UNITED REPUBLIC OF TANZANIA
PRIME MINISTER’S OFFICE REGIONAL ADMINISTRATION AND
LOCAL GOVERNMENT

P.O. Box 1923
Dodoma, Tanzania.

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE
INVESTMENT SUB-PROJECTS IN KIGOMA MUNICIPALITY UNDER
THE PROPOSED TANZANIA STRATEGIC CITIES PROJECT

FINAL REPORT

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The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

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EXECUTIVE SUMMARY

BACKGROUND

The Permanent Secretary, Prime Minister's Office, Regional Administration and Local Government of the United Republic of Tanzania (GoT) have received a credit from the International Development Association (IDA) for the implementation of the Local Government Support Project (LGSP). It is intended that part of the proceeds of the credit will be used to cover eligible costs under the contract for the Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates and Bidding Documents, and Environmental and Social Impact Assessments for the Investment Sub-Projects in Kigoma Municipality under the proposed Tanzania Strategic Cities Project (TSCP). The LGSP, which is in an advanced stage of implementation, became effective in April 2005, and is expected to close on June 30, 2011.

The investment Subprojects in Kigoma Municipality under the proposed Tanzania Strategic Cities will entail rehabilitation/ construction of

- 25km of Urban roads, including associated structures such as drainage ditches, culverts/ bridges, footpaths and street lighting
- Solid waste management including collection, transportation, transportation and disposal
- Storm water drainage
- Local infrastructure such as bus stands.

The proposed project is estimated to cost Tanzania Shillings 21 Billion.

POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

Tanzania is committed to attaining sustainable development goal. This urge is envisaged in the National Environmental Policy and other sectoral policies including:

- National Environmental Policy (NEP) of 1997
- National Gender Policy (1999)
- The Tanzania 2025 Development Vision National Strategy for Growth and Reduction of Poverty
- Environmental Assessment and Management Guidelines for the Road Sector
Important laws and regulations that have relevance to road development in respect of environmental management include:

- Environmental Management Act No. 20 of (2004), Cap. 191
- Environmental Impact and Auditing Regulations (2005)
- The Land Act No. 4 of 1999 and the Village Land Act No. 5 of (1999)
- The Water Resources Management Act No. 11 of 2009
- The Water Supply and Sanitation Act No. 12 of 2009 The Road Act, 2007
- The Urban Planning Act (2007)
- Land Use Planning Act (2007)
- Occupation Health Safety (2003)
- Land (Assessment of the Value of Land for Compensation) Regulations, 2001
- Explosives Act, 538
- Regional and District Act No 9, 1997
- Mining Act (1998)

PROJECT DESCRIPTION

The indicative scope of works for the Kigoma Municipal Council is as follows:

- Upgrading of approximately 25 km of existing earth and gravel roads to double surface dressing (bitumen surfacing); including vertical and horizontal alignments, pavement design, drainage structures, street lights etc.

- Construction of one (1) main bus stand (30,000 m²) and two (2) town bus stands (25,000 m²); including pavement design, concrete interlocking paving block surfacing, lighting, drainage, buildings and other associated structures.

- Construction of approximately 3,200 linear metres of lined storm water drains at different locations within the municipality; including alignment and structural designs, etc.

- Construction of a dumpsite for solid waste disposal; including creation of cells, construction of inner and access roads, protection works, storm water drains, leachate discharge facilities and waste collection centres.

- Acquisition of a package of solid waste management equipment (skip loaders, skip buckets, tipper/trucks, refuse collection points, wheel loaders, etc)

Almost the project road will retain the existing horizontal profile. Construction of the drainage channels in Kigoma will also be done at the existing channels. The new sites for the Construction of one (1) main bus stand and two (2) town bus stands and dumpsite has been identified already.
The project is essentially civil works in nature. Major works include:

I. Construction of Roads and Bus stands
   1. Filling and reshaping the road section to sub-grade level
   2. Cutting of the earth sections to facilitate widening of the roads
   3. Upgrading or construction of longitudinal and cross drainage structures
   4. Provision of sub-base, base course and double surface dressing ending with finishing course of bitumen surface standard.
   5. Clearing of areas to pave way for the construction works;
   6. Demolition and removal of bridges, culverts and temporary bridges;
   7. Provision of temporary crossings and traffic diversions;
   8. Excavation of the existing roads and the construction of fill embankments;
   9. Shaping of gravel from borrow pits for sub-base and base;
   10. Supply of bitumen and stone chippings;
   11. Laying a bitumen prime coat and bituminous surface treatment;
   12. Excavation for the construction of the concrete bridges and incidental works;
   13. Construction of concrete bridges and incidental works;

II. Construction of the Landfill
   1. Modification of the site existing drainage (i.e. routing away the runoff from the landfill area);
   2. Construction of access roads and installation weighing facilities;
   3. Excavation and preparation of landfill bottom and subsurface sides;
   4. Preparation of the daily and final cover materials;
   5. Laying of the landfill liners;
   6. Installation of leachate collection and extraction facilities;
   7. Installation of landfill gas control facilities;
   8. Installation of weigh bridge for measuring the weight of solid wastes;
   9. Construction of dump site office;

POTENTIAL SIGNIFICANT ENVIRONMENTAL AND SOCIAL IMPACTS

The development of core urban infrastructure can cause a wide range of environmental and social impacts on a number of receptors. The impacts are of both positive and negative nature. The significant environmental and social impacts identified include:

Positive impacts:
   - Improved Solid waste collection and disposal (Improved Sanitation);
   - Improved storm water collection (Reduced soil erosion);
   - Improved transportation services;
   - Improved community life and services;
   - Job creation and improved employment opportunities;

Negative impacts:
   - Loss of natural habitat;
The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

- Increased water and soil pollution;
- Soil erosion;
- Noise, vibration and air pollution;
- Safety and health risks
- Landscape modification
- Interference to local hydrology;
- Disruption of other infrastructure
- In-migration/influx of people from other areas;
- Increased spread of HIV/AIDS and other diseases
- Land expropriation and relocation/resettlement

MITIGATION MEASURES AND ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

The options to minimize or prevent the identified adverse social and environmental impacts as well as a monitoring plan have been suggested in this report. Many of them are based on good engineering practices.

The ESMP describes the implementation schedule of the proposed mitigation measures as well as planning for long-term monitoring activities. It defines roles and responsibility of different actors of the plan. The associated environmental costs amount to USD 153,000. The estimated annual costs for carrying out the proposed environmental monitoring programme amounts to USD 109,300.

DECOMMISSIONING

Decommissioning is not anticipated in the foreseeable future. However, if this will happen, may entail change of use (functional changes) or demolition triggered by change of land use.

CONCLUSION

Implementation of the proposed Investment Subprojects in Kigoma Municipality will entail no deterrent impacts provided the recommended mitigation measures are adequately and timely put in place. The identified adverse impacts shall be managed through the proposed mitigation measures and implementation regime laid down in this EIS. Kigoma Municipal Council is committed in implementing all the recommendations given in the EIS and further carrying out the environmental auditing and monitoring schedules.
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<tr>
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<th>Definition</th>
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<tr>
<td>BATNEEC</td>
<td>Best Available Technology Not Entailing Excess Cost</td>
</tr>
<tr>
<td>CBO</td>
<td>Community Based Organization</td>
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<tr>
<td>COBET</td>
<td>Complementary Basic Education in Tanzania</td>
</tr>
<tr>
<td>DoE</td>
<td>Department of Environment</td>
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<tr>
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<tr>
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<tr>
<td>WHO-GPA</td>
<td>World Health Organization Global Programme on AIDS</td>
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ACKNOWLEDGEMENT

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1.0 INTRODUCTION

1.1 Project Background and Justification

The Permanent Secretary, Prime Minister's Office, Regional Administration and Local Government of the United Republic of Tanzania (GoT) have received a credit from the International Development Association (IDA) for the implementation of the Local Government Support Project (LGSP). It is intended that part of the proceeds of the credit will be used to cover eligible costs under the contract for the Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates and Bidding Documents, and Environmental and Social Impact Assessments for the Investment Sub-Projects in Kigoma Municipality under the proposed Tanzania Strategic Cities Project (TSCP). The LGSP, which is in an advanced stage of implementation, became effective in April 2005, and is expected to close on June 30, 2011.

The investment Subprojects in Kigoma Municipality will under the proposed Tanzania Strategic Cities entail rehabilitation/ construction of the following:

- 25km of Urban roads, including associated structures such as drainage ditches, culverts/bridges, footpaths and street lighting
- Solid waste management including collection, transportation and disposal
- Storm water drainage
- Local infrastructure such as bus stands.

The proposed project is estimated to cost Tanzania Shillings 21 Billion.

Kigoma/Ujiji Town started from the Arabic era as one of the major slave trade starting from Congo DRC through kigoma to Bagamoyo. Kigoma Town was a collecting centre, although slave trade was later abolished, the existence of Arabs and slave trades brought about an establishment of strong Islamic faith among the inhabitants. Kigoma-Ujiji Town Council was established in 1962 by the Local Government Act No 12 that passed in the National Assembly on the sixteenth day of February, 1963. In 1982 the town Council was re-established by Act No 8 of Local Government Authorities. As from 1st July, 2005 the Town Council was upgraded to a Municipality Council authority.

From environmental management point of view, the World Bank Guidelines and the current legislation in Tanzania requires all development projects to pass through a mandatory Environmental Impact Assessment (EIA) process. The Terms of Reference (ToR) for this assignment requires undertaking an Environmental Impact Assessment and Social Impact Assessment studies for the proposed projects. These studies were undertaken between September and November 2009.
1.2 Rationale of the SIA and EIA Studies

The SIA and EIA studies provide an analysis of the implications of the investment Subprojects in Kigoma Municipality to the social and biophysical environment in the project area. The studies also provides mitigation plan to prevent or minimize adverse impacts to be caused by the intended Investment Subprojects. The studies address key environmental and social aspects of the proposed investment Subprojects in relation to other land uses and community life in Kigoma Municipality.

The principal legislation guiding EIA undertakings in Tanzania is the Environmental Management Act (EMA), Act No.20 of 2004 (Cap. 191). For matters pertaining to EIA, the EMA is operationalized through the EIA and Audit Regulations of 2005. According to these regulations, the National Environment Management Council (NEMC) manages the EIA process (screening and review of statements), which culminates by an award of an Environmental Certificate to the proponent by the Minister responsible for Environment. The Council (i.e. NEMC) determines the level of the EIA study after the project has been registered by the proponent.

The World Bank’s Operational Directive 4.01 on Environmental Assessment (now referred to as Operational Policy and Bank Procedure 4.01) requires that environmental assessments be undertaken in those categories of projects that have or are likely to have potentially significant impacts on the environment. Under this policy, projects are categorized as category A, B, or C according to type, scale, location and anticipated severity of environmental impacts.

The proposed project essentially aims at rehabilitation/ construction of an existing urban infrastructure, it may be considered to fall into Category B because the construction sites are not virgin lands and significant environmental impacts have already occurred during their initial development. The environmental impact focus for a Category B project is usually on the repair or rehabilitation of prior environmental damage and ensuring that the environment is not subjected to significant new negative impacts. Nevertheless, there is a component of involuntary resettlement and construction of a landfill on a new site, which suggests that the categorization could be upgraded to A.

1.3 Scope of the consultancy service

The overall scope of the consultancy assignment comprises the preparation of preliminary and detailed designs, drawings, cost estimates, suitable contract packages, final bidding documents and overall time-bound implementation schedules. It also involves the preparation of environmental and social impact assessments, preparation of environmental management plans and, where necessary, resettlement plans and indigenous people’s development plans, for all investment sub-projects proposed by the Kigoma / Ujiji Municipal Council for financing under the core urban infrastructure sub-component of the TSCP.
1.4 Scope of Work

The scope of this work is outlined in the ToR and includes:

- To make consultation with Government agencies, local communities and the private sector operating in the communities affected by the project.
- To review of policies, legislation and administrative framework pertaining to this project and environment as a whole.
- To establish an environmental baseline for the project area and description of the proposed construction work.
- To assess and quantify the potential environmental impacts resulting from the Investment Subprojects, especially within the zone of influence of the project.
- To identify key stakeholders and review on the adequacy of participatory approaches suggested.
- To assess and quantify the potential social impacts resulting from the Investment Subprojects, and assess the target groups to be affected.
- To develop an Environmental Management Plan (EMP) detailing actions and responsibilities for impacts mitigation and monitoring.
- To assess resettlement issues (Resettlement Impact Analysis).

1.5 Methodology

1.5.1 Study Team and Scoping

In order to properly address the environmental issues, a team of experts drawn from relevant fields participated in undertaking the EIA and SIA studies. The experts were environmentalist, sociologist, and civil engineer.

Scoping was done through consultation and interviews with various relevant stakeholders, reviewing various reports, studies and literature relevant to environment and core urban infrastructure development in Tanzania. Related EIA studies in Tanzania were reviewed in order to draw on existing knowledge and experiences. The information was further complimented by extensive field visits in the project area. The scoping exercise facilitated the identification of key stakeholders for the project and the main issues of concern to be addressed by the detailed EIA and SIA studies. The scoping exercise was conducted in September 2009.

1.5.2 Field Studies and Public Participation

Broader consultation: The fieldwork for this study was carried out between September and October 2009. The fieldwork involved reconnaissance to all sub-projects making various observations, site visits and interviews with stakeholders as well as meeting relevant Kigoma Municipality officials.
The field visits were essential to fully realize the scope of the project, the biophysical environment specific to the location and the socio-economic conditions in the project area. The information was collected from various sources including Kigoma Regional secretariats, Kigoma Municipal council, Kigoma Urban Water Supply and Sewerage Authority (KUWASA). Others included meeting with Ujiji Community in Kigoma Municipality.

Information and data collected include land use, ecosystems and human habitat, demography, hydrology, and other indicators related to environmental and socio-economic trends of the project area. Other information was appraised through key informants interviews and experts’ observations.

Public participation was considered as an important element of the process. In these EIA and SIA studies, various stakeholders participated. Broad consultations that involved local communities ward and key city and municipal officials were carried out. During these consultations, the local communities had opportunities to air their concerns. The concerns of each group have been addressed in Chapter 5 of this Environmental and Social Impact Assessment Report. The following methods were used during field studies to ensure effective public involvement:

- **Focus Group Discussions**: These discussions were held with specific and targeted groups in the society including women, youths and small business entrepreneurs, village leaders and environmental committees. Guiding questions or checklists were prepared to facilitate the discussions and to focus it on issues related to a particular group. Dynamics of focus group discussions were observed to ensure fruitful discussions under the leadership of the sociologist. The names of participants in the discussions are attached in Annex I.

- **Meetings with Government Authorities**: Brief meetings were held with heads of various departments of Kigoma Municipal Council, ward leaders and beneficiaries of the subprojects. Meetings with authorities were held in their offices and involved few technical people. However, the meetings with communities in the project sites were more comprehensive and were attended by a cross-section of people. First, a brief description of the project was explained to them by the Sociologist before opening the floor for comments. The attendance and proceeding of the meetings were recorded by a secretary chosen among the attendees. One meeting was conducted including meeting with Ujiji Community in Kigoma Municipality. This meeting was intended to ensure that people discussed issues related to the project in an open manner thus fostering a community participatory approach prior to project implementation. Clarifications and affirmations were made with regard to the expected impacts on individuals and the community in general.

- **Direct observations**: Some facts were observed directly by the EIA team. The information obtained from this technique assisted the study team to have the starting point during subsequent one-to-one interviews with stakeholders.
• **Secondary information:** This information was obtained from existing reports including
  o World Bank Operational Policy 4.01
  o Kigoma Municipality Social economic Profile (2008) and
  o Kigoma Municipality Environmental Profile (2008)

### 1.5.3 Project Impact Assessment

Superimposing project elements onto the existing social and environmental natural conditions has identified the potential environmental impacts of the proposed Investment Subprojects. The checklist method has been used to identify the impacts and to recommend mitigation measures. Further, the environmental impact matrix method has been adopted to identify impacts of major concern. A key guiding assumption in this study is that the project will be designed, constructed, operated and maintained with due care for safety and environmental matters using current and practical engineering practice and/or Best Available Technology Not Entailing Excess Cost (BATNEECE). The implementation schedule of the mitigation measures is summarized in the Environmental Management Plan (EMP).

The environmental assessment has been undertaken in close interaction with the engineering planning and design team of UWP Consulting. In this process environmental impacts have been evaluated for various alternatives. Several project alternatives were considered including that of not implementing the project. The fundamental environmental protection strategy and environmental considerations influencing engineering design were incorporated. However, reasonable regard to technological feasibility and economic capability were taken into account. *Inter alia*, the assessment entailed the following:

**Collection of Baseline Data**

The collection of baseline data was conducted subsequent to defining the scope of the EIA. These data allows the study team to determine whether more detailed information on environmental conditions at the development site and its surroundings are needed and where such information can be obtained.

The sample of the study consisted mainly of ward division executives, committee members and the members of the general public who were considered to be potential affected persons and/or interested parties. All respondents were selected through convenient sampling techniques.

Both primary and secondary data were collected. Primary data were collected by direct measurement, questionnaires, observations and using semi-structured interviews with respective and targeted parties (as explained in the previous section). Secondary data were obtained from various relevant sources of information such as municipal profiles, wards, education and health reports and many other official and non official documents.

*Review of Policies, Legal and Institutional Framework for Environmental Management*
This allowed the study team to update and enhance their understanding of national policies, legislation and institutional arrangements for environmental management in Tanzania and relevant international procedures to ascertain the optimal management of impacts.

**Identifying Environmental Impacts**

This was undertaken by compiling a contender list of key impacts such as loss of flora and fauna, settlement patterns, social and cultural systems, water resources, land tenure systems etc;

**Predicting Environmental Impacts**

The environmental impacts were identified and their potential size and nature were predicted. The prediction of impacts specified the impact’s causes and effects and its secondary and tertiary consequences for the environment and the local community was assessed

**Determining the Significance of Impacts**

The key activity was to evaluate the significance of impacts, that is, judgments were made about which impacts found in the study area were considered important and therefore need to be mitigated.

**Identifying Mitigation and Management Options**

The options for dealing with identified and predicted impacts were considered. This enabled the study team to analyze proposed mitigation measures. A wide range of measures have been proposed to prevent, reduce, remedy or compensate for each of the adverse impacts evaluated as being significant. Analysis of the implications of adopting different alternatives was done to assist in clear decision-making.

### 1.6 Report Structure

This report is divided into nine (11) chapters:

Chapter 1 presents the Introduction to the report. Chapter 2 describes the proposed undertaking i.e. Investment sub projects in Kigoma Municipality. Chapter 3 contains the policies, legal and administrative frameworks within which the EIA is carried out. Chapter 4 covers the project’s environmental and social setting. Chapter 5 gives involvement of stakeholders and public consultations. Chapter 6 provides the Identification, Assessment and Analysis of environmental and social impacts. Chapter 7 describes the proposed mitigation measures. Chapter 8 explains the Environmental and Social Management Plan. Chapter 9 presents the Environmental and Social Monitoring Plan. Chapter 10 discusses the costs and benefits of the project while decommissioning and demobilisation plans are detailed in Chapter 11. Chapter 12 gives Conclusions and Recommendations.

The appendices, containing some key primary information collected during the study are attached at the end of this report. Generally, the report structure flows in conformity with that specified in the World Bank OP 4.01 on Environmental and Social Impact Assessment and Tanzania EIA and Audit Regulations of 2005.
2.0 PROJECT BACKGROUND AND DESCRIPTION

2.1 Project background and Location

The Permanent Secretary, Prime Minister's Office, Regional Administration and Local Government of the United Republic of Tanzania (GoT) have received a credit from the International Development Association (IDA) for the implementation of the Local Government Support Project (LGSP). It is intended that part of the proceeds of the credit will be used to cover eligible costs under the contract for the Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates and Bidding Documents, and Environmental and Social Impact Assessments for the Investment Sub-Projects in Kigoma Municipality under the proposed Tanzania Strategic Cities Project (TSCP). The LGSP, which is in an advanced stage of implementation, became effective in April 2005, and is expected to close on June 30, 2011.

Kigoma-Ujiji Municipality (MC) is the headquarters of Kigoma District and Kigoma Region, respectively. Kigoma/Ujiji Municipality is located at the North Eastern shore of Lake Tanganyika at 90ºS and 90ºE in Western Tanzania (Figure 2.1). The distance from Dar es Salaam to Kigoma Municipality is 1500 Km. On the western part, the Municipal boarders the Democratic Republic of Congo (DRC), to the South East and North it boarders with Kigoma District council (Figure 2.1). Figure 2.2 shows the Kigoma Municipality and Project roads.
The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in

KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

**Figure 2.1**: Map of Tanzania Showing project area. (Source: Digital National Atlas 2007)
The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

Figure 2.2: Satellite Image Showing the Kigoma Municipality and Project roads
2.2 Project Components

The indicative scope of works for the Kigoma Municipal Council is as follows:

- **Cluster I (Roads):** Upgrading of approximately 25 km of existing earth and gravel roads to double surface dressing (bitumen surfacing); including vertical and horizontal alignments, pavement design, drainage structures, street lights etc.

- **Cluster II (Bus Stands):** Construction of one (1) main bus stand (30,000 m²) and two (2) town bus stands (25,000 m²); including pavement design, concrete interlocking paving block surfacing, lighting, drainage, buildings and other associated structures.

- **Cluster III (Storm water drains):** Construction of approximately 3,200 linear metres of lined storm water drains at different locations within the municipality; including alignment and structural designs, etc.

- **Cluster IV (Landfill):** Construction of a landfill for solid waste disposal; including creation of cells, construction of inner and access roads, protection works, storm water drains, leachate discharge facilities and waste collection centres.

All the project roads will retain the existing horizontal profile. Construction of the drainage channel in Kigoma will also follow the existing alignment. The new sites for Construction of one (1) main bus stand and two (2) town bus stands and dumpsite have already been identified.

2.3 Project activities in general

2.3.1 Mobilization phase

The duration of the mobilization phase is estimated to be about four (4) months. The mobilization phase (for all clusters) will include the following activities:

a. Marking clearly the Project sites boundaries and identification of structures and items to be cleared from the sites;

b. Identifying appropriate camping site(s) either as recommended by the EIS or others depending on the bidder’s preference

c. Construction and running the camp(s);

d. Procurement of construction equipment and machineries (otherwise owned by the construction company) including vehicles, bulldozers, excavators, vibrating rollers, concrete vibrators, generators and others;

e. Transportation of construction materials to the sites;

f. Undertaking the auxiliary and preliminary works such as crushing of aggregates, locating sign posts and identifying sites for disposal of wastes.

The waste types which are likely to be generated during the mobilization phase include

- **Spoil soils**
The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

- Plants including trees and grasses
- Food remains
- Sullage
- Oils and grease
- Scrap metals

Solid waste such as top soils will be used to fill the diversions, while plants such as felled trees will be used as a source of energy in the camp sites. Scrap metals will be sold for recycling purposes. Scrap metals, used oil and greases will be sold for recycling purposes. Car maintenance and repair should be done in proper garages.

2.3.2 Construction phase

The project is essentially civil works in nature mainly consisting of;

I. Cluster I (Roads)
   1. Clearing of areas to pave way for the construction works;
   2. Filling and reshaping the road section to sub-grade level
   3. Cutting of the earth sections to facilitate widening of the roads
   4. Upgrading or construction of longitudinal and cross drainage structures
   5. Provision of sub-base, base course and double surface dressing ending with finishing course of bitumen surface standard.
   6. Demolition and removal of bridges, culverts and temporary bridges;
   7. Provision of temporary crossings and traffic diversions;
   8. Excavation of the existing roads and the construction of fill embankments;
   9. Shaping of gravel from borrow pits for sub-base and base;
   10. Supply of bitumen and stone chippings;
   11. Laying a bitumen prime coat and bituminous surface treatment;
   12. Excavation for the construction of the concrete bridges and incidental works;
   13. Construction of concrete bridges and incidental works;

II Cluster II (Bus Stands):

   1. Clearing of areas to pave way for the construction works;
   2. Provision of temporary crossings and traffic diversions;
   3. Filling and reshaping the site to sub-grade level
   4. Upgrading or construction of longitudinal and cross drainage structures
   5. Provision of sand base
   6. Concrete interlocking paving block surfacing
   7. Construction/provision of water and power supplies, lights and sanitation facilities.

III Cluster III (Storm water drains):

   - Clearing of areas to pave way for the construction works;
   - Provision of temporary crossings and traffic diversions;
The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

- Filling, levelling and reshaping and drains
- Lining of the drains;

### III Cluster IV (Landfill):

1. Clearing levelling, and/ excavation of the site
2. Construction of dikes/bunds
3. Construction of access and on-site roads
4. Construction of surface run-on and run off drainage channels
5. Lying down of liners
6. Construction of leachate collection and retention systems
7. Construction of leachate treatment facilities
8. Construction of landfill gas ventilation/ collection system
9. Setting up of monitoring facilities for ground/ surface water (monitoring wells), air (sampling stations) and noise pollution (measurement stations)
10. Construction/ provision of fences, gate, office, weighbridge, water and power supplies, sanitation facilities, garage and workshop for heavy equipments and vehicles, cover soil, stockyard and other facilities

Again, the waste types which are likely to be generated during the construction phase include

- Spoil soils
- Plants including trees and grasses
- Food remains
- Sullage
- Oils and grease
- Scrap metals

Solid waste such as top soils will be used to fill the diversions, while plants such as felled trees will be used as a source of energy in the camp sites. Scrap metals, used oil and greases will be sold for recycling purposes. Car maintenance and repair should be done in proper garages.

### 2.3.3 Operation phase

#### Cluster I, II,III

The actual usage of the facilities is expected to commence after completion of the construction works. The project facilities in Kigoma will be directly managed by Kigoma Municipal Council, respectively. During operational phase, Kigoma Municipal Council will carry out routine maintenance of the facilities including resurfacing of the roads, removal of debris from storm water channels, clearance of vegetation along the road, etc.

#### Cluster IV (Landfill)

Kigoma Municipal Council will also be responsible for ensuring that the solid waste disposal site is managed in environmentally sound manner. The following are activities will be performed during the operation phase:
1. Placement of the waste in cells;
2. Levelling, covering and compacting of solid waste
3. Extension/Construction of on-site roads
5. On/ Near site excavation / trenching of soil for cover material
6. Estimate of traffic volume during the landfill operation phase

2.3.4 Decommissioning/Demobilization phase

Demobilization (All clusters)

Demobilization of temporary structures will be done for proper restoration of the site (e.g. removing/spreading top-soils piled along the road, restoration of borrow pits to required grades and removing all temporary structures). Campsites may be left to the local governments depending on agreements that will be reached during the mobilization phase).

Decommissioning

Cluster I, II,III

Decommissioning of roads, storm water drains, and bus stands is not anticipated in a foreseeable future as Tanzania still needs these facilities and cannot afford to abandon them. After the landfill closure there shall be adequate long term maintenance controls (control of landfill gasses and leachate) to protect the surrounding environment.

Cluster IV (Landfill)

Decommissioning of landfill will happen after its design life (50 years) expires. The activities in this phase will include;
1. Application of the final cover
2. Grading the final slopes to around 5%
3. Installation of a permanent system of surface drainage channels on the landfill
4. Disassemble temporary structure (eg site buildings)
5. Seeding the final cover with the appropriate mixture of grasses.
6. Regular inspection of
   • Settlement, cover soil integrity, and need for grading
   • Sedimentation and erosion control facilities
   • Leachate and gas control
   • Vandalism and squatting prevention measures
   • Vegetation
   • Fencing
   • Monitoring systems
2.4 Design Considerations

The following approved standards (Table 4.1) by the Ministry of Infrastructure Development (formerly the Ministry of Works –MoW) shall be adopted and adhered to:

\textbf{Table 2.1: Design Standards to be followed}

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Specifications</td>
<td>MoW Standard Specifications for Road Works</td>
</tr>
<tr>
<td>4</td>
<td>Testing Procedure</td>
<td>MoW Central Materials Laboratory testing Manual</td>
</tr>
<tr>
<td>5</td>
<td>Structures</td>
<td>British Standards BS 5400</td>
</tr>
<tr>
<td>6</td>
<td>Hydrology and Hydraulics</td>
<td>TRRL East African Flood Model</td>
</tr>
<tr>
<td>7</td>
<td>Surveying</td>
<td>Land Survey and Mapping Standards of Tanzania (Land Surveying Regulations CAP 390)</td>
</tr>
</tbody>
</table>

Since Tanzania does not have a design manual, the sanitary landfill will be designed in accordance to the internationally acceptable design code.

2.5 Construction Materials and Labour Force

The essential construction materials include gravel, stone aggregates, sand, iron bars, water, bitumen, landfill liners, leachate collection pipes and landfill gas vents. All materials are available in the project area (Table 2.2) except bitumen and landfill liners, which will be imported by the contractor. Gravels will be obtained from the existing borrow pits (Figure 2.3) though more may have to be opened up during the construction stage if the need will arise.
Table 2.2: Potential material sources

<table>
<thead>
<tr>
<th>Material</th>
<th>Source</th>
<th>Estimated quantities (m³)</th>
<th>Type</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>Lake Tanganyika</td>
<td>Abundant</td>
<td></td>
<td>Existing</td>
</tr>
<tr>
<td>Gravel</td>
<td>Bangwe</td>
<td>70,000</td>
<td>Reddish lateritic gravels</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Bangwe 2</td>
<td>65,000</td>
<td>Reddish lateritic gravels</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Katonga</td>
<td>50,000</td>
<td>Reddish lateritic gravels</td>
<td>Existing</td>
</tr>
<tr>
<td>Hard rock</td>
<td>Ilagala Chinese quarry</td>
<td>50,000</td>
<td>Granodiorite</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Stone deposits</td>
<td>15,000</td>
<td>Granite</td>
<td>Existing</td>
</tr>
<tr>
<td>Sand</td>
<td>Kibirizi Pits</td>
<td>Abundant</td>
<td>Quartize</td>
<td>Existing</td>
</tr>
</tbody>
</table>

Figure 2.3: Kibirizi Sandpit (left) and Bangwe gravel; source site (right) at Kigoma

Construction works is generally a labour intensive undertaking. Apart from technical and skilled manpower, recruitment of unskilled labour will be done locally. More than 1,000 people will be employed by the projects.

2.6 Waste Generation

The major wastes generation associated with the project are spoil soils resulting from earthworks during the road formation and creation of borrow pits. This soil shall be stock piled along the
road alignment or at the new borrow pits. The soils shall be used to reinstatement of sites at the end of the project implementation phase.

Other waste streams will come from the campsites, which will include liquid wastes (domestic), general refuse and petroleum hydrocarbons. About 6 tonnes per month of domestic refuse will be generated at the campsites. A local disposal site shall be designated by the Contractor in collaboration with the communities’ leadership for disposal of solid wastes to be generated from project activities. Also about 100L/month of waste oils will be generated from maintenance of construction equipment and machines and vehicles. Sanitation facilities to be used in the camps will include ventilated improved pit latrines (VIP latrines) and septic tank/soakaway. About 24m$^3$ per day of liquid will be generated from the campsites. Other contingent plans to handle the accidental oil spillages and general waste management shall be worked out during the preparation of the Environmental Management Plan (EMP) for this project.
3.0 POLICY, ADMINISTRATIVE AND LEGAL FRAMEWORK

3.1 Environmental Management Regulation in Tanzania

A clean and safe environment is the constitutional right of every Tanzanian citizen. Regulation on environmental management in the country is mainly vested on two public institutions, the National Environment Management Council (NEMC) and the Division of Environment (DoE) in the office of the Vice President. The NEMC undertakes enforcement, compliance, and review of environmental impact statements whereas the DoE provides the policy formulations and technical back-up and executes the overall mandate for environmental management in the country. The EIA certificate is issued by the Minister responsible for Environment. There are many policies and pieces of legislation on environmental management in Tanzania, the relevant ones to this project area briefly discussed below.

3.2 National Policies

Environmental awareness in the country has significantly increased in recent years. The government has been developing and reviewing national policies to address environmental management in various sectors. Among others, the objective of these policies is to regulate the development undertaken within respective sectors so that they are not undertaken at the expense of the environment. The National Policies that address environmental management as far as the proposed projects are concerned and which form the cornerstone of the present study include *inter alia*.

3.2.1 National Environmental Policy (NEP) of 1997

Tanzania currently aims to achieve sustainable development through the rational and sustainable use of natural resources and to incorporate measures that safeguard the environment in any development activities. The environmental policy document seeks to provide the framework for making the fundamental changes that are needed to bring consideration of the environment into the mainstream of the decision making processes in the country.

The National Environmental Policy, 1997 stresses that for a framework law to be effective, environmental standards and procedures have to be in place. For example, Chapter 4 of the policy (Instruments for Environmental; Policy), Section 61, states that “As part of the (National Environmental Policy) strategy in the implementation of the National Environmental Guidelines, specific criteria for EIA conduct will be formulated”.

The National Environmental Policy as a national framework for environmental management emphasized that the transport sector shall focus on the following environmental objectives:

- Ensuring sustainability, security and the equitable use of resources for meeting the basic
needs of the present and future generations without degrading the environment or risking health or safety

- To prevent and control degradation of land, water, vegetation and air which constitute our life support system
- To conserve and enhance our natural and man-made heritage, including the biological diversity of the unique ecosystem of Tanzania
- To improve the condition and productivity of degraded areas including rural and urban settlement in order that all Tanzanians may live in safe, healthful, productive and aesthetically pleasing surroundings.
- To raise public awareness and understanding of the essential linkages between environment and development and to promote individual and community participation in the environmental action
- To promote international co-operation on the environment and expand our participation and contribution to relevant bilateral, sub-regional, regional, and global organizations and programs, including implementation of treaties

Critically, the National Environmental Policy emphasize the following aspects of natural resources management taking into account that the project proposal has impacts on natural resources:

- Wildlife resources should be protected and utilized in a sustainable manner; and on the basis of careful assessment of natural heritage in flora and fauna, fragile ecosystem, site under pressure and endangered species, with participation of, and benefits to, the local communities. Environmentally adverse impacts of development project in wildlife conservation area e.g. (tourist hotels, road construction) will be minimized by Environmental Impact Assessment studies.
- It encourages the development of sustainable regimes for soil conservation and forest protection, taking into consideration the links between desertification, deforestation, freshwater availability, climatic change and biological diversity.

On addressing the issues of poverty alleviation, the policy recognizes its impact to the environment. The policy focuses on the satisfaction of basic needs of citizens with due cognizance to protecting the environment. This project will ensure that the above policy objectives are met.

The NEP advocates the adoption of Environmental Impact Assessment (EIA) as a tool for screening development projects which are likely to cause adverse environmental impacts.

3.2.2 National Transport Policy (2003)

The vision of this policy is “to have an efficient and cost-effective domestic and international transport service to all segments of the population and sectors of the national economy with maximum safety and minimum environmental degradation”. Its mission is to “Develop safe, reliable, effective, efficient and fully integrated transport infrastructure and operations which will best meet the needs of travel and transport at improving levels of service at lower costs in a
manner which supports government strategies for socio-economic development whilst being economically and environmentally sustainable”.

In transport, the main objective of the policy is to improve infrastructure whilst minimizing wasteful exploitation of natural resources and enhancing environmental protection. Improving infrastructure assists in poverty reduction and eradication which is a major goal in Tanzania. Most activities in the project area depend in one way or another on the environment and therefore protection of the environment is vital.

In order to promote environmental protection whilst reducing poverty in rural areas, the policy direction is to:

- Influence use of alternative energy sources such as biogas and solar available at the residential localities instead of travelling long distances in search of firewood as a source of power; and
- Raise environmental awareness.

Sections 5.9 and 6.13 on Road Transport and Environment respectively give policy directions towards enhancing environmental protection through environmentally friendly and sustainable transport infrastructure both in the rural and urban areas.

3.2.3 National Mineral Policy (1998)

The National Mineral Policy requires that mining activities are undertaken in a sustainable manner. Reclamation of land after mining activities is recommended. As far as this project is concerned, mining activities refer to quarrying and gravel extraction (borrow pits) activities.

3.2.4 Construction Industry Policy (2002)

Among the major objectives of the policy, include the promotion and application of cost effective and innovative technologies and practices to support socio-economic development activities such as road-works, water supply, sanitation, shelter delivery and income generating activities and to ensure application of practices, technologies and products which are not harmful to either the environment or human health.

3.2.5 National Land Policy (1995)

The National Land Policy states that, “the overall aim of a National Land Policy 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”. This EIA partly responds to this requirement.

3.2.6 Energy Policy (2003)

The continuing decline in industrial and agricultural production during the period between 1980 and 1985 led to increased inflation and a decline in the standard of living. In order to arrest this decline, the Government gave priority to the rehabilitation of the basic economic infrastructure,
The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

especially communication, so that they can fully support the production sector. The energy policy considers the condition of roads as a determinant factor in vehicle energy use. Rough and pothole filled roads necessitate frequent braking and acceleration, leading to wasteful use of fuel; smooth, well-surfaced and well maintained roads lead to energy savings.

3.2.7 National Human Settlements Development Policy (2000)

Among the objectives of this policy to improve the level of the provision of infrastructure and social services for the development of sustainable human settlements and to make serviced land available for shelter to all sections of the community. Such infrastructure and services constitute the backbone of urban/rural economic activities. All weather roads and a reliable and efficient transport system, bus stands, drainage channels, and proper collection and disposal of solid waste are essential for sustainable human settlement development undertakings.

3.2.8 National Gender Policy (1999)

The key objective of this policy is to provide guidelines that will ensure that gender sensitive plans and strategies are developed in all sectors and institutions. While the policy aims at establishing strategies to eradicate poverty, it puts emphasis on gender quality and equal opportunity of both men and women to participate in development undertakings and to value the role-played by each member of society.

This project will also ensure that women, who are the main users of the infrastructure, will be adequately involved at all levels of project planning to implementation.

3.2.9 The National Water Policy (2002)

The overall objective of this policy is to develop a comprehensive framework for the sustainable management of the national water resources. The policy seeks to ensure that water plays an important role in poverty alleviation. Section 2.15 notes that the size of Tanzania means that communication is time consuming and expensive. Inadequate communication systems (including poor roads) affect the effective implementation of water resources management activities in terms of higher cost of monitoring, supervision, management, policing and data transfer. These roads development will help to alleviate accessibility problems and thus facilitate the enhancement of water resources management within the project influence area.

3.2.10 Tanzania 2025 Development Vision

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. Specific targets include:

1. A high quality livelihood characterized by sustainable and shared growth (equity), and freedom from abject poverty in a democratic environment. Specifically the Vision aims at: food self-sufficiency and security, universal primary education and extension of tertiary education, gender equality, universal access to primary health care, 75%
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reduction in infant and maternal mortality rates, universal access to safe water, increased life expectancy, absence of abject poverty, a well educated and learning society.

2. Good governance and the rule of law moral and cultural uprightness, adherence to the rule of law, elimination of corruption.

3. A strong and competitive economy capable of producing sustainable growth and shared benefits a diversified and semi-industrialized economy, macro-economic stability, a growth rate of 8% per annum, adequate level of physical infrastructure, an active and competitive player in regional and global markets.

Developing core urban infrastructure is one of the most important agents to enable Tanzania achieve its Development Vision objectives (both social and economic), such as eradicating poverty, attaining water and food security, sustaining biodiversity and sensitive ecosystems. Providing good urban infrastructure through this project will contribute to the attainment of the 2025 Vision.

3.2.11 National Strategy for Growth and Reduction of Poverty

The National Strategy for Growth and Reduction of Poverty (NSGRP or “MKUKUTA” as known in Kiswahili) sets out the medium term strategy for poverty reduction and indicators for measuring progress. It defines the objectives for poverty eradication by 2010, with the following key priority areas for achieving its goal: (i) reducing poverty through equitable economic growth, (ii) improving human capabilities, survival and social well being, and (iii) containing extreme vulnerability among the poor. The NSGRP recognizes the heavy dependence of the poor on the environment (soil, water and forests), in particular household’s reliance on environmental resources for income generation. Sound urban infrastructures are key factor in the socio-economic development and the fight against poverty. Providing adequate urban infrastructure through this project is in line with the MKUKUTA’s goals.

3.2.12 National Policy on HIV/AIDS (2001)

The National Policy on HIV/AIDS (2001) was formulated by the Government of Tanzania (GOT) under technical support from the World Health Organization Global Programme on AIDS (WHO-GPA) that led to the establishment of National HIV/AIDS Control Programme (NACP) under the Ministry of Health. However, due to its multi-sectoral nature there was a need to involve all sectors and community participation was found to be crucial. One of the government strategic initiatives is to establish Tanzania Commission for AIDS (TACAIDS) under the Prime Minister’s Office. The Commission provides leadership and coordination of national multi-sectoral response to the HIV/AIDS epidemic. The management functions, institutional and organizational arrangement of TACAIDS are outlined in the National Policy.

The Policy identifies HIV/AIDS as a global disaster, hence requiring concerted and unprecedented initiative at national and global levels. It recognizes HIV/AIDS as an impediment to development in all sectors, in terms of social and economic development with serious and
direct implication on social services and welfare. Thus, the policy recognizes the linkage between poverty and HIV/AIDS, as the poor section of the society are the most vulnerable.

The main policy objective is reflected well in the establishment of TACAIDS. However, the policy has also set a number of strategic objectives to deal with specific HIV/AIDS problems:

- Prevention of transmission of HIV/AIDS;
- HIV Testing;
- Care for People Living with HIV/AIDS (PLHAS);
- Enhance Sectoral roles through participation and financial support;
- Promote and participate in research on HIV/AIDS-including dissemination of scientific information and development of HIV vaccine;
- Creating a legal framework through enactment of laws on HIV/AIDS-governing ethical issues and legal status of HIV/AIDS affected families;

Other objectives:
- monitoring and safeguarding rights of infected or affected people;
- prevent human rights abuse, discrimination and social injustice;
- provide effective treatment for opportunistic diseases;
- promote fight against drug substance abuse;
- prohibit misleading advertisements of drugs and other products for HIV/AIDS prevention, treatment and care.

### 3.2.13 Environmental Assessment and Management Guidelines for the Road Sector

The Environmental Assessment and Management Guidelines for the Road Sector (EAMGRS) were developed in December 2004, just after EMA (2004) was enacted. The guidelines give procedures for the EIA process as briefly explained in Table 3.1.

**Table 3.1: Developed EIA Procedures in the Road Sector**

<table>
<thead>
<tr>
<th>EIA PROCEDURES IN THE ROAD SECTOR (as per EAMGRS 2004)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Administrative Procedures:</strong></td>
</tr>
<tr>
<td>EIA administrative procedures vary based on the significance of the environmental impacts. The Minister for Environment is responsible for projects with potential major environmental impacts. The EIA of projects with potential non-major environmental impacts are carried out under the Ministry responsible for the road sector and the Road Sector-Environmental Section (RS-ES).</td>
</tr>
<tr>
<td><strong>Environment Application and Screening Process:</strong></td>
</tr>
<tr>
<td>EA procedures in the road sector are initiated when the Road Implementing Agency (RIA) submits an Environment Application Form to the RS-ES during the Project Identification or Project Planning/Feasibility Study Phase. An environmental screening of the proposed project will determine whether the project will require: An Initial Environmental Examination (IEE); a Limited Environmental Analysis (LEA); or a detailed Environmental Impact Assessment (EIA).</td>
</tr>
<tr>
<td>Environmental Screening is done based on the information presented in the Environmental Application Form. The RS-ES is responsible for screening projects and this may acquire a reconnaissance study by an environmental specialist, especially if the project traverses sensitive areas or when there is potential for complex environmental issues.</td>
</tr>
</tbody>
</table>
All road projects with non-major environmental impacts shall be subject to an Initial Environmental Examination (IEE) or a Limited Environmental Analysis (LEA). Projects with major environmental impacts are subject to EIA. The RS-ES will register non-major-impact-projects. For major-impact-projects, the registration is done by NEMC.

3.3 Legal Framework

3.3.1 Environmental Management Act No. 20 of (2004), Cap. 191

The Environmental Management Act (EMA) is a piece of legislation that forms an umbrella law on environmental management in Tanzania. Its enactment has repealed the National Environment Management Council Act. 19 of (1983) while providing for the continued existence of the National Environment Management Council (NEMC).

Among the major purposes of the EMA are to provide the legal and institutional framework for sustainable management of the environment in Tanzania; to outline principles for management, impact and risk assessment, the prevention and control of pollution, waste management, environmental quality standards, public participation, compliance and enforcement; to provide the basis for implementation of international instruments on the environment; to provide for implementation of the National Environmental Policy; to provide for establishment of the National Environmental Fund and to provide for other related matters.

Part III, Section 15(a) states that in matters pertaining to the environment, the Director of Environment shall coordinate various environment management activities being undertaken by other agencies to promote the integration of environment considerations into development policies, plans, programmes, strategies projects and undertake strategic environmental assessments with a view to ensuring the proper management and rational utilization of environmental resources on a sustainable basis for the improvement of the quality of human life in Tanzania.

Part VI of the EMA deals with Environmental Impact Assessments (EIA) and other Assessments and directs that an EIA is mandatory for all development projects. Section 81(2) states that “An Environmental Impact Assessment study shall be carried out prior to the commencement or financing of a project or undertaking”, while Section 81(3) states “a permit or licence for the carrying out of any project or undertaking in accordance with any written law shall not entitle the proponent or developer to undertake or to cause to be undertaken a project or activity without an environmental impact assessment certificate issued under this Act”.

3.3.2 Environmental Impact and Auditing Regulations (2005)
These regulations set procedures for conducting EIA and environmental audit in the country. The regulations are made from Section 82 and 230 of the EMA (2004) and prescribe that the Minister responsible for environment shall formulate regulations and guidelines on how EIA shall be conducted. The EIA regulations are applicable to all project contained in Third Schedule of the EMA (2004) and First Schedule of the EIA and Audit Regulations. These Regulations prescribes the stages and/or the EIA process, which are in principle managed by the NEMC.

3.3.3 The Land Act No. 4 of 1999 and the Village Land Act No. 5 of (1999)

These laws declare all land in Tanzania to be “Public land” to be held by the state for public purposes. The Acts empower the President of the United Republic of Tanzania, to revoke the “Right of Occupancy” of any landholder for the “public/national interest” should the need arise. The laws also declare the value attached to land.

**Land Tenure System**

The existing land ownership system has a history of more than forty years. At present the Land Act (1999) and the Village Land Act (1999) provide guidance to land ownership in Tanzania. The laws vest all land in the President and grant occupancy rights to individuals, legal persons and territorial communities. The President holds *land in trust* for all citizens and can acquire land for public use and benefit, for instance, to resettle people from densely populated areas to sparsely populated areas, settle refugees and so forth. The President can also acquire land for other national projects like the proposed Investment sub-projects.

**Compensation Rules**

Under the Government Standing Order on expropriation for public utility, the holder of a Right of Occupancy is guaranteed a free enjoyment of the land and is entitled to compensation if dispossessed by the Government for public use. In many cases whilst the holders agree to leave their land they are not happy with the amount and delay of the compensation. Often, for example, improvements that they have made to the land are omitted or underrated. The expropriation should match the price that improvements can fetch if sold in the open market. Replacement value (defined as the cost of putting up a structure equivalent to the evaluated one) makes allowance for age, state of repair and economic obsolescence.

The compensation must therefore include:-

- The replacement value of the un-exhausted improvements
- Disturbance and transport allowance
- Loss of income
- Cost of acquiring or getting an equivalent land
- Actual value of the present property/utility available in the land and
- Any other immediate costs or capital expenditure incurred in the development of the land.

3.3.4 The Water Resources Management Act No. 11 of 2009
This is a new legislation that has repealed the Water Utilization (Control and Regulation) Act (1974). The Act provides for institutional and legal framework for sustainable management and development of water resources; outlines principles for water resources management; for prevention and control of water pollution; and provides for participation of stakeholders and general public in implementation of the National Water Policy. Its main objective is to ensure that the nation’s water resources are protected, used, developed, conserved, managed and controlled in ways that among others meets the basic human needs of present and future generations, prevents and controls pollution of water resources and protects biological diversity especially the aquatic ecosystems.

Section 9 of this the law requires carrying out an Environmental Impact Assessment for any development in water resource areas or watershed. This ESIA is in line with this legal requirement.

### 3.3.5 The Water Supply and Sanitation Act No. 12 of 2009

This is also a new legislation that provides for sustainable management and adequate operation and transparent regulation of water supply and sanitation services; provides for establishment of water supply and sanitation authorities as well as community owned water supply organizations; and provides for appointment for service providers. The main aim of this law is to ensure the right of every Tanzanian to have access to efficient, effective and sustainable water supply and sanitation services for all purposes by taking into account among others protection and conservation of water resources and development and promotion of public health and sanitation; and protection of the interest of customers. This law is in line with this project because the project will improve the sanitation of the Kigoma Municipality by provision of proper solid waste collection and disposal facilities.

### 3.3.6 The Road Act, 2007

For purposes of the Investment Subproject roads road upgrading project, the Act 2007 serves as a guide to the use of the road reserve. Contrary to previous informal understanding the reserve is exclusive to road related activities that do not include other utilities. However clause 29 (2) does give provision for the request and terms of approval for use of the road reserve by utilities such as power lines and water pipes.

On land acquisition the Act clearly states in part III, Section 16 that ‘where it becomes necessary for the road authority to acquire a land owned by any person, the owner of such land shall be entitled to compensation for any development on such land in accordance with the Land Act and any other written law’.

### 3.3.7 Antiquities Act of 1964 (as amended in 1979) and the Antiquities Rules of 1991

The Antiquities Act of 1964, as amended in 1979, and the Antiquities Rules of 1991 govern archaeological research in Tanzania. The main thrust of this legislation is that no archaeological research in Tanzania will be undertaken without the permission of the Director of Antiquities.
The Director, under the Act, gives permission for qualified scientific personnel, both foreign and local, to undertake research after being satisfied that they possess adequate financial resources and professional competence. Excavation permits are issued for a period not exceeding one year at a time. Furthermore, where the need arises, artefacts export permits are issued for a period not exceeding three years at a time.

Under the 1964 Act, all objects (relics) that were made or modified by man before the year 1864 are automatically protected under the law whilst the Minister responsible for Antiquities can declare monuments and protect objects which were made or modified by man after the year 1863. The 1979 Amendment Act was passed to correct inherent deficiencies in the 1964 Act. For instance the collection and export of ethnographic objects without the permission of the Director of Antiquities was made illegal. Furthermore, the Act established the National Antiquities Advisory Council to advise the Government on matters related to the preservation, development and research of our archaeological heritage including publications and the establishment and maintenance of archaeological research facilities. Concurrently a National Antiquities Fund was established to complement government budgetary financing.

Section 16 of the 1964 Act (which was not amended in the 1979 Act) gives powers to Local Government Authorities, under the Local Government Ordinance, 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 jurisdiction. This act is in line with this project since the wafipa road (one of the subproject) was used as a slave caravan route in 1800s.

3.3.8 The Urban Planning Act (2007)

The law provides for the orderly and sustainable development of land in urban areas, to preserve and improve amenities; to provide for the grant of consent to develop land and powers of control over the use of land and to provide for other related matters. Expropriation of land for urban infrastructure development and associated activities in urban areas shall comply with the provisions of this law. Under Section 3, among others the law seeks to improve level of the provision of infrastructure and social services for sustainable human settlement development. Therefore road development is in line with the objectives of this law.

Section 58 of the Urban Planning Act provides for protection of buildings or group of buildings of special architectural or historic interest. The law states “The planning authority may compile a list of areas, buildings or group of buildings of special architectural or historic interest and may amend any list so compiled, such areas may include; buildings, group of buildings, areas of unique biodiversity; and rare species of trees and special trees”. Section 59 gives powers to the Planning authority to grant permission for demolition of such buildings or otherwise powers to restrain any proposed demolition. Any building of special architectural or historic interest located in the road reserve is to be demolished. This law is in line with this project.

3.3.9 Land Use Planning Act (2007)
The Act provides for the procedures for the preparation, administration and enforcement of land use plans; to repeal the National Land Use Planning Commissioning Act and to provide for related matters. Among the objectives of the Act as given in Section 4 are to facilitate the orderly management of land use and to promote sustainable land use practices. Development of Urban Infrastructure that affects land use and livelihood shall comply with the provisions of this Act. Any infringement on existing land use shall need consultation with land use planning authorities.

3.3.10 Occupation Health Safety (2003)

The law requires employers to provide a good working environment to workers in order to safeguard their health. The employers need to perform medical examinations to determine fitness before engaging employees. Employers must also ensure that the equipment used by employees is safe and shall also provide proper working gear as appropriate. The contractors shall abide to the provisions of this Act.

3.3.11 Land (Assessment of the Value of Land for Compensation) Regulations, 2001

These regulations provide criteria for the assessment of compensation on land, as per market value for real property; disturbance allowance is calculated as a percentage of market value of the acquired assets over twelve months; and transport allowance calculated at the cost of 12 tons hauled over a distance not exceeding 20 km. The other criteria includes loss of profit on accommodation based on business audited accounts and accommodation allowance equivalent to the rent of the acquired property per month over a 36 month period.

3.3.12 Explosives Act, 538

This Act requires all persons wanting to use explosives in their activities to hold an explosive license. For this Investment Subproject, this applies to use of material from any quarries and borrow pits where blasting is to be employed. The contractor for this project shall apply for the explosives licence before starting using the explosions in quarry sites and construction works.

3.3.13 Regional and District Act No 9, 1997

The Act provides for Regional Commissioners to oversee Regional Secretariats, with District Commissioners directly supervising the District Councils. Local authorities oversee the local planning processes, including establishing local environmental policies. The National Environmental Policy establishes a policy committee on Environment at Regional level chaired by the Regional Commissioner, mirrored by environmental committee at all lower levels, i.e. at the District, Division, Ward and Village or Mtaa Councils.

Under the EMA 2004, the Regional Secretariat is responsible for coordination for all advice on environmental management in their respective region and in liaison with the Director of Environment. At Local Government level, an Environmental Management Officer should be designated or appointed by each City, Municipal, District or Town Council. In each City or
Municipality or District Environmental Committees should be established to promote and enhance sustainable management of the Environment. The Village Development Committee is responsible for proper management of the environment in their respective areas. The District Council designates for each administrative area as township, ward, village, sub-street and Environmental Management Officer to coordinate all functions and activities related to protection of environmental in their area.

3.3.16 Mining Act (1998)

This Act states that “building material” includes all forms of rock, stones, gravel, sand, clay, volcanic ash or cinder, or other minerals being used for the construction of buildings, roads, dams, aerodromes, or similar works but does not include gypsum, limestone being burned for the production of lime, or material used for the manufacture of cement.

This act make sure minerals are well controlled and Section 6(1) states that no person shall, on or in any land to which this act refers, prospect for minerals or carry on mining operations except under the authority of Mineral Right granted, or deemed to have been granted under this Act.

3.3.17 Land Acquisition Act 1967

Under the Land Acquisition Act, 1967, the President may, subject to the provisions of this Act, acquire any land for any estate or term where such land is required for any public purpose.

Land shall be deemed to be acquired for a public purpose where it is required, for example, for exclusive Government use, for general public use, for any Government scheme, for the development of agricultural land or for the provision of sites for industrial, agricultural or commercial development, social services, or housing or; where the President is satisfied that a corporation requires any land for the purposes of construction of any work which in his opinion would be of public utility or in the public interest or in the interest of the national economy, he may, with the approval, to be signified by resolution of the National Assembly and by order published in the Gazette, declare the purpose for which such land is required to be a public purpose and upon such order being made such purpose shall be deemed to be a public purpose; or in connection with the laying out of any new city, municipality, township or minor settlement or the extension or improvement of any existing city, municipality, township or minor settlement; etc.

Upon such acquisition of any Land the President is compelled on behalf of the Government to pay in respect thereof, out of moneys provided for the purpose by Parliament, such compensation, as may be agreed upon or determined in accordance with the provisions of the Land Acquisition Act, 1967.

The President may also revoke a right of occupancy if in his opinion it is in public interest to do so. Accordingly, the land for which a right of occupancy has been revoked reverts back to the Government for re-allocation pursuant to the existing need (s). It should also be noted here that, though the land belong to the government some changes on the land act has taken place. Land
has value to the owner; therefore any land taken from the user has to be compensated. Based on this act the villagers affected by the project are claiming that they should be compensated for the lost farms and land used for residential purposes.

3.4 World Bank EIA requirements

3.4.1 World Bank Environmental Regulations

*Environmental Assessment (OP. 4.01)*

The World Bank’s Operational Directive 4.01 on Environmental Assessment (now referred to as Operational Policy and Bank Procedure 4.01) requires that environmental assessments be undertaken in those categories of projects that have or are likely to have potentially significant impacts on the environment. Under this policy, projects are categorized as category A, B, or C according to type, scale, location and anticipated severity of environmental impacts. The category indicates the scope and detail required for the EIA. These categories are presented in Table 3.2.

<table>
<thead>
<tr>
<th>Category</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A full (comprehensive) EIA is normally required as the project may have significant adverse impacts that may be sensitive, irreversible and diverse. These are mainly new construction projects</td>
</tr>
<tr>
<td>B</td>
<td>More limited environmental analysis is appropriate, as the project may have specific environmental impacts and mitigation measures can be more easily designed. Projects under this category entails rehabilitation, maintenance or rehabilitation rather than new construction</td>
</tr>
<tr>
<td>C</td>
<td>Environmental analysis is normally unnecessary. Projects focus on education, family planning, health and human resources development</td>
</tr>
</tbody>
</table>

As may be seen, in strict accordance with the guidelines, as this project is the rehabilitation of an existing urban infrastructure, it may be considered to fall into Category B because the most are the project sites are in use now and significant environmental impacts have already occurred during their initial construction. The environmental impact focus for a Category B project are usually on the repair or rehabilitation of prior environmental damage and ensuring that the environment is not subjected to significant new negative impacts.

Nevertheless, there is a component of *involuntary resettlement* (OP 4.12), which suggests that the categorization could be upgraded to A.

*Involuntary resettlement (OP 4.12)*

Regarding resettlement, the Bank guidelines prescribe measures to minimize the negative impacts and ensure that the displaced community benefits from the project. Therefore the Policy requires that displaced person should be:

- Compensated for their losses at full replacement cost prior to the actual move;
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- Assisted with the move and supported during the transition period in the resettlement site;
- Assisted in their effort to improve their former living standards, income earning capacity, and production levels, or at least restore them
- Integrated socially and economically in to host communities so that adverse impacts on host communities are minimized. The best way of archiving this integration is for resettlement to be planned through consultation involving affected people and future hosts and affected people

In addition, land, housing, infrastructure, and other compensation should be provided to the adversely affected population, indigenous groups, ethnic minorities, and pastoralists who may have customary right to the land and other resources taken for the project. The absence of legal title to land by such groups should not be a bar to compensation.

**Cultural Property (OP 4.11)**

This policy addresses physical cultural resources, which are defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings, and may be above or below ground, or under water. Their cultural interest may be at the local, provincial or national level, or within the international community.

Physical cultural resources are important as sources of valuable scientific and historical information, as assets for economic and social development, and as integral parts of a people’s cultural identity and practices.

The Bank assists countries to avoid or mitigate adverse impacts on physical cultural resources from development projects that it finances. The impacts on physical cultural resources resulting from project activities, including mitigating measures, may not contravene either the borrower’s national legislation, or its obligations under relevant international environmental treaties and agreements.

**3.5 Institutional Framework**

**3.5.1 Overall Management Responsibility**

The institutional arrangement for environmental management in Tanzania is well spelt out in the EMA (2004). There are seven (7) institutions mentioned by the act, of which the Minister Responsible for the Environment is the overall in-charge for administration of all matters relating to the environment.

Part III, Section 13(1) of EMA (2004) states that the Minister responsible for environment shall be in overall incharge of all matters relating to the environment and shall in that respect be responsible for articulation of policy guidelines necessary for the promotion, protection and sustainable management of environment in Tanzania.

The legal institutions for environmental management in the country include;

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- National Environmental Advisory Committee;
- Minister responsible for Environment;
- Director of Environment;
- National Environment Management Council (NEMC);
- Sector Ministries;
- Regional Secretariat;
- Local Government Authorities (City, Municipal, District, Township, Ward, Village, sub-village “Mtaa and Kitongoji”)

### 3.5.2 National Environmental Advisory Committee

The National Advisory Environmental Committee is comprised of members with experience in various fields of environmental management in the public and private sector and in civil society. The committee advises the Minister on any matter related to environmental management. Other functions include:

- Examine any matter that may be referred to it by the Minister or any sector Ministry relating to the protection and management of the environment;
- Review and advise the Minister on any environmental plans, environmental impact assessment of major projects and activities for which an environmental impact review is necessary;
- Review the achievement by the NEMC of objectives, goals and targets set by the Council and advise the Minister accordingly;
- Review and advise the Minister on any environmental standards, guidelines and regulations;
- Receive and deliberate on the reports from Sector Ministries regarding the protection and management of the environment;
- Perform other environmental advisory services to the Minister as may be necessary.

### 3.5.3 Minister Responsible for Environment

The Minister is responsible for matters relating to environment, including giving policy guidelines necessary for the promotion, protection and sustainable management of the environment in Tanzania. The Minister approves an EIA and may also delegate the power of approval for an EIA to the DoE, Local Government Authorities or Sector Ministries. The Minister also:

- Prescribes (in the regulations) the qualifications of persons who may conduct an EIA;
- Reviews NEMC reports on the approval of an EIA;
- Issues an EIA certificate for projects subject to an EIA;
- Suspends an EIA certificate in case of non-compliance.

### 3.5.4 Director of Environment
The Director of Environment heads the Office of the Director of Environment and is appointed by the President of the United Republic of Tanzania. The functions of the Director of Environment include:

- Coordination of various environmental management activities undertaken by other agencies;
- Promotion of the integration of environmental considerations into development policies, plans, programmes, strategies, projects;
- Undertaking strategic environmental risk assessments with a view to ensuring the proper management and rational utilization of environmental resources on a sustainable basis for the improvement of quality of human life in Tanzania;
- Advise the Government on legislative and other measures for the management of the environment or the implementation of the relevant international environmental agreements in the field of environment;
- Monitoring and assessing activities undertaken by relevant Sector Ministries and agencies;
- Preparation and issuing of reports on the state of the environment in Tanzania through relevant agencies;
- Coordination of issues relating to articulation and implementation of environmental management aspects of other sector policies and the National Environment Policy

3.5.5 National Environment Management Council (NEMC)

The NEMC’s purpose and objective is to undertake enforcement, compliance, review and monitoring of EIA’s and to facilitate public participation in environmental decision-making. According to the Environmental Management Act (2004) the NEMC has the following responsibility pertaining to EIA in Tanzania:

- Registers experts and firms authorized to conduct EIA;
- Registers projects subject to EIA;
- Determines the scope of the EIA;
- Set-ups cross-sectoral TAC to advise on EIA reviews;
- Requests additional information to complete the EIA review;
- Assesses and comments on EIA, in collaboration with other stakeholders,
- Convenes public hearings to obtain comments on the proposed project;
- Recommends to the Minister to approve, reject, or approve with conditions specific EIS;
- Monitors the effects of activities on the environment;
- Controls the implementation of the Environmental Management Plan (EMP);
- Makes recommendations on whether to revoke EIA Certificates in case of non-compliance;
- Promotes public environmental awareness;
- Conducts Environmental Audits

NEMC has got a zonal office in Mwanza City which serves Lake and Western zone including Kigoma. It has three technical personnel. The office is functional.
3.5.6 Sector Ministries

The existing institutional and legal framework the Sector Ministries are required to establish Sector Environmental Sections headed by the Sector Environmental Coordinator.

The Sector Ministries’ Environmental Sections;

- Ensure environmental compliance by the Sector Ministry;
- Ensure all environmental matters falling under the sector ministry are implemented and report of their implementation is submitted to the DoE;
- Liaise with the DoE and the NEMC on matters involving the environment and all matters with respect to which cooperation or shared responsibility is desirable or required;
- Ensure that environmental concerns are integrated into the ministry or departmental development planning and project implementation in a way which protects the environment;
- Evaluate existing and proposed policies and legislation and recommend measures to ensure that those policies and legislation take adequate account of effect on the environment;
- Prepare and coordinate the implementation of environmental action plans at national and local levels;
- Promote public awareness of environmental issues through educational programmes and dissemination of information;
- Refer to the NEMC any matter related to the environment;
- Undertake analysis of the environmental impact of sectoral legislation, regulation, policies, plans, strategies and programmes through strategic environmental assessment (SEA);
- Ensure that sectoral standards are environmentally sound;
- Oversee the preparation of and implementation of all EIA’s required for investments in the sector;
- Ensure compliance with the various regulations, guidelines and procedures issued by the Minister responsible for the environment and;
- Work closely with the ministry responsible for local government to provide environmental advice and technical support to district level staff working in the sector.

3.5.7 Regional Secretariat

The Regional Secretariat, which is headed by the Regional Environmental Management Expert, is responsible for the co-ordination of all environmental management programmes in their respective regions. The Regional Environmental Expert:

- Advises local authorities on matters relating to the implementation of and enforcement of environmental laws and regulations;
- Creates a link between the region and the DoE and the Director General of the NEMC.

Kigoma Regional Secretariat has no Regional Environmental Management Officer, all Environmental issues in the Municipality are handled by the Municipality Environmental Officers.
3.5.8 Local Government Authorities

Under the Local Government Act of 1982 (Urban and District Authorities), Local Government Authorities include the City Councils, Municipal Councils, District Councils, Town Councils, Township, Kitongoji, Ward, Mtaa and Village.

The Environmental Management Committee of each jurisdiction:

- Initiates inquiries and investigations regarding any allegation related to the environment and implementation of or violation of the provisions of the Environmental Management Act;
- Requests any person to provide information or explanation about any matter related to the environment;
- Resolves conflicts among individual persons, companies, agencies non-governmental organizations, government departments or institutions about their respective functions, duties, mandates, obligations or activities;
- Inspects and examines any premises, street, vehicle, aircraft or any other place or article which it believes, or has reasonable cause to believe, that pollutant or other articles or substances believed to be pollutant are kept or transported;
- Requires any person to remove such pollutants at their own cost without causing harm to health and;
- Initiates proceedings of civil or criminal nature against any person, company, agency, department or institution that fails or refuses to comply with any directive issued by any such Committee.

Under the Environmental Management Act (2004), the City, Municipal, District and Town Councils are headed by Environmental Inspectors who are responsible for environmental matters. The functions of the inspectors are to:

- Ensure enforcement of the Environmental Management Act in their respective areas;
- Advice the Environmental Management Committee on all environmental matters;
- Promote awareness in their areas on the protection of the environment and conservation of natural resources;
- Collect and manage information on the environment and the utilization of natural resources;
- Prepare periodic reports on the state of the local environment;
- Monitor the preparation, review and approval of EIA’s for local investors;
- Review by-laws on environmental management and on sector specific activities related to the environment;
- Report to the DoE and the Director General of the NEMC on the implementation of the Environmental Management Act and;
- Perform other functions as may be assigned by the local government authority from time to time.

Kigoma Municipality has got an Environmental Management officer who heads the section of Environment under the department of Town planning and Environment. Due to the presence of
this section there is no Environmental Committee in Kigoma Municipality. Therefore all issues concerning environmental management during and after construction of sub-projects will be handled by this section.
4.0 BASELINE ENVIRONMENTAL AND SOCIAL CONDITIONS

4.1 Spatial, Institutional and Temporal boundaries

4.1.1 Spatial boundaries

Kigoma / Ujiji Municipality is the Regional Headquarters of Kigoma Region. It is located at the North shores of the second deepest Lake in the world, Lake Tanganyika at the latitude of 4.52° South and longitude of 29° 35 East. It is also the western terminal of Central Railway line from Dar es Salaam about 1200 km. away. On the West the area borders the DRC, to the south, east and north borders Kigoma District.

The spatial dimension encompasses the geographical spread of the impacts regardless of whether they are short term or long term. The spatial scale considers the receptor environmental component and can be local or broader. Following this, two zones of impacts are considered;

*The core impact zone:* This includes the area immediately bordering the project (local). In the case of this project local impacts will include the site of the construction (borrow areas, quarries and the actual sub projects) and the immediate surrounding areas.

*The zone of influence:* This includes the wider geographical areas that are influenced by this project (e.g. Kigoma Municipality).

4.1.2 Institutional boundaries

Institutionally, Kigoma Municipal Council and have the mandate to develop and maintain the urban infrastructures in the Kigoma Municipal respectively. Their primary function includes the maintenance and development of the infrastructures to support the economic and social development of in the Municipality. They will also be responsible for addressing the environmental issues posed by the subprojects. Roads, bus stands and storm water drainage will be under the municipal engineer while solid waste collection and disposal will be under the Municipal health officer.

From the central government line of administration, by virtue of their location, the urban infrastructures to be developed by this project in Kigoma region is under the jurisdiction of the Regional Commissioner for the Kigoma region.

4.1.3 Temporal boundaries

With the exception of the landfill (until design life expires), all other sub-projects being improved under TSCP are not expected to stop being used so long as they are habitually maintained and operational although each infrastructure will have its own design life.
Conversely because of a number of reasons the Government may wish to do one or several decisions. For instance, abandoning a portion of the infrastructure and creating another one or an alternative portion; and diverting the original course and substituting it with a new one. Other measures are expanding the infrastructure because of several reasons; and if there is a decision for closing the infrastructure permanently then the required activities for decommissioning process will be obligatory.

4.2 Physical Environments

4.2.1 Climatic Conditions

1) The climate in Kigoma / Ujiji is tropical with moderate to high rainfall (average 980 mm – 1,200 mm) per annum, also falling in two distinct seasons i.e. between the months of October and December and between February and May. Kigoma further has a high daytime temperature (average 30°C) and high humidity (Kigoma Municipality Socio economic Profile, 2008).

4.2.2 Geology and Soil

1) Kigoma / Ujiji is mostly underlain by sandy, loamy soils prone to erosion. Between 1984 and 2007 close to 2.5 million trees were planted to combat erosion and siltation(Kigoma Municipality Socio economic Profile, 2008).

4.2.3 Topography and Drainage

1) The Municipal of Kigoma / Ujiji is located on the rift valley fringe of Lake Tanganyika, with large parts lying on terrain consisting of hills rising over 1,000 meters above sea level. However, the average altitude is 773 m to 960 m above sea level. The hilly terrain causes quick run-off of water resulting in severe soil erosion. This has been exacerbated by urban development and increasing population numbers(Kigoma Municipality Socio economic Profile, 2008).

4.2.4 Area and Administrative structure

1) Administratively, the Kigoma/ Ujiji Municipality is divided into two divisions; Kigoma North and Kigoma South, and it is further more subdivided into 13 Wards and 200 streets. The area covers about 128km², of which 127.85km² is land and 0.15km² is water bodies (Kigoma Municipality Socio economic Profile, 2008).

4.2.5 Population

1) According to 1988 population census Kigoma/Ujiji had 84,700 inhabitants. By then the Town Council had a growth rate of 3.05%. The 2002 population and housing census
results indicate that the Municipality had a population about 144,257 of which 70,228 were males and 74,029 were female with growth rate of 3.8%, hence by December, 2007 the population was projected at 218,935 due to increase in the rural–urban migration and the influx of refugees from Burundi and DRC caused by civil conflicts (Kigoma Municipality Socio economic Profile, 2008).

4.3 Biological Environment

As for many urban areas, Kigoma Municipality is deprived of vegetation mainly due to human activities and settlements. Apart from domestic animals kept by inhabitants of the town, there are no animals of ecological importance.

4.3.1 Natural Vegetation

Kigoma Municipality natural vegetation can only be seen in protected hill areas such as Katonga, Kibirizi, Masanga, Mwanga and Kitwe Sanctuary Forest Reserve with an average area of 425ha. Also they occur in areas abandoned by farmers where natural regeneration takes place. Natural vegetation in the Municipality can be divided into three main categories:

- **Hilltop Miombo:** Hilltop miombo are found on rocky hills mainly in protected areas.

- **Miombo woodland:** Miombo woodland are found on hills and middle to lower slopes mainly in uncultivated or abandoned land. They appear as closed woodland (with limited human influence), occurring in protected area (Forest Reserves) and open woodland (due to human influence through uncontrolled utilization) when occurring in the public land.

- **Swamp/Marsh areas:** These are permanently flooded areas containing large area of wooded grassland and dark/closed grassland. Common swamps in the Municipality are found along Luiche river basin.

4.5 Economic Activities in Kigoma Municipality

The town Kigoma / Ujiji in Tanzania started as one of the major slave trade collecting centres during the Arabic occupation era. Although slave trading was later abolished it brought about a strong Islamic faith among the inhabitants. The Kigoma / Ujiji Town Council was established in 1962 by the Local Government Act Number 12. It was re-established by Act Number 8 of local Government Authorities in 1982 and upgraded to a Municipal Council from 1 July 2005.

The Kigoma / Ujiji area is one of the least developed in the country. This is due to a lack of essential crops, industries, technical and entrepreneurial capacity. The major economic activities are:

- Fishing;
• Small-scale agriculture
• Trading;
• Tourism and Recreation and
• Small-scale industries.

4.5.1 Fishing

Fishing activities are carried out mostly in Lake Tanganyika. Kigoma/Ujiji Urban has a distance of about 50km of Lake Tanganyika shoreline in which fish production potentially is high. Fishing is carried out by artisanal fisherman. It contributes about 30% to the urban economy annually by creating employment opportunities to youth and women in fishing, processing and marketing of the fish products.

There are four fishing villages namely Kibirizi, Katonga, Ujiji and Shede. There has been an increase of fisherman and small scale fish processors, while the amount of fishing productivity is declining. Fish catch from Lake Tanganyika is marketed to various parts of the country. The surplus produced is exported to DRC, Burundi, and Zambia. Lake Tanganyika is very rich in biodiversity specie. The predominant fish specie is “dagaa” (Stolothris tanganyicae) and “migebuka” (Lates stepprersii) which are endemic. Based on sustainable fishing industry development, local communities play a major role in the conservation and protection of the natural heritage of Lake Tanganyika.

Fishing industry is facing many problems, among which being poor and inadequate facilities in fish processing, modern fishing gear, technologies and entrepreneurship skills. Fishing activities are also affected by piracy and lack of high scale fish processing industries.

4.5.2 Agriculture and Livestock

Agricultural activities are normally carried out for subsistence. About 6785 Hectares of the urban land is arable land. Agricultural activities are carried out mainly along Luiche River Basin, the Lake Shores and undeveloped open spaces. The major crops grown in the area are in form of staple food, legumes, minor grains, root crop, oil palms, and vegetables (See Table 4.5 and 4.6)). Minor irrigation activities are also carried out by small holder schemes (Table 4.7).

Table 4.1: Estimated Productions of Major Food Crops (Tons)

<table>
<thead>
<tr>
<th>Crop</th>
<th>2000/01</th>
<th>2001/02</th>
<th>2002/03</th>
<th>2003/04</th>
<th>2004/05</th>
<th>2005/06</th>
<th>2006/07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>2,800</td>
<td>2,599</td>
<td>2,433</td>
<td>2,520</td>
<td>2,550</td>
<td>2,145</td>
<td>2,550</td>
</tr>
<tr>
<td>Beans</td>
<td>1,140</td>
<td>1,171</td>
<td>1,005</td>
<td>985</td>
<td>475</td>
<td>430</td>
<td>475</td>
</tr>
<tr>
<td>Bananas</td>
<td>5,400</td>
<td>4,040</td>
<td>4,039</td>
<td>4,290</td>
<td>4,725</td>
<td>6,150</td>
<td>4,725</td>
</tr>
<tr>
<td>Cassava</td>
<td>3,040</td>
<td>2,865</td>
<td>2,700</td>
<td>3,017</td>
<td>3,264</td>
<td>2,535</td>
<td>3,264</td>
</tr>
<tr>
<td>Sweet Potato</td>
<td>4,200</td>
<td>3,391</td>
<td>3,154</td>
<td>2,952</td>
<td>4,627</td>
<td>3,888</td>
<td>4,627</td>
</tr>
<tr>
<td>Paddy</td>
<td>700</td>
<td>1,403</td>
<td>1,338</td>
<td>1,372</td>
<td>2,275</td>
<td>1,521</td>
<td>2,275</td>
</tr>
<tr>
<td>Total</td>
<td><strong>17,280</strong></td>
<td><strong>15,469</strong></td>
<td><strong>14,669</strong></td>
<td><strong>15,136</strong></td>
<td><strong>17,916</strong></td>
<td><strong>16,669</strong></td>
<td><strong>17,916</strong></td>
</tr>
</tbody>
</table>

Source: Kigoma / Ujiji Agriculture and Livestock Department
Table 4.2: Estimated Production Of Major Cash Crop (Tons)

<table>
<thead>
<tr>
<th>Crop</th>
<th>2000/01</th>
<th>2001/02</th>
<th>2002/03</th>
<th>2003/04</th>
<th>2004/05</th>
<th>2005/06</th>
<th>2006/07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil Palm</td>
<td>600</td>
<td>217.5</td>
<td>6,370</td>
<td>2,020</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
</tr>
<tr>
<td>Horticulture</td>
<td>3,780</td>
<td>8,500</td>
<td>9,393</td>
<td>9,440</td>
<td>13,000</td>
<td>10,200</td>
<td>13,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4,380</strong></td>
<td><strong>8,717.5</strong></td>
<td><strong>15,763</strong></td>
<td><strong>11,460</strong></td>
<td><strong>14,200</strong></td>
<td><strong>11,400</strong></td>
<td><strong>14,200</strong></td>
</tr>
</tbody>
</table>

Source: Kigoma / Ujiji Agriculture and Livestock department

Table 4.3: Irrigation Scheme (Small Holder’s Scheme) that are Found In the Municipality

<table>
<thead>
<tr>
<th>No</th>
<th>Name of Scheme</th>
<th>Type of Crop</th>
<th>Area (Ha)</th>
<th>Production (Tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Luiche Valley</td>
<td>Paddy</td>
<td>476</td>
<td>1237.6</td>
</tr>
<tr>
<td>2.0</td>
<td>Katandala</td>
<td>Paddy</td>
<td>15</td>
<td>39</td>
</tr>
<tr>
<td>3.0</td>
<td>Kirugu</td>
<td>Paddy</td>
<td>10</td>
<td>26</td>
</tr>
<tr>
<td>4.0</td>
<td>Burega</td>
<td>Tomatoes</td>
<td>606</td>
<td>9363</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td><strong>1107</strong></td>
<td><strong>10695.6</strong></td>
</tr>
</tbody>
</table>

Source: Kigoma/Ujiji Agriculture and Livestock department

Livestock species kept in the Municipal include cattle, goats, pigs, sheep and poultry normally at zero grazing. Livestock population found in the Municipality for the past four years are indicated in able 4.8 below:

Table 4.4: Estimated Livestock Population in Kigoma Urban

<table>
<thead>
<tr>
<th>Year</th>
<th>Cattle</th>
<th>Goats</th>
<th>Sheep</th>
<th>Pigs</th>
<th>Poultry</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>1209</td>
<td>3304</td>
<td>1036</td>
<td>1686</td>
<td>77147</td>
</tr>
<tr>
<td>2006</td>
<td>1876</td>
<td>3200</td>
<td>1181</td>
<td>1720</td>
<td>78884</td>
</tr>
<tr>
<td>2007</td>
<td>2252</td>
<td>3410</td>
<td>3410</td>
<td>3410</td>
<td>79149</td>
</tr>
<tr>
<td>2008</td>
<td>2252</td>
<td>3410</td>
<td>1336</td>
<td>1886</td>
<td>79149</td>
</tr>
</tbody>
</table>

Source: Kigoma/Ujiji Agriculture and Livestock Department.

4.5.3 Trade and Business

About 75% of Municipal residents earn their living through trading, especially from the informal sector and business activities. There are more than 1500 registered business people in the Municipality of which 70% are located in three main markets of (Kigoma, Mwanga and Buzebazeba) and other 5% do their business in six (6) small informal market points namely Ujiji, Kagera, Gungu, Nazareth, Kibirizi and Katonga. There are opportunities to develop these small markets to main markets.

A large number of shops are retailers selling manufactured and industrial goods. Goods like rice, beans, maize, sardines, clothes (Vitenge) are being traded between Kigoma and neighboring countries like DRC, Burundi, and Zambia.
There are four commercial banks namely NBC, NMB, CRDB, and TPB that are running daily money transactions including money transfer, issuing loans to borrowers and money exchange. The Municipality gets significant revenue in the form of taxes from the trade and business sector which is about 4% of its total revenue. The small scale industrial sector employs number of people and manufactures several industrial products.

4.5.4 Tourism and Recreation

Ujiji is a historical Town, which began in the Arabic era as major slave collecting centre. It is also a place where the ancient explorers Dr. David Livingstone and Henry Stanley met in 1871 (Rendezvous point of Doctor Livingstone and Henry Morton Stanley at Ujiji). This centre also attracts foreign and local tourists to visit Gombe and Mahale National Parks. A beautiful beach belt along Lake Tanganyika is another attractive area for tourist and hotel investment.

High quality Tourist accommodation is available at Hilltop Hotel, Zanzibar Lodge Hotel etc. The Municipality has also several recreation points, Lake Tanganyika being the main one. Several other points are distributed throughout the Municipality. Among them, they include video show centers, beaches for swimming and indoor games. The Municipality has a modern gymnasium at the Kigoma Hilltop Hotel.

4.5.5 Industries

Due to intermittent power supply there are no large scale manufacturing industries, instead there are many small scale industries dealing with soap manufacturing, palm oil processing, milling machines etc. At present the demand for power is only to the tune of 2.57 Megawatts which is supplied by TANESCO diesel powered generators. The shortage of power supply has been a great hindrance to the development of manufacturing industries in the Region, and the Municipality in particular.

4.7 Social Services in Kigoma Municipality

4.7.1 Health

The Municipality has few health facilities that provide services to the community which are owned by voluntary agencies, private sector and the government. Considering the current growing population, the facilities are not adequate as shown on Table 4.15 below.

<table>
<thead>
<tr>
<th>No</th>
<th>Type of health facility</th>
<th>Government</th>
<th>Private</th>
<th>Religious</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Hospital</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2.0</td>
<td>Health Centre</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.0</td>
<td>dispensaries</td>
<td>6</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Kigoma/Ujiji Health department
The major epidemic diseases in the Municipality are cholera, dysentery and meningitis. The main causes of these epidemic diseases are poor environmental sanitation, lack of clean and safe water. Top ten endemic diseases are shown in Table 4.16 below.

<table>
<thead>
<tr>
<th>NO</th>
<th>DISEASE</th>
<th>&lt;5 YEARS</th>
<th>&gt;5 YEARS</th>
<th>&lt;YEAR</th>
<th>&gt;5 YEARS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>M</td>
<td>F</td>
<td>M</td>
<td>F</td>
</tr>
<tr>
<td>1.0</td>
<td>Complicated Malaria</td>
<td>440</td>
<td>418</td>
<td>2132</td>
<td>740</td>
</tr>
<tr>
<td>2.0</td>
<td>Uncomplicated Malaria</td>
<td>438</td>
<td>417</td>
<td>2142</td>
<td>730</td>
</tr>
<tr>
<td>3.0</td>
<td>Diarrhea disease</td>
<td>125</td>
<td>131</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4.0</td>
<td>Tuberculosis</td>
<td>0</td>
<td>0</td>
<td>888</td>
<td>161</td>
</tr>
<tr>
<td>5.0</td>
<td>Anemia</td>
<td>846</td>
<td>888</td>
<td>17</td>
<td>1027</td>
</tr>
<tr>
<td>6.0</td>
<td>Burns</td>
<td>17</td>
<td>17</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>7.0</td>
<td>Cardiovascular disease</td>
<td>0</td>
<td>0</td>
<td>61</td>
<td>63</td>
</tr>
<tr>
<td>8.0</td>
<td>ARI</td>
<td>105</td>
<td>128</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>9.0</td>
<td>Meningitis</td>
<td>15</td>
<td>16</td>
<td>40</td>
<td>36</td>
</tr>
<tr>
<td>10.0</td>
<td>UTI</td>
<td>7</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: Kigoma/Ujiji Health department 2008

4.7.2 Education

Pre – Primary Education

Young children (3 – 6 years old) are cared for and receive initial education in the pre – primary schools. The Municipality has 22 pre – primary schools, whereby 16 are public schools and six are private owned.

Primary Education

The Municipality has 47 primary schools Where by 44 are public schools and three are private schools. In 2008, the number of pupils in such primary schools is 42, 674, among them 21,619 are boys and 21,055 are girls. There are 1,069 teachers and there is a shortage of 38 teachers. The standard one pupil’s enrolment in the Municipality for six preceding years is as shown in the Table 4.17below.
The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

Table 4.7: Standard One Pupil Enrolment 2003 -2008

<table>
<thead>
<tr>
<th>Year</th>
<th>Estimates</th>
<th>Actual Enrolment</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>8517</td>
<td>7206</td>
<td>85</td>
</tr>
<tr>
<td>2004</td>
<td>6277</td>
<td>5344</td>
<td>85</td>
</tr>
<tr>
<td>2005</td>
<td>6848</td>
<td>7452</td>
<td>109</td>
</tr>
<tr>
<td>2006</td>
<td>4625</td>
<td>4878</td>
<td>105</td>
</tr>
<tr>
<td>2007</td>
<td>6029</td>
<td>6130</td>
<td>102</td>
</tr>
<tr>
<td>2008</td>
<td>4059</td>
<td>4998</td>
<td>102</td>
</tr>
</tbody>
</table>

Source: Kigoma/Ujiji Municipal Profile 2008

Secondary Education

The Municipality has 17 secondary schools, out of which 10 are public schools and 7 schools are private. Apart from those operating public and private secondary schools, the other seven schools are in construction stage at community ward levels. These are Kagera, Mlole Block B, Gungu, Bushabani, Majengo, Buhanda/Businde and Kasimbu.

Other Institutions

Other institutions in the Municipality include:-
- Zonal Training Central – Clinical Officers Training Centre
- National Meteorological Institute
- Lake Tanganyika Bible School
- Open University of Tanzania, Kigoma Branch
- Kigoma Homecraft
- Sanganigwa II Street children Centre
- VETA – Kigoma

4.7.3 Water Supply

The water demand is going up because of increase of population and standard of living. The volume of water demand is 26000 liters/day, while supply is 13500 liters (52%) only/day which is inadequate; (See Table 4.18); 80% of population are served by piped water, shallow wells, Lake water and three unprotected springs serve the remaining 20%. Pipe water supply network is being served by KUWASA (Kigoma Urban Water Supply and Sewerage Authority).

Table 4.8: Key Results in Water Sector

<table>
<thead>
<tr>
<th>No.</th>
<th>Service Name</th>
<th>Target</th>
<th>Service Level</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Distribution system</td>
<td>646 km</td>
<td>517 km</td>
<td>80%</td>
</tr>
<tr>
<td>2.0</td>
<td>Water supply</td>
<td>26,000m³</td>
<td>13500m³</td>
<td>52</td>
</tr>
<tr>
<td>3.0</td>
<td>Water loss</td>
<td>13500m³</td>
<td>5400m³</td>
<td>40</td>
</tr>
<tr>
<td>4.0</td>
<td>Revenue Collection</td>
<td>51,200,000</td>
<td>42,000,000</td>
<td>82</td>
</tr>
<tr>
<td>5.0</td>
<td>Water connection</td>
<td>10,000</td>
<td>6781</td>
<td>67.8</td>
</tr>
</tbody>
</table>

Source: Kigoma/Ujiji Municipal Council Profile 2008
4.7.4 Transport

There are central railway line and road services between Kigoma, Tabora, Dodoma and Dar es Salaam. Also they join Mwanza, Bukoba and Mpanda. Water way transport services run from Kigoma town to Zambia, DRC and Burundi. Within the township there are reliable commuter services plying from Ujjii via CBD to Katonga, Kibirizi and Mwandiga.

Roads
Total length of road network by grade in the Municipality is 352 km as follows:-
(i) Gravel roads 71 km with drainage system of 89 km
(ii) Earth roads 266 km with drainage system of 15 km
(iii) Tarmac roads 15 km with drainage rain system of 30 km.
Most of the roads are not passable during rain season due to inadequate side drains, soil erosion and poor maintenance and repair.

Railways
The Municipality is served by central railway line from Kigoma – Dar es Salaam which is about 1200Km in length.

Air Transport
The Municipality is served by airport that can accommodate Fokker Friendship class aircrafts.

4.7.5 Energy

Electricity
Urban and Rural electricification is an important economic infrastructure. Without it; the pace of development is slow. The major source of electricity in the Municipality is the power plant at Kigoma/Bangwe. Electricity (thermal) is mostly used by high income earners and small industries. There is electricity shortage in the urban due to the fact that Kigoma region is not connected to National Grid and our electricity being generated by old and outdated machines.

Wood fuel
Municipal residents use fuel wood in the form of charcoal and firewood for domestic heating and cooking. Fuel wood is also used in brick burning, which now aggravates its demand, causing an extensive deforestation hence rampant soil erosion and siltation.

Fossil Fuel
Most households in the urban use fossil fuel for domestic lightening mostly kerosene due to shortage of electricity. Industrial and transport uses for fossil fuels are also higher.
4.9 Kigoma Municipality Environmental Setting

4.9.1 Land

Characteristics of the land resource

The land is an environmental resource required by the people to live on. The development activities on land resource have a resultant environmental consequence. The existing municipal land use set-up (in the urban proper) resulted from and tells of the past and present development activities. This could possibly guide the future land use.

Land is under control of the President and is held and administered for the use and common benefit, direct or indirect of the Native of Tanzania “(Land Acts No. 4 & 5 of 199)” basing on this ordinance land allocation have been pursued by the Local Government through the District Allocation Committee on behalf of the President. At present following the Central and Local Government reform land allocation is performed by the Local Government that is the Local Authorities within their jurisdiction areas.

The Impacts of the Activity sectors on Land Resource

Extensive Agricultural activities, uncontrolled forest activities and urban development activities such as settlement building and road construction cause environmental degradation and the dwindling of the land resource base as well as disruption of the biodiversity.

4.9.2 Forests and Natural Vegetation

Characteristics of Forest and Natural Vegetation

There are two types of forests in the Municipality namely Natural Forest and Plantations (man–made). The natural forest has the following natural vegetation including wood, bush and grass lands which covers most parts of the area. This in turn is divided into two groups, namely Miombo, woodland which covers the great part of Forest Reserves and partially in public lands, bush land and bushed grass land considered to be deforested, forming a number of different vegetation types which have been cleared, browsed and selectively grazed for a long period. This is widely spread in public lands. Conservation of Forest resource is protected by Forest Act. NO. 14 of 2002 including Municipality by-law GN.

Man-made vegetation covers include trees planted along the collector roads in town; they provide shades to pedestrians. Vegetation of these plantations is mainly dominated by tree species of Albizia and senna spp. Building pole harvesting is not carried out in these plantations.
The Impact of the Activity sectors on the Forest and Natural Vegetation

Deforestation has a major impact on the forest resource. Deforestation occurs when people clear forests for agriculture expansion, bush fire outbreaks, use of fuel woods in brick burning, housing activities which put a high demand of forest related building materials such as poles and timber.

Clearing of forests and other natural vegetation causes macro and micro climatically changes and destroys biodiversity reducing soil fertility, and conservation of ground water; hence affect weather conditions, such as rainfall. Activity sectors which result into deforestation are real threats in many aspects including change of air quality since it is well known that trees utilize carbon dioxide to produce oxygen in their photosynthesis process.

Also an aesthetic destruction is an impact caused by clearing of forests and uncontrolled cutting of trees in many areas leaving bare land resulting into soil erosion and land degradation. Farming or agricultural activities in some wards pose a threat to forestry and natural vegetation resources.

4.9.3 Surface Water

Characteristics and importance of surface water and springs

Lake Tanganyika stretches for about 50km from north to south of the Municipality and has an average of 57km in width. It is a fresh water Lake and it is the second deepest in the world, next to lake Balkan in Siberia (Russia).

The municipality has also many rivers and fertile valleys that are suitable for irrigation including Luiche and Mungonya rivers with estimated potential area of 3030 Ha but the area under irrigation currently is only 605 Ha.

Lake Tanganyika is the major source of water for the municipality, Other water sources are springs namely Nyakageni, Rutale and Kirugu and Katosho pond. Also Water from the rivers like Luiche, Mungonya and Kaseke are sources of water for domestic and family uses. The raw lake water gravitates into a swamp and well at Bangwe estuary from which water is pumped to medium and high level tanks situated on the Mjimwema hill, near the central business district (CBD). Water demands for the township population is 26,000m³/day but only an amount of 15,500m³/day (53%) is supplied. The present water intake is exposed to pollution due to siltation, oil from power generating plant, farming utilizing chemicals and lack of sewerage drainage systems.

The Impacts of activity sectors to surface water

Since the water production capacity is less than demand, thus any increase in demand and use of water by any sector (irrigation, fishing, animal husbandry) put further strain on the resource. This results into the depletion of the resource. During the dry seasons, water quantities in the springs
dwindle considerably. Lake Tanganyika is affected mostly by siltation due to agricultural and settlement activities.

4.9.4 Ground Water and Aquifers

**Characteristics of Ground water**

Most of the water resource that are naturally reserved in the ground comes from residual precipitation of the surface water infiltration into the soil and percolating downwards through the porous layers. Underground water is normally protected in springs and ponds. Some of natural springs existing in the municipality are listed in the Table 4.19. Presently, there no substantial data showing the amount water consumption contributed by the underground and aquifer water resources in the Municipality.

<table>
<thead>
<tr>
<th>Area</th>
<th>Number of springs/ponds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rusimbi</td>
<td>2</td>
</tr>
<tr>
<td>Gungu</td>
<td>4</td>
</tr>
<tr>
<td>Kigoma/Bangwe</td>
<td>2</td>
</tr>
<tr>
<td>Kasimbu</td>
<td>2</td>
</tr>
<tr>
<td>Buhanda/Businde</td>
<td>3</td>
</tr>
<tr>
<td>Mwanga Kaskazini</td>
<td>1</td>
</tr>
<tr>
<td>Kagera</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

*Source: Environmental Unit Kigoma/Ujiji Municipal Council, 2008*

The Impact of activity Sectors on the Environmental Resources:

Housing activities including sanitary facilities like pit latrines, septic tanks and subsurface sewage disposal within 30m from the underground water source or on the slope areas e.g. Kibirizi water spring, pose danger of causing pollution to underground water.

Agricultural activities like the use of insecticides and chemical fertilizers which percolate through the ground and ultimately pollute underground water.

4.9.5 Air

**Characteristics of the Air resource:**

The town is situated on the undulating land and surrounded by hills in all directions; in the western and southern faces Lake Tanganyika which blows winds to off shores. The central area is relatively flat and bowl-shaped land. The surrounding hills act as wind barriers such that during hot months people are forced to sit outside their houses for Lake Breeze fresh air.
The geographical location of the town makes it (especially the central business district) very sensitive for air pollution. During hot months of the year people feel and suffer most from air pollution. The town has good tree cover mainly along the roads and other plantations which purifies and adds quality to urban air. Trees give shade to the pedestrians.

There are no readily available air quality spot measurements or monitoring data that can be used to gauge the air quality trends in the Municipality. As such, an evaluation of air quality trends in the Municipality can only be based on circumstantial evidence and tell-tale signs as well as use of comparative data. Circumstantial evidence of air pollutions is reflected in health statistics for air pollution related diseases.

Air pollution has been identified as actually and potentially coming from industries mines and mineral processing sites; the sewerage system; households; traffic and solid waste disposal sites. Industrial emit gaseous emissions including particulate matter as well as offensive odours, and noise.

**The Impact of the activity sectors on the air quality**

The following sectors pollute air in the Municipality.

**Traffic**

Most roads in peri-urban areas and few roads in the Municipality are not paved. As a result, vehicular traffic blows up dust. Traffic also emits exhaust gases including carbon dioxide, carbon monoxide as well as gases referred to as SO₂ and NO₂ which have public health and environmental impacts. Traffic air pollution is exacerbated by traffic volume, narrowness of streets. Height and density of buildings, lack of open spaces and generally poor ventilation. Also, uses of reconditioned vehicles which do not burn fuel efficiently escalate traffic air pollutions.

Moreover, traffic volumes on most roads are normally light and traffic congestion is not very common. In the CBD, the housing density is rather high but most buildings are of low rise type. As such, air pollution does not seem to be problems currently, but with an increase in the number of vehicles in the urban precautions will need to be taken against air pollution.

**Households**

Household’s use of biomass fuel like firewood produces air pollutants that are found in the combustion products. Since a large number of households in the urban, especially in rural areas, use firewood this is a significant source of air pollution. Since use of the biomass is done in enclosed spaces, in the kitchens, households produce indoor and outdoor air pollution.

Indoor air pollution affects the uses of the fuel in the kitchen and other occupants in the house plus people outside. It is worthwhile to point out that indoor air pollution causes more deaths than outdoor air pollution, and its effects are more serious in developing countries like Tanzania than in developed countries.
**Solid Waste collection Sites**

Decaying solid waste at the disposal site produces offensive odours that are blown by wind and are able to cause a nuisance in residents in the vicinity of the site. Burning wastes produce smoke and other combustion products that also get access to residence in the vicinity of the disposal site.

The pollutants from burning waste pollute the air causing health hazards while the smoke can cause impairment of visibility. Other disposal sites in the urban including those at households and institutions like the Maweni hospital where solid waste is burnt have similar environmental impacts.

**Disposal of waste water**

Overflowing of waste water due to blockages gives rise to offensive odours in the vicinity of the affected sites, thus polluting the air. Worse still, In the Municipality there is no central sewerage system; therefore sewage discharged into the lake through the sea outfall is blown back to the shore giving rise to waves of offensive smell along the shore in the neighbourhood of the outfall.

### 4.11 Kigoma Municipality Environmental Priorities

Again these environmental priorities are drawn from the environmental setting of the Municipality (section 4.9), Views of the stakeholders and the physical observations. The priorities include:

1. **Flooding and Soil erosion**
   
   Many parts of Municipality are prone to flooding and soil erosion during rainy season. A number of highly and low-lying areas, including Mjimwema, Gungu, Katubuka and Mlole which are formally/informally developed are prone to soil erosion and flooding. Flooding causes destruction of infrastructure services, damage to buildings, cause safety risks and create conditions that are conducive for the breeding of disease vector. Notably permanent gullies can be found in the affected areas, for example in Lubengera, NHC Katubuka and Katonyanga during heavy rains.

2. **Environmental Health and Sanitation**

   For more than 10 years now, the sanitary condition of the Municipality has been deteriorating steadily. The main cause being improper disposal of liquid and solid wastes, lack of reliable and safe water supply, inefficient of storm water drainage systems and the existence of dilapidated buildings. The environmental health deficiencies have contributed to foul smells in residential areas and the Central Business District. The urban development activities which leaves open pits which act like breading sites for mosquitoes and other insects which transmit water-borne diseases that affect the health of the Municipal residents. The Municipal has neither dumpsite for solid waste disposal nor wastewater treatment plant for treating water before disposal into the lake.
3. Water resources pollution

The existing liquid waste disposal practices for domestic liquid waste in Municipality are on–site waste disposals practices mainly consisting of pit latrines and septic tanks as well as soak-away pits. The on–site waste disposal practices have high likelihood of faecal/contamination of ground water sources and surface water sources in areas where water table levels are high and overflowing of wastes from these systems occurs like Nyakageni, Kibirizi and Rutale springs.

Surface and ground water in the Municipality are polluted by seepages from pit latrines and soak–pits that find their way and pollute water sources. Industrial, commercial and residential liquid wastes discharged are into drainage systems pose dangers of polluting both ground and surface water. Fishing activities by using poisonous chemicals also pollute the lake water.

Along the shores of lake, springs and ponds; vegetable farming utilizing inorganic fertilizers and insecticides is being practiced. This is another potential source of pollution and siltation to the lake, springs and ponds.

4.12 Existing Situation in project areas of Subprojects

4.12.1 Cluster I (Roads)

All 25 km of roads in Kigoma Municipality are surfaced with earth/gravel and are generally in a poor condition of disrepair (Figure 4.1). Generally, there is neither flora nor fauna of ecological importance in the project area. As for most towns, the project roads are characterized by the presence of commercial and residential buildings and physical infrastructures such as telephone lines, electricity lines, water supply system, and storm water drainage system.

Figure 4.1: Typical roads at Kigoma, Job Lusinde (left) and Wafipa road (right)
4.12.2 Cluster II (Bus Stands)

- The main bus stand site is located at Masanga area, 100m from Kasulu road. This is a new site, which is flat and open and it is covered by grasses. There are few houses near the site.
- The town bus stand, which is normally used by commuter buses and taxis for hire is located at the centre of the Municipality (Figure 4.2). The bus stand is unpaved and is surrounded by residential/commercial buildings. The site is disturbed and as such there are few natural features within and around it.
- The Ujiji Bus stand site is located in Ujiji area, it is now being used for cultivation of vegetables by nearby residents. It is a flat area, which is located within the residential area.

Figure 4.2: New town bus stand (left) and Main bus stand (right) sites at Kigoma

4.12.3 Cluster III (Storm water drainage)

Kigoma is characterized by loose soils which are very prone to erosion during rain season (Figure 4.3). A total 3.2 km storm water drainage to be constructed by the project include Kitonyanga Storm Water drain (600m), Luberenga Storm Water drain (600m), Mlole Storm Water drain (1000m) and NHC Katubuku Storm Water drain (1000m). All four drains are in very bad state of disrepair, approximate average depth and width of the drainage channel sections are 7 and 2.5m, respectively. The drains are also overgrown with grasses.
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4.12.4 Cluster IV (Landfill)

The dump site is located at Mungonya about 14 km from the Municipal centre. It is an open space covered by grasses and shrubs (Figure 4.4). There is no water source near the site and it is accessible throughout the year. There are no human activities or development within a radius of 6 km.

Table 4.20 give a summary of the current environmental condition of subprojects.

Figure 4.3: Luberenga (left) and NHC Katibuku (right) Storm Water Drainage at Kigoma

Figure 4.4: Combo pictures of the proposed site solid waste dumpsite
Table 4.10: Summary of the current environmental condition of subprojects

<table>
<thead>
<tr>
<th>Priority Number</th>
<th>Description of Sub Project</th>
<th>Length/unit of Measure</th>
<th>Current Physical Status</th>
<th>Existing Infrastructure</th>
<th>Current Environmental Status</th>
<th>Possible Resettlement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phase I</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Construction of new main bus stand</td>
<td>28780m²</td>
<td>-New area, -Just outside of the Municipal centre at Masanga -Few houses around the site -Flat area</td>
<td>Non</td>
<td>-Covered by grasses only -Situated 100 m from the main road to Kasulu therefore, Very low levels of dust and noise -No water course near</td>
<td>Non</td>
</tr>
<tr>
<td>2</td>
<td>Town bus stand in ujiji</td>
<td>1500m²</td>
<td>-Unpaved surface without facilities -Situated at Matofalini area -Now used for cultivation of vegetables -Flat area</td>
<td>Non</td>
<td>-The only vegetation are vegetables and grasses -Situated 100 m from the main road to Lumumba therefore, Very low levels of dust and noise -No water course near -The site has about 7 shallow wells used for watering vegetables</td>
<td>Non</td>
</tr>
<tr>
<td>3</td>
<td>Town bus stand Kigoma</td>
<td>5000m²</td>
<td>-New area, unpaved surface without facilities -Situated at Municipal centre opposite railway station -Now used as taxi stand -Flat area</td>
<td>Non</td>
<td>-No vegetation -Due to high traffic, levels of dust and noise are high -No water course near</td>
<td>Non</td>
</tr>
<tr>
<td>4</td>
<td>Katonyanga Storm water drain</td>
<td>600m</td>
<td>-Located at Katonyanga area -Existing lined main drain collapsed -Average dimensions about 3m depth and 3m wide</td>
<td>Non</td>
<td>-Covered by grasses -A lot of solid waste in it -Loose Soil prone to erosion -Drain its water to Lake Tanganyika.</td>
<td>Non</td>
</tr>
<tr>
<td>5</td>
<td>Luberenga Storm</td>
<td>600m</td>
<td>-Located at the Municipal centre</td>
<td>Non</td>
<td>-Covered by grasses and few</td>
<td>Non</td>
</tr>
<tr>
<td>Priority Number</td>
<td>Description of Sub Project</td>
<td>Length/unit of Measure</td>
<td>Current Physical Status</td>
<td>Existing Infrastructure</td>
<td>Current Environmental Status</td>
<td>Possible Resettlement</td>
</tr>
<tr>
<td>-----------------</td>
<td>-----------------------------</td>
<td>------------------------</td>
<td>-------------------------</td>
<td>-------------------------</td>
<td>-----------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>6</td>
<td>water drain</td>
<td>near Gumuma road</td>
<td>- Existing lined main drain collapsed - Average dimensions about 10m depth and 7m wide</td>
<td>Non</td>
<td>trees - A lot of solid waste in it - Loose Soil prone to erosion - Drain its water to Lake Tanganyika.</td>
<td>Non</td>
</tr>
<tr>
<td>6</td>
<td>Mlole Storm water drain</td>
<td>1000m</td>
<td>- Located at Mlole area near VETA. - Not lined - Average dimensions about 5m depth and 4m wide - 1 house in danger of falling into it</td>
<td>Non</td>
<td>- Covered by scrub - Loose Soil prone to erosion - Drain its water to Lake Tanganyika.</td>
<td>Non</td>
</tr>
<tr>
<td>7</td>
<td>NHC Katubuku Storm water drain</td>
<td>1000m</td>
<td>- Located at Katubuku about 0.3m from Kasulu road. - Existing lined main drain collapsed - Average dimensions about 5m depth and 2m wide - 2 house near it</td>
<td>Non</td>
<td>Covered by grasses - A lot of solid waste in it - Loose Soil prone to erosion - Drain its water to Lake Tanganyika.</td>
<td>Non</td>
</tr>
<tr>
<td>8</td>
<td>Airport- Mwisenga Gungu - Road</td>
<td>5km</td>
<td>- Earth surface not passable throughout the year - Unlined Storm water drains at some sections - Residential area - Very low traffic - Good condition</td>
<td>Non</td>
<td>- Grasses, Few trees and Palm trees at some sections - Dust and Noise when a car pass - No water course near or across.</td>
<td>Non</td>
</tr>
<tr>
<td>9</td>
<td>Job rusinde road</td>
<td>1.7km</td>
<td>- Earth surface not passable throughout the year, - Residential area - no existing drains - The alignment is not clear - Very low traffic - Very bad condition</td>
<td>- Power Lines - Telephone line</td>
<td>- Few trees along the road - Dust and Noise when a car pass - No water course near or across. - A lot of solid wastes on the road</td>
<td>2 structures</td>
</tr>
<tr>
<td>10</td>
<td>New dumpsite</td>
<td>- Very huge area Located 14km from Municipal centre</td>
<td>Non</td>
<td>- Covered by grasses and scrub</td>
<td>Non</td>
<td>Non</td>
</tr>
<tr>
<td>Priority Number</td>
<td>Description of Sub Project</td>
<td>Length/unit of Measure</td>
<td>Current Physical Status</td>
<td>Existing Infrastructure</td>
<td>Current Environmental Status</td>
<td>Possible Resettlement</td>
</tr>
<tr>
<td>-----------------</td>
<td>----------------------------</td>
<td>------------------------</td>
<td>-------------------------</td>
<td>--------------------------</td>
<td>----------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>11</td>
<td>Solid waste collection points</td>
<td></td>
<td>Undulating area covered by grasses and scrubs - No settlements near</td>
<td>construction of 30 solid waste collection points</td>
<td>- Neither Dust nor Noise was observed - No water course near or across.</td>
<td>Non</td>
</tr>
<tr>
<td>12</td>
<td>Solid waste equipment</td>
<td></td>
<td>Not existing</td>
<td>40 skip buckets, 2 skip master trucks, one wheel loader</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>13</td>
<td>Wafipa - kagera Road</td>
<td>1.3km</td>
<td>Earth surface not passable throughout the year - Very narrow at some sections - Storm water drain at one section - Residential area - Very low traffic - Bad condition - It was used as a slave caravan route in 80s</td>
<td>Power lines</td>
<td>- About 30 mango trees on both sides of the road (the last 300m) near sokoni. - Dust and Noise when a car pass - No water course near or across.</td>
<td>6 Houses</td>
</tr>
</tbody>
</table>

**Phase II**

<table>
<thead>
<tr>
<th>Priority Number</th>
<th>Description of Sub Project</th>
<th>Length/unit of Measure</th>
<th>Current Physical Status</th>
<th>Existing Infrastructure</th>
<th>Current Environmental Status</th>
<th>Possible Resettlement</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Mwanga - kitambwe-mwembe togwa road</td>
<td>2.3km</td>
<td>Party Earth, party gravel road passable throughout the year - Some sections are highly eroded - Lined Storm water drain at some sections - Residential area - Very low traffic - Generally good condition</td>
<td>Power lines</td>
<td>- Few trees along the road - Dust and Noise when a car pass - No water course near or across.</td>
<td>Non</td>
</tr>
</tbody>
</table>
The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

<table>
<thead>
<tr>
<th>Priority Number</th>
<th>Description of Sub Project</th>
<th>Length/unit of Measure</th>
<th>Current Physical Status</th>
<th>Existing Infrastructure</th>
<th>Current Environmental Status</th>
<th>Possible Resettlement</th>
</tr>
</thead>
</table>
| 15              | Mji mwema road             | 3.0km                  | - 1km of Earth road and 2km of gravel road passable throughout the year  
- Storm water drain at some sections  
- Residential area  
- Very low traffic  
- Generally good condition | -Power lines  
- Telephone lines | - Grasses, scrubs and very few trees along the road  
- Dust and Noise when a car pass  
- No water course near or across. | 1 house |
| 16              | Kaya - Simu road           | 2.0km                  | - Earth surface not passable throughout the year  
- Highly eroded at some sections  
- Storm water drain at some sections  
- Residential area  
- Low traffic  
- Fairly good condition | -Power lines  
- Telephone lines | - Grasses, scrubs and very few trees along the road  
- Solid waste everywhere on the road  
- Dust and Noise when a car pass  
- No water course near or across. | 2 houses |
| 17              | Rusimbi road               | 1.0km                  | - Earth surface not passable throughout the year  
- Storm water drain at some sections  
- Residential area  
- Low traffic  
- Fairly good condition | -Power lines | - No vegetation except for three trees  
- Dust and Noise when a car pass  
- No water course near or across. | 3 Houses |
| 18              | Kikolwa road               | 0.5km                  | - Graved and worn out tarmac road passable throughout the year  
- No Storm water drain  
- Commercial/ Residential area  
- High traffic  
- Fairly good condition | -Power lines  
- Telephone lines | - No vegetation except for a few trees  
- High levels Dust and Noise at a gravel section  
- No water course near or across. | Non |
### KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

<table>
<thead>
<tr>
<th>Priority Number</th>
<th>Description of Sub Project</th>
<th>Length/unit of Measure</th>
<th>Current Physical Status</th>
<th>Existing Infrastructure</th>
<th>Current Environmental Status</th>
<th>Possible Resettlement</th>
</tr>
</thead>
</table>
| 19              | Kagashe road                | 1.3km                  | -Earth surface passable throughout the year  
- Storm water drain at some sections  
- Residential area  
- Low traffic  
- Good condition | -Power lines | -No vegetation except for a few trees  
- Dust and Noise when a car pass  
- No water course near or across. | Non |
| 20              | Entrance to regional hospital | 0.1km                  | -Earth surface passable throughout the year  
- Storm water drain at some sections  
- Commercial/Residential area  
- Very Low traffic  
- Good condition | -Non | -No vegetation except for a two trees  
- Dust and Noise when a car pass  
- No water course near or across. | Non |
5.0 STAKEHOLDER CONSULTATIONS AND PUBLIC INVOLVEMENT

5.1 Stakeholders Identification

Simple methods such as networking, literature review and interviews were used in the process of stakeholder identification. From one stakeholder, the team was connected to another and another stakeholder, in a chain like manner. The main stakeholders included Kigoma Regional secretariats, Kigoma Municipal council, Kigoma Urban Water Supply and Sewerage Authority (KUWASA), Lake Tanganyika Basin Offices and Lake Tanganyika (UNDP/GEF) Project office and Ujiji Community.

5.2 Public involvement

Public Participation is a process through which different stakeholders influence and share their views regarding development initiatives and the decisions and resources that affect them. The effectiveness of resettlement programs is directly related to the degree of continuing involvement of those affected by a project. Comprehensive planning is required to ensure that local government, NGOs, Project staff and affected men and women interact regularly and purposefully during all stages of the Project.

The overall goal of the consultation process was to disseminate Project information and to incorporate the views of stakeholders in the design of the Environmental and Social mitigation measures, management plan and Monitoring Plan. The specific aims of the consultation process are to:

- Improve Project design and, thereby, minimize conflicts and delays in implementation;
- Facilitate the development of appropriate and acceptable entitlement options;
- Increase long term Project sustainability and ownership;
- Reduce problems of institutional coordination and
- Increase the effectiveness and sustainability of income restoration strategies, and improve coping mechanisms.

An important element in the process of impact assessment is consulting with stakeholders to gather the information needed to complete the assessment. In the public consultation process three types of consultation were considered. These were:

- Consultations with Municipal Councils.
- Consultations with the water authorities and
- Consultation with the communities living near proposed subprojects

Fundamentally these consultations were intended to disseminate Project information and to collect feedback regarding the Project. It was intended to collect information regarding core urban infrastructure in the municipality, environmental issues and views and perceptions.
regarding the Project. The minutes of the consultative meetings are attached as one of Annexes of this report.

5.3 Consultative Meetings with Municipal Councils

Consultative meetings at regional, Municipal and local levels included discussions with Municipal heads of departments (Including Municipal Director, Water Engineer, Health Officer, Economist, Development officer, Land Officers, Surveyors etc. These consultations were conducted as either:

- direct, personal interviews with selected informants, or
- Focus Group Meetings with authorities and technical personnel

Typically, the Agenda for these consultations included:

- Presenting the Project:
- Discuss the Status of the core urban Infrastructure in the Municipality;
- Obtaining from the authorities their environmental and socio-economic concerns and perceptions regarding the proposed Investment Subprojects.

5.4 Consultative Meetings with Water Authorities

These include the consultative Meetings and discussions with KIUWSA officers, Lake Tanganyika Basin Offices, specialists and other knowledgeable people and key informants. These consultations were conducted through direct personal interviews with selected informants, or

Typically, the Agenda for these consultations included:

- Presenting the Project:
- Discuss the water supply status in the Municipality in terms of Coverage, Infrastructure, Quantity and Quality;
- Discuss the sanitation status in the Municipality in terms of Sanitation systems, Coverage of sewerage system, Wastewater treatment etc.
- Discuss the role of the authorities in Management of water resources and environment as a whole.
- Obtaining from the authorities their environmental and socio-economic concerns and perceptions regarding the proposed Investment Subprojects.
5.5 Community Consultations

Dissemination of Project information among communities living near the proposed investment subprojects is an important aspect of the public participation process and they should be appropriately informed about what is planned. In addition, they, including women and youth, should be involved in a two-way dialogue regarding the Project.

The main objectives of community consultations are to:

- provide clear and accurate information about the Project to the communities along the road;
- inform communities about the Project schedule;
- obtain the main concerns and perceptions of the population and their representatives regarding the project;
- obtain opinions and suggestions directly from the affected communities on their preferred mitigation measures; and
- identify local leaders with whom further dialogue can be continued in subsequent stages of the Project.

The entire consultation process of the Project was seeking the present, opinions and concerns of women and youth regarding the proposed investment subprojects and involves them in the overall planning of mitigation measures.

The Agenda for the Community consultations included:

- presenting the Project;
- defining the local institutional framework and stakeholders;
- obtaining from the local population their environmental and socio-economic concerns and perceptions regarding the proposed project; and
- identifying local leaders with whom further dialogue can be continued in subsequent stages of the Project.

The main concerns of the stakeholders included the positive anticipated impacts as well as negative impacts.

5.6 People’s Attitude towards the project:

It can be said that the communities are very interested to see that the Core urban infrastructures are improved. They could realize the benefits of the project in terms of economic and social growth. They appreciate the World Bank (IDA) and Tanzania government effort to give its priority in improvement of the Municipality Infrastructure. However, the stakeholders consulted are worried about the expropriation of properties and compensation issues. Table 5.1 summarises issues of concern raised during consultative meetings.
Table 5.1: Issues of Concern Raised during Consultative meetings

<table>
<thead>
<tr>
<th>S/no</th>
<th>Organization/ Authority</th>
<th>Issues/ Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.</td>
<td>Kigoma Municipality</td>
<td>1. Agricultural activities near the lake contribute a lot to siltation and decreased depth of the lake. They also cause the pollution of the lake due to the use of pesticides and fertilizers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Soil erosion is the biggest environmental problem in the Municipality.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. The project will improve solid waste management and sanitation as a whole because the situation now is very critical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. The municipality is facing a very big problem of water scarcity due to unavailability of energy for pumping (Costs for pumping) and poor infrastructure.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Poor sanitation practices since there is neither sewerage system nor wastewater treatment plant. Most people use pit latrines, during rain season these latrine are highly damaged since they have no lining.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. High incident rates of Cholera especially at Ujiji.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. Most of the roads have no storm water drains, Stagnation of water on the road increase the incidences of Malaria</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8. The project will reduce the risk of flooding to a large extent. The Luberenga, Mlole and NHC storm drainage always cause floods during rain season.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9. Improvement of core urban infrastructure will expand tourism sector in the Municipality.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10. The income of the municipality will increase as many investors will come after the improvement of the core urban Infrastructures.</td>
</tr>
<tr>
<td>5.</td>
<td>KUWASA</td>
<td>1. “We are aware of the project and we were part of it from the beginning” these are the words of the KUWASA Technical Engineer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. The water supply coverage is about 80% but the infrastructure (Pipes, Pumps etc) is very old.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. KUWASA expects its infrastructure in most of the roads will be improved by this project. They should be consulted prior to construction. Funds for moving out these infrastructure should be part and parcel of the budget for subprojects</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. The Improvement of the Kigoma Infrastructure will beautify the Municipality.</td>
</tr>
<tr>
<td>6.</td>
<td>Lake Tanganyika Basin Office</td>
<td>1. The quality of water of Lake Tanganyika is deterioration due to human activities including urban agriculture, poor sanitation, dynamite fishing etc.</td>
</tr>
</tbody>
</table>
|      |                         | 2. Construction of the selected storm drains will reduce the rate of siltation now taking place in the lake. Most of the eroded soil from these drains
The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in **KIGOMA MUNICIPALITY** under the Proposed Tanzania Strategic Cities Project

<table>
<thead>
<tr>
<th>S/no</th>
<th>Organization/ Authority</th>
<th>Issues/ Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>ends up in the lake.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Construction of subprojects will create employment to the local community.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. The contractor must ask for the water right before any abstraction of water during the construction phase.</td>
</tr>
<tr>
<td>7.</td>
<td>Lake Tanganyika (UNDP/ GEF) Project office</td>
<td>1. The office is aware of the project</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Kigoma has got very loose soils which erode easily, this erosion increase the rate of siltation of the lake.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Cholera still prevails since 1958 because by poor sanitation which in turn cause water pollution.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. There is upcoming construction of sewerage system in the Municipality. This project might damage the proposed roads to be constructed by Investment Subproject.</td>
</tr>
<tr>
<td>8.</td>
<td>Ujiji Township</td>
<td>1. The soap factory owners at Ujiji requested the designers to include their factory building within the main design because demolishing of the factory may retard their efforts towards poverty alleviation.</td>
</tr>
</tbody>
</table>
6.0 IDENTIFICATION AND ASSESSMENT OF IMPACTS

6.1 Impact zones

The study has considered two critical impact zones, namely;
- The core impact zone – include the area immediately bordering the project site.
- The zone of influence – which includes the wider geographical areas of Kigoma Municipality.

6.2 Impact Identification and evaluation

The development of roads, bus stands, dumpsite and storm water drainage in Kigoma Municipality can cause a wide range of environmental and social impacts on a number of receptors. The EIA and SIA identify these impacts for the purposes of mitigating the adverse ones or enhancing the benefits. Impact identification is a process designed to ensure that all potentially significant impacts are identified and taken into account in the EIA process. A number of ‘tools’ are available to assist in impact identification. The simplest, and most frequently used, are checklists of impacts, although matrices, network diagrams and map overlays are also commonly used. In this EIA simple checklists and expert’s knowledge were used. These checklists are the simplest types that provide lists of potential impacts. These are designed to help practitioners to avoid overlooking some of the potential impacts.

The impacts are categorized into direct (short-term or long-term) or indirect impacts. The direct short-term impacts are considered to be those, which will be apparent only during the construction period and such will include mainly construction related impacts. Direct long-term impacts are considered to be those, which will be apparent after construction has been completed (but includes also impacts which may become apparent during the construction phase). The direct long-term impacts, therefore, include those that are construction related and those resulting from the use of the facilities. Indirect impacts are considered to be those, which may be encouraged or enabled due to the presence of these facilities. As such they will include social and economic impacts and tend to be long-term.

The main receptors of impacts associated with the anticipated Investment sub-projects in Kigoma Municipality include physical resources (hydrology, surface water quality, soils, air quality and noise); ecological resources; material assets, public health and safety, aesthetics and landscape.

The interaction between the intended Strategic cities project activities and the different environmental receptors are summarized in a simplified matrix presented in Table 6.1 to Table 6.4. A simple matrix with the following ratings was used to determine significant impacts:
+3 Very high positive impacts
+2 High positive impacts
+1 Minor positive impact
0 No impacts
-1 Minor negative impact
-2 High negative impacts
-3 Very high negative impacts

The team focused on significant positive and negative impacts that were rated +2, +3, -2, -3 and developed mitigation and enhancement measures.

In the next sections, significant impacts (positive and negative) associated with each phase of the project are discussed, before mitigation, enhancement measures and project alternatives are discussed in the next section.

Note: Since this is essentially a civil work, most if not all short term impacts (during construction) cut across all clusters (e.g. noise, vibrations, etc) the discussion of these impacts will be lumped together in Section 6.3 to avoid repetition. The impacts during operational phase will be discussed separate in their respective clusters (Section 6.4) because they are different in nature.
Table 6.1: Environmental Impacts Matrix for Cluster I (roads)

<table>
<thead>
<tr>
<th>S/N</th>
<th>Environmental parameters/Impacts</th>
<th>Mobilization Phase</th>
<th>Construction Phase</th>
<th>Operation Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Materials extraction and transport</td>
<td>Detour routes</td>
<td>Construction Infrastructures usage</td>
</tr>
<tr>
<td>1.0</td>
<td><strong>Positive Impacts</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>Improved transportation within the area</td>
<td>0</td>
<td>0</td>
<td>+1</td>
</tr>
<tr>
<td>1.2</td>
<td>Improved community life and services</td>
<td>0</td>
<td>0</td>
<td>+1</td>
</tr>
<tr>
<td>1.3</td>
<td>Job creation and increased income</td>
<td>-2</td>
<td>+1</td>
<td>0</td>
</tr>
<tr>
<td>1.4</td>
<td>Improved storm water collection (reduced soil erosion)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1.5</td>
<td>Reduced traffic congestion</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1.6</td>
<td>Increased Property value</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.0</td>
<td><strong>Negative Impacts</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1</td>
<td>Increased water and soil pollution</td>
<td>0</td>
<td>-2</td>
<td>-2</td>
</tr>
<tr>
<td>2.2</td>
<td>Soil erosion and instability of slopes</td>
<td>0</td>
<td>-3</td>
<td>-2</td>
</tr>
<tr>
<td>2.3</td>
<td>Increased spread of HIV/AIDS</td>
<td>-1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.4</td>
<td>Loss of definite materials and land degradation</td>
<td>-1</td>
<td>-3</td>
<td>0</td>
</tr>
<tr>
<td>2.5</td>
<td>Safety and health risks</td>
<td>-1</td>
<td>-2</td>
<td>-2</td>
</tr>
<tr>
<td>2.6</td>
<td>Landscape degradation</td>
<td>0</td>
<td>-2</td>
<td>-2</td>
</tr>
<tr>
<td>2.7</td>
<td>Loss of Natural Habitats</td>
<td>0</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>2.8</td>
<td>Interference to local hydrology</td>
<td>0</td>
<td>0</td>
<td>-1</td>
</tr>
<tr>
<td>2.9</td>
<td>Increased noise, vibration and air pollution</td>
<td>-1</td>
<td>-2</td>
<td>-2</td>
</tr>
<tr>
<td>2.10</td>
<td>Population Influx</td>
<td>-1</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>2.11</td>
<td>Land expropriation, loss of property and resettlement</td>
<td>-1</td>
<td>0</td>
<td>-3</td>
</tr>
<tr>
<td>2.12</td>
<td>Disruption of Other infrastructures</td>
<td>0</td>
<td>0</td>
<td>-3</td>
</tr>
<tr>
<td>2.13</td>
<td>Increased Waste</td>
<td>-1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.14</td>
<td>Increased road accidents</td>
<td>0</td>
<td>-1</td>
<td>-1</td>
</tr>
</tbody>
</table>

65
The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

2.16 Incompatibility with O.P 4.11

<table>
<thead>
<tr>
<th>S/N</th>
<th>Environmental parameters/Impacts</th>
<th>Mobilization Phase</th>
<th>Construction Phase</th>
<th>Operation Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Materials extraction and transport</td>
<td>Construction Infrastructures usage</td>
<td>Maintenance</td>
</tr>
<tr>
<td>1.0</td>
<td>Positive Impacts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>Improved community life and services</td>
<td>0</td>
<td>0</td>
<td>+3</td>
</tr>
<tr>
<td>1.2</td>
<td>Job creation and increased income</td>
<td>-2</td>
<td>+1</td>
<td>+3</td>
</tr>
<tr>
<td>1.3</td>
<td>Increased Property value</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1.4</td>
<td>Increased Municipal income</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1.5</td>
<td>Reduced traffic in the town centre</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.0</td>
<td>Negative Impacts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1</td>
<td>Increased water and soil pollution</td>
<td>0</td>
<td>-2</td>
<td>-2</td>
</tr>
<tr>
<td>2.2</td>
<td>Soil erosion and instability of slopes</td>
<td>0</td>
<td>-3</td>
<td>-3</td>
</tr>
<tr>
<td>2.3</td>
<td>Loss of definite materials and land degradation</td>
<td>-1</td>
<td>-3</td>
<td>-3</td>
</tr>
<tr>
<td>2.4</td>
<td>Increased spread of HIV/AIDS</td>
<td>-1</td>
<td>0</td>
<td>-3</td>
</tr>
<tr>
<td>2.5</td>
<td>Safety and health risks</td>
<td>-1</td>
<td>-2</td>
<td>-2</td>
</tr>
<tr>
<td>2.6</td>
<td>Landscape degradation</td>
<td>0</td>
<td>-2</td>
<td>-2</td>
</tr>
<tr>
<td>2.7</td>
<td>Loss of Natural Habitats</td>
<td>0</td>
<td>-1</td>
<td>-2</td>
</tr>
<tr>
<td>2.8</td>
<td>Increased noise, vibration and air pollution</td>
<td>-1</td>
<td>-2</td>
<td>-2</td>
</tr>
<tr>
<td>2.9</td>
<td>Population Influx</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>2.10</td>
<td>Land expropriation, loss of property and resettlement</td>
<td>-1</td>
<td>0</td>
<td>-3</td>
</tr>
<tr>
<td>2.11</td>
<td>Increased liquid and solid waste</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.12</td>
<td>Increased crime</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Key: Mild Adverse (-1); Adverse (-2); Highly Adverse (-3); Mild Beneficial (+1); Beneficial (+2); Highly Beneficial (+3); No impact (0)
### Table 6.3: Environmental Impacts Matrix for Cluster III (Storm water drains)

<table>
<thead>
<tr>
<th>S/N</th>
<th>Environmental parameters/Impacts</th>
<th>Mobilization Phase</th>
<th>Construction Phase</th>
<th>Operation Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Materials extraction and transport</td>
<td>Construction Infrastructures usage</td>
<td>Maintenance</td>
</tr>
<tr>
<td>1.0</td>
<td><strong>Positive Impacts</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>Job creation and increased income</td>
<td>-2</td>
<td>+1</td>
<td>+1</td>
</tr>
<tr>
<td>1.2</td>
<td>Improved storm water collection</td>
<td>0</td>
<td>0</td>
<td>+3</td>
</tr>
<tr>
<td>2.0</td>
<td><strong>Negative Impacts</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1</td>
<td>Soil erosion and instability of slopes</td>
<td>0</td>
<td>-3</td>
<td>0</td>
</tr>
<tr>
<td>2.2</td>
<td>Loss of definite materials and land degradation</td>
<td>-1</td>
<td>-3</td>
<td>0</td>
</tr>
<tr>
<td>2.3</td>
<td>Safety and health risks</td>
<td>-1</td>
<td>-2</td>
<td>0</td>
</tr>
<tr>
<td>2.4</td>
<td>Landscape degradation</td>
<td>0</td>
<td>-2</td>
<td>0</td>
</tr>
<tr>
<td>2.5</td>
<td>Loss of Natural Habitats</td>
<td>0</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>2.6</td>
<td>Interference to local hydrology</td>
<td>0</td>
<td>0</td>
<td>-1</td>
</tr>
<tr>
<td>2.7</td>
<td>Increased noise, vibration and air pollution</td>
<td>-1</td>
<td>-2</td>
<td>0</td>
</tr>
<tr>
<td>2.8</td>
<td>Blocking access paths</td>
<td>0</td>
<td>0</td>
<td>-2</td>
</tr>
</tbody>
</table>

**Key:** Mild Adverse (-1); Adverse (-2); Highly Adverse (-3); Mild Beneficial (+1); Beneficial (+2); Highly Beneficial (+3); No impact (0)
The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

Table 6.4: Environmental Impacts Matrix for Cluster IV (Landfill)

<table>
<thead>
<tr>
<th>S/N</th>
<th>Environmental parameters/Impacts</th>
<th>Mobilization Phase</th>
<th>Construction Phase</th>
<th>Operation Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Materials extraction and transport</td>
<td>Construction Infrastructures usage</td>
<td>Maintenance</td>
</tr>
<tr>
<td>1.0</td>
<td>Positive Impacts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>Improved Solid waste management and Sanitation</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1.2</td>
<td>Job creation and increased income</td>
<td>-2</td>
<td>+1</td>
<td>+3</td>
</tr>
<tr>
<td>1.3</td>
<td>Increased Municipal income</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.0</td>
<td>Negative Impacts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1</td>
<td>Increased water and soil pollution</td>
<td>0</td>
<td>-3</td>
<td>-2</td>
</tr>
<tr>
<td>2.2</td>
<td>Soil erosion and instability of slopes</td>
<td>0</td>
<td>-3</td>
<td>-3</td>
</tr>
<tr>
<td>2.3</td>
<td>Loss of definite materials and land degradation</td>
<td>-1</td>
<td>-3</td>
<td>-3</td>
</tr>
<tr>
<td>2.4</td>
<td>Increased spread of HIV/AIDS</td>
<td>-1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.5</td>
<td>Safety and health risks during construction</td>
<td>-1</td>
<td>-2</td>
<td>-2</td>
</tr>
<tr>
<td>2.6</td>
<td>Landscape degradation</td>
<td>0</td>
<td>-2</td>
<td>-2</td>
</tr>
<tr>
<td>2.7</td>
<td>Loss of Natural Habitats</td>
<td>0</td>
<td>-1</td>
<td>-2</td>
</tr>
<tr>
<td>2.8</td>
<td>Increased noise and vibration and air pollution</td>
<td>-1</td>
<td>-2</td>
<td>-2</td>
</tr>
<tr>
<td>2.9</td>
<td>Ground water pollution due to leachate</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.10</td>
<td>Increased risk of open and subsurface fire</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.11</td>
<td>Public health problems due to pests and birds</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>2.12</td>
<td>Occupational Health effects</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Key: Mild Adverse (-1); Adverse (-2); Highly Adverse (-3); Mild Beneficial (+1); Beneficial (+2); Highly Beneficial (+3); No impact (0)
6.3 Construction Phase (All Clusters)

6.3.1 Short-Term Impacts:

Direct Positive

i. Job creation and increased income to local communities

Most of the casual labourers and some skilled workforce will be recruited from within the Kigoma Municipality. In addition, the local people will be selling food and other merchandise to the construction workforce. The utilization of local workmanship will take place for the activities that don’t require special skills, and in any case there will be diffusion of knowhow from the more qualified personnel towards the local personnel.

Direct Negative impacts

ii. Increased water and soil pollution

Whichever construction method used, small-scale and short-term water pollution may result especially during construction of off-road drainage structures. Impacts can also result from accidental spillage of fuels and construction materials, which may pollute both water and soil. Culvert construction may stir riverbed deposits into suspension. Though the large particles may settle quickly, the finer ones will increase the turbidity of surface water sources. The turbidity impacts may be short-term since the stream construction takes place within a few weeks.

All clusters entail construction of drainage channels in order to drain concentrated run-off from the road, bus stands, and landfill. Water or soil pollution by accidental spillage of fuel or other materials and chemicals associated with construction is an undesirable possibility. Obviously, it is not possible to predict the location or type of spillage, but it is considered that any spillage to soil will be local in nature and remediation should not be difficult. This impact will not be significant because there is no water course near/in any of the subprojects, only Lake Tanganyika water pollution is expected due to construction of drainage channels at the sites.

iii. Soil erosion and instability of slopes

Construction works would accelerate erosion problems in most cut sections. Nevertheless, all cuts in the sloping grounds should be refurbished firmly and provided with the vegetation cover to reduce the effect of soil erosion.

iv. Noise, vibration and air pollution during construction phase

Dust will arise from construction site due to excavation work, movement of vehicles, stock piling of materials, operation of crusher and asphalt plants, and general earth works
at the site. Exhaust fumes will mainly come from construction plant, machinery and vehicles in operation. Fumes will also come from the processing of asphalt. Dust and fumes will have major direct but short-term impacts during the project construction phase. Along the project sites, the adjacent areas are relatively open, without impediment to air movement hence enhance dilution of air pollutants. For areas away from the construction sites, leafy vegetation should be able to fill out a considerable content of low level air borne pollutants. Thus, ventilation and vegetation are anticipated to lessen the air pollution problem. Moreover, sprinkling of the road with water during construction work will further lessen generation of dust, and consequently alleviate the air pollution problem.

Noise and vibration will be produced by construction vehicles, plant and machinery during delivery of materials, processing of materials, and actual construction work. Due to an increase in activities and number of operational vehicles, the impacts of noise and vibration will cause disturbance to humans and animals as well as birds. Vibration may even cause physical damage to properties near the construction site. The vegetation and loose soil along the roads in the project area have the potential for damping noise and vibration. As such, noise and vibration impacts will have short range near the construction site. Dust will be a temporary nuisance to the people within the core impact area especially during construction in the dry season.

v. Increased spread of HIV/AIDS

The most health risk is on HIV/AIDS epidemic. Considering the socio-economic as well as geographical characteristics of the project area, there exist number problems that either may influence high infection rate, or deter efforts to combat the epidemic. For example, the problem of low or irregular incomes among young women aged 15 – 45 years is HIV/AIDS risk factor, which can influence high infection rate in the project area.

This impact will be contributed by the influx of people into the area including construction workers. This would result in an increase in the incidence of diseases including STI, and HIV/AIDS. This would also lead to an increased pressure and demand on social services.

vi. Safety and health risks

Construction of these sub projects will expose the labourers and the general public to bronchial and other respiratory tract diseases. Also poor use (or not using at all) of the safety gears during construction phase will result into loss of lives or injuries during construction. The incidence rate of water borne diseases such as cholera and diarrhoea will increase if there will be no proper sanitation practices at the camps.
vii. Disruption of other infrastructure

Some of the infrastructure such as pipe network, sewerage network, telephone lines and power lines are either under, in, near or close to the project sites and can be destroyed during construction. Relocation of this infrastructure is therefore very important during the construction of these proposed infrastructure. Disruption of services to the community provided by these infrastructures. However, this relocation can cause the following impacts to the community:

- Cost implications to the authorities managing the infrastructures
- Disruption of service to the community provided by these infrastructures.

In the view of the above, the authorities managing these infrastructures (TANESCO, TTCL and KUWASA) should be involved from the early stages of implementation of these sub-projects so as to have an integrated planning.

6.3.2 Long-Term Impacts:

viii. Loss of definite materials and land degradation

Construction of these utilities will have direct impacts related to excavation; quarrying and deposition of spoil material. Significant volumes of earthworks fill; gravel and rocks will be extracted during project execution.

Quarrying involves clearing the vegetation at the sites, excavation and transportation of the material. Thus, borrowing and quarrying activities will cause habitat change, land degradation (due to removal of fertile top soil), landscape impairment (visual intrusion) and soil erosion—which lead to siltation of waterways. Quarrying, excavation and the disposal of spoil material can destroy the economic and aesthetic value of public and/or private property including land. Some species may be affected during construction, but not to the level of extinction. However, establishment of detour routes during construction may damage some species.

Scenic quality deterioration will occur due to stock piling of construction materials and discoloration of plant leaves and houses in the vicinity of the roads due to wind blown dust. Excavation work as well as presence of construction vehicles, plant and equipment will also add to scenic quality deterioration. Scenic quality deterioration will also occur off-site, at the sources of construction materials, the quarries and sand mines. If these are not made good they may become an eyesore. Scenic quality deterioration can destroy the economic and aesthetic value of public and/or private property including land. Scenic quality degradation effects will be significant, short term and direct. They will, in spite of everything, be manageable given proper site operation and prior warning as well as issuance of site operation guidelines.

Abandoned borrow pits have damaging effects (as experienced in other parts of Tanzania). Borrow pits and quarry sites provide good environments for disease vectors.
and thus posing serious public health hazards. Abandoned pits filled with water harbour disease vectors responsible for transmission of malaria and *schistosomiasis*.

ix. **Loss of natural habitats**

Land clearance to obtain the required area for the construction will of sub projects will involve uprooting vegetations (mainly grasses and few trees) which falls within the area as well as displacing huge masses of topsoil. Clearance of grasses will be significant for the proposed Main bus stand and Landfill construction sites (Figure 6.1).

Figure 6.1: Section of the proposed site for the Main bus stand (left) and Landfill site (right)

x. **Landscape degradation**

Much of the landscape modification will be associated with land take for construction site widening, levelling and cut and fill sections to improve both horizontal and vertical alignment. These are permanent features as it is highly improbable that any land taken or earthworks constructed for the project will ever be returned or reinstated.

*Channels, tunnels including drainage revetments* are essential to divert water from the road surface and from the dumpsite. They are important because if the water continuously remains on or close to the road tends to ‘consume’ away the surface and gradually causing potholes and ditches or pits. Drainage channels are also very important around the dumpsite to direct water away from it in order to reduce the leachate that will result from moist solid waste in the dumpsite. Alternatively construction of these structures particularly on mountainous, hilly and rainy areas the results can be serious. The consequences to be expected include soil erosion leading to man-induced channels and gulleys that if unattended early can later be unmanageable. As pointed out above the secondary impacts could be many to the environment and humans.

xi. **Increased Wastes**

It is obvious that construction activities are associated with production of wastes. These wastes can either be solid waste or liquid waste. The waste streams are Construction
activities and Domestic activities of the workers at the camp and site. The solid waste include, Spoil, rubbles, Tree logs, metals, glasses, papers etc while the liquid waste include Sewage, oils etc. The quantities are provided in chapter two of this report. These wastes if not well handled can change the aesthetic nature of the project area and can even lead to water pollution incase of improper disposal of oils.

6.4 Long-Term Impacts- Operation Phase

6.4.1 Cluster I (Roads)

Positive Impacts

xii. Improved Transport and Economy of the People

As stated earlier on the existing roads are in a poor state (Figure 6.2). The roads improvement will facilitate easy transportation within the Kigoma Municipality as well as increasing communication among the communities along the road. The improved roads would be particularly beneficial to passengers and cargoes where journey times will be shortened.

![Figure 6.2: Kaya –Simu and Kagashe Roads in Kigoma existing situation](image)

This will have an impact to the enhanced capacity of the marginalized groups to afford education, health and decent housing in the project areas. The improved roads will boost up the existing informal sector, which is a source of self-employment for mainly women and youth; the roads will ensure increased commuting speed and thereby facilitating the goods exchange in the informal sector. The improved roads are expected to expand and improve the informal sector in which the unemployed women and youth will engage themselves to perform various income generating activities.

xiii. Improved community life and services
There are several social related advantages that will accrue from the construction of the roads. Improved transportation will enable easy delivery of drugs/medicines to health care facilities. The roads will facilitate easy access to health centres, and thus lives of some patients will be saved. Living standard of local communities along the project area will be enhanced, as they will be able to easily get access to social facilities such as schools, health centres, religious centres etc.

xiv. **Job creation and increased income to local communities**

There would also likely be employment availability during the operation phase pertaining to these roads maintenance such as grass cutting, cleaning drainage culverts, etc; as well as some clerical / low level supervision jobs. Such employment would contribute to poverty reduction, especially for women.

xv. **Reduced traffic congestion**

The improvement of the roads will definitely reduce problem in the municipality of Traffic congestion. Now most cars use the tarmac roads which are few and this cause congestion especially in the city centre. After the completion of these subprojects the pressure will be distributed to all the roads since a number of tarmac roads will be more. Reduced traffic congestion has impacts on serving fuel costs and time.

xvi. **Increased property values**

It is very obvious that improved roads will increase the property values (plots, farms, buildings etc). This will be an advantage to the property owners since the resell value and rent will increase. Also the city and national income will increase through the property tax. However, the rise of property value will be disadvantage to tenants and investors.

**Negative Long-Term Impacts**

xvii. **Interference to local hydrology**

The proposed roads will not entail any new and undue interference with the hydrologic and drainage aspects of the project area. The change from gravel surfacing to bituminous surfacing will improve drainage of the area, especially with improvement of roadside drainage and cross drainage. This will result into a minor positive impact. On the other hand sources of construction materials will create pits in which water will accumulate. These can be breeding sites for mosquitoes and can serve as a means of harvesting rainwater as well. The latter possibility can help to alleviate water shortages in the area especially during dry seasons. Other negative hydrologic and drainage impacts are not foreseen. The main impact associated with the provision of road drainage channels is the blocking of access paths to residences for houses located along the road.
xviii. **Increased road accidents**

Increased traffic and speed driving will result into unnecessary road accidents to people especially school children and old people. The main causes for accidents are poor road conditions due to lack of maintenance, reckless driving, defective vehicles, drunkenness, poor road facilities for the pedestrian and cyclists and unqualified drivers. The improvement of the Kigoma Municipality roads might lead to an increase in accidents due to increase in traffic volume and speed, unless precautionary measures are taken.

xix. **Increased noise, vibration and air pollution at operation phase**

Pollution will be evident during the operation life of the roads due to emissions from the fuels and other chemicals associated with vehicular traffic and maintenance works. The chemical emission will be washed by rain to water sources and adjacent soils. However, the magnitude of the pollution is considered to be very low.

Noise is one of the most obvious negative impacts of daily road use. The discomfort caused by noise includes auditory fatigue and temporary lessening of hearing ability. However, perceived noise is related to background noise level, so that new roads in quiet areas or noisy trucks at night are often perceived as worse than higher levels of noise in a busy area during the work day. For these project roads, the noise and vibration impacts will be reduced due to improved roads surface. In addition, since the vehicular density is low, it is therefore considered that the perceived effect on traffic noise and vibration effects will likely be greatly reduced.

The effect on air quality of the increased traffic flow and from the emissions from the dumpsite is considered to be significant if no maintenance program will be installed. Under good maintenance schedule, traffic exhaust emissions, will be intermittent and atmospheric dispersal of exhaust emissions will maintain the air quality. However, concerted effort to check engine performance is needed so as to deter vehicles not road-worth from using the roads.

xx. **Population Influx**

The improvement of roads is usually accompanied by in-migration of job seekers and opportunistic businesses and speculators. Considering the current HIV-AIDS level in Tanzania, increased population in Kigoma Municipality due to immigration may result into increased HIV-AIDS victims. This would also lead to an increased pressure and demand on social services.

xxi. **Land expropriation, loss of property and resettlement**

The use of land for urban infrastructure construction or improvement may entail the voluntary sale or compulsory acquisition (expropriation) of homes, property, businesses,
farms and other productive resources. In Tanzania expropriation method is common, which by its nature causes social disruption and economic loss for the affected individuals and their families. The impacts of expropriation are not only social and economic, but also psychological and in most cases complex or devastating. A participatory approach and dialogues to solving such issues have proved fruitful in previous road development projects in Tanzania.

The construction would most likely involve among other things, demolition of people’s houses and business premises in the project are. The risk of compulsory resettlement is however not very high since all the most of the people who will be affected know that they will be relocated if the improvement of the roads is to take place. It was observed that the relocation of people and their properties will be very minimal since the construction is done on the existing roads. Table 6.5 shows the structures which are going to be relocated in each subproject.

### Table 6.5: Structures to be resettled

<table>
<thead>
<tr>
<th>Subproject</th>
<th>No of Structures/graves</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job Lusinde Road</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Mji mwema Road</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Kaya-Simu Road</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Wafipa Road</td>
<td>6</td>
<td>3 houses belong to catholic church</td>
</tr>
<tr>
<td>Rusimbi Road</td>
<td>4 houses</td>
<td></td>
</tr>
</tbody>
</table>

Apart from buildings, some of the cultivated farms and trees will be affected. Compensation for lost property is an important issue that should not be underestimated. During consultations with the communities and district authority leaders, it was very clear that compensation must be made prior to implementation of the project. Failure of implementing the compensation plan can result into social friction with local communities that can cause delay in the construction schedule.

xxii. **Road safety and health risks**

Road deaths, injuries and damage to property are most tangible negative impacts on the community environment and may be reduced or increased as a result of road projects. The project roads transverse community areas and the effects the road causes on safety in these settlements are dependent on location.

Vehicles travelling at increased speeds will make it difficult for road users to cross the road, particular animals, children and elderly people will be at risk of accidents.

xxiii. **Incompatibility with WB OP 4.11 on cultural property**
The proposed construction of Wafipa-Kagera road (Figure 6.3) is incompatible with World Bank operational Policy 4.11 which deals with cultural properties. This road was a slave caravan route in 1880s. OP 4.11 addresses physical cultural resources, which are defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings, and may be above or below ground, or under water. Their cultural interest may be at the local, provincial or national level, or within the international community. Therefore, construction of the Wafipa-Kagera road will change the natural condition of this important historical site.

![Figure 6.3: Wafipa – Kagera road which was used as a slave caravan route](image)

The following projects are classified during the environmental screening process by the Bank as Category A or B, and are subject to the provisions of this policy: (a) any project involving significant excavations, demolition, movement of earth, flooding, or other environmental changes; and (b) any project located in, or in the vicinity of, a physical cultural resources site recognized by the borrower. Projects specifically designed to support the management or conservation of physical cultural resources are individually reviewed, and are normally classified as Category A or B.

6.4.2 Cluster II (Bus Stands)

**Positive Impacts**

**xxiv. Improved community life and services**

There are several social related advantages that will accrue from the construction of the bus stands. The bus stands will provide market for the local community to sell their goods and in-turn increase their income and economy. Also many people will start doing
passenger transportation business since there is a reliable place for parking while waiting for passengers.

**xxv. Job creation and increased income to local communities**

There would also likely be employment availability during the operation phase pertaining to these bus stands maintenance such, cleaning the bus stands, etc; as well as some clerical / low level supervision jobs. Such employment would contribute to poverty reduction, especially for women.

**xxvi. Reduced traffic congestion**

The construction of the main bus stand outside of the town will definitely reduce Traffic congestion in the Municipality. This is because busses to and from other districts and regions will start and end their journeys at Masanga area which is outside of the town. Reduced traffic congestion has impacts on serving fuel costs and time.

**xxvii. Increased property values**

It is very obvious that construction of the bus stands will increase the property values (plots, farms, buildings etc) near the project area. This will be an advantage to the property owners since the resell value and rent will increase. Also the city and national income will increase through the property tax. However, the rise of property value will be disadvantage to tenants and investors.

**xxviii. Increased Municipal Income**

The income of Kigoma municipality will increase because for a bus to use a bus stand it must pay some amount per day. Having three bus stations this will be a significant amount.

**Negative Impacts**

**xxix. Increased noise and air pollution at operation phase**

Pollution will be evident during the operation life of the bus stands due to emissions from the fuels and other chemicals associated with vehicular traffic and maintenance works. The chemical emission will be washed by rain to water sources and adjacent soils. However, the magnitude of the pollution is considered to be very low.

Noise is one of the most obvious negative impacts of daily bus stands use. The discomfort caused by noise includes auditory fatigue and temporary lessening of hearing ability.
The effect on air quality of the increased traffic flow and is considered to be significant if no maintenance program will be installed. Under good maintenance schedule, traffic exhaust emissions, will be intermittent and atmospheric dispersal of exhaust emissions will maintain the air quality. However, concerted effort to check engine performance is needed so as to deter vehicles not road-worth from using the bus stands.

**xxx. Population Influx**

The construction of bus stands is usually accompanied by in-migration of job seekers (drivers and conductors) and opportunistic businesses and speculators. Considering the current HIV-AIDS level in Tanzania, increased population in Kigoma Municipality due to immigration may result into increased HIV-AIDS victims. This would also lead to an increased pressure and demand on social services.

**xxxi. Land expropriation, loss of property and resettlement**

The construction Ujiji bus stand would most likely involve among other things, demolition of three (3) buildings, one being the village office (Figure 6.4). The risk of compulsory resettlement is however not very high since all the people who will be affected are aware that they will be relocated if the construction of the bus stands is to take place.

During consultations with the Ujiji village community and district authoritys leaders, it was emphasised that compensation must be made prior to implementation of the project. Failure of implementing the compensation plan can result into social friction with local communities that can cause delay in construction schedule.

*Figure 6.4: Proposed site for the Ujiji bus stand showing village office to be relocated.*

**xxxii. Increased Crime**

Presence of new bus stands is more likely to attract more advanced criminal activities in the project area since population density is always higher at the bus stands. Also theft of cars and car parts will increase. The life of residents will be more in danger than now.
Advanced weapons are more likely to increase. Influx of job seekers of all ages and subsequent crime poses a threat to security in the project areas.

xxxiii. Increased Solid waste and Wastewater at the area

The bus strands are characterised by high population density per square meter which is contributed by operators (drivers etc) and passengers. This will undoubtfully increase the amount of solid waste and wastewater generated at the area. This will have repercussions;

- Increased pressure to the existing collection and disposal facilities;
- Increased operation costs due to increased no of solid waste collection trips;
- Poor sanitation;
- Ground water pollution.

6.4.3 Cluster III (Storm water drains)

Positive Impacts

xxxiv. Improved Storm water collection

Many parts of Kigoma Municipality are prone to flooding and soil erosion during rain season (Figure 6.5). A number of high and low-lying areas, including Mjmwema, Gungu, Katubuka and Mlole which are formally/informally developed are prone to soil erosion and flooding. Flooding causes destruction of infrastructure facilities, damage to buildings, cause safety risks and create conditions that are conducive for the breeding of disease vectors. Notably, gullies can be found in the affected areas, for example in Lubengerwa, NHC Katubuka and Katonyanga. The rehabilitation of the storm water drainage of the Kigoma municipality will have the following advantages;

- Reduce to a great extent floods and hence reduce the risk of death posed by recurring floods.
- Combat soil erosion especially during rain season
- Reduce siltation of Lake Tanganyika caused by eroded materials which are transported by storm drains to the lake.
The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

Figure 6.5: Section of Luberenga (left) and Mlole (right) Storm water drainage

Negative Impacts

xxxv. Interference to local hydrology of the area

Improvement of storm water drainage in Kigoma Municipality will include concrete lining of the banks and bottom of the channel. This will direct the stormwater to the disposal site (away from the project site) and there will be no infiltration of the storm water to the ground. This will interfere with the local hydrology of the project area.

xxxvi. Blocking access paths

The main impact associated with the provision of road drainage channels is the blocking of access paths. During field visit it was observed that people walk down the channel and come up on the other side before continuing with their destinations (Figure 6.6). After the construction of these channels it will not be easy to do that. It is, therefore, important to provide small bridges across drains wherever there is a access path.

Figure 6.6: Section of Mlole drain showing access path

6.4.4 Cluster IV (Landfill)

Positive Impacts

xxxvii. Improved Solid Waste Collection and Disposal

Currently, coverage of the solid waste management service is about 30% of the total urban area in Kigoma Municipality. It is estimated that more than 50% of the waste generated in the Municipality is not collected, and as such it is either buried, left to decay (Figure 6.7) or burnt near the source. Most of the uncollected waste is in the part of the Municipality. The per capita solid waste generation rate in the Municipality is estimated to range between 0.30 and 0.33 kg per person per day. This generation rate brings the
total solid waste generation rate to between 50 and 60 tonnes/day. A major part of the waste is organic in nature.

Most of the commercial and domestic solid wastes generated in various areas are collected in the refusal bays situated in the central business district and there is no dumpsite. At household level, domestic waste is buried or burnt. Solid waste from transfer station is transported and disposed of in gullies.

**Figure 6.7:** Solid waste waiting to be collected at Nazareth food Market

Construction of 30 solid waste collection points, installation of 40 skip buckets and provision of 2 skip master trucks and one wheel loader by this project will substantially improve the solid waste collection services at Kigoma Municipality. Also, the new landfill (Figure 6.8) to be constructed in the municipality will provide a sanitary disposal facility for solid wastes and consequently the hygienic condition of the Municipality will be enhanced.

**Figure 6.8:** A section of the proposed site for the new landfill at Kigoma Municipality
xxxviii. **Job creation and increased income to local communities**

There would also be employment availability during the operation phase pertaining to this landfill operation such as, security guards, operators etc; as well as some clerical / low level supervision jobs. Such employment would contribute to poverty reduction.

xxxix. **Increased Municipal Income**

The income of Kigoma Municipality will increase as every vehicle coming to the dumpsite with solid waste will have to pay some amount before disposing the solid waste to the landfill.

**Negative Impacts**

xl. **Ground water pollution due to leachate**

Groundwater contamination is a major concern in landfill operations because of the pollution effects of landfill leachate and its potential health. The greatest contamination threat to groundwater comes from the leachate generated from the fill material which most often contains toxic substances especially when wastes of industrial origin are landfilled. However, it has been widely reported that leachates from landfills for nonhazardous waste could as well contain complex organic compounds, chlorinated hydrocarbons and metals at concentrations which pose a threat to both surface and ground waters. Solvents and other synthetic organic chemicals constitute a significant hazard, being of environmental significance at very low concentrations and resistant to degradation.

Moreover, they may be transformed in some cases into more hazardous compounds. Most landfill leachate has high levels of BOD, COD, ammonia, chloride, sodium, potassium, hardness and boron. The conditions within a landfill often vary over time, from aerobic to anaerobic thus allowing different chemical reactions to take place. The leachate from landfills for non-hazardous waste could produce reducing conditions at landfill base thereby enhancing the percolation of iron and manganese solution from the underlying deposits. The chemical composition of leachate varies due to a number of different known factors as the age, type of waste, operational practices at the site and percolation rate through the fill to the groundwater. Heavy metals such as cadmium, arsenic, chromium have been reported at excessive levels in groundwater due to landfills operations.

xli. **Increased risk of surface and subsurface fire**

Open and subsurface fires are more likely to happen during operation phase of the landfill. These fires may be due to

- Methane produced from anaerobic conditions of the subsurface environment
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- Scavengers activities eg smoking, cooking etc
- Waste coming with wood or charcoal that was not fully extinguished

These fires can pose a serious danger to environment (air pollution) and human health.

xlii. Increased noise and vibration and air pollution

Landfill operations always cause air pollution if it is not operated and maintained properly. The following are the major causes of this pollution

- Airborne or windblown particulates of solid wastes
- Odour and biogas due to biodegradation of organic wastes
- Toxic gasses from toxic wastes
- Particulates and toxic gas due to open burning
- Sulphur and Nitrogen oxides, carbon monoxide, etc. from vehicle emissions
- Noise and vibration due to traffic and heavy equipment works.

xliii. Public health problems due to pests and birds

Pests (e.g. birds, vermin, rodents and flies) are a large nuisance to workers and the surrounding inhabitants to a landfill. The abundance of pests around an open dump is a clear indication that poor waste management is being practiced.

Flies and Mosquitoes are two types of insects of primary concern because they both spread diseases. Flies spread many food borne diseases, such as salmonella by physically carrying bacteria from the waste to food. Mosquito breed in water that collects in depressions on the landfill surface, and in uncompacted and uncovered wastes such as piles of tires and other bulky items. Mosquito carry diseases such as dengue fever and malaria.

Rats and other rodents spread diseases such as rabies, rat-bite fever, typhus, plague etc. Rodents are brought in to site in loads of wastes or migrate from surrounding areas. They remain in the facility if there is food, shelter and water.

Birds are attracted to landfills for food. They may constitute a potential hazard and be a nuisance because of noise and droppings, especially if residential areas are situated nearby.

This impact is not expected to be significant for now because there are no residential areas near the proposed landfill site. The closest village is about 6 km from the site.

xliv. Occupational Health effects

Solid wastes can come into direct contact with human beings at several stages in waste cycle. For the case of landfill the group at risk is workers in the landfill. Table 6.6 outlines health risks that are posed to waste workers;
Table 6.6: Occupational hazards associated with waste handling

<table>
<thead>
<tr>
<th>INFECTIONS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Skin and blood infections resulting from direct contact with the waste,</td>
<td>and from infected wounds</td>
</tr>
<tr>
<td>• Aye and respiratory infections resulting from exposure to infected dust</td>
<td></td>
</tr>
<tr>
<td>• Zoonoses resulting from bite by wild or stray animals feeding on wastes</td>
<td></td>
</tr>
<tr>
<td>• Enteric infections transmitted by flies feeding on wastes</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ACCIDENTS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Musculoskeletal disorder result from handling heavy containers</td>
<td></td>
</tr>
<tr>
<td>• Wounds, most often infected, resulting from contact with sharp items</td>
<td></td>
</tr>
<tr>
<td>• Poisoning and chemical burns resulting from contact with small amount</td>
<td>of hazardous chemical waste mixed with general waste.</td>
</tr>
<tr>
<td>• Burns and other injuries resulting from occupational accidents at waste</td>
<td>disposal sites or from methane gas explosions at landfill gasses.</td>
</tr>
</tbody>
</table>

(Source: UNEP 1996)
IMPACTS MITIGATION MEASURES

7.1 General considerations

This Section is devoted to describing measures or actions that shall be implemented so as to minimize any of the potential impacts identified in the preceding section. Many of the mitigation measures put forward are nothing more than good engineering practice that shall be adhered to during the design and construction phases. The developer is committed in implementing the mitigation measures contained in this report.

7.2 Mitigation measures for Direct Short-Term impacts (All Clusters)

7.2.1 Increased water and soil pollution

- Spillage to watercourse is harmful to all living beings. In case of accidental spillage, the contractor shall exercise every effort in order to minimize the associated risks. For instance refueling of plant or transfer of materials should not be carried out near watercourses, and any local spillage to soil should immediately be remedied. Also car and equipment maintenance shall be done in proper garages and all oil tanks shall be stored in bunds.

- Good house keeping shall be practiced within material storage compounds or vehicle maintenance yards where the possibility of spillage is great.

- The contractor should Plant vertiver grasses to minimise exposed soil surface area where necessary

- Silt fences and hay bales shall be used to remove suspended solids from surface water runoff

- Silt curtains shall be used to minimize sediment suspension and transport while working near water crossings.

7.2.2 Soil erosion and instability of slopes

- Unnecessary ground clearance and sensitive re-alignments shall be avoided.

- Lined drainage channels at sensitive terrains shall be provided to control speed and volumes of storm-water. The discharge points must be carefully chosen to avoid erosion of arable land and creation of gullies.
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- The contractor should Plant vertiver grasses to minimise exposed soil surface area where necessary proper grading to promote sheet flow and minimize flow concentration on unconsolidated soil, and directing flow to properly designated channels.

7.2.3 Noise, vibration and air pollution

- The nuisance of noise, vibration and dust will be transient and good work practice shall minimize them. In addition, these impacts are already being experienced due to the existing road segments.

- The impacts of noise and dust emissions will further be minimized by proper choice of plant and machinery (i.e. fitted with noise and dust silencers or reducers) and locating quarry areas away from human habitations (at least 500 m away).

- Dust at work places within or close to human habitation shall be critically minimized by periodic water sprinkling on working sections. The contractor shall advise or notify local households on dust, noise, vibration and other dangers.

- Watering shall be practiced regularly at all active work sections especially along the road and at all quarries and borrow sites for the protection of workers. In addition, sections of construction site heavily traversed by construction vehicles should also be regularly watered.

7.2.4 Safety and health risks

- Appropriate working gear (such as nose, ear mask and clothing) and good camp management shall be provided. During construction the contractor shall ensure that the campsite is fenced and hygienically kept with adequate provision of facilities including waste disposal receptacles, sewage, fire fighting and clean and safe water supply. The contractor may be required to drill a borehole for obtaining water for construction.

- A well-stocked First Aid kit (administered by medical personnel) shall be maintained at each camp, quarry sites and each active work section. The medical personnel shall also be responsible for primary treatment of ailments and other minor medical cases as well as providing some health education to the workforce.

7.2.5 Increased spread of HIV/AIDS

- Since construction camps will attract many job seekers and trade mongers, the contractor shall enforce a code of conduct in the camp to encourage respect for the local community and to maintain cleanliness of the camp at all times.
The contractor shall deploy locally available labour to reduce risk of spreading of communicable diseases (especially STD).

- A safety, health and environment induction course shall be conducted to all workers, putting more emphasis on HIV/AIDS, which has become a national disaster.

- In order to prevent more HIV/AIDS infection, during the implementation phase, the project shall include information education and communication component (IEC) in its budget. This will help to raise more awareness on HIV/AIDS, and means to suppress its incidence.

- Condoms shall be supplied to the contractor staff for free.

### 7.2.6 Disruption of other infrastructure

- The authorities managing these infrastructures (TANESCO, TTCL and Water Supply and Sewerage Authority) should be involved from the early stages of these project so as to have an integrated planning.

- Early notice should be given to the community before any service interruption

- The funds for the relocation of this infrastructure should be part and parcel of the project.

### 7.2.9 Increased Wastes

- Disposal wastes shall be done in accordance to clause 1713 of the Standard Specifications for Road Works 2000. Table 7.1 below gives the directives on the proper methods of handling wastes

<table>
<thead>
<tr>
<th>Waste Type</th>
<th>Burial</th>
<th>Burning</th>
<th>Approved Dump</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td>Allowed</td>
<td>Allowed</td>
<td>Allowed</td>
</tr>
<tr>
<td>Cloth</td>
<td>Allowed</td>
<td>Allowed</td>
<td>Allowed</td>
</tr>
<tr>
<td>Wood</td>
<td>Allowed</td>
<td>Allowed</td>
<td>Allowed</td>
</tr>
<tr>
<td>Metal(^1)</td>
<td>Allowed</td>
<td>Not feasible</td>
<td>Allowed</td>
</tr>
<tr>
<td>Plastics(^2)</td>
<td>Only if no approved dump available</td>
<td>Prohibited</td>
<td>Allowed</td>
</tr>
<tr>
<td>Motor Oil(^3, 4, 5)</td>
<td>Prohibited</td>
<td>See Note 4</td>
<td>See Note 5</td>
</tr>
<tr>
<td>Hydraulic Oil(^3, 4, 5)</td>
<td>Prohibited</td>
<td>See Note 4</td>
<td>See Note 5</td>
</tr>
<tr>
<td>Oil Filters</td>
<td>Prohibited</td>
<td>Prohibited</td>
<td>Approved</td>
</tr>
</tbody>
</table>

**NOTES:**

1. Metal shall be recycled or reused to the extent practicable.
2. If plastic shall be recycled.
3. The preferred method of managing used oils is to use them in the asphalt process to coat the aggregate.
4. Motor oils and hydraulic oils shall be mixed with other oils and used as fuel in a controlled burn situation such as a boiler or furnace. Open burning of oils shall not allowed.
5. No free liquids shall be disposed in an approved dump. Any fluids disposed in an approved dump shall be fully absorbed into a particulate medium such as sawdust.
6. Used oil filters shall be disposed in an approved dump if they have been hot-drained.

- **Waste for Burial**: Only inert materials or readily decomposable materials shall be disposed by burial. Inert materials include materials such as brick or concrete debris. Readily decomposable materials include materials such as paper, cloth, wood, and vegetative waste. Best practices for burial include the following:
  - No liquids or material containing liquids shall be buried.
  - No waste shall be buried below the water table or less than 1 meter above the water table. If the water table has seasonal fluctuations, this restriction applies to the highest seasonal water level.
  - No waste shall be buried within 100 meters of a surface water body or water well.
  - No waste shall be buried within 300 meters upgradient of a surface water body or water well.
  - No waste burial site shall have a surface slope greater than 4:1 (horizontal to vertical).
  - Waste burial sites shall be protected against future erosion.
  - Municipality Authority (Kigoma) will be notified of the locations of any waste burial sites. The locations shall be identified with GPS coordinates. All waste burial sites will be clearly marked around the perimeter indicating that the cover soil within the perimeter shall not be disturbed.
  - At the end of the project, all of the waste burial sites shall be marked on the As Built drawings. A single drawing with all of the waste burial sites marked shall be produced, and with the coordinates listed in a table shown in the drawing.
  - A record of the types and volumes of wastes buried at each site and the dates of operation for each site shall be produced.

- **Waste for Burning**: In general, no burning of waste materials which produces black smoke shall be approved. Plastics shall not be burned. No open burning of oils
shall be approved by the engineer. Best practices for burning might include the following:

- Burning shall only occur in flat areas devoid of vegetation.
- No burning shall be performed on windy days.
- All charred pieces remaining after burning shall be disposed in an approved dump.
- All ash shall either be disposed in an approved dump or buried in accordance with the guidelines for waste burial.

**Waste for Removal** - All waste that is to be removed from site of production will be taken to the approved dump site at Kigoma Municipality.

**7.3 Mitigation measures for Direct Long-Term Impacts**

**7.3.1 Landscape degradation**

- Wherever possible mature trees shall be retained.
- Any cleared plant material and topsoil shall be stockpiled so as to assist in replanting scheme.
- The harvested timber shall be given to local communities (through local government) for use.
- Cut and fills sections shall be designed so as to minimize net materials import. Appropriate work method employed will minimize material import.
- Borrow pits and quarries will be reinstated and blended to fit the surrounding landscape environment.
- Contract documents shall specify the disposal of spoil material not used for embankment.

**7.3.2 Loss of definite materials and land degradation**

- Construction materials should be fetched from the existing sites/sources
- Where construction materials such as gravel and stones are to be obtained from people’s lands, the material shall be purchased and this will be officially negotiated with people and/or Local government in order to avoid conflicts. The contractor may be compelled to pay a small fee to the people and/or Local government.
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- Potential long term environmental impacts of borrow pits and quarry sites relate to the way they are left once the resource has been extracted.

- In this case, all borrow pits and quarries shall be rehabilitated and proper landscaping done after completion of the construction. Pits shall not be left with steep or vertical sides.

- The topsoil shall be stock piled for later use in reinstating the pit. Shallow slopes will encourage rapid re-vegetation thus preventing erosion as well as providing safety to animals.

- The significance to the region of the depletion of the material assets is not considered to be high as deposits throughout the remainder of the region will not be significantly affected by this project and they remain available for other projects.

- Obtaining sand from valleys and riversides must be well investigated to avoid accelerated land degradation and pollution of water sources and/or interfere with agricultural activities in farmland.

### 7.3.3 Loss of natural habitat

- Close supervision of earthworks shall be observed in order to confine land clearance within the construction site boundaries. Since vegetation is cleared along the existing site, the impact will be small.

- Topsoil shall be stockpiled and used for reinstating flora along the project sites. It is assumed that displaced fauna will return once the work is over, or seek another habitat locally.

- The contractor shall be instructed to give the uprooted trees from the construction site to the villagers through village governments or any other arrangement may seem convenient provided he does not contravene the Forest Acts 2002. The roads design shall try as practicable to offset the route so as to avoid felling all big trees that take many years to grow or other flora of outstanding importance.

- Consultation with the Municipal Forest Officer shall be made prior to clearing trees

### 7.4 Mitigation measures for Long-Term impacts

**Cluster I (Roads)**

#### 7.4.1 Increased road accidents

- The designs shall take account of safety concerns especially at human habitation crossings e.g. installation of bus stops at settlement centres.
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- Awareness seminars shall be conducted during the construction and operation phases

- Traffic management plan shall be incorporated in the designs to include for example details of signs, markings, intersection layouts, access restrictions, bus stops, crossings, footpaths etc.

- The traffic management plans shall be presented both in English and Swahili.

- Capacity building of district polices (traffic) offices

- Installation of speed control devices like humps

- Installation of pedestrian lanes at human settlement crossings

7.4.2 Increased noise during the operation phase

- Steep grades at critical locations shall be avoided so as to reduce noise from acceleration, braking and gear changes.

- Cut sections shall be used (where appropriate) to decrease noise in nearby residences.

- Speed limit and exhaust controls shall be enforced, especially in towns.

7.4.3 Population Influx

- Capacity building of Kigoma Municipality police (immigration) officers.

7.4.4 Land expropriation, loss of property and resettlement

- Development and Implementation of a Resettlement Action Plan (RAP) consistent with OP 4.12 (See section 3.5); see the RAP that has been prepared as a separate document from this ESIA.

- NEMC advice that the Madrasa and the two graves in the Madrasa shall be left untouched has been incorporated in the Rusimbi road design.

7.4.5 Incompatibility with OP 4.11

- The Wafipa road has been designed for a single lane only so that the trees along the road not to be affected

- NEMC advise on the use of stones rather than bitumen shall be taken into account during detail design
Cluster II (Bus Stands)

7.4.6 Increased noise, vibration and air pollution during the operation phase
  - Designs shall include measures to reduce noise and vibration.
  - Regular cleaning and watering will reduce dust
  - Speed limit and exhaust controls shall be enforced, especially in towns.

7.4.7 Population Influx
  - Capacity building of Kigoma Municipality police (immigration) officers.

7.4.8 Land expropriation, loss of property and resettlement
  - Development and Implementation of a Resettlement Action Plan (RAP) consistent with OP 4.12 (See section 3.5); see the RAP that has been prepared as a separate document from this ESIA.

7.4.9 Increased Crime
  - The police post must be constructed near the bus stands. Police will be provided with modern arms and equipment to fight crime in the project area.
  - Community policing should be established to support insufficient police force. Community should be encouraged to participate in security matters by providing information on any suspects. The cooperation of local people together with the sungusungu will help to lessen criminal incidents and maintain security of people and their properties.

7.4.10 Increased liquid and solid waste
  - The waste generated in the bus stand to managed by the Municipality
  - Provision of dust bins/containers around the bus stands for collection of waste
  - Retail mobile vendors (famously known as ‘machingas’) to be restricted inside the bus stand/lorries parking area
  - All permanent business owners/vendors inside the bus stand/lorries sparking to pay for solid waste and waste water collection costs
o Polluters to be penalised, the Municipality to set penalty rates for pollution offences.
o Construction of a proper sanitation system for collection and treatment of wastewater from the bus stand.

Cluster III (Storm Water drains)

7.4.11 Blocking Access paths

o Provision of drainage crossings to provide access paths where the drain is constructed near house, school, religious institution etc. Also these crossings should be provided wherever there was an access path.

Cluster IV (Landfill)

7.4.12 Ground water pollution due to leachate

o Drainage system shall be constructed to collect polluted surface runoff

o Liners shall be applied to intercept leachate

o Design shall include Construction of leachate collection system

o Wastewater/leachate treatment system shall be constructed to treat polluted surface runoff and/ or leachate

7.4.13 Increased risk of open and subsurface fires

o Workers shall be instructed not to set fire

o Fire must be extinguished immediately

o Cooking and cigarette smoking should not be allowed in the landfill

o Landfill operators should be trained to fight fire

o Provision of fire extinguishers

7.4.14 Increased noise and vibration and air pollution

o Minimization of dust generation by sprinkling stockpiles of removed earth and dusty roads with water
o Choose working hours and use larger vehicles to reduce noise vibrations and air pollution levels due to traffic

o Application of daily cover soil to prevent odour emission and airborne waste

o Application of mobile fence to reduce windblown waste

o Construction of biogas collection and disposal systems

o Limiting the entry of hazardous/toxic waste

7.4.15 Public health problems due to pests and birds

o Pests: The waste should be well compacted and covered, and, where rain water would tend to collect, filling depressions to eliminate breeding sites.

o Rats and other rodents: Covering the waste daily, properly compacting it, and filling the site to shed water will eliminate the three items rodents need to survive.

o Birds: Noise production, distress calls, and use of captive birds of prey shall be used to control birds

7.4.16 Occupational Health hazards

o Pre-employment examination should be done to exclude persons with sensory defects

o Health education and training of all personnel engaged in the SWM.

o Supply of protective measures as uniform, gloves, and hats

o Use of Mechanical means to lift heavy loads to avoid occurrence of low backaches and hernia

o Provision of water facility at work site for drinking and washing

o Provision of first aid kits in the trucks and at the Landfill

o The Municipality should put an adequate system of salaries and compensation allowances, with incentives for achieving optimum performance and safer working
8.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

8.1 Environmental and Social Management Plan

The Environmental and Social Management Plan (ESMP) presents the implementation schedule of the proposed mitigation measures to both environmental and social impacts as well as planning for long-term monitoring activities. For the proposed core urban infrastructure construction works, the ESMP for roads, bus stands, storm water drains and landfill are given in Table 8.2, Table 8.3, Table 8.4 and Table 8.5 respectively. The ESMP also includes the associated environmental costs needed to implement the recommended mitigation measures. The engineering designs have already included some of the mitigation measures recommended in this report. Additional recommendations are provided in the ESMP to enable the proposed facilities to be more environmentally friendly. The implementation steps will involve the contractor, the Resident Engineer, Municipal Council, infrastructure users and the local communities at large.

8.2 Environmental Monitoring

The national EIA guidelines require the developer to prepare and undertake monitoring plan and regular auditing. Monitoring is needed to check if and to what extent the impacts are mitigated, benefits enhanced and new problems addressed. Recommendations for monitoring have been included in the ESMP (Table 9.1, 9.2, 9.3, and 9.4). The ESMP also assigns responsibilities for monitoring activities. However, the division/ward environmental committees and Municipal environmental committee will participate in the long-term daily monitoring of the project road.

8.3 Implementation of the ESMP

The environmental measures incorporated in the detailed engineering design will be attached to the Contract Documents. The Contractor shall take stock of the contents of the Environmental and Social Impact Assessment Statement of the Project.

An environmental expert should be appointed to assist the Resident Engineer, in order to make sure that the environmental measures recommended in this report are effectively complied with and timely adjusted whenever necessary. The expert will be familiar with the scientific measurement of environmental impacts and remedies. He/she will work on a part-time basis and may be selected, by the firm in-charge of supervision works, from the roster of national environmental experts. He will liaise with the relevant public agencies and will carry out the training scheme associated to his assignment.
8.4 Personnel and training needs

As for all other large construction projects, the contractor who will Construct Kigoma Municipality facilities will be supervised by a selected consulting firm. One of the team member of the supervision team will be Environmental supervisor who is an expert in Environmental Management issues especially of construction project. One of his tasks will be to oversee contractor implement the mitigation measures proposed by the ESMP during construction phase. His other duties will be to assist the contractor in the implementation of the Environmental Monitoring Plan during construction period. The environmental supervisor will write a monthly report which will reach the Municipal council through his/ her firm.

Municipal council will provide PMO-LGRG and NEMC with reports on environmental compliance during implementation as part of their annual progress reports and annual environmental monitoring reports. Depending on the implementation status of environmentally sensitive areas of the project, NEMC will perform annual environmental reviews in which environmental concerns raised by the project will be reviewed alongside project implementation.

The Environmental Section of the Municipal council is responsible for the management of Environment in Kigoma Municipality. For this project this section will work hand in hand with the environmental supervisor in implementing the Environmental and Social Management Plan and Environmental and Social Monitoring plan during construction phase. After construction the environmental section will have the responsibility to monitor the environmental impacts during the actual usage of the facilities. The remuneration of the environmental supervisor is included in the BoQ for supervision works and it will not be part of the ESMP costs.

The current number staffs in this Environmental section in Kigoma Municipality is four (4) which is enough for the environmental management of the subprojects during and after construction. However, there are other sections in the Municipal council that will be involved in the management of the environment of this subprojects indirectly, these include;

- Roads section under the Engineering Department- This section will be responsible for the maintenance of the roads.
- Health – This section will be responsible for Solid and liquid waste management including landfill.
- Water – This section will be responsible for water supply and water quality issues.

In the view of the above, it can be observed that Kigoma Municipality has enough staff to oversee the environment during and after construction of subprojects. During consultation it was observed that there is a need for these staff to be trained especially on the Environmental Management of Construction works. Table 8.1 present the total
number of staff to in the particular section to be trained and the type of training required. The costs and duration of training are provided in the ESMP (Table 8.2).

Table 8.1: Training needs for Environmental Management in Kigoma Municipality

<table>
<thead>
<tr>
<th>Department</th>
<th>Section</th>
<th>Total no of technical staff</th>
<th>No of staff to be trained</th>
<th>Type of training needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td>Roads</td>
<td>4</td>
<td>4</td>
<td>• Training/mentoring in relevant skills in project design and supervision.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Environmental Management in construction works</td>
</tr>
<tr>
<td>Town Planning and Environment</td>
<td>Environment</td>
<td>4</td>
<td>4</td>
<td>• Training in conducting EIA, monitoring and Environment auditing skills.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Environmental Management in construction works</td>
</tr>
<tr>
<td>Health</td>
<td></td>
<td>3</td>
<td>3</td>
<td>• Short training in term training in EIA approaches in solid waste and liquid waste management, landfill management, solid waste recycling techniques, approaches of PPP in solid and liquid waste management.</td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td>1</td>
<td>1</td>
<td>• Clean water management and wells management</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Environmental Management in construction works</td>
</tr>
<tr>
<td>Total</td>
<td>All Sections</td>
<td>12</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

8.5 Environmental cost

The principal environmental cost includes the cost for implementing the mitigation measures proposed and that for carrying out monitoring of specific environmental parameters. These costs are indicated in Table 8.2, Table 8.3, Table 8.4 and Table 8.5. It should be noted that most of the costs for mitigation measures are already included in the bills of quantities of the overall works. The costs for the environmental supervisor shall be included in the overall supervision cost of the works. The supervisor shall be engaged for at least 3 man-days a month over the entire construction period.
Table 8.2: Environmental and Social Management Plan (ESMP) for the Roads

<table>
<thead>
<tr>
<th>Impact</th>
<th>Mitigation measure</th>
<th>Responsible institution</th>
<th>Mitigation Time frame</th>
<th>Estimated cost (US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre- construction phase</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land acquisition/ Loss of Property/farmland and natural habitat for Camp erection</td>
<td>○ Development and Implementation of a Resettlement Action Plan (RAP) consistent with OP 4.12 (See section 3.5); see the RAP that has been prepared as a separate document from this ESIA.</td>
<td>○ WB/ Municipal Council/ Contractor/Env. Supervisor</td>
<td>Before and during construction phase</td>
<td>See RAP</td>
</tr>
<tr>
<td>Inadequate Knowledge of Environmental Management Issues</td>
<td>○ Training of 12 Municipal council staff from various sections</td>
<td>○ Municipal council (Road, Environment, Health and water sections) ○ Reputable training institution on Environmental Issues ○ World Bank as the financer</td>
<td>One Month Short Course.</td>
<td>25,000</td>
</tr>
<tr>
<td><strong>Construction phase</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil and water pollution</td>
<td>○ In case of accidental spillage, the contractor shall exercise every effort in order to minimize the associated risks. ○ Practice Good housekeeping. ○ The use of silt fences and hay bales to remove suspended solids from surface water runoff ○ The use of silt curtains to minimize sediment suspension and transport while working near water crossings.</td>
<td>○ Contractor/ Municipal Council/Env. Supervisor ○ Contractor ○ Contractor/ Env. Supervisor ○ Contractor/ Env. Supervisor</td>
<td>During Construction and operation</td>
<td>N/A</td>
</tr>
</tbody>
</table>
### Impact and Mitigation Measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Mitigation measure</th>
<th>Responsible institution</th>
<th>Mitigation Time frame</th>
<th>Estimated cost (US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil Erosion and instability of Slopes</td>
<td>- Unnecessary ground clearance and sensitive re-alignments shall be avoided.</td>
<td>- Contractor</td>
<td>During Design and Construction</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>- Lined drainage channels at sensitive terrains shall be provided to control speed and volumes of storm-water.</td>
<td>- Consultant, Env. Supervisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- The discharge points must be carefully chosen to avoid erosion of arable land and creation of gullies.</td>
<td>- Consultant, Env. Supervisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of definite materials and Land degradation</td>
<td>- Where construction materials such as gravel and stones are to be obtained from village lands, the material shall be purchased and this will be officially negotiated with villagers and/or village government in order to avoid conflict.</td>
<td>- Contractor/Consultant/Village Leaders</td>
<td>During Mobilization, Construction and after construction</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>- All borrow pits and quarries shall be rehabilitated and proper landscaping done after completion of the road construction.</td>
<td>- Contractor /Env Supervisor/ Municipal Council</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- The topsoil shall be stock piled for later use in reinstating the pit.</td>
<td>- Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Obtaining sand from valleys and riversides must be well investigated to avoid accelerated land degradation and pollution of water sources and/or interfere with agricultural activities in farmland.</td>
<td>- Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of Natural Habitat</td>
<td>- Close supervision of earthworks shall be observed in order to confine land clearance within the construction site boundaries.</td>
<td>Env. Supervisor/ Municipal Forest Officer/ Contractor</td>
<td>Construction and operation phase</td>
<td>N/A</td>
</tr>
</tbody>
</table>
### Impact of Consultancy Services

**Impact** | **Mitigation measure** | **Responsible institution** | **Mitigation Time frame** | **Estimated cost (US $)**
---|---|---|---|---
Noise pollution | o Topsoil shall be stockpiled and used for reinstating flora along the project sites.  
  o The design shall try as practicable to offset the route so as to avoid felling all big trees that take many years to grow or other flora of outstanding importance.  
  o Consultation with the Municipal Forest Officer shall be made prior to clearing trees | o Contractor/ Env Supervisor  
  o Contractor  
  o Env. Supervisor/ Municipal Forest Officer/ Contractor | Construction and operation phase | 2,000
Air pollution | o Provide working gear to workers  
  o Proper choice of equipment which offer environmental advantages | o Contractor  
  o Contractor | Construction and operation phase | 5,000
Vibration | o Advance notice to local communities  
  o Proper location of quarry sites | o Contractor  
  o Contractor/ Env. Supervisor | Construction and operation phase | 2,000
Increased Road Accidents | o Traffic management plan (in both English and Swahili)  
  o Speed limits in villages  
  o Conduct seminars to road users | o Design Engineer/Contractor  
  o Design Engineer/Contractor  
  o Traffic police/ Local community | Constructional Phase | 5,000
Increased Spread of HIV/AIDS | o Safety, Health and Environment (SHE) induction | o Contractor/ Municipal Council/ NGOs/CBOs/local | | 10,000
The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

<table>
<thead>
<tr>
<th>Impact</th>
<th>Mitigation measure</th>
<th>Responsible institution</th>
<th>Mitigation Time frame</th>
<th>Estimated cost (US $)</th>
</tr>
</thead>
</table>
| Safety and health risks         | o Regular maintenance of construction machinery to minimise accidents during construction period.  
                                     o Safety, Health and Environment (SHE) induction course  
                                     o Adequate signage and availability of First Aid Kit | o Contractor  
                                     o Contractor/ Env. Supervisor/ Workers  
                                     o Contractor | Short-term (Construction phase) | 5,000 |
| Disruption of other infrastructure | o Integrated planning is needed with owners of infrastructures at the proposed subproject  
                                      o Early notice to users before interruption | o Municipal Council/ TANESCO/TTCL/ AWASA  
                                      o Contractor / Municipal Council |                          |                      |
| Increased Waste                 | o Disposal wastes shall be done in accordance to clause 1713 of the Standard Specifications for Road Works 2000.  
                                      o Only inert materials or readily decomposable materials shall be disposed by burial.  
                                      o No burning of waste materials which produces black smoke shall be approved. Plastics shall not be burned.  
                                      o No open burning of oils shall be approved by the engineer  
                                      o All waste that is to be removed from site of production will be taken to the dumpsite approved by Kigoma Municipality. | o Contractor/ Env. Supervisor | Construction phase | N/A |
The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

<table>
<thead>
<tr>
<th>Impact</th>
<th>Mitigation measure</th>
<th>Responsible institution</th>
<th>Mitigation Time frame</th>
<th>Estimated cost (US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interference to local hydrology</td>
<td>o  Good design and engineering practice</td>
<td>o  Design engineer/ Municipal Council//NEMC</td>
<td>Long-term</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>o  Efficient drainage system</td>
<td>o  Design engineer /Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o  Control alien species</td>
<td>o  Local communities /Traffic police</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety of human beings (Increased Road accidents)</td>
<td>o  Traffic management plan (in both English and Swahili)</td>
<td>o  Design Engineer/Contractor</td>
<td>Long-term</td>
<td>6,000</td>
</tr>
<tr>
<td></td>
<td>o  Speed limits in settlements</td>
<td>o  Traffic police</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o  Conduct seminars to road users</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise</td>
<td>o  Provide side-hedges</td>
<td>o  Contractor</td>
<td>Operation phase</td>
<td>5,000</td>
</tr>
<tr>
<td></td>
<td>o  Enforce speed and exhaust limits</td>
<td>o  Environmental Supervisor /Traffic police</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In compatibility with OP 4.11</td>
<td>o  The design should make sure that all the trees are left where they are to so as not to destroy the historical site.</td>
<td>o  Design Engineer/ Contractor</td>
<td>Design and Construction Phase</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>65,000</strong></td>
</tr>
</tbody>
</table>
Table 8.3: Environmental and Social Management Plan (ESMP) for the Bus Stands

<table>
<thead>
<tr>
<th>Impact</th>
<th>Mitigation measure</th>
<th>Responsible institution</th>
<th>Mitigation Time frame</th>
<th>Estimated cost (US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-construction phase</td>
<td>Land acquisition/ Loss of Property/farmland and natural habitat for Camp erection</td>
<td>o Development and Implementation of a Resettlement Action Plan (RAP) consistent with OP 4.12 (See section 3.5); see the RAP that has been prepared as a separate document from this ESIA.</td>
<td>o WB/ Municipal Council/ Contractor/Env. Supervisor</td>
<td>Before and during construction phase</td>
</tr>
<tr>
<td>Construction phase</td>
<td>Soil and water pollution</td>
<td>o In case of accidental spillage, the contractor shall exercise every effort in order to minimize the associated risks.</td>
<td>o Contractor/ Municipal Council/Env. Supervisor</td>
<td>During Construction and operation</td>
</tr>
<tr>
<td></td>
<td>o Practice Good housekeeping.</td>
<td></td>
<td>o Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o The use of silt fences and hay bales to remove suspended solids from surface water runoff</td>
<td></td>
<td>o Contractor/ Env. Supervisor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o The use of silt curtains to minimize sediment suspension and transport while working near water crossings.</td>
<td></td>
<td>o Contractor/ Env. Supervisor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soil Erosion and instability of Slopes</td>
<td>o Unnecessary ground clearance and sensitive realignments shall be avoided.</td>
<td>o Contractor</td>
<td>During Design and Construction</td>
</tr>
<tr>
<td></td>
<td>o Lined drainage channels at sensitive terrains shall be provided to control speed and volumes of stormwater.</td>
<td></td>
<td>o Consultant, Env. Supervisor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o The discharge points must be carefully chosen to avoid erosion of arable land and creation of gullies.</td>
<td></td>
<td>o Consultant, Env. Supervisor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Loss of definite materials and Land degradation</td>
<td>o Where construction materials such as gravel and stones are to be obtained from village lands, the material shall be purchased and this will be officially negotiated with villagers and/or village government in</td>
<td>o Contractor/Consultant/Village Leaders</td>
<td>Construction and after construction</td>
</tr>
</tbody>
</table>
The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

<table>
<thead>
<tr>
<th>Impact</th>
<th>Mitigation measure</th>
<th>Responsible institution</th>
<th>Mitigation Time frame</th>
<th>Estimated cost (US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>order to avoid conflict.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o All borrow pits and quarries shall be rehabilitated and proper landscaping done after completion of the road construction.</td>
<td>o Contractor /Env Supervisor/ Municipal Council</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o The topsoil shall be stock piled for later use in reinstating the pit.</td>
<td>o Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Obtaining sand from valleys and riversides must be well investigated to avoid accelerated land degradation and pollution of water sources and/or interfere with agricultural activities in farmland.</td>
<td>o Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of Natural Habitat</td>
<td>o Close supervision of earthworks shall be observed in order to confine land clearance within the construction site boundaries.</td>
<td>o Env. Supervisor/ Municipal Forest Officer/ Contractor</td>
<td>Construction and operation phase</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Topsoil shall be stockpiled and used for reinstating flora along the project sites.</td>
<td>o Contractor /Env Supervisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Consultation with the Municipal Forest Officer shall be made prior to clearing trees</td>
<td>o Env. Supervisor/ Municipal Forest Officer/ Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise pollution</td>
<td>o Provide working gear to workers</td>
<td>o Contractor</td>
<td>Construction Phase</td>
<td>2,000</td>
</tr>
<tr>
<td></td>
<td>o Proper choice of equipment which offer environmental advantages</td>
<td>o Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air pollution</td>
<td>o Watering working sections (especially near human habitation)</td>
<td>o Contractor</td>
<td>Construction Phase</td>
<td>5,000</td>
</tr>
<tr>
<td></td>
<td>o Proper choice of equipment which offer environmental advantages</td>
<td>o Contractor / Env. Supervisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration</td>
<td>o Advance notice to local communities</td>
<td>o Contractor</td>
<td>Construction Phase</td>
<td>2,000</td>
</tr>
<tr>
<td>Impact</td>
<td>Mitigation measure</td>
<td>Responsible institution</td>
<td>Mitigation Time frame</td>
<td>Estimated cost (US $)</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>-----------------------------------------</td>
<td>-----------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Increased Road Accidents</td>
<td>o Proper location of quarry sites</td>
<td>o Contractor/ Env. Supervisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Traffic management plan (in both English and Swahili)</td>
<td>o Design Engineer/Contractor</td>
<td>Constructional Phase</td>
<td>5,000</td>
</tr>
<tr>
<td></td>
<td>o Speed limits in settlements</td>
<td>o Design Engineer/Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Conduct seminars to road users</td>
<td>o Traffic police/ Local community</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased Spread of HIV/AIDS</td>
<td>o Safety, Health and Environment (SHE) induction course</td>
<td>o Contractor/ Municipal Council/ NGOs/CBOs/local communities</td>
<td></td>
<td>10,000</td>
</tr>
<tr>
<td></td>
<td>o Support HIV/AIDS campaigns</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Provision of condoms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety and health risks</td>
<td>o Regular maintenance of construction machinery to minimise accidents during construction period.</td>
<td>o Contractor</td>
<td>Short-term (Construction phase)</td>
<td>5,000</td>
</tr>
<tr>
<td></td>
<td>o Safety, Health and Environment (SHE) induction course</td>
<td>o Contractor/ Env. Supervisor/ Workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Comply with the Occupation Health and Safety Act (2003) by provision of safety gears.</td>
<td>o Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Adequate signage and availability of First Aid Kit</td>
<td>o Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Availability of adequate fire extinguishers</td>
<td>o Contractor</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

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<thead>
<tr>
<th>Impact</th>
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<th>Responsible institution</th>
<th>Mitigation Time frame</th>
<th>Estimated cost (US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disruption of other infrastructure</td>
<td>o Integrated planning is needed with owners of infrastructures at the proposed subproject</td>
<td>o Municipal Council/ TANESCO/TTCL/ AWASA</td>
<td>Construction phase</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Early notice to users before interruption</td>
<td>o Contractor / Municipal Council</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise, vibration and air pollution</td>
<td>o Good design practice</td>
<td>o Design Engineer</td>
<td>Operation phase</td>
<td>3,000</td>
</tr>
<tr>
<td></td>
<td>o Provide side-hedges</td>
<td>o Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Enforce speed and exhaust limits</td>
<td>o Environmental Supervisor/ Traffic police</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population Influx</td>
<td>o Capacity building of Kigoma Municipality police (immigration) officers.</td>
<td>o Kigoma Municipal Council</td>
<td>Operation phase</td>
<td>2,000</td>
</tr>
<tr>
<td>Increased Crime</td>
<td>o The police post must be constructed near bus stands</td>
<td>o Kigoma Municipal Council</td>
<td>Operation phase</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>o The cooperation of local people together with the sungusungu will help to lessen criminal incidents and maintain security of people and their properties</td>
<td>o Kigoma Municipal Council</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased liquid and solid waste</td>
<td>o Provision of dust bins/ containers around the bus stands for collection of waste</td>
<td>o Kigoma Municipal Council</td>
<td>Operation phase</td>
<td>4,000</td>
</tr>
<tr>
<td></td>
<td>o Retail mobile vendors (famously known as ‘machingas’) to be restricted inside the bus stand/orries parking area</td>
<td>o Kigoma Municipal Council</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o All permanent business owners/vendors inside the bus stand/orries sparking to pay for solid waste and waste water collection costs</td>
<td>o Kigoma Municipal Council</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Polluters to be penalised, the Municipality to set penalty rates for pollution offences,</td>
<td>o Kigoma Municipal Council</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Construction of a proper sanitation system for collection and treatment of waste water from the bus stand.</td>
<td>o Kigoma Municipal Council</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

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<th>Responsible institution</th>
<th>Mitigation Time frame</th>
<th>Estimated cost (US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Cost</td>
<td></td>
<td></td>
<td></td>
<td>38,000</td>
</tr>
</tbody>
</table>
Table 8.4: Environmental and Social Management Plan (ESMP) for the Storm water drains

<table>
<thead>
<tr>
<th>Impact</th>
<th>Mitigation measure</th>
<th>Responsible institution</th>
<th>Mitigation Time frame</th>
<th>Estimated cost (US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction phase</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Soil and water pollution                    | ☐ In case of accidental spillage, the contractor shall exercise every effort in order to minimize the associated risks.  
  ☐ Practice Good housekeeping.  
  ☐ The use of silt fences and hay bales to remove suspended solids from surface water runoff  
  ☐ The use of silt curtains to minimize sediment suspension and transport while working near water crossings. | ☐ Contractor/Municipal Council/Env. Supervisor  
  ☐ Contractor  
  ☐ Contractor/Env. Supervisor  
  ☐ Contractor/Env. Supervisor | During Construction and operation | N/A |
| Soil Erosion and instability of Slopes       | ☐ Unnecessary ground clearance and sensitive realignments shall be avoided.  
  ☐ Lined drainage channels at sensitive terrains shall be provided to control speed and volumes of stormwater.  
  ☐ The discharge points must be carefully chosen to avoid erosion of arable land and creation of gullies. | ☐ Contractor  
  ☐ Consultant, Env. Supervisor  
  ☐ Consultant, Env. Supervisor | During Design and Construction | N/A |
| Loss of definite materials and Land degradation | ☐ Where construction materials such as gravel and stones are to be obtained from village lands, the material shall be purchased and this will be officially negotiated with villagers and/or village government in order to avoid conflict.  
  ☐ All borrow pits and quarries shall be rehabilitated and proper landscaping done after completion of the road construction.  
  ☐ The topsoil shall be stock piled for later use in | ☐ Contractor/Consultant/Village Leaders  
  ☐ Contractor /Env Supervisor/Municipal Council | Construction and after construction | N/A |
<table>
<thead>
<tr>
<th>Impact</th>
<th>Mitigation measure</th>
<th>Responsible institution</th>
<th>Mitigation Time frame</th>
<th>Estimated cost (US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>reinstating the pit.</td>
<td>o Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Obtaining sand from valleys and riversides must be well investigated to avoid accelerated land degradation and pollution of water sources and/or interfere with agricultural activities in farmland.</td>
<td>o Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of Natural Habitat</td>
<td>o Close supervision of earthworks shall be observed in order to confine land clearance within the construction site boundaries.</td>
<td>o Env. Supervisor/ Municipal Forest Officer/ Contractor</td>
<td>Construction and operation phase</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Topsoil shall be stockpiled and used for reinstating flora along the project sites.</td>
<td>o Contractor/ Env Supervisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Consultation with the Municipal Forest Officer shall be made prior to clearing trees</td>
<td>o Env. Supervisor/ Municipal Forest Officer/ Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise pollution</td>
<td>o Provide working gear to workers</td>
<td>o Contractor</td>
<td>Construction Phase</td>
<td>2,000</td>
</tr>
<tr>
<td></td>
<td>o Proper choice of equipment which offer environmental advantages</td>
<td>o Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air pollution</td>
<td>o Watering working sections (especially near human habitation)</td>
<td>o Contractor</td>
<td>Construction Phase</td>
<td>5,000</td>
</tr>
<tr>
<td></td>
<td>o Proper choice of equipment which offer environmental advantages</td>
<td>o Contractor/ Env. Supervisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration</td>
<td>o Advance notice to local communities</td>
<td>o Contractor</td>
<td>Construction Phase</td>
<td>2,000</td>
</tr>
<tr>
<td></td>
<td>o Proper location of quarry sites</td>
<td>o Contractor/ Env. Supervisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased Road Accidents</td>
<td>o Traffic management plan (in both English and Swahili)</td>
<td>o Design Engineer/Contractor</td>
<td>Constructional Phase</td>
<td>5,000</td>
</tr>
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The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

<table>
<thead>
<tr>
<th>Impact</th>
<th>Mitigation measure</th>
<th>Responsible institution</th>
<th>Mitigation Time frame</th>
<th>Estimated cost (US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased Spread of HIV/AIDS</td>
<td>o  Speed limits in settlements</td>
<td>o  Design Engineer/Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o  Conduct seminars to road users</td>
<td>o  Traffic police/ Local community</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o  Safety, Health and Environment (SHE) induction course</td>
<td>o  Contractor/ Municipal Council/ NGOs/CBOs/local communities</td>
<td>Constructional and Operational Phase</td>
<td>10,000</td>
</tr>
<tr>
<td></td>
<td>o  Support HIV/AIDS campaigns</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o  Provision of condoms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety and health risks</td>
<td>o  Regular maintenance of construction machinery to minimise accidents during construction period.</td>
<td>o  Contractor</td>
<td>Short-term (Construction phase)</td>
<td>5,000</td>
</tr>
<tr>
<td></td>
<td>o  Safety, Health and Environment (SHE) induction course</td>
<td>o  Contractor/ Env. Supervisor/ Workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o  Comply with the Occupation Health and Safety Act (2003) by provision of safety gears.</td>
<td>o  Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o  Adequate signage and availability of First Aid Kit</td>
<td>o  Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disruption of other infrastructure</td>
<td>o  Integrated planning is needed with owners of infrastructures at the proposed subproject</td>
<td>o  Municipal Council/ TANESCO/TTCL/ AWASA</td>
<td>Construction phase</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o  Early notice to users before interruption</td>
<td>o  Contractor / Municipal Council</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Operation phase
The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

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<thead>
<tr>
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<th>Responsible institution</th>
<th>Mitigation Time frame</th>
<th>Estimated cost (US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise, vibration and air pollution</td>
<td>o  Good design practice</td>
<td>o  Design Engineer</td>
<td>Construction &amp; Operation phase</td>
<td>2,000</td>
</tr>
<tr>
<td></td>
<td>o  Provide side-hedges</td>
<td>o  Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o  Enforce speed and exhaust limits</td>
<td>o  Environmental Supervisor/ Traffic police</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blocking access paths</td>
<td>o  Provision of drainage crossings to provide access paths where the drain is constructed near house, school, religious institution etc. Also these crossings should be provided wherever there was an access path.</td>
<td>o  Contractor</td>
<td>Construction phase</td>
<td>2,000</td>
</tr>
<tr>
<td>Total Cost</td>
<td></td>
<td></td>
<td></td>
<td>33,000</td>
</tr>
</tbody>
</table>
Table 8.5: Environmental and Social Management Plan (ESMP) for the Landfill

<table>
<thead>
<tr>
<th>Impact</th>
<th>Mitigation measure</th>
<th>Responsible institution</th>
<th>Mitigation Time frame</th>
<th>Estimated cost (US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction phase</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil and water pollution</td>
<td>○ In case of accidental spillage, the contractor shall exercise every effort in order to minimize the associated risks.</td>
<td>○ Contractor/Municipal Council/Env. Supervisor</td>
<td>During Construction</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>○ Practice Good housekeeping.</td>
<td>○ Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>○ The use of silt fences and hay bales to remove suspended solids from surface water runoff</td>
<td>○ Contractor/ Env. Supervisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>○ The use of silt curtains to minimize sediment suspension and transport while working near water crossings.</td>
<td>○ Contractor/ Env. Supervisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil Erosion and instability of Slopes</td>
<td>○ Unnecessary ground clearance and sensitive re-alignments shall be avoided.</td>
<td>○ Contractor</td>
<td>During Design and Construction</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>○ Lined drainage channels at sensitive terrains shall be provided to control speed and volumes of storm-water.</td>
<td>○ Consultant, Env. Supervisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>○ The discharge points must be carefully chosen to avoid erosion of arable land and creation of gullies.</td>
<td>○ Consultant, Env. Supervisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of definite materials and Land degradation</td>
<td>○ Where construction materials such as gravel and stones are to be obtained from village lands, the material shall be purchased and this will be officially negotiated with villagers and/or village government in order to avoid conflict.</td>
<td>○ Contractor/Consultant/Village Leaders</td>
<td>Construction and after construction</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>○ All borrow pits and quarries shall be rehabilitated and proper landscaping done after completion of the road construction.</td>
<td>○ Contractor/Env Supervisor/ Municipal Council</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>○ The topsoil shall be stock piled for later use in</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in
KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

<table>
<thead>
<tr>
<th>Impact</th>
<th>Mitigation measure</th>
<th>Responsible institution</th>
<th>Mitigation Time frame</th>
<th>Estimated cost (US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>reinstating the pit.</td>
<td>o Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Obtaining sand from valleys and riversides must be well investigated to avoid accelerated land degradation and pollution of water sources and/or interfere with agricultural activities in farmland.</td>
<td>o Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of Natural Habitat</td>
<td>o Close supervision of earthworks shall be observed in order to confine land clearance within the construction site boundaries.</td>
<td>o Env. Supervisor/ Municipal Forest Officer/ Contractor</td>
<td>Construction and operation phase</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Topsoil shall be stockpiled and used for reinstating flora along the project sites.</td>
<td>o Contractor/ Env Supervisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Consultation with the Municipal Forest Officer shall be made prior to clearing trees</td>
<td>o Env. Supervisor/ Municipal Forest Officer/ Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise pollution</td>
<td>o Provide working gear to workers</td>
<td>o Contractor</td>
<td>Construction Phase</td>
<td>2,000</td>
</tr>
<tr>
<td></td>
<td>o Proper choice of equipment which offer environmental advantages</td>
<td>o Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air pollution</td>
<td>o Watering working sections (especially near human habitation)</td>
<td>o Contractor</td>
<td>Construction Phase</td>
<td>5,000</td>
</tr>
<tr>
<td></td>
<td>o Proper choice of equipment which offer environmental advantages</td>
<td>o Contractor/ Env. Supervisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration</td>
<td>o Advance notice to local communities</td>
<td>o Contractor</td>
<td>Construction Phase</td>
<td>2,000</td>
</tr>
<tr>
<td></td>
<td>o Proper location of quarry sites</td>
<td>o Contractor/ Env. Supervisor</td>
<td></td>
<td></td>
</tr>
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<td>Increased Road Accidents</td>
<td>o Traffic management plan (in both English and Swahili)</td>
<td>o Design Engineer/Contractor</td>
<td>Constructional Phase</td>
<td>5,000</td>
</tr>
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</table>
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<th>Mitigation measure</th>
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<th>Mitigation Time frame</th>
<th>Estimated cost (US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>o Speed limits in settlements</td>
<td>o Design Engineer/Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Conduct seminars to road users</td>
<td>o Traffic police/ Local community</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Increased Spread of HIV/AIDS</strong></td>
<td>o Safety, Health and Environment (SHE) induction course</td>
<td>o Contractor/ Municipal Council/ NGOs/CBOs/local communities</td>
<td></td>
<td>10,000</td>
</tr>
<tr>
<td></td>
<td>o Support HIV/AIDS campaigns</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Provision of condoms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Safety and health risks</strong></td>
<td>o Regular maintenance of construction machinery to minimise accidents during construction period.</td>
<td>o Contractor</td>
<td>Short-term (Construction phase)</td>
<td>5,000</td>
</tr>
<tr>
<td></td>
<td>o Safety, Health and Environment (SHE) induction course</td>
<td>o Contractor/ Env. Supervisor/ Workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Comply with the Occupation Health and Safety Act (2003) by provision of safety gears.</td>
<td>o Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Adequate signage and availability of First Aid Kit</td>
<td>o Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operation phase</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ground water pollution due to leachate</strong></td>
<td>o Construction of drainage system to collect polluted surface runoff</td>
<td>o Designer/ Contractor</td>
<td>Design and Construction phase</td>
<td>In the BOQ</td>
</tr>
<tr>
<td></td>
<td>o Application of liners to intercept leachate</td>
<td>o Designer/ Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact</td>
<td>Mitigation measure</td>
<td>Responsible institution</td>
<td>Mitigation Time frame</td>
<td>Estimated cost (US $)</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>------------------------------------------------------------------------------------</td>
<td>------------------------------------</td>
<td>-----------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td></td>
<td>○ Construction of leachate collection system</td>
<td>○ Designer/ Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>○ Construction of a wastewater/ leachate treatment system to treat polluted surface</td>
<td>○ Designer/ Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>runoff and/or leachate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased risk of open and subsurface</td>
<td>○ Workers should be instructed not to set fire</td>
<td>○ Municipal Council</td>
<td>Operation phase</td>
<td>5,000</td>
</tr>
<tr>
<td>fires</td>
<td>○ Fire must be extinguished immediately</td>
<td>○ Municipal Council/ Workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>○ Cooking and cigarette smoking should not be allowed in the landfill</td>
<td>○ Municipal Council</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>○ Landfill operators should be trained to fight fire</td>
<td>○ Municipal Council</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>○ Provision of fire extinguishers</td>
<td>○ Contractor/ Municipal Council</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased noise and vibration and air</td>
<td>○ Minimization of dust generation by sprinkling stockpiles of removed earth and</td>
<td>○ Municipal Council/ Workers</td>
<td>Design/Construction</td>
<td>5,000</td>
</tr>
<tr>
<td>pollution</td>
<td>dusty roads with water</td>
<td>○ Municipal Council/ Workers</td>
<td>/Operation phase</td>
<td></td>
</tr>
<tr>
<td></td>
<td>○ Choose working hours and use larger vehicles to reduce noise vibrations and air</td>
<td>○ Municipal Council/ Workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>pollution levels due to traffic</td>
<td>○ Municipal Council/ Workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>○ Application of daily cover soil to prevent odour emission and airborne waste</td>
<td>○ Designer/ Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>○ Construction of biogas collection and disposal systems</td>
<td>○ Municipal Council</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>○ Limiting the entry of hazardous/toxic waste</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public health problems due to pests and</td>
<td>○ Pests: The waste should be well compacted and covered, and, where rain water</td>
<td>○ Municipal Council/ Workers</td>
<td>Operation phase</td>
<td>10,000</td>
</tr>
<tr>
<td>birds</td>
<td>would tend to collect, filling depressions to eliminate breeding sites.</td>
<td>○ Municipal Council/ Workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>○ Rats and other rodents: Covering the waste daily, properly compacting it, and</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>filling the site to shed water will eliminate the three items rodents need to</td>
<td>○ Municipal Council/ Workers</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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<th>Estimated cost (US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>survive.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Birds: Noise production, distress calls, and use of captive birds of prey shall be used to control birds</td>
<td>o Municipal Council/ Workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupational Health hazards</td>
<td>o Pre-employment examination should be done to exclude persons with sensory defects</td>
<td>o Municipal Council</td>
<td>Operation phase</td>
<td>10,000</td>
</tr>
<tr>
<td></td>
<td>o Health education and training of all personnel engaged in the SWM.</td>
<td>o Municipal Council</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Supply of protective measures as uniform, gloves, and hats</td>
<td>o Municipal Council</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Use of Mechanical means to lift heavy loads to avoid occurrence of low backaches and hernia</td>
<td>o Municipal Council</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Provision of water facility at work site for drinking and washing</td>
<td>o Designer/ Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Provision of first aid kits in the trucks and at the Landfill</td>
<td>o Municipal Council</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o The Municipality should put an adequate system of salaries and compensation allowances, with incentives for achieving optimum performance and safer working</td>
<td>o Municipal Council</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Cost</td>
<td></td>
<td></td>
<td></td>
<td>59,000</td>
</tr>
</tbody>
</table>
9.0 ENVIRONMENTAL AND SOCIAL MONITORING PLAN

9.1 Environmental and Social Monitoring

Monitoring of the anticipated environmental and social impacts in the receiving environments is important. It helps in determining the effects of the project activities on the environments enhancing understanding of cause effect relationships between human activities and environmental changes, and verifies the accuracy of prediction about the environmental impacts. It ensures compliance with regulatory measures and understanding the degree of implementation of EPM and its effectiveness. The monitoring results are also used extensively during the environmental auditing. The ESMP for roads, bus stands, storm water drains and landfill are given in Table 9.1, Table 9.2, Table 9.3 and Table 9.4 respectively.

9.2 Environmental Audit

It is recommended that environmental audits determine the long-term effects of adopted mitigation measures. It is recommended that environmental audits be carried out on the project as part of the on-going maintenance programme. The audits will unveil the actual performance of mitigation measures and will allow effective measures to be included in future projects based on the legislation in force. As per operative ESIA documents in Tanzania, environmental audits would be a responsibility of the developer (Municipal Council) and the National Environment Management Council (NEMC).

9.3 Monitoring parameters

The selection of the parameters to be monitored is based on the high likelihood of occurrences of the selected parameters. Monitoring of these parameters will be done in various stages of the project as follows;

*Pre construction stage* – Monitoring of the parameters at this stage is meant to establish the baseline information of the target parameters in the project area.

*Construction stage* – Monitoring at this stage is meant to establish the pollution levels that arise from the construction activities.

*Operation stage* – Monitoring at this stage is meant to check on the impacts that might arise as the result of normal use of the infrastructure.
### Table 9.1: Environmental and Social Monitoring Plan for the Roads

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Monitoring frequency</th>
<th>Sampling Area</th>
<th>Measurement Units</th>
<th>Method</th>
<th>Target level/Standard</th>
<th>Responsibility for monitoring</th>
<th>Annual estimates (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre construction stage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SO₂</td>
<td>Once before the construction starts</td>
<td>Project site</td>
<td></td>
<td>Detector tubes</td>
<td>No Tanzanian Standard</td>
<td>Municipal council/Env. Supervisor</td>
<td>500</td>
</tr>
<tr>
<td>NOₓ</td>
<td>Project site</td>
<td>Detector tubes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PM₁₀</td>
<td>Project site</td>
<td>Mini-Vol Sampler</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO₂</td>
<td>Project site</td>
<td>Detector tubes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise Baseline</td>
<td>Noise level</td>
<td>Project site</td>
<td>dB</td>
<td>Measurements</td>
<td></td>
<td></td>
<td>500</td>
</tr>
<tr>
<td><strong>Water pollution</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitrate</td>
<td>Once before the construction work starts</td>
<td>Lake Tanganyika /streams and shallow wells near the project sites</td>
<td>mg/l</td>
<td>Sampling and analysis (Spectrophotometer)</td>
<td>30</td>
<td>Municipal council/Env. Supervisor</td>
<td>600</td>
</tr>
<tr>
<td>Lead</td>
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<td>Contractor/ Municipal council/Env. Supervisor</td>
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<td>Project site</td>
<td>Detector tubes</td>
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## The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

### Parameters | Monitoring frequency | Sampling Area | Measurement Units | Method | Target level/Standard | Responsibility for monitoring | Annual costs estimates (USD)
---|---|---|---|---|---|---|---
Sulphate | Three times a year | Tanganyika/streams and shallow wells near the project sites | mg/l | Sampling and analysis (AAS) | 600* | Env. Supervisor | 1200
Turbidity | Three times a year | | mg/l | Sampling and analysis (Spectrophotometer) | 30 | | 1500
Hydrocarbons | Three times a year | | mg/l | Sampling and analysis (Spectrophotometer) | 1800 | | 1800
pH | Three times a year | | pH | Sampling and analysis (pH Meter) | 6.5-9.2 | | 300
Soil erosion | Once in three month for construction period | Project area | | Site inspection | – | Municipal environmental officer/Contractor | 5000
Interference to local hydrology | Hydrometric | Once in a month during rain season in the construction period | Lake Tanganyika/streams near the project sites | Flooding levels | Volumetric measurements | Envi. Supervisor Municipal Council/Contractor | 4,000
Vibration | Vibration levels | Three times a year | Project sites and all borrow pits | Number | Vibration meter | – | Contractor | 1500
Frequency of illness of construction workers | Illness of construction workers | Once in a month for the construction period | Project site | Number of cases | Health records | Municipal Health officers | 2000
Employment opportunity | Percentage of local construction labourers | Three times a year | Project site | Number of local people employed in the project | Records, inquiries and observation | Municipal councils | N/A
Occupational Safety and health risks | Number and type of safety equipment such as mask, helmet gloves and ear plugs. Health and | Once a year | Project site | Number of safety measures provided | Records, injuries and inspection | NEMC Municipal Council/Contractor | 3000
### The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

<table>
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<th>Method</th>
<th>Target level/ Standard</th>
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**Total monitoring costs** | 53,200
### Table 9.2: Environmental and Social Monitoring Plan for the Bus Stands

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<th>Method</th>
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<td>Detector tubes</td>
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## Parameters and Monitoring Details

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<th>Measurement Units</th>
<th>Method</th>
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<th>Annual costs estimates (USD)</th>
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<td>Number of local people employed in the project</td>
<td>Records, inquiries and observation</td>
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The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

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<td>mg/l</td>
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<td></td>
<td>Hydrocarbons</td>
<td>Three times a year</td>
<td>mg/l</td>
<td>Sampling and analysis (Spectrophotometer)</td>
<td></td>
<td></td>
<td>1800</td>
</tr>
<tr>
<td></td>
<td>pH</td>
<td>Three times a year</td>
<td>pH Meter</td>
<td></td>
<td>6.5-9.2</td>
<td></td>
<td>300</td>
</tr>
<tr>
<td>Total monitoring costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>52,000</td>
</tr>
</tbody>
</table>
The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

Table 9.3: Environmental and Social Monitoring Plan for the Storm Water Drains

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Monitoring frequency</th>
<th>Sampling Area</th>
<th>Measurement Units</th>
<th>Method</th>
<th>Target level/Standard</th>
<th>Responsibility for monitoring</th>
<th>Annual costs estimates (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction stage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of natural habitat</td>
<td>Trees and Grasses</td>
<td>Once in three month for construction period</td>
<td>New Bus stand site</td>
<td>-</td>
<td>Inspection</td>
<td>-</td>
<td>Contractor Municipal Council, NGOs CBOs local communities</td>
</tr>
<tr>
<td>Frequency of illness of construction workers</td>
<td>illness of construction workers</td>
<td>Once in a month for the construction period</td>
<td>Project site</td>
<td>Number of cases</td>
<td>Health records</td>
<td>-</td>
<td>Municipal Health officers</td>
</tr>
<tr>
<td>Employment opportunity</td>
<td>Percentage of local construction labourers</td>
<td>Three times a year</td>
<td>Project site</td>
<td>Number of local people employed in the project</td>
<td>Records, inquiries and observation</td>
<td>-</td>
<td>Municipal councils</td>
</tr>
<tr>
<td>Occupational Safety and health risks</td>
<td>Number and type of safety equipment such as mask, helmet gloves and ear plugs. Health and sanitation facilities in camps.</td>
<td>Once a year</td>
<td>Project site</td>
<td>Number of safety measures provided</td>
<td>Records, inquiries and inspection</td>
<td>-</td>
<td>NEMC Municipal Council/Contractor</td>
</tr>
<tr>
<td><strong>Total monitoring costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9,800</td>
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Table 9.4: Environmental and Social Monitoring Plan for the Landfill

<table>
<thead>
<tr>
<th>Parameters</th>
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<th>Sampling Area</th>
<th>Measurement Units</th>
<th>Method</th>
<th>Target level/Standard</th>
<th>Responsibility for monitoring</th>
<th>Annual costs (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SO₂</td>
<td>Once before the construction starts</td>
<td>Project site</td>
<td>Detector tubes</td>
<td>No Tanzanian Standard</td>
<td>Municipal council/Env. Supervisor</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>NOₓ</td>
<td></td>
<td>Project site</td>
<td>Detector tubes</td>
<td></td>
<td></td>
<td></td>
<td>500</td>
</tr>
<tr>
<td>PM₁₀</td>
<td></td>
<td>Project site</td>
<td>Mini-Vol Sampler</td>
<td></td>
<td></td>
<td></td>
<td>500</td>
</tr>
<tr>
<td>CO₂</td>
<td></td>
<td>Project site</td>
<td>Detector tubes</td>
<td></td>
<td></td>
<td></td>
<td>500</td>
</tr>
<tr>
<td>CO</td>
<td></td>
<td>Project site</td>
<td>Detector tubes</td>
<td></td>
<td></td>
<td></td>
<td>500</td>
</tr>
<tr>
<td>Noise Baseline</td>
<td>Noise level</td>
<td>Project site</td>
<td>dBA</td>
<td>Measurements</td>
<td>Municipal council/Env. Supervisor</td>
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<td></td>
</tr>
<tr>
<td>Ground Water pollution</td>
<td></td>
<td>Ground water</td>
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<td></td>
<td>6.5-9.2</td>
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<td></td>
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<tr>
<td>pH</td>
<td>Once before the construction work starts</td>
<td>Ground water</td>
<td>pH Meter</td>
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<td>Municipal council/Env. Supervisor</td>
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</tr>
<tr>
<td>Temperature</td>
<td></td>
<td></td>
<td>Centigrade</td>
<td>Thermometer</td>
<td></td>
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</tr>
<tr>
<td>Electric conductivity</td>
<td></td>
<td></td>
<td>µs/cm</td>
<td>Electrode Meter</td>
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<td></td>
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<tr>
<td>Ammonium Nitrogen</td>
<td></td>
<td></td>
<td>mg/l</td>
<td>Sampling and analysis (Spectrophotometer)</td>
<td></td>
<td>400</td>
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</tr>
<tr>
<td>Chloride</td>
<td></td>
<td></td>
<td>mg/l</td>
<td>Sampling and analysis (Spectrophotometer)</td>
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<td>500</td>
<td></td>
</tr>
<tr>
<td>BOD</td>
<td></td>
<td></td>
<td>Mg/l</td>
<td>Sampling and analysis (BOD Track)</td>
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<tr>
<td>COD</td>
<td></td>
<td></td>
<td>mg/l</td>
<td>Sampling and analysis (Spectrophotometer)</td>
<td>60</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>Construction stage</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air pollution</td>
<td></td>
<td>Project site</td>
<td>Detector tubes</td>
<td>No Tanzanian Standard</td>
<td>Contractor/ Municipal council/Env. Supervisor</td>
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</tr>
<tr>
<td>SO₂</td>
<td>Three times a year</td>
<td>Project site</td>
<td>Detector tubes</td>
<td></td>
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</tr>
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<td>Project site</td>
<td>Detector tubes</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>PM₁₀</td>
<td>Three times a year</td>
<td>Project site</td>
<td>Mini-Vol Sampler</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>CO₂</td>
<td>Three times a year</td>
<td>Project site</td>
<td>Detector tubes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise pollution</td>
<td>Noise level</td>
<td>Project site</td>
<td>dBA</td>
<td>Measurements</td>
<td>Municipal council/Env. Supervisor</td>
<td>1500</td>
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<td>Soil erosion</td>
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<td>Project area</td>
<td>Level of erosions</td>
<td>Site inspection</td>
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<td>Municipal environmental officer/Contractor</td>
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<td>Vibration</td>
<td>Vibration levels</td>
<td>Project sites</td>
<td>Number</td>
<td>Vibration meter</td>
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<td>Contractor</td>
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<td>Parameters</td>
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<td>Sampling Area</td>
<td>Measurement Units</td>
<td>Method</td>
<td>Target level/Standard</td>
<td>Responsibility for monitoring</td>
<td>Annual costs estimates (USD)</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>----------------------------------------------------------</td>
<td>----------------------------------------------------</td>
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<td>-------------------------------------------------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>Loss of natural habitat</td>
<td>Trees and Grasses</td>
<td>Once in three months for construction period</td>
<td>Landfill site</td>
<td>Inspection</td>
<td>-</td>
<td>Contractor Municipal Council, NGOs, CBOs, local communities</td>
<td>2000</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency of illness of</td>
<td>ill of construction workers</td>
<td>Once in a month for the construction period</td>
<td>Project site</td>
<td>Health records</td>
<td>-</td>
<td>Municipal Health officers</td>
<td>3000</td>
</tr>
<tr>
<td>ill of construction workers</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Employment opportunity</td>
<td>Percentage of local construction labourers</td>
<td>Three times a year</td>
<td>Project site</td>
<td>Records, inquiries and observation</td>
<td>-</td>
<td>Municipal councils</td>
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</tr>
<tr>
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<td>Number and type of safety equipment such as mask, helmet</td>
<td>Once a year</td>
<td>Project site</td>
<td>Records, inquiries and inspection</td>
<td>-</td>
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<tr>
<td>risks</td>
<td>gloves and ear plugs, health and sanitation facilities in</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>camps.</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dust</td>
<td>Water sprinkling</td>
<td>Twice a week</td>
<td>Project site</td>
<td>Frequency of water sprinkling</td>
<td>Minimum dust emission</td>
<td>Contractor</td>
<td>Included in the contract lump sum</td>
</tr>
<tr>
<td>Operation stage</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>Air pollution</td>
<td>SO₂</td>
<td>Twice every month</td>
<td>Project site</td>
<td>Detector tubes</td>
<td>No Tanzanian Standard</td>
<td>Municipal Council</td>
<td>4000</td>
</tr>
<tr>
<td></td>
<td>NOₓ</td>
<td>Twice every month</td>
<td>Project site</td>
<td>Detector tubes</td>
<td></td>
<td></td>
<td>4000</td>
</tr>
<tr>
<td></td>
<td>Dust pollution (PM₁₀)</td>
<td>Twice every month</td>
<td>Project site</td>
<td>Mini-Vol Sampler</td>
<td></td>
<td></td>
<td>4000</td>
</tr>
<tr>
<td></td>
<td>CO₂</td>
<td>Twice every month</td>
<td>Project site</td>
<td>Detector tubes</td>
<td></td>
<td></td>
<td>4000</td>
</tr>
<tr>
<td></td>
<td>Methane</td>
<td>Once a week</td>
<td>Project site</td>
<td>Detector tubes</td>
<td></td>
<td></td>
<td>8,000</td>
</tr>
<tr>
<td>Noise pollution</td>
<td>Noise level</td>
<td>Once in 3 months</td>
<td>Project site</td>
<td></td>
<td></td>
<td>Municipal Council</td>
<td>2000</td>
</tr>
</tbody>
</table>
## The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Monitoring frequency</th>
<th>Sampling Area</th>
<th>Measurement Units</th>
<th>Method</th>
<th>Target level/Standard</th>
<th>Responsibility for monitoring</th>
<th>Annual estimates (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground Water pollution pH</td>
<td>Twice every month</td>
<td>Ground water</td>
<td>-</td>
<td>pH Meter</td>
<td>6.5-9.2</td>
<td>Municipal council/ Env. Supervisor</td>
<td>2400</td>
</tr>
<tr>
<td>Temperature</td>
<td>Twice every month</td>
<td></td>
<td>Centigrade</td>
<td>Thermometer</td>
<td>20-35</td>
<td></td>
<td>2400</td>
</tr>
<tr>
<td>Electric conductivity</td>
<td>Twice every month</td>
<td></td>
<td>µs/cm</td>
<td>Electrode Meter</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Ammonium Nitrogen</td>
<td>Twice every month</td>
<td></td>
<td>mg/l</td>
<td>Sampling and analysis (Spectrophotometer)</td>
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</tr>
<tr>
<td>Chloride</td>
<td>Twice every month</td>
<td></td>
<td>mg/l</td>
<td>Sampling and analysis (Spectrophotometer)</td>
<td>600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOD</td>
<td>Twice every month</td>
<td></td>
<td>Mg/l</td>
<td>Sampling and analysis (BOD Track)</td>
<td>600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COD</td>
<td>Twice every month</td>
<td></td>
<td>mg/l</td>
<td>Sampling and analysis (Spectrophotometer)</td>
<td>600</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total monitoring costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>84,700</strong></td>
</tr>
</tbody>
</table>
9.4 Institutional arrangements and reporting procedures

Municipal councils, assisted by environment specialists, will be responsible for reviewing civil works contracts in accordance with the ESIA report; coordinating the implementation of the ESMP among the contractors, local environmental authorities (e.g., Ward Development Committees; monitoring the implementation of the ESMP and the civil works contracts in collaboration with NEMC and PMO-LGRG; and, preparing annual environmental progress reports.

The purpose of environmental and social monitoring is to quantitatively measure the environmental effects of the project. The environmental monitoring program will operate through the preconstruction, construction, and operation phases. It will consist of a number of activities, each with a specific purpose, key indicators, and significance criteria.

The monitoring of mitigation measures during design and construction will be carried out by an Environmental/Social Specialist. He/she will conduct mitigation monitoring as part of the regular works inspections. The responsibility for mitigation monitoring during the operation phase will lie with the Environmental Section in Municipal Councils.

Municipal council will provide PMO-LGRG and NEMC with reports on environmental compliance during implementation as part of their annual progress reports and annual environmental monitoring reports. Depending on the implementation status of environmentally sensitive areas of the project, NEMC will perform annual environmental reviews in which environmental concerns raised by the project will be reviewed alongside project implementation.

9.5 Capacity building and training programmes:

Inadequate knowledge based and technical manpower in Environmental and social impacts business, both at private and public sectors will hinder the pace of its effective use in project such as this.

The efforts for capacity building on environmental and social impacts to people who will be involved with the project in one way or another should go hand-in-hand with awareness raising to decision makers at various levels in the project area, project implementers and stakeholders about its importance, usefulness and value of using this tool to make the project environmental friendly and cost effective on the long run on the environmental grounds.
10.0. COST BENEFIT ANALYSIS OF THE PROJECT

10.1 Introduction.

This section addresses financial, economic and an extended cost-benefit analyses for the proposed project. However, lack of information on aspects such as costs and units for various materials that will be used in the construction process (until completion of the detailed design) have prevented a detailed cost benefits analysis to be undertaken. Therefore, what is presented in this section is rather an indicative and elementary description of the costs and benefits. It is based on the indicative costs for implementation of mitigation measures as well as the cost of monitoring.

10.2 Benefits related to the project

Several benefits are associated with the proposed development both at local (Municipality) and national level in terms of revenue generation and the multiplier effects associated with linkages with local and national economy. Table 10.1 summarises the benefits that are expected during construction and operation of the facilities.

Table 10.1: Project’s Benefits

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Construction</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roads</td>
<td>Job creation and increased income to local communities</td>
<td>Improved Transport and Economy of the People</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Improved community life and services</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Job creation and increased income to local communities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reduced traffic congestion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increased property values</td>
</tr>
<tr>
<td>Bus Stands</td>
<td>Job creation and increased income to local communities</td>
<td>Improved community life and services</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reduced traffic congestion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increased property values</td>
</tr>
<tr>
<td>Storm water drains</td>
<td>Job creation and increased income to local communities</td>
<td>Improved Storm water collection</td>
</tr>
<tr>
<td>Landfill</td>
<td>Job creation and increased income to local communities</td>
<td>Improved Solid Waste Collection and Disposal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increased Municipal Income</td>
</tr>
</tbody>
</table>
10.3 Costs related to the project

The estimated cost for the construction of the facilities is Tanzanian Shillings 21 Billion. The estimated costs for implementing enhancement measures, impact management as well as monitoring process as outlined in Chapters 8 and 9 is about US$ 153,000 and US$109,300 respectively.

The Government of the United Republic of Tanzania (GoT) have received a credit from the International Development Association (IDA) for the implementation of this project. The project road being a trunk road shall be maintained by Kigoma Municipal Council using annual government disbursements. However, the socio-economic benefits that will accrue from the construction of this facilities are great and shall permeate in two or three generations to come.
11.0 DECOMMISSIONING AND DEMOBILIZATION PLAN

11.1 Demobilization of the project (All Clusters)

11.1.1 Introduction

Upon completion of the Contracted Work, the Contractor shall remove all of its tools, materials and other articles from the construction area. Should the Contractor fail to take prompt action to this end, the Municipal council, at its option and without waiver of such other rights as it may have, upon sixty (60) calendar days notice, may treat such items as abandoned property. The Contractor shall also clean areas where he worked, remove foreign materials and debris resulting from the contracted work and shall maintain the site in a clean, orderly and safe condition.

Materials and equipment shall be removed from the site as soon as they are no longer necessary to minimize the demobilization work after completion of the project. Before the final inspection, the site shall be cleared of equipment, unused materials and rubbish so as to present a satisfactory clean and neat appearance.

All the camp sites will be built as temporary structures and these will also include the use of movable structures such as movable containers. All the temporary structures will be demolished after accomplishing the contracted jobs.

11.1.2 Impacts of the Demobilization of project

- Loss of jobs and Resettlement
- Air water and soil pollution
- Noise pollution
- Closing down of borrow pits

- Loss of jobs and Resettlement

The local population that will be employed in the project during construction of the road will lose jobs immediate after the closure of the project. The loss of jobs will have far reaching impacts. Resettlement is certainly for those who will migrate to the areas along the road as job seekers after the secession of the project.

Mitigation
Establish some small group business and Saccos to assist people access loans to enable them run small businesses.

Monitoring
The Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates, Bidding Documents and Environmental and Social Impact Assessments for the Investment Sub-Projects in KIGOMA MUNICIPALITY under the Proposed Tanzania Strategic Cities Project

- The social response to the problem of unemployment
- Settlement pattern of people resuming their previous life after termination of work.

  o **Air, water and soil pollution**

During the demobilization movement of heavy duty equipments shall contribute to air pollution as the result of operation of the vehicles and equipments. This may also be accompanied by the soil and water pollution that might result from spillage of oil and fuel.

*Mitigation*

- Care shall be taken to prevent spillage on haul routes. Any such spillage shall be removed immediately and the area cleaned.

- The effects of the emission will be minimal due to intensified vegetative cover that will be provided in the area.

*Monitoring*

- Monitoring various parameters in air, water and soil such as CO₂, SO₂, Nitrate, Sulphates, Lead, oils and petroleum, hydrocarbons etc.

  o **Noise pollution**

The problem of the noise pollution caused by the demobilization will have little impact since this will be done once.

*Mitigation*

- Use machines with silencer or with low levels of noise.

*Monitoring*

- Monitor the levels of noise (dBA)

  o **Closing down of borrow pits and quarry site**

All the borrow pits and quarry site need to be reinstated to minimise the erosion problems, unaesthetical environments and creation of mosquito breading stations.

*Mitigation*

- Back fill the borrow pits with top soils stockpiled along the project road
- Modify the borrow pits which doesn’t present a threat of turning out to be breeding station of mosquitoes to a dam for collection of rainwater to be used as reliable water sources in the project areas.
Replanting of vegetations on the banks of the borrow pits to minimise the erosion

Monitoring
- Soil erosion
- Conditions of the abandoned borrow pits
- Growth of the vegetation replanted on the borrow pits

It can be concluded that the primary objective of the demobilization exercise is to clean up the project site to a condition suitable for use by the community. All potentially harmful contaminants at the site will be thoroughly removed, treated and disposed of in an environmentally acceptable manner. With the implementation of the precautionary and mitigation measures recommended in the EIA report, the demobilization of the project will comply with all environmental standards and legislation.

11.2 Decommissioning

Cluster I, II, III
Decommissioning is not anticipated in the foreseeable future. However, if this will happen, may entail change of use (functional changes) or demolition triggered by change of land use.

Cluster IV
The most important part of landfill closure is to construct a low permeability cover, or cap, over the waste when the final elevations are reached. The following procedures are typically proposed to close and restore a landfill:

1. Cover all waste. All waste should be sufficiently covered, and any unstable areas of the landfill should be well marked with barriers.
2. Permit sufficient time for settling of any recently deposited waste.
3. Apply final cover. This cover may include a surface layer of topsoil, which is striped and stockpiled prior to commencing the landfill operations
4. Grade slopes to around 5%.
5. Install permanent system of surface drainage channels on the landfill.
6. Check sediment and erosion control and modify according to any change of slopes
7. Disassemble temporary structures (eg site buildings) and waste receiving areas not required for the after-use of the site
8. Seeding the final cover with the appropriate mixture of grasses.
9. Regular inspection of

- Settlement, cover soil integrity, and need for grading
- Sedimentation and erosion control facilities
- Leachate and gas control
- Vandalism and squatting prevention measures
- Vegetation
- Fencing
- Monitoring systems
12.0 SUMMARY AND CONCLUSIONS

The EIA study results show some limited negative environmental implications of the project, the core urban infrastructure will have high socio-economic benefits to the people of Kigoma Municipality and adjoining regions as well. The associated negative impacts, to a large extent have been minimized through good engineering design and envisaged construction practices. Specific mitigation measures have been suggested in this report to offset some of the inherent adverse impacts especially those linked to land, water and air pollution. Implementing these mitigation measures would increase environmental soundness of the project.

It is, therefore, concluded that, implementation of the proposed Investment subprojects will entail no detrimental impacts provided that the recommended mitigation measures are adequately and timely put in place. The identified adverse impacts shall be managed through the proposed mitigation measures and implementation regime laid down in this EIS. Kigoma Municipal Council are committed in implementing all the recommendations given in the EIS and further carrying out the environmental auditing and monitoring schedules.
REFERENCES

2) Kigoma Municipality Socio economic Profile 2008
3) Kigoma Municipality Environmental Profile 2008
4) United Republic of Tanzania (2005), EIA and Audit Regulations
5) United Republic of Tanzania (2007), EIA Guidelines (Draft)
6) World Bank Operational Policy 4.01
APPENDICES

Appendix I: Terms of References

TERMS OF REFERENCE FOR CONDUCTING ENVIRONMENTAL AND SOCIAL IMPACTS ASSESSMENT FOR THE INVESTMENT SUB-PROJECTS IN KIGOMA MUNICIPALITY UNDER THE PROPOSED TANZANIA STRATEGIC CITIES PROJECT

BACKGROUND

Local Government Support Project (LGSP)

The Government of the United Republic of Tanzania (GoT) has received a credit from the International Development Association (IDA) towards the cost of the Local Government Support Project (LGSP). It is intended that part of the proceeds of the credit will be used to cover eligible payments under the contract for the Provision of Consultancy Services for Preparation of Preliminary and Detailed Engineering Designs, Cost Estimates and Bidding Documents, and Environmental and Social Impact Assessments for the Investment Sub-Projects in Kigoma Municipality under the proposed Tanzania Strategic Cities Project (TSCP).

The LGSP, which is in advanced stage of implementation, became effective in April 2005, and is expected to close on June 30, 2011.

Proposed Tanzania Strategic Cities Project (TSCP)

The GoT and the World Bank are preparing a new credit for the proposed Tanzania Strategic Cities Project (TSCP). The overall objective of the TSCP is to: (i) improve basic urban infrastructure and services in selected urban LGAs; and (ii) strengthen the management and fiscal capacity of those urban LGAs for improved operations, maintenance and infrastructure development.

The proposed project is estimated to cost of US$ 150 million, to be implemented over a period of five years. The project would target seven selected urban LGAs. The selected urban LGAs to be supported under the proposed credit are: Mwanza, Arusha, Mbeya, Tanga, Dodoma, Kigoma and Mtwara. At this stage, it is anticipated that the project would consist of the following three components:

Component 1(a): Core urban infrastructure: This sub-component would
support: (i) urban roads and drainage, including associated structures such as drainage ditches, culverts/bridges, footpaths and street lighting; (ii) liquid and solid waste management including collection, transportation and disposal; (iii) community infrastructure upgrading; and (iv) local infrastructure such as bus stands and lorry stands/parking areas.

**Component 1(b): Strategic economic infrastructure:** This sub-component would support strategic investments falling outside the traditional mandates of the urban LGAs. The sub-component would aim to reinforce synergies across sectors and begin to address some of the key impediments to realizing the economic potential of Tanzania’s cities. It could support infrastructure investments and/or feasibility studies and related preparatory consultancies covering: (i) energy distribution; (ii) port and transport services; and (iii) peri-urban areas (outside but adjacent to urban LGAs).

**Component 2: Institutional strengthening:** The objective of this component is to strengthen the fiscal and management capacity of the seven selected urban LGAs for improved O&M and infrastructure development. The intended outcomes include: (a) improved capacity for technical design, procurement, financial management, contract management, and environmental and social safeguards for urban infrastructure development; (b) improved asset management and O&M; (c) enhanced cost recovery and management of key urban services including solid waste; and (d) improved own source revenue.

**Component 3: Implementation Support.** This component will cover: (i) support to PMO-RALG and LGAs to enhance capacity for project management, monitoring, reporting, environmental and social safeguards, and audit systems; (ii) design work and preparation of future urban projects, including a separate Dar es Salaam project; (iii) further design work or related consulting services (beyond that completed during preparation); (iv) consultancy services for Mid-Term Review (MTR); and (v) additional TA relevant to the urban sector.

**Progress on TSCP Component 1(a): Core Urban Infrastructure**

**Indicative Planning Figures (IPFs) for the selected LGAs:** The allocation of funds across the selected urban LGAs was guided by considering the relative strengths of the urban LGAs in terms of: (i) urban population; (ii) economic activities; and (iii) own source revenue (a proxy for capacity for O&M and sustainability). The following are allocations in the form of IPFs notified to the selected LGAs for planning of investment sub-projects to be supported under Component 1(a) for the Core Urban Infrastructure:

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<tr>
<th>Urban</th>
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<th>Remarks</th>
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### Table 1: LGA Investments

<table>
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<th>LGA</th>
<th>Billion</th>
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<tr>
<td>Mwanza</td>
<td>21.0</td>
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<tr>
<td>Arusha</td>
<td>21.0</td>
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<tr>
<td>Mbeya</td>
<td>21.0</td>
</tr>
<tr>
<td>Tanga</td>
<td>21.0</td>
</tr>
<tr>
<td>Dodoma</td>
<td>32.0</td>
</tr>
<tr>
<td>Kigoma</td>
<td>16.0</td>
</tr>
<tr>
<td>Mtwara</td>
<td>16.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>148.0</strong></td>
</tr>
</tbody>
</table>

**Dodoma MC = 16; CDA = 16**

### Principles for selection of sub-projects:
The selection of sub-projects in urban LGAs was guided by the following principles:

- Consistent with, and in furtherance of, the overall project development objective.
- Capable of being fully implemented within a maximum of three years.
- Demand driven, reflecting the infrastructure priorities expressed by the participating urban LGAs and their stakeholders.
- Being able to have measurable impact that meets pre-agreed indicators.
- Socially, environmentally, and financially sustainable (e.g. in terms of the operation and maintenance requirements).
- Complementary to other sectoral investments.
- Consistent with the National Framework on Participatory Planning and Budgeting, other aspects of the Tanzanian regulatory framework, and with World Bank guidelines and safeguard policies.

### ASSIGNMENT OBJECTIVES

The basic objectives of this consultancy assignment are to:

- Prepare preliminary designs and cost estimates for the LGA sub-projects and group them into two phases for implementation purposes.
- Prepare detailed designs, drawings and cost estimates for the LGA sub-projects, package them into suitable contracts, prepare final bidding documents and overall time-bound implementation schedule.
- Conduct an Environmental and Social Impact Assessment (ESIA) of individual sub-projects proposed for investment in the urban LGAs and prepare an overall ESIA report for the LGA investments.
• Prepare Environmental Management Plans (EMPs) and where necessary, Resettlement Action Plans (RAPs) and, in the case of Arusha, Indigenous Peoples Development Plans (IPDPs) for individual sub-projects and prepare overall EMP and RAP for the LGA investments.

SCOPE OF WORK

Overview

The overall scope of the consultancy assignment comprises the preparation of preliminary and detailed designs, drawings, cost estimates, suitable contract packages, final bidding documents and overall time-bound implementation schedules, and the preparation of environmental and social impact assessments, preparation of environmental management plans and, where necessary, resettlement plans and indigenous peoples development plans, for all investment sub-projects proposed by the Kigoma Municipal Council for financing under the core urban infrastructure sub-component of the TSCP.

The indicative scope of works for the Kigoma Municipal Council is as follows:

• Upgrading of approximately 25 km of existing earth and gravel roads to double surface dressing (bitumen surfacing); including vertical and horizontal alignments, pavement design, drainage structures, street lights etc.

• Construction of one (1) main bus stand (30,000 m²) and two (2) town bus stands (25,000 m²); including pavement design, concrete interlocking paving block surfacing, lighting, drainage, buildings and other associated structures.

• Construction of approximately 3,500 linear metres of lined storm water drains at different locations within the municipality; including alignment and structural designs etc.

• Construction of a dumpsite for solid waste disposal; including creation of cells, construction of inner and access roads, protection works, storm water drains and leachate discharge facilities and town waste collection centres; all to meet environmental requirements with necessary mitigation measures or provide alternative.

• Acquisition of a package of solid waste management equipment (skip loaders, skip buckets, tipper/trucks, refuse collection points, wheel loader etc)
ENIRONMENTAL AND SOCIAL IMPACT ASSESSMENTS

(a) Undertake Environmental and Social Impact Assessment (ESIA) for each sub-project proposed by the LGA for funding under the TSCP. The ESIA should conform to World Bank requirements as specified in the World Bank’s Operational Policy for Environmental Assessment (OP 4.01). Determine design or operating quality standards to meet compliance with environmental safeguards (e.g. water quality standards, air, and health and safety requirements); national laws and regulation on environmental assessment. The results of the ESIA for each sub-project should be used to prepare an Environmental Management Plan (EMP) for the sub-project and these further be consolidated respectively into an overall ESIA Report and EMP for the LGA investments under TSCP. The Consultant should also assist the developer/LGA through the required review and approval processes within the GoT and WB up to the disclosure of the documents to the public (see detailed TOR in attachment 1);

(b) As detailed in attachment 2 of the Main TOR), determine whether any resettlement, or temporary displacement, loss of assets, loss of access to assets and services will be required in each sub-project area, based on its ESIA report. If it is determined that resettlement is required, compile a list of Resettlement Actions (RAs) required for each sub-project and prepare a Resettlement Action Plan (RAP) for the sub-project. Prepare an overall RAP for the LGA investments under TSCP; assist the developer/LGA through the required GoT and WV review and approval processes up to the disclosure of the documents to the public;

(c) Some sub-projects in urban LGAs and vicinity, may directly affect indigenous peoples, such as the Hadzabe, who may have moved into the area. The ESIA in such LGAs will determine the presence of indigenous peoples (as defined in the World Bank guidelines) and the impact of the sub-projects on them. If indigenous peoples are impacted by the sub-projects, the consultants will develop an Indigenous People’s Development Plan (IPDP) as per the guidelines (attachment 2-A) provided in the Indigenous People’s framework to assist in development of specific programs that may affect the livelihoods (markets) and mobility (roads – grazing pastures) of the affected communities. The development plan must be prepared through active participation of the affected community.

(d) Note that, In order to meet WB (IDA) disclosure requirements, the draft ESIA, RAPs and IPDP (if required) will need to be reviewed and cleared by the Bank during pre-appraisal and finalized and publicly disclosed in the seven urban centers and Info-Shop at the World Bank prior to appraisal.
ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Introduction

These Terms of Reference (TOR) outline the scope of work to be carried out in preparation of an Environmental Management Plan (EMP) for Component 1(a): Core Urban Infrastructure of the proposed Tanzania Strategic Cities Project (TSCP). The EMP will be a compilation of information gathered through Environmental Impact Assessments (EIAs) carried out for all sub-projects to be implemented through Component 1(a) of the TSCP. The EMP will be carried out in accordance with the World Bank’s Operational Policy for Environmental Assessment (OP 4.01).

The Environmental Management Plan to be prepared by the Consultant for the participating urban LGA under the assignment includes: (1) Environmental Overview Report for the LGA; (2) Environmental Management Plans for each sub-project proposed by the LGA, to be an integral part of the consolidated final LGA sub-projects investment proposal document and; (3) the Environmental Impact Assessment Section prepared for the LGA for incorporation in the Overall Operational Manual for the TSCP. An executive summary synthesizing the process and incorporating the findings from the above reports will also need to be prepared.

Scope of Work

Environmental Overview of urban LGA

The purpose of this section is to provide a broad description of environmental issues facing the Municipality and in particular, areas that are adversely affected by poor environmental conditions or contributing to further degradation of the environment. This section will be prepared using secondary data sources and other information collected during the course of the overall design of the sub-projects (see main TOR).

Specifically, the section should include the following:

(a) Background information about the City/Municipality (socio-economic conditions, demography, status of water and environmental quality, etc);

(b) A description of environmental priorities of City/Municipality residents/local authorities;

(c) The number and location of communities living in environmentally vulnerable areas (e.g. close to a polluted canal, poor ventilation causing indoor air pollution, on or adjacent to garbage dumps, close to large enterprises polluting the locality etc);
(d) A review of City/Municipal level environmental and social legislation, regulations and procedures that facilitate or hinder improvements in environmental conditions.

(e) An outline of the institutional framework for addressing environmental issues posed by the proposed sub-projects under Component 1(a): Core Urban Infrastructure; and the related capacity building requirements.

**Environmental Management Plans (EMPs)**

An EMP will be prepared for each of the sub-project areas. The purpose of EMPs is to ensure that the interventions targeted by the proposed sub-project are environmentally sound and sustainable. The preparation of these plans should be done in tandem with the sub-projects design process and follow a participatory process. EMPs should form an integral part of the consolidated final LGA sub-projects investment proposal document; and the Consultant should inform, advise and consult with community organizations in sub-project areas while preparing these plans.

Specifically, each EMP should detail the following:

(a) describe the environmental conditions and identify the possible adverse environmental problems associated with the proposed sub-project, which the EMP is intended to deal with;

(b) assess whether proposed infrastructure interventions will address or exacerbate environmental problems and identify alternatives;

(c) propose and describe mitigation actions that need to be implemented at the community/LGA-level and indicate how and when they will be implemented. These actions should be reflected and costed in the preliminary and detailed engineering designs;

(d) define the institutional arrangements at the community/LGA-level, by specifically describing who will be responsible for implementing the EMP during construction, operation and maintenance of the sub-project including the environmental mitigation actions;

(e) Review the capability of institutions at all levels (i.e. staffing, training requirements, and other necessary support services to implement the mitigation measures) and recommend steps to strengthen or expand them in order for the EMP to be effectively implemented;

(f) prepare a monitoring program that will involve communities/LGA as appropriate to assess environmental effects of the project – both positive and negative;

(g) in the event of resettlement or relocation, environmental conditions of the new site should be assessed before a decision is made on the suitability of
this site; where applicable, assess compensation to affected parties for impacts that can not be mitigated;

(h) propose an environmental education and public hygiene awareness program; and

(i) compile the above in the form of an EMP for the sub-project and integrate it to the Overall EMP for the LGA that should form an integral part of the consolidated final LGA sub-projects investment proposal document.

Environment Section for the TSCP Operational Manual

The purpose of this Section in the TSCP Operational Manual is three-fold: (i) establish the appropriate institutional arrangement for managing the environmental assessment process; (ii) guide the development of possible future sub-projects; (iii) catalogue the “typical” environmental mitigation measures that need to be incorporated in the engineering design of any variation/additional works or additional sub-projects.

Specifically, the Section for the Manual should include the following:

(i) the process used to prepare EMPs

(ii) institutional arrangements and responsibilities for identifying, appraising, evaluating and monitoring EMPs at the City/Municipal and community level;

(iii) checklist and guidelines to be used for sub-project EIAs, including a summary of relevant planning, building and environmental codes and standards of GoT;

(iv) formats for EMPs

(v) guidelines for sub-project appraisal;

(vi) guidelines for assessing variation/additional works or additional sub-projects;

(vii) overall environmental monitoring and evaluation framework for the sub-projects investment implementation programme; and

(viii) capacity building program for environmental assessment in the implementation units, local authorities and at the relevant community-level

Executive Summary

The Executive Summary should synthesize the three outputs mentioned above in accordance with the World Bank’s OP 4.01 for Environmental Assessment. This document will be distributed to the Bank’s Executive Directors 120 days before Board presentation.
Public Disclosure
All the above documents should be available to the public. Sub-project EMP at the community-level where the sub-project is located, and the Overall EMP and Operations Manual Section at City/Municipal-level and Nationally. Records of consultation and disclosure should be maintained and reported in the Executive Summary.

Inputs
The Consultant team should include, at least, an environmental planner/expert, who should be familiar with liquid and solid waste management; as well as institutional and capacity building issues in relation to environment in urban LGAs. He/She should have registration/accreditation (or be able to get registration/accreditation based on possessed qualifications and experience once contracted for the assignment); with relevant environmental bodies such as NEMC, GoT Department for Environment etc. A qualified sociologist and experts in other disciplines should be drawn in as and when required.

ASSIGNMENT DURATION
The assignment is expected to take approximately nine (9) calendar months to complete, from early June 2009. However, the Consultant will be responsible for carrying out revisions/improvements etc as advised by the approving bodies/authorities (including GoT and its agencies, World Bank etc.) up to the time the documents get the necessary approvals for project implementation.

MANAGEMENT OF ASSIGNMENT
The Consultant shall undertake the assignment under the overall supervision of the Director of Local Government, Prime Minister’s Office, Regional Administration and Local Government (PMO-RALG), but will work closely with the relevant urban LGAs (Council Management and Staff, Officials and Staff in the Regional, District and Community leadership, NGOs, CBOs, social and environmental organisations and other stakeholders in the project areas).

KEY DOCUMENTS
• Lists of LGAs’ sub-projects investment proposals submitted in January 2009 for reference, noting that some variations may occur as the lists get finalised during the project preparation cycle
• Necessary introduction letters to facilitate activities in relation to proposal preparation and execution of the assignment (if requested)

However, consultants are advised (through own efforts) to access other key documents mentioned or referred to in the TORs; or any other documents found to be necessary for preparation of proposal or execution of the assignment.

(e) An action plan of measures to ensure that the Indigenous Peoples receive social and economic benefits that are culturally appropriate, including, if necessary, measures to enhance the capacity of the project implementing agencies.

(f) When potential adverse effects on Indigenous Peoples are identified, appropriate action plans to avoid, minimize, mitigate, or compensate for these adverse effects.

(g) The cost estimates and financing plan for the IPDP.

(h) Accessible procedures appropriate to the project to address grievances by the affected Indigenous Peoples’ communities arising from project implementation. When designing the grievance procedures, the borrower takes into account the availability of judicial recourse and customary dispute settlement mechanisms among the Indigenous Peoples.

(i) Mechanisms and benchmarks appropriate to the project for monitoring, evaluating, and reporting on the implementation of the IPP. The monitoring and evaluation mechanisms should include arrangements for the free, prior, and informed consultation with the affected Indigenous Peoples’ communities.
Annex I: List of Stakeholders Consulted
<table>
<thead>
<tr>
<th>S/N</th>
<th>Date</th>
<th>Name</th>
<th>Institution</th>
<th>Position</th>
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<td></td>
<td>07/09/2009</td>
<td>Moses Waramoni</td>
<td>Kigoma JIC</td>
<td>AG/ME &amp; MORE</td>
<td>Box 44 - Kigoma</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yakuye J. Shaban</td>
<td></td>
<td>BLDG/TECH</td>
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<tr>
<td></td>
<td></td>
<td>Julius Kasara</td>
<td></td>
<td>Surveyor Tech</td>
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<td>11</td>
<td></td>
<td>James Mkomwa</td>
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<td></td>
<td>08/12/2009</td>
<td>Susan Ngwomba</td>
<td>Clinical</td>
<td>MEPEO</td>
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<td>08/09</td>
<td>Isaac Nchungu</td>
<td>BONAFE ZIYA</td>
<td>AG BURU</td>
<td>Box 105</td>
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<td>1</td>
<td>08/09/2009</td>
<td>Vitalis Mlaya</td>
<td>Lake Tanzania (UNDP/GER) Project</td>
<td>National Project Coordinator</td>
<td>Box 557 Kigoma</td>
<td>0754-285200</td>
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<td>08/09/2009</td>
<td>Edward L. Phili</td>
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<td>T.D. Riziki</td>
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