investment and for creating wealth and employment generating activities.

[17] Environmental, Health, and Safety (EHS) Guidelines. World Bank Group. International Finance Corporation (IFC). http://documents1.worldbank.org/curated/en/157871484635724258/pdf/112110-WP-Final-General-EHS-Guidelines.pdf

Relevance / Compliance

The project involves upgrading of the road section, which passes through the rural areas, hence in line with Vision 2025, which seeks to promote rural development through development of road network in the country.

3.2.2 National Five-Year Development Plan (2021/22-2025/26)

The main objective of the Third National Five-Year Development Plan (2021/22-2025/26)[18] is to contribute to realisation of the National Development Vision 2025 goals. Therefore, one of the specific objectives of the Five-Year Plan is to build on achievements realised towards attainment of TDV 2025 to make Tanzania a semi-industrialised, middle-income country by 2025. Another relevant objective to this project is enhance the scope of Tanzania's benefits from strategic geographical opportunities through enabling improved business environments and strengthening the country's regional position as a hub for production, trade, supply, and transportation.

Relevance / Compliance

The project is focused on improvement of the road section into bitumen standard. The project is in line with Fiver Year Development Plan which focuses in improvement of transportation in the country.

3.2.3 Cross-cutting Policies

3.2.3.1 National Environmental Policy (2021)

The National Environmental Policy (NEP) of 2021[19] is the is the result of the review of NEP of 1997. As it was with NEP (1997) the NEP (2021) is the main policy document governing environmental management in the country. The overall objective of NEP (2021) is to provide a national framework for guiding harmonized and coordinated environmental management for the improvement of the welfare of present and future generations.

The policy provides a broad range of measures and actions responding to key environmental issues and challenges. It provides the framework for an integrated approach to planning and sustainable management of environment in the country. It also recommends strong institutional and governance measures to support the achievement of the desired objectives and goals.

Therefore, the policy addresses the following key environmental issues and challenges:

- land degradation;
- lack of accessible good quality water for urban and rural inhabitants;
- environmental pollution;
- loss of wildlife habitats and biodiversity;
- deterioration of aquatic ecosystems;
- deforestation;
- environmental pollution;
- climate change; and
- safe use of modern biotechnology.

The policy also identifies the following crosscutting issues as challenges facing environmental management in the country:

- Inadequate environmental Good Governance at all levels;

[18] THE UNITED REPUBLIC OF TANZANIA. **NATIONAL FIVE-YEAR DEVELOPMENT PLAN. 2021/22 - 2025/26 "Realising Competitiveness and Industrialisation for Human Development" MINISTRY OF FINANCE AND PLANNING June 2021.**

[19] The United Republic of Tanzania. Vice President's Office. National Environmental Policy, 2021. October 2021. https://www.vpo.go.tz/uploads/publications/en-1644923087-NATIONAL%20%20ENVIRONMENTAL%20POLICY%202021%20new.pdf

- Inadequate financial resources for Environmental Management; and
- Inadequate Gender consideration in environmental management.

The policy recognises the role and responsibilities of key players for successful achievement and implementation of policy objectives: These include the Ministry Responsible for Environment, Ministry of Finance, Sector Ministries, Government Departments and Agencies, Regional Secretariats, Local Government Authorities (LGAs), National Environment Management Council (NEMC), National Environmental Advisory Committee (NEAC), Environmental Appeals Tribunal, Civil Society Organizations, Academic and Research Institutions, Local Communities, Media, Development Partners, Regional and International Bodies,

Relevance / Compliance

The project is being implemented by TANROADS under the Ministry of Works and Transport, which are recognized by the policy as one of the key players in the implementation of NEP (2021). The project proponent will ensure mainstreaming of the NEP objectives and strategies into the project and will ensure there is collaboration with other stakeholders as required by the policy.

3.2.3.2 National Human Settlements Development Policy (2000)

The overall goal of the National Human Settlement Development Policy (2000)[20] is to promote development of sustainable human settlement and to facilitate provision of adequate and affordable shelter to all people, including the poor. The policy outlines a number of objectives; however, the relevant objective is to protect the environment within human settlement and natural ecosystem against pollution, degradation, and destruction with the aim of attaining sustainable development.

Relevance / Compliance:

The project is likely to lead into environmental pollution due to dust emission and generation liquid and solid wastes. The project proponent will ensure dust emission is minimized within densely populated and residential areas. The project proponent will also ensure proper disposal of solid wastes and liquid wastes to avoid pollution of surrounding environment with residential areas.

3.2.3.3 Women and Gender Development Policy (2000)

The objective of Women and Gender Development Policy (2000)[21] is to provide a directive to ensure the planning, strategies, and various activities in each sector and institution take into consideration gender equality.

The policy outlines eleven specific objectives, but the most relevant ones for this project include:

- To ensure development plans take into consideration gender equality
- To identify the role of women and men to ensure their participation in development activities for the benefit of society.

In general, the policy aims at establishing strategies on poverty eradication through ensuring that both women and men get access to existing resources for their development. It values the role played by women in bringing about development in the society.

Relevance / Compliance

[20] National Human Settlements Development Policy (2000). United Republic of Tanzania. Ministry of Lands and Human Settlement Development. Dar Es Salaam, January, 2000.

[21] Jamhuri ya Muungano wa Tanzania. Sera ya Maendeleo ya Wanawake na Jinsia. Wizara ya Menedeleo ya Jamii, Wanawake and Watoto. S. L.P. 3448, Dar Es Salaam, TANZANIA. Mwaka 2000.

The project has the potential to create employment of people during construction. The project proponent will ensure the Contractor provides equal employment opportunity between women and men; and will avoid any kind of discrimination at the workplace.

3.2.3.4 National Employment Policy (2008)

The overall objective of the National Employment Policy (2008)[22] is to stimulate national productivity, to attain full, gainful, and freely chosen productive employment, to reduce unemployment, underemployment rates, and enhance labour productivity. The policy outlines several specific objectives but the most relevant ones are:

- To promote equal access to employment opportunities and resources endowments for vulnerable groups of women, youth, and People with Disabilities (PWDs).
- To address cross-cutting issues related to the environment, gender, and HIV/AIDS in employment

Relevance / Compliance

The project has the potential to create employment for youth and women and to create adverse environmental impacts as well as the prevalence of HIV/AIDS. The project proponent will ensure the Contractor provides equal employment opportunities to people with a focus on vulnerable groups. The project proponent will also ensure the Contractor minimize HIV/AIDS prevalence through formulation and implementation of HIV/AIDS preventive and control programme.

3.2.3.5 Occupational Health and Safety Policy (2009)

The main objective of the Occupational Health and Safety Policy (2008)[23] is to reduce the number of work-related accidents and diseases in Tanzania. The policy outlines eight specific objectives, but the most relevant ones are:

- To improve the occupational health and safety skills and resources in the public and private sectors.
- To enhance education and training on occupational health and safety at all levels.
- To mainstream cross-cutting and cross-sectoral issues at workplaces.

Relevance / Compliance

The project has the potential to create occupational health and safety risks during implementation. The project proponent will ensure the provision of Personal Protection Equipment (PPE) to the construction workers and regular training on OHS issues to the construction workers.

3.2.3.6 National Health Policy (2009)

The National Health Policy (2009)[24] outlines several objectives but the most relevant one is to reduce the burden of disease, maternal and infant mortality and increase life expectancy through the provision of adequate and equitable maternal and child health services, facilitate the promotion of environmental health and sanitation, promotion of adequate nutrition, control of communicable diseases and treatment of common conditions.

Relevance/Compliance

The project has the potential to create a spread of communicable diseases due to interaction between the construction workers and local community members. The project proponent will ensure provision of sanitary facilities for construction workers.

[22] The United Republic of Tanzania. Ministry of Labour, Employment and Youth Development. National Employment Policy 2008. Dar Es Salaam, Tanzania 2008.
[23] The United Republic of Tanzania. Ministry of Labour, Employment and Youth Development. National Occupational Health and Safety Policy. 2009.
[24] The United Republic of Tanzania. Ministry of Health, National Health Policy, Ministry of Health, October 2003.

3.2.3.7 National Policy on HIV / AIDS Policy (2001)

The overall goal of the National Policy on HIV/AIDS (2001) [25] is to provide for a framework for leadership and coordination of the National multispectral response to the HIV/AIDS epidemic.

The policy outlines several specific objectives but the most relevant are:

- To create and sustain an increased awareness of HIV/AIDS through targeted advocacy, information, education, and communication for behaviour change at all levels by all sectors.

- To prevent further transmission of HIV/AIDS through: (a) making blood and blood products safe, and (b) promoting safer sex practices through faithfulness to partners, abstinence, non-penetrative sex, and condom use according to the well-informed individual decision (c) early and effective treatment of STIs in health facilities, with special emphasis on high-risk behaviour groups, and early diagnosis of HIV infection through voluntary counselling and testing.

Relevance / Compliance

The project is likely to lead into HIV/AIDS transmission due to interaction between construction of workers and local community members. The project proponent will ensure the Contractor develops and implements HIV/AIDS prevention and control programme. This will include giving employment priority to local people to minimize the number of new comers, hence reducing the possibility of new transmission of HIV among the local people.

3.2.3.8 National Plan of Action to End Violence against Women and Children

The National Plan of Action to End Violence Against Women and Children (NPA-VAWC, 2017/18-2021/22)[26] emphasizes the actions needed for both preventing and responding to violence and recognizes that investing in violence prevention initiatives has a positive impact on inclusive growth.

Thus, strengthening the impact of the diverse investments being made by government, development partners and stakeholders on the lives of women, children, and families and subsequently on communities and Tanzania as a whole is of paramount importance. The NPA-VAWC is grounded in the Tanzanian context and envisages improved coordination, delivery of quality services, implementation of viable prevention and response measures and application of innovative solutions to end all forms of violence against women and children.

Relevance / Compliance

The project is likely to induce influx of people into the project site in the form of job seekers and small business operators. The influx of people may lead into risk of emergence of Gender Based Violence (GBV), Sexual Exploitation and Abuse (SEA) and Child Labour. The project proponent will ensure the Contractor prevents emergence of GBV/SEA and Child Labour. This will include awareness creation among the local community members on GBV/SEA and Child Labour.

3.2.4 Sectoral Policies

3.2.4.1 National Road Safety Policy (2009)

The national road safety policy is a critical initiative in the effort to elevate road safety issues to a position of high priority on the national agenda. It provides the basis for working towards attaining the vision of a safe traffic environment. Some of the relevant policy objectives are:

- to promote road safety engineering and implement road design or traffic management improvements that will cost-effectively reduce road crashes.

[25] The United Republic of Tanzania. Prime Minister's Office. National Policy on HIV/AIDS. Dar Es Salaam. September 2001.
[26] NATIONAL PLAN OF ACTION TO END VIOLENCE AGAINST WOMEN AND CHILDREN IN TANZANIA. December, 2016. file:///E:/DOCS/BRT%20PHASE%204%20PROJECT/LITERATURE/NATIONAL%20PLAN%20OF%20ACTION%20TO%20END%20VIOLENCE.pdf

- to ensure that roads do not suffer unnecessary distress due to gross vehicle weight, axle weight or the combination of the two while serving their need for transportation;
- to protect the public's safety and preserve the investments while serving the need for transportation;
- to ensure that road pavement and bridge design are suitable to safe guard both interests of the road user cost and investor cost.

Relevance / Commitment:
The project involves construction of road section, with the aim of facilitating efficient and safe transportation of people and goods, which is emphasized in the policy.

The project is likely to result into disruption of traffic flow along the road sections. The project proponent will ensure the Contractor develops and implements traffic management plan during construction.

3.2.4.2 National Transport Policy (2003)

The vision of National Transport Policy (2003)[27] is to have efficient and cost effective domestic and international transport services, while at the same time maintaining maximum safety and minimum environmental degradation. The medium and long-term objective is to have bitumen roads for all trunk roads while at the same time ensuring that all regional and district roads are sufficiently rehabilitated and maintained to ensure smooth traffic flow.

The policy underlines the need for private sector participation including the local communities in the planning and rehabilitation of the road that pass through their areas.

Relevance / Compliance
The project involves construction of dedicated lane in them median for BRT Buses, hence reduced traffic congestion and improved public transport in the Dar Es Salaam City. The construction of BRT lanes will also improve road safety and reduced emission of air pollutants, hence in line with the policy objective.

3.2.4.3 Construction Industry Policy (2003)

The vision of the Construction Industry Policy (2003)[28] is: To have a dynamic, efficient, and competitive local construction industry that is able to undertake construction projects of any magnitude and participate effectively in providing its services in the regional and global market place.

The mission is to create an enabling environment for the development of a vibrant, efficient, and sustainable local industry that meets the demand for its services to support sustainable economic and social development objectives.

The policy outlines several objectives; however, the relevant policy objective is to improve the capacity and competitiveness of the local construction enterprises (contractors, consultants, and informal sector).

Relevance / Compliance:
The project proponent has involved the service of local consultant in the design, preparation of bidding document and supervision. During construction priority will be given to local contractors, local people, as well as, the use of locally available materials, as emphasized in the policy.

3.2.4.4 National Land Policy (1995)

[27] National Transport Policy (2003). United Republic of Tanzania. Ministry of Communications and Transport. P.O. Box 9144, Dar Es Salaam. Fax +255 022 2112751. Tel\; +255 022 2112858 / 022 2137650/5
[28] Construction Industry Policy (2003). The United Republic of Tanzania. Ministry of Works. November, 2003.

The overall aim of a National Land Policy (1995)[29] is to promote and ensure a secure land tenure system, to encourage the optimal use of land resources, and to facilitate broad-based social and economic development without upsetting or endangering the ecological balance of the environment.

The policy outlines several specific objectives, however, the most relevant policy objective to this project is to protect land resources from degradation for sustainable development.

Relevance / Compliance
The project has the potential to create land degradation through soil excavations, and accumulation of construction solid wastes into the surrounding environment. The project proponent will ensure proper disposal of construction solid wastes and restoration of landscape after construction. The construction activities will be confined within the permitted areas by the Engineer in order to minimize land degradation.

3.2.4.5 National Mineral Policy of Tanzania (2009)

The purpose of the Mineral Policy of Tanzania (2009)[30] is to increase the mineral sector's contribution to the GDP and alleviate poverty by integrating the mining industry with the rest of the economy. The policy outlines several objectives, but the most relevant objective is to promote safety and maintain hygiene conditions and protect the environment in mining areas.

Relevance / Compliance:
The project will involve extraction of construction materials from quarry sites and borrow pits. The project proponent will ensure safety, hygiene and environmental protection are taken into consideration during extraction of construction minerals. This will include provision of temporary sanitary facilities at the borrow pits and quarry site areas.

3.2.4.6 National Energy Policy (2015)

The Vision of the National Energy Policy (2015)[31] is to have a vibrant Energy Sector that contributes significantly to economic growth and improved quality of life of Tanzanians. The Mission is to provide reliable, affordable, safe, efficient and environment friendly modern energy services to all while ensuring effective participation of Tanzanians in the sector.

The main objective of the policy is to provide guidance for sustainable development and utilization of energy resources to ensure optimal benefits to Tanzanians and contribute towards transformation of the national economy.

The policy outlines sector specific issues, statements, and objectives. With regards to energy efficiency and conservation, the policy objective is to promote energy efficiency and conservation in all sectors of the economy. The relevant issues to this project are energy efficiency in transport sector and in residential and commercial sectors.

Relevance / Compliance:
The project falls under the transport sector which is recognized by the policy as a large consumer of imported petroleum products. The construction of dedicated BRT lanes will result into reduced traffic congestion, faster movement of vehicles along the road sections, hence minimizing consumption of fossil fuels. Not only that but faster movement of vehicles will result into reduced emission of air pollutants, hence reduced environmental pollution.

3.2.4.7 National Water Policy (2002)

[29] National Land Policy (1997). The United Republic of Tanzania. Ministry of Lands and Human Settlements Development, Dar Es Salaam, Tanzania. Second Edition 1997.
[30] The Mineral Policy of Tanzania. The United Republic of Tanzania. Ministry of Energy and Minerals September, 2009
[31] National Energy Policy (2015). The United Republic of Tanzania. Dar Es Salaam. December, 20015.

The main objective of the National Water Policy (2002)[32] is to develop a comprehensive framework for sustainable development and management of the Nation's water resources. The policy recognizes the importance of water quality management and pollution control. In this case the policy objective is to have water resources with an acceptable quality by avoiding pollution from point and non-point sources. The policy seeks to protect water sources from encroachment of land around water source areas. It recognizes the problem of water pollution due to due to the disposal of untreated and/or inadequately treated domestic and industrial wastewater, agrochemicals and high turbidity caused by sediments due to soil erosion.

Relevance / Compliance:

The project will involve abstraction of water from existing DAWASA natural stream/rivers, which are the important source of water for the local communities in the project area. In this regard, the abstraction of water will be carried out carefully to avoid pollution of this water sources. This will include the use of water pump and hose pipe at a distance of not less than 50m from the water sources and avoiding washing of vehicles in the natural streams/rivers.

3.2.4.8 National Tourism Policy (1999)

The overall objective of the National Tourism Policy (1999)[33] is to assist in effort to promote the economy and livelihood of the people, essentially poverty alleviation, through encouraging the development of sustainable and quality tourism that is culturally and socially acceptable, ecologically friendly, environmentally sustainable and economically viable. The policy outlines specific Economic, Social, Environmental and Cultural objectives. However, the most relevant one is environmental objective which to promote land development for tourism in a coordinated manner so as to attract private investment and ensure sustainable tourism development.

Relevance / Compliance:

The project involves construction of BRT lanes along the New Bagamoyo Road, which forms an important link to the Bagamoyo Town which is an important tourist destination. The project proponent will ensure the design of the road takes into consideration the needs of the tourism sector. The project proponent will also ensure any findings of archaeological and historical importance are salvaged by the contractor during construction.

3.3 LEGAL FRAMEWORK

3.3.1 Cross-sectoral Legislation

3.3.1.1 Environmental Management Act Cap 191

The Environmental Management Act Cap 191 (EMA Cap 191)[34] is an Act to provide for legal and institutional framework for sustainable management of environment; to outline principles for management, impact and risk assessments, prevention and control of pollution, waste management, environmental quality standards, public participation, compliance and enforcement; to provide basis for implementation of international instruments on environment; to provide for implementation of the National Environment Policy; to repeal the National Environment Management Act, 1983 and provide for continued existence of the National Environment Management Council; to provide for establishment of National Environmental Trust Fund and to provide for other related matters.

Sub-section 81(1) requires any developer of a project to undertake Environmental Impact Assessment study at his/her own cost Sub-section 81(2) requires Environmental Impacts Assessment to be carried out prior to the commencement or financing of a project or undertaking.

Relevance / Compliance

[32] National Water Policy (2002). The United Republic of Tanzania. Ministry of Water and Livestock Development. July 2002.
[33] National Tourism Policy (1999). The United Republic of Tanzania. Ministry of Natural Resources and Tourism. Dar es Salaam September, 1999.
[34] Environmental Management Act No. 20 of 2004. The United Republic of Tanzania. Vice President's Office. 11th November 2004.

The project falls under those project that require EIA to be carried out prior to commencement of construction works. This EIA is an indicator of compliance with the requirements of the EMA Cap 191.

3.3.1.2 Environmental Impact Assessment and Audit Regulations (2005)

The Environmental Impact Assessment and Audit Regulations (2005)[35] are made under Environmental Management Act No. 20 of 2004. The regulations provide basis for undertaking Environmental Impact Assessment (EIA) and Environmental Audit for various development projects with significant environmental impacts in the country. These regulations provide the procedures for carrying out Environmental Impact Assessment, Environmental Monitoring and Environmental Audits.

Regulation 4 prohibits any developer or proponent from implementing a project which is likely to have a negative environmental impact without conducting Environmental Impact Assessment study.

Relevance / Compliance

The project falls under those projects that require Environmental Impact Assessment (EIA) study. The Project Proponent will adhere to the procedures for conducting EIA study as prescribed in these regulations.

3.3.1.3 Environmental Management (EIA and Audit) (Amendment) Regulations (2018)

The Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations, 2018 is read as one with the Environment Impact Assessment and Audit Regulations (2005)/ These provides some amendments to the EIA and Audit Regulations (2005) and classifies projects into Four (4) Categories based on the magnitude of impacts on the environment. These include Category “A”; Category “B1”; Category “B2” and “Special Category”. The regulations provide the procedures for registration of each category of project.

Relevance / Compliance

The project falls under Category A in accordance with the classification provided in the amendment regulations. The Project Proponent will adhere to the project registration procedures as prescribed in these regulations.

3.3.1.4 Occupational Health and Safety Act (2003)

The Occupational Health and Safety Act No. 5 of 2003[36] is an Act to repeal the Factories Ordinance; to make provisions for the safety, health, and welfare of persons at work in factories and other places of work; to provide for the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with activities of persons at work; and to provide for connected matters

Relevance / Compliance:

The project involves construction activities that are likely to create occupational health and safety risks. The project proponent will follow the provisions given in the Act to safeguard health and safety of workers. This will include ensuring that the contractor provides Personal Protective Equipment (PPE) to construction workers. The contractor will also develop occupational health and safety management plan.

[35] Environmental Impact Assessment and Audit Regulations (2005). The United Republic of Tanzania.
[36] Occupational Health and Safety Act (2003). The United Republic of Tanzania. Ministry of Labour. 13th February 2003.

3.3.1.5 Public Health Act (2009)

The Public Health Act No. 1 of 2009[37] is an Act to provide for the promotion, preservation, and maintenance of public health with a view to ensuring the provisions of comprehensive, functional, and sustainable public health services to the general public and to provide for other related matters.

Section 32(1) requires the occupier or owner of any premises shall cause any drainage system to be properly protected or inspected to the satisfaction of an authorized officer in order to prevent the ingress of mosquitoes, vermin, and other disease-causing agents. According to Sub-section 32(2), any person who contravenes the provisions of this section commits an offence and on conviction is liable to a fine not exceeding one hundred thousand shillings.

Section 101(2) deals with connection of private drain or sewer with public sewer. It prohibits direct or indirect discharge of any matter from a manufacturing process or factory other than domestic or storm water into public sewer without a written agreement with the Authority.

Relevance/Commitment:

The storm water drainage is likely to create damage to adjacent properties if not properly designed or located. The project proponent will ensure all storm water drainage systems are properly designed to avoid damage on the adjacent properties.

3.3.1.6 HIV and AIDS (Prevention and Control) Act (2008)

The HIV and AIDS (Prevention and Control Act No. 28 of 2008[38] is an Act to provide for prevention, treatment, care, support and control of HIV and AIDS, for promotion of public health in relation to HIV and AIDS; to provide for appropriate treatment, care and support using available resources to people living with or at risk of HIV and AIDS and to provide for related matters. Section 6(3) requires project proponent to design and implement HIV/AIDS prevention and control programme and to submit it to TACAIDS before implementation for coordination and advice.

Relevance / Compliance:

The project is likely to create increased transmission of HIV/AIDS due to interaction between construction and the adjacent local community members. Thus, the project proponent will ensure the contractor formulates and implements HIV/AIDS prevention and control programme.

3.3.1.7 Employment and Labour Relations Act of 2004

The Employment and Labour Relations Act No. 6 of 2004[39] is an Act to provide for core labour rights to establish basic employment standards; to provide a framework for collective bargaining; to provide for the prevention and settlement of disputes and to provide for related matters.

Relevance / Compliance:

The project involves employment of construction workers and other staff, who are covered by the provisions of the Act. The project proponent will comply with the provisions of the Act by ensuring the contractor avoids child labour, discrimination at work place directly or indirectly, and pays minimum wages to the construction workers as prescribed by the Labour Laws.

3.3.1.8 Worker's Compensation Act No. 20 of 2008

[37] The Public Health Act No. 1 of 2009.
[38] HIV and AIDS (Prevention and Control) Act (2208). The United Republic of Tanzania. Ministry of Health and Social Welfare. 1st February 2008.
[39] Employment and Labour Relations Act (2004). The United Republic of Tanzania. Ministry of Labour. 14th April 2004.

This is an Act[40] to provide for compensation to employees for disablement of death caused by or resulting from injuries or diseases sustained or contracted in the course of employment; to establish the Fund for administration and regulation of workers' compensation and to provide for related matter.

Section 34(1) requires an employer shall, within seven days after receiving a notice of an accident from the employee or having learned in some other way that an accident has occurred, report the accident to the Director- General in a prescribed form.
Sub-section 34(2) requires an employer, at the request of an employee or the dependant of an employee furnish the employee or dependant with a copy of the notice of the accident furnished by the employer to the Director-General in respect of a claim for compensation by the employee or dependant.

Section 71(1) requires an employer carrying on business in Tanzania shall within the prescribed period and in the prescribed form register himself to the Director-General and furnish the Director-General with-
(a) the prescribed particulars of the employer's business; and
(b) any additional particulars he/she may require.

Section 72(1) requires an employer to keep a register or other record of the earnings and other prescribed particulars of all employees employed by the employer and shall, at all reasonable times, produce the register or record or a satisfactory reproduction on demand to an authorized person for inspection. Section 73(1) requires an employer, not later than the 31st day of March in each year, to furnish the Director-General with a return in the prescribed form, certified by the employer, as correct, showing the amount of earnings up to the maximum contemplated in section 74(7) paid by the employer to its employees during the period with effect from the first day of March of the immediately preceding year up to and including the last day of February of the following year and; such further information as may be prescribed or as the Director-General may require.

Relevance/Commitment:
The project is likely to create accidents or health and safety risks to construction workers. The project proponent will adhere to the objectives of the Act. This will include submission employees' records of earnings and monthly contributions.

3.3.1.9 Contractors Registration Act (1997)

This is an Act[41] to provide for the registration of contractors and to establish a Board to regulate the conduct of contractors and for the related matters.

Section 12(l) prohibits non-citizen of the United Republic from forming a local contracting firm unless the majority of its shares are owned by the citizens of United Republic of Tanzania. Otherwise, it will be registered as a foreign firm or company.

Section 23(1) prohibits any body of persons, whether corporate or unincorporated, from carrying out the business of contractors, unless at least one of the partners or directors who shall also be a shareholder has, as prescribed by the Board the required technical qualifications, skills, and experience.

Relevance / Compliance

[40] The United Republic of Tanzania. Chapter 263. The Workers' Compensation Fund Act. (Principal Legislation). Revised Edition of 2015.
[41] Contractors Registration Act No. 17 of 1997. United Republic of Tanzania.

The project will engage the services of contractors during construction. Therefore, the project proponent will ensure only qualified and registered contractor is engaged in the execution of the project.

3.3.1.10 Contractors Registration (Amendment) Act (2008)

This is an Act[42] to amend the Contractors Registration Act, with a view to providing provisions for effective regulation of activities and maintenance of professional conduct and integrity of contractors and for related matters. The Act shall be read as one with the Contractors Registration Act, hereinafter referred to as the "principal Act."

Sub-section 22(4) prohibits an employer or developer from engaging an unregistered firms or persons. If found guilty is liable to a fine of not exceeding ten percent of the contract sum or project value but not less than one percent of such contract sum or project value or five million shillings whichever amount is greater or to imprisonment for a term of not less than three years or to both.

Relevance /Commitment

The project will require engagement of contractor during construction. The project proponent will comply with the requirement of the Act by employing only a qualified and registered contractor.

3.3.1.11 Engineers Registration Act (1997)

This is an Act[43] to repeal and re-enact with modifications the Engineers (Registration) Act of 1968, to establish a Board to regulate the conduct of engineers, to provide for their registration and for related matters. Section 12(1) prohibits any person or body of persons who are not citizen of the United Republic from being registered as a local consultant or consulting firms unless:

- in the case of a natural person, he is a citizen of the United Republic;
- in the case of a company, it is incorporated in Tanzania and the firms.

Relevance /Commitment

The project involves consultancy services during contract supervision. In this regard, the project proponent will engage only a qualified and registered engineering consultancy firm.

3.3.1.12 Engineers Registration (Amendments) Act (2007)

This is an Act to amend the Engineers Registration Act of 1997[44] and shall be read as one with the Engineers Registration Act, hereinafter referred to as the "principal Act".

Sub-section (1) any person from employing as an engineer any person who is not a professional engineer or consulting engineer, or causing to undertake engineering works or services without employing the services of a professional engineer or consulting engineer.

Sub-section (2) prohibits any person from taking up or continuing in any employment as an engineer, or carrying out engineering works or services, unless he is a professional engineer or consulting engineer.

Relevance /Commitment

The project will require services of engineers during construction. In this regard, the project proponent will ensure only qualified professional engineers are employed.

3.3.2 Sector Legislations

[42] Contractors Registration (Amendment) Act No. 15 of 2008. United Republic of Tanzania.
[43] Engineers Registration Act No. 15 of 1997. United Republic of Tanzania.
[44] Engineers Registration (Amendments) Act No. 25 of 2007. United Republic of Tanzania.

3.3.2.1 Road Act (2007)

The Road Act No. 13 of 2007[45] is an Act to make provisions for road financing, development, maintenance, management, and other related matters. The Act outlines several functions of road authority, but the relevant one is to control the use of roads with the aim of providing safe and adequate infrastructure for transportation commensurate with economic development of the country.

Relevance / Compliance:

The project involves construction of dedicated bus lanes on the median, with associated infrastructure with the aim of improving transportation of people and goods along the road sections. The project proponent will ensure road safety issues are taken into consideration during design, construction, and operation phase.

3.3.2.2 Road Traffic Act Cap 168

The Road Traffic Act Cap 168[46] is an Act to provide for the control and regulation of road traffic. Section requires Employer to keep a written record of the name and driving licence number of such other person and shall on demand by a police officer produce such a record for inspection.

Relevance / Compliance:

The project has the potential to create disruption of traffic flow and road traffic accidents during construction. The project proponent will ensure that the Contractor formulates and implements traffic management plan during constriction. The contractor will erect permanent road signs to guide traffic movement during operation phase.

3.3.2.3 Water Resource Management Act (2009)

The objective of this Act is to ensure that water resources are protected, used, developed, conserved, managed, and controlled in ways which consider fundamental principles.
Section 63 requires any person who wishes to discharge effluents from commercial, industrial, or agricultural sources or from any sewerage works or trade waste systems or from any other source into surface water or underground strata to apply to the Basin Water Board.

Section 54{1) requires any person who intends to construct, sink, enlarge, or deepen a well or borehole in a Groundwater Controlled Area declared under section 38 or any other area, to apply for a Groundwater Permit.

Relevance / Compliance

The project has potential to pollute ground and surface water sources during construction and operation phase. The Project Proponent will ensure the Contractor avoids pollution of ground and surface water sources during construction.

The project is likely to use ground water by drilling a borehole or shallow well. The project proponent will be required to obtain a ground water permit from the Basin Water Board.

3.3.2.4 Forest Act (2002)

The Forest Act No. 14 of 2002[47] is an Act to provide for the management of forests, to repeal certain laws relating to forests and for related matters. Section 17.-(I) provides for removal of trees in specified circumstances.

Relevance / Compliance:

The mangrove vegetation is a protected natural vegetation under the Forest Act. However, the project is not likely to result into destruction of mangrove vegetation because the project

[45] Road Act (2007). The United Republic of Tanzania. Ministry of Works. 28th August 2007.
[46] Road Traffic Act Cap 168 (Principal Legislation). The United Republic of Tanzania.
[47] Forest Act (2002). The United Republic of Tanzania. 4th June 2002.

will involve construction of a new bridge to replace the existing Selander Bridge, which is located about 10-30 m from the bridge centreline. Therefore, the bridge site will have a Right of Way (ROW) of about 20-60 m, which is adequate for construction works.

3.3.2.5 Land Act (1999)

The Land Act No. 4 of 1999 is an Act to provide for the basic law in relation to land other than the village land, the management of land, settlement of disputes and related matters. Section 156 of the Land Act 1999 requires compensation to be paid to any person for the use of land of which he / she is in lawful or actual occupation as a communal right of way and with respect to a way leave. These include: any damage suffered in respect of trees, crops, and buildings as result of creation of way leave; and damage due to surveying or determining the route of that way leave. It is the responsibility of the government department of Ministry, Local Government authority or corporate body that applied for right of way to pay compensation.

Relevance / Compliance

The project will involve some land acquisition for construction of BRT Terminals, Car Park, and Ride Buildings, hence the need for compensation of affected people. The project proponent will ensure compensation is paid for any acquired land. The project proponent will also ensure the Contractor pays compensation for any damage caused to private property during construction.

3.3.2.6 Land Use Planning Act (2007)

The Land Use Planning Act No. 6 of 2007[48] is an Act to provide for procedures for preparation, administration, and enforcement of land use plans, to repeal the Land Use Planning Commission and to provide for related matters.

The Act has distinctive authorities of land use planning in Tanzania and establishes land use planning authorities. It outlines their functions and powers conferred upon. The authorities established under the Act include:

- Village Councils – that are responsible for planning and managing village lands.
- District Councils – that are responsible for planning and managing all lands in the district and assist Village Councils to plan and manage their areas of authority.
- Land Use Planning Commission – which prepares national land use planning framework plan and assist the lower echelon to prepare plans and manage their lands.

Relevance / Compliance:

The project proponent will make consultation with the village and district land use planning authorities before implementing the project in their areas of jurisdiction. The project proponent will implement the project in accordance with the current land use plans in the project area to avoid any possible conflicts or incompatibility with current and future land use plans.

3.3.2.7 Urban Planning Act of 2007

The Urban Planning Act No. 8 of 2007 regulates land use in the country. It requires the occupier to pay land rent in order to get the Certificate of Occupancy. Other conditions stipulated in the act include:

- Erecting building by using permanent materials designed for the building in accordance with the condition of the issued Right of Occupancy.
- Conforming to the building line decided by the Authority.
- Providing plans for the building showing position of the building.
- Submitting drawings, elevations, plans and specifications to the Authority.

[48] Land Use Planning Act (2007). The United Republic of Tanzania. Act Supplement No. 10 22nd June, 2007. to the Gazette of the United Republic of Tanzania No. 25 Vol. 88, dated 22nd June, 2007.

- Maintaining buildings in good order and repair to the satisfaction of the Commissioner for Lands.
- Protecting all beacons on land and re-establishing at the occupier's expenses as assessed by the Director of Surveys and Mapping.
- Providing adequate water supply, drainage, and disposal of trade refuse and effluent to the satisfaction of the Authority.
- Fencing the land with good quality fencing and provide car parking as required by the Authority and provide loading and unloading facilities within the boundaries of land.

The Act gives the Commissioner for lands absolute discretion to give or withhold building consent.

Relevance / Compliance

The road sections pass through the planned urban areas with certificate of occupancy. The project proponent will respect the individual right of occupancy. The road construction will be carried out carefully without affecting public or individual plots or will pay compensation for any acquired land. The project management will adhere to the procedures stipulated in the Urban Planning Act (2007).

3.3.2.8 Local Government (Urban Authorities) Act Cap 288 (1982)

This is an Act[49] to make better provision for the establishment of urban authorities for the purposes of local government, to provide for the functions of those authorities and for other matters connected with or incidental to those authorities.

Section 59 provides for the functions and powers of the Urban Authorities. According to the Act, the Urban Authorities, among others, shall have power:

- to construct any new and necessary works in connection with any of the functions under this Act;

- to provide for the establishment, management, layout, planting, improvement, maintenance and regulation of parks, gardens, swimming baths, public libraries, museums and other places of public resort, recreation of entertainment for the use of the public, and to contribute to the cost of maintenance of any parks, gardens, swimming baths, public libraries, Museums and other places of public resort, recreation or entertainment provided by persons for the use of the public;

- to design the layout of streets, building areas and other areas, and to provide for and authorise the adoption of such measures with respect to expropriation or limitation of user, and with respect to the assessment and time of payment of compensation, as the authority may consider necessary or desirable for the purpose of the convenient design and construction of such layouts; save that before any layout is made, the plan or plans of such layout or alteration shall be submitted for the approval of the Minister.

Relevance/Compliance

The project involves construction and upgrading of road sections in urban area, and therefore has the potential to interfere with urban land use planning, such as allocation of areas for gardens, parks, or recreational areas. In this case the project proponent will be required to make consultation with relevant urban authorities in order to ensure the construction of the road sections is compatible with urban land use planning.

3.3.2.9 Explosives Act (1963)

[49] The Local Government (Urban Authorities) Act No. 8 of 1982.

This is an Act to make further and better provision for the control of the manufacture, import, export, purchase, sale, possession, and use of explosives, to repeal the Explosives Ordinance and for matters incidental thereof and connected therewith.

Relevance / Compliance

The project will not involve operation of quarry sites, instead crushed stone aggregates will be obtained from quarry sites operators. However, in the event that the operation of quarry site become necessary, the project proponent will ensure the Contractor adheres to the conditions of dealing with explosives as stipulated in the legislations. The project proponent will ensure the contractor does not use explosives for demolition works or extraction of rocks materials during foundation works.

3.3.2.10 Explosives Regulations (1964)

According to Regulation 5(1), a detailed map to a scale of not less than 1:1.000 of the area within l mile radius of the proposed magazine shall accompany an application for a permit to construct a magazine. Regulation 24, prohibits storage of explosives other than an underground store or a temporary store shall be licensed for the storage of explosives unless it has been constructed in accordance with the provisions of these regulations.

Sub-Regulation 32-(1) prohibits blasting operations to be carried out in surface or open cast works within one hundred yards of any place which the public customarily frequent except with the permission of an inspector and subject to any special conditions he may impose having regard to the public safety. Sub-Regulation 32(2), requires a person in-charge to supply sufficient guards carrying red flags to guard all approaches thereto so as to ensure no person is allowed inadvertently to approach within dangerous range of the blasting operations.

Relevance / Compliance

The project will not involve extraction of stone aggregates from quarry sites. However, in the event that the operation of quarry site becomes necessary the project proponent will adhere to the requirements of these regulations. This includes employment of qualified person in blasting operations and proper storage of explosives.

3.3.2.11 Antiquities Act of 1964 and the Antiquities Rules of 1991

The Antiquities Act of 1964[50] and the Antiquities Rules of 1991[51] govern archaeological research in Tanzania. Under the Act, all objects (relics) that were made or modified by man before the year 1864 are automatically protected under the law.

Section 16 of the 1964 Act gives powers to Local Government Authorities, to pass by-laws (with the approval of the Minister responsible for Antiquities) with respect to the preservation of the archaeological heritage in their areas of authority. They also have mandates to spearhead developments in districts and urban centres (for cities and municipalities) respectively.

Relevance / Compliance

The project has the potential to create destruction of archaeological artefacts due to land excavations, especially during foundation works. In this regard, the proponent will ensure the Contractor avoids destruction of archaeological materials and report on any archaeological findings to the Director of Antiquities and local government authority.

3.3.2.12 Antiquities (Amendment) Act (1979)

The Antiquities (Amendment) Act No. 22 of 1979[52] is an Act to amend the Antiquities Act of 1964 and shall be read as one with the Antiquities Act of 1964 (hereinafter referred to as the "principal Act").

[50] Antiquities Act of 1964. United Republic of Tanzania.
[51] Antiquities Rules of 1981. United Republic of Tanzania
[52] Antiquities (Amendment) Act No. 22 of 1979. United Republic of Tanzania.

According to Section 11(1) no person except the Director or a person acting on his behalf, shall whether on his own land or elsewhere: (a) excavate, dig or probe for monuments or relics; or (b) remove or collect any relic or any object he supposes to be a relic from the site of its discovery, except for the purposes of protecting it and reporting the discovery under the provisions of section 10 or for the purposes of delivering it to the authorities if required to do so under that section. (c) search for or collect any ethnographical object, except under and in accordance with an excavation licence or in the case of an ethnographical object, a collector's licence issued by the Director.

Relevance / Compliance

The project will involve land excavation during road bed preparations and foundation works. During this process some archaeological artefacts may be encountered. The Contractor will comply by immediate reporting of any archaeological findings to the Department of Antiquities.

3.3.2.13 Other Relevant Legislations

The following are other relevant legislations to which the project will comply with during implementation:

- The Environmental Management (Air Quality Standards) Regulations 2007 (GN No. 237/2007)
- The Environmental Management (Water Quality Standards) Regulations, 2007 (GN No. 238/2007);
- The Environmental Management (Soil Quality Standards) regulations 2007 (GN 239/2007)
- The Environmental (Solid Waste Management) Regulations, 2009 (GN No. 263/2009)
- The Environmental Management (Quality Standards for Control of Noise and Vibration Pollution) Regulations, 2015.
- The Environmental Management (Hazardous Waste Control and Management) Regulations, 2021
- The Environmental Management (Fees & Charges) Regulations, 2021
- The Standard Act, 2009
- The Environmental Management (Prohibition of Plastic Carrier Bags) Regulations, 2009.
- The Environmental Management (Electric and Electronic Equipment Waste) Regulations, 2021

3.3.3 Environmental Management Guidelines

3.3.3.1 Environmental Assessment and Management Guidelines in Road Sector (2004)

The Environmental Assessment (EA) Guidelines for Road Sector (July 2004) has been prepared to address environmental issues in all projects that fall under the road sector. The road sector guideline outlines resettlement plan and compensation procedures. It recognizes the considerable impacts of road infrastructure on human settlement and local community properties, including adjacent land use.

Relevance / Compliance

The project proponent will ensure compensation is paid to affected persons for any affected properties due to land acquisition or any damaged property due to construction activities.

3.3.3.2 Environmental Code of Practice for Road Works (2009)

The Environmental Code of Practice for Road Works has been prepared to guide the intervention of road engineers and technicians during the planning, design, construction, and operation phases, so that direct adverse environmental impacts of the project can be avoided or minimized through appropriate corrective measures. The intention is to ensure that all environmental considerations are well integrated into the road projects and activities.

The overall objective of the Environmental Code of Practice is to provide a tool, which integrates identified environmental aspects for project managers, road engineers, technicians, contractors, and environmental specialists. Specifically, the objectives of the environmental code are:

- To establish specific environmental criteria for road works in Tanzania.
- To provide technical assistance.
- To ensure general understanding of environmental impacts and define environmental criteria to minimise such impacts.
- To ensure that road engineers and technicians can find solutions for any problems arising during road constructions or maintenance activities.
- To facilitate the preparation of environmental assessment for road development projects.

Relevance / Compliance

The project proponent will ensure that the contractor adheres to the environmental code of practice during construction. This includes application of cost-effective mitigation measures to minimize environmental degradation due to construction activities.

3.3.3.3 Road Sector Compensation and Resettlement Guidelines (2009)

The purpose of these guidelines is to provide a consistent approach in the development and implementation of Compensation and Resettlement Plans (CRPs). The main strategy is to integrate compensation and resettlement process from the planning phase of the road project. The objectives are to:

- Create awareness on compensation and resettlement issues among the various road agencies and other stakeholders;
- Ensure transparency in the compensation and resettlement process;
- Clarify respective roles and obligations of each responsible institutions;
- Providing technical guidance;
- Clarify reporting requirements;
- Ensure information flow and public participation; and
- Provide logical methodology for C&R in the road sector.

Therefore, the overall objectives of a CRP are to:

- Ensure displaced persons/parties receive benefits from the project that is displacing them;
- Ensure Social disruption is minimised;
- Ensure Resettlement activities are executed as sustainable development programmes;
- Ensure Affected persons are consulted throughout the planning and implementation stages of the compensation and resettlement process;
- Ensure Income restoration is integral to the C&R process;
- Ensure there is a net improvement in livelihood activities and standards of living of affected persons as compared with their situation prior to displacement or implementation of the project;
- Ensure fair and prompt compensation (in cash or in kind, as preferred by the PAP) is paid before roadworks activities begin;
- Ensure Resettlement timetables are well coordinated with roadworks activities;
- Ensure an adequate budget is provided for the C&R process.

The guidelines have been developed to complement the Environmental Assessment and Management Guidelines (2004) and have drawn from the World Bank's Operational Policy 4.12 on Involuntary Resettlement, the IFC's Handbook for Preparing a Resettlement Action Plan, and the African Development Bank's Involuntary Resettlement Policy.

The guidelines are intended to guide the user in the preparation of a Compensation and Resettlement Plan (CRP) and are to be used on an individual or case by case basis, bearing in mind that the overall objective of a CRP is that the resultant standard of living of the affected persons is equivalent to, if not higher, than before the project.

Relevance / Compliance

The project will involve land acquisition due to construction of BRT infrastructures such a s Bus Terminals, Depots, and Car Park & Ride Buildings. In this regard, the project proponent will ensure that all the PAPs are compensated in accordance with the Compensation and Resettlement Guidelines.

3.3.4 International Conventions

3.3.4.1 Convention on Biological Diversity (1992)

The Convention on Biological Diversity (CBD)[53] entered into force on 29 December 1993. It has 3 main objectives:

- conservation of biological diversity.
- sustainable use of the components of biological diversity.
- fair and equitable sharing of the benefits arising out of the utilization of genetic resources.

Relevance / Compliance

The project involves widening of the Selander Bridge, hence likely to result into destruction of some mangrove vegetation on the upstream and downstream side. The mangrove vegetation is an important natural habitat for variety of marine organisms. The mangrove vegetation is important for maintaining the biodiversity of marine ecosystem.

3.3.4.2 Convention for the Protection, Management, and Development of the Marine and Coastal Environment of the Eastern African Region

This Convention[54] was adopted in Nairobi on 21 June 1985 for the Eastern African Region, hereinafter referred to as "the Convention area" as defined in paragraph (a) of Article 2[55]; and does not include internal waters of the Contracting Parties.

Article 4(10 of the Convention requires the Contracting Parties, individually or jointly, to take all appropriate measures to prevent, reduce and combat pollution of the Convention area and to ensure Sound environmental management of natural resources, using for this purpose the best practicable means at their disposal, and following their capabilities.

Article 4(2) requires the Contracting Parties to take all appropriate measures to prevent, reduce and combat pollution of the Convention area caused by coastal disposal or by discharges emanating from rivers, estuaries, coastal establishments, outfall structures or any other sources within their territories.

Relevance / Compliance

The project will involve expansion of Selander Bridge, hence likely to affect the mangrove vegetation on the upstream and downstream sides. The mangrove vegetation provides a natural habitat for a variety of marine organisms and forms an important interface between the terrestrial and marine environment.

3.3.4.3 ILO Conventions

[53] Convention on Biological Diversity (1992) United Nations 1992 https://www.cbd.int/doc/legal/cbd-en.pdf
[54] Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region. Nairobi, 21 June 1985.
[55] "Convention area" shall be comprised of the marine and coastal environment of that part of the Indian Ocean situated within the Eastern African region and falling within the jurisdiction of the Contracting Parties to this Convention

The ILO Conventions cover a wide area of social and labour issues including basic human rights, minimum wages, industrial relations, employment policy, social dialogue, social security, and other issues.

(a) Working Environment (Air Pollution, Noise, and Vibration) Convention, 1977 (No. 148)

The Convention[56] got entry into force on 11 Jul 1979, and Tanzania signed the Convention on 30 May 1983 and has accepted the obligation of the convention in respect of air pollution only[57]. According to Article 3: the term air pollution covers all air contaminated by substances, whatever their physical state, which is harmful to health or otherwise dangerous; the term noise covers all sound which can result in hearing impairment or be harmful to health or otherwise dangerous; The term vibration covers any vibration which is transmitted to the human body through solid structures and is harmful to health or otherwise dangerous.

Article 4 requires national laws or regulations to prescribe measures to be taken for the prevention and control of, and protection against, occupational hazards in the working environment due to air pollution, noise, and vibration; and to have provisions concerning the practical implementation of the measures so prescribed may be adopted through technical standards, codes of practice and other appropriate methods.

Relevance / Compliance:

The project has the potential to create occupational health and safety risks due to handling of hazardous construction materials and equipment. The propjet proponent will ensure the Contractor provides relevant PPE to construction workers.

(b) Worst Forms of Child Labour Convention, 1999 (No. 182)

The Convention[58] concerning the Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labour, known in short as the Worst Forms of Child Labour Convention, was adopted by the International Labour Organization (ILO) in 1999 as ILO Convention No 182. It is one of eight ILO fundamental conventions. Tanzania signed the Convention on 12 September 2001.

By ratifying this Convention No. 182, a country commits itself to take immediate action to prohibit and eliminate the worst forms of child labour. Article 1 requires member countries to take immediate and effective measures to secure the prohibition and elimination of the worst forms of child labour as a matter of urgency.

Relevance / Compliance:

The project has the potential to create employment, and there is a possibility of children trying to seek employment during construction. The project proponent will ensure the Contractor does not employ children aged 14 years or below.

(c) Discrimination (Employment and Occupation) Convention, 1958 (No. 111)

The Convention concerning Discrimination in Respect of Employment and Occupation or Discrimination (Employment and Occupation) Convention (ILO Convention No. 111) [59] is an ILO Convention on anti-discrimination. It is one of eight ILO fundamental conventions. The convention requires states to enable legislation that prohibits all discrimination and exclusion on any basis including race or colour, sex, religion, political opinion, national or social origin in employment, and repeal legislation that is not based

[56] https://en.wikipedia.org/wiki/Working_Environment_(Air_Pollution,_Noise_and_Vibration)_Convention,_1977
[57] https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:11300:0::NO::P11300_INSTRUMENT_ID:312293
[58] https://en.wikipedia.org/wiki/Worst_Forms_of_Child_Labour_Convention
[59] https://en.wikipedia.org/wiki/Discrimination_(Employment_and_Occupation)_Convention

on equal opportunities. Article 2 requires each Member Country to declare and pursue a national policy designed to promote, by methods appropriate to national conditions and practice, equality of opportunity and treatment in respect of employment and occupation, to eliminate any discrimination in respect thereof.

Relevance / Compliance:
This project will employ different people of different origins in terms of nationalities, tribe, race religious affiliations, and gender. The Contractor will ensure there is no any kind of discrimination based on nationality, tribe, race, religion, or gender.

(d) Workmen's Compensation (Accidents) Convention, 1925 (No. 17)
Workmen's Compensation (Accidents) Convention, 1925[60] is an International Labour Organization (ILO) Convention, which was adopted on June 10, 1925, and came into force on April 1, 1927. Tanzania signed the convention on 30 January 1962. Article 1 requires each Member Country to ensure that workers, who suffer personal injury due to an industrial accident, or their dependents, shall be compensated on terms at least equal to those provided by this Convention.

Relevance / Compliance:
This project has the potential to cause accidents or death during construction. The project proponent will ensure the Contractor is registered by the Workers Compensation Fund, which is responsible for the payment of compensation in case of injury or death of any worker in the course of work.

3.4 INSTITUTIONAL FRAMEWORK

The institutional framework for environmental management in Tanzania is well established from local government level to national level. The organisational structure for implementation of environmental management matters from national to local government authorities' level is provided in in **Figure 3-1.** The responsibilities of each institution for implementation of environmental management matters from national level down to local government level and relevant sections of the EMA Cap.191 specifying their responsibilities are summarized in **Table 3-1.**

[60] https://en.wikipedia.org/wiki/Workmen%27s_Compensation_(Accidents)_Convention,_1925

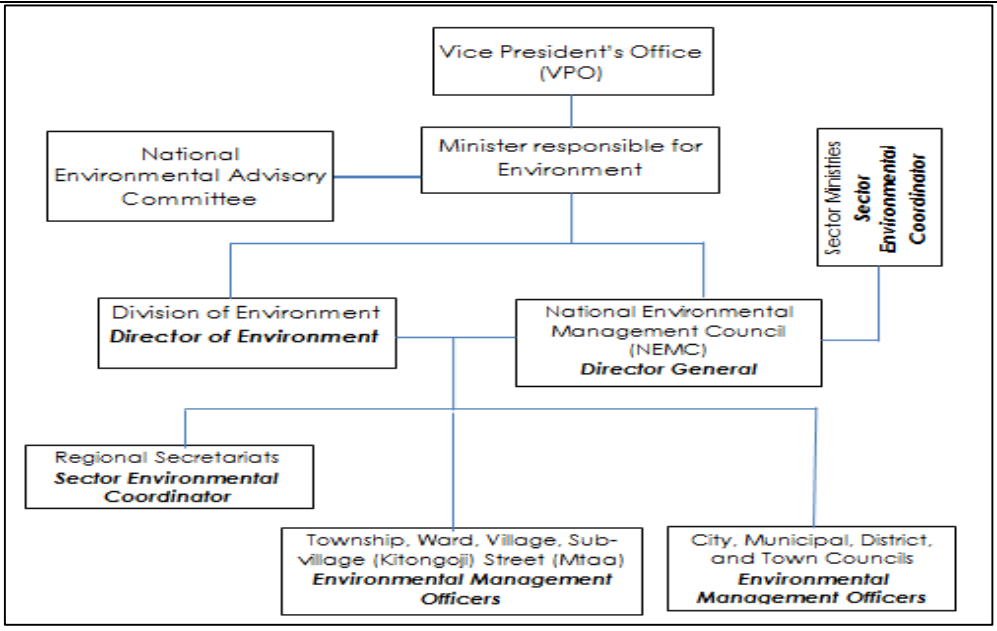

Figure 3-1: Organisational Structure for Environmental Management in

Table 3-1: Institutional Responsibilities for Environmental Management.

Institution	Responsibilities	Relevant Section of EMA Cap. 191
1. National Level		
(a) National Environmental Advisory Committee (NEAC)	The NEAC is responsible for: - Advising the Minister or any Sector Ministry on any matter which may be referred to it by the Minister or any Sector Ministry relating to the protection and management of the environment. - Examining any matter which may be referred to it by the Minister relating to the protection and management of the environment and recommending to the Minister or Sector Ministry any action for achieving the objectives of the EMA Cap. 191.	Section 12
(b) Minister Responsible for Environment	The Minister is responsible for all matters relating to environment and for articulation of policy guidelines necessary for the promotion, protection, and sustainable management of environment in Tanzania.	Section 13(1)
(c) Vice President's Office-Division of Environment (VPO-DoE)	The VPO-DOE under the Director of Environment, is responsible for coordination of environmental activities, advising the government on the law and international environmental agreements on the environment, monitor and assess activities of relevant agencies, prepare and issue State of Environment Report. These functions are the day-to-day functions of the Director of Environment.	Section 15
(d) National Environment Management Council (NEMC)	The NEMC, under the Director General is responsible for undertaking enforcement, compliance, review, and monitoring of environmental impact assessment; facilitation of public participation in environmental decision making; exercising general supervising and coordination over all matters relating to the environmental management in the country.	Section 17(1)
(e) Sector Ministry	The Sector Ministry, under its Sector Environmental Sector Section is responsible for: - Ensuring compliance by the sector Ministry with the requirements of EMA Cap 191, and implementation of all environmental matters contained in the written laws falling under sector ministry. - Reporting their implementation of environmental matters to the Director of Environment; and liaising with the Director of Environment and the Council (NEMC) on all environmental matters.	Section 30
2. Regional Level		

Institution	Responsibilities	Relevant Section of EMA Cap. 191
(a) Regional Secretariat	The Regional Secretariat under its Regional Environmental Management Expert is reproable for: - Coordination of all advice on environmental management in their respective regions and liaising with the Director of Environment and Director General of NEMC on implementation and enforcement of EMA Cap 191. - Advising the local authorities on matters relating to the implementation and enforcement of the EMA Cap 191.	Section 34 and Section 35
3. Local Government Level		
(a) City, Municipal, and District Councils	The City Councils, Municipal Councils and District Councils through the Environmental Management Committees are responsible for overseeing environmental management within their jurisdictional boundaries and carrying out all directives given by the Minister in relation to the promotion and enhancement of the sustainable management of the environment.	Section 37(3)
(b) (b) Townships and Wards	The Townships through their Standing Committees and Wards through tier Ward Development Committees are responsible for proper management of the environment within their areas of establishment and carrying out directives given by the Minister in relation to the promotion and enhancement of sustainable management of the environment.	Section 38(1)
(c) (c) Village, Mtaa and Kitongoji Committees	The Villages through their Village Development Committees are responsible for proper management of the environment in respect of the area in which it is established and other functions as are provided under the provisions of EMA Act Cap. 191.	Section 38(2)

4.0 ENVIRONMENTAL BASELINE CONDITIONS

4.1 Physical Environment

4.1.1 Topography

The topography along the New Bagamoyo Road Section is mainly undulating with altitude ranging from 14 m to 28 m (m.a.s.l.). The elevation profile along Bibi Titi-Ali Hassan Mwinyi-New Bagamoyo Road is provided in **Figure 4-1.**

The elevation profile indicates the road ascends from an altitude of about 14 m (m.a.s.l.) at Maktaba Street Junction (km 0+000) to an altitude of about 28 m (m.a.s.l.) near Salasala Road Junction (km 18+800), and thereafter, the road descends rapidly to 21 m (m.a.s.l.) at DAWASA Bus Stop (km 24+570).

For Sam Nujoma Road Corridor the topography is dominantly flat with at altitude ranging from 28 m to 55 m (m.a.s.l.). The elevation profile along the Sam Nujoma Road Corridor is provided in **Figure 4-2.** The elevation profile indicates the road ascends from an altitude of about 28 m (m.a.s.l.) at Mwenge Junction (km 0+000) to an altitude of about 55 m (m.a.s.l.) at Simu 2000 Road Junction (km 3.14).

Figure 4-1: Elevation Profile along Bibi Titi-Ali Hassan Mwinyi-New Bagamoyo Road Corridor.

Source: Google Map[61].

Figure 4-2: Elevation Profile along Sam Nujoma Road Corridor.

Source: Google Map[62]..

4.1.2 Drainage and Hydrology

The field investigation carried out by the design team indicates the road section crosses several natural streams and drainages at various locations as shown in **APPENDIX 13.** The road also passes through flood prone areas along the New Bagamoyo Road as shown in

[61] Data SIO. NOAA.U.S. Navy, NGA, GESCO. Image© 2022 Maxar Technologies.
[62] Ibid.

Table 4-2. The results on the hydrological study based on the rational method along Bibi Titi/Maktaba-New Bagamoyo Road is provided in **Table 4-1.**

Table 4-1: Flood Prone Areas along the New Bagamoyo Road Section[63].

Road Section	Eastings	Northings
Bagamoyo/Chato Road km 5+525	0528704	9251133
Makumbusho area km 6+700	0527312	9251166
Mikocheni/Aspen Area km 8+300	0525476	9252432
Goba Junction km 14+375	0523495	9257118
Makonde area km 15+013	0523318	9257704
Manyema1 Stream km 15+915	0523061	9258568
Manyema2 Stream km 16+415	0523000	9258867
Africana Stream 1 km 16+850	0522845	9259473
Africana Str. 2 Crossing km 16+975	0522816	925961
Rafia area km 17+612	0522666	9260214
Boko DAWASA km 24+475	0518631	9265683

Table 4-2: Results of Hydrological Study Based on Rational Method.

Catchment Number	Co-ordinates		Chainage (km)	Name of Stream	Area in km2	Return Period (Q25)
	Eastings	Northings				
1						
2	053061	925036	0+125	Bibi Titi/ Maktaba	0.4	1.2
3	0529765	9251019	0+350	Bibi Titi /Ohio	0.5	1.5
4	0528733	9251136	0+875	Bibi Titi /Magore	0.6	1.5
5	0527373	9251143	1+900	Salander Police Station	0.5	1.5
6	053061	925036	3+550	Ali Hassan/Mkwawa	0.4	1.3
7	0529765	9251019	4+460	Best Bite	1.2	2.0
8	528842	9251155	5+395	Egyptian Attache	0.99	0.87
9	0528733	9251136	5+535	Bagamoyo/Chato road	2.7	10.36
10	0528546	9251108	5+695	Unnamed stream	0.99	1.05
11	0528328	9251073	5+915	Unnamed stream	0.99	0.87
12	0528101	9251041	6+145	Halotel	0.99	0.70
13	0527775	9251057	6+445	Victoria Tower	2.0	3.2
14	0527332	9251162	6+950	Makumbusho area	2.5	6.46
15	0526985	9251292	7+300	Unnamed stream	0.98	1.05
16	0526731	9251452	7+300	Oilcom Petrol stat.	4.0	5.57
17	0526204	9251873	7+600	Bamaga/Shekilango	3.6	21.61
18	0524941	9252047	8+595	ITV Mikocheni	1.5	1.28
19	0525476	9252432	8+300	Mikocheni/Aspen area	3.2	11.07
20	0526204	9251873	9+175	Junct,/S,Nujoma Rd	3.2	11.07
21	0524682	9253526	9+512	Pedestrian. Crossing	0.38	1.32
22	0524626	9253642	10+590	Makongo Football pitch	0.38	1.32
23	0524513	9253893	10+725	Makongo Secondary Sch.	0.6	2.08
24	0524428	9254048	10+975	Lugalo Pump House	1.2	5.77
25	0524268	9254370	11+175	Lugalo to Hospital	0.8	3.87
26	0524202	9254511	11+520	At Sports grounds	0.5	2.44
27	0524113	9254730	11+685	At Sports grounds	0.6	2.92
28	0524082	9254827	11+925	Lugalo near Main Gate	2	0.98
29	0523986	9255103	12+313	Lugalo after Main Gate	2	0.98
30	052395	9257118	14+375	Goba junction	5	43.72
31	0523318	9257704	15+013	Makonde stream	3	6.25
32	0523063	9258568	15+915	Manyema 1/Interchick	15	47.37
33	0523000	9258867	16+415	Manyama 2	7.0	15.98

[63] Source: Design Report

Catchment Number	Co-ordinates		Chainage (km)	Name of Stream	Area in km2	Return Period (Q25)
	Eastings	Northings				
34	0522845	925973	16+850	Africana Stream 1 NMB	0.63	3.40
35	0522816	9259610	16+975	Africana Str. 2 Cross.	1.00	4.83
36	0522666	9260214	17+612	Rafia area	15	30.72
37	0522615	9260392	17+790	Mazrui International	2	6.80
38	0521148	9262812	20+650	Tegeta Stream 1	8.0	17.77
39	0519444	9264804	23+275	Tegeta Rabinisia	7.0	5.95
40	0518995	9265275	24+075	Kibo Cement Namanga	6.0	7.97
41	0518631	9265681	24+475	DAWASA	6.0	5.71

4.1.3 Climate

The project area has a tropical climate characterised by hot and humid weather throughout much of the year with an average temperature of 29ºC. In general, the climate is influenced by its proximity to the warm Indian Ocean. The hottest season is from October to March during which temperatures can raise up to 35ºC. It is relatively cool between May and August, with temperature around 25ºC.

The area has a tropical wet and dry climate with two distinct rainy seasons. These include the “long rains” between March and May, and "short rains", from October to December. The average rainfall is 1000mm (lowest 800mm and highest 1300mm). Humidity is around 96% in the mornings and 67% in the afternoons. The project area is relatively cool between May and August, with temperature around 25ºC[64].

4.1.4 Climate Change

The following tabulation outlines the possible climate change events, risks and proposed mitigation measures to minimize climate change impacts.

Climate event	Risks to the road	Measures
Heavy rain for longer periods	Water overtopping on road crest Increased capacity of moistures and decreased cohesion of soil and increased seepage and infiltration across road body Drainage system over capacity of and increase drainage erosion Embankment instability or loss, road wash away	Increase road level to at least 0.5 m over the maximum flood level Erosion protection Increase capacity of culverts Build up weirs and spillways Increase capacity of compaction (lower moisture percentage) Decrease hydrodynamic force of water through planting grass • Use resistant materials for building roads
Storm events (Typhoons, Cyclones) and extreme winds	Destabilisation of bridges Trees blocking the roadway Damage to traffic signs	Increase capacity of spillways and culverts Embankment protection through tree plantings Increase road inspections Decrease road traffic during storms

4.1.5 Ambient Noise and Vibration Levels

The noise measurements carried out along the road corridors are shown in **Table 4-2.** The results indicate Maktaba Junction (71.6 dBA) had the highest noise levels, followed by United

[64] African Development Bank Group. Dar Es Salaam Bus Rapid Transit Project, Tanzania. Environmental and Social Impact Assessment Summary. March 2015.

Nations Junction and Mwenge Junction (71.3), Ufukoni Road Junction and Shekilango Road Junction (70.7 dBA), Victoria/Kairuki Junction and Rose Garden Road Junction (68.6 dBA), Morroco Junction 68.5 dBA), and Proposed BRT Tegeta Terminal (59.4 dBA). The baseline information indicates the traffic noise levels range between 59.4 to 71.6 dBA, which are lower than noise levels from common construction equipment **(Table 4-3)**[65]**.** The traffic noise levels are also lower than the maximum permissible noise levels for construction site during the day time in accordance with Tanzania Standards[66] as shown in **Table 4-4.**

It is therefore expected that during construction noise levels are likely to increase along the road corridors due to operation of heavy construction equipment. The significance of noise and vibration effects will depend on the location of sensitive receptors. During the field investigation some residential buildings were found to be close to the road (10-20 m), hence likely to be affected during construction. There is no information on the vibration levels along the road corridor. However, the major source of vibrations is from the movement of heavy trucks and mobile equipment along the road sections. Although most of the buildings are located close to the road there is no any sign of vibration effects on the adjacent buildings along the road corridors. For example, some of the buildings were found to be located about 12 m and 18 m from the road centreline along Bibi Titi Mohamed-Ali Hassan Mwinyi Road Section **(Figure 4-3).**

Table 4-3: Average Noise Levels Along the Road Corridors.

Measured Stations Location	Daytime Measured Data $(dBA)_{60min}$					
	L_{Aeq}	LA_{90}	LA_{10}	L_{Amax}	L_{Amin}	L_{Apeak}
Maktaba Junction	71.6	67.4	74.2	84.4	65.4	105.1
Ufukoni Road Junction	70.7	65.7	69.9	95.1	62.0	108.4
United Nations Junction	71.3	66.3	73.3	89.6	63.9	103.3
Morocco Junction	68.5	68.1	68.5	68.6	68.0	99.8
Victoria/Kairuki Road Junction	68.6	68.1	68.5	68.6	68.0	85.4
Rose Garden Road Junction	68.6	62.1	70.9	92.4	45.8	107.3
Shekilango Road Junction	70.7	64.8	73.7	86.8	56.3	108.1
Mwenge Junction	71.3	62.6	73.8	92.1	52.2	123.1
University Road Junction	66.8	59.0	68.6	90.2	48.6	108.6
Simu 2000 Bus Terminal	63.5	45.1	64.4	94.5	42.2	123.7
Proposed BRT Tegeta Terminal	59.4	58.5	61.2	68.1	50.5	95.4

Table 4-4: Noise ranges at 50 feet from common construction equipment.

Equipment	Noise levels (dBA)	Equipment	Noise levels (dBA)
Heavy trucks (avg.)	82-96	Backhoe (avg.)	72-90
Grader (avg.)	79-93	Paver (avg.)	85-89
Excavator (avg.)	81-97	Front loader (avg.)	72-90
Crane (avg.)	74-89	Generator (avg.)	71-82
Pile driver (peak)	81-115	Jackhammer/rock drills (avg.)	75-90
Concrete mixer (avg.)	75-88	Roller (avg.)	72-75

Sources: Bolt et al. (1971, 1987); Western Highway Institute (1971); WSDOT (1991); LSA Associates (2002).

Table 4-5: Maximum Permissible Noise Levels for Construction Site.

Facility	Maximum noise level permitted (Leq) in dBA

[65] Bolt et al. (1971, 1987); Western Highway Institute (1971); WSDOT (1991); LSA Associates (2002).
[66] *The Environmental Management (Standards for the Control of Noise and Vibrations Pollution).*
THE GOVERNMENT NOTICE NO. 32 published on 30/01/2015

	Day	Night
Hospital, schools, Institutions of higher learning. homes for the disabled, etc.	60	50
Building other than those prescribed in (i) above	75	65

Source: Environmental Management (Standards for the Control of Noise and Vibration Pollution) Regulations (2010)[67].

Figure 4-3: Buildings close to the road along Bibi Titi Mohamed Road Section.
Source: Google Map[68]..

4.1.6 Ambient Air Quality

4.1.6.1 Sources of Air Pollutants

(a) Nitrogen Oxides (NOx)

The major sources of nitrogen oxides are volcanic action and lightning. Anthropogenic emissions come from heating, power generators and transport (combustion engines). Atmospheric nitrogen is oxidized to NO during combustion and later oxidized to NOx. Nitrogen oxides is a collective term for nitric oxide, NO and nitrogen dioxide, NO_2. When emitted into the air NO is quite rapidly transformed into NO_2. Therefore, N02 is more important for the human health. NO_2 is a reddish-brown gas.

A variety of respiratory problems has been associated with exposure to NO_2. Young children and asthmatics are at risk from ambient NO_2 exposure, which may result in chronic bronchitis or other respiratory diseases. Nitrogen oxides also contribute to acid deposition and vegetation effects. Plants are more sensitive to nitrogen dioxide during the growing season and especially due to interactive effects with sulphur dioxide (SO_2).

(b) Sulphur dioxide (SO_2)

The main sources of sulphur dioxide, SO_2 are the burning of fossil fuel, and industrial sources like smelting of ores and manufacturing of paper. The amount of SO_2 emitted from a motor vehicle depends on the concentration of sulphur in the fuel. SO_2 is a colourless gas that can react with many airborne particles. It is soluble in water and can be oxidised within a water droplet.

After having been emitted from high chimneys sulphur is eventually oxidised further to sulphuric acid and giving rise to acid rain. Several environmental problems are associated with acid rain, including the killing of fish and the leaking of nutrients from soil. Other effects include damage to human respiratory function, especially when exposed in combination with particles.

[67] The Environmental Management (Standards for the Control of Noise and Vibrations Pollution) THE GOVERNMENT NOTICE NO. 32 published on 30/01/2015.
[68] Ibid.

Sulphur dioxide is also damaging to plants at moderate concentrations, especially at interactive effects with nitrogen dioxide.

(c) Carbon oxides (CO_x)

The major source of atmospheric carbon monoxide (CO) is the spark ignition engine. If the presence of oxygen is sufficient, most CO is instantly oxidised to Carbon dioxide (CO_2). However, this is not the case in an Otto-engine[69], especially under idling and decelerating conditions.

Carbon monoxide, CO is a colourless, odourless, tasteless gas that is lighter than air. Effects on the human body when inhaled are that CO disrupts the supply of 02 to the body, in other words suffocation. The lowest level of which notable effects on vegetation have been observed is 115 mg/m^3.

(d) Ozone

Ground level ozone, O3 is a so-called secondary pollutant formed in atmospheric reactions involving oxides of nitrogen and hydrocarbons. Their major sources are motor vehicles. The oxides react in the presence of sunlight.

This reaction usually gives the highest concentration of ozone some kilometres downwind from the source. Stratospheric ozone is not a pollutant but part of the ozone layer protecting the earth from ultraviolet radiation. Ozone is known to be the main source of photochemical smog.

4.1.6.2 Measurements of Air Pollutants

The measurements of ambient air quality in terms of particulate matter (PM10 and PM2.5) and gaseous emissions at some selected locations along the road corridor is provided in Table **4-5** and **Table 4-4**, respectively. The results as shown in **Figure 4-5**, indicate the Victoria/Kairuki Road Junction, the highest concentration of PM10 (413.3 µg/m^3)) followed by Simu 2000, Shekilango Road Junction, Mlimani Road Junction, Morocco Road Junction, Ufukoni Road Junction, Maktaba Street Road Junction, University Road Junction, Rose Garden Road Junction, United Nations Road Junction, and Tegeta DAWASA Depot.

In terms of PM2.5 the results in **Figure 4-5** indicate Morocco Junction to have highest concentration, followed by Rose Garden Road, Victoria /Kairuki Road Junction, SIMU 2000, University Road Junction, Mlimani Road Junction, Ufukoni Road Junction, Maktaba Street Road Junction, Proposed Tegeta BRT Terminal, and United Nations.

Table 4-6: Recorded PM10 and PM2.5 Concentrations.

Sampling Locations	Parameters (µg/m^3)	
	PM_{10}	$PM_{2.5}$
Maktaba Junction	154.2	12.55
Ufukoni Road Junction	200.5	19.20
United Nations Junction	36.4	11.17
Morocco Junction	209.9	47.43
Victoria/Kairuki Road Junction	413.3	40.40

[69] The *Otto engine* was a large stationary single-cylinder internal combustion four-stroke *engine* designed by the German Nicolaus *Otto*. It was a low-RPM machine, and only fired every other stroke due to the *Otto* cycle, also designed by *Otto*. An *Otto* cycle is an idealized thermodynamic cycle that describes the functioning of a typical spark ignition piston *engine*

Rose Garden Road Junction	58.2	42.8
Shekilango Road Junction	310.5	16.26
Mlimani Road Junction	291.2	22.56
University Road Junction	80.0	21.14
SIMU 2000 Bus Terminal	366.5	23.64
Proposed BRT Tegeta Terminal	34.1	11.7
WHO Standard	50	25

Table 4-7: Average Concentration Values of Gaseous Pollutants.

Sampling Locations	Parameters			
	CO	NO	SO_2	H_2S
	µg/m³	µg/m³	µg/m³	µg/m³
Maktaba Road Junction	500	200	0.00	0.00
Ufukoni Road Junction	0.00	0.00	0.00	0.00
United Nations Road Junction	0.00	0.00	0.00	0.00
Morocco Road Junction	300	200	300	0.00
Victoria/Kairuki Road Junction	100	0.00	0.00	0.00
Rose Garden Road Junction	0.00	200	0.00	0.00
Shekilango Road Junction	100	200	0.00	0.00
Mwenge Junction	700	400	0.00	0.00
University Road Junction	0.00	0.00	0.00	0.00
Simu 2000 Bus Terminal	0.00	0.00	0.00	0.00
Proposed BRT Tegeta Terminal	0.00	0.00	0.00	0.00
WHO Standard[70]	**30***	**200**	**500**	-

*See Appendix 15, Table 1.3

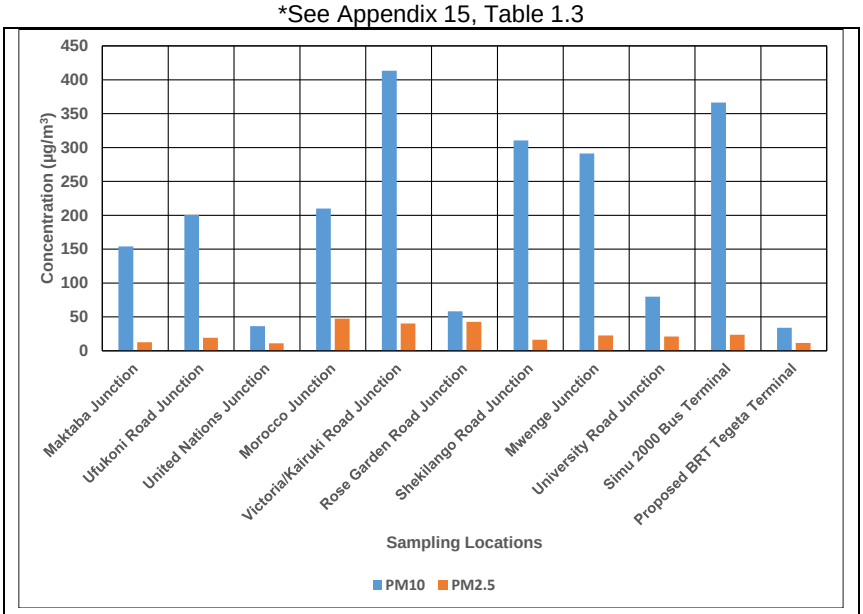

Figure 4-4: Concentration of Gaseous Pollutants along the Road Corridors.

[70] WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulphur dioxide *Global update 2005* Summary of risk assessment. **WHO/SDE/PHE/OEH/06.02.** https://apps.who.int/iris/bitstream/handle/10665/69477/WHO_SDE_PHE_OEH_06.02_eng.pdf;jsessionid=BE441035A463E7BFFE47296BF0FE6EC2?sequence=1

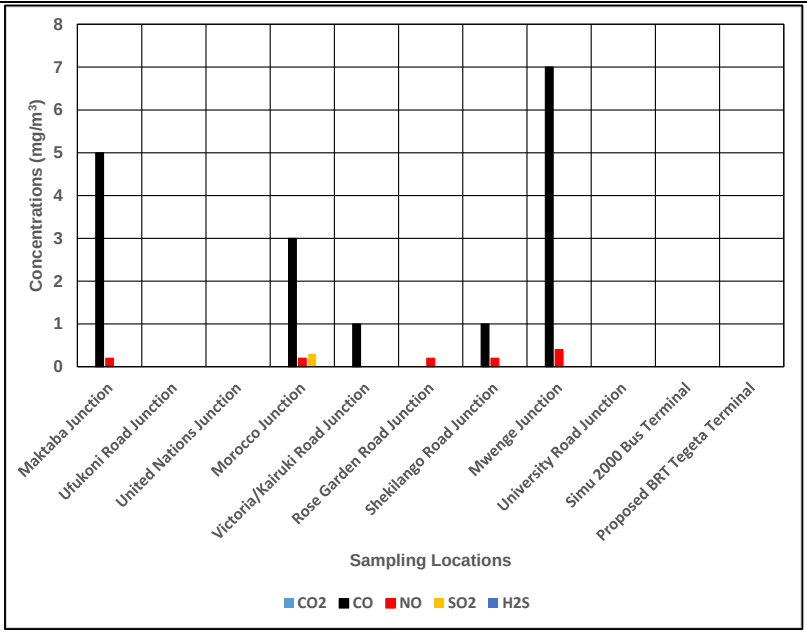

Figure 4-5: Air Pollutants Concentration along the Road Corridors.

The high values of PM10 at Victoria/Kairuki could be attributed to on-going construction activities along the New Bagamoyo Road. The highest values of M2.5 at Morocco Junction can be attributed to the high concentration of vehicles including the presence of DART Bus Terminal.

In terms of gaseous pollutants, the results indicate Mwenge Junction has the highest concentration of CO (700 µg/m^3) and NOx (400 µg/m^3), followed by Maktaba Street Road Junction, Morocco Road Junction, Shekilango Road Junction and Victoria//Kairuki Road Junction.

In terms of NOx, Mwenge Junction was found to have highest concentration, followed by Rose Garden Road Junction, Shekilango Road Junction, Morocco Junction and Maktaba Street Road Junction. The values for Mwenge Junction were twice the WHO Guidelines (200 µg/m^3), but values at other locations did not exceed the WHO Guidelines. The highest concentration of gaseous pollutants at Mwenge Junction can be attributed to the high level of traffic congestion in this location.

The findings indicate the values of PM10 for Victoria/Kairuki Road Junction (413.3 µg/m^3) are higher than WHO Guidelines (50 µg/m^3) and lower than WHO Guidelines at United Nations Junction (36.4 µg/m^3) and Proposed BRT Tegeta Terminal (34.1 µg/m^3). The values of PM2.5 were higher than WHO Guidelines (25 µg/m^3) for Morocco Junction (47.43); Victoria/Kairuki Road Junction (40.40 µg/m^3), and Rose Garden Road Junction (42.8 µg/m^3) and lower than WHO Guidelines at United Nations Junction (11.17 µg/m^3), Maktaba Junction (12.55 µg/m^3), Shekilango Road Junction (16.26 µg/m^3), Ufukoni Road Junction (19.20 µg/m^3), Simu 2000 Bus Terminal (23.64 µg/m^3), Mwenge Junction (22.56 µg/m^3), University Road Junction (21.14 µg/m^3).

Findings indicate concentrations at Mwenge Junction for CO (700 µg/m^3) and NOx (400 µg/m^3) exceeded the WHO Guidelines for CO (30 µg/m^3) and NOx (200 µg/m^3). The Morocco Road Junction was found to have higher concentration of SO_2 (300µg/m^3) than other locations, but did not exceed WHO Guidelines (500 µg/m^3).

The findings from the literature indicates vehicle exhaust emissions is the major source of ambient air pollution, hence contributing to the increasing exposure to health risks (World Bank Group, 2020[71], Robert et al, 2016[72]). The most vulnerable groups were found to be children (0-5 years) and the elderly (62+)[73] and their vulnerability depended on geographical locations, and seasonal weather variations such as (temperature, humidity, and wind-speed / direction). The measurements taken in Dar City in 1997 indicated the yearly average values exceeded the WHO and UNECE Guidelines[74]. By then the levels were not alarmingly high, but considering that the number of vehicles has now increased, the concentration of air pollutants is expected to exceed the WHO and UNECE Guidelines. The WHO and UNECE Guidelines is provided in **APPENDIX 14.**

4.1.7 Greenhouse Gas Emissions

Tanzania's total GHG emissions in 2014 were 286.49 million metric tons of carbon dioxide equivalent (MtCO2e), totalling 59% of GHG emissions[75]. In Tanzania, 72.7 percent of GHG emissions come from the land-use change and forestry sector, followed by agriculture, energy, waste, and industrial processes which contribute 17.3 percent, 7.8 percent, 1.6 and 0.5 percent relatively to GHG emissions[76].

According to WRI CAIT, GHG emissions in Tanzania increased by 3% between 1990 and 2014 by 9 MtCO2e, while GDP grew 234%, averaging 5.2% annually. Although GDP grew faster than GHG emissions, in 2014, Tanzania's emissions relative to GDP were almost eleven times the world average, indicating significant potential for improvement[77].

In its Intended Nationally Determined Contribution (INDC), Tanzania states its goal to embark on a climate resilient development pathway that will reduce GHG emissions by 10% to 20% by 2030, relative to the projected 2030 business-as-usual emissions of 138-153 MtCO2e[78]. The INDC also identifies intended actions whose implementation would reduce emissions while developing Tanzania's agriculture, livestock, forestry, energy, transport, waste management, coastal / marine / environment / fisheries sector, water resources, tourism, human settlements, and health sectors[79]. However, according to the NDC Report (2021)[80], Tanzania will reduce greenhouse gas emissions economy-wide between 30-35% relative to the Business-As-Usual (BAU) scenario by 2030, whereby about 138-153 Million tons of Carbon dioxide equivalent (MtCO2e)-gross emissions is expected to be reduced, depending on the baseline efficiency improvements, consistent with its sustainable development agenda.

[71] Traffic, Air Pollution, and Distributional Impacts in Dar es Salaam. A Spatial Analysis with New Satellite Data. Susmita Dasgupta, Somik Lall, David Wheeler. WORLD BANK GROUP. Development Economics Development Research Group & Urban, Disaster Risk Management, Resilience and Land Global Practice. March 2020. https://openknowledge.worldbank.org/bitstream/handle/10986/33445/Traffic-Air-Pollution-and-Distributional-Impacts-in-Dar-es-Salaam-A-Spatial-Analysis-with-New-Satellite-Data.pdf?sequence=1&isAllowed=y

[72] Spatial Variability of Ambient Air Pollution Concentration in Dar es Salaam. By Robert Njee Kees Meliefste, Hamisi Masanja Malebo. November 2016 DOI: 10.12691/jephh-4-4-2 https://www.researchgate.net/publication/310423870

[73] Ibid.

[74] Air Pollution by Motor Traffic in Dar-Es Salaam. Measurements and state of the art description. By **Daniel Henricson.** KFB-Meddelande 1999:8. **KFB - Swedish Transport and Communications Research Board, Stockholm** KFBs DNR 1997-526 June 1999. https://www.osti.gov/etdeweb/servlets/purl/10147816 .

[75] Greenhouse Gas Emissions in Tanzania. USAID. https://www.climatelinks.org/resources/greenhouse-gas-emissions-factsheet-tanzania

[76] Food and Agriculture Organization of the United Nations Statistics Division (FAOSTAT). Tanzania, Emissions – Land use total and Emissions – Agriculture total, viewed on August 19, 2018.

[77] Greenhouse Gas Emissions Factsheet: Tanzania. Greenhouse Gas Emissions in Tanzania. Tanzania Numbers at a Glance (2014). USAID**.** https://www.climatelinks.org/resources/greenhouse-gas-emissions-factsheet-tanzania

[78] United Republic of Tanzania. Intended Nationally Determined Contributions, 2018.

[79] Ibid.

[80] The United Republic of Tanzania. Vice President's Office. Nationally Determined Contribution. July, 2021. https://unfccc.int/sites/default/files/NDC/2022-06/TANZANIA_NDC_SUBMISSION_30%20JULY%202021.pdf

The amount of GHG emission from transportation in the Dar Es Salaam City was estimated[81] to be ktCO2e 490, whereby use ktCO2e 440 was from Light Duty Vehicles (LDV), 20 from Daladala use, 30 from Bajaj or Bodaboda use. However, the residential emissions were found to be higher than emissions from transportation at ktCO2e 1,400 with tCO2e/capita of 0.2.

In 2030, the total GHG emission from transportation will be ktCO2e 700, whereby ktCO2e 560 will be from LDV, ktCO2e 40 from Daladala Use, ktCO2e 50 from Bajaj and Bodaboda Use, and ktCO2e 0.4 from BRT Use[82]. It can therefore, be noted that the amount of GHG is expected to increase in future but GHG emission from BRT use will be very small compared to other transport modes.

4.1.8 Geology and Soils

The geology of the project area is dominated by continental and lacustrine sedimentary formations[83]. The sub-soil is dominated by marine limestone, mainly comprised of sandy clay and clayey sands. According to the Geological Map of Tanzania[84] the project area is comprised of Mesozoic rocks, limestone, sandstone, shales and mark.

Generally, the soils are categorized as SAND and loamy SAND with good drainage properties. Along the project routes, the soils are changing SAND, loamy SAND and CLAY from Tegeta toward Bibi Titi/Maktaba road Junction via Morocco. Branch line from Ubungo to Mwenge appears to have silty SAND soils.

4.1.9 Ground and Surface Water Resource

4.1.9.1 Surface Water Quality

The road section crosses two major seasonal rivers, namely the Lugalo River at km 8+400 and Tegeta River at km 16+100. The two rivers are highly contaminated due to discharge of raw sewage wastewater from adjacent local residents and dumping of solid wastes. Sand mining activities is common in the river beds, hence affecting the stability of the river banks.

4.1.9.2 Ground Water Quality

The project site is within the Coastal Sedimentary Aquifer, which is typically five to 30 meters thick, with a water depth of 10 to 35 meters below ground. Water quality varies, with periodic nitrate and salinity issues and better productivity from limestone and sandstone, compared with shale and marl.

According to the hydrogeological map of Tanzania[85], the project area is within the Karoo Sandstone Aquifer is unconfined with the inter-granular flow and is also comparatively near-surface—boreholes are seldom drilled more than 80 meters deep. However, the baseline indicate there is not any groundwater source within the road corridor. It is therefore unlikely that ground water sources will be affected during construction.

4.1.10 Biological Environment

4.1.10.1 Flora

[81] Modelling future patterns of urbanization, residential energy use and greenhouse gas emissions in Dar Es Salaam with the Shared Socio-Economic Pathways. By Chibulu Luo, I. Daniel Posen, Daniel Hoornweg, Heather L. MacLean. Journal of Cleaner Production 254 (2020) 119998. https://www.researchgate.net/publication/338506682_Modelling_future_patterns_of_urbanization_residential_energy_use_and_greenhouse_gas_emissions_in_Dar_es_Salaam_with_the_Shared_Socio-Economic_Pathways/link/5f7c8ba4458515b7cf6a563b/download

[82] Ibid.

[83] GEOLOGY AND MINERAL MAP OF TANZANIA. Patrice PINNA, Sospeter MUHONGO, Boniface A. MCHARO, Elizabeth LE GOFF, Yves DES CHAMPS, Francis VINA UGER and Jean Pierre MILESH, December 2004

[84] Source: . http://earthwise.bgs.ac.uk/index.php/Hydrogeology_of_Tanzania

[85] **Source:** Hydrogeology of Tanzania. http://earthwise.bgs.ac.uk/index.php/Hydrogeology_of_Tanzania

The project is located within heavily built-up urban environment with high rise or multi-storey buildings. Most of the existing flora is comprised of planted grass and ornamental or shade trees along the road sections and within the road median. The planted trees are also common within the proposed depot areas at Njia Panda Salasala **(Photo No. 4.2-1),** Tegeta Nyuki **(Photo No. 4.2-2),** and DAWASA –Tegeta **(Photo No. 4.2-3).** The most common tree species include Neem trees (*Azadirachta indica*) and Ashoka trees (*Polyalthia longifolia*) and a few African teaks (*Tectona grandis*).

Photo No. 4.2-1: Proposed Depot Area at Njia Panda Salasala.

Photo No. 4.2-2: Proposed Depot Area at Tegeta Nyuki Bus Stand.

Photo No. 4.2-3: Proposed Depot Area at DAWASA-Tegeta.

The species abundance was determined during the baseline survey to be as follows:

Location	Recorded Number of Species
SIMU 2000 to Magufuli Hostel	19
Magufuli Hostel to Mlimani city Round about	30
Mlimani City Round About to Mwenge	27
Maktaba to Mwenge	40
Mwenge traffic light to Wazo hill junction	60

Large parts of the road corridors are dominated by abandoned tree nurseries. However, some remmnats of natural vegetation (thicket) can be found along the New Bagamoyo Road Corridor, adjacent to Lugalo Hospital. In general, most of the natural vegetation has been replaced by exotic ornamental or shade trees. Remnants of natural vegetation can be seen at Basihaya terminal whereby few Baobab trees (*Adansonia digitata)* are still present at Mbuyuni area near Namanga junction, Mbuyuni Kunduchi junction, Road Junction to White Sand Hotel

where Baobab tree of cultural significant still grows on the road median and Road Junction to IPTL on the roadsides. There is no significant presence of unique, threatened, or endangered species in the project area. However, Baobab Trees are classified as Near threatened (Nt) species according to IUCN Categorization.

The existing mangrove vegetation on the upstream side **(Photo No. 4.2-4)** and downstream side **(Photo No. 4.2-5)** of the Ali Hassan Mwinyi Road / Selander bridge provides a natural habitat and breeding ground for aquatic fauna. The mangrove forest on the upstream of Selander Bridge, has been fluctuating since 1991 from 25.3 hectares (Ha) to 47,5 ha in 2005 and then reduced to 37.1 ha in 2015, due to human activities and climate change factors[86]. According to the literature, heavy sedimentation of the Msimbazi River has resulted into destruction of mangrove vegetation[87]. The accumulation of sediments has now reached to a height that is above tidal levels; this means that much of the wetland area that borders the river channel remains dry even at high tide. The effect is that sea water no longer reaches the mangroves that are further inland, hence death to the large sections of the mangrove forest.

According to the literature, only a single mangrove tree species (*Avicinnia marina*-family *Avicinniaceae*) was identified in the Msimbazi Valley with estimated above-ground tree biomass and carbon stock of 458.3t/ha and 221.67t/ha respectively[88],.

The mangrove forest plays an important ecological function of being an interface between the terrestrial and marine environments. They facilitate exchange of biological information and /or materials between the terrestrial and marine environments. The presence of mangrove vegetation on the downstream side helps to prevent or minimize soil erosion along the shorelines.

It is important to note that the Msimbazi Creek receives a lot of industrial and domestic pollutants. Therefore, the presence of mangrove vegetation in the Msimbazi Creek plays a role of wastewater treatment system due to its high uptake of pollutants like heavy metals, nitrates, and phosphates, therefore considered as bio-filters[89]. In addition, the Msimbazi Creek itself is a safety valve because it allows movement of seawater to the upstream side during high tide, hence minimizing the rate of soil erosion along the shorelines.

However, the mangrove vegetation is not likely to be affected during construction because it is located about 10-30 m from the bridge centreline. Therefore, the Right of Way (20-60 m) will be adequate for construction works.

[86] **Mangroves and Urbanization: Systems in Transition** A Study of Social Ecological Systems of Mangroves in Dar es Salaam, Tanzania. Linn Maria Himberg. Master's Thesis 2016. Norwegian University of Life Sciences. https://nmbu.brage.unit.no/nmbu-xmlui/bitstream/handle/11250/2398882/Linn%20Maria%20Himberg%2C%20Master%20Thesis.pdf?sequence=1&isAllowed=y

[87] **THE UNITED REPUBLIC OF TANZANIA. PRESIDENT'S OFFICE - REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT (PO - RALG). THE MSIMBAZI BASIN DEVELOPMENT PROJECT. ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK (ESMF). DRAFT REPORT. DECEMBER, 2021.** https://www.tamisemi.go.tz/storage/app/uploads/public/61c/57d/784/61c57d784b99b212200867.pdf

[88] Tree Species Composition and above-ground tree biomass of Selander Bridge Mangrove Patch, Ilala, Dar Es Salaam Region, TANZANIA. By Mrumba E. John. 2014. https://www.academia.edu/8935769/TREE_SPECIES_COMPOSITION_AND_ABOVE_GROUND_TREE_BIOMASS_OF_SALENDA_BRIDGE_MANGROVE_PATCH_ILALA_DAR_ES_SALAAM_REGION_Tanzania

[89] PUMPSEA (2008). *Publishable final activity report.* Peri-urban mangrove forests as filters and potential phytoremediators of domestic sewage in East Africa (PUMPSEA)

Photo No. 4.2-4: Mangrove vegetation on the upstream side at km 2+000.

Photo No. 4.2-5: Mangrove vegetation on the downstream side at km 1+950.

4.1.10.2 Fauna

The existing flora provides a natural habitat for small mammals (e.g., rats and squirrels), insects, reptiles (e.g., snakes), amphibians (e.g., toads, and frogs), and birds (e.g., Indian house crow). However, the presence of Indian house crow ***(Corvus splendens)*** has resulted into elimination of other avian species.

4.2 Socio-economic and Cultural Environment

4.2.1 Population

The project area is comprised of three municipalities namely Kinondoni, Ilala/Dar es Salaam city and Ubungo. The BRT 4 road traversed 12 wards in Kinondoni, Ilala 4 wards and Ubungo only 2 wards are involved. According to 2022 National Population and Housing Census Kinondoni had a population of 982,328 where male was 474,825 and female 507,503. Ubungo Municipality had a population of 1,086,912 where male was 519,925 and female was 566,987. Ilala Municipal had 1,649,912 people whereby male was 793,731 and female was 856,181 as shown in the **Table 4-7.**

Table 4-8: Projected Population in the study area by 2020.

Municipality	No. of Wards	Population by Sex2022			Sex Ratio	Number of households	Average Household Size
		Males	Female	Total			
Kinondoni	12	474,825	507,503	982,328	94	299,184	3.3
Da es Salaam City	4	793,731	856,181	1,649,912	93	458, 614	3.6
Ubungo	2	519,925	566,987	1,086,912	92	317,087	3..4
Total	**18**	**1,788,481**	**1,930,671**	**3,719,152**		**616,271**	

***Source**: 2022 National Population and Housing Census, growth rate 5%*

4.2.2 Land Use

Kinondoni MC where large part of the project lies has a total area of 231 square Km and the land use planning is comprised of settlements with 106 streets whereby 49 streets (mitaa) are surveyed, 46 streets unsurveyed and 11 streets partially surveyed. Other uses of land include industrial area (Mikocheni Light Iindustry, and Wazo Hill Cement Factory), Pande Game Reserve, Public and Private Institutions, Military Area (Lugalo and Mbweni) and Agriculture which is mainly done at peri-urban areas. **Table 4-8** below illustrates the occupancy percentage.

Table 4-9: Land use Planning in KMC

Status of land	% of occupancy	Status of land	% of occupancy
Settlement area	82.8	Institutional and army area	6.3
Industrial area	5.4	Agricultural area	3.2
Pande Game Reserve	0.7	Others	1.6

Source: Estimated report from KMC Land use Planning Department, 2021

4.2.3 Planned Development Projects

Planned projects in the study area which are located along the BRT 4 includes Bus stand at Mwenge and Tegeta Nyuki, Football stadium at Mwenge, Market square at Bunju and composite plant for organic manure at Mabwepande. All these projects will depend on rapid transport when completed for the residents to reach such services in a reasonable time.

4.2.4 Community Structure

The main organization of Mtaa government in the study area is the Mtaa Assembly and Council. The Mtaa Assembly is made up of the adult members of the community and the Mtaa council is composed of 5 members comprised of men and women representatives. The Mtaa council is responsible for overseeing day to day activities in the Mtaa (sub-ward) as well as to make decisions on matter concerning the whole community. Functions of the Mtaa Assembly are the maintenance of peace and order the promotion of social welfare and economic development. The Council manages the mtaa and implements decisions made by the assembly.

Like the Municipal council, the mtaa government is arranged into a series of committee's and overseen by the Mtaa Chairperson, Mtaa Executive Officer (MEO), and mtaa leader members of the council). The main committees include Finance and Planning, safety and security, construction and finally Education, and social services. The sub-committee of the latter includes the water and sanitation committee, health committee, Environment committee and the school committee.

4.2.5 Employment

Employment pattern in the project area reflect urban characteristics whereby formal and non-formal employment is dominant. Employment in all municipalities reflect that private sector occupies 61%, self-employment 35% and public sector covers only 4%. Looking at Ilala MC where industries are dominant compared with Kinondoni and Ubungo, small scale industries has employed 340,378 workers, medium scale industries 913,998 workers while large scale industries employed 478,400 workers (*Ilala MC, 2018).* In the study area majority of workers are in private sector almost 76% and those in industries occupies 20% and 4% are in domestic employment.

4.2.6 Household Resource Control and Property Ownership

Although men are still regarded as the family breadwinner gender relationships reflect the importance of both men and women in the present socio-economic set-up and activities in the study area. In access to, and utilization of production resources, both genders are involved. Both men and women are in retail business, operating food-vending, industrial employment and casual labour and urban agriculture. Transport operators remain to be youth activities living in the study area. Ownership of means of production such as capital, labour, basic capital assets (plots, houses and working tools) and seasonal inputs such as seed is also balanced. In some cases, ownership of capital and interest from the financial capital is based on the male domination where, husband have more voice over his wife (wives). However, at the end men are regarded as the owner and final decision maker over the family resources.

4.2.7 Education

In this section education is divided into three areas of pre-primary, primary and secondary education. Almost every ward in all three municipalities has pe-primary, primary and secondary school. For the sake of this project main focus will be status of education in Kinondoni MC because many kilometres of BRT lay in Kinondoni. Kinondoni MC where the main BRT 4 roads traverse has 161 Pre-Primary Schools out of which 78 belongs to Government and 83 are owned by private sectors. Also, Municipal has 163 Primary schools, whereby 79 are owned by Government and 84 Primary Schools are owned by Private Sectors. All 77 Government Primary Schools have a total number of 86,672 pupils from Pre-Primary level to Primary level and 1975 teachers and Private Schools has total 34,170 pupils.

Since many primary schools are along BRT 4 in both sides, the Contractor must take precautions to prevent road accidents which may involve school children particularly during school sessions when going to school, during break hours and in the afternoon when lessons end. The enrolment in Dar Es Salaam increased by 4.4% from 645,718 in 2018 to 674,236 in 2019[90].

An average of Gross Enrolment Rate (GER) in the country is 110.27% (Boys 110.08% and Girls 110.46%) but Dar es Salaam region is one of the regions with GER less than 90%. On Net Enrolment Rate (NER) national average is 95.4% (Boys 94.7% and Girls 96.1%). NER has surpassed the 2020 and 2025 Education targets.

4.2.8 Adolescent Pregnancy

Despite efforts to reduce adolescent pregnancy rates in Tanzania, they are still high. Information from Municipal Social experts in Kinondoni MC highlighted that, adolescent pregnancies are caused by different factors including social capital whereby adolescents did not get pregnancy information from their parents and peers, when in need of information on how to avoid or deal with teenage pregnancy. In previous times, other relatives like aunts, in particular were approached, but due to societal changes and new family structures (moving from extended to nuclear families because of modernity and increasing mobility) this service seemed to cease.

Other factors are cultural capital (used as barrier) where family members, and peers may not offer reliable information about sexual health and pregnancy. Economic capital has also contributed to adolescent pregnancy especially for school girls from low earners families. It was estimated (Anecdotal data) that almost 27% of school drop outs at primary level and 31% of drop out at secondary school in the study area are caused by lack of basic needs at school including pocket money and other supplies. It is within the context that the proposed project must provide reproductive health education to adolescents and temporary employment to minimize economic constraints which may put the adolescents into more temptations and health risks.

4.2.9 Learning Institutions Along the Road

There are significant institutions along BRT 4 which are providing training/courses at different stages. These are Aga Khan University training Nurses and other health personnel, Social Welfare Institute (Ustawi), Ardhi University, University of Dar es Salaam and IMTU University training medical personnel. There are also vocational training institutions training hoteliers, computer basic skills and alike.

4.2.10 Medical Facilities/Hospitals Along the Road

[90] Source: Education Sector Performance Report, 2019.

Despite many health centres and dispensaries along the route there are also referral hospitals like Aga Khan (in Ilala), Kairuki Memorial hospital, Lugalo TPDF hospital, Masana hospital and Rabinisia hospital which are found along BRT 4 route.

4.2.11 Livelihood

The main economic activities taking place in the proposed BRT 4 route in both Municipalities of Ilala and Kinondoni can be categorized as mercantile business, retailing businesses including small and medium shops, hotels, bars and restaurants, transportation services, clearing and forwarding, agro businesses, medical businesses, handcraft businesses, banking businesses and construction business. These activities employ about 45% of the total population of the Municipalities. The businesses play a significant role to the Municipals' economy in terms of revenue and in provision of job opportunities to the residents.

Agriculture and livestock sector is another important economic activity in Municipalities whereby about 13% of the population is employed in the sector. The livestock kept in the study area are cattle, goats, sheep, pigs, and chicken. Fishing in Indian Ocean also provides employment to a sizeable proportion of the people in the Municipalities.

In industrial sector, Ilala Municipal Council has more developed industries than Kinondoni. The most significant industries include medium industries which process food, beverage, and textiles. Others include small scale industries which dominates wide range of food and textiles. The small-scale industries comprise hulling and milling and fruit processing machines which add value to agricultural primary products.

4.2.12 Income Generating Activities (IGA)

The analysis of social economic activities determined income and expenditure pattern of people living along and adjacent BRT 4 Road sections where the project is located. In access to, and utilization of production resources, both genders are involved.

Although men are still regarded as the family breadwinner gender relationships reflect the importance of both men and women in the present socio-economic set-up and activities in the area. Both men and women are engaged in whole sell business, retail business, operating food-vending, industrial sector, horticulture, and agriculture.

4.2.12.1 Medium, small-scale (micro) enterprises and retail shops

This is important sector, a first main occupation of the interviewed stakeholders (along BRT 4 road sections) followed by formal and non-formal employment and agriculture. The activities include retail shops, small restaurants, and petty trade.

4.2.12.2 Retail shops

Currently the residents along the project road have retail shops particularly in all business centres rom Maktaba – Morocco – Mwenge –Tangi bovu – Tegeta up to Basihaya. The shops and kiosks stock a wide range of goods including foodstuffs, household utensils, school supplies, textiles and minor spare parts for motorbikes, bicycles. However, some of the goods are slow moving commodities because of many shops selling the same items.

Construction materials such as corrugated iron sheets and cement are mainly found in some shops in Mwenge and Tegeta while other small centres are mostly equipped with other consumable goods. The shop operations adopt various techniques to keep the operation costs low. For example, some shops are often located in one of the rooms within the homestead which are along the project road and usually attended and managed by members of the household. Other shops are located in hired frames and most of them possess a single room.

4.2.12.3 Restaurants and food vending

There are medium and small restaurants and numerous food vendors in business centres in the study area especially at Namanga, Mwenge, Tangibovu, Tegeta and SIMU 200 where BRT 4 connects with BRT 5. The restaurants serve soft drinks, tea snacks and meals basically to industrial workers, visitors, and limited number of students. It was noted that restaurants and food vending employ a good number of girls in a daily basis and wages range from TZS. 5,000 to TZS. 10,000. These girls apart from preparing food they also supply to the customers in their respective offices of working places. This technique is to reduce the walking distance of customers and increase income of to the owners. In rare cases girls are paid according to the plate of food they sell daily.

4.2.12.4 Boda-boda (motorbike) Business

This is the recently emerged business which employs many youths. The business deals with transportation of passengers from the trunk roads to remote areas with transport difficulties. Due to transport congestions in Dar es Salaam Bodaboda are used as means of transport which penetrates during traffic jams and reach the intended destination within a reasonable time. So many workers and people who want to reach early at their respective destinations opt Bodaboda than other commuters. Most of the Bodaboda operators do not own the bike but they work for wage in daily basis. However, few of them engage in contract with owners and after servicing the agreeable amount, the operator owns the bike. Bodaboda business makes more than TZS. 30,000/= and pays the owner TZS. 10,000 per day. It means the operator can accumulate TZS. 20,000/= per day as a daily income.

4.2.12.5 Flower Vendors and Furniture Dealers (Hand craft and small scale workshops)

Flower vendors and Furniture dealers are one of emerging small business operators in the project area. The sector employs more than 150 people along the project roads. These groups are found at the junction of St. Peters (Mbuyuni) up to Basihaya at the end of the project road. Flower vendors deal with variety of flowers in pots and in nurseries located along the project road and most of them are in Right of Way (RoW). However, the flowers are movable so during construction can be moved away to give the space for construction. Potential customers for flowers are people who pass by the road and become attracted with flowers and decorated pots (containers) and opt buying them. Flowers are sold at a price of TZS 5,000/= to TZS. 20,000/= for flowers in nurseries while in containers range from TZS. 20,000/= to TZS. 100,000/=.

Furniture dealers often display their furniture along the project road **(Photo No. 4.3-1).** However, furniture making workshops are located away from the project road so during construction workshops will not be affected. Furniture is displayed during the day and in the evening are collected back to the stores. During discussion with dealers revealed that a set of tables and six chairs is sold at TZS. 700,000 to TZS. 1,000,000 depending on the type of wood (timber) used to make them. Dealers of flowers and furniture have acquired IDs which allow them to display their goods without any restriction from Municipal Authorities.

Photo No. 4.3-1: Small Business Operators at Mbuyuni Area.

4.2.12.6 Small Business Operations

Petty trade includes selling a range of products in small and medium quantities in stalls/shelves along the project road and, in other areas, at the local market or along the streets especially in business centres like Mwenge, Tegeta and at the market square in SIMU 2000. The products sold include rice, maize and cassava flour, vegetables, and dry cassava, and dried fish, and fruits. Other products dealt by petty traders include household utensils and textiles, mainly second-hand clothes.

4.2.12.7 Mercantile Enterprises

Mercantile is an important sub-sector, the main occupation in Central Business District (CBD) particularly in Kisutu Ward, Mwenge including Mlimani City Maul and Tegeta. The activities carried within the CBD include whole sale shops, medium and restaurants and other trading.The area has the highest concentration of commercial services characterized by mercantile business where exporters and importers of goods operate. Companies dealing with transportation are also found in this area. Electronic appliances and software dealers are common within CBD.

On the other hand, there is a good number of financial institutions that provide financial services in the study area these include banks such as CRDB Bank PLC, National Microfinance (NMB), Standard Chartered Bank, ABSA Bank, Akiba, Stanbic, Exim, National Bank of Commerce (NBC), Tanzania Postal Bank, Azania Bank etc. Non-Bank financial institutions are also available in the project area for instance Savings and Credit Cooperative Societies (SACCOS). Apart from mercantile enterprises, the study area is endowered with offices of different companies such as telecommunication companies, Attorney, petrol filling stations, pharmacies, construction, and consulting firms.

4.2.13 Industrial Operation

In industrial sector, main industries found in the study area (Dar es Salaam Municipalities) include several industries in Mikocheni Light Industries Area, Tanzania Breweries Ltd, ALAF Ltd, Pharmaceutical Industries, Car body builders, Azam Milling Industries, TCC, Matures and soap industries and others**.**

In addition, there are about 200 small scale industries all over the project road, but Kidongo Chekundu Areas accommodates more than 30 small scale industries. However, some of the industries have closed down due to lack of raw material, poor management, financial

constraints, and stiff competition from imported commodities. Apart from their economic importance, industries also enhance sustainable development and livelihood of Dar es Salaam residents through reliable employment opportunities.

Most of the big/medium industries use modern production technologies and employ different options in marketing strategies. For the purpose of this project industries in Mikocheni Light Industries area is a case in point whereby BRT 4 will support ferrying workers to and from the working place as it passes along the area from Morocco to Mwenge.

4.2.14 Urban Agriculture

As far as agriculture is concerned, there has been a significant variation in the production capacity of vegetables, fruits, coconut, cashew nuts and food crop in all three Municipalities of Ilala, Ubungo and Kinondoni. For example, Kinondoni MC, agriculture provides 466.74 tons of food crops, which is only 0.18% of the total annual food requirement and actual food consumption is 255,064.38. In all Municipalities food shortages is not a case because food crops come from regions outside Dar es Salaam.

The major food crop grown includes cassava, sweet potatoes, paddy, maize, and cowpeas. Cassava is the main food crop in the peri – urban areas. The main cash crops grown include a variety of vegetables such as amaranthus, Chinese cabbages, egg plants, okra, kale, and leek (*matembele*), fruits like citrus, passions, paw paws (papaya), pineapples, mangoes, cucumbers, and cashew nuts.

4.2.15 Livestock

Livestock keeping is usually done in rural areas. Major types of animals kept are dairy cattle, poultry, sheep, goats, and pigs. Zero grazing is practised in urban areas and semi-intensive to extensive method in peri urban. The available data reveal that wards in peri-urban are leading in livestock keeping. The project area has a significant number of livestock, they are owned by individual families. The sector acts as an alternative source of income. For instance, Kinondoni MC in 2018 had the livestock population as shown in **Table 4-10.**

Table 4-10: Livestock Population in the study area.

Type of animal	Number	Type of animal	Number
Dairy cattle	8,435	Commercial broiler	8,227,320
Indigenous cattle	24	Commercial layers	3,255,836
Goats	2,494	Back yard chicken	1,082,454
Dairy goats	51	Ducks	32,381
Sheep	445	Donkeys	15
Pigs	1,935	Dogs	10,078

Source: KMC Socio-economic profile, 2018

4.2.16 Fisheries Sector

Fisheries sector is mainly done along Indian Ocean. For this case Ubungo MC does not have coastal strip so insignificant fish farming is practiced. Major fisheries are done in Kinondoni MC which possess a coastline of about 143 km long along the Indian Ocean as well as Ilala MC which has also a significant coastline strip. In Kinondoni MC there are about 2,978 fishers and the total number of fishing vessels is about 501. The estimated number of fish catch per year is about 3,995.86 tonnes.

There are about six (6) landing sites, among these only three landing sites are sheltered and those include Msasani, Kunduchi, and Ununio. There are about six (6) Beach Management Units (BMU's). These are Msasani, Kawe, Mbweni, Maputo, Kunduchi and Ununio.

The Municipal also possess about 7 fishers associations found at Msasani, Kunduchi, Kawe Ununio and Mbweni (*Kinondoni MC, 2018)*. On the other side Ilala MC has Fishing License 1,335, fishers 2,128, Vessels (Registered) 196 and in 2018 the catch was tons 2,613,078. The main fish market or Ilala which also cater for other Municipalities is Ferry Fish market located at Magogoni Kivukoni Ward. It is anticipated that the BRT 4 project will facilitates easy transport of people getting to fish landing areas in both municipalities from Ferry to Ununio. (*Ilala MC, 2018).*

4.2.17 Distribution of Income

The socio-economic survey obtained from Dar es salaam City Master Plan (2016/2018) indicated that, in the project area majority of residents earn income between TZS 50,000 and 200,000 about 71% of which 28% earned monthly income ranging from TZS 50,000 to 100,000, 21% earn income between TZS 100,000 and 200,000 and 22% ranging between TZS 200,000 and 400,000.

Only 15% of the residents earn income above TZS 400,000 and 14% earn income below TZS 50,000. The result from socio economic survey indicates that about 91% of residents had a monthly income below TZS 600,000. Only 8% had monthly income ranging from TZS 600,000 to TZS 1,500,000 and 1% had income above TZS 1,500,000. This is below the national average where the group earns income above TZS 1,500,000 is 3.8%, also the fact implies that majority of households in peri-urban are low-income earners.

4.2.18 Infrastructure and Utilities

4.2.18.1 Water Supply

The main source of water supply for Kinondoni, Ubungo and Ilala residents is from Lower and Upper Ruvu which managed by Dar-Es-salaam Water and Sewerage Authority (DAWASA). In Kinondoni MC the water from DAWASA systems contributes 81% of water being consumed daily and the rest is contributed by deep wells which owned by both private and community. The estimated population of Kinondoni Municipality is 1,134,211 out of that only 81% have direct access to clean and safe water in less than 400 metre according to Water Policy (2012) while the rest 19% have no smooth access.

In Ilala MC the situation is not better because residents in peri-urban have no smooth access of clean water. Residents use water from shallow wells almost 982 of shallow wells which are not well protected exist. There are 270 boreholes owned by public and 2280 owned by private individuals. DAWASA has to put more efforts to supply water in Ilala peri-urban. Water supply in the project area is relatively better because the project is within CBD and DAWASA main pipe is laid along the project road so water for domestic use is available.

4.2.18.2 Transport Issues

Transportation plays a major role in urban development enabling movement of both people and goods between points. For Dar Es Salaam, transportation is dominated by public transit and walking between its primary roads and arterial roads. Traveling for Dar es Salaam residents is influenced by behaviour, proximity, and a mix of land use, density, and design. The city's residents travel short distances but with much difficulty, leading to low levels of mobility and therefore, difficulty in meeting transportation demands.

The poor level of mobility is caused by overpopulation, poverty, and uncontrolled urban growth, factors that directly affect the provision of transport services and transportation infrastructure construction. Dar Es Salaam is generally clustered and uses zoning systems with high-density residential areas; most of its residents regardless of where they live rely on public transport. In spite of this, residents who live on the fringes of the city use informal means of transport due to the fact that access to bus stops varies from place to place.

As noted earlier the city is the largest hub for commercial, industrial and transport activities. The city hosts about 52% of Tanzania's vehicles and has a traffic density growth rate of over 6.3% per annum. The common means of transport in the Dar Es Salaam City is characterized by mixture of BRT and Private Commuter Buses **(Photo No, 4.3-2).**

Photo No. 4.3-2: Parked Commuter Buses (Dala-Dala) at one of the bus terminals in the city.

Dar es Salaam city is mainly characterized by road transport mode to serve the majority of its population. However, the challenge has been to cater for traffic demand in the available road infrastructure capacity. The situation particularly in this project is coupled by development of satellite areas at Bunju, Mbweni, Goba and Tegeta including the other centres outside Dar Es Salaam like Bagamoyo.

The influx of traffic has excessively lowered the mobility level along the Tegeta – Mwenge - Morocco road and adjacent roads network. However, the Government through TANROADS has done various interventions to reduce traffic congestion along the project road including the construction of Bus Rapid Transit (BRT4) infrastructure from Kisutu/Maktaba – Morocco – Mwenge and Tegeta Basihaya and a spur from Mwenge to SIMU 2000.

4.2.19 Housing

Shelter is one of the most important human basic needs. Good housing has a close correlation with good health and other aspects of human dignity and wellbeing. Although there is no clear-cut definition on which is proper and good housing facility, but enough and well-ventilated rooms, kitchen and toilets provision were used to determine the quality of the shelter in the study area. Moreover, type of structures and materials used in construction were also primarily used to determine the quality of the house in the study area.

The BRT4 is proposed to be constructed at the midst of main roads of Ali Hasan Mwinyi from Kisutu-Maktaba to Morocco and New Bagamoyo Road from Morocco to Tegeta Basihaya and Sam Nujoma a spur road from Mwenge to SIMU 2000. All structures (houses) along these roads are in a linear form and in planned plots. However, some areas behind the planned plots notably Mikocheni, Kawe, Mwananyamala, Mlalakuwa, Wazo, Makongo and Goba are in unplanned areas. The high population growth rate of Dar es Salaam city coupled with insufficient formal land and housing delivery mechanisms have forced many city residents to build in unplanned settlements where land is easily acquired.

It is estimated that 70 percent of the population in Dar es Salaam live in unplanned and un-serviced settlements. This situation leads to: poor accessibility and frequent flooding, soil erosion, ground water and air pollution, public safety issues, lack of playground for children, high cost of services such as potable water, long walking distances to water points, health services and schools. Most of houses are also in poor condition require major improvements or replacement. But these areas are considered to have potential passengers for the BRT 4 project and the project intends to provide areas for ‘’Park and Ride” whereby passengers from these satellites can park their cars and board into BRT buses.

4.2.20 Solid Waste Disposal

In regard to solid waste collection and transportation, there has been an increase in rates of solid waste collected and transported to the disposal site since 2000, when Councils opted to work in partnerships with the private sector as contractors of solid waste collection and transportation, the collection rate decreased from 650 tons in 2015 to 550 tons per day 2018 and disposed of.

The decrease was due to decrease of skip buckets, decrease in number of skip loaders, and decrease in number of refuse trucks The main factors contributing to low level of solid waste collection include:

- fast population growth resulting in daily waste generation levels that exceed the handling capacities of the council
- limited financial resources which constrain the ability of the council to secure the necessary infrastructures and appropriate equipment in adequate numbers to provide the services

4.2.21 Energy

Electricity is the power source for domestic, commercial premises, institutions, and industries. All Municipalities are connected to the National grid. The power supply line connects almost all wards except few wards in per-urban.

Another major source of energy is Fossil fuels. Petroleum products are the most important source of lighting energy in rural areas and even in urban areas. Fossil fuels also do energize transport, industries, and various commercial establishments. The Municipalities and project area in general are supplied with petroleum products from private companies. Gas is another energy used in households mainly for cooking and few industries also use it as source of running machines.

Low- and medium-income earners in both rural and urban use fuel wood. Charcoal is the most important form of energy used for domestic purposes such as cooking. Solar energy is also available to few individuals with the financial ability to install.

4.2.22 Safety and Security

Urban safety and security are a deepening concern worldwide. In the study area and Dar es Salaam city in general, safety and security are low due to increases in urban crimes and violence and environmental degradation that tends to affect public health. In high-density areas the crimes rate is higher than in medium and low-density areas. Informal housing development, lack of street lighting compounds the problem.

4.2.23 Recreational Facilities

Recreation in the project area is commonly found in Central Business District (CBD) where hotels, Bars and Restaurants and night clubs are found. Furthermore, along the coastal strip tourist hotels, swimming pools. In other areas particularly, peri-urban traditional and religious ceremonies is part of recreation activities done in local pubs and drinking moments during marriage occasions. These recreation ceremonies are done through traditional dancing, ritual practices (*unyago*), etc.

4.2.24 Health Facilities

Health is one of the key sectors of which people depend on it when seeking their health status. The BRT 4 project will also require the services from health sector as construction workers will have to seek health services when get injuries or for the sake of knowing their health status. The BRT 4 route largely transverse Kinondoni MC so health facilities in the municipal is taken as a sample of other municipalities.

The KMC currently has a total of 188 health facilities of which 27 are government owned, while the remaining 161 are owned by Private[91].

It is within this context that many dispensaries, health centres and referral hospitals like Aga Khan (in Ilala), Kairuki Memorial hospital, Lugalo TPDF hospital, Masana hospital and Rabinisia hospital are found along BRT 4 route. It means during construction all severe accidents and major injuries will be attended without much problems since many health facilities are close to the project road. Looking at morbidity rate in the project area shows that ten common diseases which are reported in health facilities (out patients) birth asphyxia and anaemia are the leading diseases to majority of communities in the project area **(Figure 4-6).**

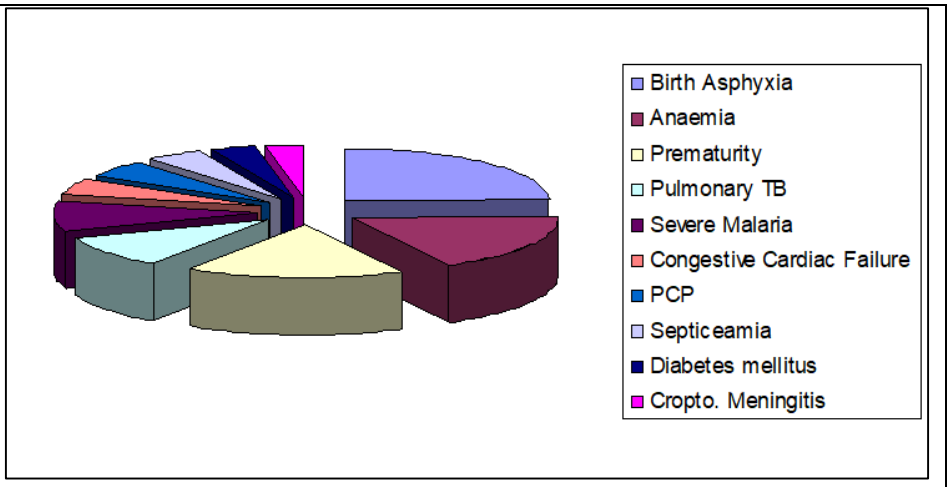

Figure 4-6: Ten Common Diseases in the Project Area in 2018.

4.2.25 Gender Issues

Gender empowerment ensures that, all sexes particularly women are fully participating in policy and decision-making processes and in all aspects of economic, socio-cultural, participation in managerial, political, professional, and technical personnel. It is within this context women are encouraged to participate fully in this BRT 4 project from planning stage, construction, and operation stages as one of the most beneficiaries of employment in the project. In the project area women are significantly involved in implementing activities especially in economic activities besides horticulture, 60% of the interviewed women were engaged in business activities such as selling of food crops, local brewing, food vending and alike.

For example, in Ilala Women groups have been assisted in different projects. In 2015, data available shows that there were 298 women groups with 1,489 members among them 92 groups were loaned 774,652,652.00. In 2018, there were 2322 women economic groups, with members being 11,624 who were loaned Tsh 1,021,200,000.00 who were engaged in a variety

[91] Source: KMC Socio-economic profile, 2018

of economic activities such as petty business, agriculture and animal husbandry, Batik, tie and die and food/beverages processing.

The unequal access to economic opportunities such as sharing of household income and other family/clan wealth existing between men and women leaves women with minimal options of earning their lives decently. It is reported that sometimes some of the women resort to promiscuity in order to meet their needs. With the prevalence situation of HIV/AIDS, they place themselves in a high-risk. Furthermore, women and girls are more vulnerable as they face early pregnancies, school dropout, early marriages, raping, unequal gender roles and prevalence of STDs among women and girls.

4.2.26 Cultural/Historic Properties

There are several historic and cultural heritage properties along the road section. These include Nyumba ya Sanaa (Ilala), Nyerere Cultural Centre (Ilala), Grave yard for 2nd World War (Ilala) Makumbusho ya Taifa (Kinondoni). There are other cultural and historic properties found within the project municipalities these are the then State house, National Museum, Askari Monument, Uhuru Torch, and the Republic Fountain, Karimjee Hall and others. Furthermore, there are curio shops along BRT 4 and Makonde carvings at Mwenge (Kinondoni).

There is one important Baobab tree on the road median at km 3+800 along the Ali Hassan Mwinyi Road Section **(Photo No. 4.3-3).** The Baobab Tree is used by local people as a sacred site. Therefore, before commencement of construction works the local people must be consulted on the procedure for removal of the Baobab Tree.

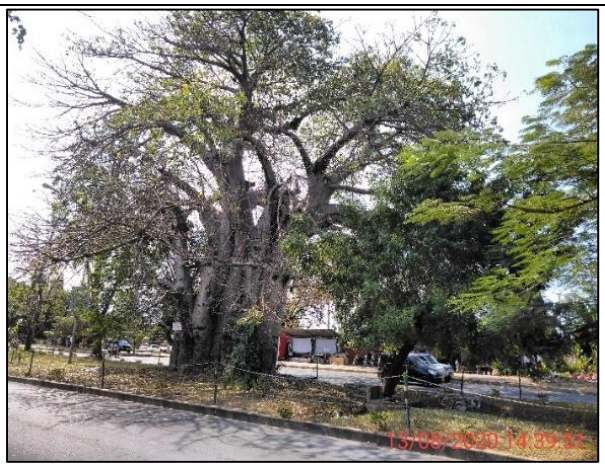

Photo No. 4.3-3: Baobab Tree (15 m circumference) at km 3+800 in the medina.

4.2.27 HIV/AIDS Prevalence

According to Tanzania HIV/AIDS and Malaria Indicator Survey (THMIS, 2017/18), Tanzania is experiencing some recent decline in national HIV prevalence. Between 2004 and 2012, the overall adult prevalence rate fell from 7% to 5.0 (from 6% to 3.8% % for men and from 8% to 6.5% % for women). Declines in HIV prevalence was also observed among pregnant women attending antenatal clinics and among blood donors.

The downward trend in levels of HIV infection correlates with the reduction in behaviours known to have a high risk of transmitting HIV. For example, in the 15-49 age group, casual sex with non-marital, non-cohabiting partners declined from 46% to 29% among men, and from 23% to 16% among women. (National HIV and AIDS Policy, 2013).

Looking at the study area HIV/AIDS is a killer disease in all the regions including Dar es Salaam. It was revealed from the reported cases in Ilala Municipal (one of the project municipals) from 2015 to 2018 that a total of 208 persons were tested in 2015, 314 in 2016, 2,445 in 2017 and 9,397 in 2018. The same report reveals that Expectant mothers were tested for HIV/AIDS status and the status of their children born in 2018 and 49,823 mothers tested indicated that 2.7% were HIV/AIDS positive. Thus, the number of children born with negative status ware 40312 and 1521 children was HIV positive.

Regarding the life style of the people and socio-cultural and traditional practices, the project area is not exceptional from other communities with similar traditions which in one way or another early marriage, raping cases and early pregnancies are indicators of activities fuelling the prevalence of HIV. With the coming project stern measures should be taken to prevent the spread of it through HIV awareness campaigns including safe sexual relations and fidelity to couples.

4.2.28 Ethnic Groups

The dominant ethnic groups in the Municipalities are Zaramo and Ndengereko, but due to urbanization many people of different ethnicity have immigrated making a heterogeneous tribal composition where no single ethnic group accounts for more than 20 percent of the total Dar es Salaam population. The project area inherits a long-established Swahili-Arab Culture that predates Arabs Settlers. The majority of ethnic groups speak Swahili, as a common language for communication and general trading.

4.2.29 Aspirations and Attitudes of the Adjacent Communities

Transport in Dar es Salaam is a major problem faced by almost every resident in the city despite his/her age. Workers and school children face constant transport hurdles in the morning and in the evening. The proposed BRT 4 project from Tegeta to the City centre seemed to be the best solution of ferrying magnitude of passengers in peak hours to and from city centre.

Residents are very much wishing if the project could start without much delays. People are hoping that the project will have enough buses against the number of buses in BRT 1. Reasonable number of buses will definitely ferry good number of passengers and reduce congestions at bus stations/stops. The project therefore is considered as one of development indicators and residents have agreed to collaborate with DART to make sure that no sabotage activities will take place against the project.

4.2.30 Gender Based Violence, Sexual Exploitation and Abuse

4.2.30.1 Country and District Level GBV

Gender Based Violence has been defined as “any harmful act that is perpetrated against a person’s will and that is socially ascribed (gender) differences between males and females. GBV has a greater impact on women and girls, as they are most of often the survivors and suffer of great physical damage than men when victimized. It was revealed by Community Development Officer (DCDO) from GBV Desk that in the project area the gender-based violence which is leading is *sexual abuse* reflecting; rape, dishonesty in relationship, forced unprotected sex, touching of private parts of a person without his/her consent, etc; followed by *physical violence* referred to beating, punching, pushing, grabbing, maiming, and killing with or without weapon. *Psychological violence* includes verbal abuse, scolding, isolating, verbal humiliation, gesture, annoyance, slandering and disgracing.

The last (but not the least) is economic abuse includes lack of voice in economic rights affecting one, working for less pay, failure to own property that one deserves, trafficking of persons, denial of basic necessity e.g., food, denial of education as a basic right, and early

marriages, lack of right to access health delivery in hospitals, denial of funds for attending health services by parent or guardian, etc

According to the study carried out in 2013 shows that in the project area GBV is existing with alarming rate that women Ever experienced physical violence is 31.8% and those Ever-experienced sexual violence is 24.1%.

Looking at the acceptance of GBV the study shows that attitudes towards wife beating 39% of women aged 15-49 agree that a husband has a right to beat his wife if he argues with him. 18% of women of the same age cohort agree that a husband has the rights to beat his wife if she burns the food. 40% of women agree that the husband has the rights to beat his wife if she neglects children.

The main challenge of such violence in the project area is attitudes, norms and behaviours that are deep-rooted in the families, homes and communities and institutionalized at all levels and consequently producing a culture of social acceptance of gender violence, especially violence against women. The study is still collecting current data from respective districts which may be higher than this due to COVID 19 where children (school children) remained home for couple of months.

4.2.30.2 Project Related Risks on GBV, SEA and SH

It should be noted that the main affected personnel in the project are company staff, local workers (skilled and non-skilled) as well as the surrounding community. At the working scenarios there will be high interaction of different cadre of people. At the working sites the Contactor should develop GBV and Sexual harassment Policy to guide workers not to engage in:

- Physical conduct – beating, unwelcoming physical conduct like patting, kissing etc
- Physical violence including sexual assault
- The use of job-related threats or rewards
- Verbal conduct
- Non-verbal conduct like display of sexually explicit or suggestive materials

Provision of training to all workers on GBV, SEA and SH and collaborate with community leaders on GBV related issues existing in the community (physical violence, sexual violence, and economic violence) that can be a barrier in executing site works among labourers (men and women).

4.2.31 Road Traffic Safety

In this section traffic and road accidents are not yet available. Zonal Traffic Officer in Dar es Salaam is still working on it. However, in the past there was an increase in road traffic accidents in the region of 4.3% between 1999 and 2000 and 2.7% during 2000 and 2001. The total number of traffic accidents was 16 372 during these 3 years. There were more injury victims among men than among women in all 3 years. A steady increase of 15 % of injured victims was observed from 1999 to 2001 (3426 vs. 3926 injuries). Men had an approximately four times higher prevalence of death compared to women in each survey year. The total number of death cases in road traffic accidents increased by 21% from 1999 to 2001 (296 vs. 375 death cases). The causes of road traffic accidents in 2001 were speeding (25.1%), careless driving (20.1%) and mechanical defect of the vehicle (14.0%). Most of the injuries occurred during the day (61.2 –65.9%, These former findings will be used as benchmark for current road accidents. In the last decade the Government has put some stern measures to reduce road accidents through speed limits in urban areas which is 50 Km/hr, inspected driving licence, vehicle inspections and other related measures.

5.0 STAKEHOLDER CONSULTATIONS AND PUBLIC PARTICIPATION

5.1 Stakeholder Identification and Analysis

The identified stakeholders can be categorized into Developers; Decision makers; Interested parties; and Affected parties positively or negatively and directly or indirectly. The stakeholder analysis matrix is provided in **Table 5-1.** The identification of stakeholders was based on how they are related to the project, how the project is going to affect them and why should they be consulted. The list of identified stakeholders and their role or involvement in the project is provided in **APPENDIX 15.**

5.1.1 Developers

The developers in this project are the Ministry of Works (MoW) and President's Office, Regional Administration and Local Government (PO-RALG)[92], and Tanzania National Roads Agency (TANROADS) Chief Executive at National Level and TANROADS Regional Manager at Regional Level. The MoWT and PO-RALG are responsible for ensuring the project is implemented and operated during and after construction, respectively in compliance with sectoral and national policy objectives.

The TANROADS Chief Executive Officer is responsible for financing the project on behalf of the Government of the United Republic of Tanzania (GOT) and TANROADS Regional Manager is responsible for assisting the Chief Executive Officer in overseeing the implementation of the project at regional level.

The Dar Es Salaam Rapid Transit Agency (DART Agency) was established in May 2007 under the Executive Agencies Act No. 30 of 1997. The Agency is responsible for the establishment and operation of the Bus Rapid Transit (BRT) system for Dar Es Salaam. Specifically, DART Agency is responsible for procurement of services, bus operators (private), fare collection system and ITS systems as well as overseeing operations of the BRT system.

5.1.2 Decision Makers

The decision-making authorities are those institutions dealing with environmental management in the country and therefore they can decide on whether a project should be implemented or should not be implemented. These include the Division of Environment in the Vice President's Office (VPO-DOE) and National Environment Management Council (NEMC). The VPO-DOE is responsible for approval of Environmental Impact Assessment report and issuance of Environmental Impact Assessment (EIA) Certificate. The National Environmental Management Council (NEMC) is responsible for screening and registration of the project, review and approval of scoping report and review of environmental impact assessment report and submission to the VPO-DOE for approval.

5.1.3 Interested Parties

The interested parties are those stakeholders who are not directly or indirectly affected by the project but they can influence the success or failure of the project or can provide advice to the project. For this project, the interested parties are Tanzania Rural and Urban Roads Agency (TARURA), Dar Es Salaam City Council (DCC), Ubungo Municipal Council (UMC) and Kinondoni Municipal Council (KMC) and their respective Ward Development Committees (WDCs), and Street/ "Mtaa" Development Committees (MDCs). The Local Government Authorities (LGAs) are responsible for land use planning and issuance of development permits within their jurisdictional boundaries. TARURA is responsible for construction and maintenance of rural and urban roads, which are linked to the BRT System.

5.1.4 Affected Parties

[92] In Kiswahili it is known as "Ofisi ya Rais, Tawala za Mikoa na Serikali za Mitaa (TAMISEMI)"

These are those stakeholders who can be directly or indirectly affected, whether positively or negatively by the project. The infrastructure / utility authorities namely, Tanzania Electricity Supply Company Limited (TANESCO), Dar Es Salaam Water and Sewerage Authority (DAWASA), and Tanzania Telecommunication Company Limited (TTCL) are considered to be indirectly and negatively affected because their infrastructures/utilities are likely to be affected. The Medium and Small Business Operators, Commuter Transport Operators (DARCOBOA & UWAMADAR), Bajaj/Bodaboda Operators, and Local Residents living adjacent to the road corridors will be directly and positively affected. It is expected that during construction some of the local residents will get temporary employment opportunity, hence considered to be directly and positively affected parties. Also, during construction, some small business operators like food vendors will get opportunity to increase their income by selling food items to the construction workers, hence considered to be indirectly and positively affected parties.

The local residents are also indirectly and negatively affected due to environmental, health and safety effects associated with the project activities. It is anticipated that during construction the project is likely to create some air pollution and risk of health and safety hazards to the local residents and therefore, considered to be indirectly and negatively affected parties.

Table 5-1: Stakeholder Identification and Analysis Matrix

S/n	Stakeholders	Categorization
1.	Ministry of Works (MoW)	
2.	President's Office, Regional Administration and Local Government (PO-RALG)	
3.	Tanzania National Roads Agency (TANROADS)	
4.	Dar Es Salaam Bus Rapid Transit (DART) Agency	
5.	Division of Environment in the Vice President's Office (DOE-VPO)	
6.	National Environment Management Council (NEMC)	
7.	Tanzania Rural and Urban Roads Agency (TARURA)	
8.	Dar Es Salaam City Council (DCC)	
9.	Ubungo Municipal Council (UMC)	
10.	Kinondoni Municipal Council (KMC)	
11.	Ward Development Committees (WDCs)	
12.	Mtaa Development Committees (MDCs)	
13.	Embassy of France, Japan, and Indonesia	
14.	Tanzania Electricity Supply Company Limited (TANESCO)	
15.	Tanzania Telecommunication Company Limited (TTCL)	
16.	Commuter Transport Operators	
17.	Business Operators along the Road Corridors	
18.	Local Communities along the Road Corridors.	

KEY	
	Developers
	Decision Makers
	Interested Party
	Affected Parties (Direct Positively)
	Affected Parties (Indirect Positively)
	Affected Parties (Direct Negatively)
	Affected Parties (Indirect Negatively)

5.2 Stakeholder Consultation

The stakeholder consultation involved face to face interviews with representatives of relevant government institutions, agencies, and local government authorities. These include TANROADS, Tanzania Rural and Urban Roads Agency (TARURA), Dar Es Salaam Rapid Transit (DART), Tanzania Forest Services (TFS), Dar Es Salaam Water and Sewerage

Authority (DAWASA), Dar Es Salaam City Council (DCC), Ubungo Municipal Council and Kinondoni Municipal Council (KMC). The stakeholder consultation was also carried out with Small Business Operators (i.e., Bajaj/Bodaboda Operators, Flower, and Furniture Vendors). The names and signatures of consulted stakeholder representatives is provided in **APPENDIX 16.**

5.3 Results of Stakeholder Consultations

5.3.1 Consultation with Stakeholder Representatives

The consultation with stakeholder representatives was carried out between 14th July 2020 and 21st August 2020. In general, the stakeholders have raised some issues/concerns have provided recommendations or mitigation measures. The record of issues / concerns raised during consultation with stakeholder representatives is provided in **APPENDIX 17.**

The raised issues/concerns were then analysed to determine the most affected Valued Environmental Components (VECs) based on the number of issues/concerns raised by the stakeholders. The analysis of issues / concerns raised by stakeholder representatives is provided in **APPENDIX 18.**

The analysis indicates issues / concerns raised by the consulted stakeholder representatives were more on Public Service infrastructure / Utilities (19 issues) and Land and Resource Use (13 issues), followed by Terrestrial Environment (9 issues), Economy and Employment (9 issues), Public Health and Safety (7 issues), Wetland Environment (2 issues), Atmospheric Environment (1 issue), Aquatic Environment (1 issue) and Wetland Environment (1 issue).

It can therefore by concluded that the stakeholders were more concerned that the project will have more effect on land use and public service infrastructure/utilities.

5.3.1.1 Identified issues/concerns

The following are the identified issues / concerns by the consulted stakeholder officials:

- Disruption of road transportation, hence the need to create diversion roads during construction.
- Destruction of adjacent land use and properties due to storm water discharge from the road, hence the need to avoid directing storm water drainages into the adjacent land.
- Disruption of public service Infrastructures and utilities
- Increased prevalence of HIV/AIDS, hence the need to formulate HIV/AIDS prevention and control programme to be implemented by qualified person.
- Displacement of commuter bus operators, hence the need to compensate them
- Destruction of mangrove vegetation, hence the need for compensation.

5.3.1.2 Recommendations

The following are some of the recommendations provided by the consulted stakeholder representatives:

- The discharge from the drainage system should not be directed to residence areas.
- Sensitization to the public should be done early for them to know the government plan and accept the situation if the plan will need them to vacate from the proposed road corridor.
- Contractor should make sure that he has the contracts with sanitation facility owner that will be utilized by their workforces during construction along the road.
- The owner of the proposed borrow and sand pits have to be known and they have to provide the reinstatement plan after finishing the project since they will be selling materials.
- Traffic management plan should be prepared and implemented during construction.
- Training should be given to drivers to use the proposed alternative/diversion roads during construction.

- The project implementation team should plan to renovate the proposed alternative/diversion roads after project completion.
- The construction team have to map all the pipes that needs to relocated traversing along and crossing the proposed road corridors in consultation with DAWASA Regional Offices.
- The pipes that cross the proposed road corridors have to be provided with service ducts.
- Quantitative environmental and social baseline data have to be collected before the commencement of the construction works.
- The stations between BRT roads should be provided with sanitary facility to improve the provided services.
- The construction works should provide service ducts/sleeves at least every 1 km for future utility crossing due to the expected increase in demand to avoid cutting the roads since reinstatement will not be the same as the original works.
- The access road that receives traffic turns left and right from the BRT road have to be improved.

5.3.2 Consultation with Ward and Mtaa Leaders

The consultation with Ward and Mtaa Leaders was carried out from 15th September 2020 to 18th January 2021. The list of consulted Ward and Mtaa Leaders is provided in **APPENDIX 19.** In general, the stakeholders have raised some issues/concerns have provided recommendations or mitigation measures. The record of issues / concerns raised during consultation with Ward and Mtaa Leaders is provided in **APPENDIX 20.**

The raised issues/concerns were then analysed to determine the most affected Valued Environmental Components (VECs) based on the number of issues/concerns raised by the stakeholders. The analysis of issues / concerns raised by Ward and Mtaa leaders is provided in **APPENDIX 21.**

The analysis indicates issues / concerns raised by the consulted stakeholder representatives were more on Transportation (7 Issues), followed in that order by Current Land and Resources Use (5 Issues), Terrestrial Environment (4 Issues), Acoustic Environment (3 Issues), Public and Community Service infrastructure / Utilities (2 Issues), Public Health & Safety (2 Issues), Atmospheric Environment (1 Issue) and Labour & Economy (1 Issue).

It can therefore by concluded that the consulted stakeholders were more concerned about the effect of the project on transportation, adjacent properties, surrounding environment, and to moderately concerned on about noise and vibration effects from the project, effect on the project on infrastructure/ utilities, HIV/AIDS transmission. To the lesser extent the stakeholders were concerned about air pollution. However, the stakeholders are also aware that the project will have beneficial impacts in terms of increased revenue from operation of park and ride facilities.

5.3.3 Consultation with Small Business Operators

In general, the consulted Small Business Operators (SBOs) do support the project and they are willing to vacate any time when requested to do so. The names and signatures of consulted small business operators are provided in **APPENDIX 22.** However, the consulted stakeholders have raised some issues/concerns regarding the project. The record of issues/concerns raised during consultation with SBOs are provided in **APPENDIX 23.** The raised issues/concerns were then analysed to determine the most affected Valued Environmental Components (VECs) based on the number of issues/concerns raised by the consulted stakeholders. The analysis of issues / concerns raised by small business operators is provided in **APPENDIX 24.**

The analysis indicates issues / concerns raised by SBOs were more on Labour and Economy (11 issues), followed by Current Land and Resources Use (10 issues), Transportation (4 issues) and Terrestrial Environment (2 issues). It can therefore by concluded that the stakeholders were more concerned that the project will have more effect on their livelihood in terms of employment and income due to displacement from the road reserve.

5.3.3.1 Identified issues/concerns

The following are the identified issues/concerns by the consulted small business operators:

- Loss of business due to displacement from the road reserves (e.g., 38 flower and furniture vendors).
- Loss of space for conducting small and medium business operations (e.g., one pump will have to be shifted or relocated at the Total Petrol Station at km 54+100).
- Loss of revenue and employment due to displacement of customers (E.g., Total Petrol Station at km 5+100).
- Displacement of small business operations from the road reserve.
- Loss of employment for youth due to displacement of small business operations from the road reserve.
- Loss of revenue by the government due to closure of various medium and small business operations.
- Loss of income for commuter bus operators due to operations of BRT buses.

5.3.3.2 Recommendations Given by SBOs

The following are some of the recommendations provided by the consulted small business operators:

- TANROADS and Local Government Authorities (LGAs) should find a place to relocate them before removing them from the road reserve.
- TANROADS should inform them at least 1-2 months before commencement of construction works.
- The design of BRT should take into consideration the importance of small business operators.
- The design of BRT should consider provision of parking area for Bajaj and Bodaboda. The Bajaj and Bodaboda parking should not be located far from the proposed BRT stations for our costumer not to walk a distance to find Bajaj or Bodaboda.
- TANROADS should think to provide the pedestrian bridge since this is the accident zone and many pedestrians who crossing here are prone to accident.
- The design should consider to improve the U-Turn locations since the U-Turn areas in BRT phase 1 are very complicated and the access roads to the directed areas are not in a good standard.
- During construction works the Contractors should plan the means of helping instead of vacating us from the working area since we depend on the road for our livelihood.
- TANROADS should provide the small area for conducting business and we promise we will not interrupt the pedestrian.
- The design should take into consideration that the proposed DAWASA Bus Terminal is a flood prone area.

6.0 IDENTIFICATION AND ASSESSMENT OF IMPACTS

Preamble

In this Chapter, the assessment of effects/impacts has been carried out in two steps, whereby the first step is identification of impacts and the second one is determination of significance of

impacts. The identification of impacts considers both positive and negative impacts which result from interaction between the Project related activities and Valued Environmental Components (VECs)[93]. The assessment also considers cumulative effects/impacts; impacts of the potential environmental effects arising from credible accidents, malfunctions, and unplanned events; and effects of the environment on the projects. For the purpose of this report, the term "environmental effects" will be taken to be synonymous to the term "environmental impacts" as referred to in the EIA and Audit Regulations (2005). As such, the EIA study considers environmental effects and impacts as defined by the national legislation. However, for convenience the term "impact(s)" shall be used throughout this report, unless otherwise specified.

6.1 Identification of Impacts

The identified potential environmental effects/impacts are based on the interaction between the Project Related Activities and Selected Valued Environmental Components (VECs) [94]. The selection of VECs was based on existing project environment (environmental baseline conditions), opinions/views obtained from stakeholder consultations, and consultant's professional judgement. For this project the selected VECs include Atmospheric Environment; Acoustic Environment; Water Resources; Aquatic Environment; Wetland Environment; Terrestrial Environment; Public Health and Safety; Labour and Economy; Public Services Infrastructure / Utilities; Transportation; Current Land and Resource Use; and Cultural Heritage Resources. The potential interactions between the Project Related Activities and the Selected VECs for each phase of the project implementation is illustrated in **Table 6-1.**

Table 6-1: Potential Interactions of the Project with VECs.

Valued Environmental Components	Project Phase		
	Construction	Demobilization	Operation
Atmospheric Environment	✓	✓	✓
Acoustic Environment	✓	✓	✓
Water Resources	-	-	-
Aquatic Environment	-	-	-
Wetland Environment	-	-	-
Terrestrial Environment	✓	✓	-
Public Health and Safety	✓	-	✓
Labour and Economy	✓	✓	✓
Public Services Infrastructure / Utilities	✓	-	-
Transportation	✓	-	✓
Land and Resource Use	✓	-	✓
Current Use of Land and Resources by Indigenous Peoples[95]	-	-	-
Cultural Heritage Resources	✓	-	-
Legend:			
- No Substantial Interaction			
✓ Possible Interaction			

The identified impacts were further screened during scoping study to identify the likely significant environmental effects/impacts as shown in the summary of scoping results provided in **APPENDIX 25.** The scoping results indicate the likely significant environmental effects/impacts to be further considered (Scoped IN) in the EIA study and those effects/impacts that are not significant and therefore should not be further considered (Scoped

[93] Valued Environmental Components can be physical, biological, social, economic or cultural
[94] Valued Environmental Components can be physical, biological, social, economic or cultural
[95] Defined as members of those cultures which have historic, ancestral, spiritual and functional connection to the land on which and from which they live. Distinguished from members of those cultures whose connection to the land on which they live is limited to the historical period.

OUT) in the EIA study. From the scoping result it was also possible to eliminate some of the selected VECs because their interactions with project related activities was not likely to create significant environmental effects/impacts. Therefore, as a result of scoping exercise the Aquatic and Wetland Environment were eliminated and will not be further considered in the assessment.

The following sub-sections outline the potential environmental effects/impacts (positive and negative) at various stages of the project implementation (i.e., mobilization, construction, demobilization, and operation phase). The findings indicate most of the identified negative impacts will occur during construction phase and positive impacts during operation phase.

6.2 Assessment of Impacts

The identified impacts were assessed by using Environmental Impact Assessment Matrix provided in **APPENDIX 26**, based on the Rapid Impact Assessment Matrix (RIAM) Methods[96]. The assessment of impacts helped to determine the significance of impacts based on the following criteria:

- ***Importance*** – whether important to national, regional or international interest or site specific.
- ***Magnitude of Change*** – whether Positive or Negative
- ***Permanence*** – whether condition is permanent or temporary.
- ***Reversibility***- reversible or irreversible.
- Whether ***Cumulative / Synergistic*** for positive and negative impacts, respectively.

The significance of impacts also took into consideration existing by-laws, national and international environmental standards, legislation, treaties, and conventions that may affect the significance of identified impacts. These techniques have been used in order to have a logical and systematic way of identifying, assessing, and analysing environmental impacts. The techniques also allowed subjective judgments to be quantitatively recorded and therefore make the assessment of impacts become more objective.

6.2.1 Mobilization Phase

6.2.1.1 Impacts on Current Land and Resource Use

The project will result into loss of land ownership and other properties due to land acqusition for construction of BRT infrastructure such as Depots, Terminals, and Car Parks.

The impact has been assessed to be ***Indirect*** and ***Negative*** with ***High Significance***; and is expected to be ***Long-term*** and ***Permanent,*** with ***Irreversible*** effects on the socio-economic conditions of the project affected persons (PAPs).

6.2.1.2 Impacts on Public Services Infrastructure and Utilities

(a) Disruption of public infrastructure and utility services

The relocation of existing infrastructures and utilities will result into disruption of public service infrastructure and utilities, hence leading into financial and economic loss to the affected people.

The impacts have been assessed to be ***Indirect*** and ***Negative*** with ***Medium Significance***; and is expected to be ***Short-term*** and ***Temporary*** as it occurs only during relocation of affected infrastructure and utilities. However, its effects on human life can be ***Irreversible*** if it occurs. For example, death of a patient due to power failure during operation in a hospital is irreversible effects caused by disruption of power supply.

(b) Increased revenue for community and public infrastructure service providers

[96]Environmental Impact Assessment Using the Rapid Impact Assessment Matrix (RIAM). Ed. Kurt Jensen. Published by Olsen & Olsen, 1998.

The increased demand for power supply for operation of construction camp site and influx of people into the project area is likely to result into increased demand for housing and accommodation services. This will result into increased revenue for community and public infrastructure and utility service providers.

The impact has been assessed to be ***Indirect*** and ***Negative*** with ***Medium Significance***; and is expected to be ***Short-term*** and ***Temporary*** as it occurs during construction phase. However, it can have ***Long-term*** effects on the socio-economic conditions of the local people.

6.2.2 Construction Phase

6.2.2.1 Impacts on Atmospheric Environment

The followng are the identifed impacts on the Atmospheric Environment during Construction Phase:

- Increased air pollution due to dust emission from road construction activities.
- Increased air pollution due to dust emission from movement of heavy trucks hauling construction materials from borrow pits/quarry pits.

(a) Creation of air pollution due to dust emission from road construction works

The project will involve soil excavatios, stockpiling and earth moving activities along the construction road. This is likely to result into dust emission, espcially during dry seasons, hence affecting the the adjacent local residents and nearby road users.

The impact has been assesed to be ***Indirect and Negative*** with ***Low Significance***; and is expected to be ***Short-term*** and ***Temporary*** as it will occur only during construction phase. However, its effects on the human heath will be ***Irreversible*** if it occurs.

(b) Creation of air pollution due to dust emission from movement of heavy trucks along access roads to borrow pits/quarry sites.

The project will involve transportation of construction materials from borrow pits and quarry sites. The movement of heavy trucks hauling construction materials along the access roads to borrow pits / quarry pits will result into dust emission, hence likely to affect the adjacent local residents, cultivated crops and natural vegetation.

The impact has been assessed to be ***Indirect*** and ***Negative*** with ***Medium Significance***; and is expected to be ***Short-term*** and ***Temporary*** as it will occur only during construction phase. However, its effects on human heath, cultivated crops and natural vegetation will be ***irreversible*** if it occurs.

6.2.2.2 Impacts on Acoustic Environment

The following are the identifed impacts on the Acoustic Environment during Construction Phase:

- Noise nuisance and vibration effects on adjacent buildings along the construction road.
- Noise nuisance and vibration effects on adjacent buildings along the access roads to borrow pits/quarry sites.

(a) Creation of noise nuisance and vibration effects along the construction road.

The project will involve operation of mobile equipment/machinery during the construction. This is likely to result into creation of noise nuisance and vibration effects on the adjacent buildings. The vibration effects on adjacent buildings will be more significant during compaction of soil/gravel materials along the construction road. However, the effect is not likely to be very significant to the adjacent buildings because the construction works will be within the median, which is far from the adjacent buildings.

The impact has been assessed to be ***Direct*** and ***Negative*** with ***Low Significance***; and is expected to be ***Short-term*** and ***Temporary*** as it occurs only during construction phase. However, its effects on human health will be ***Irreversible*** if it occurs. But the effects of vibration on building structures can be ***Reversible*** through repair of damaged structures.

(b) Creation of noise nuisance and vibration effects along the access roads to borrow pits/quarry sites.

The project will involve transportation of construction materials from borrow pits / quarry pits will create noise nuisance on the adjacent buildings. The effects will be more felt if the access road passes through human settlements or densely populated areas.

The impact has been assessed to ***Indirect*** and ***Negative*** with ***Medium Significance***; and is expected to be ***Short-term*** and ***Temporary*** as it occurs only during construction phase. However, its effects on human health will be ***irreversible*** if it occurs. But the effects of vibration on building structures can be ***Reversible*** through repair of damaged structures.

6.2.2.3 Impacts on Terrestrial Environment

The following are the identified impacts on Terrestria Environment during Construction Phase:

- Creation of landscape degradation due to water flow from roadside storm water drainages into the adjacent lands.
- Loss of aesthetic value of the surrounding environment due to accumulation of construction and domestic solid wastes
- Loss of aesthetic value of the surrounding environment due to spillage of waste oils from storage containers.

(a) Creation of landscape degradation due to water flow from road side storm water drainages

The project will involve construction of roadside storm water drainages. If not properly designed the flow from roadside storm water drainages may result into landscape degradation due to soil erosion on the adjacent lands.

The impact has been assessed to be ***Direct*** and ***Negative*** with ***Low Significance***; and is expected to be ***Long-term*** and ***Permanent*** as it persists even after construction phase. Its effect on the terrestrial habitats is ***Irreversible*** because the natural vegetation will not be recovered.

(b) Loss of aesthetic value of the surrounding environment

The project will involve generation of construction and domestic solid wastes and waste oils from vehicles and mobile construction equipment. The accummulation of construction and domestic solid wastes and spillage of waste oils from storage containers is likely to result into loss of aesthetic value of the surrounding environment.

The impact has been assessed to be ***Indirect*** and ***Negative*** with ***Very Low Significance***; and is expected to be ***Short-term*** and ***Temporary*** as it occurs only during the construction phase. Its effects on the surrounding environment are ***Reversible*** because the surrounding environment can be restored to its original condition after removal of the impact or completion of the project.

6.2.2.4 Impacts on Public Health, Safety and Security

The following are the identifed impacts on Public Health and Safety Component during Construction Phase:

- Increased prevalence of HIV/AIDS and STIs due to interaction between the construction workers and local community members.

- Creation of occupational health and safety risks to the construction workers due to handling /operation of hazardous construction materials/equipment.
- Creation of risk of construction related accidents due to trespass by unauthorized people into the construction sites.
- Increased risk of Covid-19 transmission due to influx of people into the project site.
- Creation of construction related risk of accidents due to trespassing of the construction site by unauthorized people.
- Increased risk of traffic accidents at the junction of access road due to frequent movement of construction vehicles to and from the construction site.
- increased risk of fire outbreak at the construction camp site.

(a) Increased prevalence of HIV/AIDS and STIs

The project is likely to result into increased prevalence of HIV/AIDS and STIs in the project areas due to social interaction between construction workers and local community is likely to result into increased prevalence of HIV/AIDS and STIs among the local community members of the project area.

The impact has been assessed to be ***Indirect*** and ***Negative*** with ***High Significance***; and is expected to be ***Long-term*** and ***Permanent*** as it continues to occur even after construction phase. Its effects on the human health are ***Irreversible*** because there is not yet any known treatment for HIV, apart from Ant-retrovirus (ARV) drugs, which helps to increase resistance against HIV.

(b) Creation of occupational health and safety risks

The project will involve handling and operation of hazardous construction materials and equipment by construction workers. This is likely result into creation of occupational health and safety risks to the construction workers. These include physical injury by construction equipment like jack hammers; exposure to dusty construction materials like dry cement, sand, and aggregate and hand injury due to exposure to wet cement, etc.

The impact has been assessed to be ***Direct*** and ***Negative*** with ***Low Significance***; and is expected to be ***Short-term*** and ***Temporary*** as it occurs only during construction phase. However, its effects on the human health will be ***Irreversible*** because once a damage occurs it cannot be reversed. For example, hearing loss due to prolonged exposure to high pitch noise, occurrence of disease like Chronic Obstructive Pulmonary Disorder (COPD) due to prolonged exposure to dust emission, etc.

(c) Increased risk of Covid-19 transmission.

The project will result into induced influx of people into the project sites in form of small business operators, customers, and job seekers. This will result into increased population at the construction sites, hence increased risk of Covid-19 transmission among the construction workers and local community members.

The impact has been assessed to be ***Indirect*** and ***Negative*** with ***Low Significance***; and is expected to be ***Long-term*** and ***Permanent*** as it continues to occur during operation phase after abandonment of the open borrow pits /quarry pits. Its effects on human health may be ***Irreversible*** because a Covid-19 virus can cause death to its victim.

(e) Creation of construction related risk of accidents.

Trespassing by unauthorized people into the construction site is likely to result into risk of construction related accidents due to movement of mobile construction equipment like bulldozers, graders, and heavy dumper trucks, around the construction site. For example, a person may be overrun by backward moving mobile construction equipment / machinery, especially if it is not fitted with sounding alarm device.

The impact has been assessed to be ***Indirect*** and ***Negative*** with ***Low Significance***; and is expected to be ***Short-term*** and ***Temporary*** as it occurs only during construction phase. However, its effects on the human health may be ***Irreversible*** because the impact may result into fatal injury (death) or non-fatal injury which results into loss of an organ (E.g., legs, arms, etc).

(f) Increased risk of traffic accidents
The project will involve movement of heavy trucks vehicles to and from the construction site during transportation of construction materials into the construction site and spoil materials from the construction site to the dumping site. The frequent movement of heavy trucks to and from the construction site is likely to result into risk of traffic accidents at the junction between the access roads to the construction site and the local roads or at the entrance and exit of the construction site.

The impact has been assessed to be ***Indirect*** and ***Negative*** with ***Low Significance***; and is expected to be ***Short-term*** and ***Temporary*** as it occurs only during construction phase. However, its effects on the human health may be ***Irreversible*** because the impact may result into fatal injury (death) or non-fatal body injury and irreversible damage to a property.

(g) increased risk of fire outbreak at the construction camp site.
The project will involve storage of inflammable liquids like petroleum products and gas at the construction camp site. This is likely to result into increased risk of fire outbreak due to accidental ignition of spilled or leaking petroleum products or gas from storage containers.

The impact has been assessed to be ***Indirect*** and ***Negative*** with ***Low Significance***; and is expected to be ***Short-term*** and ***Temporary*** as it occurs only during construction phase. However, its effects on the human health and property will be ***Irreversible*** because the impact may result into fatal injury (death) or non-fatal body injury and irreversible damage to a property.

6.2.2.5 Impacts on Transportation

The following are the identifed impacts on Transportation Component during Construction Phase:

- Severance of community access to and from their residences due to excavation of road bed and trenches for roadside storm water drainages.
- Disruption of traffic flow and public transport due to construction of BRT road and associated drainage structures.
- Disruption of traffic flow along the construction road during construction of road pavement and associated storm water drainages.
- Relocation of Daladala terminal especial at Kivukoni due to extension of the BRT Terminal

(a) Severance of community access to their residences.
The project will involve excavation of road bed and trenches for road side storm water drainages. This is likely to result into severance of access for local people to their residences or business premises due to creation of deep trenches. Ultimately, this will result into increased travel time to the local residents.

The impact has been assessed to be ***Indirect*** and ***Negative*** with ***Low Significance***; and is expected to be ***Short-term*** and ***Temporary*** as it occurs only during construction phase. Its effects will be ***Reversible*** because it will no longer exist after provision of access.

(b) Disruption of traffic flow and public transportation along the construction road

The project will involve construction of road pavement and drainage structures. This is likely to create disruption of traffic flow and public transportation along the construction road. This will also result into increased travel time due to delayed movement of traffic along the construction road.

The impact has been assessed to be ***Direct*** and ***Negative*** with ***High Significance***; and is expected to be ***Short-term*** and ***Temporary*** as it occurs only during construction phase. Its effects will be ***Reversible*** because it will no longer exist after completion of construction works.

(C) Relocation of Daladala terminal especial at Kivukoni due to extension of the BRT Terminal

The project will involve relocation of the currently Kivukoni Daladala terminal due to extension of the BRT terminal that will be accommodated by the buses from BRT 1 to BRT 4. All the daladala and bajaj will not be allowed to use that area during the construction and operation.

The impact has been assessed to be ***Direct*** and ***Negative*** with ***High Significance***; and is expected to be ***Long-term*** and ***permanent*** since the Daladala will exist only during the construction but in proposed new location to allow extension of the BRT terminal while during the operation the area will be used by BRT buses only and Daladala to Kivukoni will be phased out.

6.2.2.6 Impacts on Labour and Economy

The following are the identified impacts on Labour and Economy Component during Construction Phase:

- Recruitment of construction workers will result into creation of employment opportunity for local people.
- Increased demand for food and other items from construction workers will create opportunity for local food vendors to increase their income by selling food and other items to the construction workers.
- Emergence of Gender Based Violence (GBV), Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH) due to influx of people into the project site.

(a) Creation of employment opportunities for local people

The project will involve recruitment of construction workers, hence resulting into creation of employment opportunity for local people.

The impact has been assessed to be ***Direct*** and ***Positive*** with ***Medium Significance***; and is expected to be ***Short-term*** and ***Temporary*** as it occurs only during construction phase. However, it can have ***Long-term*** effects on the socio-economic conditions of the local people.

(b) Increased income generation opportunity for local people.

The presence of large number of construction workers will result into increased demand for food and other items, hence resulting into increased income generation opportunity for local people.

The impact has been assessed to be ***Indirect*** and ***Positive*** with ***Medium Significance***; and is expected to be ***Short-term*** and ***Temporary*** as it occurs only during construction phase. However, it can have long-term effects on the socio-economic conditions of the local people.

(c) Emergence of Gender Based Violence, Sexual Exploitation and Sexual Harassment

The influx of people into the project site will result into increased number of people seeking for employment into the project and other economic activities. This will also result into emergence of Gender Based Violence (GBV), Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH). The increased demand for employment will make some corrupt senior

project staff may use this opportunity to demand sexual favours in exchange for employment Also, senior staff may resort into sexual harassment of junior staff and workers.

The impact has been assessed to be ***Indirect*** and ***Negative*** with ***High Significance***; and is expected to be ***Short-term*** and ***Temporary*** as it occurs only during construction phase. However, it can have long-term and ***Irreversible*** effects on the socio-psychological conditions of the affected people.

6.2.2.7 Impacts on Historical and Cultural Heritage Resources

The following are the identifed impacts on Historical and Cultiural Heritage Resoruces during Construction Phase:

- Destruction of sacred or cultural site due to removal of baobab tree from the road median.
- Destruction of archaeological artefacts due to land excavation.

(a) Destruction of sacred or cultural site

The baseline indicates there is a Baobab tree in the road median. This tree will have to be removed to allow the construction of BRT road. The Baobab is used by loca people as a sacred or cultural site.

The impact has been assessed to be ***Indirect*** and ***Negative*** with ***Very High Significance***; and is expected to be ***Long-term*** and ***Permanent*** because the sacred tree will be permanently removed from the road median. The effect is considered to be ***Irreversible*** because once the tree is removed it will never be recovered or replanted into the area.

(b) Destruction of archaeological artefacts

The project is likley to result into destruction of archaeological artefacts due to extraction of construction materials from borrow pits, excavation of road bed and roadside storm water drainages during the road construction. If precautions are no taken these activities are likely to result into destruction of archaeological artefacts.

The impact has been assessed to be ***Indirect*** and ***Negative*** with ***Low Significance***; and is expected to be ***Short-term*** and ***Temporary*** as it occurs only during construction phase. Its effects will be ***Irreversible*** because when destroyed the artefact will never be recovered or restored into its original condition.

6.2.3 Demobilization Phase

6.2.3.1 Impacts on Labour and Economy

The project will involve retrenchment of construction workers after completion or closure of the project. This will result into loss of employment opportunity by the local people. The baseline (Section 2.6.3) indicates 90% of 825 workers (743 people) will obtain temporary employment as local people. It is therefore, expected that about 743 people will be retrenched during closure or completion of the project.

The impact has been assessed to be ***Direct*** and ***Negative*** with ***Low Significance***; and is expected to be ***Long-term*** and ***Permanent*** as it occurs after completion of construction works. Its effects will be ***Reversible*** because the affected workers are likely to return into their original economic and income generating activities.

6.2.4 Operation Phase

6.2.4.1 Impacts on Public Health and Safety

The following are the identifed impacts on Public Health and Safety due to improvement of the road into bitumen standard during Operation Phase:

- Reduced risk of traffic accidents due to construction of BRT road with dedicated lane for BRT buses.
- Increased comfortability for passengers due to provision of large buses with more space.

(a) Reduced risk of traffic accidents due to provision of dedicated BRT lane
Currently the road is characterized by uncontrolled movement of different category of vehicles along the road section, hence creating the risk of traffic accidents. For example, it is common to see Daladala Commuter Buses being parked at unauthorized areas, hence creating inconveniences to other road users and risk of traffic accidents to pedestrians. The most vulnerable groups being the school children, disabled persons, the elderly and sick people. The construction of dedicated BRT lane will not only reduce traffic congestion but also reduce the risk of traffic accidents for pedestrians.

The impact has been assessed to be ***Indirect*** and ***Positive*** with ***High Significance***; and is expected to be ***Long-term*** and ***Permanent*** as it will continue to occur throughout the operation phase.

(b) Increased comfortability for passengers
The project will involve the use of large buses during operation. This will result into increased comfortability of passengers due to provision of more space.

The impact has been assessed to be ***Indirect*** and ***Positive*** with ***High Significance***; and is expected to be ***Long-term*** and ***Permanent*** as it will continue to occur throughout the operation phase.

6.2.4.2 Impacts on Labour and Economy
The following are the identifed impacts on Employment and Economy Component after improvement of the road into concrete standard during Operation Phase:

- Increased productivity and stimulation of economic growth.
- Employment creation and economic improvement of households.
- Increased Revenue Collection by Local and Central Government
- Reduced Transportation Costs and Improved Access to Social Services.
- Reduced risk of traffic accidents
- Increased comfortability of passengers.

The identified impacts have been assessed to be ***Indirect*** and ***Positive*** with ***High Significance***; and are expected to be ***Long-term*** and ***Permanent*** as it will continue to occur throughout the operation phase.

6.3 Overall Assessment of Impacts
The overall assessment of impacts in **Table 6-2** indicates most of the negative impacts will occur during construction phase and their significance ranges from Very Low, Low and Medium and most of the positive impacts will occur during operation phase and their significance ranges from Low, Medium to High.

Table 6-2: Overall Assessment of Impacts.

Affected Component	Environmental Effects/Impacts	Significance	Mobilization Phase	Construction Phase	Demobilization Phase	Operation Phase
Atmospheric Environment	Increased air pollution due to dust emission along the construction road.	**Low**	✓	✓	✓	□
	Increased air pollution due to dust emission along the access roads to borrow pits/quarry sites.	**Medium**	✓	✓	□	□
Acoustic environment	Creation of noise nuisance and vibration effects the adjacent local residents due to road construction works.	**Low**	□	✓	□	□
	Creation of noise nuisance and vibration effects to adjacent local residents along the access roads to borrow pits.	**Medium**	□	✓	□	□
Terrestrial environment	Loss of aesthetic value of the surrounding environment due to accumulation of excavated soil materials and construction solid wastes.	**Low**	✓	✓	□	□
Public Health, Safety and Security	Increased transmission of HIV/AIDS and STIs due to social interaction between the construction workers and local community members.	**High**	✓	✓	□	✓
	Creation of occupational health and safety risks due to handling / operation of hazardous construction materials/equipment.	**Low**	✓	✓	□	□
	Increased risk of Covid-19 transmission due to influx of people into the construction sites.	**Low**	✓	✓	□	□
	Creation of construction related risk of accidents due to trespassing by unauthorized persons into the construction site.	**Low**	✓	✓	□	□
	Increased risk of traffic accidents due to movement of heavy trucks to and from the construction site.	**Low**	✓	✓	□	□
	Increased risk of fire outbreaks due to accidental contact between inflammable materials and ignition sources.	**Low**	✓	✓	□	□
	Reduced road traffic accidents due to operation of BRT road after construction.	**High**	□	□	□	✓

Affected Component	Environmental Effects/Impacts	Significance	Mobilization Phase	Construction Phase	Demobilization Phase	Operation Phase
Labour and Economy	Increased employment opportunities for local people due to recruitment of construction workers.	**High**	✓	✓	□	□
	Risk of emergence of GBV/SEA, SH, and Child Labour due to influx of people into the project sites.	**Medium**	✓	✓	□	□
	Increased income generation opportunities for local people due to increased demand for food by construction workers.	**High**	✓	✓	□	□
	Loss of temporary employment opportunities for local people due to closure or completion of construction works.	**High**	□	□	✓	□
	Operation of BRT road after construction will result into the flowing impacts:					
	- Increased productivity and stimulation of economic growth.	**High**	□	□	□	✓
	- Employment creation and economic improvement of households.	**High**	□	□	□	✓
	- Increased Revenue Collection by Local and Central Government	**High**	□	□	□	✓
	- Reduced Transportation Costs and Improved Access to Social Services.	**High**	□	□	□	✓
	- Reduced risk of traffic accidents	**High**	□	□	□	✓
	- Increased comfortability of passengers.	**High**	□	□	□	✓
Commodity and Public service infrastructure/ utilities.	Increased pressure on existing sanitary and solid wastes disposal facilities due to increased influx of people into the construction sites.	**Medium**	✓	✓	□	□
	Disruption of public infrastructure and utility services due to relocation of infrastructure/utilities from the construction road.	**Medium**	✓	✓	□	□
Transportation	Severance of access by local residents to the road due excavation of road bed and roadside storm water drainages.	**High**	□	✓	□	□

Affected Component	Environmental Effects/Impacts	Significance	Mobilization Phase	Construction Phase	Demobilization Phase	Operation Phase
	Disruption of traffic flow and public transportation due to construction of BRT lane.	**High**	□	✓	□	□
Current Land and Resource Use	Loss of land and other properties by local residents.	**Very Low**	✓	□	□	□
Cultural Heritage Resources	Destruction of sacred or cultural site due to removal of existing baobab tree from the road median.	**Very High**	✓	□	□	□
	Destruction of archaeological artefacts due to land excavation.	**Very Low**	□	✓	□	□

KEY:			
	Ver High Positive Impact		Very High Negative Impact
	High Positive Impact		High Negative Impact
	Medium Positive Impact		Medium Negative Impact
	Low Positive Impact		Low Negative Impacts
	Very Low Positive Impact		Very Low Negative Impact

6.4 Assessment of Cumulative Environmental Impacts

The general approach to the assessment of cumulative environmental effects is to identify other past, present, or reasonably foreseeable future projects or activities whose environmental effects could overlap those of the Project. The cumulative effects/impacts occur if there is substantive interaction between project related environmental effects/impacts with that of other activities.

The project has been found to have cumulative environmental effects/impacts on Atmospheric Environment, Acoustic Environment, Terrestrial Environment, Public Health, Safety and Security. The summary of the identified cumulative environmental effects/impacts and VECs is provided in **Table 6-3.**

The findings indicate most of the negative cumulative environmental effects/impacts will occur during construction phase and their significance ranges from Very Low, Low, Medium, and High; and most of the positive cumulative (synergistic) environmental effects/impacts will occur during operation phase and their significance is assed to be High.

Table 6-3: Identified Cumulative Impacts and Affected VECs.

Affected Component	Environmental Effects/Impacts	Significance
Atmospheric Environment	Increased air pollution due to dust emission along the construction road.	**Low**
	Increased air pollution due to dust emission along the access roads to borrow pits/quarry sites.	**Medium**
Acoustic environment	Creation of noise nuisance and vibration effects the adjacent local residents due to road construction works.	**Low**
	Creation of noise nuisance and vibration effects to adjacent local residents along the access roads to borrow pits.	**Medium**
Terrestrial environment	Loss of aesthetic value of the surrounding environment due to accumulation of excavated soil materials and construction solid wastes.	**Low**
Public Health, Safety and Security	Increased transmission of HIV/AIDS and STIs due to social interaction between the construction workers and local community members.	**High**
	Increased risk of Covid-19 transmission due to influx of people into the construction sites.	**Low**
	Increased risk of traffic accidents due to movement of heavy trucks to and from the construction site.	**Low**

KEY:			
	Ver High Positive Impact		Very High Negative Impact
	High Positive Impact		High Negative Impact
	Medium Positive Impact		Medium Negative Impact
	Low Positive Impact		Low Negative Impacts
	Very Low Positive Impact		Very Low Negative Impact

6.5 Assessment of Accidents, Malfunctions and Unplanned Events

Accidents, Malfunctions and Unplanned Events refers to events or upset conditions that are not part of any activity or normal operation of the Project. Even with the best planning and the implementation of preventative measures, the potential exists for accidents, malfunctions, or unplanned events to occur during any Project phase, and if these events are not addressed or responded to an environmentally appropriate manner. Many accidents, malfunctions and

unplanned events are, however, preventable and can be readily addressed or prevented by good planning, design, emergency response planning, and mitigation.

Based on these considerations, the potential accidents, malfunctions, and unplanned events that were considered by the Study Team for the Project are:

- Accidental Overflow of Raw Sewage Waste Water;
- Soil Erosion and Sedimentation;
- Uncontrolled Explosion;
- On-Site Spillage of Petroleum Products
- Off-Site Trucking Accident;
- Vehicle Collision;
- Project Related Fire.

6.5.1 Non-Credible Accidents, Malfunctions and Unplanned Events

Of the potential accidents, malfunctions or unplanned events listed above, three such events Accidental overflow of raw sewage waste water, Soil erosion and sedimentation, and Uncontrolled explosion are considered by the Study Team to be non-credible and were thus not considered further in the assessment for the reasons described below.

(a) Accidental Overflow of Raw Sewage Waste Water

Uncontrolled overflow of raw sewage waste water can be caused by blockage of sewer pipeline leading into overflow of sewer chambers. This could result into accumulation of raw sewage waste water into the surrounding environment.

The sewage waste water can be transported through natural drainages into the downstream receiving water bodies and could also lead into contamination of ground water resource. However, since the sewage treatment system will be regularly inspected and repaired, this scenario is not considered to be a credible accident. Moreover, there are not any known nearby flowing surface waters or ground water sources that are likely to be affected by the project.

(b) Uncontrolled Explosion

An uncontrolled explosion is defined as an unmanaged or uncontrolled detonation of explosives, or inadvertently combined emulsion constituents, or detonators associated with blasting of an open pit or quarry, or the detonation of explosives resulting in property damage from fly rock or higher-than standard-practice vibration levels. However, operation of quarry site will not be part of this project because aggregates will be obtained from potential suppliers. Therefore, this scenario should not be considered to be credible accident for this Project.

(c) Soil Erosion and Sedimentation

In order to prevent the potential adverse environmental effects of accidental erosion and sedimentation events, erosion and sediment control measures are a key management feature used during construction. These measures will be in place to minimize the potential for erodible soils exposed during construction activities from eroding and for silt-laden water to enter downstream watercourses.

However, due to having these measures in place, soil erosion is not a critical factor in this project and major source of sediments will be expected from stockpiling of soil materials, which will be minimized by immediate removal of stockpiled soil materials and disposal into the permitted area. It is for these reasons therefore; soil erosion and sedimentation should not be considered to be a credible accident for this project.

6.5.2 Credible Accidents, Malfunctions and Unplanned Events

The description of credible accidents, malfunctions and unplanned events assessed for the Project are summarized in **APPENDIX 27.** The description of credible accidents, malfunctions and unplanned events including scenarios, and assessment of environmental effects of each of these events on various VECs, are provided in this section.

The interaction between Accident Scenarios and respective VECs are ranked as follows:

0 = No substantial interaction. The environmental effects are rated not significant and are not considered further in this report.

1 = Interaction may occur. However, based on past experience and professional judgment, the interaction would not result in a significant environmental effect, even without mitigation, or the interaction would clearly not be significant due to application of codified practices.

2 = Interaction may, even with codified mitigation, result in a potentially significant environmental effect and/or is important to regulatory and/or public interest. Potential environmental effects are considered further and in more detail in the EIA.

6.5.2.1 Impacts of On-Site Spillage of Petroleum Products

(a) Description of Scenarios

An On-Site Spillage of Petroleum Products is a spill of petroleum products associated with the Project that is considered to be hazardous due to its inherent physical or chemical properties, or because of its toxicity, flammability, corrosiveness, or explosiveness.

There are several situations that could result in an On-Site Spillage of Petroleum Products as follows:

- Relatively small spillage of petroleum products may occur during refuelling or leakage from machinery or tanks used to store petroleum products.

- An accident involving a vehicle transporting petroleum products within the PDA could result in a spillage of petroleum products into the surrounding environment, including internal site roads within the PDA.
- Large leakage from storage tanks could occur as a result of structural failure of the tank or as a result of an accidental impact to a tank from a vehicle. However, a spillage of the entire contents of the fuel storage tank that escapes the secondary containment measures is assumed as a worst-case scenario for this accident, in itself a low likelihood scenario.

(b) Assessment of Impacts

The potential interactions between On-Site Spillage of Petroleum Products and the selected VECs for this EIA are presented in **Table 6-4.** There will not be any substantial interaction between an On-Site Spillage of Petroleum Products and the Acoustic Environment, Water Resources, Terrestrial Environment, Public Health and Safety, Labour and Economy, Public Services Infrastructure/Utilities, Transportation, Current Land and Resource Use, and Cultural Heritage Resources. This is because all spilled petroleum products will be contained within the PDA and thus no spilled petroleum products will leave the project site, hence no opportunity to interact with the surrounding natural environment, apart from groundwater resources.

Interactions between an On-Site Petroleum Spillage and the Atmospheric Environment have been ranked to be 1. For the Atmospheric Environment, an accidental event that exposed fuel to the open air would release volatile organic compounds (VOCs). Clean-up of the spill would employ hauling trucks and earth moving equipment which would release particulate matter and combustion gases through fuel consumption, and dust emissions from the clean-up

activities. Changes in the air quality due to a spill will be local in geographic extent, affecting only the immediate vicinity.

Pollutant emissions from the clean-up will be sporadic in frequency and short in duration and likely not be detectable above emissions from other Project activities involving the use of heavy equipment. Any minor adverse environmental effects on air quality will cease once the clean-up is complete. Contaminant emissions are expected to be within all pertinent standards and guidelines and no significant residual environmental effects are predicted.

Based on the mitigation and response mechanisms and procedures, the potential environmental effects of an On-Site Spillage of Petroleum Products on the VECs ranked as 0 or 1 for all phases of the Project are rated not significant and no specific mitigation measures are proposed.

However, a number of prevention and mitigation measures will be in place to prevent such a spill from happening or to minimize the environmental effects. In the unlikely event of a spill of any petroleum products, emergency containment and recovery procedures developed in the Emergency Preparedness and Response Plan (EPRP) will be implemented. An example of EPRP, which can be used for developing emergency procedures for On-Site Spillage of Petroleum Products is provided in **APPENDIX 28.**

Table 6-4: Interactions between VECs and On-Site Spillage of Petroleum Products.

Valued Environmental Component (VEC)	On-Site Spillage of Petroleum Products
Atmospheric Environment	1
Acoustic Environment	0
Water Resources	0
Terrestrial Environment	0
Public Health and Safety	0
Labour and Economy	0
Public Services Infrastructure/Utilities	0
Transportation	0
Current Land and Resource Use	0
Heritage Resources	0

6.5.2.2 Impacts of Off-Site Trucking Accident

(a) Description of Scenarios

An Off-Site Trucking Accident is defined as a vehicle accident resulting in the spill of petroleum products (e.g., gasoline, diesel, or bitumen) associated with the Project during the Construction or Operation phase that occurs on roads beyond the PDA, and existing access roads to the Project site. An Off-Site Trucking Accident resulting in a spill of petroleum products has the potential to affect both land and water.

Diesel fuels will be transported to the Project site in tanker trucks for use by on-site mobile equipment/machinery that does not leave the project site, and all motorized vehicles have their own fuel tanks that could be ruptured in the event of an accident.

The following are the scenarios that could result into Off-Site Trucking Accident:

- An accident involving a petroleum tanker truck resulting in damage to the tank and release of large amount (E.g., up to 45,000 Litres) of diesel or petroleum fuel to the environment, depending on road weight restrictions, and in a worst-case (though unlikely) scenario, a full tanker load of petroleum could be released into the environment.

- Vehicles used to haul material to and from the Project site have their own fuel tanks that could be ruptured in an accident.

For the purposes of this assessment, the mechanisms causing the accident are not considered; only the resulting spillage is considered.

(b) Assessment of Impacts

The potential interactions between Off-Site Trucking Accident and the VECs selected for this EIA are presented in **Table 6-5.** Interactions between Off-site Trucking Accident with Acoustic Environment and Cultural Resources is ranked to be 0 and therefore rated not significant with a high level of confidence.

Interactions between an Off-Site Trucking Accident and Other VECs are ranked to be 1, because the potential adverse environmental effects resulting from a spill will not result in a significant environmental effect even without mitigation, or the interaction will not be significant due to application of codified practices.

Table 6-5: Interactions between VECs and an Off-Site Trucking Accident.

Valued Environmental Component (VEC)	Off-Site Trucking Accident
Atmospheric Environment	1
Acoustic Environment	0
Water Resources	1
Aquatic Environment	1
Terrestrial / Vegetated Environment	1
Wetland Environment	1
Public Health, Safety and Security	1
Labour and Economy	1
Community and Public Services Infrastructure/Utilities	1
Transportation	1
Land and Resource Use	1
Heritage Resources	0

6.5.2.3 Impacts of Vehicle Collision

(a) Description of Scenarios

A Vehicle Collision is defined as a Project-related vehicle accident occurring on the road transportation network leading to or from the Project site. A vehicle collision would pose a danger to the public and livestock crossing the road.

Though existing urban road will be used for the Project, this facility will remain unchanged from their current state, the Project will not result in additional road traffic due to transportation of construction materials or petroleum products, and no new road is required or planned to facilitate its use by the Project. Therefore, assessment of road infrastructure is not considered in this EIA Report.

The following are the scenarios that could result into Vehicle Collision:

- There will be frequent movement of heavy trucks during construction as a result of transportation of construction materials, equipment, supplies, and personnel to and from the construction site.

- The construction road forms junction or is crossed by several minor roads, track or footpaths. The minor roads, tracks or foot paths provide access by local people to their residents and/or business areas.

Given these conditions, there is potential for a number of vehicle accident scenarios to occur during construction phase, including single vehicle, multiple vehicles, or pedestrian strikes, with resulting environmental effects on Public Service Infrastructure/Utilities, Transportation, and Public Health and Safety.

(b) Assessment of Impacts

The potential interactions between Vehicle Collision and the VECs selected for this EIA are presented in **Table 6-6.** There will not be any substantive interaction between a Vehicle Collision and Atmospheric Environment, Acoustic Environment. Water Resources, Terrestrial Environment, Labour and Economy, Current Land and Resource Use, or Cultural Heritage Resources, and thus these interactions have been ranked to be 0 and are considered not to be significant with a high level of confidence.

The interaction between Vehicle Collision with Public Services Infrastructure/Utilities, Transportation, Public Health, and Safety are ranked to be 2. However, a vehicle collision would likely result in a call and the use of emergency response services. As a vehicle collision is unlikely to result in any large-scale event, response should be well within the capacity of local emergency response services.

A vehicle collision would also be a single event that would rarely occur and therefore any strain on community services would be short-term and sporadic and unlikely to result in any significant residual environmental effects, and therefore will not be further considered. Based on the capacity of the existing services, the residual environmental effects of a Vehicle Collision on Public Services Infrastructure/Utilities and Transportation during all phases after application of mitigation measures are considered to be not significant, with a high level of confidence.

Table 6-6: Potential Interactions between VECs and Vehicle Collision.

Valued Environmental Component (VEC)	Vehicle Collision
Atmospheric Environment	0
Acoustic Environment	0
Water Resources	0
Terrestrial / Vegetated Environment	0
Public Health, Safety and Security	2
Labour and Economy	0
Community and Public Service Infrastructure/Utilities	2
Transportation	2
Current Land and Resource Use	0
Historical and Cultural Heritage Resources	0

6.5.2.4 Impact of Project Related Fire

(a) Description of Scenario

A Project Related Fire is defined as a Project-caused fire occurring as a result of an accident associated with the activities of the Project due to an equipment malfunction, human carelessness, or vehicle accident. The scenarios for this accident include a fire within the camp site, a fire resulting from a fuel spill that could spread outside of the camp site, or a fire arising from an off-site vehicle accident. A fire in the camp site may occur as a result of welding activities in a workshop getting in touch with flammable liquid or shorting from vehicle battery. A fire may also occur as a result of fuel transfer operations during construction.

The immediate concern in the event of a Fire Outbreak would be for human health and safety; and loss or damage of property. The emissions from a fire would likely consist mainly of smoke (particulate matter) and several combustion gases (*e.g.,* CO_2, CO, NOx, SO_2, and other products of incomplete combustion).

Depending on its size and environmental conditions at the time of the fire, a large fire could result in air contaminant levels greater than the ambient air quality standard over distances of more than one kilometre.

(b) Assessment of Impacts

The potential interactions between a Fire and the selected VECs for this project are presented in **Table 6-7.** A fire that gets out of control will interact to some extent with all VECs, with the exception of the Acoustic Environment and Cultural Heritage Resources.

Interactions between a Fire and the Acoustic Environment and Cultural Resources are ranked to be 0. Therefore, the environmental effects of a Fire on the Acoustic Environment and Cultural Heritage Resources during all phases of the Project are rated not significant with a high level of confidence.

Interactions between Fire and Water Resources are ranked 0 because fire will not continue to occur once it contacts water. Therefore, the effects/impacts should be considered to be not significant and should not be further discussed.

Interactions between a Fire and the Atmospheric Environment is ranked to be 2 and therefore considered to be significant. Interaction between Fire and other VECs have been ranked to be 1 and therefore considered to be less significant. However, the residual effects/impacts of Fire on the Atmospheric Environment and other VECs has been considered to be not significant due to application of codified practices.

Table 6-7: Potential Interactions between VECs and Project Related Fire.

Valued Environmental Component (VEC)	Project Related Fire
Atmospheric Environment	2
Acoustic Environment	0
Water Resources	0
Terrestrial Environment	2
Public Health, Safety and Security	2
Labour and Economy	1
Community and Public Service Infrastructure/Utilities	1
Transportation	1
Current Land and Resource Use	1
Heritage Resources	0

6.3.3 Summary of Residual Environmental Effects

Contractor will implement a number of design features, mitigation measures and operational practices intended to minimize the likelihood for accidents, malfunctions, and accidental events to occur and/or the severity of such events if they did occur. Even with these measures in place, a number of potential events were deemed to be credible, and residual environmental effects on each of the identified VECs were assessed for worst-case scenarios. In all cases, worst-case scenarios and the resulting worst-case environmental effects that might arise from such scenarios were predicted to be unlikely to occur.

The residual environmental effects predicted for each VEC for each accident scenario is summarized in **Table 6-8.** Note that for most scenarios, it is assumed that these can occur during any Project phase. Overall, the environmental effects of most accidents, malfunctions, and unplanned events during all phases of the Project are rated not significant.

Table 6-8: Summary of Residual Environmental Effects for Accidents, Malfunction and Unplanned Events.

Valued Environmental Component (VEC)	Accident, Malfunction or Unplanned Event			
	On-Site Spillage of Petroleum Products	Off-Site Trucking Accident	Vehicle Collision	Project Related Fire
Atmospheric Environment	NS	NS	NS	NS
Acoustic Environment	NS	NS	NS	NS
Water Resources	NS	Ns	NS	NS
Aquatic Environment	NS	NS	NS	NS
Terrestrial Environment	NS	NS	NS	NS
Wetland Environment	NS	NS	NS	NS
Public Health, Safety and Security	NS	NS	S/U	S/U
Labour and Economy	NS	NS	NS	NS
Community and Public Services Infrastructure/ Utilities	NS	NS	NS	NS
Transportation	NS	NS	NS	NS
Land and Resource Use	NS	NS	NS	NS

6.5.3 Impacts of the Environment on the Project

The effects/impacts of environment on the Project are associated with risks of natural hazards and influences of nature on the Project. Typically, these are a function of project or infrastructure design in the context of its receiving environment, and ultimately how the project is affected by nature. These effects/impacts may arise from physical conditions, land forms, and site characteristics or other attributes of the environment which may act on the project such that the project components, schedule, and/or costs could be substantively and adversely changed.

In this report the assessment of the effects of the environment focuses on the environmental attributes that are considered to have a potential effects/impact on the Project. These are based on the regulatory consultation, public and stakeholder input, a review of the known past and existing conditions, and knowledge gained through projections of potential future conditions. For example, potential effects of climate change, severe weather, including: wind; precipitation; floods; electrical storms; seismic activity; and external fires resulting from causes other than the Project.

This section provides the summary of the identified environmental effects on the Project In general, the effects of the environment on the Project during the construction phase have been rated not significant.

6.5.3.1 Effects/Impacts of Climate Change on the Project

The Project area may experience extreme weather conditions during construction and operational life of the Project due to increasing climate change events. To assess the environmental effects of climate on the Project, current climate and climate change must both be considered. Current climate conditions are established by compiling relevant historical data and establishing a climatological background for the project area. The historical and projected extremes in temperature, intense precipitation, or other storm events, are important considerations that must be accounted for in the design of the Project and in all other aspects of construction. The study on climate projections indicates in the present century (2011–2040)

Dar Es Salaam is projected to feature decreased minimum temperature in the range of −0.1°C to 0°C; and increased rainfall in the range of 0.25 to 0.5 mm/day[97].

Forecasted changes in climate may affect construction and operation in both positive and negative ways and may vary from nominal to extreme effects. Climate changes that could potentially have residual effects on the project include:

- Extreme low and high temperatures
- increased frequency and magnitude of heavy precipitation events;
- increased frequency of extreme storms accompanied by heavy precipitation, thunderstorms, and strong winds; and
- increased incidence of soil erosion and flooding.

Each of these effects must be considered in terms of how they may adversely affect the Project if they are not planned, engineered, and designed to account for such effects. Such effects could cause:

- reduced visibility and inability to manoeuvre operation equipment;
- delays in shipment of materials, supplies and/or products;
- changes to the ability of workers to access the site (e.g., if a road were to wash out);
- damage to infrastructure;
- increased structural loading; and/or
- loss of electrical power resulting in potential loss of production.

Mitigation measures

The potential effects of climate on construction will be considered in the planning and design of the Project and in the scheduling of construction activities to limit delays, prevent damage to infrastructure and the environment, and to maximize the safety of construction staff. Compliance with design and building codes and standards are expected to account for weather extremes through built-in factors of safety to prevent undue damage to infrastructure from such events. Table 6-9 provides the general mitigation measures against climate change effects**. Table 6-10** outlines the specific mitigation measures against the potential effects/impacts of climate change on the BRT road project.

The predicted effects of climate change on the Project will be carefully considered in the planning, design, and construction activities; the selection of materials to be used; and the operating plans for the Project to ensure the long-term viability and sustainability of the Project.

The likely adverse effects on the Project during Construction and Operation will be taken into consideration in the planning and design of the Project (or managed adaptively as appropriate as information regarding climate change evolves. As a result, substantive damage to the Project or interruption to the Project schedules are not anticipated.

Table 6-9: General Climate Change Effects and Mitigation Measures.

Event	Effects	Mitigation measures
(a) Extreme temperature variations	▪ Reduced ductility of construction materials and increased susceptibility to brittle factures.	The specification of construction materials must comply with the applicable standards and codes and must maintain structural integrity at the anticipated minimum and maximum ambient temperatures.

[97] Climate Change Projections for Tanzania Based on High-Resolution Regional Climate Models From the Coordinated Regional Climate Downscaling Experiment (CORDEX)-Africa. Philbert Modest Luhunga, Agnes L. Kijazi, Ladislaus Chang'a, Afredy Kondowe, Hashim Ng'ongolo and Habiba Mtongori. https://www.frontiersin.org/articles/10.3389/fenvs.2018.00122/full

Event	Effects	Mitigation measures
		Use resistant materials to extreme temperatures for road and bridge construction.
(b) Extreme wind storm and severe precipitation.	▪ Reduced visibility and inability to manoeuvre construction equipment/machinery.	Make prediction of short delays and make allowance for them to be included in the construction schedule.
	▪ Disruption of construction activities and delays to the construction schedule. ▪ Delays in the transportation of construction materials to the site. ▪ Inability of construction personnel to access the construction site (e.g., if the road were to wash out) ▪ Damage to road and other infrastructure. ▪ Increased structural loading. ▪ loss of electrical power resulting in potential loss of production.	Scheduling of tasks that require precise movement of equipment (*e.g.,* positioning steel I-beams in place with cranes) to periods when the weather conditions are favourable.

Table 6-10: Potential Climate Effects on the Road and Mitigation Measures.

Climate event	Risks to the road	Mitigation Measures
(a) Heavy rain for longer periods	Water overtopping on road crest. Increased capacity of moistures, decreased cohesion of soil, increased seepage and infiltration across road body. Drainage system over capacity of and increase drainage erosion. Embankment instability or loss, road wash away.	Increase road level to at least 0.5 m over the maximum flood level. Implement erosion protection and control measures. Increase capacity of culverts. Build up weirs and spillways. Increase capacity of compaction (lower moisture percentage). Decrease hydrodynamic force of water through planting grass.
(b) Storm events (Typhoons, Cyclones) and extreme winds	Destabilisation of bridges. Falling of trees and blocking the roadway. Creation of damage on the traffic signs.	Increase capacity of spillways and culverts. Undertake embankment protection by planting grass and trees/shrubs. Increase frequency of road inspections.

		Decrease road traffic movement during storms.

6.5.3.2 Effects/Impacts of Seismic Activity on the Project

Since the Project is not located within an area with high seismic hazard[98] as shown in **APPENDIX 29,** the possibility of seismic activity occurring in the PDA is low. Therefore, the likelihood of a major seismic event in the immediate vicinity of the Project that could cause major Project damage or interrupt operations during any phase is low.

6.5.3.3 Effects/Impacts of External Fires on the Project

In the event that an external fire did occur in close proximity of the Project, there is a potential risk of contact with fuel storage tanks, thereby potentially creating a risk of fire with petroleum products which are by their nature highly flammable.

Mitigation measures

The presence of fence wall established around the materials storage yard will help to reduce the likelihood of an external fire causing substantive damage to the Project. In addition, firefighting capabilities (including appropriate equipment) on-site will be at a high level of readiness. The safety and security personnel will be in place in collaboration with Fire and Rescue Department to provide for rapid detection and response to any fire threat.

The materials to be used for construction will be inherently fire resistant. For example, the facility structures can be constructed primarily of concrete and steel, which are not typically affected by fire.

[98]Map updated by U.S. Geological Survey National Earthquake Information Centre. 13 September 2016. https://reliefweb.int/sites/reliefweb.int/files/resources/20160910.pdf

7.0 ANALYSIS OF ALTERNATIVES

Preamble

The project will involve constriction of the BRT lane for in the road median into concrete pavement. This will facilitate faster transportation of passengers, comfortable travel, and reduce traffic congestion along the road sections. The three alternatives have been considered in this study based on technical, economic, environmental, and social point of view. That means selected alternative must be technically feasible, economically viable, environmentally friendly, and socially acceptable. The analysis of alternatives considered whether the project should be implemented or not ("No project Alternative" vs "Project" alternative), and if it will be implemented what type of construction method should be used (Labour-intensive Method vs Machine-intensive Method). For comparison of these alternatives the Multi-Criteria Analysis Method has been used, based on Technical, Economic (Techno-economic), Environmental and Social Criteria. Another considered alternatives is pavement alternatives, whereby the comparison of these alternatives has been based on their advantages and disadvantages.

7.1 No Project Alternative VS Project Alternative

The "No project" alternative" means the project should not be implemented at all and therefore we should continue using the road sections under existing condition but only making periodic maintenance. The comparison of alternatives based on techno-economic, environmental, and social criteria is summarized in **Table 8-1.**

From techno-economic point of view the "No Project Alternative" will have less investment cost, but higher maintenance costs due to the need for long-term periodic maintenance. The "Project Alternative" will result into higher increased productivity due to reduced travel time and less fuel consumption due to reduced traffic congestion.

The improvement of the road condition will also result into reduced vehicle operation and maintenance costs, hence low transportation costs. Therefore, from techno-economic point of view the "No Project Alternative" should be rejected and the "Project Alternative" should be selected.

From environmental and social point of view the "No Project Alternative" will have long term impacts due to continued dust emission within unpaved or earthed sections, continued emission of exhaust fumes and more fuel consumption as a result of traffic congestion. The "Project Alternative", the above benefits will be achieved, but during construction the project is expected to have more environmental impacts including increased dust emission.

However, the environmental impacts will be short-term as they occur only during construction and could be minimized through implementation of appropriate mitigation measures. The improvement of the road condition into bitumen standard will result into more comfortable travel and improved aesthetic value of the urban environment due to less dust emission, hence socially acceptable. In addition, the Project Alternative is likely to create more temporary and income generation opportunity to the adjacent local residents during construction.

Therefore, from environmental and social point of view the "No Project Alternative" should be rejected and the "Project Alternative" should be selected.

Table 8-1: No Project Alternative VS Project Alternative.

Evaluation Criteria	No Project Alternative		Project Alternative	
	High	Low	High	Low
(a) Techno-economic				
Investment Costs	-	+1	-1	-
Maintenance Costs	-2	-	-	+2
Durability		-2	+2	

Evaluation Criteria	No Project Alternative		Project Alternative	
	High	Low	High	Low
Transportation costs	-2	-	-	+2
Fuel consumption	-1	-	-	+1
Vehicle operation and maintenance costs	-2	-	-	+2
Travel time spent	-2	-	-	+2
Productivity	-	-2	+2	-
(b) Environmental and Social	-	-	-	-
Dust emission	-2	-	-1	-
Exhaust emission	-2	-	-1	-
Employment and income generation opportunity	+1	-	+1	-
Incidence risk of traffic accidents	-	-2	-2	-
Aesthetic and/or social acceptability	-	-2	+2	-
Total Score:	**(-13) +(+1) = -12**	**(-8) +(+1) = -7**	**(-5) +(+7) =+2**	**(+9)**
Overall Net Score:	**-12**		**+11**	
KEY: +1 = Short-term Positive Impact -1 = Short-term Negative Impact +2 = Long-term Positive Impact -2 = Long-term Negative Impact				
Conclusion: The "No Project Alternative" has been found to have an overall score of -12 and the Project Alternative an overall score of +11. Therefore, the "Project Alternative" should be selected and "No Project Alternative should be rejected.				

7.2 Labour Intensive Alternative VS Machine Intensive Alternatives

The use of labour-intensive construction method is compared against machine-intensive construction method. The comparison of alternatives based on techno-economic, environmental, and social criteria is summarized in **Table 8-2.** From economic point of view the labour-intensive construction method makes use of manual labour and therefore likely to create employment opportunity to a large number of adjacent local residents than machine-intensive method, hence improving the local economy. The employment creation will have multiplier effect as it will also benefit their families, hence socially acceptable. However, the use of mobile equipment / machine is more costly than labour-intensive method, but it is more efficient than labour-intensive method.

From environmental point of view the labour-intensive method will have minimum risk of construction related risk of accidents to construction workers and the local community, unlike the use of mobile equipment / machinery during excavation works, Labour-intensive method has less environmental impacts compared to machine-intensive method. For example, the use of mobile equipment / machine is likely to create more dust emission than labour-intensive method. The use of mobile equipment / machine will also create air pollution and noise nuisance than labour-intensive method. The use of mobile equipment will have will create more landscape degradation than labour-intensive method.

From the analysis it can be seen that the labour-intensive method could be selected and machine-intensive method could be rejected. However, due to the nature of the project and limitations of labour-intensive method, the combination of the two methods should be more favourable. In this case, the contractor should give priority to labour-intensive method for those

activities that could be done manually. For, example, excavation of roadside drainages could be done manually instead of using an excavator.

Table 8-2: Labour-intensive VS Machine-intensive Methods.

Evaluation Criteria	Labour-intensive method		Machine-intensive method	
	High	Low	High	Low
(a) Techno-economic				
Cost of equipment / machinery	-	+1	-1	-
Employment creation	+1	-	-	-1
Efficiency and time consumption		-1	+1	
Work productivity	-	-1	+1	-
(b) Environmental and Social	-	-	-	-
Dust emission		+1	-1	-
Exhaust emission	-	-	-1	-
Landscape degradation		+1	-1	
Risk of construction related accidents	-	+1	-1	-
Social acceptability	+1	-		-1
Total Score:	**+2**	**(-2) +(+4) = +2**	**(-5) +(+2) = -3**	**-2**
Overall Net Score:	**0**		**-1**	
KEY: +1 = Positive Impact -1 = Negative Impact				
Conclusion: The “labour-intensive method|” has been found to have an overall score of 0 and machine-intensive method an overall score of -1. Therefore, the “labour-intensive method” should be favourable than machine-intensive method. However, due to the nature of the project the labour-intensive method has some limitations, and therefore the combination of the two methods should be more favourable.				

7.3 Asphalt Pavement VS Concrete Pavement Alternatives

The comparison between Asphalt Pavement and Concrete Pavement has been evaluated based on technical, economic, and environmental criteria as shown in **Table 8-3.** In addition, the advantages and disadvantages of each alternative is provided in **Table 8-4.** However, it seems there is no simple answer on which material is preferable. According to experts, when trying to decide between concrete vs asphalt roads, it is important to consider the specifics of your project first and foremost; and as such choosing a paving material cannot be decided on initial costs alone[99].

Table 8-3: Asphalt Pavement Alternative VS Concrete Pavement Alternative.

Evaluation Criteria	Bitumen Road Alternative		Concrete Pavement Alternative	
	Rank	Score	Rank	Score
(a) Techno-economic				
Durability	Low	-1	High	+1
Construction Costs	Low	+1	High	-1
Maintenance Costs	Low	+1	High	-1
Fuel efficiency	Low	-1	High	+1

[99] https://www.perrinconstructionredding.com/blog/2018/9/25/concrete-vs-asphalt-roads-pros-and-cons-of-each

Evaluation Criteria	Bitumen Road Alternative		Concrete Pavement Alternative	
	Rank	Score	Rank	Score
Suitability under rural condition	High	+1	Low	-1
(b) Environmental and Social				
Air pollution	High	-1	Low	+1
Noise nuisance	Low	+1	High	-1
Risk of traffic accidents	Low	+1	High	-1
Heat absorption capacity	High	+1	Low	-1
	Total Score:	**(+6) (-4)**		**(+3) (-6)**
Overall Score:		**+2**		**-3**

The comparison was made between the asphalt pavement and concrete pavement based on their disadvantages and disadvantages as listed below;

- **Durability and maintenance free life:** Concrete roads have a long service life of forty years, whereas asphalt roads last for ten to twenty years. Moreover, during this service life concrete road do not require frequent repair or patching work like asphalt roads.

- **Vehicles consume less fuel:** A vehicle, when run over a concrete road, consumes 15-20% less fuel than that on asphalt roads. This is because of the fact that a concrete road does not get deflected under the wheels of loaded trucks.

- **Resistant to automobile fuel spillage and extreme weather:** Unlike asphalt roads, concrete roads do not get damaged by the leaking oils from the vehicles or by the extreme weather conditions like excess rain or extreme heat.

- **Greener process:** Asphalt (bitumen) produces lots of highly polluting gases at the time of melting it for paving. Also, less fuel consumption by the vehicle running on a concrete road means less pollution.

- **Saving of natural resources:** Asphalt (bitumen) is produced from imported petroleum, the reserve of which is becoming reduced drastically. On the other hand, concrete (cement and aggregates) is produced from abundantly available limestone and stones

- **Durability*:*** Concrete roads are highly durable and more environmentally friendly as compared to asphalt roads. However, asphalt paving costs far less than concrete paving. Also, asphalt road provides a little better safety of the vehicle against snow and skidding

Table 8-4: Advantages and Disadvantages of Asphalt and Concrete Pavements.

Asphalt Pavement	
Advantages	**Disadvantages**
Asphalt is very cost-effective material and time-efficient too. Asphalt dries very fast and does not need to block the road for a long time.	Asphalt pavement is more of maintenance than concrete. You need to reseal it every 3-5 year to prevent it from cracking. And after applying sealers you do not have to drive on the surface from a few hours to days.
Asphalt is a reliable weather resistant material which can be used for low and high traffic as well.	If you have not mixed and laid asphalt properly then it'll erode. Before paving you should also take care or uneven surfaces and previous

Asphalt can withstand the harshest weather condition.	cracked surface. First, make them compact and then pave.
Asphalt paved road will have a feature that it gets smooth like finish. It offers drivers skid resistance, splash back and better visual distinction between road markings.	If you would likely to get the best result from the asphalt then you should heat it to 250 to 350°F. Once the asphalt has been paved on the surface then it must be covered with the sand or other aggregates to get more compaction and durable lifespan.
Asphalt is 100% recyclable material. You can use it all over again because its lifecycle is endless. When you are repairing road then all the dug-up asphalt can be used again for the resealing.	Melting asphalt creates air pollution due to emission of hydrocarbons. Cutback asphalt which is used in creating asphalt cement releases more hydrocarbons.
Asphalt is time-efficient and easy when it comes for repairing. If you provide your asphalt a little routine maintenance then the deterioration of the surface can be delayed.	Asphalt, irrespective of the type used for the pavement requires heavy-equipment to install. Unless you've paving equipment's, you will not be able to lay down the asphalt.
Concrete Pavement Alternative	
Advantages	**Disadvantages**
Concrete roads have long life than any other roads.	The initial cost of concrete road is high.
These roads are durable and are practically unaffected by weathering agencies.	They are liable to crack and warp due to temperature variations.
They provide an excellent riding surface under all weather conditions.	Become noisy under iron-wheeled traffic.
They provide impervious, dustless, and clean surface.	Skilled supervision and labour are required for construction.
They do not develop corrugations.	Less resilient than bituminous or WBM[100] roads
Can be laid on any subgrade.	Require long time for curing and thus cannot be opened to traffic earlier.
Can be easily reinforced when they are to resist high stresses due to heavy wheel loads of the traffic.	It is very difficult to locate and repair sewers and water mains lying under the pavement in their case.
Concrete roads are non-slippery and offer less tractive resistance.	
They provide good visibility for traffic during night hours	
Maintenance cost is low	

Conclusion

From the above table it can be noted that Bitumen Alternative have an overall score of +2 and Concrete Alternative has an overall score of -3. It can therefore be concluded that the Bitumen Alternative is preferable to Concrete Alternative. However, based on the project requirements the Concrete Pavement has been selected due to its higher durability than Asphalt Concrete Pavement. Other considered factors include less fuel consumption, resistance to fuel spillage, than Asphalt Concrete,

[100] Full form of **WBM** is Water Bound Macadam. It is the layer of broken stone aggregates bound together by stone dust or screening material and water applied during **construction** and compacted by heavy smoothed wheel roller.

8.0 MITIGATION AND ENHANCEMENT MEASURES

Preamble

In general, the project has been found to have both beneficial (positive) and adverse (negative) effect/impacts. However, the positive has been found to outweigh the negative impacts. Moreover, most of the identified negative impacts have very low significance, and short-term, as they occur only during construction phase.

There are several environmental, social, health and safety, and economic benefits to be obtained from the BRT project. The environmental benefits will be obtained from improved air quality for urban population because the use of BRT lane will result into reduced traffic congestion, hence reduced exhaust emission along the road sections.

Socio-economic benefits include creation of temporary employment and income generation opportunity for local people during the road construction; employment creation and economic improvement of households using the BRT services; increased revenue collection by the central and local government authorities; reduced transportation costs and improved access to social services. The employment opportunities during construction can be enhanced by emphasising on labour-intensive construction methods such as excavation of trenches for roadside storm water drainages and culverts. The labour-intensive construction methods help poor families to supplement their incomes, and at the same time gives them some skills for future employment.

Finally, the project is expected to result into reduced risk of traffic accidents and increased comfortability of passengers. The most beneficiaries will be the vulnerable groups mainly the vulnerable groups such as school children, disabled, sick persons, and the elderly persons.

Despite the mentioned benefits the project is likely to create some negative impacts. These include loss of cultural site; loss of land and other properties; disruption of public transport; increased risk of traffic accidents during construction; increased transmission of communicable diseases such as HIV/AIDS and STIs. The project is also likely to result into emergence of GBV/SEA and SH.

The purpose of this Chapter is to outline some proposed enhancement and mitigation measures for the identified positive and negative impacts, respectively. In order have better understanding the information is presented in tabular form showing the affected valued environmental component, project related activities, which are likely to create effects/impacts and proposed enhancement or mitigation measures for the identified positive and negative effects/e effects/impacts, respectively.

8.1 Enhancement Measures for Positive Impacts

Most of the beneficial impacts are long-term and socio-economic in nature and will be obtained during operation of BRT infrastructure. The following are the planned enhancement measures for the identified significant positive impacts on Atmospheric Environment; Public Health, Safety and Security; and Labor and Economy:

Affected Component	Effects/Impacts	Enhancement Measures
Atmospheric Environment	Reduced exhaust emissions due reduced traffic congestion.	Enforcement of law to ensure that the BRT lane is used exclusively by DART Buses. Awareness creation among the road users to avoid using the BRT lanes. Carrying out periodic maintenance of the road pavement.

Affected Component	Effects/Impacts	Enhancement Measures
Public Health, Safety and Security	Reduced road traffic accidents due presence of dedicated BRT lane.	DART Agency in collaboration with Traffic Department will promote education, awareness creation and enforcement of rules and regulations to prevent unauthorized vehicles from using the BRT lanes.
Labour and Economy	Creation of temporary employment opportunities for local people during construction.	The contractor will give employment priority to the residents. This will include consultation with local community leaders to identify appropriate skills among the local community members. The contractor will give equal employment opportunities to males and females and will avoid any kind of discrimination based on gender, race, religion, etc. The Contractor will ensure all workers are served with Employment Contracts which stipulates all workers' rights under the labour laws such as maternity leave, sick leave, etc. The Contractor will ensure workers are paid not less than minimum wage as stipulated by the government. The Contractor will ensure payment of monthly contributions to the National Social Security Fund (NSSF) and Workers Compensation Fund (WCF) as required by the national laws. Contractor will ensure all workers are made aware, understand and follow the Code of Ethical Conduct.
	Increased income generation opportunities for local people by selling food items to the construction workers	Provide enabling environment for food vendors to sell their food in a clean and hygienic environment by providing shelter and water supply.
	Increased productivity and stimulation of economic growth due to reduced travel time.	DART Agency will create awareness among the local residents and public on the benefits of using BRT transport system.

Affected Component	Effects/Impacts	Enhancement Measures
	Employment creation and economic improvement of households.	LGAs will promote local entrepreneurship by establishing small business operations.
	Increased Revenue Collection by Local and Central Government	LGAs in collaboration with TRA will create awareness to the public to pay service levies and income tax to the local authorities and central government respectively. This includes issuing receipts to customers whenever they buy goods and customers must demand receipts of any service provided.
	Reduced Transportation Costs and Improved Access to Social Services.	DART Agency will provide enabling environment for the vulnerable groups like school children, the disabled and elderly people.
	Reduced risk of traffic accidents and improved environmental quality.	The DART Agency in collaboration with other stakeholders will create awareness to the road users to avoid using the dedicated BRT lanes.
	Increased comfortability of passengers.	DART Agency will ensure provision of high-quality transport services to its customers. This includes provision of high-quality buses with adequate space to meet international standards.

8.2 Mitigation Measures for Negative Impacts

Most of the identified adverse impacts are short-term and will be associated with construction activities, and could be mitigated through engineering design and good construction practice. The implementation of mitigation measures will be the responsibility of the Contractor under the supervision of the Resident Engineer.

However, successful implementation of some of the mitigation measures will require participation of other stakeholders. For example, mitigation measures against HIV/AIDS prevalence during construction will require collaboration from local NGOs/CBOs and LGAs. In addition, relocation of public service infrastructure/utilities and small business operations will require involvement of infrastructure/utility service providers and Local Government Authorities (LGAs). These stakeholders will help in the identification of new areas for relocation of affected small business operations and infrastructure/utilities.

8.2.1 Mobilization Phase

8.2.1.1 Mitigation of Impacts on Current Land and Resources Use

The following is the planned mitigation measures for the identified negative effects/impacts on Current Land and Resource Use:

Effects/Impacts	Mitigation Measures
Loss of land and other properties by local residents due to land acquisition for	▪ Payment of compensation to the PAPs.

Effects/Impacts	Mitigation Measures
camp site, borrow pits, and quarry sites.	

8.2.2 Mitigation of Impacts on Public Service Infrastructure and Utility

The following is the planned mitigation measures for the identified negative effects/impacts on Public Services Infrastructure/Utility:

Effects/Impacts	Mitigation measures
Disruption of social and economic activities due to relocation of public service infrastructures and utilities.	▪ Make consultation with relevant public service infrastructure/utility authorities to identify location of underground utilities before commencement of construction works. ▪ Provide prior information through mass media to the public on the possible interruption of public services. ▪ Immediate relocation and restoration of affected infrastructure/utilities within 12 hours.

8.2.3 Construction Phase

8.2.3.1 Mitigation of Impacts on Atmospheric Environment

The following are the planned mitigation measures for the identified effects/impacts on the Atmospheric Environment:

Effects/Impacts	Mitigation Measures
Creation of air pollution due to exhaust emissions from operation of mobile equipment and dust emission from construction activities.	▪ Avoid the use of old vehicles and construction equipment /machinery that emit visible smoke. ▪ Ensure regular maintenance of vehicles and construction equipment / machinery. ▪ Always switch off the engines when the vehicles and equipment are not in use. ▪ Application of water on dusty areas. ▪ Minimize stockpiling of excavated soils within the construction site by immediate removal and transportation to dumping site.

8.2.3.2 Mitigation of Impacts on Acoustic Environment

The following are the planned mitigation measures for the identified effects/impacts on Acoustic Environment:

Effects/Impacts	Mitigation measures
Creation of noise nuisance to the adjacent sensitive receptors due to operation of mobile equipment and construction activities.	▪ Limiting noisy construction activities only to day time hours. ▪ Prohibit the use of old equipment / machinery which produce high noise levels and ensure noise emission from heavy trucks and mobile construction equipment do not exceed 75 dB, in accordance with Tanzania Noise Emission Standards[101]. ▪ Ensure exhausts of heavy trucks and mobile equipment /machinery are fitted with noise reducing mufflers. ▪ Carry out regular maintenance of vehicles and mobile equipment / machinery. ▪ Limiting transportation of construction materials only to daytime hours. ▪ Whenever, possible avoid passing through human settlement areas.

8.2.3.3 Mitigation of Impacts on Water Resources

The following are the planned mitigation measures for the identified effects/impacts due to interaction between Project Related Activities and Water Resources Component:

Effects/Impacts	Mitigation measures
Creation of ground and surface water pollution due to accidental overflow of raw sewage waste water into the surrounding environment	▪ Avoid locating the camp site close to surface and ground water sources. ▪ Avoid discharge of raw sewage waste water into natural streams/river or natural water courses. ▪ Ensure that sewage treatment system is provided at the Contractor's Office and carry out periodic maintenance of sewer pipeline and sewer chambers. ▪ Carry out regular emptying of soak pits and maintenance of sewage chambers to prevent overflow of raw sewage into the environment. ▪ All discharged wastewater from sewage treatment plant must not exceed Tanzania Effluent Discharge Standards[102].

8.2.3.4 Mitigation of Impacts on Terrestrial Environment

The following are the planned mitigation measures for the identified effects/impacts on the Terrestrial Environment:

[101] United Republic of Tanzania. Environmental Management (Standards for the Control of Noise and Vibration Pollution) Regulations (2010). THIRD SCHEDULE (Made Under Regulation 15(1)).
[102] United Republic of Tanzania. Environmental Management (Water Quality Standards) Regulations (2007). FIRST SCHEDULE (Made Under Regulation 8).

Effects/Impacts	Mitigation Measures
Creation of landscape degradation and loss of aesthetic value of the surrounding environment due to accumulation of construction solid wastes and accidental spillage of waste oils.	▪ Ensure proper design of roadside storm water drainages to ensure there is no concentration of storm water flow on adjacent lands. ▪ All stockpiled soil materials and construction related solid wastes must be immediately removed and transported to the permitted dumping site. ▪ Useful soil materials can be retained, but properly stockpiled for landscaping purpose. ▪ Ensure all waste oil containers are stored in concrete paved area with bund wall to prevent spilled oil from escaping into the surrounding environment. ▪ Always take precautions to prevent spillage of waste oil into the surrounding environment.

8.2.3.5 Mitigation of Impacts on Public Health and Safety

The following are the planned mitigation measures for the identified negative effects/impacts on Health and Safety Component:

Effects/Impacts	Mitigation Measures
Increased transmission of HIV/AIDS and STIs due to social interaction between construction workers and local community	▪ Formulation and implementation of HIV/AIDS prevention and control programme. ▪ Giving employment priority to local people to minimize the number of new comers, hence minimizing the likelihood of new HIV transmission. ▪ Collaboration with local NGOs/CBOs dealing with HIV/AIDS to promote awareness and education campaigns.
Increased risk of Covid-19 transmission due to influx of people into the project sites.	▪ The Contractor will take necessary precautions as stipulated in the ESF/Safeguards Interim Note: Covid-19 Consideration in Construction/Civil Works Projects. These include: - Checking and recording temperatures of workers and other people entering the site or requiring self-reporting prior to or on entering the site. - Providing daily briefings to workers prior to commencing work, focusing on COVID-19 specific considerations including cough etiquette, hand hygiene and distancing measures, using demonstrations and participatory methods. - Preventing a worker from an affected area or who has been in contact with an infected person from returning to the site for 14 days or (if that is not possible) isolating such worker for 14 days.

Effects/Impacts	Mitigation Measures
	- Preventing a sick worker from entering the site, referring them to local health facilities if necessary or requiring them to isolate at home for 14 days. - Provision of hand sanitizers, hand washing basins and soap at the entry gate. ▪ Stakeholder consultations will be carried out before commencement of construction works to create awareness among the local residents on prevention and control of Covid-19.
Creation of construction related risk of accidents due to trespassing by unauthorized persons into the construction site.	▪ Fitting all mobile construction equipment / machinery and trucks with alarm and signal device to warn people, especially during backward movement. ▪ Placing written warning signs at strategic locations to prohibit or prevent entrance of unauthorized persons into the construction site. ▪ Restrict operation of mobile construction machinery / equipment to trained personnel only. ▪ Fencing the construction site to prevent people from entering the construction site. This will include putting a written warning in both English and Kiswahili at a strategic location to prevent unauthorized people from entering the construction site.
Creation of risk of accidents to pedestrians and other road users due to presence of excavated pits and trenches along the construction road.	▪ All excavated pits or trenches must be surrounded by safety nets to prevent people from falling into open pits or trenches.
Creation of occupational health and safety risks due to handling of hazardous construction materials.	▪ Provision of appropriate Personal Protection Equipment (PPE) to construction workers dust protection masks to construction workers. ▪ Preparation and implementation of Environmental Health and Safety Management Plans (EHSMP). This includes conducting toolbox meetings; health and safety training; daily health and safety inspection at the construction sites.
Increased risk of traffic accidents due to movement of heavy trucks to and from the construction site	▪ Develop and implement traffic management plan. This includes deploying flag persons to guide traffic movement along the road. The involvement of traffic police may be useful, whenever possible.

8.2.4 Mitigation of Impacts Labour and Economy

The following are the planned mitigation measures for the identified negative effects/impacts on Labour and Economy:

Effects/Impacts	Mitigation measures
Risk of emergence of Gender-Based Violence and Sexual Exploitation and Abuse due to influx of job seekers into the project sites.	▪ Ensuring there are codes of conduct in place that forbid and place penalties for Gender-Based Violence and Sexual Exploitation and Abuse. ▪ Ensure a Code of Conduct (CoC) is signed and understood by all project workers. This will include the provision of training and information regarding Worker Code of Conduct in Kiswahili. ▪ Disseminating information that raises awareness on the prohibition of GBV and SEA among the workers, local community members and general public and disseminate information that promotes good and respectful relationships between workers and the fish market community members. ▪ As a prevention measure, the contractor will be required to develop a code of conduct of GBV that will be attached to the ESMP and signed by all workers. An example of Code of Conduct for EH&S and GBV. ▪ Contractor will engage a qualified NGO to carry out awareness raising campaign against GBV and SEA on monthly basis during the construction phase. ▪ Provision of cultural sensitization training for workers regarding engagement with local community. ▪ Stakeholder consultation on GBV/SEA and SH and EH&S issues will be carried out with fish market community members before commencement of rehabilitation / construction works. ▪ Grievances Redress Mechanism will be in place to deal with any conflicts between the construction workers and the local residents.
Loss of temporary employment opportunities for local people due to closure or completion of the project.	▪ Give employment priority to local people, because after project closure they will easily revert back to their normal economic activities. ▪ Ensure that all construction workers are registered with social security funds and are paid their terminal benefits immediately before retrenchment from jobs.

8.2.4.1 Mitigation of Impacts on Transportation

The following is the planned mitigation measures for the identified negative effects/impacts on Transportation:

Effects/Impacts	Mitigation Measures
Severance of access by local residents to the road due to presence of excavated road bed and storm water drainages.	▪ Provision of temporary access for pedestrians and non-motorized transport users. ▪ Provision of temporary pedestrian crossings.

Effects/Impacts	Mitigation Measures
Disruption of traffic flow along the construction roads.	▪ Formulation of traffic management plan. This includes: - Diverting all traffic to the right and left side lanes. - Deployment of flag persons to guide movement of vehicles. - Installation of speed limit signs and diversion signs. - Provision of temporary terminal for the daladala that heading Kivukoni area.

8.2.4.2 Mitigation of Impacts on Cultural Heritage Resources

The following is the planned mitigation measures for the identified negative effects/impacts due to interaction between Project Related Activities and Cultural Heritage Resources Component:

Effects/Impacts	Mitigation Measures
Destruction of sacred site due to removal of existing Baobab Tree from the road median.	▪ Contractor will make consultation with local residents to work out the mechanism for removal of Baobab Tree. This may involve conducting some rituals depending on the cultural procedures of the local people.
Destruction of archaeological artefacts due to land excavations during construction of BRT Infrastructures.	▪ Formulation and implementation of chance find procedures for any archaeological findings. ▪ Any identified archaeological findings will be rescued and reported to the Antiquities Department.

9.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

9.1 The Objectives and Scope of ESMP

9.1.1 The Objectives of ESMP

The purpose of this Environmental and Social Management Plan (ESMP) is to ensure that the project is being implemented with minimum adverse environmental and social impacts. The ESMP focuses on avoiding, where practical, unacceptable adverse environmental, social and/or economic impacts. In the event that an impact cannot be avoided, then appropriate compensatory and/or mitigation measures have to be implemented.

For clarity in the management structure, Safety and Environmental Unit (SEU) will consult with TANROADS /DART on matters relating to environmental and health and safety performance. However, SEU will have overall responsibility for planning, implementation, monitoring and enforcement of activities associated with this ESMP and environmental and health and safety performance.

The objectives of this ESMP are to:

- Describe the measures required to implement construction related management and mitigation commitments made in the ESIA Report;
- Describe specific additional measures required to implement construction related good practice, approval conditions stipulated by Tanzania National Policies/Legislations and World Bank Safeguard Policies;
- Identify the roles and responsibilities of the environmental and social management organisation of the project; and
- Communicate environmental and social expectations and requirements to various stakeholders and relevant institutions, and regulatory agencies.

All contractors and subcontractors shall comply with apply the ESMP requirements as applicable to the tasks they are employed to undertake.

The measures and procedures outlined in this ESMP are commitments made by SEU, and therefore remain responsible for their implementation. It is recognised that practical implementation of many of the measures may rest with contractors and subcontractors and consequently, SEU will require the implementation of a robust review/audit programme, as described in this ESMP, to measure and ensure that it is executed on their behalf.

9.1.2 The Scope of ESMP

This Environmental and Social Management Plan (ESMP) has been developed to identify the environmental and social management and mitigation actions required to implement the project in accordance with the requirements of the World Bank Safeguard Policies and applicable Tanzania national policies and legislation.

The ESMP also outlines the performance standards based on the National Policies/Legislations, World Bank Safeguard Policies/Guidelines; and International Conventions/Treaties/Agreements.

The potential impacts and associated mitigation measures and management procedures presented in this ESMP are based on the baseline information and assessments provided in the ESIA Report.

The Specific Management Plans presented in **APPENDIX 30** provide details on the environmental and social management procedures, processes and mitigation and monitoring measures required to complete actions identified in the ESIA Report.

9.2 ESMP Performance Standards

The overview of ESMP Performance Standard which informed the development of this ESMP is provided in **APPENDIX 31.** The performance standard specifies the objectives, supporting documents, and requirements for each aspect of the ESMP.

9.3 Institutional Roles and Responsibilities

The important stakeholders / agencies identified in this ESMP include the Tanzania National Roads Agency (TANROADS); Dar Es Salaam Rapid Transit Agency (DART Agency); World Bank Group (IBRD/IDA); NEMC; Ilala City Council (ICC); Ubungo Municipal Council (UMC); Kinondoni Municipal Council (KMC); Ward and Mtaa Development Committees, and Non-Governmental Organisations (NGOs) / Community Based Organisations (CBOs) dealing with project related environmental and social aspects in the project area. The organisation structure for implementation of ESMP is provided in **Figure 9-1.**

The effective implementation of ESMP also requires that all persons working for the project are aware of the importance of environmental requirements of the project; their roles and responsibilities in the implementation of the ESMP. They should also be aware of the significant actual or potential environmental impacts of their work activities; the benefits of improved performance and the consequence of not complying with environmental requirements.

Specifically, ESMP schedule as shown in **Table 8-1**, summarizes all anticipated significant adverse environmental impacts and provides specific description of institutional arrangement for carrying out mitigation measures. The institutional roles and responsibilities for ESMP implementation is provided in Error! Reference source not found..

In order to have effective ESMP there will be an integration of efforts among various stakeholders. This ESMP therefore specifies roles and responsibilities of various stakeholders during implementation. However, it is important that all responsible agencies / stakeholders should appreciate that they are united and should interact and work towards a common purpose.

9.3.1 Financing agency

The project is being financed by TANROADS on behalf of the Government of the United Republic of Tanzania in collaboration with the World Bank Group (IBRD/IDA). TANROADS and the WB shall be responsible for review and approval of Contractor's ESMP (C-ESMP), and Monthly Progress Reports. The TANROADS will also be responsible for review and approval of Monthly Environmental, Social, Health, and Safety (ESH&S) Compliance Reports submitted by the Contractor.

9.3.2 Implementing Agency

The project is being implemented by TANROADS on behalf of the Government of the United Republic of Tanzania. In this regard, TANROADS also holds final responsibility for environmental performance of the project.

TANROADS is responsible for the environmental and social management of the Dar Es Salaam Urban Transport Project (DUTP)[103]. Specifically, the responsibility for environmental and social management in TANROADS rests with the Safety and Environment Unit (SEU). Therefore, the TANROADS shall be responsible for overseeing implementation of mitigation measures and compliance monitoring through its Safety and Environment Unit (SEU).

[103] UNITED REPUBLIC OF TANZANIA. MINISTRY OF WORKS, TRANSPORT AND COMMUNICATION. TANZANIA NATIONAL ROADS AGENCY (TANROADS. Environmental and Social Management Framework for Dar Es Salaam Urban Transport Improvement Project. January, 2017. http://documents1.worldbank.org/curated/pt/822301484722638339/pdf/SFG2870-EA-P150937-Box402873B-PUBLIC-dislcosed-1-16-17.pdf

9.3.3 Dar Es Salaam Rapid Transit Agency (DART Agency)

The DART Agency, apart from its operational responsibility, shall be responsible for overseeing compliance with national environmental policy objectives, including the outlined mitigation measures in the ESMP during operation phase. The DART Agency will be collaborating with TANROADS to ensure the road infrastructure is protected against vandalism, hence safeguarding the road traffic safety.

Currently, there is no any environmental and social unit within the DART Agency. There will be a need for capacity building by establishing the Environmental and Social Unit (ESU). The DART Agency will also employ the Environmental, Health and Safety Officer (EHSO) and Social Gender Officer.

9.3.4 Supervision Consultant

The Supervision Consultant will be appointed by the implementing agency and will be responsible for monitoring and supervision of the construction works including implementation of ESMP. The Supervision Consultant will appoint a Resident Engineer to oversee the construction works and monitor the works undertaken by the Contractor and implementation of ESMP to ensure compliance with contract specification and contractual requirements. The Supervision Consultant will also appoint Environmental Specialist and Social/Gender Specialist to assist the Resident Engineer. The Environmental Specialist shall be responsible for Environmental, Health, Safety and Security (EHSS) Issues and Social/Gender Specialist shall be responsible for Worker's Welfare, Resettlement / Compensations Issues, Grievances Redress Mechanism (GRM), Gender Based Violence (GBV), Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH).

9.3.5 Contractor

The Contractor shall be responsible for the implementation of construction works and ensure compliance with environmental and social requirements, including implementation of outlined mitigation measures in the ESMP. Therefore, the Contractor will be responsible for preparation and implementation of Contractor's ESMP (C-ESMP) based on this ESMP or Project ESMP (P-ESMP). The Contractor will ensure that the implementation of C-ESMP conforms to the requirements of all local laws, regulations, and contract clauses.
The Contractor shall appoint the Project Manager who will be assisted by ESH&S Team, which will be comprised of Environmental Manager assisted by Environmental Health and Safety Officer (EHSO) and Social/Gender Specialist.

The Environmental Manager shall be an overall in-charge responsible for overseeing implementation of Environmental, Social, Health, Safety and Security (ESHSS) Issues. However, for effective implementation of the ESMP, the Contractor will be required to appoint an Environmental, Health, and Safety Officer (EHSO) and a Social/Gender Specialist.
The responsibilities of other experts shall be as follows:

Title/Position	Responsibility
Environmental Health and Safety Officer (EHSO)	Environmental, Health, Safety and Security Issues
Social/Gender Specialist	Social, Gender and Resettlement Issues, including GRM, GBV/SEA and SH.

In order to ensure enforcement of ESHSS issues, the Site Inspectors and Site Foremen, apart from undertaking supervision of rehabilitation works, shall also be responsible for overseeing the implementation of outlined mitigation measures in the ESMP, including ESHSS issues

9.3.6 Local Government Authorities (LGAs)

The project road is located within the jurisdictional boundaries of Ilala City Council (ICC), Ubungo Municipal Council (UMC) and Kinondoni Municipal Council (KMC), and of their respective Wards and Street Governments. The ICC and KMC and their respective Ward and Street Governments are considered as the Local Government Authorities (LGAs).

The involvement of the Local Government Authorities (LGAs) is crucial for successful implementation of ESMP because some of the mitigation measures are better undertaken by local communities with the support of the LGAs. It is therefore important that ICC and KMC as should be involved in the implementation of this ESMP. In order to make the LGAs to be well informed on the contents of the ESIA Report, one copy of this report will be submitted to KMC. This is to ensure that the LGAs through their Environmental Management Officers are aware of the environmental and social issues regarding this project and therefore shall be able to monitor the Contractor's compliance with mitigation measures.

9.3.7 Local Community Members

The Local Community Members include the Local Residents of all Wards / Mtaa Traversed by the Road Corridors; Small Business Operators, Commuter Bus Transport Operators; Baja / Bodaboda Operators; Petrol Station Operators; Whole Sale and Retail Shop Operators along the road corridors.

In general, consultation with these stakeholders indicate they do support the project because they believe it going to improve passenger transport in the city. However, the project can obtain maximum support if it involves the local community members and make them aware of the project.

Therefore, TANROADS Chief Executive Officer as an implementing agency through TANROADS Regional Manager-Dar Es Salaam will prepare and distribute brochures which provide some information about the project.

TANROADS Regional Manager will encourage the local residents to participate in the project through temporary employment during construction and in the maintenance activities during operation phase. In this way the local community members will feel ownership of the project and therefore protect the project infrastructure against vandalism. For example, it is common to find people removing road signs or vandalising bridge structures.

The TANROADS Regional Manager will prepare and implement education and awareness campaigns, which among others will educate the local people on the importance of project infrastructure against vandalism.

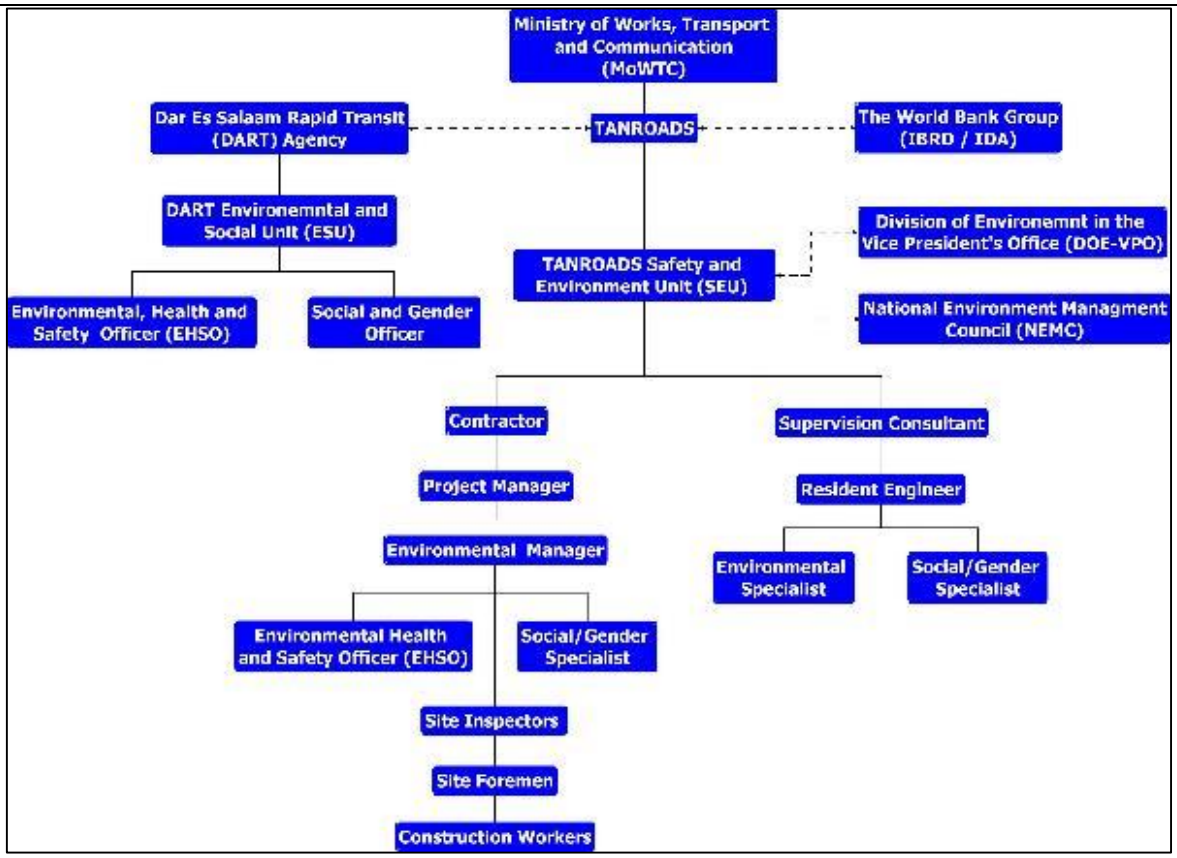

Figure 9-1: Organisational Structure for ESMP Implementation.

9.4 Contractor's Environmental Specification

The *Contractor's Environmental Specification* will be incorporated into the Contract Document to ensure the environment is free from the impacts of the Contractor's activities. The Contractor shall follow the guidelines determined in the Contract Document. General environmental problems related to the Contractor's activities include:

- Site management;
- Storage and treatment of fuel and material;
- Dust and noise hazard control;
- Solid Waste Management; and
- Wastewater Management.

9.4.1 Contractor's Environmental Protection Plan

The Contractor shall hold the copy of *Environmental and Social Management Plan (ESMP*, which shall be included in the bidding documents. Before rehabilitation / construction[104], the Contactor shall submit an *Environmental Protection Plan* for the construction site to the Supervision Consultant's Resident and PIU for review and approval.

The Plan shall include the general mitigation measures for environmental impacts and the specific mitigation measures for response to emergency accidents, and the general measures shall include the followings, but not be limited to the followings:

- General Rehabilitation Plan, indicating operation area, fuel storage area, fuel supply area, parking area, equipment maintenance area, material storage area and campsite;

[104] Construction means "rehabilitation" unless otherwise specified.

- Waste Management Plan;
- Dust Control Plan; and
- Noise Control Plan.

9.4.2 Site Facility

The Contractor's Office and Materials Storage Yard will be secured near the construction site. The Contractor will be required to prepare site plan for review and approval by the Resident Engineer. This will include drawings showing the layout of the Contractor's Office and Materials Storage Yard.

9.4.3 Recruitment of Construction Workers

The Contractor will always give employment priority to the local people. The Contractor shall publish the required positions for employment in the local media and all signboards. The construction workers and other personnel shall be employed in accordance with the Employment and Labour Relations Act No.6 of 2004. The Contractor shall provide training for the construction workers on environmental protection, GBV / SEA, and occupational health and safety issues.

9.4.4 Requirements for Contractor's Office

Since all construction workers to be recruited will be from the within the urban areas, there will not be any requirements for accommodation for the construction workers. However, the Contractor must provide cloth changing rooms, resting areas and sanitary facilities for the construction workers.

There shall be independent and sound bath facilities (toilets, bathroom) and cloth changing rooms) for male and female workers. The toilets shall have sufficient water and be equipped with soap and toilet paper, etc. All facilities shall be clean and available. The toilet shall be marked indicating separate toilets, bathrooms and cloth changing rooms for "Male" and "Female".

Other facilities shall include:

- Kitchen supplied with clean water, and in favourable sanitary condition.
- Septic tank soak pit system for treatment of domestic sewage before discharge into the seawater.
- First Aid Kit complete with medicine shall be available at the Contractor's Office managed by a qualified nurse. The nurse shall receive complete emergency rescue training and be capable of properly transferring the injured or patients to local referral hospital on time.

9.4.5 Code of Ethical Conduct

The *Code of Ethical Conduct* shall be established for the construction workers and emphasize appropriate conduct, strict prohibition of drug and alcohol and conformance to relevant laws and regulations to reduce the social impacts. All workers shall be familiar with the *Code of Ethical Conduct*. The local community shall also know the *Code of Ethical Conduct* for construction workers. The workers who fail to follow the *Code of Ethical Conduct* shall be punished. The *Code of Ethical Conduct* shall include, but not be limited to the following measures:

- All workers shall abide by national laws and regulations.
- Dangerous goods and weapon are strictly forbidden at the construction site.
- Obscene goods and gambling are strictly forbidden at the construction site.
- Fighting is strictly forbidden at the construction site.
- Life and production of the surrounding area and the local people shall not be interfered.
- Local traditional culture, customs and traditional activities shall be respected.

- Smoking is only allowed in designated area.
- Dressing and personnel hygiene shall be appropriate.
- Sanitary conditions of accommodation shall be proper.

The *Code of Ethical Conduct* shall be followed even outside the project site in their residential areas during interaction with local community members.

The followings are strictly forbidden at the construction site and the surrounding area:

- Impacting or damaging the structure with historical or architectural value;
- Burning of solid wastes into the surroundings without permission from resident engineers.
- Drinking during working time.
- Mechanical maintenance (engine oil and lubricant addition) of vehicles outside the designated area.
- Dumping of solid wastes outside the designated area.
- Dangerous driving in the surrounding area and local roads.
- Failure to PPE (safety shoes, reflective vests, face masks, and helmet) at the construction site.
- Causing any health and safety impact to the surrounding people.
- Leakage of any pollutant leakage, like waste oil; and
- Dumping of solid waste into the surrounding environment (E.g., plastic bottles, plastic bags, food cans, etc.).

All Contractors, office workers or other personnel who violate the above regulations shall be subject to punishment of verbal warning or termination of employment contract depending on the severity.

9.4.6 Health and Safety

The Contractor shall ensure the project conforms to all national and local safety regulations and other damage avoidance measures. Before construction, the Contractor shall execute safety training for the workers. Other measures include:

- Provision of sufficient sunlight during the day time and light during the night time.
- Provision of enclosure made up of corrugated iron sheet around the construction site, and shall be regularly inspected and maintained during construction. This will be reinforced by provision of written warning signboard in Kiswahili and English Language to prevent trespass by unauthorized persons into the construction site without the approval of the Contractor's personnel.
- Provision of Fire-fighting equipment, like fire extinguisher at the Contractor's Office.
- Provision of sufficient PPE such as eye goggles, protective gloves, face shield, dust cover, helmet, ear plugs, steel helmet, etc.) to the construction workers.
- Safety regulations, contingency plans and emergency contact information shall be indicated in the bulletin board at the construction site.
- Conducting medical examination for the construction workers annually;
- Provision of training on personal basic hygiene and epidemic prevention, including respiratory disease and communicable disease.
- Conducting HIV/AIDS prevention and control campaigns for construction workers and fish market users, including publicity at the construction site and the surrounding areas in the form of bulletin and training course.
- Provision of basic emergency rescue service and emergency measures for the construction workers.

9.4.7 Storage of Fuel, Oil/Grease, and Other Hazardous or Toxic Material

All fuel shall be stored in a concrete paved the storage yard with bund walls and shall be 110% of the fuel storage container. Fuel storage sites shall not to be located near any water sources

(i.e., within 100m from the water source). Dangerous goods shall be stored in a designated storage device. Temporary storage regulations shall be prepared for fuel, oil and paint, etc.

Only authorized personnel are allowed to enter the storage area. The storage area shall be free from vehicle damage, and shall be subject to periodic inspection for leakage, damage and pollution condition.

Equipment maintenance can only be made at the workshop / garage. The operation surface (concrete floor within the rail area) must be properly designed to ensure collection of oil and fuel in the appropriate container. In case of oil/fuel leakage, the soil polluted must be removed and transported to the approved area. Relevant preventive measures must be taken to prevent the grease, oil, fuel, solvent and chemicals from polluting soil and water.

9.4.8 Solid Waste Management

During construction, the Contractor must take proper measure to timely remove the waste at the construction site to the approved waste treatment equipment. Construction material accumulation shall be reduced by any possibility.

Household garbage produced during the Contractor's activities at the campsite must be placed in the can (210L steel or plastic buckets) or garbage truck. The Contractor must ensure to empty the garbage container weekly or as required.

All garbage must be immediately put into the garbage can or truck. The garbage shall not be thrown about in operation area or Contractor's campsite.
The construction waste must be temporarily stored within the construction site and transported to the approved dumping site. Incineration or burning of any kind of solid wastes is strictly forbidden at the construction site.

9.4.9 Wastewater and Storm Water Management

Wastewater from the construction site and the campsite shall not be directly discharged to the surface waters. Domestic sewage must be discharged after proper treatment by using septic tank system.

Storm water must be discharged to the sea through concrete lined storm water drainages to prevent sedimentation of the marine environment. Storm runoff discharged from the construction site (temporary drainage facility) shall be through concrete lined storm water drainages.

9.4.10 Noise Control

Construction works shall be confined to the day time only and construction near the fish market users shall be noise-free.

Personnel, visitor, and construction worker at the site must wear proper hearing protection device to avoid hearing injury by noise.

The Environmental Specialist must check the site periodically to ensure the site comply with *Occupation Health and Safety*.

9.5 Grievances Redress Mechanism

The Contractor will be required to formulate Grievances Redress Mechanism (GRM). The purpose of the GRM is to outline a process for dealing with or resolving project-level grievances raised by Aggrieved Person (AP) regarding specific activities, and/or unanticipated social impacts resulting from Project implementation. The GRM applies to the construction workers and local residents, and other stakeholders who are directly or indirectly affected by

the project. The grievance process outlined hereunder provides procedures for handling complaints/claims internally in a transparent manner, to avoid conflict and therefore maintain good relationships with various stakeholders.

The PIU will oversee implementation of GRM during execution of the Project, to ensure the protection of the rights of APs and beneficiaries during Project implementation. The requirements for the GRM are as follows:

- The grievance process must not impose any cost to those raising the grievances (i.e., the complainants).
- Concerns arising from Project implementation must be adequately addressed promptly.
- Participation in the grievance process must not preclude the pursuit of legal remedies under the laws of Tanzania.

The issues covered by the GRM, among others, include complaints related to employment, sexual harassment, and gender-based violence. Specifically for employment issues may include:

- Failure by the Contractor to serve the employment contract.
- Failure by the Contractor to pay minimum wage following the labour laws.
- Failure by the Contractor to remit monthly national social security contributions.
- Failure by the Contractor to provide medical treatment for a sick employee.
- Unlawful termination of a worker,
- General workers' welfare such as annual leave, and sick, maternity and family leave,
- Failure to provide Project workers with adequate periods of rest per week, as required by the labour laws.

In case of GBV/SEA and SH a proper reception channel will be in place by appointing an NGO (or CBO) to handle all kind of complains related to GBV/SEA and SH), including providing appropriate counselling to the victims.

9.5.1 Formation of Grievances Redress Committee

To address grievances, a Grievance Redress Committee (GRC) will be formed for dealing with grievances as they arise. The GRC will be comprised of the following:

- ESU's Safeguard Officer.
- Supervision Consultant's Environmental Specialist and Social/Gender Specialist
- Contractor's Human Resource Officer.
- Municipal Environmental Management Officer (MEMO) and Municipal Community Development Officer (MCDO).
- Ward Executive Officers (WEO) from traversed Wards by the BRT Roads.
- Street ("Mtaa") Executive Officers from traversed Streets by the BRT Roads.

Note that the presence of the local government authorities is important because some of the grievances may originate outside the project boundaries. The involvement of NGO / CBO will also be necessary. For example, if a project worker is involved in sexual harassment of a local community member, the matter will be handled by a qualified NGO / CBO.

The construction workers and fish market users will be informed of the existence of the GRM as soon as it is in place, as well as of the following:

- Members of the Grievances Redress Committee (GRC)
- How to access the GRC.
- How to lodge a formal complaint.
- The timeframes for each stage of the process.
- Characteristics of the GRC: confidentiality, responsiveness, and transparency.

- Alternative avenues of grievance resolution in case of conflicts of interest.

9.5.2 Role and Responsibility of Grievances Redress Committee

The Gender Redress Committee (GRC) will be Chaired by SEU's Safeguard Officer who shall be responsible for receiving and registering grievances. The Supervision Consultant's Social/Gender Specialist shall be the Secretary of the GRC and shall be responsible for assisting the Chairperson in documenting, registering, communicating, and reporting issues related to grievances management.

The grievance management procedure will be simple and will be administered as far as possible by the GRC at the Project Level. The GRC will prepare monthly reports showing how received grievances were handled summary and submit to TANROADS and WB for record purposes. To ensure transparency, the Grievance Redress Procedure will be printed in A3 Size Paper and posted at all strategic locations within the BRT project sites to be read by construction workers and local community members.

The GRC shall disseminate detailed procedures to redress grievances and appeal process among the construction workers and local community members through their local government offices (E.g., Ward Officers and Mtaa Officers).

9.5.3 Grievance Redress Procedures

The formal, detailed GRM to be developed will contain specific grievance procedures, including both informal and formal grievance mechanisms. In general, complaints and disputes should be resolved at the project level. Each grievance will be treated confidentially.

The grievance resolution process is comprised of four stages:

- Reception
- Investigation and inquiry.
- Response
- Follow up and closeout.

The access to the GRM will be easy and quick, in particular to APs, who are the people most likely to need it. The formal grievance will be:

I. documented in a written Grievance Form and recorded in a logbook:
II. assessed on its level of urgency/severity; and
III. assigned to GRC, which will then inform the complainant within seven (7) days that it has received the grievance and that it is under review.

The Aggrieved Person (AP) will report his/her grievance to the GRC through its Chairperson. If a grievance is received face to face or over the phone and the aggrieved wishes to address the grievance formally, it is the responsibility of Chairperson who receives the grievance to complete a Grievance Registration Form provided in **APPENDIX 32.** The grievance redress mechanism for dealing with complaints is illustrated in **Figure 9-2.**

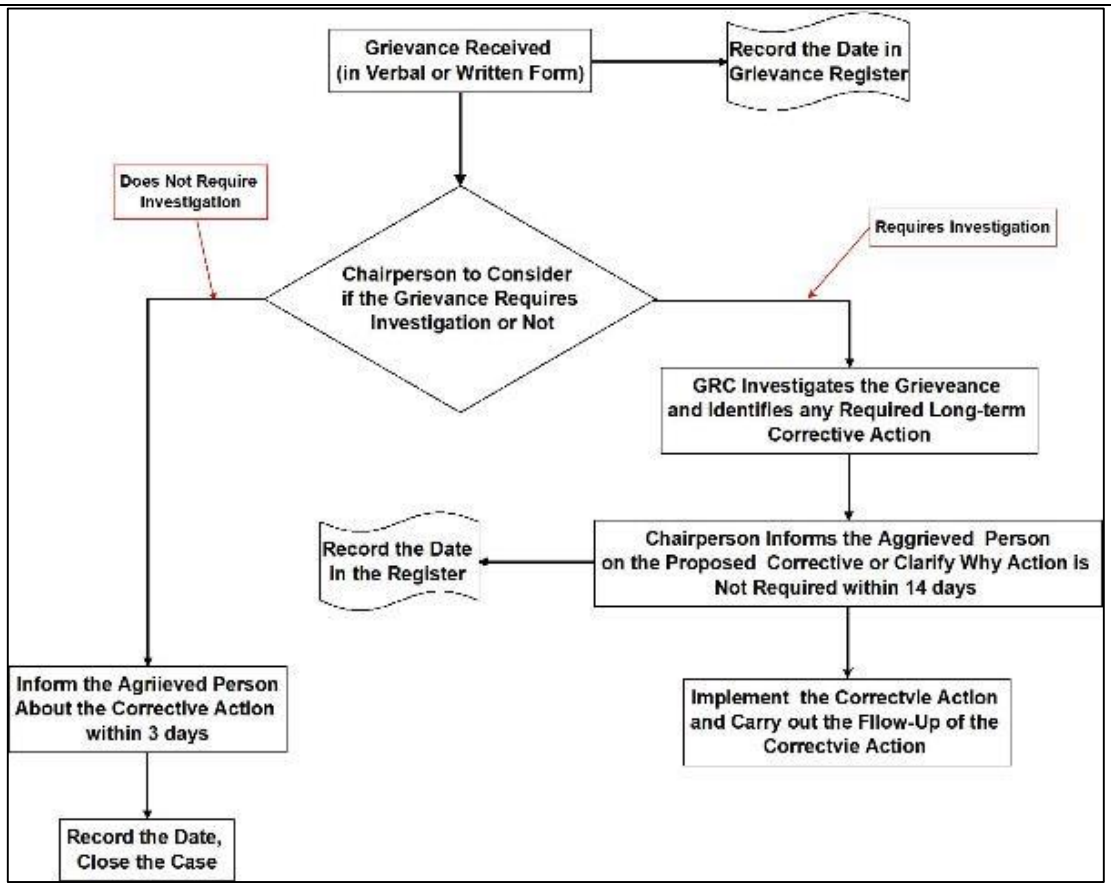

Figure 9-2: Grievances Redress Mechanism.

In general, grievances should be resolved within 30 days. The Chairperson will communicate the findings of the investigation and resolution and seek approval from the AP, who will either accept or appeal the outcome. If the AP is satisfied with the outcome, then the grievance is closed out and will provide his/her signature (or fingerprint) on the Grievance Form as confirmation.

If an agreement is unable to be reached between the AP and the GRC, the grievance will be submitted to TANROADS as a lead Project Implementation Agency for review and a final decision through its PMU. If necessary, further action will be taken to resolve the issue. The national courts are the last avenue for addressing grievances. In case the AP reaches the judicial system, there should be no cost to the claimant.
A grievance is closed out when no further action can be or needs to be taken. Closure status will be entered into the Grievance database as follows:

- **Resolved:** the resolution of the complaint was reached and implemented and signed documentary evidence exists.

- **Unresolved:** the agreed resolution of the complaint was not reached and the case has been authorized for closeout by the Grievance Redress Committee (GRC).

- **Abandoned:** complaints in which efforts to contact a given complainant were unsuccessful for two months after receipt of the formal grievance.

Specifically, depending on the issues that may arise during project implementation the following stages will be observed in the grievances redress process:

Stage 1: Reception
The Aggrieved Persons (AP) is documented in the appropriate form to be provided by Chairperson. If during the process it appears that the AP does not understand the procedures, this will be explained. The Chairperson should not discourage the filing of a grievance form. The grievance will also be documented in the Grievance/Issues Register.

The Grievance Registration Form should be signed and dated by the aggrieved person. Where the aggrieved person is unable to write, he shall obtain assistance from the Chairperson to fill the form and emboss the form with his/her thumbprint.

Step 2: Investigation
If the issue is easily resolvable and it does not require investigation the Chairperson will refer to the GRC, which will carry out the hearing of the grievances and provide the answer within 3 days, after the date of hearing the grievances.

If the grievance is a more complex project-related issue, it will be investigated further, and then arrange the hearing within 7 days after the date of registration.
The Chairperson will arrange the hearing day within 7, which shall be attended by the AP and the party causing the grievances. The Chairperson will notify both parties within 3 days after the date of hearing the grievance.

Step 3: Response
It is assumed that all cases shall be solved at the GRC level. However, some cases may remain unresolved. For such cases, the AP shall have the option to refer his/her case to the District Commissioner for final amicable solution.

The Chairperson will prepare a preliminary report containing the details of the grievance and hearing date, and decision of GRC and submit to the District Commissioner.

Step 4: Follow Up and Close-Out
If no amicable solution is reached in Step 3 the AP will have recourse to the court of law as a last resort. This can be a labour court, criminal court, or civil court depending on the type of grievance.

This is a stage that although should always be open and available, it will be discouraged by all positive means such as timely communication and open negotiations. The institutional arrangement has been designed to allow for the process to detect and deal with problems in a timely and satisfactory manner for all parties concerned. Therefore, the GRC shall take necessary measures to ensure that solutions are reached by consensus based on negotiation and agreement.

9.6 Stakeholder Consultations

Stakeholder consultations will be carried out during preparation of this ESIA Report and its associated Environmental and Social Management Plan (ESMP) and Resettlement Action Plan (RAP); and relevant stakeholders will have the opportunity to raise issues and their concerns regarding the project. All the raised issues /concerns will be taken into consideration during the project design and preparation of ESIA Report, ESMP and RAP. However, in order to properly address environmental and social issues, further stakeholder consultation will be necessary during the project implementation.

The stakeholder consultations are aimed at providing a two way communication or information exchange between the Contractor and the PAPs and the public. This is to ensure that information on the impact of the project is timely delivered by the Contractor and Project Proponent to the PAPs and the public. The Contractor shall disclose relevant content of the

Project, potential environmental and social impacts, and mitigation measures; GBV /SEA issues and EH&S issues.

The following actions will be taken by the Contractor during construction phase:

- During construction, the Contractor shall keep open communication with local government, and the surrounding local community members.

- Before construction, the Contractor shall disseminate the project information to the PAPs and surrounding local community members and the public in general in the form of brochures written in both Kiswahili and English Languages.

- Relevant project information to be published in the brochures shall include, but not be limited to:
  - Project Overview;
  - Construction Plan;
  - Main Construction Activities;
  - Main Environmental Problems and Mitigation Measures; and
  - Name and phone number of the Contractor's Project Manager, the Consultant's Resident Engineer, and PIU Safeguard Officer.

The Contractor shall regularly communicate with the Supervision Consultant's Environmental Specialist and Social/Gender Specialist on the main sensitive subjects and to mitigate any unfavourable environmental and social impacts.

The Contractor shall provide training to the workers before commencement of construction works on Grievances Redress Mechanism, Contractor's Code of Ethical Conduct and Code of Conduct on EH&S and GBV/SEA, and thereafter regularly (monthly) throughout the project implementation period. The samples of Contractor's Code of Ethical Conduct and Code of Conduct on ESH&S and GBV/SEA are provided in **APPENDIX 33** and **APPENDIX 34**, respectively.

Relevant information on Grievances Redress Mechanism, Ethical Code of Conduct, and Code of Conduct on GBV/SEA will be posted at strategic locations for easy access by construction workers in Kiswahili and English Languages.

Complaint recording system shall be placed at the Contractor's Office, whereby all submitted complaints problems and other matters shall be included in the Monthly Progress Reports and submitted to the Resident Engineer and ESU for review and approval.

9.7 Institutional Capacity Building

To ensure the sustainability of this project there is a need for institutional capacity building. The purpose of institutional capacity building is to ensure the sustainability of the benefits obtained after the construction of BRT infrastructure and effective implementation of the outlined enhancement / mitigation measures in the ESMP during operation phase.
Therefore, institutional capacity building will involve:

- Establishment of Environmental and Social Unit (ESU) at the DART Agency, which will be comprised of Environmental Health and Safety Officer (EHSO) and Social / Gender Officer (SGO).

- Training of the EHSO and SGO on the environmental, social, gender, health, and safety issues during construction phase; and environmental and social monitoring issues during operation phase.

- Training of Contractor's Staff and Construction Workers.

9.7.1 Establishment of Environmental and Social Unit (ESU)

The capacity building within the DART Agency will involve establishment of Environmental and Social Unit (ESU). The ESU will be responsible for overseeing implementation of outlined enhancement / mitigation measures in the ESMP and overseeing Environmental, Social, Gender, Health, and Safety (ESGH&S) during operation phase. The Environmental and Social Unit will also be responsible for daily monitoring of environmental and social issues, including compliance with outlined mitigation measures in the ESMP, including prevention of GBV/SEA, SH, and Child Labour.

The Environmental and Social Unit will be run by Environmental Health and Safety Officer (EHSO) and Social/Gender Officer (SGO) and will be liaising with the National Environment Management Council (NEMC) and Municipal Environmental Management Officers (MEMO) and Municipal Community Development Officers (MCDOs) from Ilala and Kinondoni Municipal Councils.

The budget for strengthening and running of the Environmental and Social Unit (ESU) will be part of the recurrent budget of the DART Agency. This budget will include salaries of two specialists, fully furnished office, two computers with accessories and other related facilities.

9.7.2 Training of ESU Staff

The objective of organizing training for ESU Staff is to strength environmental management during construction and operation phase, and to ensure the quality of environmental monitoring and effective environmental management, thus improving the quality of the construction works. At the end of the training the ESU Staff will be able to understand the main environmental and social issues during the construction and operation phase, and have a better understanding of existing problems and deficiencies on environmental management; and take necessary preventive and control measures as soon as possible.

The training shall be conducted by Supervision Consultant's Environmental Specialist in collaboration with Social/Gender Specialist. In addition, the ESU's Environmental Health and Safety Officer (EHSO) and Social/Gender Officer (SGO) will be involved on on-the job training by participating in the environmental and social monitoring during construction phase. They will be submitting their environmental and social monitoring reports for assessment by the Supervision Consultant's Environmental Specialist in collaboration with Social/Gender Specialist.

9.7.3 Training of Contractor's Staff and Construction Workers

Before commencement of construction works training will be organized for the responsible personnel and construction workers, in order to avoid environmental damages due to project implementation during construction. For contract responsible personnel, the objective of training is to define the environmental protection responsibilities of the contractor; and for construction workers, the objective is to ensure the proper construction practice during the construction period in order to avoid some construction behaviours, which have adverse impacts on the environment.

The training will be helpful for the project responsible personnel to understand their obligations in environmental protection needed to be assumed and possible consequences of the environmental damage. The construction workers will have a better understanding of the protection level and methods for environmental sensitive areas. Based on the actual situation of the Project, the training period for construction workers will not be more than one week.

9.8 Cost Estimates for Mitigation Measures

The cost estimate for mitigation measures takes into consideration those costs to be incurred due to affected resources as a result of rehabilitation works/ activities and costs to be incurred as a result of the Contractor's adherence to good engineering practice. Those costs resulting

from implementation of mitigation measures for negative environmental and social impacts are considered as extra costs outside the Project Budget. However, the project will not be responsible for costs that arise out of normal responsibility of the project proponent or implementing agency. Therefore, for that reason, recurrent costs during operation and maintenance are excluded.

The cost estimates for the implementation of ESMP mitigation measures are cost due to the implementation of specific mitigation measures. These include Implementation of Resettlement Action Plan (RAP); GBV/SEA Awareness Programme Prevention and Control of COVID-19; HIV/AIDS Prevention and Control Programme; and Health and Safety Management Plan. The summary of valuation and compensation of Project Affected Persons (PAPs) is provided in **APPENDIX 35.** According to the summary report the cost of compensation of PAPs is estimated to be Tanzania Shillings (TZS) 12,808,859,000. In this regard, the following cost estimates for mitigation measures have been considered for protection of environmental and social resources; and as such for implementation of ESMP:

S/n	Particulars of Cost Items	Amount (TZS)
1.	Compensation of PAPs due to Land Acquisition	12,808,859,000.00
2.	GBV/SEA Awareness Programme	50,000,000.00
3.	Prevention and Control of COVID-19	50,000,000.00
4.	HIV/AIDS Prevention and Control Programme	50,000.000.00
5.	Environmental, Health and Safety Management Plan	50,000,000.00
	Total 1:	**12,958,859,000.00**
	Add 10% Contingency:	1,295,885,900.00
	Total 2:	**14,254,744,900.00**

This makes the total cost for implementation of mitigation measures to be Tanzania Shillings (TZS) **14,254,744,900.00**. These costs will be included in the Bill of Quantities during the preparation of the Bidding Document. However, these are just tentative cost estimates as the actual cost will be known during the preparation of the Bidding Document. The cost estimates have been based on the Consultant's experience on projects of similar nature.

9.9 ESMP Schedule

The role of ESMP is to outline environmental requirements for the project and provide guidance for the Contractor to follow and properly manage environmental impacts during construction. It specifies mitigation and institutional measures to be taken during construction and operation phases to eliminate any adverse environmental and social impacts, offset them or reduce them to acceptable levels. Specifically, ESMP schedule as shown in **Table 9-1**, summarizes all anticipated significant adverse environmental impacts and provides specific description of institutional arrangement for carrying out mitigation measures. In order to have effective ESMP there must be an integration of efforts among various institutions/stakeholders. This ESMP therefore specifies roles and responsibilities of various institutions/stakeholders during implementation. However, it is important that all responsible institutions /stakeholders should appreciate that they are united and should interact and work towards a common purpose.

Table 9-1: ESMP Implementation Schedule.

Effects/Impacts	Mitigation/Enhancement Measures	Responsibility	Cost Estimates
A. Mobilization Phase			
A1. Loss of land and other properties by local residents due to land acquisitions for construction of BRT infrastructure.	▪ Payment of compensation to the PAPs.	TANROADS in collaboration with LGAs monitored by Supervision Consultant's Social / Gender Expert.	12,808,859,000.00
A2. Disruption of public social services due to relocation of infrastructure / utilities.	▪ Collaborate with relevant authorities to identify and located the likely affected infrastructure / utilities. ▪ Ensuring that the relocated infrastructures and utilities are immediately restored within 24 hours.	Contractor in collaboration with Utility / Infrastructure Authorities monitored by Supervision Consultant's Environmental Expert and Social/Gender Expert.	To be provided m the BOQ for Other Items
A3. Increased employment opportunities for local people due to recruitment of construction workers.	▪ Give employment priority to local people and provide equal employment opportunity for both males and females. ▪ Ensure there is not any kind of discrimination at work place discrimination. ▪ Ensure there is not any kind of Sexual Harassment and Gender Based Violence at work place.	Contractor monitored by Supervision Consultant's Environmental Expert and Social/Gender Expert	NA
A4. Destruction of sacred/cultural site due to removal of Baobab Tree from the median of the road.	▪ Contractor will make consultation with local residents to work out the mechanism for removal of Baobab Tree. This may involve conducting some rituals depending on the cultural procedures of the local people.	Contractor in collaboration with Local residents and monitored by Supervision Consultant's Social /Gender Expert.	NA
A5. Destruction of archaeological artefacts due to land excavation during preparation of BRT construction sites.	▪ Formulation and implementation of chance find procedures for any archaeological findings. ▪ Any identified archaeological findings will be rescued and reported to the Antiquities Department.	Contractor monitored by Supervision Consultant's Environmental Expert and Social/Gender Expert	NA
B. Construction Phase	▪		
B1. Creation of air pollution due to dust emission from soil excavations, earthworks and earth moving activities	▪ Application of water on dusty areas. ▪ Minimize stockpiling of excavated soils within the construction site by immediate removal and transportation to dumping site.	Contractor monitored by Supervision Consultant's Environmental Expert	To be provided m the BOQ for Other Items

Effects/Impacts	Mitigation/Enhancement Measures	Responsibility	Cost Estimates
B2. Creation air pollution due to dust emission along access roads during transportation of construction materials from borrow pits /quarry sites.	▪ Application of water within cultivated farms and human settlement areas. ▪ Whenever, possible select transportation route to avoid densely populated and cultivated areas.	Contractor monitored by Supervision Consultant's Environmental Expert	To be provided m the BOQ for Other Items
B3. Creation of noise nuisance to the adjacent local residents due to operation of mobile construction equipment /machinery.	▪ Limiting noisy construction activities only to day time hours. ▪ Prohibit the use of old equipment / machinery which produce high noise levels and ensure noise emission from heavy trucks and mobile construction equipment do not exceed 75 dB, in accordance with Tanzania Noise Emission Standards[105]. ▪ Ensure exhausts of heavy trucks and mobile equipment /machinery are fitted with noise reducing mufflers. ▪ Provide ear protection muffs to construction workers operating high pitch noise creating equipment /machinery. ▪ Carry out regular maintenance of vehicles and mobile equipment / machinery.	Contractor monitored by Supervision Consultant's Environmental Expert	
B4. Creation of vibration effects on adjacent building structures due to soil compaction along the construction road.	▪ Inform adjacent residents that they should expect ground vibrations. ▪ Conduct inventory of existing crack on adjacent buildings before commencement of compaction works.	Contractor monitored by Supervision Consultant's Environmental Expert and Social/Gender Expert	Not Applicable (NA)
B5. Creation of noise nuisance to adjacent local residents due to movement of heavy trucks along access roads to borrow pits/quarry sites.	▪ Limiting transportation of construction materials only to daytime hours. ▪ Whenever, possible avoid passing through human settlement areas.	Contractor monitored by Supervision Consultant's Environmental Expert	NA
B6. Creation of ground and surface water pollution due to uncontrolled overflow of raw	▪ Carry out regular emptying of soak pits and maintenance of sewage chambers to prevent overflow of raw sewage into the environment.	Contractor monitored by Supervision Consultant's Environmental Expert	To be provided m the BOQ for Other Items

[105] The Environmental Management (Standards for the Control of Noise and Vibrations Pollution) Regulations (2010). The Government Notice No. 32. Published on 30/01/2015.

Effects/Impacts	Mitigation/Enhancement Measures	Responsibility	Cost Estimates
sewage into the surrounding environment.	▪ All discharged wastewater from sewage treatment plant must not exceed Tanzania Effluent Discharge Standards[106].		
B7. Creation of landscape degradation due to water flow from storm water drainages.	▪ Ensure proper design of roadside storm water drainages to ensure there is no concentration of storm water flow on adjacent lands.	Contractor monitored by Supervision Consultant's Environmental Expert	To be provided m the BOQ for Other Items
B8. Loss of aesthetic value of the surrounding environment due to accumulation of excavated soil materials and construction solid wastes.	▪ All stockpiled soil materials and construction related solid wastes must be immediately removed and transported to the permitted dumping site. ▪ Useful soil materials can be retained, but properly stockpiled for landscaping purpose.	Contractor monitored by Supervision Consultant's Environmental Expert	To be provided m the BOQ for Other Items
B9. Loss of aesthetic value of the surrounding environment due to accidental spillage of waste oils from storage containers.	▪ Ensure all waste oil containers are stored in concrete paved area with bund wall to prevent spilled oil from escaping into the surrounding environment. ▪ Always take precautions to prevent spillage of waste oil into the surrounding environment.	Contractor monitored by Supervision Consultant's Environmental Expert	To be provided m the BOQ for Other Items
B10. Increased transmission of HIV/AIDS and STIs due to social interaction between construction workers and local residents.	▪ Formulation and implementation of HIV/AIDS prevention and control programme. ▪ Giving employment priority to local people to minimize the number of new comers, hence minimizing the likelihood of new HIV transmission. ▪ Collaboration with local NGOs/CBOs dealing with HIV/AIDS to promote awareness and education campaigns.	Contractor monitored by Supervision Consultant's Environmental Expert and Social/Gender Expert	50,000,000.00
B11. Increased risk of Covid-19 transmission due to induced influx of people into the BRT project sites.	▪ The Contractor will take necessary precautions as stipulated in the ESF/Safeguards Interim Note: Covid-19 Consideration in Construction/Civil Works Projects. These include: - Checking and recording temperatures of workers and other people entering the site or requiring self-reporting prior to or on entering the site.	Contractor monitored by Supervision Consultant's Environmental Expert and Social/Gender Expert	50,000,000.00

[106] United Republic of Tanzania. Environmental Management (Water Quality Standards) Regulations (2007). FIRST SCHEDULE (Made Under Regulation 8).

Effects/Impacts	Mitigation/Enhancement Measures	Responsibility	Cost Estimates
	- Providing daily briefings to workers prior to commencing work, focusing on COVID-19 specific considerations including cough etiquette, hand hygiene and distancing measures, using demonstrations and participatory methods. - Preventing a worker from an affected area or who has been in contact with an infected person from returning to the site for 14 days or (if that is not possible) isolating such worker for 14 days. - Preventing a sick worker from entering the site, referring them to local health facilities if necessary or requiring them to isolate at home for 14 days. - Provision of hand sanitizers, hand washing basins and soap at the entry gate. - Stakeholder consultations will be carried out before commencement of construction works to create awareness among the local residents on prevention and control of Covid-19.		
B12. Creation of occupational health and safety risk due to handling of hazardous construction materials.	▪ Provision of Personal Protection Equipment (PPE) to construction workers such as dust masks, ear plugs, safety boots, etc. ▪ Formulation and implementation of Health and Safety Management Plan (HSMP).	Contractor monitored by Supervision Consultant's Environmental Expert and Social/Gender Expert	50,000,000.00
B13. Creation of risk of exposure to hand-arm injury due to operation of handheld vibrating construction equipment.	▪ Provision of appropriate gloves to the construction workers. ▪ Avoid prolonged use of hand-held equipment by workers beyond the prescribed 8 hours in accordance with Tanzania Standards[107].	Contractor monitored by Supervision Consultant's Environmental Expert and Social/Gender Expert	Covered under Item B13.

[107]United Republic of Tanzania. Environmental Management (Standards for Control of Noise and Vibration Pollution) Regulations (2008). THIRD SCHEDULE (Made Under Regulation 15(1)).

Effects/Impacts	Mitigation/Enhancement Measures	Responsibility	Cost Estimates
B14. Creation of construction related risk of accidents due to operation of mobile construction equipment/machinery.	▪ Fitting all mobile construction equipment / machinery and trucks with alarm and signal device to warn people, especially during backward movement. ▪ Placing written warning signs at strategic locations to prohibit or prevent entrance of unauthorized persons into the construction site. ▪ Restrict operation of mobile construction machinery / equipment to trained personnel only. ▪ Fencing the construction site to prevent people from entering the construction site. This will include putting a written warning in both English and Kiswahili at a strategic location to prevent unauthorized people from entering the construction site.	Contractor monitored by Supervision Consultant's Environmental Expert and Social/Gender Expert	To be provided m the BOQ for Other Items
B15. Creation of safety risk to pedestrians and other road users due to deep excavations along the road section.	▪ All excavated pits or trenches must be surrounded by safety nets to prevent people from falling into open pits or trenches.	Contractor monitored by Supervision Consultant's Environmental Expert and Social/Gender Expert	To be provided m the BOQ for Other Items
B16. Increased risk of traffic accidents due to movement of heavy trucks to and from the construction sites.	▪ Develop and implement traffic management plan. This includes deploying flag persons to guide traffic movement along the road. The involvement of traffic police may be useful, whenever possible.	Contractor monitored by Supervision Consultant's Environmental Expert and Social/Gender Expert	To be provided m the BOQ for Other Items
B17. Risk of emergence of Gender-Based Violence and Sexual Exploitation and Abuse due to influx of people into the BRT project sites.	▪ Ensuring there are codes of conduct in place that forbid and place penalties for Gender-Based Violence and Sexual Exploitation and Abuse. ▪ Ensure a Code of Conduct (CoC) is signed and understood by all project workers. This will include the provision of training and information regarding Worker Code of Conduct in Kiswahili. ▪ Disseminating information that raises awareness on the prohibition of GBV and SEA among the workers, fish market community members and general public and	Contractor monitored by Supervision Consultant's Environmental Expert and Social/Gender Expert	50,000,000.00

Effects/Impacts	Mitigation/Enhancement Measures	Responsibility	Cost Estimates
	disseminate information that promotes good and respectful relationships between workers and the fish market community members. ▪ As a prevention measure, the contractor will be required to develop a code of conduct of GBV that will be attached to the ESMP and signed by all workers. An example of Code of Conduct for EH&S and GBV. ▪ Contractor will engage a qualified NGO to carry out awareness raising campaign against GBV and SEA on monthly basis during the construction phase. ▪ Provision of cultural sensitization training for workers regarding engagement with local community. ▪ Stakeholder consultation on GBV/SEA and SH and EH&S issues will be carried out with adjacent local residents, including Ferry Fish Market Users, before commencement of construction works. ▪ Grievances Redress Mechanism will be in place to deal with any conflicts between the construction workers and adjacent local residents.		
B18. Increased income generation opportunities for local people due to increased demand for food and other items from construction workers.	▪ Provide enabling environment for food vendors to sell their food in a clean and hygienic environment by providing shelter and water supply.	Contractor monitored by Supervision Consultant's Environmental Expert and Social/Gender Expert	NA
B19. Severance of access by local residents to other side of the road due to excavation of road bed and roadside storm water drainages.	▪ Provision of temporary access for pedestrians and non-motorized transport users.	Contractor monitored by Supervision Consultant's Environmental Expert and Social/Gender Expert.	To be provided m the BOQ for Other Items
B20. Disruption of public transport and pedestrian movement due to construction of BRT	▪ Provision of temporary bus stops and pedestrian crossings.	Contractor monitored by Supervision Consultant's Environmental Expert.	To be provided m the BOQ for Other Items

Effects/Impacts	Mitigation/Enhancement Measures	Responsibility	Cost Estimates
road and drainage structures.	▪ Provision of traffic management plan through jointly discussion between DART, TANROADS, Transport Operators, Municipal Councils and LATRA ▪ Installation of temporary traffic and lights.		
B21. Disruption of traffic flow along the construction roads due to construction of BRT road and drainage structures.	▪ Formulation of traffic management plan. This includes: ▪ Diverting all traffic to the right and left side lanes. ▪ Deployment of flag persons to guide movement of vehicles. ▪ Installation of speed limit signs and diversion signs.	Contractor monitored by Supervision Consultant's Environmental Expert.	
B22. Creation of damage on existing local roads due to overloading by heavy trucks.	▪ Ensure that any damaged local roads are immediately repaired to make them passable throughout the construction period.	Contractor supervised by monitored by Supervision Consultant's Environmental Expert.	
C. Demobilization Phase	▪		
C1. Loss of temporary employment due to retrenchment of construction workers after project completion.	▪ Give employment priority to local people, because after project closure they will easily revert back to their normal economic activities. ▪ Ensure that all construction workers are registered with social security funds and are paid their terminal benefits immediately before retrenchment from jobs.	Contractor monitored by Supervision Consultant's Environmental Expert and Social/Gender Expert	To be provided m the BOQ for Other Items
D. Operation Phase	▪		
D1. Reduced emission of air pollutants and greenhouse gas due to operation of BRT roads after construction.	▪ Enforcement of law to ensure that the BRT lane is used exclusively by DART Buses. ▪ Awareness creation among the road users to avoid using the BRT lanes. ▪ Carrying out periodic maintenance of the road pavement.	DART Agency in collaboration with Traffic Department.	To be provided m the BOQ for Other Items
D2. Reduced road traffic accidents due to operation of BRT roads after construction.	▪ DART Agency in collaboration with Traffic Department will promote education, awareness creation and enforcement of rules and regulations to prevent unauthorized vehicles from using the BRT lanes.	DART Agency in collaboration with Traffic Department.	NA
D3. Reduced travel time and increased productivity due to	▪ DART Agency will create awareness among the local residents and public to emphasize on the use of BRT transport system.	DART Agency in collaboration with LGAs.	NA

Effects/Impacts	Mitigation/Enhancement Measures	Responsibility	Cost Estimates
operation of BRT roads after construction.			
D4. Emergence of conflicting or incompatible activities with BRT operations due to influx of people into the BRT project sites.	▪ DART Agency in collaboration with LAGs will allocate areas for small business operators to prevent conflict with BRT infrastructure.	Ilala and Kinondoni Municipal Councils in collaboration with Ward and Village Government Leaders.	NA
D5. Increased environmental degradation due to inadequate or lack of solid wastes disposal and sanitary facilities.	▪ DART Agency in collaboration with LGAs will ensure provision of solid wastes disposal containers and introduction of toll-toilets or pay toilets managed by private operators.	DART Agency in collaboration with LGAs	NA
D6. Rapid deterioration of road pavement and bridge structures due to climate change effects like temperature changes and flood events	▪ TANROADS will ensure that the road design takes into consideration the climate change factors. These include selection of pavement materials that are adapted to climate changed effects such as temperature variations, and provision of drainage structures that could cope with flood events.	TANROADS	To be provided m the BOQ for Other Items

10.0 ENVIRONMENTAL AND SOCIAL MONITORING PLAN

10.1 Implementation of Monitoring Plan

The information collected during monitoring exercise helps to improve ESMP by adapting measures to ensure that the anticipated impacts are mitigated. For example, in case environmental monitoring identifies some environmental concerns during construction or operation phase then construction or operation works has to be modified or stopped, whenever necessary.

Thus, the objectives of environmental monitoring programme are:

- To ensure that mitigation and benefit enhancement measures have been adopted and are effective.
- To identify any unforeseen negative impacts during EIA stage and propose appropriate mitigation measures.
- To provide information on the actual nature and extent of key impacts and effectiveness of mitigation and benefit enhancement measures, which through feedback mechanism can improve the planning and execution of future, similar projects.

The ESMP monitoring schedule as summarized in **Table 10-1** addresses the following questions:

- WHAT parameter to be monitored? (Monitoring Parameters)
- WHY is the parameter being monitored? (Monitoring Objective)
- WHAT indicator to be used in monitoring? (Monitoring Indicators)
- WHERE to be monitored? (Monitoring Location).
- HOW is to be monitored? (Monitoring Methods).
- HOW frequent is to be monitored? (Monitoring Frequency)
- WHAT is the monitoring targets or standards? (Performance Standards)
- WHO is responsible for monitoring? (Monitoring Responsibility)

The ESMP monitoring during construction phase will be comprised of two activities:

- Review of Contractor's plans, methods statement, and temporary works design and arrangements to ensure that environmental protection measures specified in the contract documents are adopted and Contractor's proposals provide acceptable levels of impact control.
- Systematic observation of all site activities and the Contractor's offsite facilities, including borrow pits and quarry sites areas. To ensure that the contract requirements relating to environmental matters are being complied with and that mitigation measures for those unforeseen impacts are formulated and implemented by the contractor.

The monitoring activities will be comprised of visual observation during site inspection and will be carried out at the same time as the engineering supervision activities. Site inspections will take place with emphasis on early identification of any environmental problems and the initiation of suitable remedial action. Where remedial actions have been required on the part of the Contractor, further checks will need to be made to ensure that these are actually being implemented to the agreed schedule and in the required form.

All sites where construction is taking place will be formally inspected from an environmental view point on a regular basis. However, in addition to visual observation there shall be informal questioning of members of the local communities and their leaders who live near the project. This is because they may be aware of matters which are unsatisfactory but may not be readily apparent or recognized during normal site inspection visits.

The monitoring plan will also be integrated with other construction supervision and carried out by the Resident Engineer. The Resident Engineer will decide on the appropriate course of action to be taken in cases where unsatisfactory reports are received from the field staff regarding environmental matters. In case of relatively minor matters, advice to the Contractor on the need for remedial action may suffice, but in all serious cases, the Resident Engineer will issue a formal instruction to the Contractor to take remedial action, depending on the extent of delegated powers.

10.2 Monitoring and Reporting Responsibilities

10.2.1 Supervision Consultant

The Supervision Consultant will appoint an Environmental Specialist and Social /Gender Specialist who shall be responsible for Environmental and Social Compliance Monitoring. The Supervision Consultant's Environmental Specialist and Social / Gender Specialist shall be making a daily site inspection and shall be attending Engineer's Site Meetings.

The participation of Environmental Specialist and Social /Gender Specialist in the Engineer's Site Meetings shall enable the Environmental Specialist and Social /Gender Specialist to:

- Review the status of any problem addressed in the previous meeting; propose additional mitigation measures, if the problem has not been resolved.

- Review the main construction activities and any environmental problem that occurred since the last meeting.

- Review the construction activities and general environmental performance as listed in the ESMP.

The Environmental Specialist and Social/Gender Specialist shall be preparing Monthly Environmental and Social Monitoring Reports which will highlight:

- The extent to which the Contractor is complying with the environmental and social specifications and contract conditions (compliance monitoring).

- Any unforeseen environmental and social impacts (i.e., the failure or inadequacy of the mitigation measures) and recommendations on how to manage unforeseen impacts.

In addition, the Chief Executive Officer of TANROADS shall deploy an Environmental Officer and Social/Gender Officer who shall be collaborating with the Supervision Consultant's Environmental Specialist and Social /Gender Specialist to oversee implementation of ESMP. The Environmental Officer and Social/Gender Officer apart from making a close follow-up on engineering issues shall be responsible for environmental and social monitoring on monthly basis.

There must be feedback from monitoring to ensure that failure to implement an approved measure incurs a penalty to the Contractor. The Resident Engineer's responsibility will include enforcement of mitigation measures. In case an approved measure turns out to be ineffective or results into unforeseen adverse impacts it should be reported to the Chief Executive Officer of TANROADS through the Regional Manager's Office, which would be capable of finding out why, and of commissioning appropriate further measures.

10.2.2 Contractor

The Contractor will be responsible for implementation of environmental and social mitigation measures under the supervision of Resident Engineer. This is to ensure that technical and environmental clauses are followed and well implemented by the Contractor.

The Contractor shall assign an Environmental Manager who shall be responsible for carrying out monitoring on daily basis and overseeing compliance with environmental and social mitigation measures. The Contractor's Environmental Manager will be assisted by EHSO and Social/Gender Specialist.

The Contractor's Environmental Manager shall submit a Monthly Environmental, Social, Health, and Safety (ESH&S) Compliance report to the Resident Engineer specifying that:

- All previously notified failures to comply with the mitigation measures have been rectified.

- All newly notified requirements have been fulfilled and all standard requirements (as specified in this report) have been put into effect.

The Resident Engineer shall countersign the report and make it available to the TANROADS and World Bank. TANROADS in turn should pass a copy to the three Municipalities, namely Ilala, Kinondoni, and Ubungo Municipal Councils within a reasonable period not exceeding 30 days from receipt.

10.2.3 Monitoring Methods

The purpose of monitoring is to ensure that the Contractor implements the outlined mitigation measures in the ESMP. Therefore, monitoring methods will be based mainly on visual inspection and will be carried out by the Supervision Consultant's Environmental Specialist and Social/Gender Specialists in collaboration with Contractor's Environmental Manager assisted by Environmental, Health and Safety Officer (EHSO) and Social/Gender Specialist on daily basis.

To verify environmental effects predictions, and to evaluate the effectiveness of mitigation measures committed during the ESMP preparation, it is necessary to collect baseline data before the commencement of the construction works that may result in changes to the environment. The purpose of baseline data collection is to update the baseline information and establish the existing conditions at the construction sites.

Establishing baseline conditions allows for a comparison with conditions before and after construction works to determine the extent of any project-related environmental effects, the need for additional mitigation measures, and/or to confirm the effectiveness of mitigation measures that have been or are being implemented.

In case any environmentally and socially sensitive issues have been identified during baseline monitoring and not covered during the ESMP preparation, adaptive measures and additional monitoring or mitigation will be developed and implemented as may be necessary.

10.3 Environmental and Social Monitoring Costs

The cost of environmental and social monitoring will be included in the cost of Construction Supervision. The Supervision Consultant will be responsible for the cost of environmental and social monitoring. These costs include payment of professional fees for Environmental Specialist and Social/Gender Specialist. However, these costs will be included in the overall costs of commissioning the Supervision Consultant.

Table 10-1: ESMP Monitoring Schedule.

Monitoring Parameters	Monitoring Objective	Monitoring Indicators	Monitoring Locations	Monitoring Methods	Monitoring Frequency	Performance Indicators	Monitoring Responsibility
1. Mobilization Phase							
1.1 Compensation of PAPs.	To ensure all PAPs have been fairly and promptly compensated before land acquisition.	Number of compensated PAPs.	Proposed BRT Depots	RAP Report	Once before construction works	All PAPs have been fairly and promptly compensated	TANROADS in collaboration with LGAs monitored by Supervision Consultant's Social / Gender Specialist.
1.2 Relocation of public infrastructure / utilities.	To ensure all infrastructure / utilities have been relocated and restored within 24 hours before construction works.	Presence of infrastructure /utilities at the construction site.	Along the road sections, and proposed sites for depots, car park and terminals.	Visual inspection	Once before construction works.	All infrastructure/ utilities have been relocated and restored within 24 hours. No complaints from the public regarding disruption of services.	Contractor in collaboration with Utility / Infrastructure Authorities monitored by Supervision Consultant's Environmental Specialist and Social/Gender Specialist.
1.3 Access of local people to employment in the project area	To ensure employment priority is given to local people. To ensure equal employment opportunity without gender and/or racial discrimination. To ensure Contractor is providing	Number of local people employed in the project by gender.	Contractor's Office	Interview with local people. Sample of Employmen t Contract.	Continues throughout construction period.	Employment priority is being given to the local people. Number of reported aces of gender or racial discrimination. Employment contracts are in accordance with labour laws.	Supervision Consultant's Social/Gender Specialist

Monitoring Parameters	Monitoring Objective	Monitoring Indicators	Monitoring Locations	Monitoring Methods	Monitoring Frequency	Performance Indicators	Monitoring Responsibility
	employment contracts in accordance with the labour laws.						
1.4 Removal of Scared Baobab Tree from the median of the road.	To ensure that the Contractor follows proper procedure before removal of Baobab Tree.	Presence of Baobab Tree.	Along New Bagamoyo Road at km 3+800.	Visual inspection.	Once before construction works.	Contractor has followed all procedures before removal of the Sacred Baobab Tree.	Contractor in collaboration with Local residents and monitored by Supervision Consultant's Social /Gender Specialist.
1.5 Destruction of archaeological artefacts due to land excavation during preparation of BRT construction sites.	To ensure that the prescribed chance find procedures are followed during discovery of archaeological artefacts.	Presence of archaeological artefacts.	Along the road sections, and proposed sites for depots, car park and terminals.	Visual inspection.	Continuous during construction.	Chance find procedures has been followed during discovery of archaeological Artefacts.	Contractor monitored by Supervision Consultant's Environmental Specialist and Social/Gender Specialist
1.6 Submission of C-ESMP, HSMP and HIV/AIDS Programme.	To ensure compliance with EH&S issues by Contractor.	Submitted C-ESMP, HSMP, HIV/AIDS programme.	Based on submission of the documents to the Engineer.	Review of C-ESMP and HSMP documents.	Before construction works.	C-ESMP, HSMP and HIV/AIDs Programme has been approved and being implemented.	Supervision Consultant's Environmental Specialist in collaboration with Social/Gender Specialist
1.7 Submission of Contractor's Site Plan	To ensure compatibility of the site plan with local land use plan.	Submitted Contractor's Site Plan	Based on submission of Site Plan	Visual inspection.	Before commencement of construction works.	Location of office/camp site and materials/equipment storage yard is compatible with local land use plan.	Supervision Consultant's Site Engineer.

Monitoring Parameters	Monitoring Objective	Monitoring Indicators	Monitoring Locations	Monitoring Methods	Monitoring Frequency	Performance Indicators	Monitoring Responsibility
						Office / camp site is equipped with all support facilities.	
2. Construction Phase							
2.1 Dust and smoke emission around the project site.	To minimize impacts of air pollution from dust and exhaust emission.	Intensity of visible dust and smoke	Construction sites.	Visual inspection.	Daily, throughout construction period.	The contractor is regularly applying water on dusty areas. There is no visible smoke emission from vehicles and mobile equipment/machinery. The stockpiled dusty materials storage area has been fenced to prevent wind action. All trucks hauling dusty construction materials are always covered with tarpaulins.	Supervision Consultant's Environmental Specialist in collaboration with Social/Gender Specialist
2.2 Noise nuisance and vibration effects.	To minimize noise impacts from construction activities and transportation of materials along access roads to	Noise and Vibration Levels	At the construction sites and along access roads to borrow pits / quarry sites.	Audible noise.	Daily during construction and transportation of materials.	No complaints from adjacent local residents regarding noise nuisance.	Supervision Consultant's Environmental Specialist in collaboration with Social/Gender Specialist

Monitoring Parameters	Monitoring Objective	Monitoring Indicators	Monitoring Locations	Monitoring Methods	Monitoring Frequency	Performance Indicators	Monitoring Responsibility
	borrow pits /quarry sites.						
2.3 Construction related accidents.	To minimize risk of construction accidents.	Presence of risk factors.	Construction site	Incidents Report Forms. Monthly EH&S Compliance Reports.	Daily, throughout the construction period.	Number of reported cases of construction-related accidents. The construction site has been fenced by using a corrugated iron sheet. There is a written warning signboard in Kiswahili and English Languages. All trucks and mobile equipment have been fitted with wring signal devices and audible warning alarms.	Supervision Consultant's Environmental Specialist
2.4 Accumulation of demolition wastes and other solid wastes.	To minimize impacts due to accumulation of demolition / solid wastes.	Presence of demolition / solid wastes in the surrounding environment.	Construction sites	Visual inspection.	Continues throughout construction period.	No accumulation of demolition wastes around the site. All solid wastes are being collected and transported to the municipal dumping site.	Supervision Consultant's Environmental Specialist

Monitoring Parameters	Monitoring Objective	Monitoring Indicators	Monitoring Locations	Monitoring Methods	Monitoring Frequency	Performance Indicators	Monitoring Responsibility
2.5 Health and Safety of Construction workers.	To minimize occupational occupations health and safety risks.	Number of toolbox sessions. Number of workers provided with and using appropriate PPE. Presence of approved Health & Safety Management Plan (HSMP)."	Construction sites	Visual inspection. An informal interview with workers. Monthly ESH&S Compliance Reports.	Daily, throughout construction period.	Number of reported incidences of occupational diseases and accidents.	Supervision Consultant's Environmental Specialist in collaboration with Social/Gender Specialist
2.6 Implementation of HIV/AIDs Prevention and Control Programme.	To minimize risk of HIV transmission.	Number of HIV/AIDS campaigns and training sessions. Number of participants by gender.	Based on submission of HIV/AIDS reports	Monthly HIV/AIDS Campaign Reports.	Monthly	Number of reported cases of new HIV transmission as indicated by Voluntary Clinical Testes (VCTs) HIV//AIDS program is in place and being implemented on a regular basis.	Supervision Consultant's Social/Gender Specialist in collaboration with Contractor's Social /Gender Specialist.
2.7 Workers Welfare[108] and Child labour.	To ensure compliance with labour laws.	Monthly Salary Slips;	Based on submission of Monthly Compliance Reports.	Monthly ESH&S Compliance Reports	Monthly	Number of reported complaints regarding minimum wages.	Supervision Consultant's Environmental Specialist in collaboration with

[108] (1) Payment of Minimum Wage (2) NSSF and WCF Contributions by the Contractor (3/ Deductions from payment of wages to be made as allowed by national law (project workers to be informed of the conditions under which such deductions will be made). (4) Project workers to be provided with adequate periods of rest per week, annual holiday, and sick, maternity and family leave, as required by national law.

Monitoring Parameters	Monitoring Objective	Monitoring Indicators	Monitoring Locations	Monitoring Methods	Monitoring Frequency	Performance Indicators	Monitoring Responsibility
		NSSF Monthly Payment Receipts. WCF Monthly Payment Receipts				Reported cases of non-payment of Monthly NSSF and WCF contributions.	Social/Gender Specialist
2.8 Movement of heavy trucks to and from the construction site.	To minimize risk of traffic accidents.	Incidence of traffic accidents. Number of awareness sessions organized on road traffic safety for workers and fish market community members.	Access road to the Construction sites.	Visual inspection	Daily, during Construction period.	Number of reported cases of traffic accidents. The traffic management plan is in place and being implemented by the Contractor. Flag person has been deployed to guide movement heavy trucks to and from the construction site.	
2.9 Incidence of GBV, SEA, and SH	To prevent incidence of GBV/SEA and SH.	Number of awareness sessions.	Office/Camp Site and Construction sites.	Verification of awareness sessions organized with workers Verification of consultations with and involvement of local	After every 15 days	Number of workers who participated in awareness sessions by gender. Consistent and regular involvement of local community members	Supervision Consultant's Social/Gender Specialist in collaboration with Contractor's Social/Gender Specialist

Monitoring Parameters	Monitoring Objective	Monitoring Indicators	Monitoring Locations	Monitoring Methods	Monitoring Frequency	Performance Indicators	Monitoring Responsibility
				communities			
2.10 Mangrove vegetation construction across Msimbazi Creek.	To avoid or minimize destruction of mangrove vegetation.	Number of destroyed mangrove trees during construction.	Selander Bridge Site.	Visual inspection	Continuous during construction.	Very few or no destruction of mangrove vegetation. Construction works is being confined within the permitted area. All stockpiled excavated soils must be immediately removed from the construction site and transported to the permitted dumping site.	Supervision Consultant's Environmental Specialist.
3. Demobilization Phase							
3.1 Retrenchment of workers during project completion.	To ensure NSSF contributions and terminal benefits have been paid to all retrenched workers.	Number of retrenched workers	Contractor's and Engineer's Office	Monthly Compliance Site Closure Report	Once, during project completion.	Ensure that 100% of no skilled workers are hired in the project area	Supervision Consultant's Social/Gender Specialist in collaboration with Contractor's Social/Gender Specialist
3.2 Site restoration and clean up or removal of excess construction materials.	To ensure the site is restored to its original condition.	Presence of excess construction materials.	Construction site	Visual inspection	Once, during completion of construction works.	All demolition and solid wastes have been removed from the construction site.	Supervision Consultant's Environmental Specialist.

Monitoring Parameters	Monitoring Objective	Monitoring Indicators	Monitoring Locations	Monitoring Methods	Monitoring Frequency	Performance Indicators	Monitoring Responsibility
3.3 Climate change factors such as temperatures, rainfalls,	To ensure protection of road pavement and drainage structures against climate change effects.	Temperatures and rainfalls	Meteorological Stations	Visual inspection	Annually	Road infrastructure is able to achieve its deign life of 20 years for bituminous pavement and 40 years for concrete pavement.	TANROADS in collaboration with Tanzania Meteorological Authority (TMA)

11.0 RESOURCE EVALUATION OR COST BENEFIT ANALYSIS

11.1 Project Costs and Benefits

11.1.1 Project Costs

The project cost has been estimated to be TZS 225,019,713,710 (225 billion). This cost excludes the cost of operation and maintenance as well as cost of implementation of Environmental and Social Management Plan (ESMP) and Monitoring Plan (MP).

11.1.2 Project Benefits

The project is expected to have both short-term and long-term environmental and socio-economic benefits to the local community and the nation.

11.1.2.1 Short-term Benefits

The short-term socio-economic benefits include creation of temporary employment and increased income generation opportunities to the local people. It is expected that during construction employment priority will be given to the local people.

During construction some local people, especially women will get opportunity to increase their income by selling food items to the construction workers. This benefit will be enhanced by providing water supply and sanitary facilities to enable them sell their food in clean and hygienic environment, hence preventing transmission of hygiene related disseises like cholera and diarrhoea to the construction workers.

11.1.2.2 Long-term Benefits

The long-term environmental and socio-economic benefits will be realized from rehabilitation of the road section into bitumen standard. The long-term environmental and socio-economic benefits include:

- Increased productivity and stimulation of economic growth.
- Employment creation and economic improvement of households.
- Increased Revenue Collection by Local and Central Government.
- Creation of employment and income generation opportunities
- Reduced Transportation Costs and Improved Access to Social Services.
- Reduced risk of traffic accidents and improved environmental quality.
- Increased comfortability of passengers.

The environmental and socio-economic benefits accrued form the BRT project are very significant although some of them cannot be easily quantified in financial terms. However, some research has been carried out to evaluate the economic impacts of BRT transport in the Dar Es Salaam City[109]. For example, the BRT Phase 1 was hypothesized to increase employment rates, household income and consumption of households living along the BRT Phase 1 due to reduced travel time to other parts of the city, hence increasing access to markets.

It was hypothesized that the introduction of a BRT is expected to:

- reduce commuter travel times and urban congestion positively affecting a range of economic, social and environmental indicators.
- a location closer to the BRT line is expected to increase the share of the labour market reached by job seekers improving the quality of the skill match between jobs and workers resulting in higher productivity.
- consumers living in areas close to the BRT line are expected to access more variety of goods, making the area a more desirable place to live, and reducing the time spent in daily chores.

[109] Evaluating the impacts of the Dar Es Salaam Bus Rapid Transit System. March 2020. By Melanie Morten, Gharad Bryan, Bilal Siddiqi, and Clare Balboni. International Initiative from Impact Evaluation.

- more people will be able to access firms located close to the BRT increasing potential demand for their goods and services. This is expected to lead to an increase in the number of firms in the area.

Therefore, overall, the above forces are expected to lead to an increase in land prices, transformation of land use, and changes in the socio-economic make-up of the population living in the area. The effects are expected to be stronger in locations closer to the BRT line and but can potentially change the make-up of the city in the long-term as firms and households move around

However, the analysis indicated the reductions in travel time in Dar Es Salaam, were not followed by positive impacts on income or consumption of households. However, that did not mean the BRT is not a viable transport solution for Dar ES Salaam. In order to capture a full economic accounting of the effects of the BRT it is necessary to account for the general equilibrium forces, such as improvements in road safety or reductions in air pollution.

Another observation is that the extent of the impact of the BRT depends on its operational performance, such as increasing the number of BRT buses and feeder routes, which could potentially connect more households to the BRT, improving key outcomes like income and employment. Also, the complementary urban regulation changes that promote density along the BRT corridor can increase the share of business and households that benefit from better connectivity (e.g., by reducing the plot size).

11.2 Environmental Costs

11.2.1 Direct Environmental Costs

The cost of environmental mitigation measures as shown in **Table 11-1** is considered to be the direct environmental[110] cost to be incurred by the project. The cost of environmental mitigation measures is considered to be the environmental cost to be incurred due to implementation of mitigation measures for this project, which is estimated to be TZS 14,254,744,900.00.

Table 11-1: Direct Environmental Cost Estimates.

Particulars of Cost Items	Amount (TZS)
(a) Compensation of PAPs due to Land Acquisition	42,114,182,400.00
(b) GBV/SEA Awareness Programme	50,000,000.00
(c) Prevention and Control of COVID-19	50,000,000.00
(d) HIV/AIDS Prevention and Control Programme	50,000.000.00
(e) Environmental, Health and Safety Management Plan	50,000,000.00
Total 1:	**42,264,182,400.00**
Add 10% Contingency:	4,226,418,240.00
Total 2:	**46,490,600,640.00**

11.2.2 Indirect Environmental Cost

The indirect environmental cost as shown in **Table 11-2** includes the cost of Cost of Project Registration to NEMC; Cost of undertaking ESIA Study by Consultant; Publication of Scoping Report and ESIA Report; Review of ESIA Report by NEMC; Engagement of Environmental Monitoring Consultant[111]. This makes the estimated indirect environmental cost to be TZS 502,200,000.00.

Table 11-2: Indirect Environmental Cost Estimates.

[110]The term “environmental” in this report also means “social” and “cultural”, unless otherwise specified.
[111] Guide to Estimating Environmental Costs. Prepared By: ICF International, Venner Consulting, CH2M Hill and the University of Florida. October 2008.

Costed Items	Cost Estimates (in TZS)
(a) Cost of Project Registration to NEMC	200,000.00
(b) Cost of undertaking ESIA and RAP Study by Consultant	90,000,000.00
(c) Publication of Scoping Report, ESIA Report and RAP Report	2,000,000.00
(d) Review of ESIA Report by NEMC	50,000,000.00
(e) Engagement of Environmental Monitoring Consultant	360,000,000.00
Total:	502,200,000.00

11.3 Determination of Benefit/Cost Ratio

The resource evaluation or cost benefits analysis focuses on comparing the project costs and environmental costs. The environmental costs include direct and indirect environmental costs, which makes the total environmental cost for this project to be TZS 46,992,800,640.00, and the total project costs to be TZS 225,641,713,710.00, after including the overall environmental costs.

When compared with total project costs (TZS 225,641,713,710.00), the overall environmental cost is about 19.6% of the total project costs. It can be concluded that the environmental costs are significantly small and can be tolerated for this project.

The benefit/cost ratio is a good indicator of project viability from economic, environmental, and social point of view. The benefits are the result of benefits obtained due to project implementation during operation, and has been considered to have a Net Present Value (NPV) of TZS 477.8 billion at 12% discount rate[112].

The Benefit/Cost Ratio before including environmental costs is calculated by dividing the Project Benefits (TZS 477,800,000,000.00) by Project Costs (TZS 225,641,713,710.00), which is equal to 2.1175.

When project costs (TZS 225,019,713,710) and environmental costs (TZS 46,992,800,640.00) are combined, the overall project costs become TZS 286,267,259,250.00. Therefore, the Benefit/Cost (B/C) Ratio can be calculated by dividing the Project Benefits (TZS 477,800,000,000) by Overall Project Costs (TZS 286,267,259,250.00), which is equal to 1.66. It can be noted that there is no significant difference in Benefit/Cost Ratio before and after incorporating environmental costs. This indicates the environmental costs are negligible or very small and do not have any significant effects on the project costs. Since the Benefit/Ratio is greater than 1 the project should be considered to be economically viable, and therefore it should be implemented without delay.

[112] INTERNATIONAL DEVELOPMENT ASSOCIATION PROJECT APPRAISAL DOCUMENT ON A PROPOSED CREDIT IN THE AMOUNT OF SDR 316.2 MILLION (US$425 MILLION EQUIVALENT) TO THE UNITED REPUBLIC OF TANZANIA FOR A DAR ES SALAAM URBAN TRANSPORT IMPROVEMENT PROJECT February 14, 2017. http://documents1.worldbank.org/curated/en/794251489201242940/pdf/TZ-PAD-02162017.pdf

12.0 DEMOBILIZATION PLAN

12.1 Implementation of Demobilization Plan

The demobilization and site reclamation process are one of the required project management activities during the project completion or closure of the projects. The demobilization activities will involve removal of all mobilized items and cleaning up of the construction sites. It will include the removal of all temporary ramps, access ways, road signs, temporary fencing, construction debris including crushed stone aggregates, pieces of wood, construction stakes, and other construction-related refuse, and temporary facilities or works. The restoration of surfaces to an equal or better than existing condition shall also be included as part of demobilization. Site reclamation includes reclamation of areas disturbed during construction, other than access and staging areas, to pre-project conditions or better.

In order to ensure that all demobilization and site reclamation works are done in a comprehensive way right from the beginning, it is important to have a demobilization checklist which shows all items that need to be completed during implementation of demobilization plan. An example of Environmental and Social Demobilization Checklist is provided in **APPENDIX 36**, which groups the different items that need to be completed and inspected. The checklist covers the following issues and areas to be considered during implementation of demonization plan:

- Workers Welfare Management
- Camp Sites and Office Facilities; Solid Waste Management; Soil Erosion and
- Sedimentation Control; Groundwater and Dewatering Contol.
- Workshops/Garages,Vehicle Washing and Refuelling Areas.
- Fuel and Chemical Storage Area
- Sanitary and Wastewater Disposal Facilities.
- Landscape Management and Run-off Control
- Borrow pits/Quarry Sites Rehabilitation.

The demobilization checklist will be used by Supervision Consultant's Environmental Specialist. For each inspection item, the form has a column for the work completion status (Yes, No or Not Applicable), observation comments made by the inspector for non-compliance works that need to be rectified by the Contractor and the target completion date for completing the non-conformant works. The Environmental Inspector will be taking some photographs during the site inspection for recording purpose. The photographs will be attached to the Environmental Demobilization Checklist and submitted to the Resident Engineer for action.

12.2 Retrenchment of Employees

Three months before completion of the project, the Contractor through Human Resource Officer (HRO) will make sure NSSF contributions for all construction workers have been paid to the NSSF. This will involve posting of the names of all employees on the notice board indicating their Names, NSSF numbers and Monthly NSSF contributions. This is to ensure that that the monthly NSSF deductions have been paid by the Contractor and allow rectification for any identified shortcomings before retrenchment of employees.

12.3 Exit Medical Examination for Employees

The Contractor will carry out an exit medical examination for all employees before retrenchment. This is the requirements of Sub-section 24(2) of the Occupational Health and Safety Act No. 5 of 2003. The legislation requires the Contractor shall carry out an exit medical examination through a qualified occupational health physician. According to Sub-section 24(3), the Contractor shall be responsible for the prescribed fee and all other medical expenses.

12.4 Restoration of Utilities, Drainage Systems and Landscape

During demobilization phase all work areas, offices, workshops /garages, and other temporary installations will be cleaned up and the site will be restored. These includes removal of temporary buildings, surplus materials, pieces of wood, pieces of bricks or any other material that is not in the area before constriction works.

All drainage systems will be desilted to allow storm water flow and damaged areas will be repaired to make them compatible with urban land use and maintain the aesthetic value of the urban environment. All permanent installations such as traffic lights, street lights, electricity power supply, water supply, and sewerage systems will be restored / repaired to their initial state.

The compacted soils around buildings will be scarified to at least 15cm deep to loosen it and facilitate vegetation growth. Damaged trees will be chopped / lopped and crosscut and removed from the construction sites. The site will be cleared of equipment, solid wastes, debris, and overburden resulting from construction works.

12.5 Restoration of Workshops / Garages and Materials Storage Areas

The workshop and other materials storage areas will be cleaned to remove petroleum products like oils and grease. The petroleum products should be handled in accordance with the provisions given in the Standard Specification for Road Works (2000).

All asphalts, cements, stockpiled gravels, and any other surplus materials will be removed from the Materials storage yard. The useable materials should be taken away and stored in a safe place far from the abandoned site. The spilled materials must be removed and the site must be properly cleaned and restored to its original state. If possible, the site must be prepared and planted with vegetation. The stockpiled soils along within the project site will be spread or disposed of into permitted area by the Resident Engineer.

12.6 Restoration of Solid Wastes and Spoil Materials Dumping Sites

All unwanted soil/spoil materials will be removed from temporary dumping sites and transported to permitted disposal site. The remaining useful soil materials will be mixed with surrounding topsoil, properly levelled, and graded to allow vegetation growth.

The solid waste dump site will be cleared, levelled, and returned to a regular form. All non-toxic wastes in the dump site will be thoroughly covered with topsoil. The Contractor will ensure that no wastes are visible and no surface water drains into the site.

The eliminated dry materials should form a stable slope and must be in harmony with the surrounding landscape. The wastes will be covered with 1 m of topsoil. The soils will be compacted thoroughly, the slope flattened and spread a layer of additional cover material and cover with topsoil to allow growth of natural vegetation.

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13.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

13.1 Summary

The project involves construction of BRT Phase 4 Infrastructure in the Dar Es Salaam City. The BRT Phase 4 Infrastructure is comprised of 30.12 km road sections, namely Bibi Titi Mohamed Road Section, which starts from Maktaba Street Junction to Ohio Street Junction (0.23km); Ali Hassan Mwinyi Road Section, which starts from Ohio Street Junction to Morocco Junction (5.92 km); New Bagamoyo Road Section, which starts from Morocco Junction to Tegeta-DAWASA Daladala Bus Station (20 km); and Sam Nujoma Road Section, which starts from New Bagamoyo Road Junction to Simu 2000 Bus Terminal (3.1 km).

In addition to the proposed road sections the project will involves construction of Bus Terminals, Feeder Bus Terminals Park and Ride Complexes, Depots and Bus Stations. The BRT Road sections will also be provided with critical intersections at the junctions between Bagamoyo Road and Kawawa Road (km 5+100)) and between Bagamoyo Road and Sam Nujoma Road (km 9+400). The critical intersections are located at intersections where turning movements of the BRT is required, the design has proposed flyovers for the said intersections. The aim is to ensure provision of good level crossing between the BRT lanes and mixed traffic lanes.

The BRT system is comprised of two-lane, two-way road dedicated to BRT buses only, that enables BRT buses to bypass peak-hour congestion with allowed speed to reach destinations faster. In addition, the BRT system caters for the needs of BRT bus users by providing safe and dedicated access to pedestrians and cyclists who form the bulk of commuter bus users. This is achieved through provision of bicycle paths and their parking areas, and walkways at the bus terminals and stations. The BRT is basically promoted as a cheaper option to Mass Rapid Transit System. All other road-based vehicles (mixed traffic) are not allowed to travel on dedicated BRT lanes. There are two lanes in each direction dedicated for mixed traffic to make a total of six lanes road i.e., three in each direction.

The BRT is being implemented jointly by Tanzania National Roads Agency (TANROADS) and Dar Rapid Transit (DART) Agency, whereby TANROADS is responsible for construction and management of BRT infrastructures, and DART Agency is responsible for BRT system operations. The DART Agency was established in May 2007 under the Executive Agencies Act No. 30 of 1997. The Agency is responsible for the establishment and operation of the Bus Rapid Transit (BRT) system for Dar Es Salaam. Specifically, DART Agency is responsible for procurement of services, bus operators (private), fare collection system and ITS systems as well as overseeing operations of the BRT system.

The project is being funded by the Government of the United Republic of Tanzania. TANROADS is the financing agency for this project on behalf of the Government of the United Republic of Tanzania. The total capital investment cost of the project will be established from the Bill of Quantities (BOQ). The construction period is estimated to be about 3 years, whereby 3 months is mobilization period and 33 months will be construction period. After construction period, the roads will be operated for an estimated period of 20 years.

The review of relevant policies, legalisations and institutional framework indicate the project is compatible and complies with the national development policies, legal requirements and the institutional framework for environmental management is well established at all levels (i.e., national, regional, district, ward, village levels).

The review study also indicates the project will trigger the three World Bank Safeguard Policies, namely the Environmental Assessment (OP/BP 4.01) ; Natural Habitats (OP/BP 4.04); and Involuntary Resettlement (OP/BP 4.12), as well as WB/IFC EHS Guidelines. Some international conventions to which the country is a signatory has been found to be relevant to

this project, namely the biodiversity conventions, and ILO Conventions on air pollution, noise and vibration; child labour; discrimination at work place; and workman's compensation. The Contractor will be required to comply with the requirements of national policies/legislations, WB Safeguard Policies, Guidelines as relevant international conventions / treaties during the project implementation phase.

The baseline data collection was carried to establish the biophysical and socio-economic characteristics along road corridors and earmarked area for construction of BRT Bus Terminals, Depots and Car Park and Ride Buildings. The findings indicate the project road passes through undulating and flat topography, dissected by natural drainages, whereby the Ali-Hassan Mwinyi-New Bagamoyo Road Section crosses three major streams/rivers which discharge into the Indian ocean, namely the Msimbazi, Mlalakuwa, Lugalo and Tegeta River.

The road sections traverse through built up environment with high rise buildings in the Central Business District (CBD) and become dominated by ordinary buildings as you move away from the CBD. There is no significant natural vegetation cover expect some mangrove vegetation on the upstream and downstream of the Msimbazi River Creek, otherwise most of the vegetation is comprised of planted ornamental/ shade trees and grass adjacent to the road corridor and in the road median.

The road corridor is congested by numerous small business operations, parking of Bajaj and Bodaboda. It is also common to find small business operators close to the road and some of them doing business over storm water drainages and within the road median. All these small business operations and parking of Bodaboda and Bajaj will have to be removed before commencement of construction works.

The road corridor is occupied by public service infrastructure such as electricity power lines (underground/overhead), telephone cables (underground/overhead), water supply pipelines and sewer pipelines, which can be found to be crossing or running parallel to the road corridor. In addition, there are several traffic lights and street lights in the median of road sections. All these public service infrastructure / utilities, traffic lights and street lights will have to be relocated before commencement of construction works.

The potential environmental effects of the project have been assessed to meet the requirements of the Environmental Impact Assessment and Audit Regulations and the Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations (2018). The assessment of environmental effects/impacts was based on the interaction between the Project Related Activities and Valued Environmental Components (VECs) of relevance and importance to this EIA study.

The environmental assessment also considered the cumulative effects/impacts, effects/impacts of accidents, malfunctions, and unplanned events for credible scenarios; and effects/impacts of the environment on the project due to climate change factors. The results indicate most of the adverse (negative) are of Low Significance and will occur during construction phase and most beneficial (positive) impacts are of High Significance and will occur during operation phase.

The assessment of cumulative environmental effects indicates the project is expected to have negative impacts with very low significance, which occur during construction phase and positive cumulative (synergistic) impacts with medium and high significance during operation phase. The residual cumulative environmental effects/impacts of the Project on the VECs have been assessed and expected to be not significant due to the applied mitigation measures.

The effects of the environment on the Project were predicted to be not significant due to the engineering design that incorporates climate change factors and other mitigation strategies to minimize the likelihood of a significant adverse effect of the environment on the Project.

The assessment of environmental effects/impacts of credible accidents, malfunctions and unplanned events indicate most of the effects/impacts will not be significant. The only potentially significant environmental effects due to such credible events would be if a Project-related fire put the life and/or health of the public and/or Project employees in immediate danger, or if a Project-related fire or vehicle collision resulted in the death of pedestrians. However, the environmental effects/impacts were predicted to be highly unlikely to occur due to several mitigation measures, including formulation of emergency response plan.

Furthermore, the Environmental and Social Management (ESMP) and Environmental Monitoring Plan have been prepared to ensure the implementation of the proposed mitigation measures during construction. In order to be effective, the ESMP and Monitoring Plan have specified the institutional roles and responsibilities, with cost estimates.

13.2 Conclusion

In general, the project has been found to have short-term and long-term environmental and socio-economic benefits to the local community and the nation. The short-term socio-economic benefits include creation of temporary employment and increased income generation opportunities to the local people. It is expected that during construction some local people, especially women will get an opportunity to increase their income by selling food items to the construction workers. These benefits will be enhanced by providing clean and safe water supply and sanitary facilities to enable the food vendors sell their food in hygienic environment, hence preventing transmission of hygiene related diseases like cholera to the construction workers.

The long-term socio-economic benefits include increased productivity due to reduced travel time; reduced vehicle operation and maintenance costs; improved access to social services; improved access to external markets for agricultural produce and improved access to the tourist's destinations.

The environmental benefit to be obtained from the project include creation of temporary employment and income generation opportunity during construction; Increased productivity and stimulation of economic growth; increased self-employment and economic growth of households; increased revenue collection by local and central government; reduced transportation costs; and improved access to social services; reduced risk of traffic accidents; improved environmental quality; and increased comfortability of passengers.

Most of the identified negative impacts are short-term with low significance and mainly occur during construction phase. Moreover, the mitigation measures have been proposed for the identified negative impacts. The cost estimates for the planned mitigation measures have will be incorporated into the Bill of Quantities (BOQ) during preparation of Tender/Bidding Document.

13.3 Recommendations

The project has been found to have long-term environmental and socio-economic benefits and its adverse (negative impacts), are temporary and short-term as they occur during construction phase. In addition, the cost/benefit analysis and economic analysis have already found the project to be highly beneficial and economically viable, respectively. It is therefore, recommended that the project should be implemented immediately to avoid increased construction costs due to increasing inflation rate.

In order to ensure the successful implementation and sustainability of the project, the Consultant provides the following recommendations:

- TANROADS should consider the climate change factor during the design and construction phase to ensure the long-term durability of the road pavement and associated bridge structures.

- TANROADS should collaborate with Local Government Authorities (LGAs) to relocate small business operators before commencement of the construction works.

- TANROADS should promote awareness and education campaign among the road users on the importance of avoiding the use of dedicated BRT lane to minimize the risk of traffic accidents.

- TANROADS should promote awareness and education campaign among the small business operators to avoid encroachment into the road reserve.

- TANROADS should ensure that the design incorporates the provision of parking areas for Bodaboda and Bajaj Operators.

- TANROADS Should use the proposed Mlalakua car parking and ride as Depot area and replace the proposed depot at SIMU 2000 area due to less likely to acquire the land at that location.

In addition to the Consultant's recommendations the consulted stakeholders had the following recommendations:

- The project proponent has to ensure the design of flyover at Selander Bridge incorporates the protection of mangrove vegetation on the upstream side. That means the construction of the flyover must be on the downstream of the Selander Bridge.

- The project implementer has to provide a reasonable timeframe for relocating the utilities since relocation involves use of money and getting money for such huge work needs a budget and approval from the management, this sometimes is a source of delaying in relocation works. The joint work for mapping the utilities is of very important before start construction works to avoid disrupting the utilities and deny the services to the public. The project implementer should share the work program for the whole construction works for the utility owner to know where exactly the relocation works has to start immediately.

- The stations along the BRT road should be provided with sanitary facility to improve the quality of provided services. For example, travelling from Kivukoni to Tegeta without having the sanitary facilities is a problem for vulnerable groups like children and the elderly people.

- The Design should consider provision of shops for soft drink and pharmacy within the stations to improve the quality of services

- Traffic management plan especial for Daladala that are using the Kivukoni terminal should be done between DART, TANROADS, LATRA, Districts and Regional leaders, Municipal Councils, and the representative of Trasport Operators

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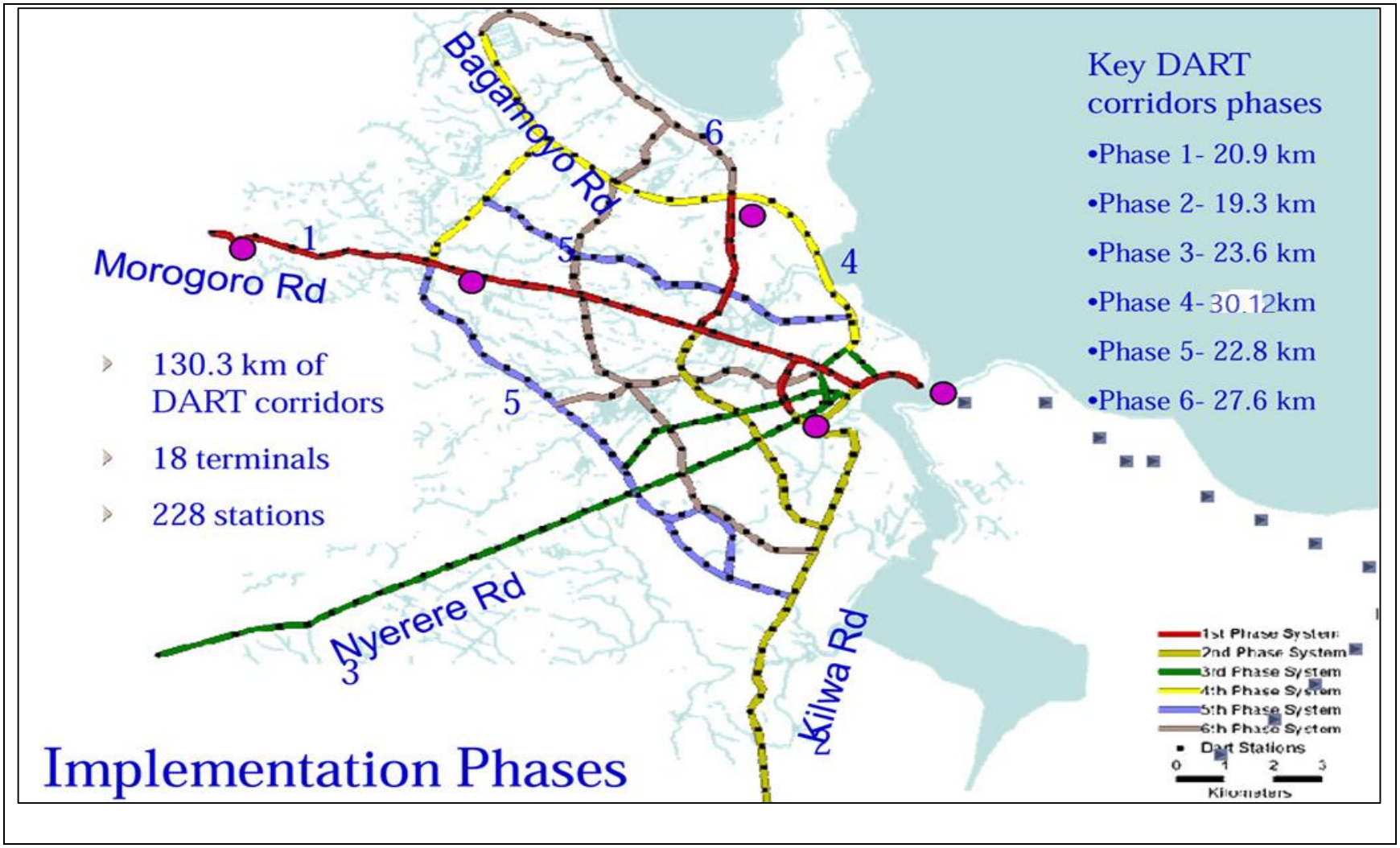
APPENDICES

APPENDIX 1: MAP OF BRT ROAD CORRIDORS IN THE DAR ES SALAAM CITY.



APPENDIX 2: LETTER OF APPROVAL OF SCOPING REPORT AND TOR FROM NEMC.

THEUNITED REPUBLIC OF TANZANIA

VICE PRESIDENT'S OFFICE
UNION AND ENVIRONMENT

NATIONAL ENVIRONMENT MANAGEMENT COUNCIL
(NEMC)

In reply please quote:

Ref: EC/EIA/2021/9377 **Date: 27. 04. 2021**

Chief Executive,
Tanzania National Roads Agency (TANROADS),
P.O. Box 11364,
Dar es Salaam.

RE: APPROVAL OF TERMS OF REFERENCE (ToR) FOR THE PROPOSED DAR-ES-SALAAM BUS RAPID TRANSIT (BRT) SYSTEM PHASE 4

2. The National Environment Management Council (NEMC) acknowledges receipt of your Scoping Report submitted with draft Terms of Reference (ToR) for undertaking Environmental Impact Assessment (EIA) study of the aforementioned project.The project has been registered with **Reg. No. EC/EIA/2021/9377** please quote this number in all future correspondences regarding this project.

3. The Terms of Reference have been reviewed;however, it lacks some required information necessary to guide the Environmental Impact Assessment study of this particular project. Therefore, you are required to improve the ToR on the following areas:-

i. Task 2, description of the proposed project should include information such as type and summary of designs of the rapid transit system, associated components i.e number, capacity, location etc. summary information on Project Affected Parties (PAP's) and compensation status, Healthy and safety matters including sanitary facilities to be placed along the project route (s) in consideration of people with disabilities etc
ii. Task 4, Stating of how the proponent is going to comply with each policy, legal, regulatory, administrative/institutional framework, international standards and international conventions; by stating relevant section / provision should be ensured;
iii. Task 5, several stakeholders have been identified and some consulted at the scoping stage, moreover among others Lugalo Military Base and Makongo High School Authority should also be consulted. Thorough consultations

Headquarters, 35 Regent Street, P.O Box 63154, 11404 Dar es Salaam, Phone: +255 22 2774852, +255 22 2774889; +255 0713 608930/0735 608930 Fax: +255 22 2774901
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should be done with relevant authorities whose utility infrastructure will be damaged (such as water network, electrical poles etc)

iv. Task of the ToR should also include provision of Non-Technical Executive Summary in English and Kiswahili language

4. You will be required to undertake the EIA study in accordance to the requirements of the Environmental Impact Assessment and Audit Regulations, 2005 specifically Regulations 18-21 read together with the Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations, 2018.

The following information should be taken into consideration while preparing the EIA report:-

a. The project title should be exhaustive to include total length of the proposed project as well as locations;
b. All key stakeholders' from National to Village level should be consulted adequately and their views and concerns addressed; records of meetings, communication and comments should be provided. Consultation forms should bear **date** and each consulted stakeholder should **sign** against his/her **name** as the law requires.
c. The EIS should indicate with justification the source of the materials that will be used for the proposed activities like cement, sand, water, hard stones etc.;
d. The EIS should clearly provide management of noise levels, dust, liquid, solid and all sorts of hazardous wastes;
e. Use specific and most current baseline data on the physical, biological, socio-economic and cultural environment. Also provide data of various parameters including air and noise levels at the project site (s);
f. Some of identified areas where project sub components will be located are prone to flood as identified i.e Boko-Basihaya and Mwenge car parking and ride area. The road design should consider hydrological conditions of the proposed project areas and detailed information on design and important studies be incorporated in the report;
g. The EIS should describe well the affected environment and Project Affected Persons (PAPs). Explain about displacement of people and property valuation, relocation and compensation arrangements and summary of current valuation and compensation status should be provided in the EIS;
h. Time frame for which this study will be conducted should be indicated in the EIS stating clearly the time from project brief up to final submission; and
i. All experts involved in the study should sign against their names and be indicated whether he/she is a registered or non-registered environmental expert. Failure to observe this requirement, it will constitute to an offense as per EMA, 2004 Cap 191.

Headquarters, 35 Regent Street, P.O.Box 63154, 11404 Dar es Salaam. Phone: +255 22 2774852, +255 22 2774889, +255 0713 608930/0735 608930 Fax: +255 22 2774901
Email Address: dg@nemc.or.tz Website: www.nemc.or.tz

5. Upon submission of the EIA report and payment of the review charges, the Council will arrange for a technical review of the document by the Cross-Sectoral Technical Advisory Committee (TAC). Prior to this review, representatives of the TAC will visit the project site to inspect and verify the adequacy of the EIS with respect to the proposed project's operation and surrounding environment. You will be required to **incur transportation costs** for the site verification team to and from the project site.

6. In case of any clarification regarding this matter, do not hesitate to contact us through Telephone No. +255 767 774 777.

Sincerely,

Abel Sembeka

***For*: Director General.**

Cc: NIMETA Consult (T) Limited,
P. O. Box 15651,
DAR ES SALAAM.

APPENDIX 3: TABLE OF CONCORDANCE WITH SUBREGULATION 18(1)

Requirements of Sub-regulation 18(1) of the EIA and Audit Regulations (2005)	Chapters / Sections of the ESIA Report
(a) the project and the activities that it is likely to generate;	Section 2.2.2
(b) the proposed location of the project and reasons for rejecting alternative locations;	Section 2.2.1
(c) a concise description of the national environmental legislative and regulatory framework, baseline information, and any other relevant information related to the project;	Chapter 3
(d) the objectives of the project;	Section 2.1.2
(e) the technology, procedures, and processes to be used, in the implementation of the project;	Section 2.4
(f) the materials to be used in the construction and implementation of the project;	Section 2.5
(g) the products, by products and waste generated by the project;	Section 2.5.4
(h) a description of the potentially affected environment including specific information necessary for identifying and assessing the environmental effects of the project;	Chapter 4
(i) the environmental effects of the project including the social and cultural effects and the direct, indirect, cumulative, irreversible, short term and long term effects anticipated;	Chapter 6
(j) alternative technologies and processes available and reasons for preferring the chosen technology and processes;	Section 6.4
(k) analysis of alternatives including project site, design and technologies and reasons for preferring the proposed site, design, and technologies;	Section 6.4
(l) an environmental management plan proposing the measures for eliminating, minimizing, or mitigating adverse impacts on the environment; including the cost, timeframe and responsibility to implement the measures;	Chapter 8
(m) provision of an action plan for the prevention and management of foreseeable accidents and hazardous activities in the cause of carrying out activities or major industrial and other development projects;	Section 7.3
(n) the measures to prevent health hazards and to ensure security in the working environment for the employees and for management of emergencies; of emergencies;	Section 7.4
(o) an identification of gaps in knowledge and uncertainties which were encountered in compiling the information;	Section 1.8
(p) an economic and social analysis of the project;	Section 7.3
(q) positive impacts and how to enhance them.	Section 7.2

APPENDIX 4: INSTITUTIONAL BOUNDARIES FOR PROJECT IMPLEMENTATION

Institution	Roles and responsibilities	Relevant Legislations
National level		
A1. Ministry of Works (MoW)	Policy formulation at sectoral level and overseeing implementation of national environment policy within the sector ministry and collaborates with the national environmental agencies. The ministry through its Sector Environmental Coordinator is responsible for: Ensuring the line ministry's compliance with Environmental Management Act Cap 191 (EMA Cap. 191); Ensuring all environmental matters contained in other laws falling under the authority of the sector ministry are implemented and reported to NEMC; and Liaising with NEMC on all environmental matters in order to achieve cooperation and shared responsibility for environmental governance.	Section 30 Environmental Management Act Cap. 191 -which establishes Sector Environment Section within Sector Ministry. Section 31 of the EMA Act Cap 191-which stipulates the functions of the Sector Environment Section.
A2. Tanzania National Roads Agency (TANROADS)	Financing and implementation of the project on behalf of the Government of the United Republic of Tanzania (GOT). Ensuring that environmental and social issues are taken into consideration during project planning, design, construction, and operation.	Section 3(1) of the Executive Agencies Act (Cap 245)-which establishes the agency.
A3. Dar Es Salaam Rapid Transit Agency (DART Agency)	The Agency is responsible for the establishment and operation of the Bus Rapid Transit (BRT) system for Dar Es Salaam. Specifically, DART Agency is responsible for procurement of services, bus operators (private), fare collection system and ITS systems as well as overseeing operations of the BRT system.	Section 3(1) of the Executive Agencies Act No. 30 of 1997 (Cap 245).
A3. Division of Environment (VPO-DOE)	The DOE which is headed by Director of Environment is responsible for: Formulation of environmental policy. Coordination and monitoring of environmental issues. Review and approval of ESIA report and issuance of EIA Certificate	Section 14 of the EMA Act Cap 191-which establishes the position of the Director of Environment. Section 15 of the EMA Cap. 191-which stipulates the functions of the Director of Environment.
A4. National Environmental Management Council (NEMC)	Undertaking enforcement, compliance, review, and monitoring of environmental impact assessment (EIA), including the facilitation of the public participation process in environmental decision making. Ensuring that the project is being implemented in an environmentally friendly and socially acceptable manner.	Section 16 of the EMA Cap. 191-which establishes NEMC. Section 17 of the EMA Cap. 191-which stipulates the object for establishment of NEMC.

Institution	Roles and responsibilities	Relevant Legislations
		Section 18 of the EMA Cap. 191-which stipulates the function of NEMC.
Regional Level		
B1. Tanzania National Roads Agency (TANROADS) –Dar Es Salaam Regional Manager	Project implementation at regional level on the behalf of TANROADS HQ. Assisting TANROADS HQ in the monitoring of the implementation of environmental mitigation measures by the Contractor.	Section 3(1) of the Executive Agencies Act (Cap 245)-which establishes the agency.
Municipal Level		
C1. Ilala City Council (IMC), Ubungo Municipal Council and Kinondoni Municipal Council (KMC)	The Municipal Councils through their Environmental Management Officers (EMOs) is responsible for: Coordination of environmental management matters at regional level. Land use planning and issuing of development permits within its jurisdictional boundaries. Monitoring the implementation of environmental mitigation measures by the Contractor through their respective Environmental Management Officers (EMOs).	Section 36 of the EMA Cap. 191-which stipulates the functions of the Environmental Management Officers.
Ward / Mtaa Level		
D1. Ward and Mtaa Development Committees	The Ward and Mtaa Development Committees are responsible for: Environmental management issues within their jurisdictional boundaries. Monitoring the implementation of environmental mitigation measures by the Contractor through their respective Environmental Management Officers (EMOs).	Sub-section 31(1) of the Local Government (District Authorities) Act of 1982-which establishes the Ward Development Committee. Sub-section 38(1) of the EMA Cap 191-which stipulates the functions of the Ward Development Committee. Sub-section 38(2) of the EMA Cap 191-which stipulates the functions of the Village Development Committees. Section 39 of the EMA Cap. 191-which establishes the position of Ward and Village Environment Management Officers. Section 40 of the EMA Cap 191-which stipulates the Ward and Village Environment Management Officers.

APPENDIX 5: MAJOR JUNCTIONS ALONG BIBI TITI, ALI HASSAN MWINYI AND NEW BAGAMOYO ROAD CORRIDOR

S/n	Major Junctions	Chainage	Location
1.	Mkataba Street	0+000	RHS
2.	National Library	0+010	LHS
3.	Magore Street	0+080	LHS
4.	Upanga Road	0+210	RHS
5.	Ohio Street	0+240	RHS
6.	Ufukoni Road	0+800	RHS
7.	Ally Khan Road	1+150	LHS
8.	Magore Street	1+570	LHS
9.	Barak Obama Drive	1+670	RHS
10.	United Nations	1+830	LHS
11.	Kenyatta Drive	2+560	LHS
12.	Kinondoni Road	2+570	LHS
13.	Laiboni Road	2+700	RHS
14.	Kilimani Road	2+880	LHS
15.	Kaunda Road	3+110	RHS
16.	Binti Matola Road	3+380	LHS
17.	Bongo Clos	3+430	RHS
18.	Madai Crescent	3+670	LHS
19.	Haile Selasie Road	3+750	RHS
20.	Ruhinde Road	4+010	LHS
21.	Unamed Road	4+280	RHS
22.	Ruhinde Road	4+380	LHS
23.	Unamed Road	4+560	RHS
24.	Kawawa / Old Bagamoyo Road	5+100	LHS/RHS
25.	Uporoto Street Road	5+240	LHS
26.	Ursino Street Road	5+260	RHS
27.	Chato Street Road	5+430	RHS
28.	Unamed Road	5+810	LHS
29.	Unamed Road	6+380	LHS
30.	New Hub Street Road	6+410	RHS
31.	Unamed Road	6+710	LHS
32.	Unamed Road	6+830	RHS
33.	Unamed Road	6+850	LHS
34.	Unamed Road	7+000	LHS
35.	Unamed Road	7+210	LHS
36.	New City Road	7+220	RHS
37.	Kajenge /Rose Garden Road	7+610	LHS/RHS
38.	Science Road	7+690	LHS
39.	Shekilango Road	8+230	LHS
40.	Unamed Road	8+270	RHS
41.	Unamed Road	8+560	Crossing

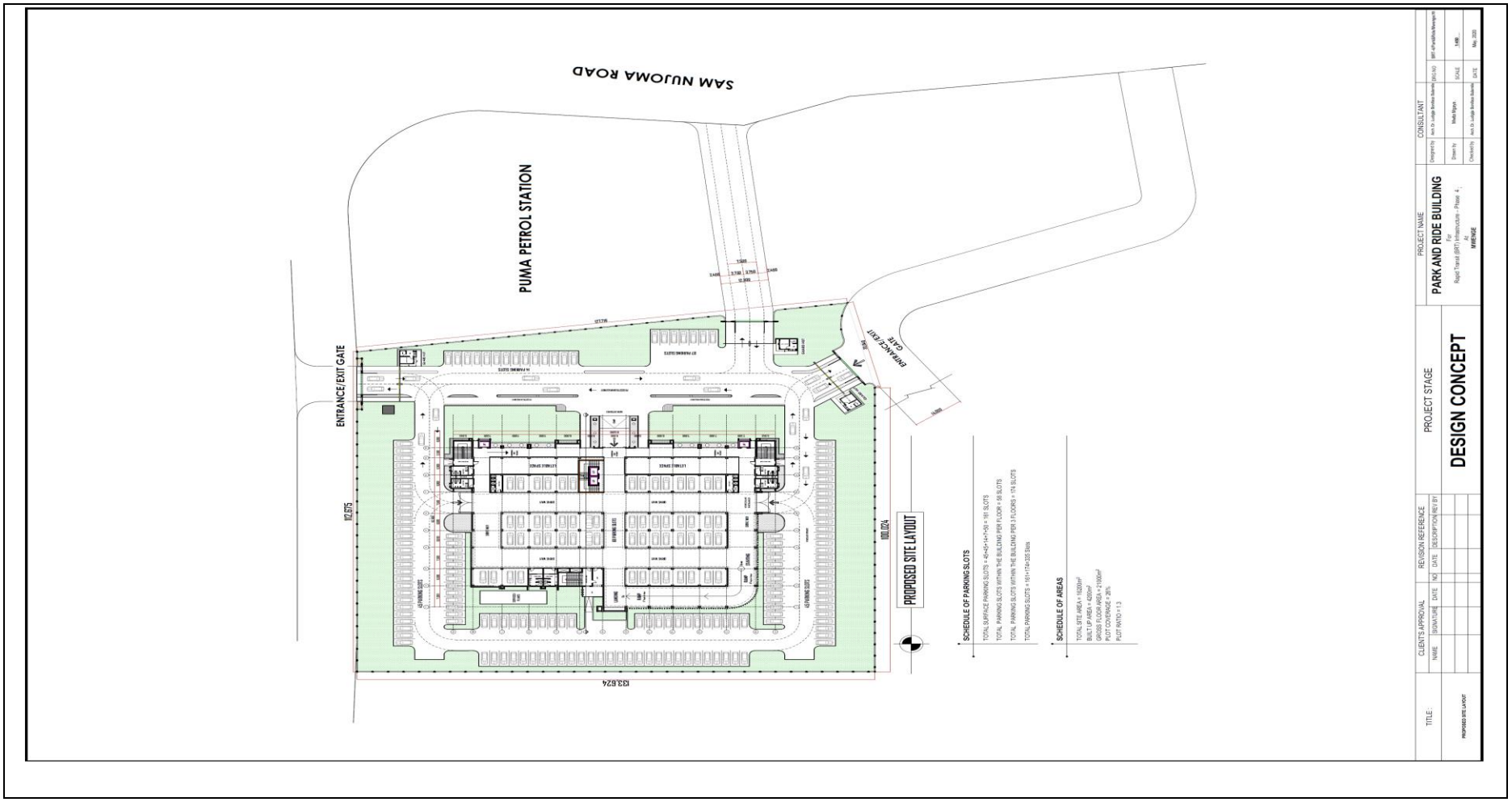
42.	Soldering Road	8+880	RHS
43.	Unamed Road	9+040	LHS
44.	Sam Nujoma / Coca Cola Road	9+400	LHS/RHS
45.	Unamed Road	9+630	LHS
46.	Unamed Road	9+680	RHS
47.	Unamed Road	9+840	LHS
48.	Unamed Road	10+040	Crossing
49.	Unamed Road	10+360	Crossing
50.	Unamed Road	11+220	RHS
51.	Unamed Road	11+410	LHS
52.	Unamed Road	11+660	LHS
53.	Unamed Road	11+880	LHS
54.	Unamed Road	11+960	RHS
55.	Old Bagamoyo Road	12+400	RHS
56.	Old Bagamoyo Road By-pass Road	12+670	Crossing
57.	Unamed Road	13+110	LHS
58.	Unamed Road	13+370	LHS
59.	Unamed Road	13+560	LHS
60.	Unamed Road	13+660	LHS
61.	Ally Sykes Road	13+680	RHS
62.	Puma Street Road	13+780	RHS
63.	Mwema Street Road	13+840	RHS
64.	Kitmtim Street Road	13+910	RHS
65.	Shaurimada Road	13+990	Crossing
66.	Shamo Street Road	14+090	RHS
67.	Unamed Road	14+220	LHS
68.	Sokoni Road	14+390	LHS
69.	Unamed Road	14+700	LHS
70.	Unamed Road	15+140	LHS
71.	NSSF Road	15+260	RHS
72.	Unamed Road	15+640	LHS
73.	Unamed Road	16+910	Crossing
74.	Unamed Road	16+260	LHS
75.	Mpakani Road	16+910	Crossing
76.	Unamed Road	18+350	RHS
77.	Salasala Road	18+530	LHS
78.	Unamed Road	20+940	RHS
79.	Unamed Road	20+020	LHS
80.	Unamed Road	20+960	RHS
81.	Unamed Road	21+000	LHS
82.	Unamed Road	21+170	Crossing
83.	Unamed Road	21+320	LHS
84.	Unamed Road	21+350	Crossing
85.	Unamed Road	21+650	RHS

86.	Wazo Hill Road	22+110	LHS
87.	Unamed Road	22+120	RHS
88.	Nyuki Road	22+260	RHS
89.	Namanga Road	22+320	RHS
90.	Unamed Road	22+620	LHS
91.	Kanisani Road	22+970	RHS
92.	Unamed Road	23+060	RHS
93.	DAWASA Boko Depot Access Road	24+570	RHS

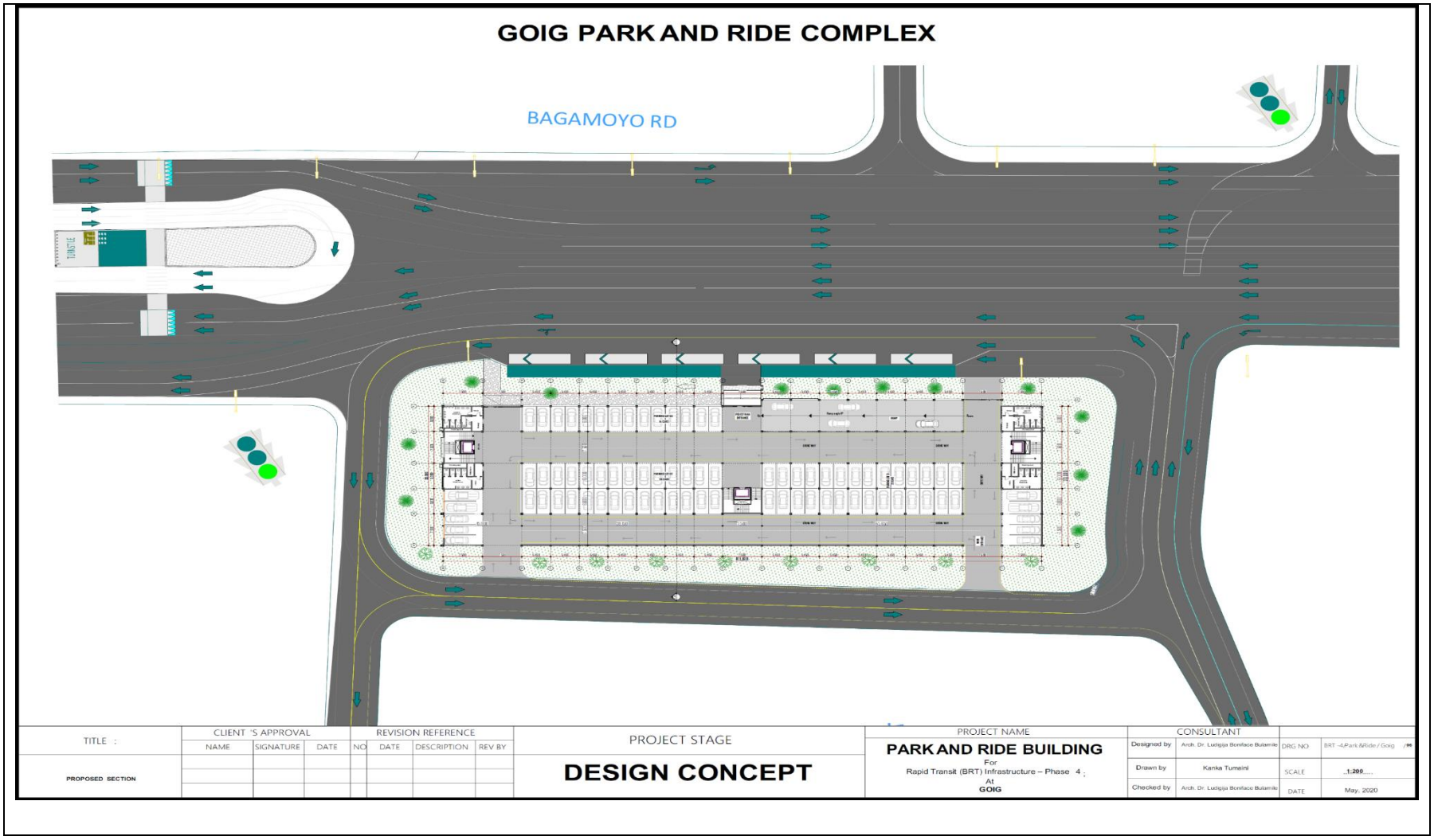
APPENDIX 6: MAJOR JUNCTIONS ALONG SAM NUJOMA ROAD CORRIDOR.

S/n	Major Junctions	Chainage	Location
1.	Simu 2000 Bus Terminal	0+000	LHS
2.	TCRA Building	0+310	RHS
3.	Unamed Road	0+480	RHS
4.	Access Road to Waste Water Stabilization Pond	0+720	LHS
5.	Igeasa Road	1+150	RHS
6.	Unamed Road	1+390	RHS
7.	Unamed Road	1+590	RHS
8.	Mlimani City Mall	1+660	LHS
9.	Unamed Road	1+730	RHS
10.	University Road	1+960	Keep Left
11.	Mor Road	1+190	RHS
12.	Unamed Road	2+250	Crossing
13.	JWTZ Drive	2+520	RHS
14.	Unamed Road	2+610	LHS
15.	Unamed Road	2+630	LHS
16.	Unamed Road	2+770	LHS
17.	Unamed Road	2+800	LHS
18.	Afrika Sana Road	2+830	RHS
19.	Unamed Road	2+860	Crossing
20.	Unamed Road	3+090	LHS
21.	New Bagamoyo / Coca Cola Jc	3+150	Crossing

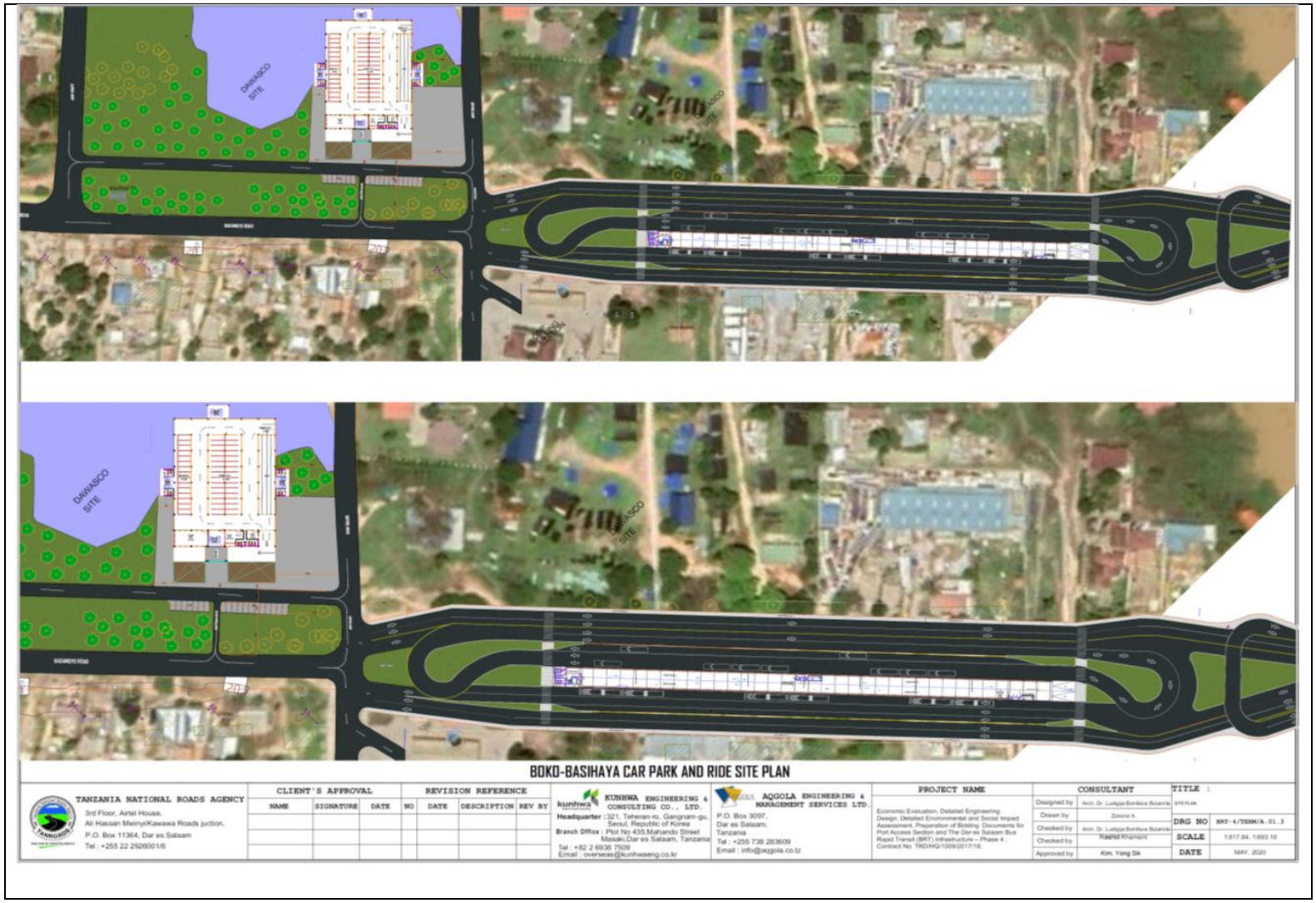
APPENDIX 7: SITE LAYOUT OF MLALAKUA CAR PARK AND RIDE BUILDING.



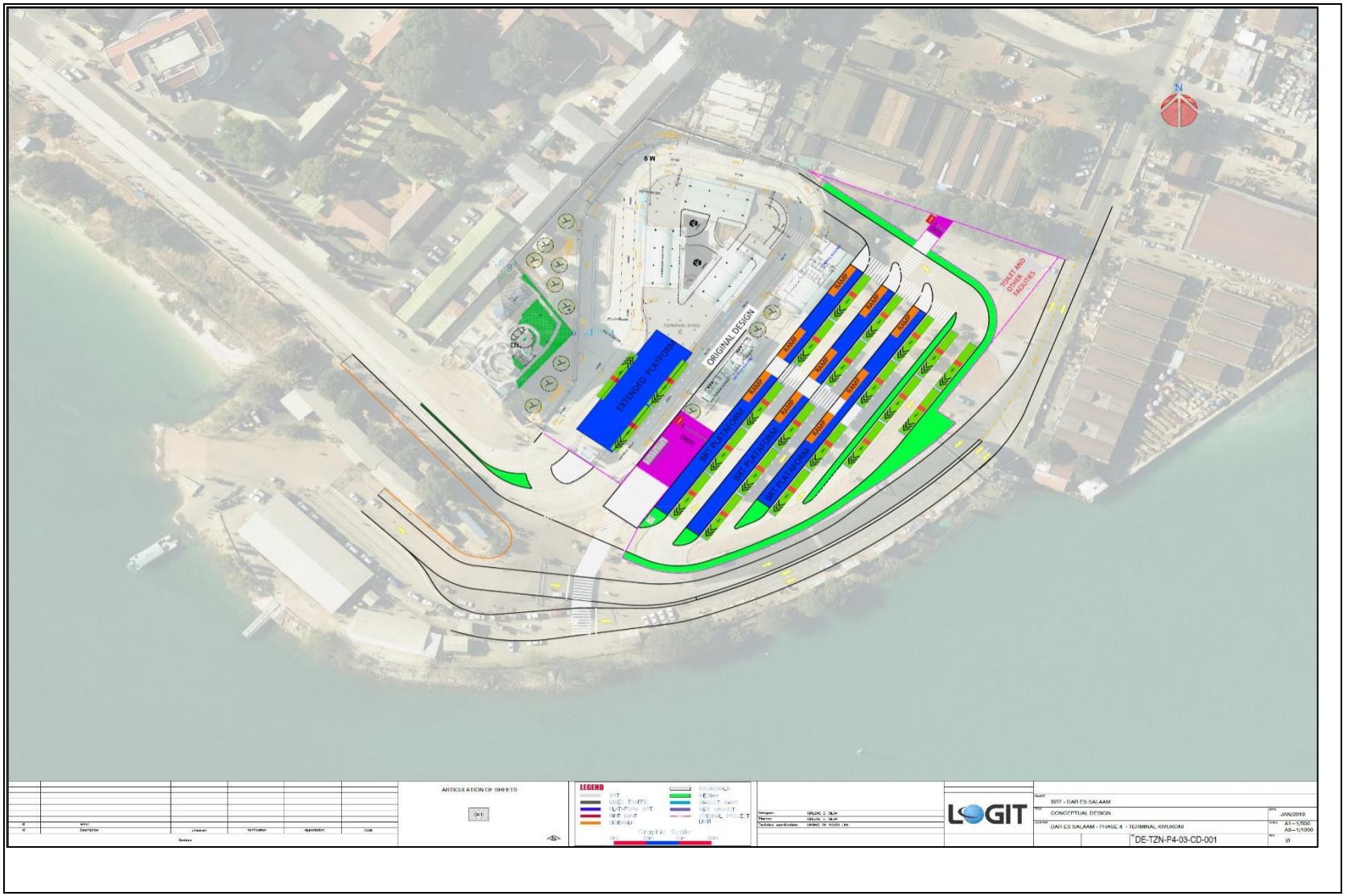
APPENDIX 8: SITE LAYOUT OF GOIG CAR PARK.



APPENDIX 9: SITE LAYOUT OF BOKO-BASIHAYA CAR PARK AND RIDE.



APPENDIX 10: SITE LAYOUT OF KIVUKONI TERMINAL.



APPENDIX 11: SCREENING OF WROLD BANK SAFEGUARD POLICIES.

S/n	Safeguard Policy	Triggered? (Yes /No	Remarks
1.	OP/BP4.01 Environmental Assessment	Yes	Category A project; A full EIA and EMP are prepared; Two rounds of public consultation have been carried out as part of the EIA procedure.
2.	OP/BP4.04 Natural Habitats	Yes	The project road crosses the Msimbazi Creek with mangrove vegetation, which provides natural habitats for numerous marine organisms.
3.	OP/BP4.36 Forests	No	The Project will not involve any change or degradation of the important forest area.
4.	OP/BP4.09 Pest Management	No	No pesticide will be procured under the Project, causing no increase in the use of pesticide. No activity is needed according to the policy.
5.	OP/BP4.11 Physical Cultural Resources	No	The Project is not close to any known historic, cultural, archaeological, or paleontological features.
6.	OP/BP4.37 Safety of Dams	No	The project does not involve dam construction.
7.	OP/BP4.10 Indigenous Peoples	No	No indigenous group lives in the project area or is affected by the Project.
8.	OP/BP4.12 Involuntary Resettlement	Yes	The project will involve land acquisition for construction of BRT Bus Terminals, Car Park and Ride Buildings, hence the need to compensate the affected persons. The baseline indicates less than 200 people will be displaced, hence requiring an Abbreviated Resettlement Action Plan (ARAP).
9.	OP/BP7.50 Projects on International Waterways	No	There is no international waterway involved in the project area.
10.	OP/BP7.60 Projects on Disputed Areas	No	There is no disputed region involved in the project area.

APPENDIX 12: COMPLIANCE OF PROJECT WITH WORLD BANK GUIDELINES.

General EHS Guidelines	**Compliance by Project**
If the facility or project is close to an identified ecologically sensitive area (such as a national park), it shall minimize the increase in pollution level whenever and wherever feasible. In addition, appropriate mitigation measures may also include the use of clean fuels or technologies, and application of comprehensive pollution control measures.	Not relevant
The most common pollutant involved in fugitive emissions is dust or particulate matter (PM). This is released during certain operations, such as transport and open storage of solid materials, and from exposed soil surfaces, including unpaved roads.	Dust-control methods, such as covering trucks hauling dusty construction materials by using tarpaulins; application of water on dusty areas; and covering stockpiled dusty construction materials to prevent wind action.
Environmental, Health, and Safety Guidelines for Water and Sanitation	**Compliance by Project**
No industrial wastewater, domestic wastewater, wastewater from operations of public works or storm water shall be discharged into a public or private wastewater treatment system unless it meets the pretreatment and monitoring requirements of such wastewater treatment system.	
Storm water shall be separated from industrial wastewater and domestic wastewater in order to reduce the wastewater generation that needs treatment before emission.	
Noise prevention and control measures shall be applied if the predicted noise level at the most sensitive receiving point due to the operation of project facilities or operation activities will exceed the noise limits.	Low sound power level equipment will be selected; vibration isolation device will be installed for machinery and equipment; Running time of certain equipment or operation will be limited, particularly mobile noise sources that will travel a longer distance beyond the site boundaries.
Design, construct, operate, and maintain wastewater treatment facilities and achieve effluent water quality consistent with applicable national requirements or internationally accepted standards.	Permissible Limits for Municipal and Industrial Effluents[113] will be applied for wastewater discharge from the WWTPs.
Odors from treatment facilities can also be a nuisance to workers and the surrounding community. Measures are recommended to prevent, minimize, and control air emissions and odours.	Odor emission units such as coarse screen and influent pumping station may be designed as enclosed chambers with covers at the top to constrain the odor diffusion space. For the sludge dewatering room that is of bigger space, odour will be collected for centralized biological treatment.
Sludge treatment and utilization. Following stabilization, the sludge can be dewatered and disposed of in a landfill or incinerator, or subject to further processing for beneficial uses.	Sludge will be dewatered by mechanical pressure filter and transferred to the municipal dumping site for disposal.

APPENDIX 13: STREAM CROSSING ALONG BIBI TITI ALI HASSAN MWINYI ROAD SECTION.

[113] THE ENVIRONMENTAL MANAGEMENT ACT (CAP. 191). REGULATIONS. (Made under Section 143, 144 and 230 (2) (s)). THE ENVIRONMENTAL MANAGEMENT (WATER QUALITY STANDARDS) REGULATIONS, 2007. FIRST SCHEDULE (*Made under Regulation 8*).

C/n	Co-ordinates		Station (km)	Name of Stream	Area in km^2	Q25
	Eastings	Northings				
1.	053061	925036	0+125	Bibi Titi/ Maktaba	0.4	1.2
2.	0529765	9251019	0+350	Bibi Titi /Ohio	0.5	1.5
3.	0528733	9251136	0+875	Bibi Titi /Magore	0.6	1.5
4.	0527373	9251143	1+900	Salander Police Station	0.5	1.5
5.	053061	925036	3+550	Ali Hassan/Mkwawa	0.4	1.3
6.	0529765	9251019	4+460	Best Bite	1.2	2.0
7.	528842	9251155	5+395	Unnamed stream		
8.	528842	9251155	5+395	Egyptian Attache	0.99	0.87
9.	0528733	9251136	5+535	Bagamoyo/Chato road	2.7	10.36
10.	0528546	9251108	5+695	Unnamed stream	0.99	1.05
11.	0528328	9251073	5+915	Unnamed stream	0.99	0.87
12.	0528101	9251041	6+145	Halotel	0.99	0.70
13.	0527775	9251057	6+445	Victoria Tower	2.0	3.2
14.	0527332	9251162	6+950	Makumbusho area	2.5	6.46
15.	0526985	9251292	7+300	Unnamed stream	0.98	1.05
16.	0526731	9251452	7+300	Oilcom Petrol stat.	4.0	5.57
17.	0526204	9251873	7+600	Bamaga/Shekilango	3.6	21.61
18.	0524941	9252047	8+595	ITV Mikocheni	1.5	1.28
19.	0525476	9252432	8+300	Mikocheni/Aspen area	3.2	11.07
20.	0526204	9251873	9+175	Junct,/S,Nujoma Rd	3.2	11.07
21.	0524682	9253526	9+512	Pedestrian Crossing	0.38	1.32
22.	0524626	9253642	10+590	Makongo Football pitch	0.38	1.32
23.	0524513	9253893	10+725	Makongo Secondary Sch.	0.6	2.08
24.	0524428	9254048	10+975	Lugalo Pump House	1.2	5.77
25.	0524268	9254370	11+175	Lugalo to Hospital	0.8	3.87
26.	0524202	9254511	11+520	At Sports grounds	0.5	2.44
27.	0524113	9254730	11+685	At Sports grounds	0.6	2.92
28.	0524082	9254827	11+925	Lugalo near Main Gate	2	0.98
29.	0523986	9255103	12+313	Lugalo after Main Gate	2	0.98
30.	052395	9257118	14+375	Goba junction	5	43.72
31.	0523318	9257704	15+013	Makonde stream	3	6.25
32.	0523063	9258568	15+915	Manyema 1/Interchick	15	47.37
33.	0523000	9258867	16+415	Manyama 2	7.0	15.98
34.	0522845	925973	16+850	Africana Stream 1 NMB	0.63	3.40
35.	0522816	9259610	16+975	Africana Str. 2 Cross.	1.00	4.83
36.	0522666	9260214	17+612	Rafia area	15	30.72
37.	0522615	9260392	17+790	Mazrui International	2	6.80
38.	0521148	9262812	20+650	Tegeta Stream 1	8.0	17.77
39.	0519444	9264804	23+275	Tegeta Rabinisia	7.0	5.95
40.	0518995	9265275	24+075	Kibo Cement Namanga	6.0	7.97
41.	0518631	9265681	24+475	DAWASA	6.0	5.71

APPENDIX 14: WHO AND UNIECE AMBIENT AIR QUALITY.

1. Standards for protection of human health

1.1 Sulphur dioxide (SO_2)

Value (µg/m³)	Specification	Type	Issued by
120	50-percentile (1-year, daily average)	Limit value	EU
180	50-percentile (6 winter months, daily av.)	Limit value	EU
350	98-percentile (1-year, daily average)	Limit value	
40-60	1-year daily average	Guide value	
100-150	Daily average	Guide value	
500	Maximum 10 minutes average	Guide value	WHO
350	Maximum hourly average	Guide value	
125	24-hour average	Guide value	
| 50	Yearly average	Guide value	

1.2 Nitrogen dioxide, NO_2

Value (µg/m³)	Specification	Type	Issued by
200	98-percentile (1-year, hourly average)	Limit value	EU
135	98-percentile (1-year, hourly average)	Guide value	
50	50-percentile (1-year, hourly average)	Guide value	
200	Maximum hourly average	Guide value	WHO
150	Maximum daily average	Guide value	
| 40-50	Yearly average	Guide value	

1.3 Carbon monoxide, CO

Value (µg/m³)	Specification	Type	Issued by
100	Maximum 15 minutes average	Guide value	WHO
60	Maximum 30 minutes average	Guide value	
30	Maximum hourly average	Guide value	
10 | Maximum 8-hour average		Guide value	

1.4 Breathable particles (PM10)

Value (µg/m³)	Specification	Type	Issued by
70	Maximum 24-hour average	Guide value	WHO
150-200	Maximum hourly average	Guide value	WHO
| 100-120	8-hour average	Guide value	WHO

1.5 Lead (Pb)

Value (µg/m³)	Specification	Type	Issued by
2	Yearly average	I Limit value	EU I
I 0.5	Yearly average	| Guide value	WHO

2. Standards for protection of plants

2.1 Nitrogen dioxide, NO2

Value (µg/m3)	Specification	Type	Issued by
95	4-hour average	Guide value	WHO I
30	Yearly average ($NO+NO_2$)	Guide value	WHO & UNECE

2.2 Sulphur dioxide (SO_2)

Value	Specification	Type	Issued by
100	Daily average	Guide value	WHO
30	Yearly average	Guide value	WHO

2.3 Ozone (O_3)

Value (µg/m^3)	Specification	Type	Issued by
200	Maximum hourly average	Guide value	WHO
65	Daily average	Guide value	WHO
60	Average for the crop season	Guide value	WHO
50	Average for the crop season	Guide value	UNECE
150	Hourly average	Guide value	UNECE
60	8-hour average	Guide value	UNECE

APPENDIX 15: IDENTIFIED STAKEHOLDERS AND REASONS FOR CONSULTATION.

S/n	Identified Stakeholders	Reasons for Consultation
1.	Ministry of Works (MoW)	The project is being implemented during construction under the sector ministry. The sector ministry will be responsible for ensuring that the project is being implemented during construction in accordance with the requirements of the national environment policy.
2.	President's Office, Regional Administration and Local Government (PO-RALG)[114]	The project will be operated under the sector ministry after construction. The sector ministry will be responsible for ensuring the project is being operated in accordance with the requirements of national environment policy.
3.	Tanzania National Roads Agency Headquarters (TANROADS HQ) and TANROADS Regional Manager-Dar Es Salaam.	The project is being implemented during construction by the Road Agency on behalf of the Government of the United Republic of Tanzania. The Road Agency is also responsible for: Financing and implementation of the project on behalf of the Government of the United Republic of Tanzania (GOT). Ensuring that environmental and social issues are taken into consideration during project planning, design, construction, and operation.
	Tanzania Rural and Urban Riads Agency (TARURA)	TARURA as an Executive Agency of the President's Office, Regional Administration and Local Government, (PO-RALG), is responsible for construction and maintenance of rural and urban roads, which link with BRT System.
4.	Dar Es Salaam Bus Rapid Transit (DART) Agency	The project will be operated by the DART agency after construction. The agency is responsible for environmental, health and safety monitoring during operation.
5.	Division of Environment in the Vice President's Office (VPO-DOE)	The Division of Environment as a national environmental agency is responsible for: Formulation of environmental policy. Coordination and monitoring of environmental issues. Review and approval of ESIA report and issuance of EIA Certificate.
6.	National Environment Management Council (NEMC)	The Council is responsible for: Undertaking enforcement, compliance, review, and monitoring of environmental impact assessment (EIA), including the facilitation of the public participation process in environmental decision making. Ensuring that the project is being implemented in an environmentally friendly and socially acceptable manner. Reviewing and approval of the Scoping Report, Terms of Reference, and EIA Report.
7.	Embassy of France, Japan, and Indonesia	The embassy offices are located along Ali Hassan Mwinyi Road Section, which is part of the project road. The project is likely to disrupt movement of vehicles to and from the embassy buildings. It may also create noise nuisance and air pollution due to dust emission during construction.

[114] In Kiswahili it is known as "Ofisi ya Rais, Tawala za Mikoa na Serikali za Mitaa (TAMISEMI)"

8.	Dar Es Salaam City Council, Ilala Municipal Council and Kinondoni Municipal Council.	The Local Government Authorities (LGAs) are responsible for: Coordination of environmental management matters at regional level. Land use planning and issuing of development permits within its jurisdictional boundaries. Overseeing environmental management matters through their Environmental Management Officers (EMOs). Monitoring the implementation of environmental mitigation measures by the Contractor through their respective Environmental Management Officers (EMOs).
9.	Ward and Mtaa Development Committees	The Ward Development Committees[115] are responsible for: Proper management of the environment issues within their jurisdictional boundaries. Monitoring the implementation of environmental mitigation measures by the Contractor through their respective Environmental Management Officers (EMOs). The following wards have been identified to be traversed by Bibi Titi Mohamed-Ali Hassan Mwinyi-New Bagamoyo Road Section: Upanga East, Kinondoni, Msasani, Mikocheni, Kijitonyama, Makumbusho, Makongo, Kawe, Kunduchi, Sinza, Hananasifu and wazo.
10.	Infrastructure / Utility Companies / Authorities (TANESCO, TTCL, Mobile Phone Companies, DAWASA)	The project is likely to affect some infrastructure / utilities such as water supply pipelines, electricity power lines, telephone cables that located along the road.
11.	Commuter Transport Operators	The project will result into loss of passenger transportation business to commuter transport operators between Tegeta and Dar Es Salaam Central Business District (CBD) and between Ubungo and Mwenge.
12.	Small Business Operators, Petrol Station Operators, Retail and Whole Sale Shops Operators.	These businesses are likely to be affected by the project due to displacement from the road rserve (Baja, Bodaboad, furniture /flower vendors, etc), disruption of vehicular movement to and from the petrol stations and shops. The project is also likle y to create noise nuisance and dust emission during construction.
13.	Local Community Members	The project is likely to benefit the local communities living along the road sections through creation of temporary employment and income generation opportunities. The project is likely to affect the local communities through exposure to risk of construction related accidents, noise nuisance and dust emission during construction. The project is also likely to result into increased HIV/AIDS prevalence due to social interaction between the local people and construction workers.

[115] Established under Sub-section 31(1) of the Local Government Authorities Act (1982).

APPENDIX 16: NAMES AND SIGNATURE OF STAKEHODER REPRESENTATIVES.

CONSULTANCY SERVICES FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN FOR DAR ES SALAAM BUS RAPID TRANSIT (BRT) SYSTEM PHASE 4: CONTRACT NO. TRD/HQ/1045/2019/20

LIST OF CONSULTED STAKEHOLDER

SN	NAME	ORGANIZATION	POSITION	CONTACTS	DATE	SIGNATURE
01	AKONDA MWANGUNGA	TRD HQ	ENV	075332877	14.07.20	
02	Eng. LEOPOLD RUNJI	TARURA KMC	MANAGER	0767665005	14-07-2020	
03	Eng. Samwel Mwambagi	TANESCO K/NORTH	Ag. R.MANAGER	0782042318	30-07-2020	
04	JESCA SEDLEY	UMC	EMO	0676-935485	04/08/2020	
05			Ag HEMU	0779090943	04/08/2020	
06				0713 299399	04/10/2020	
07		IMC	REMO	0744412616	10/08/2020	
08	MOHAMED MSANGI	K M C	MEMO	0716-413458	10/08/2020	
09	GILBERT		REGIONAL MANAGER	0757800610	10/08/2020	
10		KA WASA	AEME	0735183701	11/08/2020	
11		DART	T. Planner	0713 113044	14/08/2020	
12	NASON	DART	Town planner	0712304938	14/08/2020	
13		DART	SEMO	0754825853	16/08/2020	
14		DAWASA-KISUM	Engineer	0746002449	17/08/2020	
15		DAWASA-KISUM	Engineer	0758338866	17/08/2020	
16		DARLOBOA	NGOs LIAISON	0713-289026	17/08/2020	
17		TFS	Ag. DRM	0752-904308	20/08/2020	
18		TFS	PFO (FOOM eq)	0737 398647	20/08/2020	
19			FORCES OFFICER	0787-889977	20/08/2020	
20		NOKIA/KONSORTIM	Engineer	0713 791005	20/08/2020	
21		LATRA	MRUM	0783-223093	21/8/2020	
22		TRAFFIC POLICE	ASS TO ZTO	0715 897048	21/08/2020	
23			DMT	0719935019	21/08/2020	
24			DMT	0784 323524	21.8.2020	

APPENDIX 17: RECORD OF ISSUES RAISED BY STAKEHOLDER REPRESENTATIVES.

Date	Stakeholder Name	Raised Concern	Response
14/07/2020	TARURA Eng. Leopold Runji	• The existing levels of the residence area have to tally with that of the proposed road • The discharge from the drainage system should not be directed to residence areas. • Sensitization to the public should be done early for them to know the government plan and accept the situation if the plan will need them to vacate from the proposed road corridor. • Contractor should make sure that he has the contracts with sanitation facility owner that will be utilized by their workforces during construction along the road • The owner of the proposed borrow and sand pits have to be known and they have to provide the reinstatement plan after finishing the project since they will be selling materials. • Traffic management plan should be prepared and implemented during construction • Training should be given to drivers to use the proposed alternative/diversion roads during construction. • The project implementation team should plan to renovate the proposed alternative/diversion roads after project completion	The design will take care of this issue especially the area from Tegeta to DAWASA deport, park and ride and proposed deport Sensitization was started as instructed by the Client. Contractors will be informed on hygiene best practices. Consultant will make follow-up. Traffic management will be included in the tender documents. The Consultant will supervise maintenance of alternative routes because the budget for maintenance is specified in the main contract
04/08/2020	DAWASA HQ Mr. V. Liamuya (Ag. HEMU)	• The construction team have to map all the pipes that needs to relocated traversing along and crossing the proposed road corridors in consultation with DAWASA Regional Offices. • The pipes that cross the proposed road corridors have to be provided with ducts. • The detailed information is available at DAWASA Regional Offices.	The Contractor will sub contract relocation of utilities to other companies responsible for such utilities
10/08/2020	Mr. Enock Tumbo (Environmental Inspector- Ilala Municipal Council)	▪ The quantitative environmental and social baseline data have to be collected before the commencement of the construction works. Thus, the obtained parameters have to be monitored monthly during the whole construction	It has been done and all applicable laws and bylaws will be implemented accordingly**.** ▪ Registration to respective Authorities will be taken care of and Consultant will make follow-

Date	Stakeholder Name	Raised Concern	Response
		works to ensure the surroundings are not contaminated. For the better results of the monitoring, the work has to be done by qualified personnel. ▪ The Execution of the Environmental and Social Impact Assessment has to comply with the National Environmental Management Act. 2004 and its regulations. ▪ Solid Waste Management generated by the construction works has to comply with the bylaws during project implementation to maintain the scenic of the Municipal. ▪ All solid waste has to be collected and transported to the authorized dumpsite at Pugu Kinyamwezi area instead of pilling within the corridor or close to residential and commercial areas. ▪ The Hazardous waste management has to be executed by the Authorized Dealer recognized by the Vice President Office during the implementation of the construction works. ▪ Traffic management has to be prepared and revised during the project implementation period includes the provision of the alternative road and parking for the affected areas throughout the proposed road corridor. ▪ The Contractor has to engage the qualified person for conducting HIV/AIDS, STIs, and BP prevention and protection programs for workers and the public during project implementation to impact awareness to the public and workforces. ▪ The project should be registered by OSHA ▪ The Contractor should be registered and contributes the workforces with WCF ▪ All the workforce expected to be engaged in the project has to be provided with a working contract ▪ The existing Buses for BRT Phase 1 are not enough to meet the transport requirement.	up to ensure the adherence of laws and regulations.
10/08/2020	Kinondoni Municipal Council Mohamed Msangi (Municipal	▪ The stations between BRT roads should be provided with sanitary facility to improve the provided services. For example, travelling from Kivukoni to Tegeta without	The proposal will be shared with the Client. The Contractor must implement ESMP The design will consider flooding areas to make the project user friendly.

Date	Stakeholder Name	Raised Concern	Response
	Environmental Management Officer)	having the facility for short call especially for elders its impossible. ▪ The Contractor should implement the ESMP as proposed in the ESIA accordingly include to engage the qualified environmental and social Expert during implementation. ▪ The proposed location of Basihaya Park and ride and terminal and Mlalakua Park and ride is the flooding, the designer has to consider it not to cause as what is happening now at Jangwani Depot. ▪ Passengers' congestion in the BRT can increase outbreak of epidemic or pandemic disease, the operation has to be improved compared with what is going on in phase 1. ▪ The management have to make sure that the provided dust bins have to be emptied timely in stations ▪ The designer has to provide shops for soft drink and pharmacy within the stations to improve services ▪ The excavated materials have to collected and transported to Pugu Kinyamwezi instead of haphazardly dumping in residence and commercial areas	Environmental Health will be given the top priority. Provision of shops for sot drinks at BRT stations will be presented to the Client for consideration
11/08/2020	DAWASA Mr. Gilbert Yoachim Masawe (Regional Manager – Kawe)	▪ The proposed road sections have been traversing by the water supply pipes with diameters ranges from 6 to 72 inches located along and across as distribution and offtake pipes. Thus, in either way, the construction works may interrupt with it and cause damage. ▪ The DAWASA have been categorized the relocations works into two categories. The pipes below 10 inches its relocation works are under Regional Managers' Offices while those with above 10 inches its relocation works are under the distribution department. ▪ Close communications between DAWASA, Client, Consultant, and Contractor is of very important before the commencement of the construction works to avoid pipe breakage, thus lead to water contamination includes impairing of public health. ▪ The construction team has to write the letters to DAWASA to request a joint related to the mapping and	The relocation will be done by qualified companies in collaboration with DAWASA

Date	Stakeholder Name	Raised Concern	Response
		relocation of pipes works. DAWASA will prepare and issue financial quotations related to relocation and supervision works before the commencement of the construction works. ▪ Any pipes breakage that will cause loss of water-related to construction works, the water bill will be issued to the responsible person or firm since that water would be incurred some cost during production and transportation. ▪ The construction works should provide service ducts/sleeves at least every 1 km for future utility crossing due to the expected increase in demand to avoid cutting the roads since reinstatement will not be the same as the original works. ▪ The DAWSA discourage to engage the subcontractors into relocation works since most of them have no enough capital to execute the works and when the main Contractor delay paying them even the works delays and the DAWASA loss revenue and costumer's loss services.	
11/08/2020	Eng. Kimaro Regional Manager DAWASA – Tegeta	▪ The designer has to design in such a way that the large pipes located close along the proposed road corridor do not relocate by forcing the construction works to shift into the safe side of the road because the relocation works are very cost full. ▪ During the construction works, some of the pipes will be relocated while others protected from being damaged especially the offtake pipes, this will depend on the assessment that will be executed by the DAWASA. ▪ The proposed BRT Terminal at Tegeta is a flood area. The designer has to consider the provision of a stormwater drainage system to remove all the water that tends to pond during rainy. ▪ To avoid delay in the relocation of water utilities. The Contractor has to purchase the materials while the DAWASA will supervise the works. Purchasing working has a lot of processes in the Government that may cause a delay in work progress and relocation works.	The main pipes should lay parallel with the road to reduce costs when the main is cut. The Contractor will be advised to buy materials for relocation of water pipes.

Date	Stakeholder Name	Raised Concern	Response
		▪ It is better to engage staff from the DAWASA during relocation works since it will help the Contractor to put off the nearby valves that stop water from being wasted. Failure to do that, the water bill will be issued to the Contractor to compensate for the wasted water.	
11/08/2020	TANESCO Kinondoni North Regional Office (a) Mathew Mvungi-0788 230784	▪ The normal procedure is to make consultation with Kinondoni North Regional Manager to relocate the overhead and underground transmission lines.	Not Applicable
22/12/2021	TTCL Kinondoni Regional Manager's Office (a) Eng Bernard Kitego Assistant Regional Manager-Network (ARM-Network) -0738 262612	▪ There are some underground fibre optic cables and overhead copper cables, along the road section but mainly within the urban area. ▪ The Contractor or TANROADS will be responsible for the cost of relocation and restoration. However, after payment it is the responsibility of TTCL to carry out the relocation and restoration works. ▪ It is important for the Contractor or TANROADS to inform TTCL to enable joint survey to identify the location of underground, manholes and overhead cables before commencement of construction works	TANROADS will make consultation with TTCL before commencement of construction works to identify the location of all underground cables.
14/08/2020	DART Albina John (Environmentalist) Delfina Mathias (Town Planner) Nason Bwatota (Town Planner)	▪ The realist market property value has to provide to avoid raise of valuation cost ▪ Only the realist properties measurements have to be provided in the report to avoid reworking after verification ▪ The coordinates of the valued properties have to presented in the report to easy verification ▪ The properties and owner pictures have to be included in the report ▪ During stakeholder consultations meetings the local leader have to be told to inform the property owners in the provided infrastructures not to develop the area when waiting for their properties to be valued ▪ Grievance committee have to be made prior execution of the valuation exercises	The RAP will be developed as road map of valuation. In this case the market value cost will be considered for the properties with market value and Replacement cost will also apply to the properties with no market value i.e. community buildings, religious buildings etc. The ESIA will provide list of environmental issues in each phase.

Date	Stakeholder Name	Raised Concern	Response
		▪ All the properties fall within the demarcated corridor have to marked and valued to avoid grievances and reworking ▪ The environmental and social impacts have to listed and described according to the project phases such as mobilization, constructions and operation ▪ The impacts have to be identified according to the proposed project components such as roads, depots, park and ride, stations and terminals ▪ The project alternatives have to exhausted instead of just mention the with or without project ▪ The access road that receives traffic turns left and right from the BRT road have to be improved	
17/08/2020	DAWASA Upanga Eng. Mbaraka Mohamedi. Eng. Justine Kyando	▪ The sewage pipes located underneath varying from 3m to 4m deep, there is no possibility to be affected by the construction works. ▪ If the need of relocating the pipes arises, the joint pipes mapping between DAWASA and the proponent will be executed and the relocation will be done under supervision of DAWASA. ▪ DAWASA will provide the specification and cost estimates of the materials required during relocation	All proposals will be taken care of by both Proponent and Contractor.
17/08/2020	DARCOBOA Shifwaya Lema (Commuter Buses Leaders Representative Owner)	▪ The association is aware of the plan for implementing BRT phase 4 ▪ The association was part of co-founder of the BRT projects and the aim was to own share for the phase 1 eventually failed due to not trusting each other, hopeful we will have share for the ongoing BRT phases. ▪ The revenue collected from the commuter buses at the proposed project area will decrease and the loan credit repayment will not be completed timely. ▪ The government revenue from the commuter bus will also decrease ▪ The displaced commuter bus from the proposed road will automatically increase traffic congestion in other roads in the city and the owner will not get the usual revenue as approximately more than 1500 commuter will be displaced from the proposed road.	The commuters along BRT4 should be relocated to other areas without BRT so that the income will be restored and hence possibility of repaying the loans. Commuters may change the routes from urban area to rural areas where the transport demand is still very high. It will be ideal if commuter owners observe the law established Urban Transport (UDA) so that conflict of interest will not persist in all urban areas with BRT services.

Date	Stakeholder Name	Raised Concern	Response
		▪ It would fair for the government to compensate the commuter bus owners for the displacement but our Tanzania laws do not support the matter ▪ The commuter buses are source of income to drivers and their assistants that help to run their family through paying rent and school fees this part also will be affected with the displacement. ▪ We are ready to be relocated from the proposed BRT 4 areas ▪ The traffic management plan should be done jointly and early as much as possible inconvenience for other road users.	
20/08/2020	Nokia/Consortium Eng. Edipidius Kajuna	▪ The project implementer has to provide a reasonable timeframe for relocating the utilities since relocation involves use of money and getting money for such huge work needs a budget and approval from the management, this sometimes is a source of delaying in relocation works. ▪ The joint work for mapping the utilities is of very important before start construction works to avoid disrupting the utilities and deny the services to the public. ▪ The project implementer should share the work program for the whole construction works for the utility owner to know where exactly the relocation works has to start immediately.	All these concerned will be considered before construction.
20/08/2020	Tanzania Forest Services Mr. John Rufangwaba (Ag. DRM)	▪ The project proponent has to evaluate the mangroves that are likely to be affected and the valuation exercise has to involve the mangroves Expert from TFS to provide cost estimates for compensation of the mangroves. ▪ TFS will also assess the mangrove recovery includes management of disturbances during project implementation. ▪ The activity that involves fell of the mangroves declines the amount of CO_2 to be absorbed since Mangroves is the main natural carbon dioxide (CO_2) sink.	Environmental measures will consider destruction of mangrove and the best way of replanting/replacement since BRT is the public project like mangrove under TFS. It should also be noted that negative impacts on mangrove and other natural habitants is very minimal as the project works mainly within the midst of the road. Expansion of the road is mostly at the stations

Date	Stakeholder Name	Raised Concern	Response
		▪ Inside the mangrove coverage area are the places for fish spawning grounds, thus fell or any activity that interrupts the mangroves will also affect the fish spawning grounds. ▪ Any activity in wetland areas can affect or enhance the ecological systems, thus the project has to make sure to enhance the ecological system instead of disturbing ▪ There is the certain of the wildlife habitual to be affected by the construction works at the mangrove area, hence wildlife assessment has to be executed to be familiar with the wildlife-related impacts associated with construction works includes to propose the mitigating measures.	

APPENDIX 18: ANALYSIS OF ISSUES RAISED BY STAKEHOLDER REPRESENTATIVES.

Valued Environmental Component (VEC)	Issues / Concerns	Number of Issues / Concerns
1. Current Land and Resource Use	The existing levels of the residence area have to tally with that of the proposed road	13
	The discharge from the drainage system should not be directed to residence areas.	
	Sensitization to the public should be done early for them to know the government plan and accept the situation if the plan will need them to vacate from the proposed road corridor.	
	The owner of the proposed borrow and sand pits have to be known and they have to provide the reinstatement plan after finishing the project since they will be selling materials.	
	The realist market property value has to provide to avoid raise of valuation cost	
	Only the realist properties measurements have to be provided in the report to avoid reworking after verification	
	The coordinates of the valued properties have to presented in the report to easy verification	
	The properties and owner pictures have to be included in the report	
	During stakeholder consultations meetings the local leader have to be told to inform the property owners in the provided infrastructures not to develop the area when waiting for their properties to be valued	
	Grievance committee have to be made prior execution of the valuation exercises	
	All the properties fall within the demarcated corridor have to marked and valued to avoid grievances and reworking	
	The project proponent has to evaluate the mangroves that are likely to be affected and the valuation exercise has to involve the mangroves Expert from TFS to provide cost estimates for compensation of the mangroves.	
	TFS will also assess the mangrove recovery includes management of disturbances during project implementation.	
2. Public Health, Safety and Security	Contractor should make sure that he has the contracts with sanitation facility owner that will be utilized by their workforces during construction along the road	6
	The Contractor has to engage the qualified person for conducting HIV/AIDS, STIs, and BP prevention and protection programs for workers and the public during project implementation to impact awareness to the public and workforces.	
	Traffic management plan should be prepared and implemented during construction	
	The stations between BRT roads should be provided with sanitary facility to improve the provided services. For example, travelling from Kivukoni to Tegeta without having the facility for short call especially for elders it is impossible.	
	Passengers' congestion in the BRT can increase outbreak of epidemic or pandemic disease, the operation has to be improved compared with what is going on in phase 1.	

Valued Environmental Component (VEC)	Issues / Concerns	Number of Issues / Concerns
	The project should be registered by OSHA	
3. Transportation	Training should be given to drivers to use the proposed alternative/diversion roads during construction.	5
	The project implementation team should plan to renovate the proposed alternative/diversion roads after project completion	
	Traffic management has to be prepared and revised during the project implementation period includes the provision of the alternative road and parking for the affected areas throughout the proposed road corridor.	
	The existing Buses for BRT Phase 1 are not enough to meet the transport requirement.	
	The access road that receives traffic turns left and right from the BRT road have to be improved	
4. Community and Public Service Infrastructure / Utilities	The construction team have to map all the pipes that needs to relocated traversing along and crossing the proposed road corridors in consultation with DAWASA Regional Offices.	19
	The pipes that cross the proposed road corridors have to be provided with ducts. The detailed information is available at DAWASA Regional Offices.	
	The DAWASA have been categorized the relocations works into two categories. The pipes below 10 inches its relocation works are under Regional Managers' Offices while those with above 10 inches its relocation works are under the distribution department.	
	Close communications between DAWASA, Client, Consultant, and Contractor is of very important before the commencement of the construction works to avoid pipe breakage, thus lead to water contamination includes impairing of public health.	
	The construction team has to write the letters to DAWASA to request a joint related to the mapping and relocation of pipes works. DAWASA will prepare and issue financial quotations related to relocation and supervision works before the commencement of the construction works.	
	Any pipes breakage that will cause loss of water-related to construction works, the water bill will be issued to the responsible person or firm since that water would be incurred some cost during production and transportation.	
	The construction works should provide service ducts/sleeves at least every 1 km for future utility crossing due to the expected increase in demand to avoid cutting the roads since reinstatement will not be the same as the original works.	
	The DAWSA discourage to engage the subcontractors into relocation works since most of them have no enough capital to execute the works and when the main Contractor delay paying them even the works delays and the DAWASA loss revenue and costumer’s loss services.	

Valued Environmental Component (VEC)	Issues / Concerns	Number of Issues / Concerns
	The designer has to design in such a way that the large pipes located close along the proposed road corridor do not relocate by forcing the construction works to shift into the safe side of the road because the relocation works are very cost full.	
	During the construction works, some of the pipes will be relocated while others protected from being damaged especially the offtake pipes, this will depend on the assessment that will be executed by the DAWASA.	
	The proposed road sections have been traversing by the water supply pipes with diameters ranges from 6 to 72 inches located along and across as distribution and offtake pipes. Thus, in either way, the construction works may interrupt with it and cause damage.	
	To avoid delay in the relocation of water utilities. The Contractor has to purchase the materials while the DAWASA will supervise the works. Purchasing working has a lot of processes in the Government that may cause a delay in work progress and relocation works.	
	It is better to engage staff from the DAWASA during relocation works since it will help the Contractor to put off the nearby valves that stop water from being wasted. Failure to do that, the water bill will be issued to the Contractor to compensate for the wasted water.	
	The sewage pipes located underneath varying from 3m to 4m deep, there is no possibility to be affected by the construction works.	
	If the need of relocating the pipes arises, the joint pipes mapping between DAWASA and the proponent will be executed and the relocation will be done under supervision of DAWASA.	
	DAWASA will provide the specification and cost estimates of the materials required during relocation	
	The project implementer has to provide a reasonable timeframe for relocating the utilities since relocation involves use of money and getting money for such huge work needs a budget and approval from the management, this sometimes is a source of delaying in relocation works.	
	The joint work for mapping the utilities is of very important before start construction works to avoid disrupting the utilities and deny the services to the public.	
	The project implementer should share the work program for the whole construction works for the utility owner to know where exactly the relocation works has to start immediately.	
5. Terrestrial Environment	The quantitative environmental and social baseline data have to be collected before the commencement of the construction works. Thus, the obtained parameters have to be monitored monthly during the whole construction works to ensure the surroundings are not contaminated. For the better results of the monitoring, the work has to be done by qualified personnel.	8

Valued Environmental Component (VEC)	Issues / Concerns	Number of Issues / Concerns
	Solid Waste Management generated by the construction works has to comply with the bylaws during project implementation to maintain the scenic of the Municipal.	
	All solid waste has to be collected and transported to the authorized dumpsite at Pugu Kinyamwezi area instead of pilling within the corridor or close to residential and commercial areas.	
	The Hazardous waste management has to be executed by the Authorized Dealer recognized by the Vice President Office during the implementation of the construction works.	
	The proposed location of Basihaya Park and ride and terminal and Mlalakua Park and ride is the flooding, the designer has to consider it not to cause as what is happening now at Jangwani Depot.	
	The management have to make sure that the provided dust bins have to be emptied timely in stations	
	The excavated materials have to be collected and transported to Pugu Kinyamwezi instead of haphazardly dumping in residence and commercial areas	
	The proposed BRT Terminal at Tegeta is a flood area. The designer has to consider the provision of a storm water drainage system to remove all the water that tends to pond during rainy.	
6. Economy and Employment	The Contractor should be registered and contributes the workforces with WCF	9
	All the workforce expected to be engaged in the project has to be provided with a working contract	
	The designer has to provide shops for soft drink and pharmacy within the stations to improve services	
	The association was part of co-founder of the BRT projects and the aim was to own share for the phase 1 eventually failed due to not trusting each other, hopeful we will have share for the ongoing BRT phases.	
	The revenue collected from the commuter buses at the proposed project area will decrease and the loan credit repayment will not be completed timely.	
	The government revenue from the commuter bus will also decrease	
	The displaced commuter bus from the proposed road will automatically increase traffic congestion in other roads in the city and the owner will not get the usual revenue as approximately more than 1500 commuter will be displaced from the proposed road.	
	It would fair for the government to compensate the commuter bus owners for the displacement but our Tanzania laws do not support the matter	
	The commuter buses are source of income to drivers and their assistants that help to run their family through paying rent and school fees this part also will be affected with the displacement.	
7. Atmospheric Environment	The activity that involves fell of the mangroves declines the amount of CO_2 to be absorbed since Mangroves is the main natural carbon dioxide (CO_2) sink.	1
8. Aquatic Environment	Inside the mangrove coverage area are the places for fish spawning grounds, thus fell or any activity that interrupts the mangroves will also affect the fish spawning grounds.	1

Valued Environmental Component (VEC)	Issues / Concerns	Number of Issues / Concerns
9. Wetland Environment	Any activity in wetland areas can affect or enhance the ecological systems, thus the project has to make sure to enhance the ecological system instead of disturbing	2
	There is the certain of the wildlife habitual to be affected by the construction works at the mangrove area, hence wildlife assessment has to be executed to be familiar with the wildlife-related impacts associated with construction works includes to propose the mitigating measures.	

APPENDIX 19: LIST OF CONSULTED WARDS AND MTAA LEADERS.

No.	Municipal	Wards	Streets (Mitaa)	Contact (WEO)	Consultation Date
1	Ilala Municipal council	Kisutu	Kisutu	`0714228668	29/09/2020
			Mtendeni		
2		Upanga West	Charambe	`0655688873	15/09/2020
3		Upanga East	Kibasila	`0755360022	15/09/2020
			Kitonga		
4	Kinondoni Municipal Council	Kivukoni	Kivukoni	`0652355882	16/09/2020
5		Kinondoni	Kumbukumbu	`0713688028	16/09/2020
			Ada Estate		
6		Ananasifu	Mkunguni B	`0714186668	17/09/2020
7		Msasani	Osterbay	`0763253503	18/09/2020
			Mikoroshoni		
			Makangira		
8		Mikocheni	Legent Estate	`0735276182	18/09/2020
			Ally Hassani Mwinyi		
			TPDC		
			Mikocheni		
9		Mwananyamala	Bwawani	`0655433319	20/09/2020
			Kwa Kopa		
10		Makumbusho	Makumbusho	`0713967660	20/09/2020
11		Kijitonyama	Mwenge	0717136822	23/09/2020
			Mpakani A		
			Mpakani B		
			Kijitonyama		
			Bwawani		
12		Makongo	Mlalakua	`0714530455	22/09/20202
			Makongo juu		
13		Mbezi Juu	Mbezi Juu	`0715779633	24/09/2020
			Mbezi Kati		
			Numbwi		
			Jogoo		
14		Kawe	Ukwamani	`0755545851	18/01/2021
			Mbezi Beach A		
			Mbezi Beach B		
15		Kunduchi	Kilongawima	0713460721	25/09/2020
			Mtongani		
			Tegetta		
			Pwani		
16		Wazo	Salasala	0718417436	18/01/2021
			Wazo		
17	Ubungo Municipal Council	Sinza	Sinza A	`0752874443	30/09/2020
			Sinza B		
18		Ubungo	NHC-Ubungo	`0787944245	
			Chuo Kikuu		

APPENDIX 20: ISSUES/CONCERNS RAISED BY WARD AND MTAA LEADERS.

S/n	Issues/Concerns	Response by Consultant
1	Compensation of affected people (PAPs) must be fair and timely paid to avoid inflation.	It will be fair as long as RAP will provide means of assessment and valuation according to Tanzania Laws.
2	Pedestrian walk should be included in the design.	The Client will be advised
3	The project will affect small business people who found along the project area. People with business should be informed in advance on the intention of the Government to construct BRT 4 and they must look for other areas for their business.	Early notification will be provided as soon as design is in place.
4	Companies with utilities along and across the road like DAWASA should relocate their respective utilities before construction to avoid inconvenience. During relocation of utilities community will have some challenges like water cut and electricity cut.	The arrangement between Proponent/Contractor and Utility owners will be held before construction and all utilities will be relocated to avoid denying basic social services to the communities/customers.
5	Feeder roads will be closed during construction small business entrepreneur will be affected economically because number of customers will be reduced.	Contractor will open other alternative roads which will allow your customers to visit your business.
6	Noise and dust pollution due to machinery and excavation.	Contractor will be advised to lubricate machines to minimize noise and use water to suppress dust during construction
7	Vibration during construction can cause cracks to the nearby houses	In fact vibration will be very minimal because construction is taking place at the middle of the road except Tegeta to DAWASA deport. Furthermore, BRT4 route will be constructed by rigid concrete which does not demand heavy compaction. Before construction the Contractor will take inventory of all houses along the road if cracks will be caused by construction the Contractor will repair them at the end of the project.
8	Domestic water supply and waste water systems which are within the project area should be designed and constructed separately to avoid interference between systems.	The design will take are of these issues and propose viable solutions.
9	Contractors has to give cooperation to the community in case of any damages caused by project activities to the properties	Contractor will work very close with Mtaa leaders and he will let the community know if any damage has happened and when remedial will take place.
10	During construction phase; drainage system should be well constructed for handling floods during rain seasons.	Major drains are already existing. BRT4 is mainly concentrated at the middle of dual carriage way roads except Tegeta to DAWASA deport.

11	Bus terminals should be well covered with roofs to protect system users from rains and sun especially on pedestrian bridge. During rains passengers get wet because of the long walk before reaching ticket offices	This proposal will be shared with the Client/Proponent for possibility of shading BRT corridors.
12	Disabled and elders need special paths when using overpasses for entering bus terminals instead of using normal stairs. The design should include ramps for People with disability (PWD). On the other hand, the design should include toilet on boarding stations, and should be freely provided because of elders and people suffering from diabetes. Moreover, boarding stations should be provided with few benches for elders and PWD.	It will be considered and implemented to allow PWD to access transport easily.
13	During construction the environment should be conserved especially natural mangroves at Sealander Bridge, natural trees, and Wetlands	ESMP will instruct the best way of conserving natural habitats.
14	First aid kit should be available in all boarding stations for emergencies.	First Aid Kits and First Aides will be supplied in every BRT station
15	Passenger paying system should be electronically connected to save time and reduce congestions.	It will take care of because digital systems are more accurate than manual and it avoids temptations.
16	People stay long time waiting for buses they need to increase buses.	In the coming BRT projects buses will be increased because pilot stage is almost over.
17	Between DAWASA and Nyaishozi culverts in Kunduchi ward are 100 meters far from the mouth of water canal that drains water to the sea; Hence, large quantity of water spreads to people's residents on their way towards the water canal, so the design should take it into consideration.	In the design culverts will be of reasonable size to discharge storm water to the sea.
18	Construction must consider historical background of a place before designing drawings	It will take care of. Engineers will seek historical background of every place especially areas with unique features.
19	Sewerage system and rainy water drainage system should be designed well at Kilongawima street.	TANROADS will be advised on this issue as other project is working on main drainage at Kilongawima.
20	People should be educated about possible social interactions which may lead to HIV/AIDS provenances and unwanted pregnancies and infidelity.	Respective Municipals should continue with HIV/AIDS awareness and education. For the project there will be a programme on HIV/AIDS and STDs awareness campaign.
21	Passengers spend a lot of time waiting for buses, the new project to increase buses. Also, the number of passengers in one bus should be considered to avoid buses taking a lot of passengers without any limitation.	More buses will be increased so that a passenger can hardly wait for ten minutes to connect/continue with the journey.
22	Park and ride might generate the government revenues.	It is expected so.
23	During construction cracks on nearby houses mighty happen due to vibration, therefore compensation must be done to the affected person.	As explained in item 7 above
24	The project will solve the problem of road congestion in the city	That is the main objective of the BRT projects.

APPENDIX 21: ANALYSIS OF ISSUES RAISED BY WARD AND MTAA LEADERS.

Affected VECs	Issues / Concerns	Frequency of Issues / Concerns
1. Current Land and Resources Use	1.1. Compensation of affected people (PAPs) must be fair and timely paid to avoid inflation.	5
	1.2. The project will affect small business people who are found along the project area. People with business should be informed in advance on the intention of the Government to construct BRT 4 and they must look for other areas for their business.	
	1.3. Feeder roads will be closed during construction small business entrepreneur will be affected economically because number of customers will be reduced.	
	1.4. Between DAWASA and Nyaishozi culverts in Kunduchi ward are 100 meters far from the mouth of water canal that drains water to the sea; Hence, large quantity of water spreads to people's residents on their way towards the water canal, so the design should take it into consideration.	
	1.5. Contractors has to give cooperation to the community in case of any damages caused by project activities to the properties.	
2. Transportation	2.1. Pedestrian walk should be included in the design.	7
	2.2. Bus terminals should be well covered with roofs to protect system users from rains and sun especially on pedestrian bridge. During rains passengers get wet because of the long walk before reaching ticket offices.	
	2.3. Disabled and elders need special paths when using overpasses for entering bus terminals instead of using normal stairs. The design should include ramps for People with disability (PWD). On the other hand, the design should include toilet on boarding stations, and should be freely provided because of elders and people suffering from diabetes. Moreover, boarding stations should be provided with few benches for elders and PWD.	
	2.4. Passenger paying system should be electronically connected to save time and reduce congestions.	
	2.5. People stay long time waiting for buses they need to increase buses.	
	2.6. Passengers spend a lot of time waiting for buses, the new project to increase buses. Also the number of passengers in one bus should be considered to avoid buses taking a lot of passengers without any limitation.	

Affected VECs	Issues / Concerns	Frequency of Issues / Concerns
	2.7. The project will solve the problem of road congestion in the city.	
3. Public and Community Service Infrastructure/Utilities	3.1 Companies with utilities along and across the road like DAWASA should relocate their respective utilities before construction to avoid inconvenience. During relocation of utilities community will have some challenges like water cut and electricity cut.	2
	3.2 Domestic water supply and waste water systems which are within the project area should be designed and constructed separately to avoid interference between systems.	
4. Atmospheric Environment	Dust pollution due to machinery and excavation.	1
5. Acoustic Environment	5.1. Noise nuisance due to machinery and excavation	3
	5.2. During construction cracks on nearby houses mighty happen due to vibration, therefore compensation must be done to the affected person.	
	5.3. Vibration during construction can cause cracks to the nearby houses	
6. Terrestrial Environment	6.1. During construction phase; drainage system should be well constructed for handling floods during rain seasons.	4
	6.2. During construction the environment should be conserved especially natural mangroves at Sealander Bridge, natural trees and Wetlands.	
	6.3. Construction must take into account historical background of a place before designing drawings.	
	6.4. Sewerage system and rainy water drainage system should be designed well at Kilongawima street.	
7. Public Health & Safety	7.1. First aid kit should be available in all boarding stations for emergencies.	2
	7.2. People should be educated about possible social interactions which may lead to HIV/AIDS provenances and unwanted pregnancies and infidelity.	
8. Labour & Economy	Park and ride might generate the government revenues.	1

APPENDIX 22: NAMES AND SIGNATURES OF SMALL BUSEINESS OPERATORS.

CONSULTANCY SERVICES FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN FOR DAR ES SALAAM BUS RAPID TRANSIT (BRT) SYSTEM PHASE 4: CONTRACT NO. TRD/HQ/1045/2019/20

PRELIMINARY CONSULTATION FOR SMALL BUSINESS OPERATOR

BIASHARA

SN	NAME	~~ORGANIZATION~~	POSITION	CONTACTS	DATE	SIGNATURE
1	PATRICK R. MASHEMA	FENICHA	MWENYEKITI	0786093352	22/08/2020	[illegible]
2	JAMALI ATHUMANI	DOUBTANI	M HAZINA	0713512655	22/08/2020	[illegible]
3	AMINA SELEMANI	MAUA	MMILIKI	0787173281	22/08/2020	AMINA
4	HINDU. AMIRY.	MAMANTILIE	MPANGAJI	0655466629	22/08/2020	[illegible]
5.	LATIFA SUDI GEDE	PETROL STATION	MENEJA	0782-870481	22/08/2020	[illegible]
6	THABITI RASHID	KARADUGA		0653586001	22/08/2020	[illegible]
7	GONSALVA ATHANAS	NGUO	MFANYABIASHARA	0788-120195	22/08/2020	G. ATHANAS
8	JACKSON ANTONY	BODA	KATIBU	0756679582	22/08/2020	[illegible]
9	MUSA ALLY	TOFALI	MSIMAMIZI	0715449641	22/08/2020	[illegible]
10	PATRICK NGUYA	MAHINDI YA KUCHOMA	MWAKILISHI	0653022780	22-8-2020	[illegible]
11	KHALFAN IYULU	BAJAJ	MTIKITI	0713089363	22-8-2020	[illegible]
12.	HASSAN UKWAJU	FENICHA	MFANYABIASHARA	0714-555542	22/08/2020	[illegible]
13	OTTO IMKONTI	DAGAA	MWAKILISHI	0716-897810	22/08/2020	[illegible]
14	YUSUPH SALEHE	MAUA/MITI	MWAKILISHI	0717657540	22/08/2020	[illegible]

APPENDIX 23: RECORD OF ISSUES RAISED BY SMALL BUSINESS OPERATORS.

Location	Type of Business Operators	Issues / Concerns	Response
1. Haile Selassie or St Peters Junction Chainage: 3+900 to 4+060 RHS	Furniture and Flowers Venders	As per the leaders of the group, there is 38 people who operate business at that area are likely to be affected by the project implementation if they will be vacated. They know that the land where the business is conducted is the TANROADS property and their ready to vacate at any time when construction works will commence. Currently they are paying taxes for what they are doing there, they are pleasing the local Government to find a place where they can continue working and paying the taxes for the sustainable development of our country. The information given to them about the project were appreciated and also, they request to be informed at least one or two months before construction work to start.	-
2. Ruhinde Street Junction Chainage: 4+150 to 4+200 LHS	Mamalishe and Flowers Venders	No one is here to be against with the Government plans for the development of every citizen, we are ready to vacate when the time arrives. The government has to find the place where we can continue doing our business since we have been here since 1970 and the good enough, we are paying taxes as you can see our tax identity cards.	The respective municipal councils will identify new areas for relocation of small business operators.
3. Morocco Traffic lights Chainage: 4+800 to 4+850 LHS	Petro Station (Total)	We have already been informed about the project and the good thing TANROADS has marked their boundary and part of Petrol Station infrastructures will be used for construction thus will cause one pump to be shifted or relocated	Compensation will be paid for the affected petrol station.

Location	Type of Business Operators	Issues / Concerns	Response
		During construction works the revenue will fall as a result of our customers to be displaced thus number of employees will be reduced It is likely that, the Petro Station will be closed due to the Total policies of the Petrol station's locations where they want to do business.	
4. Mwenge Chainage: 9+100 to 9+350 LHS and 0+000 of Sum Nujoma	Various Retailers, Bodaboda and Bajaj Parking	It is true that, we are doing business within the road corridor and during construction we request TANROADS not to vacate us instead they can provide a small place where we can continue doing business. The BRT plan should also consider the small business operators since the BRT customers/commuters are also our customers and as well, we are paying taxes and cleaning the environment. If it happens that here will be no space remained for us to continue doing business, we are ready to vacate but we are requesting the government to find the place where we can continue doing business.	The respective municipal councils will identify new areas for relocation of small business operators. The design will take into consideration the needs and requirements of small business operators.
5. Mwenge Chainage: 9+100 to 9+350 LHS and 0+000 of Sum Nujoma	Various retailers, Bodaboda and Bajaj Parking	At the BRT stations the design should provide a place for Bajaj and Bodaboda since the BRT customers / commuters are also our customers especially for those who are residing and working far from the proposed road.	The design will take into consideration the needs and requirements of Bajaj and Bodaboda operators.
6. Tangi bovu Chainage: 12+400 to 12+800 LHS	Selling of Construction materials and Manufacture of Paving Concrete Blocks.	The proposed project will affect our economy The proposed project also will cause the youth who are benefiting from this business to be idle and eventual engaging in drugs thus the government will loss workforce. The government will loss revenue since the ongoing project is paying three taxes TRA, TANROADS,	The small business operators will be informed prior to commencement of construction works.

Location	Type of Business Operators	Issues / Concerns	Response
		Municipal and rent to the area beyond TANROAD property. TANROAD should inform us early the time when project will commence for us to stop paying taxes and to avoid to get loss.	
7. Tangibovu Chainage: 12+915 to 13+175 LHS	Fruits and Vegetable Vendors	We are ready to vacate when need arises, we request the government to find a place for conducting business so that we can continue contributing the development trough paying taxes. We also contributing money for cleaning the environment. The information regarding project commencement should be provided early. We all here know that, we in the government property.	-
8. Africana Chainage: 15+715 to 15+750 LHS	Fruits and Vegetable Vendors.	At this area the TANROADS should think to provide the pedestrian bridge since this is the accident zone and many pedestrians who crossing here are prone to accident. The design should consider to improve the U-Turn locations since the U-Turn areas in BRT phase 1 are very complicated and the access roads to the directed areas are not in a good standard. The location for Bajaj and Bodaboda parking should not be located far from the proposed BRT stations for our costumer not to walk a distance to find Bajaj or Bodaboda. During construction works the Contractors should plan the means of helping instead of vacating us from the working area since we depend the road for a living.	The design will take into consideration the pedestrian walkways and crossings. The design will consider the provision of access to the adjacent properties.
9. Tegeta kwa Ndevu Chainage: 20+525 to 20+800 LHS &	Furniture and Retail Shops.	The coming project will advertise more our products on the other hand the widening of the road will decrease the areas for placing our products.	The design will take into consideration the needs and requirements of small business operators.

Location	Type of Business Operators	Issues / Concerns	Response
RHS		TANROADS should provide the small area for conducting business and we promise we will not interrupt the pedestrian. The business that we are doing have been blessed by the local government since we are paying some amount for cleaning the environment. We request the TANROADS to inform us early the exactly time for project commencement since we depend this area to run our lives.	
10. Tegeta kwa Ndevu Chainage: 20+500 to 20+555 LHS	Mixed Vehicle Parking	We need such development, the government has to continue with his plan, we are ready to vacate at any time. it is good to be informed early once the project start	The small business operators will be informed prior to commencement of construction works.
11. DAWASA Depot (Basihaya) Chainage: 24 + 675 LHS	Mixed Vehicle Parking, Tree Seedlings and Flower Garden	We know the government plan regarding the proposed project We are ready to vacate since our business here is located temporary and the areas is the government property We have planted the trees here and the trees are providing the scenic of the area, if the trees are not going to be fell this will be our contribution to the proposed terminal of the BRT phase 4 The government has to know that this is the flood area we hope the plan/design has considered that.	The design has taken into consideration the flood events.
12. Tegeta Nyuki (Daladala Terminal)	Dala Dala Bus Bay	Daladala had very difficult time during the start of BRT phase 1 since we struggled to get commuters because most of them were interested to use BRT over Daladala.	The design will take into consideration the provision of parking areas for Bajaj and Bodaboda Operators.

Location	Type of Business Operators	Issues / Concerns	Response
		We also had the challenges of parking at Kariakoo after the start of Phase 1. During the displacement period it was very difficult to reach the daily target.	

APPENDIX 24: ANALYSIS OF ISSUES RAISED BY SMALL BUSINESS OPERATORS.

Affected VECs	Issues / Concerns	Frequency of Issues / Concerns
1. Labour and Economy	As per the leaders of the group, there is 38 people who operate business at that area are likely to be affected by the project implementation if they will be vacated.	11
	Currently they are paying taxes for what they are doing there, they are pleasing the local Government to find a place where they can continue working and paying the taxes for the sustainable development of our country.	
	The government has to find the place where we can continue doing our business since we have been here since 1970 and the good enough, we are paying taxes as you can see our tax identity cards.	
	During construction works the revenue will fall as a result of our customers to be displaced thus number of employees will be reduced	
	The proposed project will affect our economy	
	The proposed project also will cause the youth who are benefiting from this business to be idle and eventual engaging in drugs thus the government will loss manpower.	
	The government will loss revenue since the ongoing project is paying three taxes TRA, TANROADS, Municipal and rent to the area beyond TANROADS property.	
	TANROADS should inform us early the time when project will commence for us to stop paying taxes and to avoid to get loss.	
	During construction works the Contractors should plan the means of helping instead of vacating us from the working area since we depend the road for a living.	
	Daladala had very difficult time during the start of BRT phase 1 since we struggled to get commuters because most of them were interested to use BRT over Daladala.	
	During the displacement period it was very difficult to reach the daily target.	
2. Current Land and Resources Use	They know that the land where the business is conducted is the TANROADS property and their ready to vacate at any time when construction works will commence.	10
	We have already informed about the project and the good thing TANROADS has marked their boundary and part of Petrol Station infrastructures will be used for construction thus will cause one pump to be shifted or relocated	
	It is likely that, the Petro Station will be closed due to the Total policies of the Petrol station's locations where they want to do business.	
	It is true that, we are doing business within the road corridor and during construction we request TANROADS not to vacate us instead they can provide a small place where we can continue doing business.	

	The BRT plan should also consider the small business operators since the BRT customers/commuters are also our customers and as well, we are paying taxes and cleaning the environment.	
	If it happens that here will be no space remained for us to continue doing business, we are ready to vacate but we are requesting the government to find the place where we can continue doing business.	
	At the BRT stations the design should provide a place for Bajaj and Bodaboda since the BRT customers / commuters are also our customers especially for those who are residing and working far from the proposed road.	
	We also contributing money for cleaning the environment.	
	TANROADS should provide the small area for conducting business and we promise we will not interrupt the pedestrian.	
	The business that we are doing have been blessed by the local government since we are paying some amount for cleaning the environment.	
3. Transportation	At this area the TANROADS should think to provide the pedestrian bridge since this is the accident zone and many pedestrians who crossing here are prone to accident.	
	The design should consider to improve the U-Turn locations since the U-Turn areas in BRT phase 1 are very complicated and the access roads to the directed areas are not in a good standard.	4
	The location for Bajaj and Bodaboda parking should not be located far from the proposed BRT stations for our costumer not to walk a distance to find Bajaj or Bodaboda.	
	We also had the challenges of parking at Kariakoo after the start of Phase 1.	
4. Terrestrial Environment	We have planted the trees here and the trees are providing the scenic of the area, if the trees are not going to be fell this will be our contribution to the proposed terminal of the BRT phase 4	
	The government has to know that this is the flood area we hope the plan/design has considered that.	
	No one is here to be against with the Government plans for the development of every citizen, we are ready to vacate when the time arrives.	
	We are ready to vacate when need arises, we request the government to find a place for conducting business so that we can continue contributing the development trough paying taxes.	
	The information regarding project commencement should be provided early.	2
	We all here know that, we in the government property.	
	The coming project will advertise more our products on the other hand the widening of the road will decrease the areas for placing our products.	
	We request the TANROADS to inform us early the exactly time for project commencement since we depend this area to run our lives.	
	We need such development, the government has to continue with his plan, we are ready to vacate at any time.	
	It is good to be informed early once the project start	

	We know the government plan regarding the proposed project	
	We are ready to vacate since our business here is located temporary and the areas is the government property	

APPENDIX 25: SUMMARY OF SCOPING RESULTS.

Affected Component	Project Related Activities	Effects/Impacts	Scoped IN	Scoped OUT
1. Atmospheric Environment	Operation of heavy trucks mobile construction equipment/machinery.	Creation of air pollution due to emission of exhaust fumes.	✓	
	Soil excavations, earthworks and earth moving activities	Creation of air pollution due to dust emission	✓	
	Transportation of construction materials from borrow pits / quarry pits.	Creation air pollution due to dust emission along the access roads.	✓	
	Operation of concrete batching plant	Creation of air pollution due to dust emission.	✓	
	Operation of asphalt batch plant	Creation of air pollution due to dust emission.	✓	
	Removal of natural vegetation cover / trees	Increased concentration of GHG (CO_2).		✓
	Operation of BRT roads after construction.	Reduced emission of air pollutants and greenhouse gas.	✓	
2. Acoustic Environment	Operation of construction equipment / machinery	Creation of noise nuisance to the adjacent local residents.	✓	
	Compaction of soil materials along the road section.	Creation of vibration effects on adjacent building structures.		✓
	Transportation of construction materials from borrow pits /quarry pits.	Creation of noise nuisance to adjacent local residents.	✓	
3. Water Resources	Abstraction of water for construction and operation of camp site.	Depletion of local water sources.		✓
	Accidental overflow or deliberate discharge of raw sewage waste water.	Creation of ground and surface water pollution.		✓
	Discharge of storm water from roadside storm water drainages and culverts.	Creation of ground and surface water pollution.		✓
4. Aquatic environment	Construction of Selander bridge at Msimbazi Creek.	Destruction of mangrove vegetation		✓
	Water flow from roadside storm water drainages	Destruction of aquatic habitats.		✓
	Construction of cross drainage structures.	Destruction of aquatic habitats.		✓
5. Terrestrial environment	Site clearing and preparation	Destruction of existing planted trees and grass.		✓

Affected Component	Project Related Activities	Effects/Impacts	Scoped IN	Scoped OUT
	Transportation of construction materials from borrow pits to the construction site.	Destruction of natural vegetation and cultivated crops due to creation of access roads to borrow pits.		✓
	Storm water flow from roadside storm water drainage.	Creation of landscape degradation	✓	
	Accumulation of excavated soil materials and construction solid wastes.	Loss of aesthetic value of the surrounding environment.	✓	
	Accidental spillage of waste oils.	Loss of aesthetic value of the surrounding environment.	✓	
6. Public Health and Safety	Social interaction between construction workers and local community	Increased transmission of HIV/AIDS and STIs	✓	
	Induced influx of people into the BRT project sites.	Increased risk of exposure to Covid-19 transmission.	✓	
	Operation of construction equipment / machinery without PPE	Increased exposure to occupational health and safety risks	✓	
	Encroachment of people into the construction site.	Increased exposure to construction related risk of accidents	✓	
	Excavation of road bed and trenches for road side storm water drainages.	Creation of safety hazards to pedestrians and other road users.	✓	
	Handling of hazardous construction materials without PPE	Increased exposure to occupational health and safety risks.	✓	
	Movement of heavy trucks to and from construction site.	Increased risk of traffic accidents.	✓	
	Operation of BRT roads after construction.	Reduced road traffic accidents.	✓	
7. Labour and Economy	Recruitment of construction workers	Increased employment opportunities for local people.	✓	
	Induced influx of people into the BRT project sites.	Risk of emergence of Gender-Based Violence and Sexual Exploitation and Abuse due to influx of people into the project sites.	✓	
	Increased demand for food and other items due to presence of construction workers	Increased income generation opportunities for local people.	✓	

Affected Component	Project Related Activities	Effects/Impacts	Scoped IN	Scoped OUT
	Retrenchment of construction workers after project completion.	Loss of temporary employment	✓	
	Operation of BRT road after construction.	Increased productivity and stimulation of economic growth.	✓	
		Employment creation and economic improvement of households.	✓	
		Increased Revenue Collection by Local and Central Government	✓	
		Reduced Transportation Costs and Improved Access to Social Services.	✓	
		Reduced risk of traffic accidents and improved environmental quality.	✓	
		Increased comfortability of passengers.	✓	
8. Community Services and Public Service Infrastructure and Utilities	Increased demand for emergency response services.	Increased pressure on existing emergency response services		✓
	Increased demand for health and other social services.	Increased pressure on existing medical and social service facilities.		✓
	Increased demand for local housing and accommodation.	Increased income for owners of local housing and accommodation.	✓	
	Influx of people into BRT project sites.	Increased pressure on existing sanitary and solid wastes disposal facilities.	✓	
	Relocation of existing infrastructures and utilities.	Disruption of public infrastructure and utility services.	✓	
9. Transportation	Excavation of road bed and road side storm water drainages.	Severance of community access to other side of the road.	✓	
	Construction of BRT roads and storm water drainages.	Disruption of traffic flow along the construction road.	✓	
	Movement of heavy trucks hauling construction materials along the existing local roads.	Creation of damage on existing local roads.	✓	
10. Current Land and Resource Use	Land acquisition for construction of BRT infrastructure.	Loss of land and other properties by local residents.	✓	
	Induced influx of people into the BRT project sites.	Emergence of incompatible or conflicting land use with BRT operations.	✓	

Affected Component	Project Related Activities	Effects/Impacts	Scoped IN	Scoped OUT
11. Cultural Heritage Resources	Removal of Baobab Tree from the road median.	Destruction of sacred or cultural site.	✓	
	Preparation of BRT construction sites.	Destruction of archaeological artefacts.	✓	

APPENDIX 26: ENVIRONMENTAL IMPACT ASSESSMENT MATRIX.

Affected Valued Environmental Components (VECs)	Project Related Activities	Potential Environmental Effects/Impacts	Importance (A1)	Magnitude (A2)	Permanance (B1)	Reversibility (B2)	Cumulativity/ Synergistic (B3)	α1xα2 = ∂T	β1+β2+β3=σT	∂TxσT=ES	Significance	Ranking	Mobilization Phase	Construction Phase	Demobilization Phase	Operation Phase
Atmospheric Environment	Excavation and stockpiling of soil materials and dusty construction materials.	Increased air pollution due to dust emission along the construction road.	1	-2	2	3	3	-2	8	-16	Low	-2	-2	-2	0	0
	Transportation of construction materials from borrow pits / quarry pits.	Increased air pollution due to dust emission along the access roads.	2	-2	2	3	3	-4	8	-32	Medium	-3	0	-3	0	0
Acoustic environment	Operation of construction equipment / machinery	Creation of noise nuisance and vibration effects to the adjacent local residents.	1	-2	2	3	3	-2	8	-16	Low	-2	0	-2	0	0
	Transportation of construction materials from borrow pits /quarry pits.	Creation of noise nuisance and vibration effects to adjacent local residents.	2	-2	2	3	3	-4	8	-32	Medium	-3	0	-3	0	0
Terrestrial environment	Water flow from roadside storm drainages.	Creation of landscape degradation	2	-1	1	1	3	-2	5	-10	Low	-3	0	-3	0	0
	Accumulation of excavated soil materials and construction solid wastes.	Loss of aesthetic value of the surrounding environment.	1	-2	2	2	3	-2	7	-14	Low	-3	0	-3	0	0
Public Health, Safety and Security	Social interaction between construction workers and local community	Increased transmission of HIV/AIDS and STIs	3	-2	2	3	3	-6	8	-48	High	-3	0	-3	0	0

	Handling and operation of hazardous construction materials and equipment.	Creation of occupational health and safety risks.	1	-2	2	3	2	-2	7	-14	Low	-2	0	-2	0	0
	Increased influx of people into the project sites.	Increased risk of Covid-19 transmission.	1	-2	2	3	2	-2	7	-14	Low	-2	0	-2	0	0
	Operation of mobile construction equipment / machinery	Creation of construction related risk of accidents	1	-2	2	3	3	-2	8	-16	Low	-2	0	-2	0	0
	Excavation of road bed and trenches for road side storm water drainages.	Creation of safety risk to pedestrians and other road users.	2	-2	2	3	3	-4	8	-32	Medium	-2	0	-2	0	0
	Handling/operation of dusty construction materials/equipment	Creation of occupational health and safety risks.	1	-2	2	3	3	-2	8	-16	Low	-2	0	-2	0	0
	Movement of heavy trucks to and from construction site.	Increased risk of traffic accidents.	1	-2	2	3	3	-2	8	-16	Low	-2	0	-2	0	0
	Operation of BRT roads after construction.	Reduced road traffic accidents.	3	+3	2	3	2	+9	7	+63	High	+4	0	0	0	+4
Labour and Economy	Recruitment of construction workers	Increased employment opportunities for local people.	3	3	2	1	2	+9	5	+45	High	+4	0	+4	0	0
	Influx of people into the project sites.	Risk of emergence of GBV/SEA , SH and Child Labour due to influx of people into the project sites.	3	-2	2	1	2	-6	5	-30	Medium	-3	0	-3	0	0
	Induced influx of people into the BRT project sites.	Emergence of onflicting activities with BRT operations.	1	-1	3	3	3	-1	9	-9	Very Low	-1	0	-1	0	-1

	Increased demand for food and other items due to presence of construction workers	Increased income generation opportunities for local people.	3	+2	3	1	3	6	7	+42	High	-1	0	-1	0	0
	Demobilization or closure of the project	Loss of temporary employment opportunities for local people.	3	-3	3	1	1	-9	5	-45	High	+4	0	0	+4	0
	Operation of BRT road after construction.	Increased productivity and stimulation of economic growth.	3	+3	3	1	3	+9	7	+63	High	+4	0	0	0	+4
	-do-	Employment creation and economic improvement of households.	3	+3	3	1	3	+9	7	+63	High	+4	0	0	0	+4
	-do-	Increased Revenue Collection by Local and Central Government	3	+3	3	1	3	+9	7	+63	High	+4	0	0	0	+4
	-do-	Reduced Transportation Costs and Improved Access to Social Services.	3	+3	3	1	3	+9	7	+63	High	+4	0	0	0	+4
	-do-	Reduced risk of traffic accidents	3	+3	3	1	3	+9	7	+63	High	+4	0	0	0	+4
	-do-	Increased comfortability of passengers.	3	+3	3	1	3	+9	7	+63	High	+4	0	0	0	+4
Public service infrastructure/utilities.	Increased demand for local housing and accommodation.	Increased income for owners of local housing and accommodation.	3	+2	2	2	2	6	6	+36	High	-4	-3	-3	0	0
	Increased demand for sanitary and solid wastes disposal services.	Increased pressure on existing sanitary and solid wastes disposal facilities.	2	-2	2	2	2	-4	6	-24	Medium	-3	-3	-3	0	0
	Relocation of existing infrastructures and utilities.	Disruption of public infrastructure and utility services.	3	-2	2	1	1	-6	4	-24	Medium	-3	-3	-3	0	0

Transportation	Excavation of road bed and road side storm water drainages.	Severance of access by local residents to and from their houses / business.	3	-2	2	2	2	-6	6	-36	High	-2	0	-2	0	0
	Construction of BRT road and associated drainage structures.	Disruption of traffic flow and public transportation.	3	-2	2	2	2	-6	6	-36	High	-2	0	-2	0	0
Land and Resource Use	Land acquisition for construction of BRT infrastructure.	Loss of land and other properties by local residents.	1	-1	3	3	2	-1	8	-8	Very Low	-1	-1	0	0	0
Cultural Heritage Resources	Removal of Baobab Tree from the road median.	Destruction of sacred or cultural site.	3	-3	3	3	2	-9	8	-72	Very High	-1	0	-1	0	0
	Land excavation during preparation of BRT construction sites.	Destruction of archaeological artefacts	1	-1	3	1	2	-1	6	-6	Very Low	-1	0	-1	0	0

APPENDIX 27: CREDIBLE ACCIDETNS, MALFUNCTIONS, AND UNPLANNED EVENTS.

Accident / Malfunction / Unplanned Event	Description of Scenario	Description of Potential Environmental Effects	VECs Potentially Affected
(a) On-Site Spillage of Petroleum Products from Storage Tanks	A spill of petroleum products (*e.g.,* gasoline or diesel), within the PDA. This accident could result from fuel storage tank leakage or rupture that occurs within the PDA, with potential to affect land, air or water within the PDA or outside the PDA if not addressed in a timely manner.	A large spill may affect groundwater and soil, and surface water contamination may occur, thereby potentially adversely affecting the quality of ground and surface water. The accumulation of petrol will lead into air pollution due to volatile organic carbons. Spilled petroleum products may get into contact with ignition sources and result into fire, hence compromising the public safety.	• Atmospheric Environment. • Water Resources. • Aquatic Environment • Public Health and Safety
(b) Off-Site Trucking Accident	A Project-related accident involving a truck carrying gasoline or diesel fuel for use on-site. A spillage of fuel on external access roads beyond the PDA could spread onto land and/or enter an adjacent water body. Fires that may result from an off-site trucking accident are assessed in the “Fire” section.	An off-site trucking accident could result in a spillage of petrol or diesel fuel being transported. This spilled petroleum products could adversely affect water quality in any watercourses in proximity to the spill, the terrestrial environment, and wetlands, and could affect the ability of the public to use roads.	• Atmospheric Environment. • Water Resources. • Aquatic Environment. • Terrestrial Environment. • Public Health and Safety. • Land and Resource Use. • Current Use of Land and Resources by Local People. • Community Services, Infrastructure • Transportation
(c) Vehicle Collision	A Project-related vehicle accident on road transportation networks outside the PDA, without a spill. Includes vehicle to vehicle collision, pedestrian strike and livestock strike. Accidents involving spills are addressed under “On-Site Spillage of Petroleum Products” or “Off-Site Trucking Accident.”	A vehicle collision could adversely affect livestock, local communities, including pedestrians, using Project access roads.	• Terrestrial Environment. • Public Health and Safety. • Community Services, Infrastructure and Transportation.

Accident / Malfunction / Unplanned Event	Description of Scenario	Description of Potential Environmental Effects	VECs Potentially Affected
	Collisions resulting in fires are assessed under "Fire".		
(d) Project Related Fire	A fire occurring as a result of Project activities. A fire could occur within the Camp site due to a fuel spill from storage tanks at the petrol filling station. The spillage may spread outside of the PDA, hence getting into contact within ignition sources and resulting into fire. Spillage of petroleum products may occur from an off-site vehicle accident. During this period the local people may be tempted to tap leaking fuel from the leaking tanker. This situation may result into fire outbreak. Hence causing injuries or death to the surrounding people and damage to the adjacent properties. A fire arising from other causes and potentially affecting the Project is assessed as an Effect of the Environment on the Project (Section 8.16).	A fire could release emissions to the atmosphere, affect natural vegetation adjacent to the PDA, endanger wildlife, and affect the cultivated and livestock grazing areas surrounding the PDA. The fire outbreak could lead into loss of livelihood due to disruption of economic activities in the affected areas. The existing social services and infrastructures will also be affected by fire outbreak.	• Atmospheric Environment • Water Resources • Aquatic Environment • Terrestrial Environment • Public Health and Safety • Labour and Economy • Community Services, Infrastructure and Transportation • Land and Resource Use • Current Use of Land and Resources by Local People
(e) Hazard / Risk from High Voltage Electric Power Lines	The High Voltage (HV) Electric Power Lines passes through the PDA. The following worst-case scenarios should be considered during construction: ▪ Electrocution due to mobile equipment / machinery touching an overhead live wire. ▪ Mobile construction equipment / machinery or truck hitting an electricity pole and causing it to fall-resulting into electrocution and death to nearby people passing	If a live wire from HV Electricity Power Line falls if is likely to result into sever injury and death to the operator of a mobile equipment and other people in the area. A fallen HV Line and Pylons will prevent the use of the road until these structures are removed from the area. This will result into impairment and delays of transportation and delays along the main road, hence creating financial; and economic loss to the road users and the rest of the public due to	• Public Health and Safety • Labour and Economy

Accident / Malfunction / Unplanned Event	Description of Scenario	Description of Potential Environmental Effects	VECs Potentially Affected
	under the HV Line including the equipment operator. ▪ Extreme weather condition such as severe wind and thunderstorm causing the electricity pole to fall down -leading into electrocution of people living in the adjacent buildings and even causing fire to the adjacent buildings.	disruption of power supply to other parts of the country.	

APPENDIX 28: EMERGENCY PREPAREDNESS AND RESPONSE PLAN.

1.0 Introduction

The objective of the Emergency Preparedness and Response Plan is to assist the heath facility Contractors in developing their emergency procedures. Emergency preparedness helps to minimize human suffering and economic losses that can result from emergencies. The degree of planning for emergency will depend on the size, access and location of the health facility. It is therefore strongly recommended that the contractor should ensure that the local community members and construction workers be involved in developing the emergency response plan.

2.0 Development of the Plan

The Contractor shall develop an emergency preparedness plan before commencement of construction works. The development of emergency preparedness plan shall include:

2.1 Hazard Identification and Assessment

The process of hazard identification and assessment will involve a thorough review of the following points:

- Transportation, materials handling, hoisting, equipment or product installation, temporary structures, material storage, start-up, and commissioning activities environmental concerns
- Consultation with the client regarding potential hazards when working in or adjacent to operating facilities.
- Resources such as material safety data sheets (MSDS) to determine potential hazards from on-site materials.
- Proximity to traffic and public ways

Once hazards are identified, the next task will be to assess the potential or risk involved in each. For each hazard identified, the following questions will be asked:
What can go wrong?
What are the consequences?
For each potential hazard the identification of emergency resources necessary will be done for an appropriate emergency response. The Contractor will carry out a simple analysis based on the experience of the local people and people involved on the project.

2.2 Emergency Resources

The Contractor shall identify which resources are available and have contingency plans in place to make up for any deficiencies. The most important resource on this project will be a Police Emergency Number and Fire and Rescue Emergency Number. The Contractor will have to verify that these numbers are in effect in the project area. In this case the Contractor has to ask the following questions:
Is a high-reach rescue team available?
What is the response time?
What must site personnel do in the meantime?
Other on-site resources such as fire extinguishers, spills containment equipment, and first aid kits will be maintained and clearly identified. Construction equipment may be included among potential emergency resources. Personnel, especially on-site medical staff or workers trained in first aid, will be included in the plan.

In case outside resources are so far away that an adequate response is not possible, the resources will be obtained and kept on site. These will include fire protection or ambulance/medical resources in remote areas. Whatever the situation may be, people, equipment, facilities, and materials will be needed for emergency response. The Contractor must determine the location of these resources in advance. Moreover, the people supplying these resources must be made aware of their role in the plan.

2.3 Communication Systems

The effective emergency response depends on communications system that can relay accurate information quickly. Therefore, the Contractor will use a reliable communications equipment, develop procedures, and use trained personnel. The Contractor will have a backup system in place, in case the system is rendered useless by the emergency. For example, telephone lines may be cut.

The type and location of emergency communication systems will be posted at the construction site. This will include location of telephones, a list of site personnel with cellular phones or two-way radios,

and any other equipment available. The emergency phone numbers and the site address/location must be posted beside all site phones.

The communication system will be made up of strategically placed equipment and properly defined responsibilities. The emergency response plan will be posted in a conspicuous place at the construction site and must identify the designated equipment and people to operate it.

2.4 Administration of the Plan

The task of administering and organizing the plan is vital to its effectiveness. The person who has this task will normally be the person in charge of the emergency response operation. Thus, the Contractor must appoint an emergency response person to be in charge of emergency response operation. The task of emergency response person will be to:

- Ensure that everyone clearly understands their roles and responsibilities within the emergency response plan (a chart may be helpful in this regard).
- Ensure that emergency resources, whether people or equipment, are kept at adequate levels in step with the progress of the project.

The emergency plan will be reviewed on a regular basis and especially after an emergency has occurred. Changes will be made whenever necessary, in case deficiencies become apparent as the plan went into operation.

2.5 Emergency Response Procedure

The Contractor must understand that an emergency can be reported from any source—a worker on site, an outside agency, or the public. It must be remembered that circumstances may change during the course of an emergency. Therefore, the developed procedures must be able to respond to the ongoing situation.

The following basic actions will be taken in sequence in an emergency situation:

- ***Stay calm*** – Your example can influence others and thereby aid the emergency response.

- ***Assess the situation*** – Determine what happened and what the emergency is. Look at the big picture. What has happened to whom and what will continue to happen if no action is taken? Try to identify the cause that must be controlled to eliminate immediate, ongoing, or further danger.

- ***Take command*** – The most senior person on the scene should take charge and call, or delegate someone to call, emergency services and explain the situation. Assign tasks for controlling the emergency. This action also helps to maintain order and prevent panic.

- ***Provide protection*** – Eliminate further losses and safeguard the area. Control the energy source causing the emergency. Protect victims, equipment, materials, environment, and accident scene from continuing damage or further hazards. Divert traffic, suppress fire, prevent objects from falling, shut down equipment or utilities, and take other necessary measures. Preserve the accident scene; only disturb what is essential to maintain life or relieve human suffering and prevent immediate or further losses.

- ***Aid and manage*** – Provide first aid or help those already doing so. Manage personnel at the scene. Organize the workforce for both a headcount and emergency assignments. Direct all workers to a safe location or command post. This makes it easier to identify the missing, control panic, and assign people to emergency duties. Dispatch personnel to guide emergency services on arrival.

- ***Maintain contact*** – Keep emergency services informed of situation. Contact utilities authorities such as TANESCO where required. Alert management and keep them informed. Exercise increasing control over the emergency until immediate hazards are controlled or eliminated and causes can be identified.

- ***Guide emergency services*** – Meet services on site. Lead them to emergency scene. Explain ongoing and potential hazards and cause(s), if known.

2.6 Communication of the Procedure

In order to be effective, an Emergency Response Procedure must be clearly communicated to all site personnel. The following activities will be considered:

- Review the procedure with new site subcontractors and new workers to ensure that it covers their activities adequately.
- Review the procedure with suppliers to ensure that it covers any hazards that the storage or delivery of their materials might create.
- Review new work areas in operating plants with owner/client to ensure that new hazards are identified and covered in the procedure.
- Review the procedure with the OSHA Representative on a regular basis to address new hazards or significant changes in site conditions.
- Post the procedure in a conspicuous location.

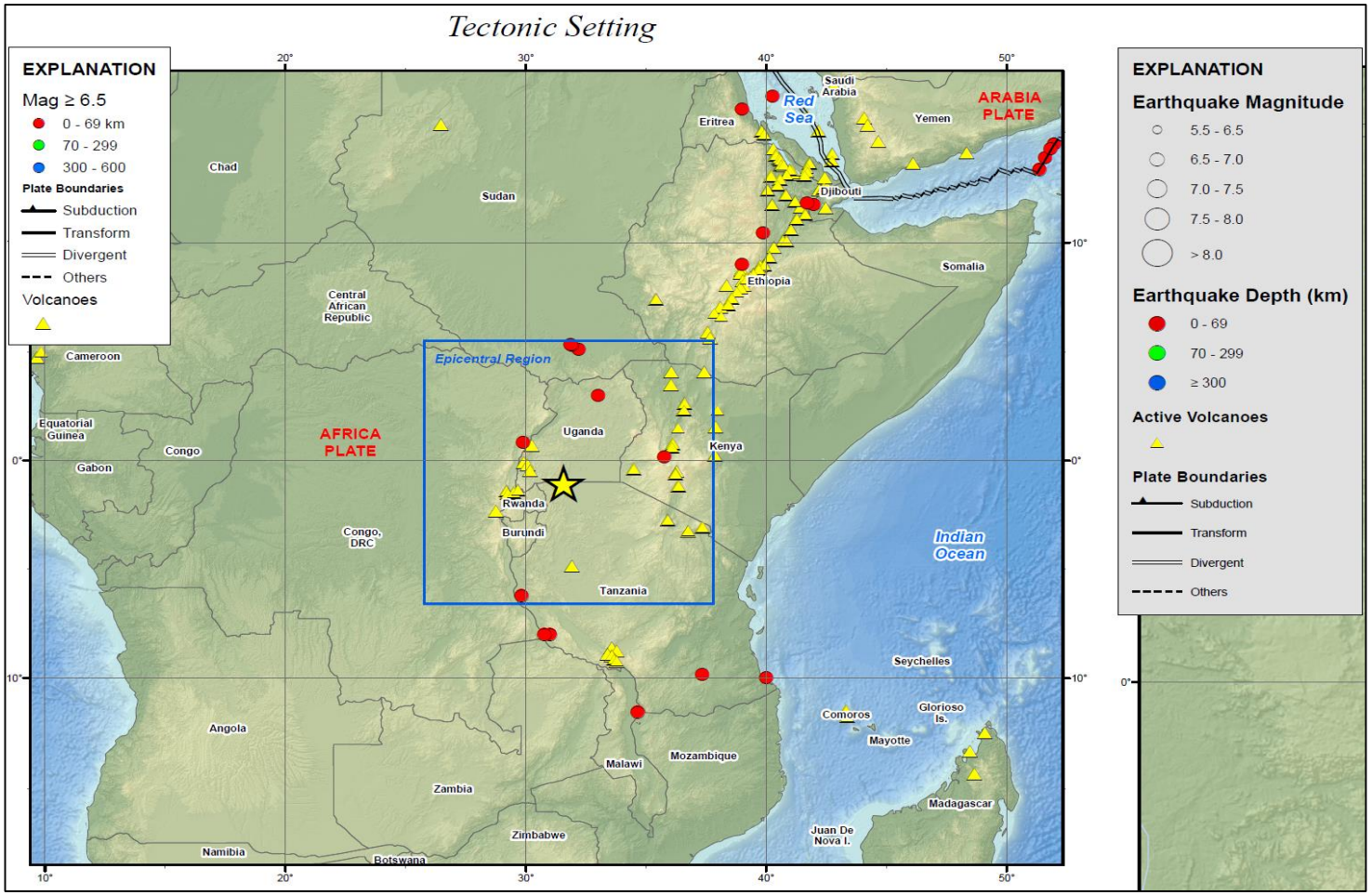
The Emergency Response Procedure will be continually reviewed and revised to meet changing conditions.

2.7 Debriefing and Post-Traumatic Stress Procedure

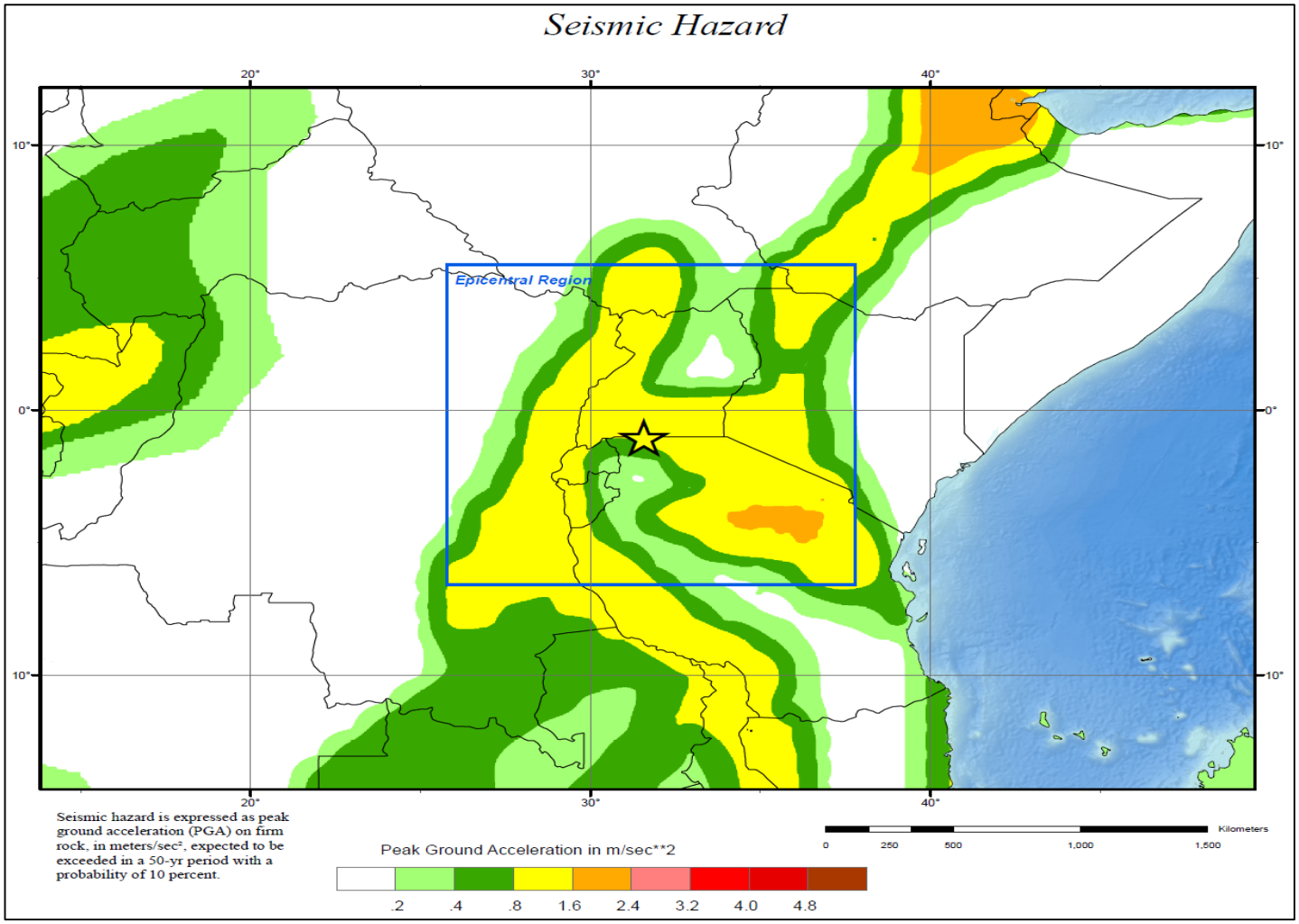
The recovery process, or what happens after the emergency response has been completed, is a critical step in the plan. Therefore, debriefing will be done to review how well the plan worked in the emergency and to correct any deficiencies that were identified.

After emergency some people may have seen their work partners and friends badly injured and suffering great pain. Some of the people involved may need assistance in order to recover. Therefore, once the emergency is over, the attitude should not be “Okay, let’s get back to work” or “Let’s go home.” In some cases, professional counselling may be needed. As part of site emergency planning, the Contractor should have measures in place to deal with post-traumatic stress. The local hospitals, ambulance services, and medical practitioners may be contacted for help.

APPENDIX 29: TECTONIC AND SEISMIC HAZARD MAP.



Source: U.S. DEPARTMENT OF THE INTERIOR / U.S. GEOLOGICAL SURVEY.
https://reliefweb.int/sites/reliefweb.int/files/resources/20160910.pdf



Source: U.S. DEPARTMENT OF THE INTERIOR / U.S. GEOLOGICAL SURVEY.
https://reliefweb.int/sites/reliefweb.int/files/resources/20160910.pdf

APPENDIX 30: SPECIFIC ENVIRONEMNTAL AND SOCIAL MANAGEMENT PLANS.

1. AIR EMISSIONS MANAGEMENT PLAN

1.1 Objectives

The objective of this plan is to minimise potential air emission impacts on receptors resulting from the BRT Phase 4 infrastructure construction project. The potential receptors include local residents and business operations along the road corridors.

This plan should be read in-conjunction with other Management plans, namely:

- Waste Management Plan;
- Raw Materials Management Plan;
- Erosion and Sediment Control Plan;
- Hazardous Materials Management Plan;
- Environmental Monitoring Plan; and
- Stakeholder Engagement Plan.

1.2 Surveys/Audits

Contractors shall undertake air quality monitoring at the established and agreed locations with the Supervision Consultant. In addition, prior to the commencement of works, the contractor shall identify work locations, including transportation routes, construction sites and hot asphalt batching plants, concrete batching plants which represent an air quality risk to community dwellings and other sensitive receptors (including schools, medical centres, etc.).

The contractor shall then agree with the Supervision Consultant, site specific air quality monitoring requirements at the location of the nearest sensitive receptors and mitigation measures to be implemented at such locations, as required.

1.3 Management and Monitoring

The summary of the potential environmental impacts related to air quality, together with mitigation and management measures to avoid or reduce these impacts is provided in **Table 1** below.

Contractor shall develop an Air Emissions Management Plan, which will as a minimum incorporate the measures, described in Table A, but shall not be limited to these measures.

Supervision Consultant shall be responsible for reviewing the Air Emissions Management Plan prepared by the contractor and for ensuring that it is consistent with this ESIA / ESMP document.

Sub-contractors appointed by the Main Contractor may utilise the same plan provided that it is reviewed and revised to account for any site specific issues.

Table 1: Management and Monitoring.

Emission Source	Potential Impact	Mitigation /Management	Ref. No.	Monitoring Frequency	Responsibility
General	General	Contractor for each BRT construction site will prepare an Air Quality Management Plan.	AE1.1	Continuous	Contractor (EM)
		Monitoring to be undertaken at established and agreed locations.	AE1.1	Continues	Contractor collaboration with Supervision Consultant
		Undertake periodic monitoring in the vicinity of plant/ activities with the potential for significant emissions (e.g. hot asphalt and concrete batching plants, materials storage yards).	AE1.2	Continues	Contractor collaboration with Supervision Consultant
		Undertake monitoring at locations with persistent air quality complaints.	AE1.3	Continues	Contractor In collaboration with Supervision Consultant
Site preparation and clearance	Dust emissions resulting in potential nuisance, human health, and aesthetic impacts	Enforce speed limit of 30 km/hr for all vehicles travelling on unpaved roads and restrict vehicles to marked trafficable areas.	AE2.1	Continues	Contractor
		Periodic application of water along unpaved roads within residential areas.	AE2.2	Continues	Contractor
		Ensure that vehicles carrying dusty construction materials are properly covered with tarpaulins.	AE2.3	Continues	Contractor
		Locate stockpiled soil materials and construction materials away from site boundaries and sensitive receptors.	AE2.4	Continues	Contractor
		Keep drop height to a Minimum (vehicle offloading of soil, rubble or any other materials that will emit dust during handling).	AE2.5	Continues	Contractor
		Implement dust suppression measures for	AE2.6	Continues	Contractor

Emission Source	Potential Impact	Mitigation /Management	Ref. No.	Monitoring Frequency	Responsibility
		all stockpiles.			
		Vegetation plating on long-term stockpiled dusty construction materials.	AE2.7	Review prior to construction	Contractor
1. Emissions from plants and vehicles	Reduced air quality with consequent and project nuisance. Greenhouse gas emissions	Select construction equipment based on industry good practice.	AE3.1	Continues	Contractor
		Ensure that all plant is turned-off while not in use.	AE3.2	Continues	Contractor
		Locate fixed and mobile equipment (e.g., hot asphalt batching plants, generators) away from sensitive receptors.	AE3.3	Continues	Contractor
		Service all diesel-powered equipment on a regular basis	AE3.4	Continues	Contractor
		Ensure that construction plant is maintained on a regular basis.	AE3.5	Continues	Contractor
		No burning of wastes to be undertaken on site.	AE3.6	Continues	Contractor

1.4 Roles and Responsibilities

The Contractor's Air Quality Management Plan shall describe the resources allocated and responsible for the execution of each task and requirement contained therein, and shall describe how their roles and responsibilities are communicated to the relevant personnel.

Contractor shall ensure sufficient resources are allocated on an on-going basis to achieve effective implementation of the Air Quality Management Plan.

1.5 Training, Awareness and Competency

The Contractor's Air Quality Management Plan shall describe the training and awareness requirements necessary for its effective implementation.

The contractor shall ensure that all personnel responsible for the execution of the tasks and requirements contained within the Air Quality Management Plan are competent on the basis of education, training, and experience.

The Contractor's training activity associated with the Air Quality Management Plan shall be appropriately documented by means of a training needs assessment, training matrix/plan and records of training undertaken.

1.6 Reporting and Notification

Contractor shall report to the Project Environmental Department (via the Independent Environmental Consultant) the results of the surveys undertaken in accordance with the relevant components of the Air Quality Management Plan and integrate the results, including additional mitigation and management measures as agreed with Company, with the Air Quality Management Plan.

Contractor's monthly report to Company shall include:

- Number and results of verification inspections; and
- Results of Monitoring.

1.7 Legal Requirements and Performance Standards

1.7.1 Legal Requirements

The following are the applicable legal requirements for Air Quality Management Plan:

- Environmental Management Act (EMA) Cap 191 of 2004
- Environmental Management (Air Quality Standards) Regulations (2007)

1.7.2 IFC Performance Standards

The following IFC Performance Standards are applicable to air emissions and ambient air quality during construction:

- IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts (2012
- IFC Performance Standard 3: Resource Efficiency and Pollution Prevention (2012)
- IFC EHS General Guidelines (April 2007), incorporating WHO Ambient Air Quality Guidelines (1987, 1999 and 2006); Section 1.1 and 4.

2. NOISE AND VIBRATION MANAGEMENT PLAN

2.1 Objectives

The objective of this plan is to minimise potential noise and vibration impacts on receptors resulting from BRT Phase 4 infrastructure construction project. Potential receptors include local residents and business operations.

This plan should be read in-conjunction with other Management plans, namely:
Ecological Management Plan;
Community Health and Safety Plan;
Environmental Monitoring Plan; and
Stakeholder Engagement Plan.

2.2 Surveys/Audits

During construction works, the Contractor shall undertake background noise monitoring at the established and agreed locations with the Supervision Consultant in order to confirm general compliance with the requirements of Tanzania Air Quality Standards and WB EHS General Guidelines (April 2007). In addition. the contractor will also identify additional work locations, including transportation routes and construction compounds, which represent a noise and vibration risk to community dwellings and other sensitive receptors (including schools, medical centres etc.
The contractor shall then agree with the Supervision Consultant, site specific noise and vibration monitoring requirements at the location of the nearest sensitive receptors and mitigation measures to be implemented at such locations, as required.

2.3 Management and Monitoring

Table 2 below presents a summary of the potential environmental impacts related to noise and vibration, together with mitigation and management measures to avoid or reduce these impacts.

Contractor shall develop a Noise and Vibration Management Plan, which will as a minimum incorporate the measures, described in Table 2, but shall not be limited to these measures.

The Supervision Consultant will be responsible for reviewing the Noise and Vibration Management Plan prepared by the Contractor and for ensuring that it is consistent with this document.
Sub-contractors appointed by the Main Contractor may utilise the same plan provided that it is reviewed and revised to account for any site-specific issues.

Table 2: Management and Monitoring.

Noise / Vibration Source	Potential Impact	Mitigation/ Management	Ref. No.	Monitoring Frequency	Responsibility
1. Noise from construction vehicles and plant (including Batching Plants).	Noise nuisance and disturbance to adjacent residents, business and local ecology	Contractor will prepare a Noise Management Plan. Noise monitoring undertaken by appropriately qualified specialists.	NV1.1	NA	Contractor
		Engage with residents and businesses in areas where potentially significant noise levels are to result from construction activities.	NV1.2	As required	Contractor
		Ensure that construction works are only undertaken in defined working hours (weekdays 8h00 – 17h00 and weekends 8h00 – 13h00). In the event that noisy activities are undertaken outside of the specified working hours, all noise receptors will be informed of such activities in advance.	NV1.3	Continuous	Contractor

Noise / Vibration Source	Potential Impact	Mitigation/ Management	Ref. No.	Monitoring Frequency	Responsibility
		In accordance with WB EHS General Guidelines (April 2007), incorporating WHO Guidelines for Community Noise (1999); The contractor should implement mitigation measures to achieve the following measured daytime noise levels at the nearest sensitive receptor: - 55 dBA for residential; and - 70 dBA for industrial/commercial or; or result in a maximum increase in background levels of 3 dB at the nearest receptor location offsite.	NV1.4	Continuous	Contractor
		Utilise noise mitigation measures (including the construction of bunds, metal sheet walls) in order to limit noise levels at sensitive receptors.	NV1.5	Continuous	Contractor
		Ensure that equipment to be used meets industry best standard in relation to noise attenuation.	NV1.6	Always inspect before use.	Contractor
		Ensure that all engines are turned-off while not in use.	NV1.7	Continuous	Contractor
		Limit work vehicles and plant to designated areas and work site areas.	NV1.8	Continuous	Contractor
		Ensure that noise suppression systems on plant and vehicles are maintained.	NV1.9	Continuous	Contractor
		All pneumatic tools to be used in close proximity to residential properties should be fitted with an air exhaust port silencer.	NV1.10	Continuous	Contractor
		Assess and manage all noise complaints.	NV1.11	Continuous	Contractor
		Undertake noise monitoring at locations with persistent noise complaints.	NV1.12	Continuous	Contractor
		Implement blasting methods designed by a suitably qualified person.	NV1.3	Continuous	Contractor

2.4 Roles and Responsibilities

Contractor shall ensure sufficient resources are allocated on an on-going basis to achieve effective implementation of the Noise and Vibration Management Plan.

Contractor's Noise and Vibration Management Plan shall describe the resources allocated and responsible person for the execution of each task and requirement contained therein, and shall describe how their roles and responsibilities are communicated to the relevant personnel.

Contractor shall ensure sufficient resources are allocated on an on-going basis to achieve effective implementation of Contractor's responsibilities in the Noise and Vibration Management Plan.

2.5 Training, Awareness and Competency

The contractor shall ensure that all personnel responsible for the execution of the tasks and requirements contained within the Noise and Vibration Management Plan are competent on the basis of education, training, and experience.

Contractor's Noise and Vibration Management Plan shall describe the training and awareness requirements necessary for its effective implementation.

Contractor's training activity associated with the Noise and Vibration Management Plan shall be appropriately documented by means of a training needs assessment, training matrix/plan and records of training undertaken.

Company shall ensure that all Company personnel responsible for the execution of Company's tasks and requirements in the Noise and Vibration Management Plan are competent on the basis of education, training, and experience.
Company's training activity associated with the Noise and Vibration Management Plan shall be appropriately documented by means of a training needs assessment, training matrix/plan and records of training undertaken.

2.6 Reporting and Notification

Contractor shall report to the Supervision Consultant the results of the surveys undertaken in accordance with the relevant components of the Ecological Management Plan and integrate the results, including additional mitigation and management measures as agreed with Company, with the Noise and Vibration Management Plan.

Contractor's monthly report to Supervision Consultant shall include:

- Number and results of verification inspections prescribed in Table 2

2.7 Legal Requirements and Performance Standards

2.7.1 Legal Requirements

The following are the applicable legal requirements for Noise and Vibration Management

- The Environmental Management Act (EMA) Cap 191 of 2004
- The Environmental Management (Standards for the Control of Noise and Vibrations Pollution) Regulations (2014).

2.7.2 IFC Performance Standards

The following IFC Performance Standards are applicable to noise and vibration issues during construction:

- IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts (2012).
- IFC Performance Standard 3: Resource Efficiency and Pollution Prevention (2012).

3. ECOLOGICAL MANAGEMENT PLAN

3.1 Objective

The objective of this plan is to avoid, where practicable, and reduce impacts on terrestrial and aquatic habitats and specific habitat features of ecological importance.

This plan should be read in-conjunction with other Management plans, namely:

- Water Management Plan;
- Hazardous Materials Management Plan;
- Raw Materials Management Plan;
- Spill Prevention and Response Plan;
- Erosion and Sediment Control Plan;
- Cultural Heritage Management Plan; and
- Program of Environmental Monitoring and Quality Supervision.

3.2 Surveys/Audits

The Contractor shall undertake the following surveys/Audits:

- Ecological surveys of road corridors, borrow pits and quarry site.
- Audits to confirm that measures identified in Management Plans (specified in Table 3) are implemented. These include:
    - Dust mitigation measures as identified in Air Emissions Management Plan (Ref: EC9);;
    - Noise mitigation measures as identified in Noise and Vibration Management Plan (Ref: EC11);
    - Erosion and Sediment control measures as identified in the Erosion and Sediment Control Plan (Ref: EC12, 13, 14);
    - Waste management measures as identified in the Waste Management Plan (Ref: EC18);
    - Hazardous materials management as identified in hazardous Materials Management Plan (Ref: 19);
    - Spill Prevention and Response measures in the Spill Prevention and Response Plan (Ref: EC20).

The contractor will undertake regular audits of stockpiled materials and compounds to confirm that there is no encroachment of soil from stockpiled areas onto vegetated areas adjacent to works areas.

Baseline ecological surveys undertaken as part of the EIA process have identified that there is some mangrove vegetation on the upstream and downstream of Selander Bridge. The mangrove vegetation provides an important habitat for marine organisms.

Habitats along the road sections and road median are comprised mainly of planted trees and grass which provides little cover or forage for animals. In general, the vegetation cover provides natural habitats a variety of insect, small mammal, reptile, and bird species. There are no known areas of natural or critical habitat along the road corridors or earmarked areas for bus terminals, depots and car park and ride buildings.

Areas of modified habitat within and in close proximity to the borrow pits and quarry sites consist of agricultural land of low conservation value and impacts on these areas are likely to be limited and of a temporary nature (dust deposition and encroachment of earth from stockpiles). Therefore, no ecological/ protected species surveys are required for these areas.

3.3 Management and Monitoring

Table 3 below presents a summary of the potential environmental impacts related to ecology, together with mitigation and management measures to avoid or reduce these impacts. The contractor shall develop an Ecological Management Plan, which will as a minimum incorporate the measures, described in Table 3-1, but shall not be limited to these measures. The Supervision Consultant will be responsible for reviewing the Ecological Management Plan prepared by the contractor and for ensuring that it is consistent with this document.

Sub-contractors appointed by the Main Contractor may utilise the same plan provided that it is reviewed and revised to account for any site specific issues.

Table 3: Management and Monitoring.

Noise / Vibration Source	Potential Impact	Mitigation Management	Ref. No.	Monitoring Frequency	Responsibility
1. Site clearance for construction of BRT lanes.	Habitat loss	Ensure that the extent of vegetation to be cleared is clearly identified on technical drawings and appropriately marked on the site.	EC1.1	Prior to clearance works.	Contractor
		Prohibit works from exceeding the approved working area.	EC1.2	Continuous	Contractor
2. Site clearance for materials/equipment storage areas.	Habitat loss	Ensure that the minimum number of staging and storage areas required are constructed.	EC2.1	Prior to construction	Contractor's Environmental Manage in collaboration with Supervision Consultant.
		Ensure that sites chosen for staging and storage sites are located in areas of low ecological value.	EC2.2	Prior to construction	Contractor in collaboration with Supervision Consultant.
		Ensure that the extent of vegetation to be cleared is clearly identified on technical drawings and appropriately marked on site.	EC2.3	Prior to construction	Contractor
		Prohibit works from exceeding the approved working area.	EC2.4	Continuous	Contractor
3. Site clearance for construction of access roads to Borrow Pits/Quarry Sites.	Habitat loss	Ensure that the extent of vegetation to be cleared is clearly identified on technical drawings and appropriately marked on site.	EC3.1	Prior to Construction/ Continuous	Contractor
		Prohibit works from exceeding the approved working corridor.	EC3.2		

Noise / Vibration Source	Potential Impact	Mitigation Management	Ref. No.	Monitoring Frequency	Responsibility
4. Dust from construction works and batching plants	Destruction of adjacent natural vegetation and crops due to dust Deposition.	Ensure that dust mitigation measures outlined in the Air Emissions Management Plan are fully implemented.	EC4.1	Continuous	Contractor
		Ensuring that concrete batching plants are not located in close proximity to ecologically sensitive areas.	EC4.2	Prior to Construction.	
5. Noise from Construction works, plant and vehicles	Disturbance to fauna	Ensure that noise mitigation measures outlined in the Noise and Vibration Management Plan are fully implemented.	EC5.1	Continuous	Contractor
6. Encroachment of soil from storage mounds onto vegetated areas adjacent to works areas.	Sediment deposition impacting on habitat and fauna.	Ensure that mitigation measures to prevent the encroachment of material from stockpiles/ storage mounds outlined in the Erosion and Sediment Control Plan are implemented.	EC6.1	Continuous	Contractor
7. Soil erosion resulting from exposure and destabilisation of landforms and soils storage.	Sediment entering natural streams/ lakes from resulting in increased turbidity/reduce d water quality and impacts on biodiversity	Ensure that measures outlined in the Erosion and Sediment Control Plan (See Section 8 of this ESMP) are implemented.	EC7.1	Continuous	Contractor
8. Bridge/ channel construction works	Erosion of riverbanks/ changes in sedimentation/ erosion patterns resulting in increased turbidity/reduced water quality and impacts on biodiversity.	Ensure that measures outlined in the Erosion and Sediment Control Plan (See Section 8 of ESMP) are implemented	EC8.1	Continuous	Contractor

Noise / Vibration Source	Potential Impact	Mitigation Management	Ref. No.	Monitoring Frequency	Responsibility
9. Dredging of sands from river beds for construction.	Impacts on benthic fauna	Identify land-based sources of sand and avoid the requirement for dredging from river beds where possible	EC9.1	Prior to dredging works	Contractor
		Undertake ecological surveys at proposed dredging locations prior to the commencement of dredging activities.	EC9.2	Continuous	Contractor
		Where surveys identify the presence of sensitive/ significant ecological receptors, identify alternative source location and/or develop appropriate mitigation measures	EC9.3	Prior to dredging activities	Contractor
10. Uncontrolled discharge of raw sewage wastewater into in rivers/streams.	Reduced water quality resulting into impacts on biodiversity.	Ensure that mitigation measures outlined in the Waste Management Plan (See Section 4 of ESMP) are implemented.	EC10.1	Continuous	Contractor
11. Leaks/ spillages from plant, vehicles, and storage compounds	Loss of aesthetic value of the surrounding environment.	Ensure waste oil management procedures, as outlined in the Hazardous Materials Management Plan (Section ___ of ESMP) are fully implemented.	EC11.1	Continuous	Contractor
		In the event of spillages/leaks being occurring/ being identified, ensure the procedures outlined in the Spill Prevention and Response Plan (Section 9 of ESMP) are implemented.	EC11.2	Continuous	Contractor
12. Light effects during construction phase and permanent road lighting.	Disturbance to, harassment of and decreases in animal and plant individuals/ communities.	Direct light in construction areas and from permanent road lighting to reduce illumination of surrounding areas and minimise disturbance to nocturnal fauna, where security and health and safety factors allow.	EC12	Continuous	Contractor
13. Accidental / Wildfires	Wildfire destroying habitat	Leave cleared vegetation to rot and prohibit burning if a fire hazard exists.	EC13	Continuous	Contractor
14. Development of new and existing quarries/ sand and/or soil pits.	Loss of habitat	Ensure that ecological surveys are undertaken prior to development of new/ extension of existing borrow pits, quarries/ sand pits.	EC14.1	Prior to development	Contractor
		Implement appropriate mitigation measures	EC14.2	Prior to	Contractor

Noise / Vibration Source	Potential Impact	Mitigation Management	Ref. No.	Monitoring Frequency	Responsibility
		(Including the creation of buffer zones) to protect any significant habitat/fauna identified.		development	
15. Lack of ecological awareness by construction workers.	Damage to habitat and fauna	Ensure that all construction workers are provided with appropriate training in ecological awareness, as appropriate to their work activities.	EC15	Continuous	Contractor

3.4 Roles and Responsibilities

Contractor shall ensure sufficient resources are allocated on an on-going basis to achieve effective implementation of the Ecological Management Plan.

The Contractor's Ecological Management Plan shall describe the resources allocated and responsible person for the execution of each task and requirement contained therein, and shall describe how their roles and responsibilities are communicated to the relevant personnel.

3.5 Training, Awareness and Competency

The contractor shall ensure that all personnel responsible for the execution of the tasks and requirements contained within the Ecological Management Plan are competent on the basis of education, training, and experience (see EC25 in Table 3 below).

The Contractor's Ecological Management Plan shall describe the training and awareness requirements necessary for its effective implementation.

All training activity associated with the Plan shall be appropriately documented by means of a training needs assessment, training matrix/plan and records of training undertaken.

3.6 Reporting and Notification

Contractor shall report to the Supervision Consultant the results of the surveys/audits/inspections undertaken in accordance with the relevant components of the Ecological Management Plan.

Contractor's monthly report to Supervision Consultant shall include:
Number and results of surveys/audits/ inspections.
The Supervision Consultant will also undertake verification audits/ inspections and will submit routine reports to the Resident Engineer.

3.7 Legal Requirements and Performance Standards

3.7.1 Legal Requirements

The following are the applicable legal requirements for Ecological Management

- The Environmental Management (Soil Quality Standards) Regulations, 2007.
- The Forest Act (2002)

- The Fisheries (2003)
- The Forest (Amendment) Regulations (2013)
- The Wildlife Conservation Act No. 5 of 2009
- The Water Resources Management Act No. 11 of 2009
- The Village Land Act No. 5 of 1999
- The Land Act No. 4 of 1999 / Land Act Cap 113
- The Plant Protection Act No. 13 of 1997

3.7.2 Performance Standards

The following IFC Performance Standards are applicable to ecology during construction:

- IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts (2012).
- IFC Performance Standard 4 and Guidance Note 4: Community Health, Safety and Security (2012).
- IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources (2012).

4. WASTE MANAGEMENT PLAN

4.1 Objective

The objectives of the plan are to:

- Establish waste management priorities based on the understanding of the potential Environmental, Health and Safety (EHS) risks and impacts associated with the project and considering the consequences of waste generation;
- Consider the prevention, reduction, reuse, recovery, recycling, removal, and disposal of waste arising from project activities in such a manner as to minimize the potential impacts to human health and the environment;
- Dispose of waste that cannot be recovered or reused at approved facilities and in an environmentally sound manner;
- Minimize, Contain, transport, handle and dispose of solid and liquid wastes arising from project construction activities in such a manner as to minimize impacts to human health and the environment; and
- Dispose of wastes at licensed facilities approved by NEMC.

This plan should be read in-conjunction with other Management plans, namely:

- Ecological Management Plan;
- Spill Prevention and Response Plan;
- Community Health and Safety Plan;
- Environmental Monitoring Plan; and
- Stakeholder Engagement Plan.

4.2 Surveys/Audits

During the project, the Contractor should develop an inventory of waste. This should include all waste streams, classifications, quantities, storage requirements, options for reuse / recyclability and treatment and disposal requirements. This should be reviewed periodically throughout the life cycle of the project to ensure it encompasses everything.

As waste producers, the Contractor has a 'duty of care' obligation regarding the management of waste. The Contractor is obliged to minimise the risk of pollution and ensure that those that handle and dispose of the generated waste are authorised to do so.

Third party audits should be undertaken and relevant paperwork maintained to ensure that the waste generated is being handled, treated and disposed of appropriately.

Regular inspections of waste storage areas should be carried out by the Contractor and findings should be documented.

Prior to the commencement of works, the Contractor should agree with the mitigation measures to be implemented. Regular checks should be carried out to ensure that these are being implemented and that they are effective.

4.3 Management and Monitoring

Table 4 below presents a summary of the potential environmental impacts related to waste, together with mitigation and management measures to avoid or reduce these impacts. Contractor shall develop a Waste Management Plan, which will as a minimum incorporate the measures, described in Table 4, but shall not be limited to these measures. Supervision Consultant will be responsible for reviewing the Waste Management Plan prepared by the Contractor and for ensuring that it is consistent with this document.

Subcontractors appointed the Main Contractor may utilise the same plan providing that it is reviewed and revised to account for any site specific issues.

Table 4: Management and Monitoring.

Sources of Waste Impact	Potential Impact	Mitigation/ Management	Ref. No.	Surveys/ Audits	Monitoring Frequency	Responsibility
1. Waste generation during Pre-construction phase / site preparation: To include waste associated with: Demolition of buildings. Vegetation clearing. Land excavations.	Landscape degradation and loss of aesthetic value of the urban environment	It is envisaged that the majority of the waste generated during demolition is reusable. Incorporate into the design the use of recyclable materials	W1.1	Undertake audits to demonstrate compliance with National and WB requirements	Continuous	Contractor
	Pollution of nearby surface and groundwater sources.	Develop procedures and controls to ensure appropriate storage of waste to minimise risk of pollution.	W1.2	Undertake audits to demonstrate compliance with National and WB requirements	Continuous	Contractor

Sources of Waste Impact	Potential Impact	Mitigation/ Management	Ref. No.	Surveys/ Audits	Monitoring Frequency	Responsibility
	Landscape degradation and loss of aesthetic value of the urban environment.	Ensure that appropriately licensed transportation Contractors and disposal sites are identified and used. Develop procedures and controls. Obtain authorisation from the Municipal Authority for transport and treatment of waste.	W1.3	Documented evidence of waste movements.	Continuous	Contractor
	Creation of air pollution due to dust emission.	Ensure that measures outlined in the Air Emissions Management Plan (Section 1) are implemented.	W1.4		Continuous	Contractor
	Noise and vibration from Vehicle movements	Ensure that measures outlined in Noise and Vibration Management Plan (Section 3) are implemented	W1.5		Continuous	Contractor
2. Waste generation during construction phase: To include waste associated with: Road construction. Drain construction. Bridge construction. Construction equipment. Concrete mixing. Contractor's Office, Engineer's, and Camp Site.	Generation of stone and waste earth, toxic gas, waste oils, domestic waste.	Review waste sources during the planning and designing phases to identify expected waste generation, identify opportunities for source reduction and reuse and recycling. Incorporate into the design the use of recyclable materials. Develop a waste inventory; this should detail the different waste streams, classification, quantities, storage requirements, potential use, and treatment and disposal arrangements. Ensure the waste hierarchy is applied.	W2.1	Undertake audits to demonstrate compliance with National and WB requirements. Periodically review the waste inventory and update as necessary. Evidence of waste movements. Establish recycling	Continuous	Contractor

Sources of Waste Impact	Potential Impact	Mitigation/ Management	Ref. No.	Surveys/ Audits	Monitoring Frequency	Responsibility
				Objectives and formal tracking of waste generation and recycling rates.		
	Inappropriate disposal of waste (i.e. fly tipping)	Ensure that appropriately licensed transportation Contractors and disposal sites are identified and used. Develop procedures and controls. Obtain authorisation from the Municipal Authority for transport and treatment of waste.	W2.2	Documented evidence of waste movements	Continuous	Contractor
	Pollution of Nearby surface and groundwater sources.	Develop procedures and controls to ensure appropriate storage of waste to minimise risk of pollution. During the design phase of the project ensure that measures are developed and implemented to minimise pollution to receptors. Waste oil containers must be stored in concrete paved areas with bund walls. Ensure the storage yard is surrounded by a fence of geo-textile or corrugated iron sheets. Provide storage for Domestic waste on the construction sites and camp site. Assess options for recyclable materials.	W2.3	Undertake audits to demonstrate compliance with National and WB requirements Establish recycling objectives and formal tracking of waste generation and recycling rates.	Continuous	Contractor

Sources of Waste Impact	Potential Impact	Mitigation/ Management	Ref. No.	Surveys/ Audits	Monitoring Frequency	Responsibility
	Creation of air pollution due to dust emission.	Ensure that measures outlined in the Air Emissions Management Plan (Section 1) are implemented.	W2.4		Continuous	Contractor
	Noise and vibration from Vehicle movements	Ensure that measures outlined in Noise and Vibration Management Plan (Section 3) are implemented	W2.5		Continuous	Contractor
3. Generation of hazardous waste Activities include: • Replacing machine oils. • Performing maintenance tasks on equipment	Soil, groundwater and surface water contamination.	Establish and implement operational controls for on-site storage of Hazardous waste. Store hazardous waste in a secure area on concrete hardstanding. Ensure containers are labelled so contents can be identified (TCV 6707/2000). Ensure the waste hierarchy is applied.	W3.1	Undertake audits to demonstrate compliance with National and WB requirements. Conduct regular inspections of waste storage areas and document the findings. Maintain an inventory of hazardous waste generation, to include quantities, Storage requirements and disposal arrangements. Review this document periodically.	Continuous	Contractor
		Where liquid waste is stored in volumes greater than 220 litres, secondary containment should be implemented. The available volume of secondary containment should be at least 110% of the largest storage container or 25% of the total storage capacity.			Continuous	

Sources of Waste Impact	Potential Impact	Mitigation/ Management	Ref. No.	Surveys/ Audits	Monitoring Frequency	Responsibility
				Report hazardous Waste information to NEMC.		
	Ground and surface water contamination	Minimise hazardous Waste generation by implementing stringent waste segregation in order to prevent mixing of hazardous and non-hazardous wastes.	W3.2	Periodic checks of hazardous waste storage area	Continuous	Contractor
	Loss of aesthetic value of the surrounding environment	Ensure that appropriately licensed transportation contractors and disposal sites are identified and used (registered with NEMC) Develop procedures and controls. Register the waste source with NEMC.	W3.3	Documented evidence of waste movements	Continuous	Contractor
4. Waste management and disposal Including: • Waste inventory • Waste transfers	Soil, groundwater and surface water contamination.	Establish and implement operational controls for material handling, spill response, storage, transportation, and disposal. Develop a waste inventory, detailing waste minimisation, segregation, and disposal. Use the inventory to identify opportunities for reuse / recycling.	W4.1	Periodic reviews of the operational procedures and the waste inventory to ensure that all activities and wastes are captured.	Continuous	Contractor
		Develop and enforce Duty of Care procedures.	W4.2	Documented evidence of waste movements.	Continuous	Contractor

Sources of Waste Impact	Potential Impact	Mitigation/ Management	Ref. No.	Surveys/ Audits	Monitoring Frequency	Responsibility
		Whereby the waste producer has a duty to ensure that waste is properly managed from generation to disposal. Undertake audits of Third Party contractors responsible for transporting and disposing of waste. Maintain documented evidence of all waste transfers. Ensure contractors regularly collect waste from the project site.				

4.4 Roles and Responsibilities

The Main Contractor will be responsible for delivering the waste management plan and will be responsible for coordinating and managing day-to-day responsibilities for waste management throughout the construction period.

The Main Contractor shall ensure sufficient resources are allocated on an on-going basis to achieve effective implementation of the Waste Management Plan.

Contractor's Waste Management Plan shall describe any necessary environmental controls or mitigation measures to be implemented. The plan shall be periodically reviewed and as necessary updated.
The Contractor will monitor the performance of sub-contractors and will be responsible for appropriate collection, segregation, treatment and transfer of waste for appropriate processing and disposal of waste.

The Contractor will maintain appropriate documentation to demonstrate compliance with local and international standards.

Contractor shall ensure sufficient resources are allocated on an on-going basis to achieve effective implementation of Contractor's responsibilities in the Waste Management Plan.

4.5 Training, Awareness and Competency

The raising of environmental awareness is viewed as a crucial element in the appreciation and implementation of a Waste Management Plan. It is importuned that the environmental requirements are appropriately communicated.

The contractor shall ensure that all personnel responsible for the execution of the tasks and requirements contained within the Waste Management Plan are competent on the basis of education, training, and experience.

Contractor's Waste Management Plan shall describe the training and awareness requirements necessary for its effective implementation.

Contractor's training activity associated with the Waste Management Plan shall be appropriately documented by means of a training needs assessment, training matrix/plan and records of training undertaken.

Contractor shall ensure that all Contractor's personnel responsible for the execution of Company's tasks and requirements in the Waste Management Plan are competent on the basis of education, training, and experience.

Contractor's training activity associated with the Waste Management Plan shall be appropriately documented by means of a training needs assessment, training matrix/plan and records of training undertaken.

4.6 Reporting and Notification

Contractor shall report to the Supervision Consultant the results of the surveys undertaken in accordance with the relevant components of the Waste Management Plan and integrate the results, including additional mitigation and management measures as agreed with Supervision Consultant.

Contractor's monthly report to Supervision Consultant shall include:

- Number and results of verification inspections prescribed in Table 4.1
- Waste transfer documentation.
- The waste inventory.
- Performance indicators (recycling objectives and rates).

4.7 Legal Requirements and Performance Standards

4.7.1 Legal Requirements

The following are the applicable legal requirements for Ecological Management

- The Environmental Management (Soil Quality Standards) Regulations, 2007.
- The Forest Act (2002)
- The Fisheries (2003)
- The Forest (Amendment) Regulations (2013)
- The Wildlife Conservation Act No. 5 of 2009
- The Water Resources Management Act No. 11 of 2009
- The Village Land Act No. 5 of 1999
- The Land Act No. 4 of 1999 / Land Act Cap 113
- The Plant Protection Act No. 13 of 1997

4.7.2 Performance Standards

The following IFC Performance Standards apply to noise and vibration issues during construction:

- IFC Performance Standard 1: *Assessment and Management of Environmental and Social Risks and Impacts* (2012) which establishes requirements for assessment, management, organisational capability, training, community engagement, monitoring and reporting.
- IFC Performance Standard 3: Resource Efficiency and *Pollution Prevention (2012),* and specifically the following provisions:
  - The objectives of pollution prevention are to a) to avoid or minimise adverse impacts on human health and the environment by avoiding or minimising pollution from project activities; and b) to promote the reduction of emissions that contribute to climate change.
  - The client will avoid or minimise the generation of hazardous and non-hazardous waste materials as far as practicable. Where waste generation cannot be avoided but has been minimised, the client will recover and reuse waste; where waste cannot be recovered or reused, the client will treat, destroy, and dispose of it in an environmentally sound manner. If the generated waste is considered hazardous.

5. WATER RESOURCES MANAGEMENT PLAN

5.1 Objective

The objective of this plan is to minimise potential effects on water resources and associated receptors

Potential receptors along the road corridors could include surface water features (i.e. rivers, streams, drainage channels, ponds), groundwater resources and associated users and specific flora and fauna.

This plan should be read in-conjunction with other Management plans, namely:

- Ecological Management Plan;
- Community Health and Safety Plan;
- Environmental Monitoring Plan; and
- Stakeholder Engagement Plan.

5.2 Surveys/Audits

During construction works, the contractor will identify additional work locations, including haul routes and construction compounds and aggregate borrow pits, which may potentially represent a risk to sensitive water resource receptors (including rivers, streams, drainage ditches, ponds etc) due to their proximity. Prior to the commencement of works, the contractor shall agree with the Supervision Consultant on site specific mitigation measures to be implemented at such locations to mitigate potential negative effects.

The contractor shall conduct environmental assessments at surface water abstraction sites to confirm water abstraction requirements do not impact on downstream users or environmental flows.

5.3 Management and Monitoring

The contractor shall undertake water quality and level monitoring at the locations previously monitored (if any) in order to confirm general compliance with the requirements of Tanzania Water Quality Standards

The contractor shall develop a Water Resources Management Plan, which will as a minimum incorporate the measures, described in **Table 5**, but shall not be limited to these measures.

Supervision Consultant acting on behalf of the Developer will be responsible for reviewing the Water Resources Management Plan prepared by the Contractor and for ensuring that it is consistent with this framework document.

Subcontractors appointed by the Main Contractor may utilise the same plan provided that it is reviewed and revised to account for any site specific issues.

Table 5-1: Management and Monitoring.

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Monitoring Frequency	Responsibility
1. Site clearance, demolition, and preparation	Physical (i.e. dust, sediments) and chemical (i.e. oil, petrol etc) contaminants resulting in a reduction in water quality.	Ensure use and storage of hazardous materials is in accordance with WB General EHS Guidelines, such as: - Ensure all hazardous substances and materials are stored in appropriate locations with impervious. - Hardstanding and adequate secondary containment; - Construction workers to be provided with adequate training on use, storage, and handling of hazardous substances; - Portable spill containment and clean-up equipment to be provided at appropriate locations on site and training in the use of the equipment. (See Raw Materials Management Plan – Section 9 and Spill Prevention and Response Plan – Section 7 of the ESMP).	WR-1.1	Continuous	Contractor
		Ensure that mitigation measures outlined within the Erosion and Sedimentation Plan (Section 6 of ESMP) are fully implemented. Measures to be implemented include:	WR1.2	Continuous	Contractor

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Monitoring Frequency	Responsibility
		- Scheduling works to avoid heavy rainfall periods (i.e., during the dry season) to the extent practical; - Contouring and minimizing length and steepness of slopes; - Mulching to stabilize exposed areas and revegetating areas promptly; and - Lining steep channel and slopes (e.g., use jute matting)			
		Ensure that dust mitigation measures outlined in the Air Emissions Management Plan (Section 1 of ESMP) are fully implemented.	WR1.3	Continuous	Contractor
		Develop a procedure for managing the discovery of contamination to minimize or reduce the risk to water resources.	WR1.4	Continuous	Contractor
		Develop an Emergency Preparedness and Response Plan in accordance with WB General EHS Guidelines.	WR1.5	Continuous	Contractor
		The contractor shall undertake water quality and level monitoring at the previously identified locations in order to confirm general compliance with the requirements of Tanzania Water Quality Standards.	WR1.6	Continuous	Contractor
	Increased flood risk from surface water run-off.	Ensure that the extent of vegetation to be cleared is clearly identified on technical drawings and appropriately marked on the road corridor to minimise the increase in surface water run-off.	WR1.7	Prior to construction	Supervision Consultant in collaboration with Contractor
		Plant grass on cleared areas promptly.	WR1.8	Continuous	Contractor
		Provide temporary surface water drainage system including settlement ponds / sediment traps prior to discharge points to control volume of discharge.	WR1.9	Continuous	Contractor
2. Staging and storage sites	Reduction in water quality	Ensure that the minimum numbers of staging and storage areas possible are used.	WR2.1	Prior to construction	

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Monitoring Frequency	Responsibility
	from storage of construction materials / chemicals	Where possible, ensure that all staging and storage areas are not located within 50m of surface water courses.			
		Ensure use and storage of hazardous materials is in accordance with WB General EHS Guidelines, such as: - Ensure all hazardous substances and materials are stored in appropriate locations with impervious hardstanding and adequate secondary containment. - Construction workers to be provided with adequate training on use, storage, and handling of hazardous substances. - Portable spill containment and clean-up equipment to be provided at appropriate locations on site and training in the use of the equipment. (See Hazardous Materials Management Plan –Section 8 and Spill Prevention and Response Plan – Section 7 of the ESMP).	WR2.1.1	Continuous	Contractor
		Ensure that dust mitigation measures outlined in the Air Emissions Management Plan (Section 1 of ESMP) are fully implemented.	WR2.1.2	Continuous	Contractor
		Ensure that mitigation measures outlined within the Erosion and Sedimentation Plan (Section 6 of ESMP) are fully implemented.	WR2.1.3	Continuous	Contractor
		Develop an Emergency Preparedness and Response Plan in accordance with WB General EHS Guidelines.	WR2.1.4	Prior to construction	Contractor
	Increased flood risk to construction	Ensure that staging and storage sites are not located within high water levels associated with rainy season.	WR2.2.1	Continuous	Contractor

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Monitoring Frequency	Responsibility
	workers				
		Avoid vegetation stripping immediately prior to or during rainy season, where possible.	WR2.2.2	Continuous	Contractor
		Ensure that appropriate temporary drainage is implemented to ensure staging and storage sites are not inundated during rainy season	WR2.2.3	Continuous	Contractor
		Develop measures to prevent, minimise, or control impacts caused by extraction activities in accordance with WB EHS Guidelines for Construction Materials Extraction, such as: - Adoption of settlement ponds, sumps, and lagoons designed to allow adequate retention time. - Construction of a dedicated drainage network; - Installation of sediment traps along water drainages, including fascines, silt fences, and vegetation traps.	WR2.2.4	Prior to construction	Contractor
		Ensure that mitigation measures outlined within the Erosion and Sedimentation Plan (Section 6 of ESMP) are fully implemented.	WR2.2.5		
		Develop an Emergency Preparedness and Response Plan in accordance with WB General EHS Guidelines.	WR2.2.6	Prior to construction	Contractor
	Effects on ecology from dredging sands from river bed	Ensure that mitigation measures outlined in the Ecology Management Plan (Section 3 of ESMP) are fully implemented.	WR2.3	Continuous	Contractor
	Increased flood risk from surface water run-off	Develop measures to prevent, minimise, or control impacts caused by extraction activities in accordance with WB EHS Guidelines for Construction Materials Extraction, such as: - Storm water peak runoff rate should not exceed the peak predevelopment runoff rate for a particular design storm;	WR2.4	Prior to construction	Contractor

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Monitoring Frequency	Responsibility
		- Adoption of settlement ponds, sumps, and lagoons designed to allow adequate retention time.			
3. Road construction including sub-grading, excavating, and embanking the road base	Physical (i.e., dust, sediments) and chemical (i.e. oil, petrol etc) contaminants resulting in a reduction in water quality	Ensure use and storage of hazardous materials is in accordance with WB General EHS Guidelines, such as: - Ensure all hazardous substances and materials are stored in appropriate locations with impervious hardstanding and adequate secondary containment. - Construction workers to be provided with adequate training on use, storage, and handling of hazardous substances. - Portable spill containment and clean-up equipment to be provided at appropriate locations on site and training in the use of the equipment.	WR3.1.1	Continuous	Contractor
		Ensure that dust mitigation measures outlined in the Air Emissions Management Plan (Section 1 of ESMP) are fully implemented.	WR3.1.2	Continuous	Contractor
		Ensure that mitigation measures outlined within the Erosion and Sedimentation Plan (Section 6 of ESMP) are fully implemented.	WR3.1.3	Continuous	Contractor
		Develop an Emergency Preparedness and Response Plan in accordance with WB General EHS Guidelines.	WR3.1.4	Prior to construction	Contractor
	Reduction in water quality from increased erosion.	Ensure that mitigation measures outlined within the Erosion and Sedimentation Plan (Section 6 of ESMP) are fully implemented	WR3.2	Continuous	Contractor
4. Bridge construction	Reduction in water quality.	Implement measures outlined in WB General EHS Guidelines, such as: - Consider installation of free-spanning structures (e.g., single span bridges).	WR4.1.1	Prior to construction	Contractor

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Monitoring Frequency	Responsibility
		- Restricting the duration and timing of in-stream activities to the dry season and avoiding periods critical to biological cycles of valued flora and fauna (e.g., migration, spawning, etc.). - For in-stream works, using isolation techniques such as use of berms or diversion during construction to limit the exposure of disturbed sediments to moving water.			
		Ensure that mitigation measures outlined in the Erosion and Sedimentation Management Plan (Section 6 of ESMP) are fully implemented.	WR4.1.2	Continuous	Contractor
		Ensure emergency response procedures are developed in line with WB guidance documents in the event of an accidental release of contamination.	WR4.1.3	Continuous	Contractor
	Change in river flow dynamics from bridge construction	Ensure that any channels and ditches required as part of road construction are designed to allow for post-construction flows.	WR4.2	Prior to construction	Supervision Consultant/ Contractor
	Inundation during periods of heavy rainfall	Schedule construction activities to avoid heavy rainfall periods (i.e., during the dry season) to the extent practical. Management program including: - Identification, regular measurement, and recording of principal water usage associated with workers facilities. - Review of measurement (metering) should emphasize areas of greatest water use and enable further water efficiency measures to be considered.	WR4.3	Continuous	Contractor
5. Water consumption	Increased water Consumption associated with construction camps		WR5.1		
	Water consumption associated with construction / concrete batching etc	Consideration of the following WB General EHS Guidelines: - Implement water use efficiency to reduce the amount of water usage.	WR5.2		

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Monitoring Frequency	Responsibility
		- Storm/Rainwater harvesting and use where possible. - Re-use of treated waste water to be included in project design processes where feasible. - Project design to have measures for adequate water collection, spill control and leakage control system.			
6. Waste water discharges	Reduction in water quality from increased waste water discharges from concrete batching plant	- Manage waste water - discharges in line with WB General EHS Guidelines. - Generation and discharge of wastewater of any type should be managed through a combination of: - Water use efficiency to reduce the amount of wastewater generation. - If needed, application of wastewater treatment techniques to reduce the load of contaminants prior to discharge, taking into consideration potential impacts of cross-media transfer of contaminants during treatment (e.g., from water to air or land).	WR6.1		
	Reduction in water quality from increased waste water discharges from workers camps	Manage waste water discharges in line with WB General EHS Guidelines. Adequate portable or permanent sanitation facilities serving all workers should be provided at all construction sites. Adopt water efficiency measures to reduce the amount of wastewater generation.	WR6.2		

5.4 Roles and Responsibilities

Contractor shall ensure sufficient resources are allocated on an on-going basis to achieve effective implementation of the Water Resources Management Plan.

Contractor's Water Resources Management Plan shall describe the resources allocated and responsibility for the execution of each task and requirement contained therein, and shall describe how their roles and responsibilities are communicated to the relevant personnel.

The Contractor shall ensure sufficient resources are allocated on an on-going basis to achieve effective implementation of Contractor's responsibilities in the Water Resources Management Plan.

5.5 Training, Awareness and Competency

The contractor shall ensure that all personnel responsible for the execution of the tasks and requirements contained within the Water Resources Management Plan are competent on the basis of education, training, and experience.

Contractor's Water Resources Management Plan shall describe the training and awareness requirements necessary for its effective implementation.

Contractor's training activity associated with the Water Resources Management Plan shall be appropriately documented by means of a training needs assessment, training matrix/plan and records of training undertaken.

Contractor shall ensure that all personnel responsible for the execution of tasks and requirements in the Water Resources Management Plan are competent on the basis of education, training, and experience.

Contractor's training activity associated with the Water Resources Management Plan shall be appropriately documented by means of a training needs assessment, training matrix/plan and records of training undertaken.

5.6 Reporting and Notification

Contractor shall complete regular monitoring of all mitigation measures developed to determine their effectiveness at reducing and minimising adverse effects. Where evidence of impacts is identified or implemented mitigation measures appear to be inadequate additional mitigation measures will be developed and implemented.

The contractor shall report to the Supervision Consultant the results of the monitoring / surveys / audits / inspections undertaken in accordance with the relevant components of the Water Resources Management Plan.

Contractor's monthly report to Supervision Consultant shall include:

- Number of monitoring / surveys / audits / inspections;
- A summary of the findings and results of all monitoring / surveys / audits / inspections; and
- Where evidence of impacts is identified or implemented mitigation measures appear to be inadequate, then additional mitigation measures will be developed and reported.

The Supervision Consultant will also undertake verification audits/ inspections and will submit routine reports to the TANROADS Safety and Environmental Unit (SEU).

6. EROSION AND SEDIMENT MANAGEMENT

6.1 Objectives

The objectives of this plan are to maintain stable landforms, reduce erosion and enhance reinstatement and to reduce potential adverse effects on stream/river water quality and sedimentation.

This plan should be read in-conjunction with other Management plans, namely:

- Air Quality;
- Ecological Management Plan;
- Waste Management Plan;
- Raw Materials Management Plan;
- Hazardous Materials Management Plan;
- Spill Prevention and Control Plan; and
- Water Management Plan.

6.2 Surveys/Audits

The contractor will undertake periodic surveys of erosion on the edges of the road and of the riverbanks in the vicinity of bridge works. The surveys should be undertaken every 3 months in the dry season and every month in the wet season as a minimum.

6.3 Management and Monitoring

Table 6 below presents a summary of the potential environmental impacts related to erosion and sediment mobilisation, together with mitigation and management measures to avoid or reduce these impacts.

The Contractor shall develop an Erosion and Sediment Control Management Plan which will, as a minimum, incorporate the measures described in Table A, but shall not be limited to these measures. Supervision Consultant's Environmental Specialist will be responsible for reviewing the Erosion and Sediment Control Management Plan prepared by the Contractor and for ensuring that it is consistent with this document.

Sub-contractor appointed by the Main Contractors may utilise the same plan for each section provided that it is reviewed and revised to account for any site-specific issues.

Table 6: Management and Monitoring.

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Surveys/ Audits	Monitoring Frequency	Responsibility
1. Sub-grading, excavating, embanking the road base and	Soil erosion resulting in reduced water quality, flooding, reduced	Assess and establish erosion and sediment control requirements (particularly in relation to site preparation earthworks (soils storage mounds), riverbanks adjacent to bridge works, site drainage), detailing specific	ES1.1	Undertake Visual surveys every 3 months in dry season and monthly in	Continuous	Contractor

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Surveys/ Audits	Monitoring Frequency	Responsibility
road construction	Agricultural productivity and impact on reservoir capacity and life expectancy.	erosion and sediment controls to be implemented (e.g., diversion drains, sediment ponds and fabric silt curtains). The controls should limit the mobilization and dispersion of sediment into freshwater and estuarine environments.		wet season as a minimum.		
		Should erosion result in any serious collapse of Roadside slopes/ banks, the contractor should implement appropriate mitigation measures. These could include: - Constructing of a retaining wall, combining drainage and surface reinforcement. - Construction of a retaining wall or arranging rock or reinforcing surface to protect and contribute retaining wall to protect slope. - Planting grass to reinforce the surface in combination with drainage.	ES1.1.1		Continuous	Contractor
		Ensure that there are no discharges of solid waste from construction and/or domestic waste into rivers.	ES1.1.2		Continuous	Contractor
		Ensure that high embankment and embankment adjacent to rivers and lakes shall be reinforced with rubble stone, mortar 10 MPa, 25cm in thickness, which is above the ballast layer, 10cm in thickness for anti-erosion purpose.	ES1.1.3		Continuous	Contractor
		To prevent the risk of overflow and erosion of soil in temporary storages areas, the following measures will be implemented:	ES1.1.4		Continuous	Contractor

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Surveys/ Audits	Monitoring Frequency	Responsibility
		- Quantity of material stored will be limited to 20-25 m2 and mounds will be no higher than 1.5m; and - The temporary storages must be surrounded by a geotextile fabric fence and securely reinforced to avoid collapsing.				
		Ensure that any material overflowing from stockpiles/ storage embankments onto residential/ agricultural land is removed immediately upon identification	ES1.1.5		Continuous	Contractor
		Provide a commitment to compensate for damages to agricultural land/other others caused by sedimentation.	ES1.1.6		Continuous	Contractor
		Install and regularly maintain screens to collect mud from surface water. (The mud screen is made of geo-textile fabric and arranged at least10cm depth and consolidated to avoid falling in). Undertake regular checks of screens (at least twice per day) to ensure drainage channels are clear of mud.	ES1.1.8		Continuous	Contractor
		In order to prevent oil and solvent in the mixture of liquid asphalt used for covering road from entering into the water source, the construction of asphalt concrete road surface should only be undertaken on dry days, and when road base is dry. If it rains during the operation, it needs to cancel the construction and prepare the dry sand to cover the road surface when adhesive asphalt is spraying.	ES1.1.9		Continuous	Contractor
	Erosion and landslides in wet season in the	Programme works to ensure that excavation and embankment are completed	ES1.1.10		Continuous	Contractor

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Surveys/ Audits	Monitoring Frequency	Responsibility
	excavation areas	for each road base section and compacted before wet season.				
		When undertaking excavation works in hilly and mountainous areas: - limit clearance of the vegetation cover beyond the scope of site clearance; - undertake excavations in areas with high positive slope, excavate in dry season: - Undertake slope stability and erosion protection before the peak time of wet season.	ES1.1.11		Continuous	Contractor
		For excavation works during the rainy season, construct temporary drainage channels to divert water to natural soakaways away from areas of potential erosion	ES1.1.12		Continuous	Contractor
		Ensure that cross-culverts are clear and new/ existing drainage systems are installed and operable prior to main rain season	ES1.1.3		Continuous	Contractor
		Ensure that grass slopes on the margins of roads are replanted with grass as soon as the construction is completed	ES1.1.4		Continuous	Contractor
2. Construction of bridge abutment, pier and bridge ends	Change in sedimentation/ erosion regime of the river bed resulting from the change in flow velocity in the vicinity of the bridge piers and ends	Implement design measures to minimise issues of erosion of riverbanks in the vicinity of new bridges/ bridge improvements. This could include the construction of stone embankments and the planting of grass on slopes.	ES2.1		Continuous	Contractor

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Surveys/ Audits	Monitoring Frequency	Responsibility
		When excavating foundation pits during the wet season, ensure that temporary mud screens are located around the pit. around the foundation pit. The screen should be cleared at least twice a day to operate effectively.	ES2.1.1		Continuous	Contractor
		Implement measures to ensure that there are no discharges of bentonite mixed mud into river; All bentonite mud should be appropriately transferred and stored in the temporary storage	ES2.1.2		Continuous	Contractor
		Prevent solid waste generated during bridge construction from entering water bodies. This should include the use of nets lined with geotextile as a barrier when implementing the construction of bridge.	ES2.1.4		Continuous	Contractor
		To prevent the collapse of road at the head of bridge, the surface of slope should be planted, to prevent erosion, and combine with the suitable drainage system.	ES2.1.5		Continuous	Contractor
3. Discharges from batching plants and dewatering of excavations and washing down of plant and equipment	Reduced water quality and associated impacts on fish and benthic fauna	Ensure that mitigation measures outlined in the Ecology Management Plan (Section 3 of ESMP) are fully implemented. Ensure that waste water from the batching plants is collected and treated, recycled for reuse. Ensure that all water from dewatering operations is treated in settling ponds prior to discharge.	ES3.1		Continuous	Contractor

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Surveys/ Audits	Monitoring Frequency	Responsibility
		Ensure that all water for used for washing down plant and equipment is collected in a settling pond prior to discharge.				
4. Contaminated surface water/ storm water discharge during road operation	Reduced water quality and associated impacts on fish and benthic fauna.	Ensure that road drains and silt traps are maintained on a regular basis.	ES4.1		Continuous	Contractor

6.4 Roles and Responsibilities

Contractor shall ensure sufficient resources are allocated on an on-going basis to achieve effective implementation of the Erosion and Sediment Control Management Plan.

The Contractor's Erosion and Sediment Control Management Plan shall describe the resources allocated and responsible for the execution of each task and requirement contained therein, and shall describe how their roles and responsibilities are communicated to the relevant personnel.

The Contractor shall ensure sufficient resources are allocated on an on-going basis to achieve effective implementation of Contractor's responsibilities in the Erosion and Sediment Control Management Plan.

6.5 Training, Awareness and Competency

The Contractor shall ensure that all personnel responsible for the execution of the tasks and requirements contained within the Erosion and Sediment Control Management Plan are competent on the basis of education, training, and experience.
The Contractor's Erosion and Sediment Control Management Plan shall describe the training and awareness requirements necessary for its effective implementation.

The Contractor's training activity associated with the Erosion and Sediment Control Management shall be appropriately documented by means of a training needs assessment, training matrix/plan and records of training undertaken.

6.6 Reporting and Notification

Contractor shall report to the Supervision Consultant the results of the surveys undertaken in accordance with the relevant components of the Erosion and Sediment Control Management Plan,

Contractor's monthly report to Company shall include:

- Number of surveys of erosion undertaken during the month and summary of the findings; and

- A summary of any actions undertaken where erosion issues have been identified.

7. SPILL PREVENTION AND RESPONSE MANAGEMENT PLAN

7.1 Objectives

The objective of this plan is to prevent spills and in the event of a spill, to minimise the environmental and social impact.

This plan should be read in-conjunction with other Management plans, namely:

- Ecological Management Plan;
- Waste Management Plan;
- Community Health and Safety Plan;
- Environmental Monitoring Plan; and
- Stakeholder Engagement Plan.

7.2 Risk Assessments

As part of a detailed execution plan and prior to the commencement of work, the Contractor shall carry out a detailed risk assessment. This should establish the high-risk locations and activities and identify measures to mitigate impacts and reduce the risks to as low as reasonably practical. As part of the risk assessment, specific response measure should be developed. The Contractor's spill risk assessment will be subject to review and approval by Supervision Consultant and will be responsible for reviewing the Spill Risk Assessment prepared by the Contractor; and for ensuring that it comprehensively covers conditions on site.

7.3 Management and Monitoring

Table 7 below presents a summary of the potential environmental impacts related to noise and vibration, together with mitigation and management measures to avoid or reduce these impacts.

Contractor shall develop a Spill Prevention and Response Management Plan, which will as a minimum incorporate the measures, described in Table A, but shall not be limited to these measures. The Supervision Consultant's Environmental Specialist will be responsible for reviewing the Spill Prevention and Response Plan prepared by the Contractor and for ensuring that it is consistent with this document.

Subcontractors appointed by the Main Contractor may utilise the same plan for each section provided that it is reviewed and revised to account for any site-specific issues. Due to the different scopes of work and work locations, not all management and mitigation measures in the Spill Prevention and Response Plan are applicable. Contractor should ensure that only applicable mitigation measures are implemented depending on the specific site conditions.

Table 7: Management and Monitoring.

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Surveys/ Audits	Monitoring Frequency	Responsibility
1. Spillage of oil/fuel/ chemicals	Pollution of nearby	Prior to the commencement of construction activities, Contractor shall undertake a spill risk	S1.1	Periodic reviews of the Risk assessment	Continuous	Contractor

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Surveys/ Audits	Monitoring Frequency	Responsibility
during transport, storage, handling, or refuelling.	receptors (i.e., ground, and controlled waters)	assessment to establish high risk locations and activities. The risk assessment will identify measures to reduce associated risks to as low as reasonably practical. Site and activity specific response measures will be incorporated into Contractor's Spill Prevention and Response Plan. As a minimum this should cover: - A description of activity type and operator information; - A responsible person, detailing job role and contact details; - Notification requirements; - Clear distinctions of severity of spills, according to the size and nature of the spill, using a clearly defined tiered approach; - Spill response frameworks based on site specific risk assessments include location volume, type of spill and environmental sensitivity; - Strategies and equipment for managing spills; - Procedures to mobilise external resources for responding to large spills; - A full list and the location of onsite and off-site spill response equipment and the response time estimates for deploying the equipment; - A plan of the surrounding area showing topography, drainage flow paths, ground and surface water resources, sensitive and protected areas, community, and cultural sensitivities;		throughout the lifetime of the project.		

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Surveys/ Audits	Monitoring Frequency	Responsibility
		- Clean up strategies and handling instructions for recovered oil, chemicals, and fuels. To include transportation, temporary storage, and treatment / disposal (see Waste Management Plan); - Identification and evaluation of potential discharge detection procedures and equipment; - Facility response self-inspection, training, exercises, drills, and logs; - Security measures, including fences, lighting guards etc. Risk assessments will be updated as necessary to incorporate the changes throughout the project. The mitigation measures will also need to be updated as a result of the updated risk assessment; these will be incorporated into the Contractor's Spill Prevention and Response Plan.				
		Fuel and chemical storage facilities shall be purpose-built, located in designated aboveground areas away from watercourses and provided with secondary containment. Where liquid waste is stored in volumes greater than 220 litres, secondary containment should be implemented. The available volume of secondary containment should be at least 110% of the largest storage container of 25% of the total storage capacity. The integrity of all storage tanks and bunds will be inspected for leaks.	S1.2	Document the findings of the inspections	Continuous	Contractor
		Ensure appropriate spill kits are available at each work site as necessary. All vehicles transporting	S1.3	Record in inspection logs the findings.	Continuous	Contractor

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Surveys/ Audits	Monitoring Frequency	Responsibility
		hazardous materials will carry appropriate spill kits. Identify appropriate location for the spill kits and ensure they contain the necessary spill response equipment. Carry out regular inspections of the kits to ensure they are fully stocked. Ensure relevant personnel are trained in spill response and emergency situations. Training sessions should be both desks based and practical.		Training records should be maintained and refresher training carried out periodically		
		Operational practices for vehicle/ equipment refuelling, which includes the prevention of spillage and the use of spill containment and response equipment, are to be in place. Include a requirement for fuel delivery vehicles and equipment to be routinely inspected so as to ensure the tank, pumps, pipework, and the vehicle itself are free from leaks and fit for purpose. Refuelling should not be performed within 30m of surface water and any drainage systems.	S1.4	Review the operational procedures throughout the lifetime of the project and update these periodically. Document the findings of the inspections.	Continuous	Contractor
		Material Safety Data Sheets (MSDS) should be kept within each storage area where substances are stored and at the site office	S1.5	See Hazardous Materials Management Plan	Continuous	Contractor
		Vehicles and equipment are to be maintained and inspected to a high level of safety with respects to leaks.	S1.6		Continuous	Contractor

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Surveys/ Audits	Monitoring Frequency	Responsibility
		Equipment and vehicles will not be washed near to watercourses.	S1.7		Continuous	Contractor
		Immediately notify the TANROADS ESU of significant spills, the notification should include: - Whether the spill was contained or uncontained; - Material released; - The volume; - Location; - Cause; - Proposed corrective measures; - Response time; - Clean up required; - Initial assessment of environmental and social impact.	S1.8	Incident logs to be maintained and reviewed for learning outcomes.	Continuous	Contractor
		Inspect and evaluate the presence and performance of spill prevention measures. Record the findings in an inspection log.	S1.9	Maintain inspection logs.	Continuous	Contractor
		In the event of significant spillage, assess the need for remediation of water/ground. This will require sampling water/ground to assess the impacts.	S1.10	Monitoring regime to be developed depending on the nature of the spillage	Continuous	Contractor
		Carry out an initial inspection of fuels and hydrocarbon storage areas to identify any non-conformances with WB EHS Guidelines. Where non-conformances are observed (e.g., the fuel and tar storage tanks at the asphalt plant), develop an action plan with	S1.11	Regular inspections of the storage areas with documented findings.	Continuous	Contractor

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Surveys/ Audits	Monitoring Frequency	Responsibility
		corrective actions and a responsible person.				
		Where there is evidence of spillage present at the site, assess the activities carried out on site and review the operational procedures in place. Modify these where appropriate. Ensure relevant personnel are trained and carry out refresher training where necessary.	S1.12		Continuous	Contractor
2. Bentonite Spillage	Pollution of nearby receptors (i.e. controlled waters)	Bentonite mixed mud will not be discharged into the surface water bodies. Bentonite mixed mud will be stored in the temporary storage yard, see the Waste Management Plan for storage and disposal arrangements. The temporary storage yard will not be within 30m of surface water	S2	Regular visual inspections	Continuous	Contractor
3. Construction of bridges and working near water	Pollution of nearby receptors (i.e., ground and surface waters)	During the design phase of the project ensure that measures are developed and implemented to minimise the potential for spillage and pollution of surface water, ensure these measures are implemented (e.g., using a grating net with geotextile material during construction of the upper bridge to minimise pollution of the river). Develop operational procedures where tasks are being carried out in or nearby water, this should also include maintenance of equipment and the use of spill containment booms in the water during active works.	S3		Continuous	Contractor

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Surveys/ Audits	Monitoring Frequency	Responsibility
4. Underground storage tanks	Contamination of ground and groundwater	Evaluate the risk of existing USTs to determine if upgrades are required, including replacement with new systems or closure. Ensure underground storage tanks (USTs) and associated pipework are double-walled and a leak detection system is in place. Avoid the use of USTs for storage of highly soluble organic materials. Regularly test the integrity of the USTs.	S4	Regularly monitor the surface above the tank for indications of soil movement. Consider monitoring of groundwater down gradient of USTs.	Continuous	Contractor

7.4 Spill Response

The level of spill response will be dependent on the nature of the spill. Clear distinctions of severity of spills, according to the size and nature of the spill, using a clearly defined tiered approach will be developed as part of the Contract risk assessment; this will indicate whether the contractor will be capable of responding to the spill or whether an external resource will be required. The spill categorisation and response will be subject to the Contractor's approval.

Where water/ground contamination has occurred, remediation should be carried out. A specific risk assessment should be developed to identify human health and environmental risks. A remediation plan should also be developed for the works. This should include target levels for contaminants of relevance and shall detail the need for a post remediation site assessment in order to verify successful remediation and, if required, any on-going monitoring.

7.5 Roles and Responsibilities

Contractor shall ensure sufficient resources are allocated on an on-going basis to achieve effective implementation of the Spill Prevention and Response Plan.

Contractor's Spill Prevention and Response Plan shall describe the resources allocated and responsible for the execution of each task and requirement contained therein, and shall describe how their roles and responsibilities are communicated to the relevant personnel.

Contractor shall ensure sufficient resources are allocated on an on-going basis to achieve effective implementation of Contractor's responsibilities in the Spill Prevention and Response Plan.

7.5 Training, Awareness and Competency

The contractor shall ensure that all personnel responsible for the execution of the tasks and requirements contained within the Spill Prevention and Response Plan are competent on the basis of education, training, and experience.

Contractor's Spill Prevention and Response Plan shall describe the training and awareness requirements necessary for its effective implementation.

Contractor's training activity associated with the Spill Prevention and Response Plan shall be appropriately documented by means of a training needs assessment, training matrix/plan and records of training undertaken.

Company shall ensure that all Company personnel responsible for the execution of Company's tasks and requirements in the Spill Prevention and Response Plan are competent on the basis of education, training, and experience.

Company's training activity associated with the Spill Prevention and Response Plan shall be appropriately documented by means of a training needs assessment, training matrix/plan and records of training undertaken.

7.6 Reporting and Notification

Contractor shall report to the Project Environmental Department the results of the risk assessment and include any additional mitigation and management measures as agreed with Company in the Spill Prevention and Response Plan. Contractor shall immediately notify TANROADS and WB of all spills as detailed above.

Contractor's quarterly report to TANROADS should include:

- The number of contained and uncontained releases;
- Number of spill prevention and response drills / toolbox talks / training;
- Results of the inspections carried out;
- Results of any sampling undertaken (where applicable).

8. HAZARDOUS MATERIALS MANAGEMENT

8.1 Objectives

The objective of this plan is to:

- Prevent uncontrolled releases of hazardous materials during transportation, handling, storage, and use;
- Ensuring that any chemicals or materials subject to national or international bans or phase-outs are not utilised

This plan should be read in-conjunction with other Management plans, namely:

- Waste Management Plan;
- Water Management Plan;
- Spill Prevention and Response Plan; and
- Program of Environmental Monitoring and Quality Supervision

8.2 Surveys

Contractor shall undertake routine audits and inspections of all hazardous materials transportation, handling and use procedures and of storage facilities.

8.3 Management and Monitoring

Table 8 below presents a summary of the potential environmental impacts related transportation, handling, storage, and use of hazardous materials, together with mitigation and management measures to avoid or reduce these impacts. Contractor shall develop a hazardous materials management Plan, which will as a minimum incorporate the measures, described in Table A, but shall not be limited to these measures.

Supervision Consultant's Environmental Specialist will be responsible for reviewing the Hazardous Materials Management Plan prepared by the Contractor and for ensuring that it is consistent with this document.

Contractors responsible for multiple sections of the highway improvement scheme may utilise the same plan for each section providing that it is reviewed and revised to account for any site-specific issues.

This plan relates specifically to the transportation, handling, storage, and use of hazardous materials. The requirement for monitoring and reporting on hazardous wastes including the quantities generated by the project is included in the Waste Management Plan (ESMP Section 4).

Table 8: Management and Monitoring.

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Monitoring Frequency	Responsibility
Transport, handling, storage, and use of hazardous materials	Potential air, soil, ground water and surface pollution.	Avoid the use of Hazardous materials	HM1	Continuous	Contractor
		Prepare a register of all hazardous materials used on site, along with appropriate Material Data Safety Sheets.	HM2	Prior to construction and maintain	Contractor
		Undertake hazardous materials assessments for all materials. The level of risk should be established through an on-going assessment process based on the criteria defined in WB EHS General Guidelines (April 2007). Ensure that results of assessment are incorporated into Spill Prevention and Response Plan (Section 7).	HM3	Continuous	Contractor
		Prepare spill management and response plans appropriate to all hazardous materials utilised on site (See ESMP Section 7: Spill Prevention and Response Plan).	HM4	Prior to use and ongoing if new materials used	Contractor
		Ensure that all hazardous materials are transported in an appropriate manner (relates to container and vehicle) (in accordance with WB EHS General Guidelines (April 2007), Section 3.5	HM5	Continuous	Contractor

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Monitoring Frequency	Responsibility
		Ensure that all hazardous materials are stored in appropriate containers/ areas with appropriate control systems (bund walls, automatic alarms, and shut-off systems). Avoid use of below ground storage tanks.	HM6	Prior to construction and ongoing	Contractor
		All fuel and chemical storage facilities should locate away from watercourses and with appropriate secondary containment (bund wall with a capacity of 110% of largest container and double-skinned tanks). This includes all temporary fuel stores.	HM7	Prior to construction and ongoing	Contractor
		Ensure that all storage facilities/tanks are clearly labelled.	HM8	Continuous	Contractor
		Ensure that all storage facilities are fitted with locking systems to prevent unauthorised access.	HM9	Continuous	Contractor
		Ensure that all deliveries are supervised by appropriately trained personnel and they are undertaken in accordance with formalised Standard Operating Procedures (SOP).	HM10	Continuous	Contractor
		Ensure that all site personnel with access to hazardous materials are appropriately trained in their transportation, handling, storage and use and in spill response procedures.	HM11	Continuous	Contractor
		Ensure that appropriate spill response equipment is located in storage areas.	HM12	Continuous	Contractor
		Undertake regular audits and inspections of hazardous materials transportation, transfer and use procedures and operations and ensure that the requirement for any additional measures is addressed with both the Hazardous Materials and Spill Prevention and Response Plans.	HM13	Continuous	Contractor/ Supervision Consultant
		Undertake regular audits and inspections of storage facilities and tanks and ensure that the requirement for any additional measures is addressed with both the Hazardous Materials and Spill Prevention and Response Plans.	HM14	Continuous	Contractor/ Supervision Consultant

8.4 Roles and Responsibilities

Contractor shall ensure sufficient resources are allocated on an on-going basis to achieve effective implementation of the Hazardous Materials Management Plan.

The Contractor's Hazardous Materials Management Plan shall describe the resources allocated and responsible person for the execution of each task and requirement contained therein, and shall describe how their roles and responsibilities are communicated to the relevant personnel.

8.5 Training, Awareness and Competency

The contractor shall ensure that all personnel responsible for the execution of the tasks and requirements contained within the Hazardous Materials Management Plan are competent on the basis of education, training, and experience.

The Contractor's Hazardous Materials Management Plan shall describe the training and awareness requirements necessary for its effective implementation.

All training activity associated with the Plan shall be appropriately documented by means of a training needs assessment, training matrix/plan and records of training undertaken.

8.6 Reporting and Notification

Contractor shall report to the Supervision Consultant the results of the audits/inspections undertaken in accordance with the relevant components of the Hazardous Materials and Spill Prevention and Response Plans and integrate the results, including additional mitigation and management measures as agreed with Supervision Consultant, within the Hazardous Materials Management Plan.

Contractor's monthly report to Company shall include:

- Number and results of verification inspections prescribed in Table 8-1 (HM13 and HM14)

The Supervision Consultant's Environmental Specialist will also undertake verification audits/ inspections and will submit routine reports to the TANROADS.

9. RAW MATERIALS MANAGEMENT PLAN

9.1 Objectives

The objective of this plan is to:

- Extract aggregate/ sands/gravel from sustainable, and approved locations/suppliers;
- Encourage the local procurement of construction materials (reinforcement bars, cement, concrete, and bitumen).

This plan should be read in-conjunction with other Management plans, namely:

- Ecological Management Plan;
- Air Emissions Management Plan;
- Community Health and Safety Plan;
- Water Management Plan;
- Erosion and Sediment Control Management Plan;
- Spill Prevention and Response Management Plan;
- Hazardous Materials Management Plan;
- Noise and Vibration Management Plan;

9.2 Surveys

Contractor shall confirm that all surveys identified in the Management Plans listed in Table 9 have been completed for existing and any new quarry sites.

9.3 Management and Monitoring

Table 9 below presents a summary of the potential environmental impacts related to raw materials, together with mitigation and management measures to avoid or reduce these impacts.

Contractor shall develop a Raw Materials Management Plan, which will as a minimum incorporate the measures, described in Table A, but shall not be limited to these measures. The Supervision Consultant will be responsible for preparing a site-specific Raw Materials Management Plan which the Contractor will then have to formally commit to implement.

Sub-contractors appointed by the Main Contractor may utilise the same plan for each section provided that it is reviewed and revised to account for any site-specific issues.

Table 9: Management and Monitoring.

Sources of Impact	Potential Impact	Mitigation/Management	Ref. No.	Monitoring Frequency	Responsibility
1. Extraction of construction materials	Potential impacts associated with extraction of construction materials. These include: - Noise and vibration; - Loss of vegetation; - Water quality; - Air quality; - Cultural heritage; - Traffic; and - Soil erosion.	Reduce the number of new quarries/soil/ sand pits required (if applicable) by using existing (appropriately licensed) quarries	RM1.1	As required	Supervision Consultant / Contractor
		Environmental and social surveys and assessment to be undertaken for new quarry/soil/ sand pit sites.	RM1.2	As required	Supervision Consultant / Contractor
		Confirm that quarries/ soil / sandpits utilised have appropriate licenses and permits.	RM1.3	As required	Contractor
		Contractors should audit/monitor management and mitigation measures and performance of the quarries identified to	RM1.4	Quarterly audit/ monitoring	Supervision Consultant / Contractor

Sources of Impact	Potential Impact	Mitigation/Management	Ref. No.	Monitoring Frequency	Responsibility
		supply the project to ensure that they operate in accordance with the requirements of WB Guidelines on Construction Materials Extraction. This will specifically include: - Air emission (fugitive dust); - Noise and vibration (blasting and plant operation); - Water quality (erosion, run-off, and water resource management); - Security and management of explosives; - Hazardous material management (transportation, storage, and use); - Geotechnical stability (rock-face slopes); and - Emergency preparedness (explosion, fire, landslide, etc).		report	
		Should any environmental, health safety issues be identified in the quarterly auditing/ monitoring reports then the contractor should work with the mine operator to implement appropriate corrective actions/ measures	RM1.5	Continuous	Contractor / Mine Operator
		The contractor will require the quarry operator to provide a copy of the proposed closure and rehabilitation plan prepared for the quarry. Should the operator not have a formalised plan, the contractor should work with the operator to develop an appropriate plan.	RM1.6	Continuous	Contractor / Mine Operator
		If new quarries/ soil / sand pits are required emphasis should be placed on them being located	RM1.7	Continuous	Contractor

Sources of Impact	Potential Impact	Mitigation/Management	Ref. No.	Monitoring Frequency	Responsibility
		in areas with low ecological and landscape value and close to existing roads.			
		Avoid, where possible, the extraction of sand from rivers. Where required, undertake baseline assessments of the rivers, and implement measures to avoid impacts on river flow, erosion, water quality (turbidity) and biological diversity	RM1.8	Prior to extraction	Contractor
2. Procurement of manufactured construction materials	Potential impacts associated with transportation, handling, storage of materials. These include: - Fire hazards from spillage inflammable materials. - Risk of injury due to handling of hazardous materials. - Landscape and loss of aesthetic value of the surrounding environment from spillage of waste oils and accumulation of scrap materials.	Contractors should execute the following: - Waste Management Plans (Section 4) - Spill Prevention and Response Management Plan (Section 7) - Hazardous Materials Management Plans (Section 8)	RM2	Continuous	Contractor

9.4 Roles and Responsibilities

Contractor shall ensure sufficient resources are allocated on an on-going basis to achieve effective implementation of the Raw Materials Management Plan. Contractor's Raw Materials Management Plan shall describe the resources allocated and responsible person for the, and shall describe how their roles and responsibilities are communicated to the relevant personnel.

Contractor shall ensure sufficient resources are allocated on an on-going basis to achieve effective execution of each task and requirement contained therein implementation of Contractor's responsibilities in the Raw Materials Management Plan

9.5 Training, Awareness and Competency

The contractor shall ensure that all personnel responsible for the execution of the tasks and requirements contained within the Raw Materials Management Plan are competent on the basis of education, training, and experience.
Contractor's Raw Materials Management Plan shall describe the training and awareness requirements necessary for its effective implementation.

The Contractor's training activity associated with the Raw Materials Management Plan shall be appropriately documented by means of a training needs assessment, training matrix/plan and records of training undertaken.

TANROADS shall ensure that all Contractors personnel responsible for the execution of tasks and requirements in the Raw Materials Management Plan are competent on the basis of education, training, and experience.

The Contractor's training activity associated with the Raw Materials Management Plan shall be appropriately documented by means of a training needs assessment, training matrix/plan and records of training undertaken.

9.6 Reporting and Notification

The Contractor shall report to the Project Environmental Department the results of the surveys undertaken in accordance with the relevant components of the Raw Materials Management Plan and integrate the results, including additional mitigation and management measures as agreed with Company, within the Plan.

Contractor's monthly report to Company shall include:

- Number and results of verification inspections prescribed in Table 9.

The Supervision Consultant's Environmental Specialist will also undertake verification audits/ inspections and will submit routine reports to the TANROADS.

10. CULTURAL HERITAGE MANAGEMENT PLANS

10.1 Objectives

The objectives of this plan are:

- To avoid impacts on cultural heritage sites (including both archaeological and oral tradition sites) where necessary and practicable; and
- Where avoidance is not possible, manage cultural heritage sites in consultation with the Tanzania Government/ Regulatory Agencies (E.g., Department of Antiquities).

This plan should be read in-conjunction with other Management plans, namely:

- Environmental Monitoring Plan; and
- Stakeholder Engagement Plan.

10.2 Surveys

Field investigation has shown that there is an existing Baobab Tree at km 3+800 in the road median along the New Bagamoyo Road. The Baobab Tree is valued by the local people as a scared site. It is common to find local people communicating with their traditional God by putting various articles like coins, pieces of cloth, tree twigs, etc under the Baobab tree.

Consultation with local regulatory organisations and the review of available records undertaken as part of the EIA process did not identify any other known sites of archaeological, palaeontological, or cultural heritage value within the development site boundary.

It is not possible to identify all sites of archaeological /palaeontological and heritage significance (with specific reference to below ground features). Therefore, in order to address this challenge a Chance Find Procedure[116] will be followed during the construction phase of the project.

10.3 Management and Monitoring

The preferred management approach for known archaeological sites is avoidance. Any cultural heritage sites that are discovered as chance finds during construction works will be managed appropriately in accordance with the Chance Finds Procedures[117].
Table 10 below presents a summary of the potential environmental impacts related to features/locations of archaeological and cultural heritage value, together with mitigation and management measures to avoid or reduce these impacts.

Contractor shall develop a Cultural Heritage Management Plan, which will as a minimum incorporate the measures, described in Table A, but shall not be limited to these measures.

Supervision Consultant's Social/Gender Specialist will be responsible for reviewing the Cultural Heritage Management Plan prepared by the contractor and for ensuring that it is consistent with this document.

Sub-contractors appointed by the Main Contractor may utilise the same plan for each section provided that it is reviewed and revised to account for any site-specific issues.

Table 10: Management and Monitoring.

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Monitoring Frequency	Responsibility
1. Construction works and movement of people and vehicles in road corridor	Damage to or destruction of sites of cultural heritage value or artefacts. Disconnection of communities from cultural sites and loss of sites from oral tradition.	Ensure that all works undertaken in relation to the project are in compliance with Tanzania national legislation and IFC Performance Standard 8: Cultural Heritage (2012).	CH1	Continuous	Supervision Consultant / Contractor

[116] UNITED REPUBLIC OF TANZANIA MINISTRY OF WORKS, TRANSPORT AND COMMUNICATION. TANZANIA NATIONAL ROADS AGENCY (TANROADS. Environmental and Social Management Framework for Dar Es Salaam Urban Transport Improvement Project. January, 2017.

[117] Ibid

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Monitoring Frequency	Responsibility
		Undertake cultural heritage survey by systematically recording and mapping cultural heritage sites in all areas where construction works will be required (including road corridor and staging/ storage compounds), including any areas that were not surveyed as part of the EIA.	CH2	Prior to construction works	Supervision Consultant / Contractor
		Undertake further research of appropriate archives (local/national) as part of pre-construction surveys.	CH3	Prior to construction works	Supervision Consultant / Contractor
		Should any features of cultural heritage significance be identified in an area where it is likely to be disturbed by the proposed works, consult with community representatives on matters concerning the management of the site.	CH4	Prior to construction works	Supervision Consultant / Contractor
		In accordance with IFC PS: 8 the project should not remove, significantly alter, or damage critical cultural heritage;	CH5	Continuous	Contractor
		In accordance with IFC PS 8: - Where the contractor has Encountered tangible cultural heritage that is replicable and not critical, the client will apply mitigation measures that favour avoidance. Where avoidance is not feasible, apply the appropriate mitigation hierarchy.	CH6	Continuous	Contractor
		In accordance IFC Performance Standard 8 (PS8), assess options to allow continued access to previously accessible cultural heritage sites subject to overriding health, safety, and security considerations;	CH7	Prior to construction	Supervision Consultant / Contractor
		Consult with appropriate department of Tanzania government to seek agreement on action and/or mitigation measures to be taken.	CH8	Continuous	Contractor
		Provide awareness training to all staff to ensure that Chance Finds Procedure is implemented where required.	CH9	Continuous	Contractor
		Ensure that Chance Find. Procedure is implemented as outlined in the ESMF document.	CH10	Continuous	Contractor

10.4 Roles and Responsibilities

Contractor shall ensure sufficient resources are allocated on an on-going basis to achieve effective implementation of the Cultural Heritage Management Plan.

The Contractor's Cultural Heritage Management Plan shall describe the resources allocated and responsible person for the execution of each task and requirement contained therein, and shall describe how their roles and responsibilities are communicated to the relevant personnel.

The Contractor shall ensure sufficient resources are allocated on an on-going basis to achieve effective implementation of Contractor's responsibilities in the Cultural Heritage Management Plan.

10.5 Training, Awareness and Competency

The Contractor shall ensure that all personnel responsible for the execution of the tasks and requirements contained within the Cultural Heritage Management Plan are competent on the basis of education, training, and experience.

The Contractor's Cultural Heritage Management Plan shall describe the training and awareness requirements necessary for its effective implementation.

The Contractor's training activity associated with the Cultural Heritage Management Plan shall be appropriately documented by means of a training needs assessment, training matrix/plan and records of training undertaken.

10.6 Reporting and Notification

The contractor shall notify Resident Engineer (as per the Chance Find Procedure) should any sites be discovered as a chance find.

11. COMMUNITY IMPACTS MANAGEMENT PLAN

11.1 Objectives

The objectives of this plan are to:

- Prevent risk and resulting adverse impacts of the contractor's activities on the health, safety and wellbeing of individuals and communities;
- Act in the event that damage or harm has been caused to repair and return to condition comparable to pre-impact condition; and
- Implement a system to maintain communication with communities and raise awareness of proposed construction activities and the potential impacts that they may represent.

This plan should be read in-conjunction with other Management plans, namely:

- Air Emissions Management Plan;
- Noise and Vibration Management Plan;
- Ecological Management Plan;
- Waste Management Plan;
- Water Resource Management Plan;
- Erosion and Sedimentation Control Plan;
- Spill Prevention and Response Plan;
- Hazardous Materials Management Plan;
- Raw Materials Management Plan; and

- Cultural Heritage Management Plan

11.2 Surveys

There are no specific surveys required in support of the implementation of this plan. However, surveys undertaken/audits undertaken to support the implementation of other plans (as specified in Section 1.0 above) are relevant to this plan.

11.3 Management and Monitoring

Table 11 below presents a summary of the potential environmental impacts related to individuals and communities, together with mitigation and management measures to avoid or reduce these impacts. The contractor shall develop a Community Impacts Management Plan, which will as a minimum incorporate the measures, described in Table 11, but shall not be limited to these measures. Supervision Consultant's Social/Gender Specialist will be responsible for reviewing the Community Impacts Management Plan prepared by the Contractor and for ensuring that it is consistent with this document.

Appointed Sub-contractors by the Main Contractor may utilise the same plan for each section provided that it is reviewed and revised to account for any site-specific impacts/issues.

Table 11: Management and Monitoring.

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Monitoring Frequency	Responsibility
1. Land acquisition	Loss of land and properties.	Ensure that measures outlined in the RAP is implemented.	C1	Before commencement of construction works	Supervision Consultant
	Loss of business	Ensure that measures outlined in the Business Impact Management Plan are implemented	C2	Before commencement of construction works	Supervision Consultant
2. Site Hazards – Community interaction with site works	Risk of construction related accidents resulting into injury or death.	Where there is a potential for the community (including workers) to be exposed to hazards. The Contractor shall: - Identify the hazard; - Inform all individuals/ communities as to the presence and nature of the hazard. - Restrict public access to works area including construction areas, staging and storage sites via appropriate security. This will include:	C3	Continuous	Contractor

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Monitoring Frequency	Responsibility
		- Security fencing and appropriate signage; - Deployment of security personnel (no security personnel will be armed); - Permitting of site access with a requirement for site induction and the use of appropriate PPE - Mitigate the hazard by modifying, substituting, or eliminating the condition or substance causing the hazard; - If the hazard conditions cannot be eliminated, exercise special care to avoid or limit their exposure by restricting access to works and storage areas, erecting appropriate signs, fences and barriers, imposing vehicle speed restrictions; and - Ensure that all deliveries or movement of hazardous materials on site are undertaken in accordance with written procedures outlined in the Hazardous Materials Management Plan (Section 8). Consult with local emergency services to agree procedures for accidents/ emergencies related to construction activities; A procedure for the recording of all public health and safety issues/incidents should be implemented. This should include procedures for recording of issues/accidents, investigation of the issue/accident			

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Monitoring Frequency	Responsibility
		and the implementation of corrective actions/ remediation as required.			
3. Hazard to community from construction traffic-related traffic.	Risk of accidents resulting in injury or death	The Contractor will develop a Construction Traffic Management Plan. This will include: - Identification and enforcement of haul routes (including avoiding dangerous routes during specific times); - Provision of appropriate barriers and signage to demarcate areas in which construction traffic is active and prevent access to the general public; - Establishment and enforcement of speed limits for all construction related vehicles; - Improving driving skills and requiring all drivers to hold appropriate licences; - Adopting limits for trip duration and arranging driver rosters to avoid overtiredness; - Provision of training to all drivers on the requirements for safe driving measures (e.g. speed limits; - Consult with local emergency services to agree on procedures for accidents/ emergencies related to construction traffic; and	C4		

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Monitoring Frequency	Responsibility
		- A procedure for the recording of all construction related traffic accidents should be implemented. This should include: - Date/time; - Location; and - Reason for accident. The procedure should also include actions for investigation of the accident and the implementation of corrective actions as required.			
4. Air Quality – emissions from site works and plant, vehicle movements	Degraded air quality and potential impact on human health/vegetation	Ensure that all measures outlined in Air Emissions Management Plan (ESMP Section 2) are implemented.	C5	Continuous	Contractor
5. Noise and vibration – 6. Emissions from site works, plant, and vehicle movements	Increased background noise levels and disruption to residents/ businesses	Ensure that all measures outlined in Noise and Vibration Management Plan (ESMP Section 2) are implemented.	C6	Continuous	Contractor
7. Stockpiling of excavated soil materials.	Damage on adjacent land use and properties.	Ensure that all measures outlined in the Erosion and Sedimentation Management Plan (ESMP Section 6) are Implemented.	C7	Continuous	Contractor
8. Land contamination 9. From spillages/ leaks of hazardous materials on construction sites.	Reduced soil quality, harm to human health, reduced agricultural production	Ensure that all measures outlined in Hazardous Materials Management Plan and Spill Prevention and Response plan (ESMP Sections 8 and 7 respectively) are implemented	C8	Continuous	Contractor
10. Contamination of watercourses due spillages/ leaks from construction site and sedimentation.	Degraded water quality and increased turbidity resulting in reduced biodiversity and potential impacts on fisheries	Ensure that all measures outlined in the Hazardous Materials Management Plan, Spill Response Plan, Erosion and Sediment Control Plan and Water Management Plan (ESMP, Section 8, 7, 6 and 5 respectively) are implemented.	C9	Continuous	Contractor

Sources of Impact	Potential Impact	Mitigation/ Management	Ref. No.	Monitoring Frequency	Responsibility
11. Waste 12. generation/ **13.** deposition	Ground/ surface water contamination, harm to human health and land-use.	Ensure that all measures outlined in the Waste Management Plan (ESMP Section 4) are implemented	C9	Continuous	Contractor
14. Operation of BRT road after construction.	Increased risk of traffic accidents to pedestrians and other vehicles due to over-speeding.	Incorporation of appropriate signage and safety measures (barriers, formalised crossing points) to reduce the risk of accidents.	C10	Continuous	Supervision Consultant.
15. General work activities	Impacts/ nuisance to individuals and the community	The contractor shall ensure that the grievance/complaint reporting procedure identified in the Stakeholder Engagement Plan is appropriately implemented and all submissions received managed using the following mechanism: - Grievance received; - Grievance recorded in a register; - For an immediate action to satisfy the complaint, the complainant will be informed of corrective action; - Implement corrective action, record the date, and close case; - For a long corrective action, the complainant will be informed of proposed action; and - Implement corrective action, record the date, and close case.			

11.4 Roles and Responsibilities

Contractor shall ensure sufficient resources are allocated on an on-going basis to achieve effective implementation of the Community Impacts Management Plan.

The Contractor's Community Impacts Management Plan shall describe the resources allocated and responsible for the execution of each task and requirement contained therein, and shall describe how their roles and responsibilities are communicated to the relevant personnel.

11.5 Training, Awareness and Competency

The contractor shall ensure that all personnel responsible for the execution of the tasks and requirements contained within the Community Impacts Management Plan are competent on the basis of education, training, and experience.

The Contractor's Community Impacts Plan shall describe the training and awareness requirements necessary for its effective implementation.

All training activity associated with the Plan shall be appropriately documented by means of a training needs assessment, training matrix/plan and records of training undertaken.

11.6 Reporting and Notification

The contractor shall submit to the Supervision Consultant a monthly report. Contractor's monthly report to shall include:

- Information on any complaints received from individuals and communities; and
- A summary of the Contractors response to the complaint and any residual impacts.

The Supervision Consultant's Environmental and Social/Gender Specialist will also undertake verification audits/ inspections and will submit routine reports to the SEU.

APPENDIX 31: ESMP PERFOMANCE STANDARDS.

1. Performance Standard 1

Performance Standard Objective	**Supporting Documentation**
Performance Standard 1 establishes the importance of integrated environmental and social assessment to identify impacts, risks and opportunities, effective community engagement and the management of environmental and social performance throughout the life of the project. The requirements for the development of an Environmental and Social Management Plan (ESMP) are outlined below. **General:** Establish an environmental and social impact assessment and management process framework that will incorporate the following elements: - policy; - identification of risks and impacts; - management programs; - organizational capacity and competency; - emergency preparedness and response; - stakeholder engagement; and - monitoring and review.	The following supporting documents will be used to monitor /assess compliance with performance standards: - National Policies/Legislations/Guidelines: - Environmental Management Act Cap 191. - Environmental Impact Assessment and Audit Regulations G.N. No. 349 of 2005. - Environmental Impact Assessment and Audit (Amendment) Regulations G.N. No. 474 of 2018. - WB/IFC Policies/Guidelines: - Operational Manual OP 4.01 - Environmental Assessment OP 4.01 January, 1999, Revised April 2013.
Aspect	**Performance Standard Requirements**
PS1: Policy	Define the environmental and social objectives and principles for achieving sound environmental and social performance Confirm legal compliance requirements (including international obligations / agreements).

	Allocate responsibility to ensure conformance and implementation.
PS1: Identification of Risk and Impacts	The process of identifying risks and impacts must: - Be consistent with good industry practice and based on relevant methods and tools for assessment. - Be based on recent environmental and social baseline data at an appropriate level of detail. - Consider the emission of greenhouse gasses and climate change risks (including adaptation opportunities). - Be applicable to the context of the project's area. - Influence and control, where possible and applicable, the risks and impacts resulting from third party's actions. - Consider risks and impacts associated with primary supply chains (where practicable
PS1: Management Programmes	Describe how risks and impacts are eliminated and / mitigated. Identify requirements for performance improvements and develop and implement action plans.
PS1: Organisational Capacity and Competency	Establish, maintain an organisational structure that define roles, responsibilities, authority and allocate the required resources (financial and external expertise) to implement the management system.
PS1: Emergency Preparedness and Response	Identify potential possible accidental and emergency situations and establish and maintain an emergency preparedness and response system.
PS1: Monitoring and Review	Establish procedures for the monitoring and measurement of the management programme Ensure compliance obligations by third parties are fulfilled (as it relates to the project)/ Involve community representatives in monitoring where applicable/ Retain external expert (where required) to verify monitoring information. Track performance and undertake trend analysis and document as appropriate. Adjust management plans based on outcomes of monitoring activities and adjust plans to improve performance Establish process for periodic senior management review of the effectiveness of the management system.
PS1: Stakeholder Engagement	Develop and implement a stakeholder engagement plan for identification, continued involvement and effective participation Disclose all relevant information to enable stakeholders to express the views and appropriately respond. Conduct an informed consultation and participation process. Indigenous Peoples: Refer Performance Standard 7. In instances where the stakeholder engagement is the responsibility of the host government, collaborate (to the extent possible) to ensure that the objectives of the performance standard is met.
PS1: External Communications and Grievance Mechanism	Receive, appropriately respond to and document comments from the public Establish a grievance mechanism to receive and facilitate resolution of affected communities' concerns and grievances.
PS1: On-going Reporting to Affected Communities	Provide periodic report to the affected communities regarding project progress, implementation of action plans, issues raised and material changes.

2 Performance Standard 2

Performance Standard Objective	**Supporting Documentation**
Performance Standard 2 recognized that the pursuit of economic growth through employment creation and income generation should be accompanied by the rights of workers. To promote the fair treatment, non-discrimination, equal opportunity, maintain, & improve the worker-management relationship, legal compliance, protect workers, a safe and healthy working environment and avoid the use of forced / child labour.	The following supporting documents will be used to monitor /assess compliance with performance standards: ▪ National Policies/Legislations/Guidelines: - The Employment and Labour Relations Act No. 6 of 2004. - The Occupational Health and Safety Act No. 5 of 2003. ▪ WB/IFC Polices /Guidelines: - Guidance Note 2 Labour and Working Conditions. - Good Practice Note on Non-Discrimination and Equal Opportunity. - Good Practice Note on Managing Retrenchment. - Workers' Accommodation: Processes and Standards. - Labour Toolkit: A Practical Screening and Due Diligence Tool for Project Review. - WB Group EHS Guidelines ▪ International Conventions/Treaties: - ILO Conventions on Working Environment (Air Pollution, Noise, and Vibration) Convention, 1977 (No. 148) [118]). - ILO Conventions on Worst Forms of Child Labour Convention, 1999 (No. 182)[119]. - ILO Conventions on Discrimination (Employment and Occupation) Convention, 1958 (No. 111)[120]. - ILO Conventions on Workmen's Compensation (Accidents) Convention, 1925 (No. 17) [121] .
Aspect	**Performance Standard Requirements**
PS2: Human Resource Policies and Procedures	Adopt and implement the appropriate human resource policies. Provide workers with clear understandable documentation explaining worker's rights.

[118] https://en.wikipedia.org/wiki/Working_Environment_(Air_Pollution,_Noise_and_Vibration)_Convention,_1977
[119] https://en.wikipedia.org/wiki/Worst_Forms_of_Child_Labour_Convention
[120] https://en.wikipedia.org/wiki/Discrimination_(Employment_and_Occupation)_Convention
[121] https://en.wikipedia.org/wiki/Workmen%27s_Compensation_(Accidents)_Convention,_1925

PS2: Working Conditions and Terms of Employment	Respect collective bargaining agreements with workers organisations. Identify and ensure substantially equivalent terms and conditions for migrant workers. Develop and implement policies on the quality and management of accommodation and provision of basic services.
PS2: Workers Organisations	Not to restrict or prevent workers from forming and / join workers organisation.
PS2: Non-Discrimination and Equal Opportunity	Employment decision will not be made on the basis of personal characteristics unrelated to inherent job requirements Promote equal opportunity, fair treatment, and non-discrimination. Take measures to prevent and address harassment, intimidation and / or exploitation.
PS2: Retrenchment	Develop a Retrenchment Plan to address issues as it relates to legal and contractual requirements.
PS2: Grievance Mechanism	Provide grievance mechanism for workers to raise workplace concerns.
PS2: Protecting the Work Force	Persons under the age of 18 will not be employed. Forced labour will not be employed.
PS2: Occupational Health and Safety	Provide safe and healthy work environment. Take steps to prevent accidents, injury, and disease. Apply good international industry practice to assess risk and potential hazards to workers, provide preventative and protective measures, training, monitoring, and reporting, emergency preparedness and response procedures.
PS2: Workers engaged by Third Parties	Take reasonable action to ascertain compliance with the Performance Standard.
PS2: Supply Chain	Take reasonable action to ascertain compliance with the Performance Standard.

3. Performance Standard 3

Performance Standard Objective	**Supporting Documentation**
Performance Standard 3 recognizes that increased economic activity and urbanization often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels. To avoid or	The following supporting documents will be used to monitor /assess compliance with performance standards: ▪ <u>National Policies/Legislations/Guidelines:</u> - National Climate Change Strategy (2012). - Climate Change Mitigation in Southern Africa. Tanzania Country Study. January 1999. - National Environmental Policy (1997)

minimize adverse impacts on human health and the environment by avoiding or minimizing pollution, promote more sustainable use of resources, including energy and water and reduce project-related GHG emissions.	- National Energy Policy (2015). - The Water Resources Management Act No. 11 of 2009. - The Environmental Management (Solid Waste Management) Regulations (2009). - The Environmental Management (Hazardous Waste Control and Management) Regulations (2009). - The Pesticides Control Regulations (1984).
Aspect	**Performance Standard Requirements**
PS3: General	Consider ambient conditions and apply technically and financially feasible resource efficiency and pollution prevention principles and techniques that are best suited to avoid, or where avoidance is not possible, minimize adverse impacts on human health and the environment.
PS3: Resource Efficiency	Implement feasible measures for improving efficiency in consumption of energy, water and other material inputs.
PS3: Greenhouse Gasses	Consider alternatives and implement feasible options to reduce project-related GHG emissions. Projects that are expected to or currently produce more than 25,000 tonnes of CO2-equivalent annually, quantify direct emissions annually in accordance with internationally recognized methodologies and good practice.
PS3: Water Consumption	Adopt measures that avoid or reduce water usage to avoid significant adverse impacts on others.
PS3: Pollution Prevention	Avoid the release of pollutants or, when avoidance is not feasible, minimize and/or mitigate. Address potential adverse project impacts on existing ambient conditions.
PS3: Wastes	Avoid the generation of hazardous and non-hazardous waste materials. Where waste generation cannot be avoided, reduce, recover, and reuse waste. Where waste cannot be recovered or reused, treat, destroy, or dispose of it in an environmentally sound manner.
PS3: Hazardous Materials Management	Avoid or, when avoidance is not possible, minimize and control the release of hazardous materials. Assess and manage risks associated with the production, transportation, handling, storage, and use of hazardous materials.
PS3: Pesticide Use and Management	Formulate and implement an integrated pest management (IPM) and/or integrated vector management (IVM) approach.

4. Performance Standard 4

Performance Standard Objective	**Supporting Documentation**
Performance Standard 4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. To anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances and ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the Affected Communities.	The following supporting documents will be used to assess/monitor compliance with performance standards: ▪ National Policies/Legislations/Guidelines: - Guidelines for Management of Hazardous Wastes. United Republic of Tanzania, Vice President's Office. Division of Environment. June 2013. - The Public Health Act No. 1 of 2009. - The Environmental Management (Hazardous Waste Control and Management) Regulations (2009). ▪ WB/IFC Polices /Guidelines: IFC Environmental, Health, and Safety (EHS) Guidelines: Community Health and Safety.
Aspect	**Performance Standard Requirements**
PS4: Community Health and Safety	Evaluate the risks and impacts to the health and safety of the affected communities during the project life and will establish preventive and control.
PS4: Infrastructure and Equipment Design and Safety	Design, construct, operate, and decommission the structural elements or components of the project in accordance with good international industry practice, taking into consideration safety risks to third parties or affected communities.
PS4: Hazardous Materials Management and Safety	Avoid or minimize the potential for community exposure to hazardous materials and substances that may be released by the project through modifying, substituting, or eliminating, control the safety of deliveries of hazardous materials, and of transportation and disposal of hazardous wastes.
PS4: Ecosystem Services	Avoid adverse impacts on ecosystem services which may result in adverse health, safety risks and/ impacts to affected communities, and if these impacts are unavoidable, implement mitigation measures.
PS4: Community Exposure to Disease	Avoid or minimize the potential for community exposure to waterborne, water-based, water-related, and vector-borne diseases, and communicable diseases.
PS4: Emergency Preparedness and Response (Refer to PS1)	Collaborate with the affected communities, local government agencies, and other relevant parties, in their preparations to respond effectively to emergency situations, especially when their participation and collaboration are necessary to respond to such emergency situations.
PS4: Security Personnel	Retains direct or contracted workers to provide security to safeguard its personnel and property.

5. Performance Standard 5

Performance Standard Objective	**Supporting Documentation**
Performance Standard 5 recognizes that project-related land acquisition and	The following supporting documents will be used to assess/monitor compliance with performance standards: ▪ National Policies/Legislations/Guidelines:

restrictions on land use can have adverse impacts on communities and persons that use this land. To avoid, and when avoidance is not possible, minimize displacement, forced eviction, social and economic impacts from land acquisition or restrictions on land use. To improve, or restore, the livelihoods and standards of living of displaced persons and living conditions among physically displaced persons**.**	- Road Sector Compensation and Resettlement Guidelines. United Republic of Tanzania. Ministry of Infrastructure Development. February 2009. - The Land Act Cap. 113 (Land Act No. 4 of 1999). - The Village Land Act No. 5 of 1999 - Land Acquisition Act No. 47 (1967). - The Land (Compensation Claims) Regulations (2001). - The Land (Assessment of Value for Compensation) Regulations (2001). ▪ <u>WB/IFC Polices /Guidelines:</u> - Operational Manual OP 4.12 - Involuntary Resettlement. OP 4.12 December, 2001 Revised April 2013.
Aspect	**Performance Standard Requirements**
PS5: Land Acquisition and Involuntary Resettlement.	▪ To avoid, and when avoidance is not possible, minimize displacement by exploring alternative project designs. ▪ To avoid forced eviction. ▪ To anticipate and avoid, or where avoidance is not possible, minimize adverse social and economic impacts from land acquisition or restrictions. ▪ To improve, or restore, the livelihoods and standards of living of displaced persons. ▪ To improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure at resettlement sites.

6. Performance Standard 6

Performance Standard Objective	**Supporting Documentation**
Performance Standard 6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural	The following supporting documents will be used to assess/monitor compliance with performance standards: ▪ <u>National Policies/Legislations/Guidelines:</u> - National Biodiversity Strategy and Action Plan. August 2001. - The Environmental Management (Soil Quality Standards). Regulations, 2007.

resources are fundamental to sustainable development. To protect and conserve biodiversity, maintain the benefits from ecosystem services, promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities. *Note: The project is located within a highly built-up urban environment, with very few natural vegetation. Most of the vegetation is comprised of planted exotic ornamental or shade trees and grass. These can be found adjacent to the road sections and in the road medians.*	- The Forest Act (2002). - The Fisheries (2003). - The Forest (Amendment) Regulations (2013). - The Wildlife Conservation Act No. 5 of 2009. - The Water Resources Management Act No. 11 of 2009 - The Plant Protection Act No. 13 of 1997. ▪ <u>WB / IFC Policies/Guidelines:</u> - Operational Manual OP 4.04 - Natural Habitats - OP 4.04 June, 2001 Revised April 2013. - Guidance Notes 6 Biodiversity Conservation and Sustainable Management of Living Natural Resources. ▪ <u>International Conventions/Treaties:</u> - Convention on Biological Diversity. United Nations (1992). - Convention for the Protection, Management, and Development of the Marine and Coastal Environment of the Eastern African Region.
Aspect	**Performance Standard Requirements**
PS6: Protection and Conservation of Biodiversity	Minimize impacts on such biodiversity and implement mitigation measures as appropriate. Do not convert or degrade natural habitats, unless the following are demonstrated: - No other viable alternatives within the region exist for development of the project on modified habitat. - Consultation has established the views of stakeholders, including Affected Communities, with respect to the extent of conversion and degradation. - Any conversion or degradation is mitigated according to the mitigation hierarchy

	In areas of natural habitat, mitigation measures will be designed to achieve no net loss of biodiversity where feasible and avoiding impacts on biodiversity through the identification and protection of set-asides; implementing measures to minimize habitat fragmentation, such as biological corridors, restoring habitats during operations and/or after operations; and implementing biodiversity offsets.
PS6: Legally Protected and Internationally Recognized Areas. *Note: Based on the available information, no legally protected and / internationally recognised areas are affected.*	Demonstrate that the proposed development in such areas is legally permitted/. Act in a manner consistent with any government recognized management plans for such areas. Consult protected area sponsors and managers, affected communities, indigenous peoples and other stakeholders on the proposed project, as appropriate. Implement additional programs, as appropriate, to promote and enhance the conservation aims and effective management of the area.
PS6: Invasive Alien Species	Implement measures to avoid the potential for accidental or unintended introductions of invasive alien species. Where alien species are already established, exercise diligence in not spreading them into areas in which they have not already been established. As practicable, take measures to eradicate such species from the natural habitats over which they have management control.
PS6: Management of Ecosystem Services *Note: Based on the available information, it is not clear to what extent the affected communities rely on ecosystem services (the economic dependency on land for agriculture is regarded as reliance on ecosystem services).*	With respect to impacts on priority ecosystem services of relevance to affected communities, adverse impacts should be avoided. If these impacts are unavoidable, minimize impacts and implement mitigation measures that aim to maintain the value and functionality of priority services. With respect to impacts on priority ecosystem services on which the project depends, minimize impacts on ecosystem services and implement measures that increase resource efficiency of their operation.
PS6: Sustainable Management of Living Natural Resources. *Note: The project does not relate to the primary production of living natural resources.*	This relates to the primary production of living natural resources, including natural and plantation forestry, agriculture, animal husbandry, aquaculture, and fisheries and is not applicable to this project.
PS6: Supply Chain	When purchasing primary production (especially but not exclusively food and fibre commodities) that is known to be produced in regions where there is a risk of significant conversion of natural and/or critical habitats, systems; verification practices will be adopted as part of the ESMS to evaluate its primary suppliers.

7. Performance Standard 7

Performance Standard Objective	**Supporting Documentation**
Performance Standard 7 recognizes that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. To ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods, anticipate and avoid, minimize and / compensate for adverse impacts, promote sustainable development benefits and opportunities, establish, and maintain an on-going relationship throughout the project's life-cycle, ensure the Free, Prior, and Informed Consent (FPIC) of the Affected Communities and respect and preserve the culture, knowledge, and practices of Indigenous Peoples.	Road Sector Compensation and Resettlement Guidelines. United Republic of Tanzania. Ministry of Infrastructure Development. February 2009.
Aspect	**Performance Standard Requirements**
PS7: Indigenous Peoples *Note: Based on the information available, indigenous people have not been identified.*	Identify, through an environmental and social risks and impacts assessment process, all communities of indigenous peoples within the project area of influence who may be affected by the project. Adverse impacts on affected communities of indigenous peoples must be avoided where possible. Where alternatives have been explored and adverse impacts are unavoidable, minimize, restore, and/or compensate for these impacts. Proposed actions will be developed with the informed consultation and participation of the affected communities of indigenous peoples and contained in a time-bound plan. Undertake an engagement process with the affected Communities of indigenous peoples as required in PS1.

8. Performance Standard 8

Performance Standard Objective	**Supporting Documentation**

Performance Standard 8 recognizes the importance of cultural heritage for current and future generations. Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, this Performance Standard aims to ensure that clients protect cultural heritage in the course of their project activities. In addition, the requirements of this Performance Standard on a project's use of cultural heritage are based in part on standards set by the Convention on Biological Diversity. To protect cultural heritage from the adverse impacts and equitable sharing of benefits from the use of cultural heritage.	▪ <u>National Policies/Legislations</u> - The Antiquities Act No. 10 of 1964 and The Antiquities (Amendment) Act No. 22 of 1979. - The Antiquities Rules of 1991. ▪ <u>International Conventions/Treaties:</u> International Council on Monuments and Sites: Charter for the Protection and Management of the Archaeological Heritage (1990).
Aspect	**Performance Standard Requirements**
PS8: Protection of Cultural Heritage in Project Design and Execution.	Identify and protect cultural heritage by ensuring that internationally recognized practices for the protection, field-based study, and documentation of cultural heritage are implemented. Develop provisions for managing chance finds through a chance find procedure. Consult with the affected communities to identify cultural heritage of importance. Where a project may affect cultural heritage, consult with affected communities who use, or have used within living memory, the cultural heritage for long-standing cultural purposes. Allow continued access to the cultural site or will provide an alternative access route previously accessible cultural heritage site. Apply mitigation measures that favour avoidance.
PS8: Project's Use of Cultural Heritage. *Note: The project will not make use of heritage* *Resources.*	Where a project proposes to use the cultural heritage, including knowledge, innovations, or practices of local communities for commercial purposes, the client will inform the relevant communities of: - Their rights under national law. - The scope and nature of the proposed commercial development. - The potential consequences of such development

	The client will not proceed with such commercialization unless it enters into an agreement which uses a good faith negotiation process that results in a documented outcome and provides for fair and equitable sharing of benefits from commercialization of such knowledge, innovation, or practice, consistent with their customs and traditions

APPENDIX 32: A SAMPLE OF GRIEVANCEIS REGISTRATION FORM.

Grievance Registration Form

Name:		☐ Please do not use my name when talking about this concern in the public	
Company: (If applicable)			
Date:		Time:	
Preferred Contact method:	☐ Telephone ☐ E-mail Mail ☐ Please provide contact detail: _____		
Supporting documents attached?	☐ Yes ☐ No		
Please provide details of your grievance			
What outcome are you seeking?			
Additional Information			

Claimant Signature: …… Date: …….

WEO Signature: …… Date…….

For Office Use only

Stakeholder Reference:	NGO	Government - Central
	Neighbour - Fisherman	Government - Local
	Neighbour - Fisherman	Contractor
	Neighbour – Business man/W.man	Consultant
	Neighbour - Farmer	
	Other	
	Comments:	

APPENDIX 33: CONTRACTOR'S CODE OF ETHICAL CONDUCT.

1. INTRODUCTION

As employees, we all make decisions every day that affect one another, our community around and the organization. The actions we choose to take as individual employees reflect on us all and influence how others perceive our organization. Each of us, through our actions and decisions has the power to improve our productivity.

2. LEGAL FRAMEWORK

This Code of Ethical Conduct (CEC) is attuned to Part III (Employment Standards), Section 14 (Contracts with employees) of the Tanzanian Employment and Labour Relations Act No. 6 of 2004.

3. WHAT IS A CODE OF ETHICAL CONDUCT?

A Code of Ethical Conduct (CEC) is a set of guidelines intended to support ethical behaviour and decision making for all employees of CONTRACTOR. The term 'employees' here include all management, staff, volunteers, students, contractors, and others who provide services for the organization.

In this booklet you will read about the values, policies, and behavioural expectations that, together, comprise the Contractor's CEC. That covers in the working area and outside the working surrounding.

Building and maintaining trusted relationships with employees and the community is fundamental to our work, our reputation, and our success. Managing in an ethical way, guided by a sense of social responsibility, is not just a matter of good practice but is the right thing to do.

We are often faced with challenges that require difficult decisions. This CEC explains the behaviour that is expected of all employees at all levels in the organization.

Each employee is responsible to become familiar with this CEC, comply with ethical and legal standards of conduct, and to lead by example in the workplace and outside the working area.

Implementation of this CEC will be done through inductions to new employees, and regular trainings, seminars, workshops etc. to current employees. This CEC will be signed by all employees and shall be part of their contracts.

4. COMPLIANCE WITH CEC AT WORKPLACE

Employees are expected to comply with this CEC and the policies it represents. Violations of the Code of Conduct and/or policies may result in disciplinary action up to and including dismissal.

a. What Employees Can Expect from CONTRACTOR

CONTRACTOR commits to providing all employees with:

i. A safe, healthy, respectful, and productive work environment.
ii. An environment free from discrimination and harassment that promotes and protects
iii. Equal opportunities
iv. Fair and equitable treatment
v. Respect for diversity; and
vi. Protection from retaliation after good faith disclosures of improper activities.

b. CONTRACTOR Expectations from All Employees

CONTRACTOR expects all employees to:

i. Act with integrity at all times;
ii. Be present and productive during working hours;
iii. Operate within the law;
iv. Follow the CEC and related policies;
v. Adhere to professional practice guidelines and practice within professional boundaries;
vi. Take personal accountability for their own workplace actions;
vii. Demonstrate a sense of respect, loyalty, good faith and responsibility toward one another, and the community around the working place.

viii. Keep all organization information confidential;
ix. Exercise sound judgment in decision making; and x. Report violations of the CEC and related policies.

5. COMPLIANCE WITH CEC OUTSIDE WORKPLACE

Just like employees are vigilant about workplace they should also be vigilant about their overall conduct outside the workplace. Inappropriate conduct can harm an employer regardless of where it occurs. So while outside the working place workers should behave well not limited to the following:

i. Behaving in a manner that is appropriate when interacting with general public, and other staff;
ii. Acting at all times in such a manner to represent CONTRACTOR in the community in a positive manner;
iii. Avoid all acts of sexual harassment to the people around the community; and
iv. Avoid conduct which is not criminal but place others in harm way.

6. DOs AND DON'Ts AS CONTRACTOR EMPLOYEE

The matrix below specifies what workers should do and what they should not do as CONTRACTOR employees.

Workers Should	Workers Should Not
Report to and leave work according to specified work hours.	Report late for work on a regular or habitual basis, leaving the work place early and without following established protocol.
Provide a doctor's note for sick leave as required.	Take extended lunch or breaks.
Submit time-off requests in Leave Management CONTRACTOR for all leaves in an accurate and timely manner.	Be absent from work without authorization or justifiable reason.
Comply with the directions of the employer.	Use lieu time or vacation or other approved credits to address personal issues.
Perform tasks as directed by the supervisor and within acceptable standards.	Work in Substandard, incompetent and/or careless work performance that is within the control of the employee.
Be in their working cloths i.e., Personal Protective Equipment (PPE) during all working hours.	Spend time on non-work-related matters (i.e., personal phone calls, chatting with co-workers about non- work-related matters etc.).
Care and maintain the property appropriately and use of CONTRACTOR property such as equipment, (computers, copiers, vehicles) properly.	Conduct the work of the union on agency time, except as provided in the Collective Bargaining Agreement (CBA). Failing to seek clarification or failing to access agency guidelines when information or guidance is needed.
Co-operate with co-workers in work-related activities.	Refuse to perform work assignments.
Perform work according to the job requirements, and in a competent, careful, and productive manner, in compliance with CONTRACTOR policies, procedures and practices and policies.	Show dishonesty; deception; theft; falsification of records including that contained in a resume or job application; fraudulent conduct and any other illegal behaviour (i.e., contravention of the Criminal Code).
Meet professional regulations and standards for regulated professionals.	Use profane language, threatening or abusive language to co-workers, visitors, sub-contractors, and local people
Maintain professional credentials and/or licenses as required for position and providing proof to the employer.	Use physical abuse, violence, threats of violence, bullying or intimidating behaviour aimed at or involving use alcohol or illegal drugs while in performance of their duties.

Workers Should	Workers Should Not
Service equipment as required, avoid deliberate damage to CONTRACTOR property and/or unauthorized use of CONTRACTOR equipment, supplies, resources, or property.	

7. PENALTIES FOR VIOLATION OF CEC

Violation of the CEC will lead to serious disciplinary measures including termination from the working place. The matrix below specifies the penalties for violating CEC items i.e. what they should not do as CONTRACTOR employees.

Act of violation of CEC	Penalty
1. Report late for work on a regular or habitual basis, leaving the work place early and without following established protocol.	Verbal warning or 1ST written warning letter
2. Take extended lunch or breaks.	Verbal warning or 1ST written
3. Be absence from work without authorization or justifiable reason.	First and second written warning
4. Use lieu time or vacation or other approved credits to address personal issues.	First and second written warning
5. Work in Substandard, incompetent and/or careless work performance that is within the control of the employee.	First and second written warning
6. Spend time on non-work-related matters (i.e., personal phone calls, chatting with co- workers about non-work-related matters etc.).	Verbal warning or 1ST written warning letter
7. Conduct the work of the union on agency time, except as provided in the Collective Bargaining Agreement (CBA). Failing to seek clarification or failing to access agency guidelines when information or guidance is needed.	First and second written warning
8. Refuse to perform work assignments.	Third warning followed by disciplinary hearing
9. Show dishonesty; deception; theft; falsification of records including that contained in a resume or job application; fraudulent conduct and any other illegal behaviour (i.e., contravention of the Criminal Code).	Dismissal but an employee will be given the right to be heard Reported to police station
10. Use profane language, threatening or abusive language to co-workers, visitors, sub-contractors, and local people.	Call for disciplinary hearing for judging the case
11. Use physical abuse, violence, threats of violence, bullying or intimidating behaviour aimed at or involving use alcohol or illegal drugs while in performance of their duties.	□ Dismissal but an employee will be given the right to be heard □ Reported to police station

8. ACCEPTANCE OF CEC BY EMPLOYEE

I……, employed by (CONTRACTOR), have read and clearly understood this Code of Ethical Conduct (CEC) (i.e., the Dos and Don'ts as CONTRACTOR employee) and in case I violate this CEC appropriate disciplinary actions shall be taken as prescribed in this CEC.

Name of employee……

Position……

Signature……

Date……

APPENDIX 34: CODE OF CONDUCT FOR ESHS AND GENDER-BASED VIOLENCE.

I, _____, acknowledge that adhering to environmental, social, health and safety (ESHS) standards, following the project's occupational health and safety (OHS) requirements, and preventing Gender Based Violence (GBV) is important.

The Company considers that failure to follow ESHS and OHS standards, or to partake in activities constituting GBV—be it on the worksite, the worksite surroundings, at workers' camps, or the surrounding communities—constitute acts of gross misconduct and are therefore grounds for sanctions, penalties, or potential termination of employment. Prosecution by the Police of those who commit GBV may be pursued if appropriate.

I agree that while working on the project I will:

1. Consent to Police background check.
2. Attend and actively partake in training courses related to ESHS, OHS, and GBV as requested by my employer.
3. Will wear my protective equipment (PPE) at all times when at the worksite or engaged in project-related activities.
4. Take all practical steps to implement the contractor's environmental and social management plan (C-ESMP).
5. Implement the OHS Management Plan.
6. Adhere to a zero-alcohol policy during work activities, and refrain from the use of narcotics or other substances which can impair faculties at all times.
7. Treat women, children (persons under the age of 18), and men with respect regardless of race, colour, language, religion, political or another opinion, national, ethnic, or social origin, property, disability, birth, or another status.
8. Not use language or behaviour towards women, children, or men that are inappropriate, harassing, abusive, sexually provocative, demeaning, or culturally inappropriate.
9. Not sexually exploit or abuse project beneficiaries and members of the surrounding communities.
10. Not engage in sexual harassment of work personnel and staff —for instance, making unwelcome sexual advances, requests for sexual favours, and other verbal or physical conduct of a sexual nature is prohibited. E.g., looking somebody up and down; kissing, howling or smacking sounds; hanging around somebody; whistling and catcalls; in some instances, giving personal gifts.
11. Not engage in sexual favours —for instance, making promises of favourable treatment (e.g., promotion), threats of unfavourable treatment (e.g., loss of job) or payments in kind or cash, dependent on sexual acts—or other forms of humiliating, degrading or exploitative behaviour.
12. Not use prostitution in any form at any time.
13. Not participate in sexual contact or activity with children under the age of 18—including grooming, or contact through digital media. Mistaken belief regarding the age of a child is not a defence. Consent from the child is also not a defence or excuse.
14. Unless there is full consent by all parties involved, I will not have sexual interactions with members of the surrounding communities. This includes relationships involving the withholding or promise of actual provision of a benefit (monetary or non-monetary) to community members in exchange for sex (including prostitution). Such sexual activity is considered "non-consensual" within the scope of this Code.
15. Consider reporting through the GRM or to my manager any suspected or actual GBV by a fellow worker, whether employed by my company or not or any breaches of this Code of Conduct.

Concerning children under the age of 18:

16. Bring to the attention of my manager the presence of any children on the construction site or engaged in hazardous activities.

17. Wherever possible, ensure that another adult is present when working in the proximity of children.
18. Not invite unaccompanied children unrelated to my family into my home, unless they are at immediate risk of injury or in physical danger.
19. Not use any computers, mobile phones, video, and digital cameras or any other medium to exploit or harass children or to access child pornography (see also "Use of children's images for work-related purposes" below).
20. Refrain from physical punishment or discipline of children.
21. Refrain from hiring children for domestic or other labour below the minimum age of 14 unless national law specifies a higher age, or which places them at a significant risk of injury.
22. Comply with all relevant local legislation, including labour laws concerning child labour and the World Bank's safeguard policies on child labour and minimum age.
23. Take appropriate caution when photographing or filming children (See Annex 2 for details).

Use of children's images for work-related purposes

When photographing or filming a child for work-related purposes, I must:

24. Before photographing or filming a child, assess and endeavour to comply with local traditions or restrictions for reproducing personal images.
25. Before photographing or filming a child, obtain informed consent from the child and a parent or guardian of the child. As part of this, I must explain how the photograph or film will be used.
26. Ensure photographs, films, videos, and DVDs present children in a dignified and respectful manner and not in a vulnerable or submissive manner. Children should be adequately clothed and not in poses that could be seen as sexually suggestive.
27. Ensure images are honest representations of the context and the facts.
28. Ensure file labels do not reveal identifying information about a child when sending images electronically.

Sanctions

I understand that if I breach this Individual Code of Conduct, my employer will take disciplinary action which could include:

1. Informal warning.
2. Formal warning.
3. Additional Training.
4. Loss of up to one week's salary.
5. Suspension of employment (without payment of salary), for a minimum period of 1 month up to a maximum of 6 months.
6. Termination of employment.
7. Report to the Police if warranted.

I understand that it is my responsibility to ensure that the environmental, social, health, and safety standards are met. That I will adhere to the occupational health and safety management plan. That I will avoid actions or behaviours that could be construed as GBV. Any such actions will be a breach of this Individual Code of Conduct. I do hereby acknowledge that I have read the foregoing Individual Code of Conduct, do agree to comply with the standards contained therein, and understand my roles and responsibilities to prevent and respond to ESHS, OHS, and GBV issues. I understand that any action inconsistent with this Individual Code of Conduct or failure to act mandated by this Individual Code of Conduct may result in disciplinary action and may affect my ongoing employment.

Signature: _____
Printed Name: _____
Title: _____
Date: _____

APPENDIX 35: SUMMARY OF VALUATION REPORT.

MRADI WA MABASI YAENDAYO MWENDOKASI AWAMU

1.10 Muhtasari wa taarifa ya Uthamini

Kulingana na muongozo wa makubaliano, sheria zinazo siamamia ukadiriaji wa Thamani kwa aji kwa ajili ya ulipwaji wa fidia sitahiki ni kama zilivyo ainishwa kwenye Jedwali Na. 1 hapo chini

Jedwali 1: Uthamini na Ulipwaji wa fidia (katika Fedha za Kitanzania)

MTAA/ENEO	THAMANI YA JENGO/MAENDELEZO	POSHO YA MAKAZI	POSHO YA UPOTEVU WA FAIDA	POSHO YA USAFIRI	THAMANI YA MAZAO	THAMAN ARDH
Mtaa wa Mlalakua	650,655,786	41,400,000	376,200,000	750,000	7,844,700	3,926,451
Mtaa wa Kunduchi	637,123,218	-	71,280,000	2,500,000	3,783,200	3,164,079
Mtaa wa Salasala	180,930,294	1,440,000	37,800,000	500,000	1,326,250	2,023,921
Mtaa wa Wazo	552,197,292	51,480,000	137,160,000	4,750,000	1,250,450	130,866
JUMLA KUU	2,020,906,590	94,320,000	622,440,000	8,500,000	14,204,600	9,245,318

1.11 Tamko.

Taarifa hii aarifa hii imeandaliwa na kuwakilishwa kwa Wakala wa Barabara Tanzania wa S

.....
Yona Nicodemus
PRV, AAREPTA
No.VRB/PRV/051/2019
Na kuizinishwa kwa Niaba ya **NIMETA CONSULT (T)** na;

.....
Simbang'ulile L. Kivinge
FRV, AAREPTA
Fully Registered and Licensed Valuer
No.VRB/FRV/019/2019

APPENDIX 36: ENVIRONMENTAL AND SOCIAL DEMOBILIZATION CHEKCLIST.

Note: Put a tick (✓) at appropriate place and always take photographs for illustration.

S/n	Description of Works	Yes	No	NA*	Comments	Target Completion Date
1.	**Employment and Workers welfare**					
1.1	Have all employees been paid their terminal benefits before retrenchment?					
1.2	Has the Contractor NSSF and WCF contributions for all employees before retrenchment?					
2.	**Camp Sites and Office Facilities**					
2.1	Has all camp site and office facilities been demolished or handed over to the relevant authorities?					
2.2	Has the all the bare areas been scarified and planted trees after demolition or removal of camp site or office buildings?					
3.	**Solid Waste Management**					
3.1	Has all construction and demolition solid wastes been removed?					
3.2	Has all hazardous wastes been removed (e.g. waste oils, used batteries, used tyres, scrap metals, etc)					
3.3	Has all excavated soil and spoil materials been removed?					
3.4	Has the tempoerary solid waste collection bay been dismannlted and remvoed?					
4.	**Soil Erosion and Sedimentation Control**					
4,1	Has all execess construction mateirals been removed?					
4.2	Has all sediment control structures been reomved?					
4.3	Has suceptible areas to erosion been adequaltely stabilized ?					
4.4	Have all stockpiles been removed or appropriately landscaped?					
4.5	Has all temporary storm water control system (e.g. drains, settling ponds, etc.) been removed?					
5.	**Groundwater and Dewatering Contol**					
5.1	Has all dewatering equipment (pumps, hose pipes, etc.) been removed?					
5.2	Has all settlement tanks / water bowsers been removed?					
5.3	Has all temporary lagoons, settlement basins been removed and retunred to its orginal state?					

S/n	Description of Works	Yes	No	NA*	Comments	Target Completion Date
5.4	Has all inert matetrials from laggons been disposed of appropriately?					
5.5	Have all well casing been removed?					
5.6	Have all wells been adequately backfilled?					
5.7	Have all wells been caped with concrete (500 mm)?					
6.	**Workshops/Garages, Vehicle Washing and Refuleing Areas**					
6.1	Have all vehicle maintenace, washing and refuleing areas been scanned for soil decontamination?					
6.2	Has all contaminated soil been collected and appropriately diposed of?					
6.3	Has all contaimineated water been removed from sumps, intercetors, etc?					
6.4	Has all cncrete bunds and floor slabls been scanned for signs of contamination?					
6.5	Has all contaminated cocnrete (portion of floor slabs, bunds and refueling aprons) been removed as hazardous wastes?					
7.	**Fuel and Chemical Storage Areas**					
7.1	Has all chemical substances and PCLs been removed?					
7.2	Has chemical and bulk fuel stoagre areas been scanned for oil contamination?					
7.3	Has all contaminated soil been collcted and appropriately dispos of?					
7.4	Have bulk fuel tanks been remvoed?					
7.5	Have conrete bunds been scanned for signs of contamination?					
7.6	Have alll contaminated conrete (portions of floor slabs, bunds, and refuleing apron been removed as hazardous wastes?					
8.	**Sanitary and Wastewater Disposal Facilities**					
8.1	Have all septic tanks from temporary facilites been emptied?					
8.2	Have all spetic tanks been removed?					
8.3	Have all spetic tanks drainage networks and insepction manholes been removed?					
8.5	Have all raw sewage discharge chambers or pti latrines been demolished and backfilled?					

S/n	Description of Works	Yes	No	NA*	Comments	Target Completion Date
9.	**Landscape Management and Run-off Control**					
9.1	Has the contractor planted grass on bare areas around the buildings?					
9.4	Has the contractor used pavement blocks instead of conrete on foot paths to promote infiltration and minimze run-off?					
10.	**Borrow pits/Quarry Sites Rehabilitation**					
10.1	Has all borrow ptis been properly rehsped and backfilled with surounding soil materials?					
10.2	Has all access roads to borroiw pits beenscarified and planted grass?					
10.2	Has the usable borrow pit for livestock water drinking been properly reshaped and handed over to local authority?					

Note: *NA = Not Applicable