THE UNITED REPUBLIC OF TANZANIA

PRESIDENT'S OFFICE

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

TANZANIA STRATEGIC CITIES PROJECT – ADDITIONAL FINANCING (TSCP - AF), 2015-2017
(IDA CREDIT No. 5460 - TZ)

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED ADDITIONAL INVESTMENT SUB-PROJECTS IN ARUSHA CITY

FINAL REPORT

Proponent: ***City Director,***
Arusha City Council
P. o. Box 3013
ARUSHA
Tel: +255 (27) 2502856 / +255 (27) 2544829. e-mail:

Date: **October 2016** Contract No. **ME/022/2013/2014/CR/15**

STUDY TEAM

Expert	Responsibility	Signature
Eng. Restituta Paul	Environmentalist and ESIA Team Leader	
Eng. Given J. Mhina	Environmental Engineer	
Mr. Robert Kishiki	Sociologist	
Eng. Flex Mtui	Civil Engineer	

EXECUTIVE SUMMARY

The Prime Minister's Office, Regional Administration and Local Government (PMO-RALG) now known as Presidents Office-Regional Administration and Local Government on behalf of the Government of Tanzania (GoT) has been implementing the Core Tanzania Strategic Cities Project (TSCP) in selected urban Local Government Authorities for 5 years financed by a World Bank (IDA) credit and a grant from the Government of the Kingdom of Denmark.
The TSCP is an investment operation that provides finance for critical infrastructure in 4 cities of Mwanza, Tanga, Mbeya and Arusha; 4 Municipalities of Ilemela, Dodoma, Kigoma-Ujiji, Mtwara-Mikindani and the Capital Development Authority (CDA). Notably, Ilemela Municipality was added to the list of the participating LGAs after the carving of the Mwanza City.

Infrastructure works have involved upgrading/rehabilitation of a number of artery urban roads and drainage and associated structures such as drainage ditches, culverts/bridges, footpaths and street lighting and local infrastructure such as bus and lorry stands aimed to improve movement of people, goods and services in the urban areas. Development of infrastructure to improve solid waste management including solid waste collection centres, equipment for transportation and disposal, and the development or improvement of disposal sites is also funded under TSCP. To date, most of the prioritized infrastructure are complete and in use or in final stages of completion.

Brief Description of the Proposed Additional Financing

In the project participating authorities, some areas of the completed infrastructure have been identified on where improvements need to be made. However, some facilities were not financed under the Core TSCP due to limited funds which were available under the credit. Also, new sub-projects were identified important for the functionality of the existing sub-projects. Based on these identified gaps, GoT is preparing a credit named as the *Tanzania Strategic Cities Project - Additional Financing* with a view of financing additional infrastructure investments in the 8 urban LGAs and CDA in Dodoma currently receiving funds from TSCP.

In other words, TSCP - Additional Financing will fund civil works construction costs mainly involving extension and rehabilitation of existing infrastructure and a few completely new structures.

The Development Objective of the proposed AF remains the same as for the Core project of improving the quality of and access to the basic urban to basic urban services in the authorities. AF works will be implemented to cover uncompleted and new additional roads, street lights and drainage infrastructure and; solid waste management.

The investments subprojects in Arusha City under the proposed Additional Financing will entail the following:

i. Upgrading of Unga Limited - Murriet road (6.4 km) to Asphalt Concrete (AC) including construction of Burka Bridge, storm water drainsinstallation of street lights, construction of culverts etc.
ii. Extension/Improvements to Bondeni storm water drains (300m) where curvets and access slabs shall be installed where necessary.
iii. Construction of two additional cells at Muriet landfill.

Objectives of the Environmental and Social Impact Assessment (ESIA)

The basis for preparation of this ESIA is the Environmental and Social Management Framework (ESMF) for TSCP Additional Financing. The ESMF provides guidance for environmental and social screening process, and preparation of appropriate safeguard instruments for proposed investments under the AF. The objective of this ESIA is to ensure that the proposed infrastructure development interventions are implemented in an environmentally and socially sustainable manner. The ESIA process aims to ensure that Arusha City has proposed strategies to identify for avoidance or minimization and mitigation of potential negative environmental and social impacts during the planning stage for the construction of the sub-projects. This ESIA for additional works presents definitive, conclusive and clear procedures consistent with the laws in Tanzania and the World Bank's safeguards policies.

The ESIA for the Core Urban Infrastructure and Services constituting rehabilitation/upgrading of urban roads and drainage and solid waste collection and disposal infrastructure was conducted and approved by the National Environment Management Council (NEMC) in 2010 and the City then the Municipal authority was awarded an Environmental Certificate No. **EC/EIS/261.** The environmental and social assessment and management process for the City responds to the World Bank Safeguard Policies and the requirements specified in the Tanzania EIA and Audit Regulations, 2005 (Part IX, Regulation 42, Sub-regulation (1); (2)(b); and (4)) dealing with approval of changes to a project with a valid EIA Certificate.

In recall, the original TSCP obtained EIS certificate for proposed works with conditions attached in the certificate after verification of the conducted ESIA study between August and November 2009. Notably, the EIA regulations of 2005 GN No. 349 of 2005 allow for variation on issued certificate for any additional works where the developer is required to fill in Form No. 5 of the regulation, but, that will not apply to this case because the additional sub-projects are part of the previously identified and designed sub-projects approved by NEMC but could not be implemented due to limitation of TSCP credit funds.

The World Bank Safeguards Policies require that, relevant safeguards instruments, such as an Environmental and Social Impact Assessment (ESIA) with an Environmental Management Plan (ESMP), or just an ESMP in it be

locally disclosed and at the World Bank InfoShop before commencement of the project activities. Where the project requires a Resettlement Action Plan (RAP) it will be locally prepared and disclosed and; will also be forwarded to the Bank for disclosure at the InfoShop.

Environmental and Social Impacts

The proposed sub-projects for the City under the proposed AF stand potential of negative environmental impacts which include:

(a) Change of scenery view of the project areas,
(b) Air pollution caused by dust and air particulates dispersion during material excavation and transportation,
(c) Noise and vibration impacts,
(d) Pollution of surface and ground water,
(e) Increased waste generation at construction sites,
(f) Loss of definite materials and land degradation,
(g) Loss of land and other assets
(h) Interuption or lack of utility servives due to damage/relocation of existing utility infrastructure,
(i) Lacking or slow restoration of areas impacted by construction,
(j) Health and safety hazards of construction workers and general public,
(k) Risks of ground and soil pollution by landfill leachate and,
(l) Risks of air pollution by landfill gases.

Impact assessment was done using simple methods (checklists) and procedures based on the existing structures in the local government system. It is envisaged that the anticipated impacts from development of the infrastructure sub-projects in Arusha City will be short-term, site specific, confined, reversible and can be managed through the application of a set of mitigation and monitoring measures presented in the ESMP.

The ESMP clearly indicates the institutional responsibilities with regard to implementing mitigation measures, monitoring of the implementation of these mitigation measures and related cost estimates and time horizons. Further, the ESIA has assessed the capacity of the City authority to implement the proposed screening process and mitigation measures. The City is experienced in the management of environmental and social issues related to construction/civil works. Moreover, PMO-RALG has the capacity and experience to do backstopping to the City as need may arise.

However the capacity of the City is still in a growing stage both to support and supervise construction work of the proposed infrastructure and implement the required environmental and social screening. Prevalent weaknesses are in the integration into the design before project commences and monitoring of the mitigation measures. The ESIA recommends as appropriate to include conducting training needs assessment and cost estimates. It recommends

building capacity at all levels through the provision of training to staff and decision makers who will be designated the role of planning, reviewing and implementing, and monitoring the construction of the different infrastructure and their auxiliary structures. The role of the NEMC in respect of additional works of TSCP is to provide technical assistance, approve the sub-projects as relevant and facilitate knowledge transfer on environmental and environmental-related matters.

LIST OF ACRONYMS

AUWASA - Arusha Urban Water Supply and Sewerage Authority
BATNEEC - Best Available Technology Not Entailing Excess Cost
CBO - Community Based Organization
COBET - Complementary Basic Education in Tanzania
DoE - Department of Environment
EIA - Environmental Impact Assessment
EMA - Environnemental Management Act, 2004
ESIA - Environmental and Social Impact Assessment
ESMF - Environmental and Social Management Framework
ESMP - Environmental and Social Management Plan
EIS - Environnemental Impact Statement
EMA - Environmental Management Act
EWURA - Energy and Water Utilization Regulatory Authority
HIV/AIDS - Human Immune deficiency Virus /Acquired Immune Deficiency Syndrome
IDA - International Development Association
ICBAE - Integrated Community Based Adult Education Program
LGSP - Local Government Support Project
NEP - National Environmental Plan
NEMC - National Environnemental Management
NGO - Non Governmental Organization
NSGRP - The National Strategy for Growth and Reduction of Poverty PMO-RALG - Prime Minister's Office, Regional Administration and Local Government
PO-RALG - Presidents Office- Regional Administration and Local Government
STD - Sexual Transmitted Diseases
TAC - Technical Advisory Committee
TANESCO - Tanzania Electricity Supply Company
TTCL - Tanzania Telecommunication Company Ltd
ToR - Terms of References
TSCP - Tanzania Strategic Cities Project
WB - World Bank

ACKNOWLEDGEMENT

The preparation of this report was guided by the Environmental and Social Management Framework (ESMF) for the Proposed TSCP – AF of 2014. The report builds on a previous document titled "Environmental and Social Impact Assessment for the Investment Sub-Projects in Arusha City, under the Proposed Tanzania Strategic Cities Project" of January 2010. This current report is a review of the previous ESIA report.

The report is a result of cooperative efforts of a number of experts some of whom are listed in the study team. The projects proponent (PO-RALG) is indebted to all those who spared their precious time to contribute to the preparations of this report. A number of stakeholdesr and/or specialists were involved, a few are mentioned here.

The ESIA consultant wishes to thank Eng. J. B. Bujulu and Dr. mukuki Hante of PO-RALG for their technical support during the preparation of this report and the Management of the UWP Consulting (Tz) Ltd for awarding her team the consultancy which has yielded to this ESIA report.

Further, the consultant wishes to thank the Arusha City Authority for their cordial cooperation and for providing technical information and documents without which this report would have not been completed.

The consultant is gratefull to all stakeholders interviewed during the scopping exercise, including the Ward and Mtaa leaders at the specific project sites. In an earnest manner, we also thank all other individuals who assisted in one way or another during the preparation of this report.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

1.1 Project Background and Justification

The Government of the United Republic of Tanzania (GoT) has received a credit from the International Development Association (IDA) towards the cost of the Tanzania Strategic Cities Project Additional Financing (TSCP - AF). It is intended that part of the proceeds of the credit be used to cover eligible payments under the contract for the Provision of Consultancy Services for Updating/Preparation of Detailed Engineering Designs, Cost Estimates and Bidding Documents, and Environmental and Social Impact Assessments for proposed additional Sub-Projects in Arusha City under the proposed TSCP - AF. Arusha City has been allocated 8.79 million USD under the TSCP AF budget. The allocated funds are within the project budget estimates.

The investments sub-projects in Arusha City will be under the proposed Tanzania Strategic Cities entail rehabilitation/ construction of the following:

- Upgrading of Unga Limited - Muriet road (6.4 km) to Asphalt Concrete (AC) including construction of Burka Bridge, storm water drains, installation of street lights, construction of culverts etc.
- Extension/Improvements to Bondeni storm water drains (300m) where curvets and access slabs shall be installed where necessary.
- Construction of an additional cell at Muriet landfill.

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 November and December 2014.

1.2 Rationale of the SIA and EIA Studies

The proposed sub-projects were among subprojects tabled by Arusha City Council for funding through the Core TSCP. Environmental and Social Impact Assessment (ESIA) reports prepared were collectively cleared by the National Environment Management (NEMC), whereby an Environmental Impact Assessment (EIA) Certificate was issued in 2010.

According to Environmental Management Act (EMA), Act No.20 of 2004 (Cap. 191) as operationalized through the EIA and Audit Regulations of 2005, an EIA certificate expires after 3 years from the date it was issued. This ESIA is being carried out as a review of the existing EIS, and to provide current and updated information on the proposed subproject, collects stakeholders concerns, review the

revised project design, evaluate projects impacts based on current situation and prepare mitigation measures and monitoring programme of the same.

1.3 Scope of Work

The indicative scope of works for the Arusha City is as follows:

(i) Unga Limited – Muriet Road (6.4km) and Burka Bridge
Complete upgrading measures of the road from its current earth/gravel road to asphalt paved road.

(ii) Construction of Additional Two Cells at Muriet Landfill
This sub-project involves construction of two additional new cells at the landfill and carrying out necessary improvements to the recently constructed cell.

(iii) Bondeni Drain Extension (300m)
This sub-project involves extending the newly constructed reinforced concrete drain by 300m to discharge point.

1.4 Application Arrangements (Institutional Set-Up)

PO-RALG will be responsible for ensuring that the requirements of this ESIA are duly implemented. Notably, the necessary approvals required by the law, involving the responsible Authorities namely: the Vice President's Office (Division of Environment and the National Environment Management Council (NEMC).

1.5 Approach and Methodology for development of ESIA

1.5.1 The Approach

The following approach was used in the development of the ESIA.

- Identification of key issues for the ESIA study,
- Conduction of Scoping exercise which involved collection of data and information from literature, consultations with key informants and observations at representative LGAs to determine:
    - Baseline conditions of important biophysical and socio-economic receptors emphasizing prevalent trends and indicators;
    - Components of the TSCP sub-projects and activities in general likely to interact with this baseline;
    - Potential resulting environmental and social impacts;
    - Best alternative approaches for designing and implementing TSCP sub-projects;

  - Individual and institutional capacity building needs for implementation ESMP
- Developing the ESIA based on content specifically specified in the TOR.

1.5.2 Methodology

Field Studies and Public Consultation

Broader consultation: The fieldwork for this study was carried out in March 2015. The fieldwork involved reconnaissance to all sub-projects making various observations, site visits and interviews with stakeholders as well as meeting relevant Arusha City 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 Arusha City Council officials, Arusha Urban Water Supply and Sewerage Authority (AUWASA), TANESCO, and Others included meeting with local community in Arusha City.

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 City 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 Appendix 2.
- *Meetings with Government Authorities*: Brief meetings were held with heads of various departments of Arusha City 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, Community in Arusha City. 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 ESIA 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
    - The World Bank Operational Policy 4.01
    - Arusha City Social economic Profile (2008) and
    - Arusha City Environmental Profile (2008)

Impact Assessment

Impacts identification was done by superimposing the project elements onto the existing social and environmental natural using checklists. An environmental impact matrix method was used 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 (BATNEEC). The implementation schedule of the mitigation measures is summarized in the Environmental and Social Management Plan (ESMP).

Nonetheless, this ESIA found-out that there will be **resettlement impacts at the sites designated for the execution of additional** sub-projects specifically for the Unga Limited- Murriet road sub-project and the landfill. Therefore the ACC prepared a RAP in 2014 for the Road and that of the landfill a separate RAP report was prepared. Both RAPs have been implemented though there are still outstanding grievances for the landfill site. The Unga Limited-Murriet Road has a total number of 198 PAPs (Head of Household) who have received 827,542,616.00 Million Tshs as compensation while the establishment of the Murriet landfill bufferzone has a total of 42 and additional 2 PAPs head of House hold who have received 272,755,548.00 Million Shillings. Once the outstanding grievance is closed it will be determined if there is a need to update the buffer zone RAP.

Other works will be aligned within infrastructure Right of Way (RoW) or reserve, and zone designated for public utilities. Thus, a Resettlement Action Plan (**RAP) will not be prepared for the proposed additional works.** This is applicable for

the additional sub-projects **besides the Unga Limited – Muriet** road sub-project which had a separate ESIA and RAP studies conducted in 2014 as explained in Section 4.8.1.

The design team will avoid interference with properties within and around project sites. The Arusha CC will collaborate with the communities, supervision consultant and the contractors to resolve any unforeseen grievances on the basis of existing regulations.

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 ESIA. These data allow the study team to determine whether more detailed information on social and 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 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 social and environmental management in Tanzania and relevant international procedures to ascertain on 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 to mention a few.

Predicting Environmental Impacts

The environmental impacts were identified and their potential size and nature were predicted. The prediction of impacts specified their causes and effects and 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.

1.7 Report Structure

This report is divided into Eleven (11) chapters as described hereunder:

Chapter 1: Introduction
Provides the general overview of the project including how the project background and justification, objectives and scope of the study and methodology used for conducting the study.

Chapter 2: Project Description
This chapter details the project components and further outlines activities and materials used in all phases of the project i.e. (mobilization, construction and operation and decommissioning).

Chapter 3: Legal Requirement and Institutional Framework
Gives an overview of Environmental and Social Management Requirements describing United Republic of Tanzania policy, legislative and institutional framework and applicable World Bank safeguard policies.

Chapter 4: Baseline Environmental and Social Conditions

The first part of this chapter elaborates the project influence area and boundaries. Subsequently the chapter outlines the baseline / existing conditions of the study area divided into physical environment, biological environment and socio-cultural environment.

Chapter 5: Stakeholders Identification and Analysis
Chapter five explains how the stakeholders were involved during the ESIA process and presents their views regarding the project.
Chapter 6: Identification and Analysis of Impacts
This chapter discusses environmental and social impacts associated with the project analysed according to impacts significance.

Chapter 7: Impact Mitigation Measures
Mitigation measures are summarized in response to the adverse impacts identified in chapter 6 of the report.

Chapter 8: Environmental & Social Management Plan
The Environmental and Social Management Plan (ESMP) presents how the identified impacts during design, construction and operation phases of the project will be managed avoid, minimise or offset any adverse significant biophysical and socio-economic effects of the proposed development.

Chapter 9: Environmental and Social Monitoring Plan
Environmental and Social Monitoring Plan elaborates how the implementation of the ESMP will be monitored throughout the phases of the project. It is a plan to monitor the efficiency of the proposed project mitigation measures.

Chapter 10: Decommissioning and Demobilisation
This chapter presents the activities involved when the proposed project is no longer operational and potential impacts to be managed.

Chapter 11: Conclusions and Recommendations
Summary and conclusion summarizes findings with regards to how feasible, viable and environmentally acceptable the project is and provides recommendations to the proponent on the feasibility of the project.

Further, the report will also provide a list of documents used in a reference list and also a list of Appendices.

2.0 PROJECT DESCRIPTION

2.1 Project Location

Arusha is located in the Northern Tanzania, about 600 km from the Dar es Salaam. Geographically, it is between latitude 2° and 6° South and Longitudes 34.50° and 38° east. The city has a unique character of being surrounded by Arumeru District in all directions. It is 50 Kilometres West of Kilimanjaro International Airport and 6 km from Arusha Airport. The City is a centre of Northern tourism zone and is the major transit point for famous worldwide tourist attractions like Mt Kilimanjaro, Serengeti National Park, Ngorongoro Crate rand Olduvai Gorge. Arusha region has a common border with Kenya in the north, to the east it borders with Kilimanjaro and Tanga regions. To the south it shares a border with Dodoma region and to the west with Singida, Shinyanga and Mara regions.

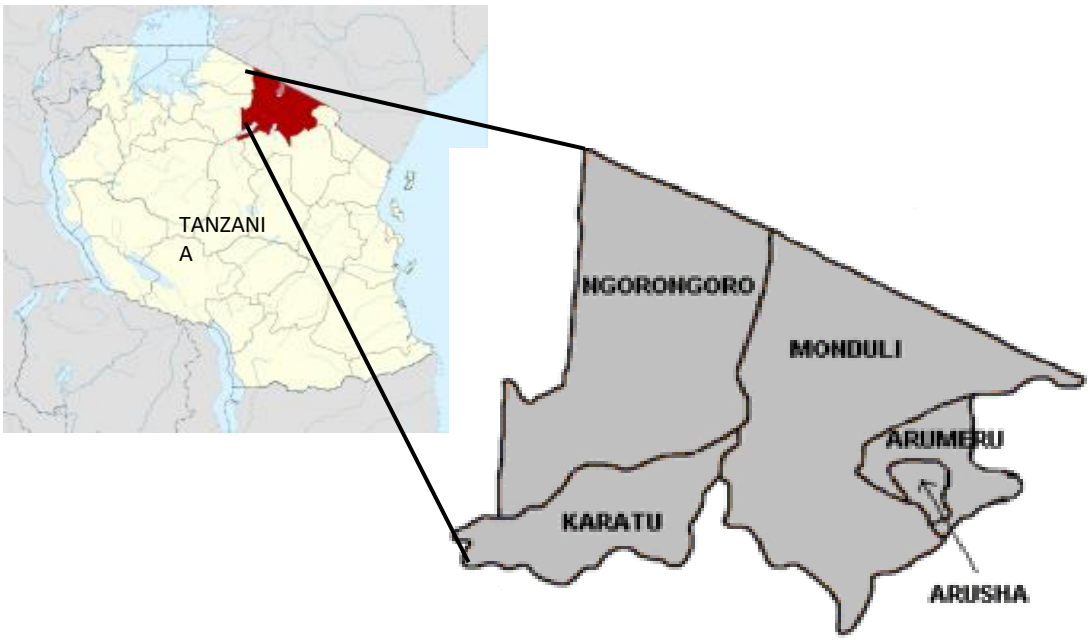
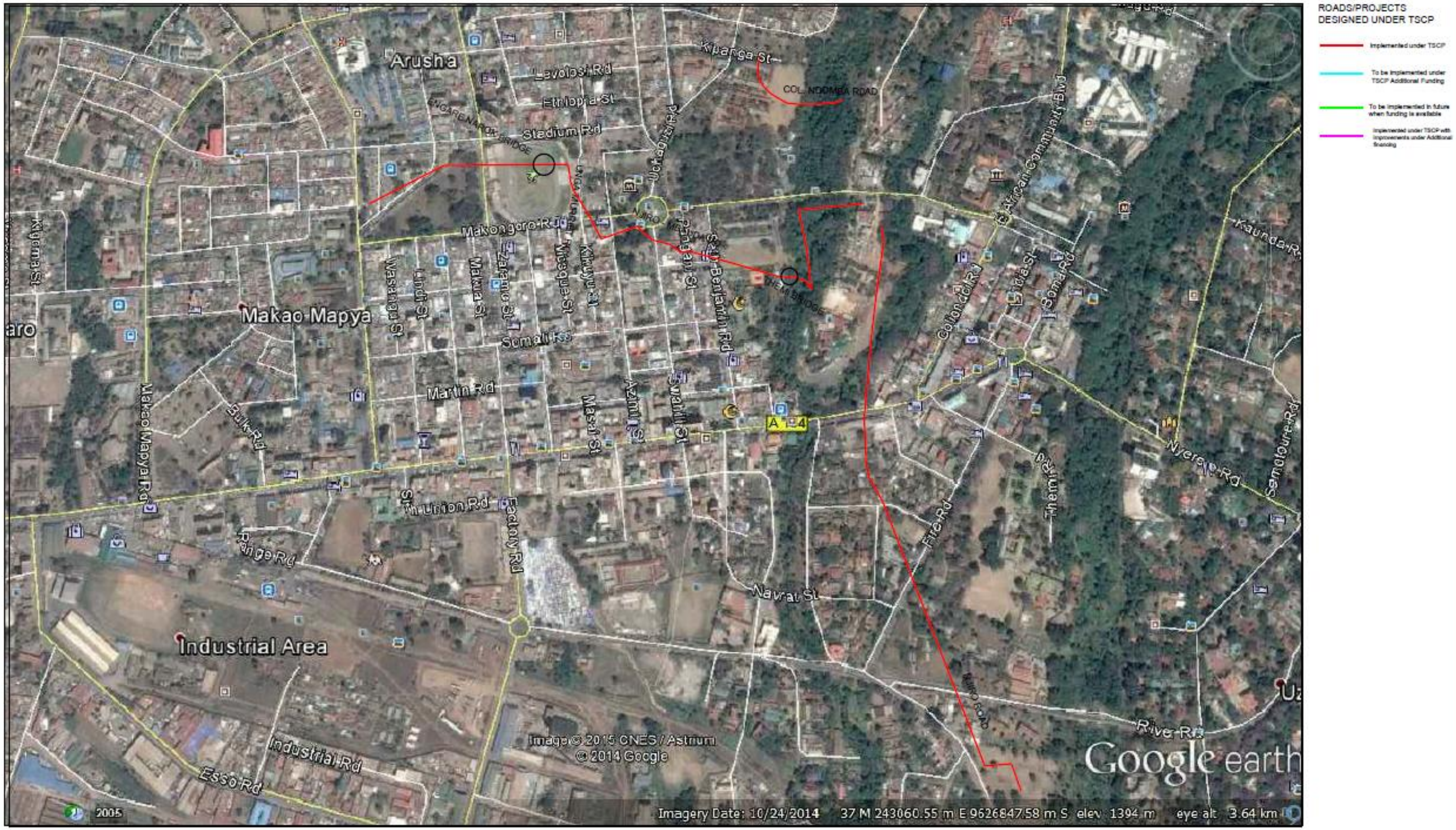


Figure 2.1: Map of Tanzania Showing project area.


ROADS/PROJECTS DESIGNED UNDER TSCP
Implemented under TSCP
To be implemented under TSCP Additional Funding
To be implemented in future when funding is available
Implemented under TSCP with improvements under Additional financing
Arusha
Makao Mapya
Industrial Area
Kiparga St
COL. NDOMBA ROAD
Levolosi Rd
Ethiopia St
Stadium Rd
Makongoro Rd
Uckaguzi Rd
Somali Rd
Martin Rd
Sokoine Rd
Union Rd
Factory Rd
Range Rd
Bulk Rd
Makao Mapya Rd
Navrat St
Fire Rd
Themi Rd
Nyerere Rd
Kaunda Rd
Colonel Rd
East African Community Blvd
Sametoure Rd
River Rd
Industrial Rd
Esso Rd
A 104
Image © 2015 CNES / Astrium
© 2014 Google
Google earth
Imagery Date: 10/24/2014 37 M 243060.55 m E 9626847.58 m S elev 1394 m eye alt 3.64 km
2005


ROADS/PROJECTS
DESIGNED UNDER TSCP
Implemented under TSCP
Implemented under TSCP with improvements under Additional financing
To be implemented under TSCP Additional Funding
To be implemented in future when funding is available
1-1 to 1-23 CBD ROADS
Arusha
Kaloleni
Bondeni
Bondeni Secondary School
Makao Mapya
Ngarenaro
Industrial Area
BONDENI DRAIN
Nawrat St
River Rd
Google earth
Imagery Date: 10/24/2014

Figure 2.2:Satellite Image Showing the Arusha City and Project roads

2.2 Project Components

The proposed TSCP AF in Arusha City has three components as described in the following section

(iv) Unga Limited – Muriet Road (6.4km) and Burka Bridge

Complete upgrading measures of the road from its current earth/gravel road to asphalt paved road with

- Paved storm water drains
- Installation of culverts where required
- Construction of new reinforced concrete - Burka Bridge
- Lanes for pedestrians/cyclists segregated from the vehicular lanes
- New pavement layers comprising
    - 30mm AC 14 on
    - 150mm CRR on
    - 150mm C1 cement stabilised Sub-base on
    - Improved sub-grade layers
- Installation of Street Lights

  NOTE: This sub-project has a separate ESIA report

(v) Construction of Additional Two Cells at Muriet Landfill

This sub-project involves construction of two additional new cells at the landfill and carrying out necessary improvements to the recently constructed cell. Activities include

- Construction according to designs additional new cells
- Construction of drainage systems to collect leachate and storm water to respective storage ponds
- Addressing shortfalls identified in the recently constructed cell. These include
    - Management of the existing waste at the site
    - Ground water monitoring – Upstream borehole
    - Leachate detection manhole
- Providing Landfill revised Site Development and Operational Plan
- Providing Site Operation and Maintenance Framework

(vi) Bondeni Drain Extension (300m)

This sub-project involves extending the newly constructed reinforced concrete drain by 300m to discharge point. Activities include

- Construction of reinforced concrete trapezoidal drain that discharges into river Naura.
- Installation of culverts and access slabs where required

The project road and the Bondeni drain will retain the existing horizontal profiles/alignment. The new landfill cell will be constructed on the existing site, adjacent the newly constructed cell.

2.2.1 Sub-projects alternatives

In the course of developing the proposed sub-projects for road, storm drain, street light and landfill structures, alternatives were compared in terms of potential environmental and social impacts; capital and operating costs, land availability and; suitability under local conditions. It was imperative to also examine and review different sub-projects settings, designs, and construction alternatives where two options were considered:

- No project option and,
- Alternative sites

2.2.2 'No sub-project' option

The investment sub-projects for the Arusha city under the proposed TSCP - AF are expected to improve sanitation and public health, promote safe and efficient mobility in the towns, improved economy and the general well-being in the city setting.

With contemporary fast increase of the population in the city, the challenge still prevails of inadequate stock and quality road, drainage, street lighting and waste disposal infrastructure. However, the sustainability of those infrastructure facilities depends on the good operation and maintenance of the facilities that will be adopted by the city authority.

If the 'no project' option was chosen, from the economic standpoint and social considerations, the following benefits will be foregone: i) improved transportation; ii) long life span for roads, iii) employment; iv) low incidence of accidents and v) controlled flooding inside urban centres against water stagnation. vi) good visibility and security at night and whenever natural light is dim, and vii) improved environmental sanitation in the city. Hence, for TSCP – AF sub-projects, the alternative of "no-project" would increase the risks on traffic and pedestrian accidents, flood damages to houses, vandalism of the infrastructure, untidy environment and general poor public health.
Thus, the 'no sub-project' option will not be a viable alternative under TSCP – AF sub-projects in Arusha.

2.3Project Activities in General

2.3.1 Mobilization phase

Activities
TSCP – AF entails mobilization of labour force, equipment and construction of project office and camp sites as well as acquisition of various permits (including water extraction rights) as required by the law. Other activities during this phase include carrying out of topographical survey, geo-technical investigation, soils and

materials investigation, land acquisition, material storage and material preparation and identification sources of construction materials including and source of water. During this period, auxiliary and preliminary works such as crushing of aggregates, locating sign posts and identifying sites for disposal of wastes will be conducted.

Duration

The duration of this phase will be four (4) months.

Types and Sources of Project requirements

Types and sources of project requirements during the pre-construction are presented in this section: Materials investigations and characterization has been done by the project design team, focusing on, among other things: investigations of existing and potential new borrow pits and quarry site areas in order to obtain suitable materials for the construction of gravel pavement layers and for the manufacture of concrete and for crushed stone and surfacing materials respectively. Further, the team has identified sources of water and sand for construction works as shown in Table 2.1

Table 2.1: Types and sources of project requirements during the pre-construction phase

Requirements	Type	Source
Raw Materials	Gravel	Kisongo 1 and 2 Borrow pits
	Hard Stone	Arusha Agregates Co. Ltd
	Sand	Crusher dust from the Arusha Aggregate quarry is used instead of sand, due to its unavailability in Arusha.
	Water	AUWSA
	Cement	Tanga Cement Co. Ltd
	Reinforcement bars	Local Vendors in ArushaCity
	Timber	Local vendorsArushaCity
Energy	Electricity	TANESCO (National Grid)/ Generators
	Fuel	Local vending stations
Manpower	Skilled	Contractor
	Unskilled	Local People along the road
Equipments	Dump Trucks, Graders, Dozers, Water Boozers, Vibratorss, Excavators	Contractor

Source: Design report for Proposed Additional Sub-Projects in Arusha City under the TSCP, 2014

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

Table 2.2: Types, amounts and treatment/disposal of wastes during the mobilization phase

Waste	Types	Amount	Treatment/ Disposal
Solid Waste (Degradable)	Garbage: Food remains, cardboards and papers Plants including trees and grasses	32 kg/day (based on generation rate of 0.32 kg/day/ person and 100 workers)	Collected in a large skip bucket at the construction sites/office and campsite. then to be composted and used as manure.
Solid Waste (Non-Degradable)	Scrap metals and plastics	1 - 6 kg per day	Sold to Recyclers
	Tins and glasses	0.5 - 5 kg per day	Disposal at the new Authorised landfill at Murriet
Liquid waste	Sewage Sullage	3.2 m^3 (Based on 100 people, 40 l/capita/day water consumption and 80% becomes wastewater)	Disposed into Septic tank –Soakaway system at the campsites/ office
	Oils and greases	None	Car maintenance will be done at proper garages

Note: Estimation data used are typical waste generation rates in construction sites, based on the experience of the consultancy.

Wastes such as top soils will be used to fill the diversions, while biomass such as felled trees will be used as a source of energy at 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 shall be done in proper garages.

2.3.2 Construction phase

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

i. **Upgrading of Unga Limited - Muriet road**
   - Filling and reshaping the road section to sub-grade level;
   - Cutting of the earth sections to facilitate widening of the roads;
   - Provision of temporary crossings and traffic diversions;
   - Excavation of the existing roads and the construction of fill embankments;
   - Shaping of gravel from borrow pits for sub-base and base

- Supply of bitumen and stone chippings Upgrading or construction of longitudinal and cross drainage structures
- Provision of sub-base, base course and double surface dressing ending with finishing course of bitumen surface standard.
- Demolition and removal of Burka bridge and several culverts along the road alignment;
- Construction of Burka Bridges and incidental works and;
- Installation of road furniture.

ii. **Extension/Improvements to Bondeni storm-water drain**

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

iii. Construction of additional cell at Muriet landfill

- Construction of dikes/bunds;
- Construction of surface run-on and run off drainage channels;
- Lying down of liners;
- Construction of leachate collection systems;
- Construction of landfill gas ventilation/ collection system and;
- Setting up of monitoring facilities for ground/ surface water, air and noise pollution

Types and Sources of Project requirements

Types and sources of project requirements during the construction phaseareshown in Table 2.3:

Table 2.3: Project requirementsand Sources during the construction phase

Requirements	Type	Source
Raw Materials	Gravel	Kisongo 1 and 2 Borrow pits
	Hard Stone	Arusha Agregates Co. LTD……
	Sand	Crusher dust from the Arusha Aggregate quarry is used instead of sand, due to its unavailability in Arusha.
	Water	AUWSA
	Bitumen	South Africa/Saudi Arabia
	Cement	Tanga Cement Co. Ltd
	Reinforcement bars	Local Vendors in ArushaCity
Manpower	Skilled	• Contractor
	Unskilled	• Local People
Equipment	All construction machines and equipment	• Contractor

Requirements	Type	Source
	All type Vehicles and Trucks	• Contractor

Source: Design report for Proposed Additional Sub-Projects in Arusha City under the TSCP, 2014)

Typical waste types during this phase are listed in Table 2.4 together with the estimated amounts.

Table 2.4: Types, amounts and treatment/disposal of wastes during the construction phase

Waste	Types	Amount	Treatment/ Disposal
Solid Waste (Degradable)	Garbage: Food remains, cardboards and papers Plants including trees and grasses	32 kg/day (based on generation rate of 0.32 kg/day/ person and 100 workers)	Disposal at the new Authorised landfill at Murriet
Solid Waste (Non-Degradable)	Scrap metals	5 - 9kg per day	Sorted and sold to recyclers
	Tins, glasses and plastics	2 - 5 kg per day	
Liquid waste	Sewage Sullage	32 m^3 (Based on 100 people, 40 l/capita/day water consumption and 80% becomes wastewater)	Disposed into Septic tank – Soak away system at the campsites/ office

Note: Estimation data used are typical waste generation rates in construction sites, based on the experience of the consultancy.

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 shall be done in proper garages.

2.3.3 Operation phase

The actual usage of the facilities is expected to commence after completion of the construction works. The project facilities in Arusha will be directly managed by Arusha City Council. During the operational phase, the City 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, management of waste placement, compaction and covering of the waste in the

landfill according to the landfill design. The following activities will be performed during the operation phase:

Operational activities at the landfill

- Placement of the waste in cells, followed by levelling, waste covering and compacting of solid waste;
- Extension/Construction of on-site roads;
- Environmental monitoring of dust, noise, leachate, landfill gas, and groundwater quality;
- Monitoring performance of leachate ponds;
- Control of soil erosion;
- On/ Near site excavation / trenching of soil for cover material and;
- Estimate of traffic volume during the land-filling operation phase

Activities during operation of roads and drains

- Periodic maintanace of of the roads and drain and;
- Removal of solid waste and silt from the trenches

Types, Amounts and treatment/disposal of Wastes

Types, amounts and treatment/disposal of wastes exepected to be generated during the operational phase are mainly waste disludged from storm drains during regular O&M of the drains, and paper wastes from the ticketing station to be constructed at the bus parking stands. These are shown in Table 2.5 as follows:

Table 2.5: Types, amounts and treatment/disposal of wastes during the operational phase

Waste	Types	Amount	Treatment/ Disposal
Mixed wastes deposited into storm water drains	Plastics, Paper, Silts and Grass	N/A	Collection and disposal in the new authorized waste dump at Muriet area
Solid waste	Used paper tickets from the ticketing station	N/A	Collection and disposal in the new authorized waste dump at Muriet

2.3.4 Decommissioning/Demobilization phase

Demobilization

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 government depending on agreements that will be reached during the mobilization phase.

Decommissioning

Decommissioning of roads and storm-water drains 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.

Decommissioning of landfill will happen at the end of the landfill design life i.e. 100 years. The activities in this phase will include;

- Application of the final cover
- Grading the final slopes to around 5%
- Installation of a permanent system of surface drainage channels on the landfill
- Disassemble temporary structure (e.g. camp site buildings)
- Seeding the final cover with the appropriate mixture of grasses.
- 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

Duration

Demobilization stage will last for a period of three (4) months

Types and Sources of Project requirements

Types and sources of project requirements during the demobilization phaseareshown in Table 2.6 as follows;

Table 2.6: Project requirements during the demobilization phase

Requirements	Type	Source
Manpower	Skilled	Contractor
	Unskilled	Local People along the road
Equipments	Bull dozer	Contractor
	Motor grader	Contractor
	Roller Compactor	Contractor
	Plate compactor	Contractor
	Tippers	Contractor

2.4 DESIGN CONSIDERATION

This section presents design concepts for each of the proposed projects. Engineering drawings for the facilities are presented in Appendix III.

2.4.1 Design of Unga Limited - Muriet Road

Following site visits to the project site by the project design team, the previously proposed geometric designs during Core TSCP were adjusted where necessary to suit the practically existing field conditions. Further refinement has led to the development of construction working drawings (Appendix III) to be used in the bidding phase of the project. A summary of the design concepts is provided hereunder.

Design Speed: Due to the nature of the environment in which the road is located being predominantly existing built-up suburban area with clearly defined right of way (R.O.W.) servitudes, the choice of design speed is based on a "safe practical" approach that best fits within the R.o.W. rather than an "ideal" approach. Design speeds vary between urban streets (commercial and industrial streets) at 30 km/h, to suburban roads (collector and arterial roads) at 50 km/h.

Cross-Sections: The roadway adopted generally comprises a carriageway consisting of two lanes, shoulders, side drains, sidewalks, and verges all located within the R.O.W. The section between CH 4+530 and CH 5+150 have been provided with a dual carriageway road to allow for High Tension electric line to be retained within the proposed median. Camber slope of 2.5% have been provided on all sections, where central Median Island is provided each lane drains away from the median island. The road is provided with 1m wide surfaced shoulder on both side and a 1m to 1.5m walkway depending on available space separated by intermittent barrier kerbs from the shoulder.
Side Drains are located on both sides of the road and generally the road camber will direct storm-water run-off from the road centreline to both drains. The types of drains used are covered under subsequent sections.

The road verges, exclusive of sidewalks, generally comprise of earth, gravel or paved surfacing depending on the adjacent environment and extend to the adjacent property boundaries. The road verges are also to be used to accommodate additional roadside furniture such as signage and barriers.

Horizontal and Vertical Alignments: As far as possible, existing conditions permitting, vertical curves coinciding with horizontal curves have been contained within the horizontal curve and ideally have the same length or less.

Other Facilities: Taxi / bus bays will also be provided; the positions and frequency being agreed upon through consultation with the LGA during the detailed design stage. Taxi / bus bays will be constructed using the same pavement and surfacing as the adjacent roadway.

Pedestrian and cyclist crossings will be provided at safe crossing zones comprising of painted road markings with adequate advance warning signage and traffic calming devices. The positions will also be established through consultation with the local communities.
Intersecting side streets and accesses generally tie into the new roads at the current horizontal and vertical alignments and terminate at the road reserve boundary. In some cases the alignments have been adjusted to improve intersection angles and visibility, and to ensure smooth transitions between roads. Access to adjacent homes and businesses separated from the roads by deep open drains will be provided for in the form of concrete access slabs spanning the drains. The position and frequency of the slabs have to be established on site.

2.4.2 Design of Bondeni Storm-water Drain

Storm-water drains: The conveyance and accommodation of road prism storm-water run-off generated from the upgraded road system has been provided for in the form of new side drains. These drains collect and transport run-off to new and/or existing inlet and outlet structures discharging into the existing storm water system. A diagram showing the final destination of storm water run-off discharge generated by the roads upgrading can be found on Appendix III. The following approved standards (Table 2.7) by the Ministry of Works – MoW shall be adopted and adhered to:

Table 2.7: Adopted Design Standards

1.	Geometric design	MoM Draft Design Manual of 1989, Code of practice for Geometric Design (Draft) published by SATTC –TU, 1998
2.	Pavement and Materials	MoW Pavement and Materials Design Manual, 1999
3.	Specifications	MoW Standard Specifications for Road Works
4.	Testing Procedure	MoW Central Materials Laboratory testing Manual
5.	Structures	British Standards BS 5400
6.	Hydrology and Hydraulics	TRRL East African Flood Model
7.	Surveying	Land Survey and Mapping Standards of Tanzania (Land Surveying Regulations CAP 390)

2.4.4 Design of the Landfill
Access control:

The entire site is fenced with a gate entrance off the municipal road which extends along the southern boundary.

A small building comprising an office and ablution is provided. The access layout allow for the construction of a weigh bridge at future date.
Utility services are required. Water supply is provided from a site monitoring bore hole at the northern boundary of the site. The water is to be pumped into a 2k elevated header tan which is connected to the building. Sewage disposal is via septic tank French drain.

Waste Cells: The proposed air space volume is $1.0x10^6$ m^3

The proposed waste disposal area covers 330x240m ($79376m^2$) with the depth of waste being build up to approximately 12m. As it is not feasible financially or technically to construct the entire site initially, the development of the site has been divided into cells approximately 50m wide. It will not be possible to fill each cell to it is full eight untitled adjacent cells are constructive; however the life of cell is approximately 2 years. An estimated daily tonnage of 150 tonnages has been used.

The cell as designed such as based is excavating into the in-situ soils. It is proposed that the soil excavating from cell one shall be stock piled in the south excavating Cell 2. This would continue for subsequent cells with the Cell 1 material being used for cover for Cell 6.

Liner System: As the volume of clay suitable for use as the liner is uncertain the primary liner incorporates a Geo-synthetic Clay Liner (GCL) in place of compacted clay. The GCL is covered by a protection layer 150 mm thick comprising material from site and is supported on a based layer 100mm think also comprising material from site. This layers under lain by 150mm stone cheaper charted tectionliyeranda150mm compacted clay secondary liner.

During the construction of subsequent cells, it is essential that the liner layers are tied into the previous constructive liner layers. Along the side slopes the leachate detection and secondary liner layers are omitted.

Leachate drainage: Leachate is generated by the liquids in the waste, the decomposition of waster and rain falling on to the waste. To restrict the volume of leachate, all storm water from adjacent areas is to be diverted away from the waste body. In addition the uncapped areas of waster shall be kept to a minimum and progressive closer of portions of the site shall be under taken as soon as final levels are attained. The primary leachate drainage system is a 150mm stone chip layer above the liner assist drainage 150mm diameter slotted peppers are provided daylong the centre of each cell. The leachate is intercepted at the southern edge of the land fill and piped to a leachate pond located at the south-western corner of the site.

It is difficult to predict the volumes of leachate that will be produced as rain affects the flow. Soon after construction of a landfill cell, run off from the lined area will increase. As waste covers the cell it attenuates the run off reducing peak flow. Data available reveals the Mean Annual Rainfall is 1200mm, the average daily rainfalls 94mm, whilst the maximum daily rainfall is recorded at 117mm. The leachate pond provides storage of 750mm3. The pond is provided with an over flow into the contaminated storm water storage pond. The leachate pond is lined with 2.0m thick HDPE geo-membrane.

2.5 Construction Materials and Labour Force

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, except bitumen and landfill liners, which will be imported by the contractor. Gravels will be obtained from the existing borrow pits though more may have to be opened up during the construction stage if the need will arise.

Construction works is generally a labour intensive undertaking. Apart from technical and skilled manpower, recruitment of unskilled labour will be done locally. A minimum of 100 people are expected to be employed by these projects.

2.6 Waste Generation

Waste generated during all the project phases shall be handled in an environmentally friendly manner. Spoil soil shall be stock piled along the road alignment or at the borrow pits. The soils shall be used to reinstatement of sites at the end of the project implementation phase. Domestic wastes generated at the campsites and offices shall be disposed in VIP latrines connected to septic tank/soak away systems.

Solid wastes shall be stored in waste bins at the sites/campsite, and later transported to designated disposal sites. Other contingent plans to handle the accidental oil spillages and general waste management shall be worked out during the preparation of the Environmental and Social Management Plan (ESMP) for TSCP – AF2.

3.0 LEGAL REQUIREMENTS AND INSTITUTIONAL FRAMEWORK

3.1 World Bank Safeguard Policies

The World Bank Safeguard Policies are Operational Policies (OP) and Bank Procedures (BP) approved by the Board for addressing environmental and social issues within the Banks supported development projects. TSCP has been assigned Environmental Risk Assessment Category B and triggers the following World Bank Safeguard Polices: (i) Environmental Assessment (OP/BP 4.01); (ii) Involuntary Resettlement Policy (OP/BP 4.12); (iii) Physical Cultural Resources (OP/BP 4.11). The same policies will apply to the Sub-Project activities under the proposed Additional Financing.
The safeguard policies applicable to the TSCP – AF in general and Additional Financing specifically are:

3.1.2 OP 4.01 (Environmental Assessment)

The World Bank's safeguard policy OP 4.01 Environmental Assessment requires that all Bank-financed operations are screened for potential environmental and social impacts a view shared by the Tanzania National EIA procedures and processes. Both policies emphasize that the required environmental assessment be carried out on the basis of the screening results.

In Arusha City, the project intends to finance additional infrastructure including arterial urban road and associated storm water drains, extension of drainage channels from urban facilities and construction of two new landfill cells at the existing Muriet dumpsite), and these can have adverse environmental impacts. In this ESIA these potential impacts are well described. The ESIA contains directions for the City project teams and local leaders and management committees on practical ways of avoiding or mitigating adverse impacts. An ESMP is also included in this ESIA report.

3.1.3 OP/BP4.11 (Physical Cultural Resources)

Culturally, Tanzania is an extremely rich and diverse country and is home to ancient civilizations: 300-year-old Arab settlements; 100–year-old European buildings; graveyards; sacred areas; mosques; churches; etc. To mitigate against the potential for adverse impacts on cultural property, training of LGA project teams and local leaders and management committees and the subproject planning checklist as well as other tools, will ensure that cultural property resources are identified during subproject planning, and appropriate measures are taken to avoid damaging them. Chance find procedures have been included into civil works

contracts; Designs and buffer zones will be created to avoid damage to cultural resources, such as "sacred" forests and graveyards. According to approved designs, the design of Unga limited -Muriet Road, extension of Bondeni drain and construction of the two addition landfill cell at Muriet dumpsite, do not affect any cultural resources, but procedures in case of "chance finds" will be observed.

3.1.4 OP 4.12 (Involuntary Resettlement)

WB Involuntary Resettlement Policy OP 4.12 requires that all projects with land acquisition implications are guided by a Resettlement Policy Framework (RPF), which outlines processes and procedures to be followed for preparation of site specific RAPs during project implementation. However, in Tanzania, there are no explicit requirements for a RPF or RAP. As regards compensation the Tanzania laws requires that only the rightful land or property owner (statutory or customary rights of occupancy) should be compensated, while the WB OP 4.12 require that any person (whether is rightful owner or not) who loose or is denied or restricted access to economic resources – including tenants, encroachers, squatters - should either be compensated for use of the land or assisted to move. TSCP project will apply both WB requirements and Tanzania government's guidelines regarding compensation and resettlement of Project Affected People (PAP), and where there are gaps between these two, the World Bank's safeguard policy will prevail.

Upgrading of the Unga Ltd- Muriet Road will involve a new re-alignment at Migungani Street, where the Arusha City Council will need to acquire the concerned pieces of land from current land holders. The city has prepared and disclosed RAP in April 2014, and another updated RAP disclosed in April 2016, based on the principles and approaches outlined under the RPF.

With regard to the Bondeni Drain, proposed drainage way is located within seasonal vegetable gardens within the railway reserve operated by the locals. About quarter of the garden will be affected by the project implementation. The city and the garden operators have agreed that the farmer shall move about 2m from that railway to pave way for the drainage. The farmers shall continue to use the remaining portion of the garden. In view of this, there will be no need for resettlement and compensation for the gardeners.

3.2 Relevant National Policies and Environmental and Social Management Requirements

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. 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.

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 General Environmental Management

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.

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.

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.

Environmental (Registration of Environmental Experts) Regulations (2005)

The law requires EIAs be conducted by person or firm of experts registered and certified by the Registrar at NEMC. PO-RALG has consulted fully registered EIA experts undertake this ESIA. Arusha City though PO-RALG has strived to assign qualified external experts to work with trained PO- RALG staff to work on the ESIA to a point where sub-projects will be granted an EIA certificate issued by Minister responsible for environment.

3.2.2 Management of Air Emissions and Ambient Air Quality

Environmental Management Act (EMA), Cap 191 (Sections 74, 75, 130-132)
EMA has provisions for three main areas: General Atmosphere; Climate Change and Management of Gaseous Wastes from Various Sources. The Act directs project proponents to adopt national standards on air emissions.

Environmental Management (Air Quality Standards) Regulations, (2007)
This regulation prohibits emissions/release of hazardous substance into the environment. The sub-project ESMP for managing wastes will adhere to permissible emission limits and quantities of emissions of SOX, CO, black smoke and suspended particulate matters, NOX, O_3, hydrocarbon, dust, lead and substances in exhaust of motor vehicles prescribed by the regulations. If need be, the City authority shall seek air pollutant emission permit issued by NEMC.

Public Health Act, Cap 336 (2009)
The Act sets requirements for management of gaseous wastes from various sources including vehicles. The sub-project ESMP will ensure that habitable buildings under TSCP -AF are designed to have adequate openings or ventilation, means of smoke escape, and maintenance of equipment and devices.

Occupational Health and Safety Act, No.5 (2003)
The subproject ESMP for the Arusha City have incorporate requirements and standards for personnel working in areas where dangerous fumes are likely to be present; and precautions in respect to explosive or inflammable dust, gas, vapour or substance.

3.2.3 Management of Solid Wastes

Environmental Management Act (EMA), Cap 191 (Sections 114 – 118).
By developing the landfill and the solid waste management system as a whole, Arusha City has fulfilled its responsibility required by EMA which empower it to devise means for minimization of solid wastes and method of collection, transportation and, treatment and disposal.

That also highlights on appropriate equipment and routes for collection; and designate transfer station / collection centres. The sub-project ESMP will ensure proper functioning of the infrastructure and facilities.

Public Health Act, Cap 336 (2009)
By developing waste management infrastructure, the City also has fulfilled PHA requirement that vest duty to LGA to set aside and manage areas in respect of solid (and liquid) wastes; collect, transport and dispose wastes from all sources; cleanse all receptacles; clean, maintain, and keep streets and public places, dumping sites and control scavengers at all waste sites. The subproject ESMP and specific Waste Management Plans will ensure that the infrastructure and facilities in the City operate as per these requirements.

Environmental Management (Hazardous Waste Control and Management) Regulations (2009)

The subproject ESMP and specific Waste Management Plans will ensure that the proposed landfill and its facilities have specific procedures and practices for storage, transportation, treatment and disposal of all categories of hazardous and toxic wastes including health care wastes, electrical and electronic wastes, pesticides, radioactive, industrial and consumer and chemical wastes. The monitoring procedures set in this ESIA will ensure periodic records and annual reports of the performance of the licensed waste management landfills.

3.2.4 Management of Water quality

Environmental Management Act (EMA), Cap 191 (Sections 61, 62, 123 – 129)
By developing storm water management infrastructure, the Arusha City also has fulfilled EMA requirement that vests duty on LGA to prepare for placement of storm water drains. The sub-project ESMP will adhere to provisions on discharge of sewage and management of liquid wastes and storm water.

Environmental Management (Water Quality Standards) Regulations (2007)
The sub-project ESMP will ensure safe distances of water supply systems from pollution sources for any infrastructure activity near water sources. The inclusion of Environmental Management Officers in project teams and approval of subproject ESMP will ensure no discharge of water polluting substances will go uncontrolled.

The Water Resources Management Act No. 11 of 2009
The Act provides for institutional and legal framework for sustainable management and development of water resources. 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, and the ESMP has provided measure to protect water resources in the subproject areas.

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 City by provision of proper solid waste collection and disposal facilities.

3.2.5 Management of Soil Quality

Environmental Management (Soil Quality Standards) Regulations (2007)
The sub-project ESMP will ensure main polluting activity and discharge effluent are prevented from contaminating soils or subsoil.

3.2.6 Management of Noise

Environmental Management Act (EMA), Cap 191 (Sections 147).
The screening procedure used during scoping delineated all sorts of activities with potential to emitting noise and vibrations in order to control noise and vibration pollution into the environment.

3.2.7 Management of Land and Land-use

The Constitution of the United Republic of Tanzania Cap 2 (1977); National Land Policy (1997); Land Act, Cap 113 (R.E 2002); Land Acquisition Act, Cap. 118 (R.E 2002); Urban Planning Act No.8 (2007); Land Use Planning Act No. 6 (2007); Land (Assessment of the Value of Land for Compensation) Regulations (2001); Land (Compensation Claims) regulations (2001); Courts (Land Disputes Settlements) Act, Cap. 216 (2002).

These laws and regulations govern the use of land and other assets in urban areas including property and land rights, acquisition of land and other assets, rights and compensation, and dispute resolution and grievance mechanisms. Resettlement of PAPs along the Unga limited - Muriet road will be according to the provision of these laws.

3.2.8 Management of Public / Occupation Health and Safety

Occupational Health and Safety Act No. 5 (2003); Employment and Labour Relation Act Cap. 366 (2004); National Policy on HIV/AIDS (2001); The HIV and Aids (Prevention and Control) No. 28 (2008); Law of the Child Act No. 21 (2009); and Disabilities Act No. 9 (2010)

These Acts make provisions for safety, health and welfare of persons at work places and general public. Sub-project ESMP has incorporated measures that ensure

employment opportunities to all while protecting right of children and people with disabilities and control of social illnesses.
The occupation health and safety Act 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. Thus, as stated in the ESMP, the Arusha City shall ensure that the equipment used by employees are safe and shall also provide proper working gear as appropriate. The contractors shall abode to the provisions of this Act.

3.2.9 Others Relevant to Infrastructure Development

National Transport Policy (2003)

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.

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'.*

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.

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.

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, 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.

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.

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.

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. 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.

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.

Explosives Act, 538

The Act requires all persons intending to use explosives in their activities to apply for an explosive license. In construction projects, explosives may be needed in material extraction from quarries and borrow pits. The developer shall apply for explosive license in case blasting becomes necessary at the working sites and/or materials extraction sites.

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

EIA PROCEDURES IN THE ROAD SECTOR (as per EAMGRS 2004)

Administrative Procedures:

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).

Environment Application and Screening Process:

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 and Social Impact Assessment (ESIA).

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.

All road projects with non-major environmental impacts shall be subject to an Initial Environmental Examination (lEE) 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.

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 Institutional Framework for Environmental and Social Management

Environmental and Social Management Authorities

Environmental Management Authorities as per Environmental Management Act, Cap 191 (2004) and EIA Regulations:

National Environmental Advisory Committee

Advice the Minister Responsible for Environment on environmental issues requiring decision making

Minister Responsible for Environment
Issue guidelines and designate duties to various entities; approval by issuing of decision letter / EIA Certificate for development projects; delegate responsibility for EIA authorization to Director of Environment, LGAs and Sector Ministries.

Director of Environment
Coordinate, advise, assess, monitor and report environmental related aspects and activities; responsible for environmental policy and legal formulation and implementation; integration of environmental considerations into development policies, plans, programmes, strategies and projects; undertake strategic environmental assessment. The Director provides advice to Minister for approval of Environmental Impact Assessment report (EIS) and issuance of EIA Certificate.

National Environment Management Council (A Body Corporate)
Undertake enforcement, compliance, review and monitoring of environmental impact assessment. NEMC role is to initiate /develop procedures and safeguards for the prevention of activities which may cause environmental degradation; provide advice and technical support to different stakeholders; enforce and ensure compliance of the national environmental quality standards. NEMC has specific roles and responsibilities to NEMC in the undertaking EIA/PEA for new development projects (Part III – XI); Environmental Audit for existing development projects (Part X); and Environmental Monitoring and Reporting (Part XI). Under the EMA, NEMC is empowered to establish specific offices or to appoint or designate officers to effectively perform its functions.

- Registrar of EIA Expert /Firm of Experts /Environmental Auditor/Environmental Inspectors: Register and keep registry of qualified firms/individuals authorized to offer services in undertaking ESIA, Initial and Control Environmental Audit Environmental Inspection, ESIA training and other technical support.
- Environmental Inspector (Appointed or Designated): Empowered to enter on any land, premise or facility of the project for the purpose of inspection, to examine records and to make enquiries on the project or for the purpose of monitoring the effects of activity carried out on that land, premise or facility upon the environment.
- NEMC Zonal Offices: Headed by Environmental Management Coordinators replicate all functions and departments of NEMC including overseeing Compliance and Enforcement; ESIA; Research and Planning etc. The Zonal Office in Arusha will be responsible in overseeing compliance and enforcement during implementation of TSCP AF subprojects in Arusha City

Sector (Ministries) Environmental Sections
Responsible for all sector–specific environmental matters within the Ministry including participation in Cross-Sectorial Advisory Committee for review of ESIA Reports; review and verification of Environmental Audit Reports, monitoring on-going projects, and submit Monitoring reports to NEMC.

Regional Secretariat
Assist the Regional Commissioner; oversee/advise implementation of national policies, enforcement of laws and regulations at regional level. EMA, Cap. 191 Section 34 confers additional roles to the Regional Secretariat to coordinate all environmental matters within respective region.

Local Government Authorities
Perform basic functions including promoting social and economic wellbeing and development of areas and people within jurisdictions including relevant to environmental and social management. EMA, Cap. 191 Section 37 confer additional functions for the environment committees; give general powers to the LGAs including to undertake inquiries and investigations, summon any person, resolve conflicts among various parties, inspect and examine any premise, order to remove substance or article harmful to the environment and prosecute or sue any violator.

- LGA Environment Management Officer (designated / appointed): Enforce, advise the Environment Management Committee, gather/ manage information, and report on state of local environment. EMO are tasked to monitor the preparation, review and approval of environmental impact assessment for local investments.
- LGA Standing Committee on Urban Planning and Environment: The Committee is established under Section 42 (1) of the Local Government (Urban Authorities) Act, 1982 as a standing committee responsible for urban planning. EMA cover additional functions for the environment committees include overseeing proper management of environment within an urban area.
- Standing Committees of Economic Affairs, Works and Environment of a Township: Established under Section 96(1) of the Local Government (District Authorities) Act, 1982 while EMA, Cap. Additional functions for the environment committee include overseeing proper management of environment within a township.

3.4 Registered EIA Expert /Firm of Experts /Environmental Auditor/Environmental Inspectors:

Qualified firms/individuals authorized to offer services in undertaking ESIA, Initial and Control Environmental Audit Environmental Inspection, ESIA training and other technical supports.

Other Actors as per EIA and Audit Regulations, 2005

- Investor/ Developer / Project Proponent: oversee and meet costs of Environmental assessment and implementation of ESMP/ESMoP; undertake Initial Environmental Audits and Environmental Control Audit, Self-auditing during implementation of ESMP; undertake Baseline Survey before project implementation as basis for undertaking effective monitoring

General Public empowered by EMA and EIA Regulations to participate in all environmental management matters concerning them and at all stages of the ESIA process specifically to raise issues and concerns and to appeal when dissatisfied.

3.5 Other Authorities relevant to Infrastructure Development

Tanzania Electric Supply Company Limited (TANESCO)
Under the Ministry of Energy and Minerals, its core functions are generation, transmission, distribution, supply and use of electric energy. At so many location TANESCO use road reserves for transmission infrastructure. The City authority collaborated with TANESCO during the planning of subproject activities.

Water Basin Authority: Established to manage water resources in nine (9) water basins. Extraction of any water for the construction of the project will have to be approved by the relevant Water Basin Authority. The relevant water basin for this project is the Internal Drainage Basin to Lake Eyasi.

Water and Sewerage Authorities
The Arusha Urban Water and Sewerage Authority (AUWASA) were established to offer water supply and sanitation services in the Municipality. The authorities issue permits for discharging liquid wastes. The ESMP specifically states that the contractor shall apply for water extraction and waste water discharge permits as necessary.

Tanzania National Roads Agency (TANROADS)
Issue approvals or permit for undertaking physical works on roads or road reserves, issue permit for extraction of construction minerals, issue permit for using roads above set limits (tonnage, width etc.).

Occupational Health and Safety Authority (OSHA)
Oversee safety, health and welfare of persons at work, carries out all workplace inspections; hygiene surveys and measurements, occupational health examinations of workers, offer advice on ergonomics and scrutinize workplace drawings. It is provided in the ESMP that the Municipal shall engage OSHA expertise for inspections of works places during the operation phase.

Tanzania Commission for Aids (TACAIDS)
Prevention and control spread of HIV/AIDS, to promote advocacy and education on HIV/AIDS, to protect human and communal rights of people infected with and affected by HIV/AIDS.

Energy and Water Utilities Regulatory Authority (EWURA): In the electricity sector its functions are to regulate transmission and distribution of petroleum and natural gas; in the water sector EWURA is responsible for (i) licensing and regulating water supply and sanitation services (ii) establishing standards, guidelines and tariffs chargeable in relation to water supply and sanitation services and (iii) Monitoring water quality.

4.0 BASELINE ENVIRONMENTAL AND SOCIAL CONDITIONS

4.1 Spatial, Institutional and Temporal boundaries

4.1.1 Spatial boundaries

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 that is the boundaries of the Arusha City.

4.1.2 Institutional boundaries

Institutionally, Arusha City Council has a mandate to develop and maintain the urban infrastructure in the Arusha City. Its primary function includes the maintenance and development of the infrastructures to support the economic and social development of in the City at large. The City Council will also be responsible for addressing the environmental issues posed by the subprojects. The road, the bridge and the extended storm-water drainage channel will be under the City engineer while sanitary landfill will be under the City health officer.
From the central government line of administration, by virtue of their location, the urban infrastructures to be developed by this project in Arusha City is under the jurisdiction of the Regional Commissioner for the Arusha region.

4.1.3 Temporal boundaries

With the exception of the landfill (until design life expires), all other sub-projects being improved under TSCP - AF are not expected to stop being functional 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.

4.1.4 Area and Administrative structure

Administratively, the Arusha Council has an area of about 208km2 [208,000 hectares] divided into 25 Wards and 154 hamlets. It has a very unique character of being surrounded by Arumeru District in all the four geographical directions.

4.2 Physical Environments

4.2.1 Project Location

Arusha City is one of the six Councils in Arusha Region, which includes Meru, Monduli, Ngorongoro, Longido , Arusha and Karatu Districts Councils and it is the head quarter of Arusha Region located in Northern Tanzania between latitude 2° and 6° South and Longitudes 34.50° and 38° East. It has a unique character of being surrounded by Arumeru District in all directions. It is 50 Kilometers West of Kilimanjaro International Airport and 6 km from Arusha Airport. Its area is 208km2 with 25 Wards and 154 hamlets.

The City is a centre of Northern tourism zone and is the major transit point for famous worldwide tourist attractions like Mt Kilimanjaro, Serengeti National Park, Ngorongoro Crater rand Olduvai Gorge.

4.2.2 Climatic Conditions

The climate in Arusha is tropical with moderate to high rainfall averaging from 500 mm to 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. Arusha falls within a wet climatic region with average annual temperature ranging from 17°C to 34°C the City is also characterised with high daytime temperature (average 30°C) and high humidity.

4.2.3 Geology and Soil

Geological information reveals that the subsoil in the Arusha region is mostly consists of volcanic sands (volcanic rocks) that have originated Mount Kilimanjaro volcanic residuals. The sandy strata have good drainage properties associated with the undulating hilly areas in and around Arusha (see Figure 4.1).

The geology, geomorphology, tectonics and volcanism of the Northern Tanzanian volcanic province, also called the Northern Tanzanian Divergence is largely found in Arusha Region.

Two rock types, from the Proterozoic in age, are exposed in the Arusha area: The Arusha quartzite of the Engaruka basin System, and the Bosatu red bed of the upper part of the west and above the Natron escarpment. Locally the Arusha

quartzite consists mainly of white or gray medium- to coarse-grained ortho-quartzite.

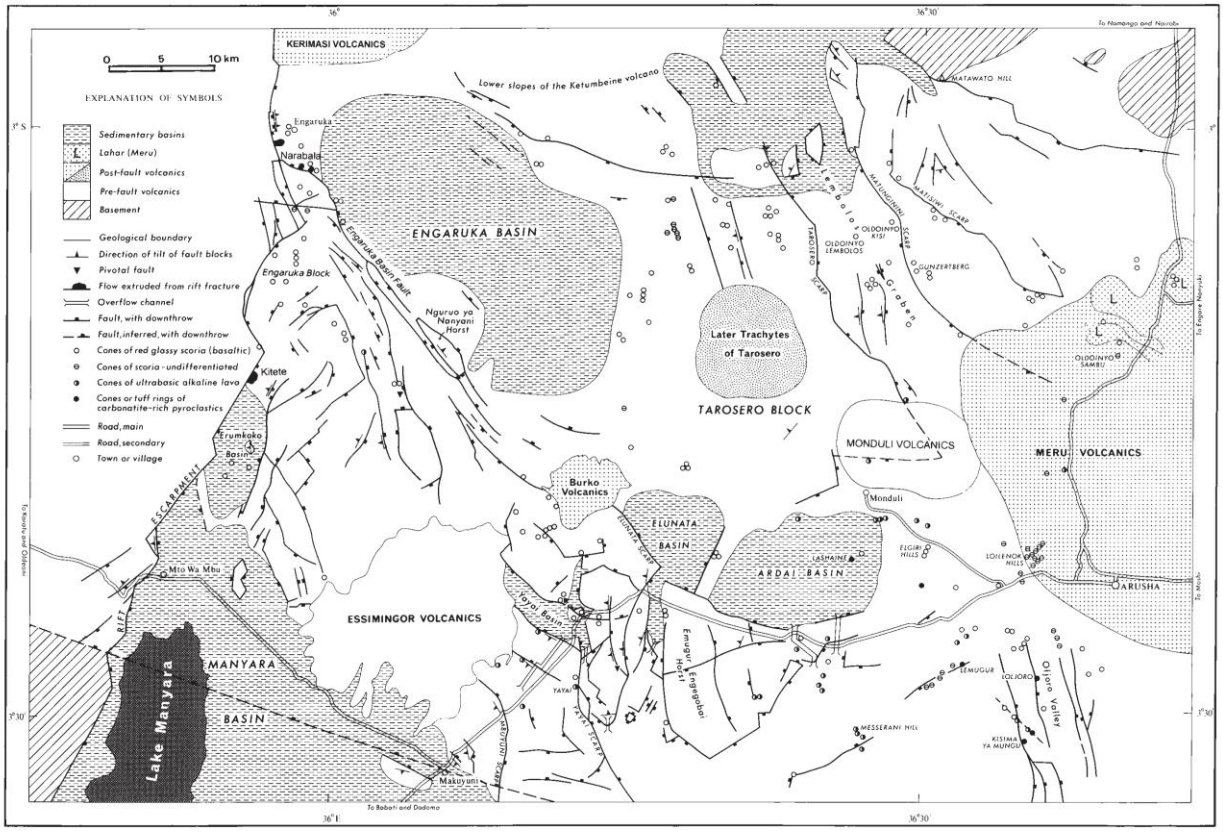


Figure 4.1: Distribution of post-fault volcanoes, minor volcanic features and sedimentary basins in Arusha (Dawson 2008)

4.2.4 Topography and Drainage

The Arusha City is located on the rift valley fringe of Naura Stream, with large parts lying on the bottom of Mt. Meru rising over 1,600 meters above sea level. However, the major part of the City lies between 1450 and 1160 meters above sea level. The hilly terrain causes high velocities of storm run-off resulting in severe soil erosion in some parts of the City. However, this process has been exacerbated by urban development and increasing in the city population.

4.2.5 Population and ethnic group

According to 2012 population and housing census indicates that the City had population of about 416, 442 people of which 199,1524 were males and 216,918 were females with an average household size of 4 people. The council is highly affected by

immigrants from rural areas. The ethnic people are Maasai, Chagga, Pare, Rangi and Sambaa. The annual growth rate is 5.4%, sex ratio is 59%.

4.3 Biological Environment

As for Many urban areas, Arusha City is deprived of vegetation mainly due to human activities and settlements. However, the City Council is doing the best possible to replenish the deprived natural trees with different exotic and modern trees in the City environment. Apart from domestic animals kept by inhabitants of the town, the City Council does not own any wildlife resource at all.

4.3.1 Natural Vegetation

Arusha City natural vegetation can only be seen in protected hill areas such as areas surrounding Arumeru plateaus. Also they occur in areas abandoned by farmers where natural regeneration takes place. Natural vegetation in the City can be divided into two main categories:-

- Hilltop Miombo: - Hilltop miombo are found on rocky hills mainly in protected areas.
- Miombo woodland: - Miombo woodland is found on hills and middle to lower slopes mainly in uncultivated or abandoned land.

4.4 Economic Activities in Arusha City

Arusha started to establish itself from a small neighbourhood settlement into an urban centre from early 1900. After being a colonial regional commissioner headquarters for quit sometime, it was officially declared to be a township in 1948 and promoted into a Municipality in 1980 by the Local Government Act No 12. On 1st of July, 2005 Arusha Town was declared to be a City Authority. The major economic activities are:

- Trading (precious stones);
- Small-scale agriculture;
- Tourism industry
- Real estate

4.4.1 Real Estate

The Arusha City is host to a number of International organisations including the International Crime Tribunal for Rwanda, the Regional Secretarial of the World Health Organisation, Pan African Postal Union, the Secretariat of the East African Cooperation, Eastern and Southern African Management Institute.

Recent developments show that the Arusha City is gradually becoming an economic hub and it is designated for growing businesses and is thus becoming a fast

expanding city. Due to the increase in the economic and development activities the demand for office space and residential accommodation will definitely grow in near future.

4.4.2 Trade and Business

Industry
The industrial base in the region is relatively at infant stage. The region produces considerable quantities of coffee annually. Still it is no financially sustainable economic coffee processing plant in the region. Coffee is traded in its raw form and it is processed and exported by other countries.

Oil milling and dairy processing
Arusha city is rural destination for vast volume of corn, vegetables, sunflowers, soya beans and other oil seeds, which exist in the region. There is some oil milling activity basically on small scale basis this gives good opportunities for investments. Moreover, Arusha region has a vast potential for milk production due to the conducive weather and the livestock population. The absence of a large plant affords an opportunity for investments in this line.

Industrial minerals
The existence of industrial minerals likes meerschaum, salt, phosphate, magnetite gives an opportunity for large scale investments. Previously there was some mining activity in meerschaum and phosphate, which have now ceased although the plants are still there. It may be worthwhile for interested investors to explore this area.
A large number of shops are retailers selling manufactured and industrial goods. Goods like rice, beans, maize, sardines, clothes (Vitenge) are being traded between Arusha and neighbouring country mainly Kenya.

There are also many financial institutions in Arusha City including BoT, STANBIC, Standard Chartered, NBC, NMB, CRDB, and TPB that are running daily money transactions including money transfer, issuing loans to borrowers and money exchange. The City 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.

4.4.3 Tourism and Recreation

Tourism is another important economic area contributing adequately to the region's economy. It is estimated that this sector alone contributes roughly 20 percent to the region's GDP. Similarly the large livestock population is an important contributed to the economy of the region. It is estimated that this too makes an annual contribution of about 20 percent to the region's GDP. Industries and mining sectors are minor economic contributors to the region, roughly at 5 and 2 percent

respectively. Other remaining economic activities contribute the remaining 13 percent.

4.4.4 Industries

Arusha region is endowed by a large agricultural sector and a dynamic tourism sector based on natural resources. But given its economic infrastructure, location and availability of raw materials it can and is already building a significant industrial sector which could be a very important engine of development for the region and the country in the future.

Under Regional Economy it has been shown that Arusha is only second to Dar-es-Salaam in the size of its contribution to the national economy. Arusha leads in Agricultural establishments reflecting its leadership in commercial agriculture. It is second to Dar-es-Salaam in construction, mining, trade, finance and transport. It is third in manufacturing establishments after Dar-es-Salaam and Mbeya.

4.5 Social Services in Arusha City

4.5.1 Health

There are 5 hospitals, 14 health centres, 61 dispensaries, 10 pharmacies and 146 medical stores, at least one or more health facility in every ward and patient bed ratio is 279. Most ten common diseases are malaria, ARI, pneumonia, diarrhoea, intestinal warms, UTI, skin infection, minor surgical condition, eye infection and ear infection.

4.5.2 Education

Arusha City has the following schools, 55 preparatory, 61 primary and 53 secondary. The standard one enrolment is 100% and all pupils passes the national standard seven always they all enrolled in form one. There are 2 vocation training centres with 476 students and 5 high leaning Institutions.

4.5.3 Water Supply

Arusha City Council estimated to supply about 42 million litres of water per day. The city obtains its water from the following sources:-

- 14 boreholes
- The Olesha - Masua springs in Arumeru district and
- The Ngarendalu springs in the City

Water from these sources could supply the 42 million litres required in the city per day. However, actually supply averages 31 million litres resulting in a deficit of 11 million litres.
Major causes of the deficit include power cut-offs and drought periods which normally occur between the months of September and March. 179 Planned strategies to improve water supplies to the city have started to be implemented after a feasibility study by a German development agency (KFW). The plan includes exploitation of gravity water sources of Nduruma and Mlala rivers and increasing capacity of flow from the Olgilai-Masara springs to the reservoir tanks at Sekei.

4.5.4 Solid Waste Management

Refuse generated is estimated at an average of 380 tons per day and 274 tons which is approximately 72% per day is collected and disposed off. The remaining 28% is not collected due to limited financial resources required for purchasing enough refuse collection trucks and other equipment resulting. Management of liquid waste in unplanned areas is more difficult due to poor inaccessibility of cesspit emptier, little space for erection of pit latrine and high water table. In planned settlements, 84% of total households use septic tanks, 2% use pit latrines, and 14% use conventional central sewerage system. Such situation causes environmental hazards through water and food contamination and consequently causing diseases such as cholera, typhoid, dysentery, diarrhoeas and worm infections.

4.5.5 Transport

Arusha region is connected to other regions and the outside world by five important roads namely: Arusha - Moshi, Arusha - Namanga, Arusha - Babati - Dodoma, Arusha - Babati – Singida and Arusha - Ngorongoro - Singida. As far as surface transport is concerned the only other transport mode connecting Arusha and the rest of the country is a single railway line to Moshi. Apart from the roads, Arusha City is also accessible by air through two air fields, KIA (about 50km away) and Arusha airport (6km).

Roads
Total length of road network by grade in the City is 245km being distributed as follows:-

(i) 9 Trunk roads
(ii) 15 regional roads
(iii) 170 Feeder roads

Most of the roads are passable all over the year.

Railways: TheCity also has access to a railway connecting Arusha to Kilimanjaro and Tanga. The rail way is currently not operation due to some technical constrains.

Air Transport: The City has access to two air ports KIA (about 50km away) and Arusha airport (6km).

4.5.6 Energy

Energy is a prerequisite for the proper functioning of all sectors of economy. It is an essential service whose availability and quality can determine the success or failure of development endeavours. In Arusha Region the main source of energy for both industrial and domestic use is fuel wood and petroleum products and electricity (thermal and hydro).

Electricity
Arusha City is supplied in excess of demand with electricity from the National Grid System. The situation of electricity demand and supply for Arusha City by 2000 was 126,000 MWH and 167,000 MWH respectively.

Wood fuel
City 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
Firewood and charcoal are the main sources of domestic energy in Arusha City. Total firewood and charcoal demand is estimated to be 3,706,900 m3 of wood per year for the entire Region. Annual charcoal wood fuel production comes from: Unreserved land 57%, 29% from forest reserves while 14% comes from forest plantations.

Biogas
Biogas energy technology was introduced in the early 1980's for domestic use only. A total of 380 biogas plants have been constructed in Arusha region by December 1996. The trend for biogas use seemed to rise in year 2000 for the data for the current status was not availed.

4.6 Arusha City Environmental Setting

4.6.1 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 City 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.

4.6.2 Forests and Natural Vegetation

Characteristics of Forest and Natural Vegetation
There are two types of forests in the City namely, the Natural Forest and Plantations (man–made). The natural forest has 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.
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
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.

4.6.3 Surface Water

The City of Arusha has also many rivers and fertile valleys that are suitable for irrigation water supply and probably irrigation. The current water supply level is 92% of the total population but it receives a stiff challenge from the fast increase in urban population. The major sources of water for Arusha city are surface and groundwater. These sources include:

- Deep Boreholes = 14
- Olesha - Masua Springs
- Ngareudaly springs.

Apart from the current initiatives, yet the city suffers water shortage. Currently, acute insufficient clean and safe water prevalent in some areas of the city especially in Sombetini, Sokon 1 and Terrat wards.

The Impacts of activity sectors to surface water
Since the water production capacity is less than demand, 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.

4.6.4 Ground Water and Aquifers

Characteristics of Ground water:
Most of the water resource that is 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. On the other hand the Arusha Water Master Plan revealed that 54% of the region's population depended on groundwater and that of this population only 8% had access to an improved supply improvement of this water resource depends on how these sources are protected from pollution.

The Impact of activity Sectors on the Environmental Resources:
Residential facilities such as sanitary facilities like pit latrines, septic tanks and subsurface sewage disposal within 30m from the underground water source or on the slope areas, this phenomenon pose danger of causing pollution to underground water. Urban agricultural activities such as the use of insecticides and chemical fertilizers may result into percolation of toxic pollutants through the ground and ultimately pollute underground water.

4.6.5 Air Quality

Characteristics of the Air resource:
Arusha City is situated on the undulating land and surrounded by hills mostly in the eastern side where mount Meru is found. The central area is relatively flat and bowl-shaped land. The surrounding hills act as wind barriers, blocking fresh air circulation in the City. Impended air circulation allows accumulation of air pollutants in the area. Dust dispersion from earth roads and unpaved/open ground is inevitable during the dry season. During rain seasons the air if fresh and moist. The City areas have good tree cover mainly along the roads and other plantations which purifies and adds quality to urban air. Trees along the 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 Arusha City. As such, an evaluation of air quality trends in the City 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

A number of sectors contribute to air pollution in Arusha City, including the following:

Traffic
Traffic can cause air pollution from exhaust emissions and from wheel generated dust. Most roads in Arusha city centre are paved, but a significant number of roads in the City outskirt are earth roads. Emission of wheel generated dust from unpaved roads in Arusha causes dispersion of dust into residential and commercial areas adjacent these roads.

Traffic also emits exhaust gases including carbon dioxide, carbon monoxide as well as gases referred to as SO_2 and NO_2 which have public health and environmental impacts. Traffic air pollution is exacerbated by traffic volume, narrowness of streets, and poor ventilation caused by height and density of buildings. As the city is growing, also the density of vehicles in the city increases, causing traffic jams. Vehicles emits more air pollutants when in stationer state that in motion. Rehabilitation of the city roads will definitely easy traffic congestion in the city and reduce emission of wheel generated dust.

Households
Many households in Arusha City use biomass fuel like firewood, charcoal, sawdust and many others. A significant number of people use kerosene and similar fuels for cooking. Depending on the types of fuel and stove used, combustion of biomass and bio-fuels can result into production of air pollutants such as CO, CO_2, SO_X, NO_X, hydrocarbons and suspended particulates.

Solid Waste collection Sites
All solid waste produced in Arusha City is disposed off at the Muriet Dump site. 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 materials produce smoke that travels by wind to residence in the vicinity of the disposal site. The newly constructed fencing wall plays a great deal in the reduction of dust and smoke dispersion to the nearby residential areas. It is expected that operation of the landfill will reduce air pollution in areas around the Muriet dump.
Other sources of air pollution from dust combustion include waste burning at in hotels and commercial sites, in agricultural farms, waste incineration at hospitals etc.

Waste water disposal sites
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 City there is no adequate central sewerage system; therefore sewage discharged into therivers cause offensive smell in the neighbourhood.

4.7 Arusha City Environmental Priorities

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

1. ***Flooding and Soil erosion***

Many parts of the City are prone to flooding and soil erosion during rainy season. A number of highly and low-lying areas, including Unga limited and Murriet 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, area around Bondeni Unga limited Streets. This is the major reason to why Bondenidrain has been specifically selected in this project, to rescue major soil erosion and floods in these areas.

2. Environmental Health and Sanitation

For quite years now, the sanitary condition of the City has been deteriorating steadily. The main cause of the problem 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 some residential areas and the Central Business District. The urban development activities which leaves open pits which act like breeding sites for mosquitoes and other insects which transmit water-borne diseases that affect the health of the City residents.

3. Water resources pollution

The existing liquid waste disposal practices for domestic liquid waste in City 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 are obvious.

Surface and ground water in the City 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. Along the rivers, springs and ponds; vegetable farming utilizing inorganic fertilizers and insecticides is being practiced. This is another potential source of pollution to the water of these important water bodies of the city.

4.8 Environmental Conditions in the Project Areas

4.8.1 Environmental conditions along Unga Limited - Muriet Road

Administratively, the road section that is planned for upgrading is wholly within the Sokoni 1 Ward, Arusha City in Arusha Region. The 6.4 km road which is partly bitumen paved and partly earth/gravel surfacedruns from Unga Limited flour milling factory (locality known by the same name) through 8 sub-wards namely: Makao Mapya, Migungani, Mlimani, Longdon, Madukani, Olovolosi, Olnjavutian, and Muriet, crossing the Burka River to Muriet settlement. The road services a mix of commercial/residential area, and is encroached by small business premises at Madukani area.

The proposed road alignment is of 15-18m wide, and will entail relocation of structures and land take. High tension electricity power lines traverses the road RoW along the centre line, at the first few kilometres from Unga-Limited point. The

owner of the power line (TANESCO), was consulted during the project planning phase, and the outcome of the consultation is a collaboration between the two.
It was agreed to design the road in such a way that the high tension power line will remain at the centreline of the road, protected by (1x1)m (WxH)) concentre base (refer Chapter 2). TANESCO has submitted a quotation amounting to TShs. 230,802,000.00 for the job.

Figure 4.1: High tension power line traversing the road

In 2014, the City authority made an inventory of PAPs along the RoW of the Unga Limited – Muriet road. About 163 PAPs were identified, and they concentrated in Migungani area. According to the Sokon 1 Ward Executive Officer, all the PAPs and the community at large are aware of the project and, all the PAPs have so far been paid by the City authority a fair compensation for their valuated properties for them to vacate the road RoW.

Figure 4.2: Some of facilities to be affected by the project

The road shall also traverse a school playing ground (Sinon Sec. School). It was observed that the playground is affected by floods during the rainy season, causing massive soil erosion. The school administration and the community are aware of the project. It is anticipated that the project will reduce soil erosion and floods near the school, while providing reliable access to the community.

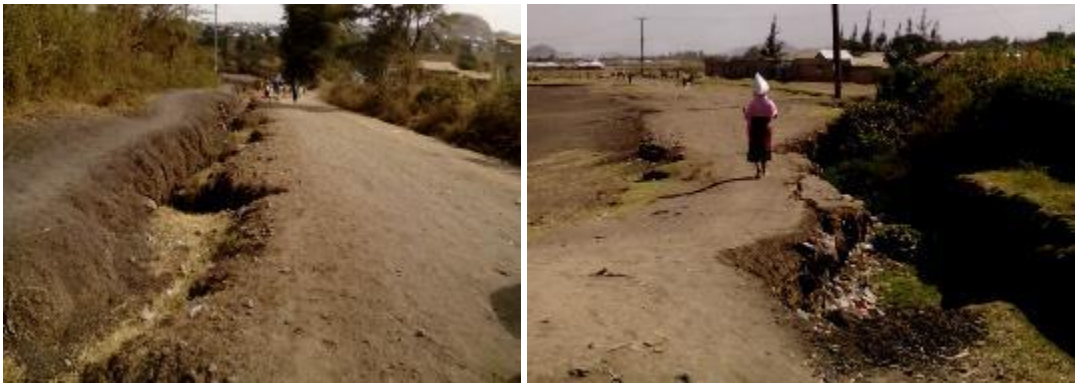


Figure 4.3: Areas along the road affected by floods and erosion

4.8.2Environmental conditions along the Bondeni drains

It has been proposed to extend the existing Bondeni drain by 300m to a safe discharge point into Naura Stream. Currently, the drain discharges storm water into a natural unlined drain across a Railway line. If the situation remains as it is now, there is a risk that storm water will destroy the railway embankment. Further, as explained by the city Engineer, storm water causes floods to residents downstream of this natural stream.

The proposed design of reinforced concrete trapezoidal drain will traverse along the railway line and within the railway reserve. Small scale vegetable gardens located within the proposed drainage way will be affected by the project. According the design drawings, only a narrow portion of the farms will be affected. The farmers have been consulted and have agreed to move 1-2m to give way for the drain. Further down there a narrow strip of grown trees stretching to Naura stream. According to the City Engineer, the tree farm will remain untouched.

Figure 4.4: Conditions along the proposed Bondeni drain route

4.8.3Environmental conditions of the Landfill site

Additional landfill cell is proposed at the newly constructed landfill, located at Muriet ward, about 14 km from Arusha City centre. The landfill was already in use even before the first cell was constructed and the new cell is not operational yet. The proposed new landfill will be located adjacent the existing. Once the two cells are put in operation, the landfill will be able to handle solid wastes from all places within the Arusha City for 50 years to come.

Figure 4.5: Burning and sorting of waste at Muriet dump site

Supporting facilities such as storm water pond, leachate pond, groundwater monitoring wells already exist on site. The propose land is bare with no vegetation cover. Thus no effects associated with vegetation removal are anticipated.
Ground water quality monitoring wells exist downstream the leachate pond. However, water pumps have not been installed yet. It was therefore not possible to take water sample for quality analysis. Water from the adjacent River Burka is being used by the local population for washing and cleaning. A number of animals

were found drinking water directly from the river. Leachate from the dumpsite can potentially contaminate the River water, especially during the rainy season.

Figure 4.6: Supporting facilities. R: Leachate pond, L: storm water pond

Figure 4.7: R: Burka, L: animals drinking water near the bridge

5.0 STAKEHOLDER'S IDENTIFICATION AND ANALYSIS

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 Arusha Regional secretariats, Arusha City Council officials, Arusha Urban Water Supply and Sewerage Authority (AUWASA), TANESCO, Tanzania Railway Authority, Local leaders at ward level and the local people in the areas of the project.

5.2 Stakeholders 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, 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 City Authorities.
- 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 City, environmental issues and views and perceptions regarding the Project.

5.3 Consultative Meetings at the Arusha City Council

Consultative meetings at City and local levels included discussions with the representative of the City Director and heads of departments including the City Water Engineer, the Road Engineer, Health Officer, Economist, Development officer, Land Officers, Surveyors etc. These consultations were conducted through both direct personal interviews with selected technical people and focus group discussions.

5.4 Consultative Meetings with Utility providers

These include the consultative Meetings and discussions with AUWASA and TANESCO officers, these consultations were conducted through direct personal interviews. The railways Authority was not directly consulted as they have moved their offices to Moshi town. The City has a memorandum of understanding with the railway authority regarding use of their RoW.
Typically, the Agenda for these consultations included:

- Presenting the scope of the project.
- 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 as well as the experiences learned from the Core TSCP.

5.5 Community Consultations

Dissemination of project information among communities living near the proposed addition 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 consultant had meeting s with PAPs along the Unga Limited -Muriet road and vegetable growers along the proposed route for extension of Bondeni drain.
The main objectives of community consultations were 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 local community 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
- The main concerns of the stakeholders included the positive anticipated impacts as well as negative impacts.

5.6 People's Attitude towards the project:

The overall people's attitude towards the TSCP projects in Arusha was very positive. Mainly because they have witnessed to implementation of Phase I subprojects, and thus they are positive these projects will also be implemented. The community is eager to 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 City Infrastructure. Some stakeholder urged the Government/City to make sure that they hire a competent contractor for each subproject, and make close supervision of the works. The main concern for PAPs along the Unga Limited - Murriet road is on payment of compensation i.e. payment using the right rates and timely.
A summary of issues and concerns raised by various stakeholders is presented in Table 4.1. A column showing where relevant issues are addressed in the report is also provided.

Table 5.1: Issues of Concern Raised during Consultative meetings

Stakeholder	Key issues raised	Relevant section in the report
ArushaCity Authority	• The City has issued letters to all utility suppliers, informing the about the project, and inviting then for site visits and discussions on the fate of affected infrastructure (if any). • TANESCO has submitted their estimates for relocation/protection of the high tension power along Unga Ltd-Muriet road (documents attached) • The Railway Authority and the City Authority have come to an understanding on the usage of the railways land for Bondeni drain extension (letters attached) • The City Authority, through ward and sub ward leaders has disseminated relevant project information to the local community.	The letters are attached (Appendix IV)
AUWASA (Discussion with the Planning and construction engineer Eng. G.F. Makame	• Development is needed in Arusha City • The storm water drainage are very important in order to avoid mosquito breeding sites and breeding sites for other disease causing organisms • Improvement of the roads should go along with the improvement installed in the road reserves to avoid re-excavation of the roads for repairing the worn out water and infrastructure sharing the road reserve • The City should contact the AUWASA during initial stages of project design to discuss and agree on fate of AUWASA infrastructures to be affected (if any)	Section 6.3, 6.4
Acting City Director Eng. Gaston.G.P	• Rehabilitation of sources of raw materials should be done immediately after material extraction phase is over. • Trucks hauling materials from source to sites must be covered to avoid environmental pollution and accidents. • During the operation phase, maintenance of storm-water drainage is	Section 6.3.9, 8.2

Stakeholder	Key issues raised	Relevant section in the report
	very important. A vegetation cover should be providing to reduce erosion risk. • The contractor must be well guided on issues of waste management. Disposal of construction wastes in gullies is prohibited. All waste must be disposed in a designed Landfill at Muriet	
Eng. Agust Mbuya-City Engineer	• The Bondeni storm-water drain should be built all the way to the discharge point in order to avoid destruction of railway infrastructures located adjacent to it. • The design of the drains should take into account vegetation cover located closer to the railway line	Section 8.2.1
WEO, Themiward, Ms Esther Method	• The community is informed and are comfortable with the Landfill project. • The project should not be expanded beyond the original site boundaries. • Compensation issues with the community living around the landfill buffer zone is done	Section 8.3.3, 6.3.2
WEO, Sokon I ward, Mary Sirikwa	• The project should consider including the wooden plank Bridge across Naura stream, at a point where Bondeni drain discharges into the stream. • The City should pay compensation to all PAPs using current rates and on the agreed time, before the project.	Section 7.1.6
WEO, Engutoto ward, Mary Sirikwa	• The community should be well informed about temporary cut of services during construction to avoid complaints • The community leaders should be well involved in project planning and proceedings such that they can easily inform the community about the development going on within their residents	Section 8.3.3, 8.2
Discussion with Eng. Fodia	• Improvement of the landfill should go along with the improvement of the facilities for solid waste collection from the communities	Section 8.3.3, 6.4

Stakeholder	Key issues raised	Relevant section in the report
Mwakanje	• The community should be well informed advance about the advantages of the landfill and the possible related costs to maintain the service	
Discussion with Felister Shayo (City Community development officer)	• Sustainability of the projects will be possible if the community is well participated from the beginning of the project and well conditioned to have a sense of ownership to the development of the projects facilities	Section 8.3.2
Discussion with James Laiboki (City Health Officer)	• The combination of the improvement of the road infrastructure to the landfill is necessary to make sure that the travel time to and from the landfill is reasonable and effective • The city official to oversee the built infrastructure will be well trained to make sure that the monitoring and evaluation of the projects are effective	Section 6.4
Discussion with Eng. Kakole G. (TANESCO Regional Engineer)	• Passage of high tension electrical infrastructure along the road is possible, however, the electrical poles should be well protected to minimize any time of foreseeable danger • The City should install road signs to enhance safe driving along the new road • The city should ensure good workmanship in the protection of the power line.	Section 6.3.9, 8.2
Vegetation farms along the proposed Bondeni drain	• The drain will reduce the size of their farms; however it is important for the development of the city. • They will be allowed to fetch water from the drain for irrigation of their farms.	Appendix IV
PAPs along Unga ltd-Muriet road	• Compensation should be fair and relevant. • They should be notified and given the works implementation schedule so they have a chance to remove their facilities/business on time	Section 6, 7, and 8

Stakeholder	Key issues raised	Relevant section in the report
	• The contractor should make all necessary efforts to reduce generation of dust and vibrations during construction phase.	

Stakeholders Consultation July 2016

SN	Name/stakeholders	Views/Concerns	Response
1	Eng Mbuya TSCP-AF Coordinator	• The project is a continuation of the TSCP that improved various infrastructures within the City Council • For Arusha City among others the project will improve storm water drainage to reduce floods, construction of a road and improve solid waste infrastructures • For this section of the storm water we are utilising the railway line and with very minimal impact on your gardens estimated at about 80sqm	
2	Ms Felista- Community Development Officer	• The purpose of these meetings is to inform people about the project and that the implementation will take place soon. • Create temporary employment during the construction period • The project will increase the quality of settlement • There is a GRM within the City Council to handle any complains arising from this project implementation therefore we argue you to choose your GRC members to facilitate the process	
3	Chairperson, Vegetable growers and other farmers	• We acknowledge that we were consulted by the City Council officials in June regarding the proposed project • This land belongs to the Tanzania Railway Authority, we are	-Please note that the cutoff date that we have agreed is 24th August, 2016, however once

		allowed to use this wayleave to only grow vegetables but the agreement is that any time the land is required we shall vacate. • We acknowledge that the City authority has allowed us to harvest our crops prior to project implementation. • The impact of land is very minimal	construction is completed you can continue using the area -We shall ensure that the construction time is not prolonged

6.0 IDENTIFICATION AND ASSESSMENT OF IMPACTS

6.1 Impacts Zones

The geographical spread of the impacts (short term or long term) is likely to encompass the following areas. The actual spatial dimension will vary with the nature of the impact and the receptor environmental and social component.

6.1.1 Primary corridor of impact

This is the core impact zone where the rehabilitation works will concentrate. The site of the construction is the Right of Way of the total length of Unga limited - Muriet road (6.4 0km), Bondeni storm water drain (300m) and the landfill site perimeter. This will also include areas immediately bordering these subprojects.

6.1.2 Secondary impact area

These are off-site locations linked to the project activities including i.e. borrow areas, quarries and other sources of materials such as sand, gravel, aggregates, fill materials, water, etc involving civil works / extraction activities done by / or on behalf of the project. Other sites will be waste disposal sites, camp site (if so requires) or other location chosen for accommodation of crew and equipment and material storage. These secondary impact areas will be interspersed across the city and beyond where sources are located (refer Chapter 2).

6.1.3 General project area of influence

This includes the wider geographical area that is influenced by this project (in Arusha City and beyond) including areas in the near vicinity within a 5km radius and transportation routes from sources of material to the project location. The area of influence along the landfill extends to around 500m around the lease area.

6.2 Impact Identification and Evaluation

The proposed additional investment subprojects in Arusha City can cause a wide range of environmental and social impacts on a number of receptors. The EIA and SIA identify these impacts for the purpose 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 s*imple 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 proposed additional investment subprojects are mainly physical resources (hydrology, surface water quality, soils, air quality and noise), public health and safety, aesthetics and landscape.

The following impacts were identified to be likely to occur during pre-construction phase of the proposed additional investment subprojects;

(m) Job creation and increased income
(n) Change of scenery view of the project areas
(o) Air pollution

The following impacts were identified to be likely to occur during construction phase of the proposed additional investment subprojects;

i. Job creation and increased income
ii. Increased dust and air pollution
iii. Increased Noise and Vibrations
iv. Pollution of surface and ground water
v. Increased waste generation
vi. Interuption or lack of utility servives due to damage/relocation of existing utility infrastructure
vii. Lacking or slow restoration of areas impacted by construction
viii. Risks to worker's and public safety
ix. Overburdened Local Authority
x. Child Labour
xi. Increased HIV/AIDS
xii. Population Influx
xiii. Visual Intrusion during construction

The following impacts were identified to be likely to occur during operational phase of the proposed additional investment subprojects;

i. Reduction of soil erosion
ii. Improved storm water collection
iii. Job creation and increased income
iv. Improved Community Life
v. Improved Accessibility
vi. Increased property and land values around the project areas
vii. Impacts associated with improper waste management
viii. Risks of Ground and soil pollution by landfill leachate
ix. Risks of air pollution by landfill gases

The interaction between the intended project activities and the different environmental receptors are summarized in a simplified matrix presented in Table 6.1. A simple matrix with the following ratings was used to determine significant impacts:

+3 Very high positive impacts	+1 Minor positive impact	-1 Minor negative impact	-3 Very high negative impacts
+2 High positive impacts	0 No impacts	-2 High negative impacts	

The consultant 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.

Table 6.1: Environmental Impacts Matrix for proposed construction of Unga Limited - Muriet Road and Burka Bridge

		Impact Rating Criteria					Impact Significance Rating			
S/N	Environmental parameters/Impacts	Spatial Scale	Temporal Scale	Reversibility	Cumulative Effects	Residual Impact	Mobilization Phase	Construction Phase	Demobilization Phase	Operation and Maintenance
	Negative Impacts									
1.	Change of scenery view	L	ST	R	✓		-1	-2	-2	+2
2.	Increased dust and air pollution	L	ST	R	✓		-1	-2	-2	-1
3.	Increased Noise and Vibrations	L	ST	R	✓		-1	-2	-2	-1
4.	Pollution of surface and ground water	L	MT	R	✓		-1	-2	0	0
5.	Soil Erosion	L	ST	R			-1	-1	-1	-1
6.	Increased waste generation during construction	L	ST	R	✓		-2	-3	-2	-1
7.	Traffic disruption and congestion	R	ST	R	✓		-1	-3	-1	0
8.	Damage to existing infrastructure and public services	L	ST	R			0	-2	0	0
9.	Loss of property/land take and possible resettlement	L	LT	IR			-3	-3	0	0
10.	Lacking or slow restoration of areas impacted by construction	R	MT	R		✓	0	0	-2	-1
11.	Risks to worker's and public safety	L	ST	R	✓		-1	-3	-1	0
12.	Overburdened Local Authority	R	MT	R	✓		-1	-2	-1	-1
13.	Child Labour	L	ST	R						
14.	Increased HIV/AIDS	R	LT	IR	✓	✓	-1	-1	-1	0
15.	Population Influx	L	ST	R	✓		-1	-1	-1	-1
16.	Visual Intrusion during Construction	L	ST	R			-1	-1	-1	0
17.	Increased Accidents	L	MT	R	✓		-1	-1	-1	-1
	Positive Impacts									
1.	Job creation and increased income	R	ST				+2	+3	+2	+3
2.	Improved Community Life	R	LT			√	0	0	0	+3
3.	Improved Accessibility	L	LT			√	0	0	0	+3
4.	Improved storm water collection (reduced soil erosion)	R	LT				0	0	0	+3
	Reduction of dust dispersion	L	LT			√				+3

5.	Increased property and land values	R	LT			√	0	0	0	+3

Table 6.2: Environmental Impacts Matrix for proposed extension of Stormwater drain at Bondeni Street

		Impact Rating Criteria					Impact Significance Rating			
S/N	Environmental parameters/Impacts	Spatial Scale	Temporal Scale	Reversibility	Cumulative Effects	Residual Impact	Mobilization Phase	Construction Phase	Demobilization Phase	Operation and Maintenance
Negative Impacts										
1.	Increased dust and air pollution	L	ST	R	✓		-1	-2	-2	-1
2.	Increased Noise and Vibrations	L	ST	R	✓		-1	-2	-2	-1
3.	Increased pollution of soil and surface water	L	MT	R	✓		-1	-2	0	0
4.	Increased waste generation during construction	L	ST	R	✓		-2	-3	-2	-1
5.	Lacking or slow restoration of areas impacted by construction	R	MT	R		✓	0	0	-2	-1
6.	Risks to worker's and public safety	L	ST	R	✓		-1	-3	-1	0
7.	Overburdened Local Authority	R	MT	R	✓		-1	-2	-1	-1
8.	Child Labour	L	ST	R			-1	-1	-1	-1
9.	Increased HIV/AIDS	R	LT	IR	✓	✓	-1	-1	-1	0
10.	Population Influx	L	ST	R	✓		-1	-1	-1	-1
11.	Visual Intrusion during Construction	L	ST	R			-1	-1	-1	0
12.	Interference to local Hydrology	L	LT	IR	✓		-1	-1	-1	-2
Positive Impacts										
1.	Job creation and increased income	R	ST				+2	+3	+1	0
2.	Improved Community Life	R	LT			√	0	0	0	+3
3.	Reduction of rate of siltation of storm water drains and the receiving River)	L	LT			√	0	0	0	+3
4.	Improved storm water collection (reduced soil erosion)	R	LT				0	0	0	+3
5.	Reduction of floods and soil erosion	L	LT			√	0	0	0	+3

Table 6.3: Environmental Impacts Matrix for proposed construction of new landfill cell

		Impact Rating Criteria					Impact Significance Rating			
S/N	Environmental parameters/Impacts	Spatial Scale	Temporal Scale	Reversibility	Cumulative Effects	Residual Impact	Mobilization Phase	Construction Phase	Demobilization Phase	Operation and Maintenance
Negative Impacts										
1.	Change of scenery view	L	ST	R	✓		-1	-2	-2	-2
2.	Increased Noise and Vibrations	L	ST	R	✓		-1	-2	-2	-1
3.	Increased dust and air pollution (by landfill gasses)	L	ST	R	✓		-1	-2	-2	-2
4.	Pollution of surface and ground water by leachate	L	MT	R	✓		-1	-2	0	-3
5.	Increased waste generation	L	ST	R	✓		-2	-3	-2	0
6.	Risks to worker's and public safety	L	ST	R	✓		-1	-3	-1	0
7.	Risks of explosion and fire hazard at the landfill site	L	LT	R	✓		-1	-1	-1	-3
8.	Overburdened Local Authority	R	MT	R	✓		-1	-2	-1	-3
9.	Child Labour	L	ST	R			-1	-1	-1	-1
10.	Increased HIV/AIDS	R	LT	IR	✓	✓	-1	-1	-1	0
11.	Population Influx	L	ST	R	✓		-1	-1	-1	-1
12.	Interference to local Hydrology	L	LT	IR	✓		-1	-1	-1	-3
Positive Impacts										
1.	Job creation and increased income	R	ST				+2	+3	+2	+3
2.	Improved Community Life	R	LT			√	0	0	0	+3
3.	Improvement to solid waste management system	L	LT			√	0	0	0	+3
4.	Increased property and land values	R	LT			√	0	0	0	+3

Key: Spatial Scale: Local (L), Regional (R), National (N)
Temporal Scale: Short Term (ST), Medium Term (MT), Long Term (LT)
Reversibility: Reversible (R), Irreversible (IR)
Significance: Highly Adverse (-3); Adverse (-2); Mild Adverse (-1); No impact (0); Mild Beneficial (+1); Beneficial (+2); highly Beneficial (+3)

6.3 Pre construction and Construction Phase Impacts (All subprojects)

Short-Term Direct Positive Impacts:

6.3.1 Job creation and increased income to local communities

During the mobilisation and construction phase, a number of people will get a chance to be employed by the project. It is expected that the unskilled /inexpert labour and some skilled labour will be sourced from the local people in Arusha City or from within Arusha City. Those who will secure employment though it is short term will get a modest payment which will help support their families for that time. Employment opportunities in the country are very scarce, especially for the unskilled people.

The presence of the construction force at site will bring a good business opportunity to local food and refreshment vendors at or near the project areas. The vendors are expected to benefit by selling food and other merchandise to the construction workforce and hence raise their economic status. Apart from the payment, it is hoped that the utilization of local labour will somehow cause a diffusion of knowledge from the skilled workers and hence open the door to the possibility of acquiring employment in similar construction works elsewhere.

Short-Term Direct Negative impacts

6.3.2 Risk of 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 including the bridge. Impacts can also result from accidental spillage of fuels and construction materials, which may pollute both water and soil. Culvert and bridge 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 subproject entail construction of drainage channels in order to drain concentrated run-off from the road, 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. All storm water collected from the project areas is eventually

discharged into Naura stream, thus could cause river water pollution. However, it is expected that this impact will be of low significance due to possible natural filtration of pollutants through soil as water flows to the disposal point.

6.3.3 Noise, vibration and air pollution (including GHGs)

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 filter 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. Vibration may even cause physical damage to properties near the construction site. The vegetation and loose soil in the project area have 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.

Construction activities will lead to emissions emanated from fuel powered equipment i.e. vehicles engines and construction equipment etc. Exhaust contain pollutants notably carbon-dioxide (CO_2) plus small quantities of noxious gases such as nitrogen oxides (NOx), sulphur dioxides (SOx), hydrocarbons and particulate matters (PM). These Green House Gases (GHGs) are known to interfere with temperature regime and cause climate change effects.

6.3.4 Accelerated Soil Erosion

Construction works have potential to accelerate soil 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. Major soil erosion is expected at the quarry sites and borrow pits. However, the sources of construction materialf for this project shall be rom legalised borrow/sand pits which are being monitored the

ArushaCity Environmental commeteee in order to reduce impacts of material quarrying on the sites.

6.3.5 Increased Generation of Wastes

Construction activities are associated with production of wastes, resulting from human and machines activities at the construction sites and at the campsites. These wastes includes solid wasteand liquid waste. Solid wastes include, spoil, rubbles, tree logs, metals, glasses, papers etc while the liquid waste include sewage, sullage, oils etc. These wastes if not well handled can change the aesthetic nature of the project area and can even lead to water pollution in case of improper disposal of oils. The quantities and types of wastes have been estimated and are presented in Chapter 2 of this report.Pollution of land from inadequate waste management is considered to be local and short term because of their small quantity and nature.

6.3.6 Loss of Vegetation

The proposed area for road construction site has few planted trees (Figure 6.1). Its natural vegetation cover was removed during the construction of the existing road. During construction of the proposed road some of the existing trees will be removed.

Figure 6.1: Some of the trees that will be removed to increase the road reserve

6.3.7 Damage/relocation of infrastructure and loss of access

Mobilisation and construction activities might result into temporal loss of access to services such as water supply, electricity and road passage. Further it has effects in terms of cost implications to the authorities managing the infrastructures, and temporal lack of service to the community provided by these infrastructures. Currently, the extent of relocation of utility infrastructure has already estimed and the City

authority is finalizing some procedures for memoruandam of understanding with the sercice providers. Moreover, the City authority approached the utility providers (TANESCO, TTCL and AUWASA) to participate in surveying the project areas in order to give an evaluation of the extent of relocation and costs involved. The final agreed budget for the undertaking will be availed soon.

Furthermore, the Unga Limited-Murriet road will somewhere share the way leave with high tension electrical infrastructure. This is often ought to be illegal but since that was the only possibility with little compassion the high tension electrical poles will be located at the centre of the road. The contract for this agreement between TANESCO and the City authority will also be signed soon. Additionally, placement of material along the road, temporal blockage of roads and construction of drainage channelsmay result into temporary loss of access to road users, thus, road users might be requested to use other roads/pathways and thus spend more time on the road.

6.3.8 Worker's and Public Safety risk

Construction activities exposes the labourers and the general public to bronchial and other respiratory tract diseases due to dusts. 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.
Also Traffic hazards might occur during contruction of Unga Limited - Murriet Road and Burka Bridge resulting from placement of materials on the road, and from temporary road closure Lack of space adjacent the road reduces chances for creation of detours or even pedestrian pathways during construction.

6.3.9 Lacking/slow restoration of areas impacted by construction

If demobilization of the project is not done at all or done in a very slow pace it can cause a number of environmental impacts including, scenic quality deterioration, acceleration of spread of vector spread diseases like malaria as a result of water ponding; and accidents. Generally for urban projects, scenic quality deterioration is the major impact. Scenic quality deterioration is expected to occur on site due to stock piling of construction materials and top soils. 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. 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 but reversible, short term and direct.

6.3.10 Loss of property/land take and possible resettlement

Nonetheless, this ESIA found-out that there will be **resettlement impacts at the sites designated for the execution of additional** sub-projects specifically for the Unga Limited- Murriet road sub-project and the landfill. Therefore the ACC prepared a RAP in 2014 for the Road and that of the landfill a separate RAP report was prepared. Both RAPs have been implemented though there are still outstanding grievances for the landfill site. The Unga Limited-Murriet Road has a total number of 198 PAPs (Head of Household) who have received 827,542,616.00 Million Tshs as compensation while the establishment of the Murriet landfill buffer zone has a total of 42 and additional 2 PAPs head of House hold who have received 272,755,548.00 Million Shillings. Once the outstanding grievance is closed it will be determined if there is a need to update the buffer zone RAP.

Figure 6.1: Some of business properties to be affected by the project.

Long-Term Impacts:

6.3.10 Overburdened local authorities

The implementation of the proposed Investment subprojects (from planning stage, construction stage, and supervision) will involve some local authority.

The local authorities in this context include Ward and Mtaa Leaders. If these local authorities are not involved in all phases of the project then it shall be very difficult to cope with the project implementation pace, and as a result they shall be overburdened by the project which may result in poor performance of the proposed investment subprojects. This impact can be short term or long term, depending on the nature of overburden felt the local authority. For example, managing the landfill activities can be a burden during planning, construction and operation.

6.3.11 Increased spread of HIV/AIDS

The major health risk the possibility of acceleration of spread of social illnesses, is always there when there is influx and or intermixing of

people. Unhealthy social interaction might exist, as fuelled by many factors including economical benefits (i.e. from the construction force to the local community). Unhealthy social interactions can be a source of increase in the incidences of such diseases.

6.3.12 Loss of definite materials and land degradation

Construction of these investment subprojects 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.

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*. If not properly managed 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.
Secondary impacts at points of extraction of the construction materials may include depletion of local construction materials e.g. stones/aggregates, sand, gravel, cobblestones, and fill materials. However, this is unlikely as the amount of materials is small and the sources of construction materials exist and are authorised.

6.4 Operation Phase Impacts (All Sub-projects)

Positive Long-Term -Impacts

6.4.1 Improved Transport and Economy of the People

Upgrading of Unga Limited - Muriet road from its existing poor condition will facilitate easy transportation within and around the nearby areas and increase interconnectivity of the City. It is hoped that the road improvement will reduce travel time around the city and consequently reduce travel costs. Road safety and access will be improved by provision of walkways, safety signs and street lights.

The improved road have potential to boost up the existing informal sector, which is a source of self-employment for mainly women and youth by enhancing an increased commuting speed and thereby facilitating the goods exchange in the informal sector. There is potential for emergency of new small business along the new road and thus create more income to people.

6.4.2 Improved community life and services

In general, the current socio-economic status of the project areas will be improved and the general outlook will be beautified. The improved road and storm drainage will reduce soil erosion and floods in respective areas, thereby enhancing the status of the City. The benefits of the improved road, storm water drainage and Burka Bridge will be long term, and will be experienced both at the core impact zone and at the zone of influence.

6.4.3 Reduction of floods and soil erosion

Lack of adequate storm-water collection systems has accelerated soil erosion and floods in the project areas. Extension of Bondeni drain will facilitate collection of storm-water from the City area and allow its safe disposal into Naura stream. Evidently, storm-water has caused significant soil erosion in some locations in the City as described in Chapter 4. Improvement to these drainages will allow smooth flow of water to the discharge point and hence reduce the extent of soil erosion along these natural drains.
As smooth flow of rain water is enhanced, there will also be reduction of floods and stagnant water in areas near the drains. Floods and stagnant water around the residential houses creates nuisance and causes a lot of inconvenience to the residents as it becomes breeding sites for disease causing organisms such mosquitoes and other disease vectors.

6.4.4 Reduction of rate of siltation of storm water drains and the receiving Lake)

Uncontrolled storm water carries silt and solid waste from upstream areas down to the disposal area. Siltation was observed to reduce carrying capacity of storm-water drains as silt slowly accumulates at the bottom. Silt and solid waste was observed to block culverts at several locations along the formally built Bondeni drain.

6.4.5 Job creation and increased income to local communities

There would also likely be employment availability during the operation phase of the landfill. A number of people will be employed to run the weighing bridge, operate the gate or direct waste hauling vehicles on site. Further, there is potential for the local people to get employed in waste sorting (and recycling of valuable items) within the landfill.

Employment opportunities are also feasible at the new constructed road, where at least 50 people will be employed in normal cleaning and taking care of the trees that will be planted along the rehabilitated road.. Short time employment in the maintenance of storm drains and Unga Limited - Muriet road (such as grass cutting, cleaning drainage culverts, etc; as well as some clerical / low level supervision jobs) will be made possible. Such employment would contribute to poverty reduction, especially for unskilled and or low income people in the project areas.

6.4.6 Increased City revenue collection

Revenue collection at the weighing bridge at the landfill site will be yet another income generation activity for the City. Revenue will be collected from the different organisation disposing their waste products.

6.4.7Increased property values

It is obvious that improved road will increase the property values along the road (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 b e disadvantage to tenants and investors.

6.4.8 Improvement to solid waste management in Arusha City

Construction of a new cell at the newly constructed landfill aims to increase the landfill capacity, and thus enhance waste management in the City. The cell will be constructed in a manner that it prevents pollution of ground and surface water, and air pollution. Usage of this new landfill will stop the ongoing haphazard waste dumping at Muriet old damp site area

and therefore reduce the rate of environmental pollution at Muriet neighbourhood.

6.4.9 Improved air quality

One of the major impacts of unpaved roads to air quality is the dispersion of dust particles into the atmosphere and its disposal on structures and facilities. Improvement of Unga Limited - Muriet road will significantly reduce dust dispersion caused by vehicle movement and wind surface erosion on unpaved road. Reduction in dust dispersion and deposition will enhance the aesthetic value of areas along the project and also reduce health impacts associated with dust contaminated air.

Negative Long-Term Impacts

6.4.10 Interference to local hydrology

Construction of the landfill cell will cause interference to the local hydrology and drainage aspects of the area. The local drainage will be routed away from the landfill area for the whole project life. Run-off trenches have been dug to safely carry the uncontaminated runoff to receiving ponds. Further interference to local hydrology could occur at the material quarry sites if they are not timely managed. Water stagnation in sand pits and borrow pits can become potential breeding sites for mosquitoes.

6.4.11 Risk of ground water pollution by 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 land-filled. However, it has been widely reported that leachate 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.

6.4.12 Risks of explosions and fire hazards

Open and subsurface fires are more likely to happen during operation phase of the landfill. These fires may be due to: explosion of methane gas produced from anaerobic conditions of the subsurface environment; scavenger's activities e.g. smoking or cooking, or from naturally explosive wastes. These fires can pose a serious danger to environment (in terms of air pollution) and human health.

6.4.13 Threats to public health and workers safety

Improper operation of the landfill could lead to creation of breaking sites for disease vectors. It could also lead spread of waste by scavenger birds, rats and pets to the nearby community; and cause outbreak of disease. For example, flies and other rodents can carry bacteria from the dump to homes, and cause eruption of diseases such as diarrhoea and dysentery. Stagnant water in the landfill will favour generation of mosquitoes, vectors malaria parasite. 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. Scavenger birds can also play a big role in spreading uncovered wastes. Scavenger birds can create nuisance and unsanitary conditions to the community near waste dumps.

Unsanitary conditions in an improperly managed landfill could cause significant health threats to the dump workers. The exposure route could be though dermal contact, ingestion (with water or food) or through inhalation, after contaminants increase into the air. Apart from health risks, workers will also be faced with accident risks from the plant equipment and vehicles.

6.4.14 Road Accidents

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.

6.4.15 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.

6.4.16 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 6.1 outlines health risks that are posed to waste workers;

Table 6.1: Occupational hazards associated with waste handling

INFECTIONS

- Skin and blood infections resulting from direct contact with the waste, and from infected wounds
- Eye and respiratory infections resulting from exposure to infected dust
- Zoonoses resulting from bite by wild or stray animals feeding on wastes
- Enteric infections transmitted by flies feeding on wastes

ACCIDENTS

- Musculoskeletal disorder result from handling heavy containers
- Wounds, most often infected, resulting from contact with sharp items
- Poisoning and chemical burns resulting from contact with small amount of hazardous chemical waste mixed with general waste.
- Burns and other injuries resulting from occupational accidents at waste disposal sites or from methane gas explosions at landfill gasses.

***(Source**: UNEP 1996)*

7.0 IMPACTS MITIGATION MEASURES

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.

7.1 Mitigation Measures for Impacts during Pre -Construction and Construction Phase

Enhancement of positive Impacts

7.1.1 Job creation and increased income to local communities

Having gained some funds from the construction, the communities employed by the project during the construction phase should be organised in groups and supported by microcredit schemes. More jobs may be designed in the facilities operation plans in relation to the operation of the landfill and beatification of the road reserves.

Mitigation of Negative Impacts

7.1.2 Risk of water and soil pollution

- The developer is responsible for compliance with the relevant Tanzanian legislation relevant to wastewater discharges into watercourses.
- Portable or constructed toilets must be provided on construction sites for use by the construction force.
- Wastewater from toilets, kitchens, showers, sinks, etc. shall be discharged into a sealed holding tank or into septic tanks systems for removal from construction sites. There should be no direct discharges to any water body.
- Wastewater that does not meet the standards set by relevant Tanzanian technical standards/regulations must be collected in a sealed holding tank and removed from site by licensed waste collectors.
- The developer shall use techniques such as berms or flow diversion during construction to limit the exposure of disturbed sediments to moving water
- Before the start of construction, the developer shall obtain all necessary wastewater disposal permits/licenses and/or finalize all necessary wastewater disposal contracts.

- At completion of construction works, wastewater collection tanks and septic tanks shall be safely disposed or effectively sealed off.

7.1.3 Noise, vibration and air pollution during construction phase

- The developer is responsible for compliance with the relevant Tanzanian legislation with respect to noise and vibration.
- When needed, the developer shall implement measures to reduce noise to acceptable levels; this should include silencers, mufflers, acoustically dampened panels or placement of noisy machines in acoustically protected areas.
- The developer shall avoid, or at least minimize, heavy vehicle traffic (carrying construction materials) or noisy material processing facilities through or near residential areas.
- The developer and contractor shall plan activities in consultation with local communities so high noisy activities are done during day time and thus reduce the level of disturbance.

7.1.4 Accelerated Soil Erosion

- The developer shall follow the detailed drainage designs included in the construction plans, intended to prevent storm water from causing local flooding or scouring slopes and areas of unprotected soil, resulting in heavy sediment loads affecting local watercourses.
- Ensure drainage system is always well maintained and cleared of mud and other obstructions.
- Areas of the site not disturbed by construction activities shall be maintained in their existing conditions.
- Earthworks, cuts, and fill slopes shall be properly maintained, in accordance with the construction specifications, including measures such as installation of drains, and use of plant cover.
- To avoid sediment-laden runoff that could adversely impact watercourses, install sediment control structures where needed to slow or redirect runoff and trap sediment until vegetation is established. Sediment control structures could include windrows of logging slash, berms, sediment catchment basins, straw bales, storm drain inlet protection systems, or brush fences.

7.1.6 Increased Waste Generation

- Contractor shall develop and implement a Waste Management Procedure / Plan specific for the road upgrading project, Landfill cell construction project and for the drainage systems respectively. The plan shall (i) identify what type of solid or liquid wastes and categories of wastes the rehabilitation works will generate; (ii) identify ways to reduce the volume of waste by reusing or recycling initiatives; (iii) use best available mechanisms, practices and

technologies for waste collection and transportation to solid waste disposal sites.

- Contractor shall use nets and mats to trap debris and the trapped debris will then be disposed of at the authorized dump site.
- The developer shall obtain all necessary waste disposal permits or licenses before the start of construction works.
- Take all necessary measures to reduce the potential for litter and negligent behaviour with regard to the disposal of refuse. At all places of work, the developer shall provide litter bins, containers and refuse collection facilities.
- Solid waste may be temporarily stored on site in a designated area approved by the construction supervision consultant and relevant local authorities prior to collection and disposal through a licensed waste collector.
- Cover all waste storage containers, to be tipping-proof, weatherproof and scavenger- proof.
- No burning, on-site burying or dumping of solid waste shall occur.
- Recyclable materials such as wooden plates for trench works, steel, scaffolding material, site holding, packaging material, etc. shall be collected and separated on-site from other waste sources for reuse, for use as fill, or for sale.
- If not removed off site, solid waste or construction debris shall be disposed of only at sites identified and approved by the construction supervision consultant and included in the solid waste plan. Under no circumstances shall the developer dispose of any waste materials in environmentally sensitive areas, such as in areas of natural habitat or in watercourses.

7.1.7 Loss of Vegetation

- The developer shall prepare a Clearance, Re-vegetation and Restoration Management Plan for prior approval by the Construction Supervision Engineer, following relevant regulations. This plan shall be approved by the Construction Supervision Consultant and followed strictly by contractor. Areas to be cleared shall be minimized as much as possible. Re-vegetation shall be done according to the plan specified by the Standard specifications for road works of 2000 section 5700
- The developer shall remove topsoil from all areas where topsoil will be impacted by construction activities, including temporary activities such as storage and stockpiling, etc; the stripped topsoil shall be stockpiled in areas agreed with the Construction Supervision Consultant for later use in re-vegetation; it shall be adequately protected while it is stored.
- The application of chemicals for vegetation clearing is not permitted.

- Prohibit cutting of any tree unless explicitly authorized in above-referred plan.
- When needed, erect temporary protective fencing to effectively protect all trees before commencement of any works within the site.

7.1.8 Damage/relocation of Infrastructure and loss of access

- PO-RALG shall collaborate with utility provides such as TANESCO, AUWASA and TTCL and estimate the expected extent of damage to existing infrastructures and/or costs for provision of alternative services during the interruption.
- With regard to planned and unplanned interruptions to water, communication and electricity, the developer must undertake prior consultation and contingency planning with local authorities about the consequences of a particular service failure or disconnection
- Coordinate with relevant utility providers to establish appropriate construction schedules.
- Provide information to affected households on work schedules as well as planned disruptions at least 5 days in advance.
- Ensure alternative water supply to affected residents in the event of disruptions lasting more than one day.
- Report any damages to existing utility systems of cable to authorities concerned; make sure they are repaired as soon as possible.

7.1.9 Worker's and Public Safety risk

- The developer shall comply with all Tanzanian regulations on Occupation Health and Safety Act, 2003. Further, the developer shall do the following:
- Prepare and implement action plan to cope with risks and emergencies
- Train workers in occupational health and safety regulations.
- Ensure that workers wear / use appropriate personal protective equipment (PPE), such as safety glasses, ear pieces (noise protection ear muffs), face shields, hard hats, safety shoes, etc.
- During demolition of existing infrastructure, workers and the general public must be protected from falling debris by measures such as warning signs, chutes, traffic control, barriers and restricting access.
- Install fences, barriers, warning/prohibition signs around construction sites with potential dangers to the public.
- Provide safety measures through installation of fences, barriers warning signs, lighting system against traffic accidents as well as other risks to the public.
- Remove hazardous conditions on construction sites that cannot be controlled effectively with access restrictions, such as covering small

openings and ensuring means of escape from larger openings, such as trenches or open excavations.
- Ensure that moving equipment is fitted with audible back-up alarms.
- When work is done in confined spaces, such as deep excavation (trenches) use dewatering, adequate side-wall supports (shoring) and slope gradients that minimize the risks of collapse, entrapment or drowning.
- Implement good housekeeping practices on site, such as sorting and placing loose construction materials and debris in established areas away from footpaths.

7.1.10 Lacking or slow restoration of areas impacted by construction

- Restore cleared areas such as borrow pits which are no longer in use, disposal areas, site facilities, workers' camps, stockpiles areas, working platforms and any areas temporarily occupied during construction of the project works; use landscaping, adequate drainage and re-vegetation.
- Start re-vegetation at the earliest opportunity, and select appropriate local native plant species for the re-planting and restoration of the natural landscape.
- Spoil heaps and excavated slopes shall be re-profiled to stable batters, and grassed to prevent erosion.
- Landscape all areas affected by construction and undertake any necessary remedial works without delay.
- Plant trees on exposed land and on slopes to prevent or reduce land slippage or collapse and keep slopes stable.
- Remove any soil contaminated with chemicals or hazardous substances and transport it to waste disposal areas for burial.
- Restore all damages to road and bridges caused by project activities.

7.1.11 Overburdened local authorities

- Maintain open communications with the local government and concerned communities; the developer shall coordinate with local authorities (leaders of local wards or communes, leaders of villages) the agreed schedules of construction activities at areas nearby sensitive places or at sensitive times (e.g., religious festival days).
- Copies of the EMPs and of other relevant environmental safeguard documents in Tanzanian shall be made available to local communities and to workers at the site.
- The loss of amenities during the construction process is often an unavoidable source of inconvenience to users in sensitive areas. However, early consultation with those affected, provides an opportunity to investigate and implement alternatives.

- Disseminate project information to affected parties (for example local authority, enterprises and affected households, etc.) through community meetings before construction starts;
- Provide a community relations contact from whom interested parties can receive information on site activities, project status and project implementation results;
- Provide all information, especially technical findings, in a language that is understandable to the general public and in a form that is useful to interested citizens and elected officials through the preparation of fact sheets and news releases, when major findings become available during project phase;
- Monitor community concerns and information requirements as the project progresses;
- Inform local residents about construction and work schedules, interruption of services, traffic detour routes and provisional bus routes, blasting and demolition, as appropriate;
- Provide technical documents and drawings to affected communities, especially a sketch of the construction area and a copy of the ESMP for the construction site;
- Notification boards shall be erected at all construction sites providing information about the project, as well as the contact information of the site managers, environmental staff, and health and safety staff. Telephone numbers and other contact information must be provided so that any affected people have the channel to voice their concerns and suggestions.

7.1.12 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.

7.1.13 Loss of definite materials and land degradation

- Construction materials shall 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 fee to the people and/or Local government.
- 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.
- Significance to Arusha 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.

7.3.14 Land expropriation, loss of property and resettlement

The impacts of land expropriation, loss of property and resettlement can be mitigated by the development and implementation of the proposed resettlement action plan (RAP), consistent with the Land (Assessment of the Value of Land for Compensation) Regulations, 2001; the Land Act No. 4 of 1999 and the village land act no. 5 of (1999); and the world bank environmental assessment (OP. 4.01).
For further details, refer the 'Resettlement action plan report for the Unga Limited-Muriet road in Arusha City Council, Arusha region' of 2014.

7.2 Mitigation Measures for Impacts during Operation Phase (All Sub-projects)

Enhancement of positive Impacts

All the identified positive impacts depend on proper management of the proposed facilities. If the facilities are not well operated, the community will not be able to benefit from collected revenue, employment opportunities, area accessibility and so forth. The developer shall create awareness on the operation and functions of these facilities before the operation phase.

7.2.1 Improvements community life and services in general

- The developer shall ensure periodic maintenance of all facilitates in order to have sustainable sub-projects.

- The local community shall be involved in Operation and maintenance of the proposed investment sub-projects. This will ensure a sense ownership throughout the life of the project.

7.2.2Reduction of floods, erosion and siltation; and improved air quality

- The developer shall ensure that the roads and drainage system receive regular maintenance and cleaning.
- Soils and solid waste removed from drainage systems shall be immediately removed. No waste shall be left over the drains sides, as these tend to fall back into the drains eventually.
- The road shall cleaned regularly to discourage dust accumulation and dispersion

7.2.3 Improvement to Solid Waste Management in Arusha City

- The prepared Landfill Operational Manual shall be strictly followed and updated to as required, to ensure best performance and protection of the environment.
- Regular monitoring of leachate in leachate ponds and of ground water quality shall be done, and preventive actions taken as required.

Mitigation for Negative Impacts (All projects)

7.2.4 Interference to local hydrology

- Construction of the roads interferes with the natural surface and groundwater flow regimes. Good design features shall be adopted to ensure that the changes of the hydrological regimes are minimized and that any impacts are insignificant.
- The design will provide controlled and effective storm water dispersion by installation of adequate and appropriate drainage structures. The discharges points shall be well designed to avoid accelerate erosion downstream.

7.2.5 Risk of ground water pollution by landfill leachate

- All surface run-offs shall be routed away from the site to prevent additional of water into the landfill, and also prevent pollution of the runoff, which ultimately feeds into lake Naura stream
- The landfill shall be lined with synthetic liners to intercept leachate, and provided with leachate collection pipes, that will drain the leachate to treatment ponds.
- The construction of the landfill shall include construction properly designed leachate treatment ponds, which shall treat the collected leachate on site.

- Landfill waste shall be covered after each fill and at the end of the day be provided with a final cover. This shall prevent waste scattering and also prevent rodents and flies from feeding on the waste materials.
- The landfill site shall be fenced to prevent scattering wind-blown waste materials.

7.2.6 Risks of explosions and fire hazards at the landfill

- Education to workers on fire hazards prevention and on proper use of fire extinguishers
- Provision of well serviced fire extinguishers, and any detected fire shall be put out immediately.
- Workers shall be provided with protective gears.
- Activities such as cooking and cigarette smoking in the landfill shall be prohibited.

7.2.7 Occupational Health effects to landfill workers

- The developer shall follow the requirements of the Occupation Health and Safety Act, 2003
- The landfill workers shall be provided with protective gears such as masks, gloves, boots etc.
- Provision of well serviced fire extinguishers, and any detected fire shall be put out immediately.
- The landfill site is provided with facilities such toilets, clean and safe water, proper dining area etc to protect their health.

7.2.8 Public health problems due to pests and birds

- Pests: The waste shall be well compacted and covered, and, where rain water would tend to collect, filling depressions to eliminate breeding sites.
- 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.
- Birds: Noise production, distress calls, and use of captive birds of prey shall be used to control birds

7.2.9 Road Accidents (Unga Limited - Muriet Road)

- Design of Unga Limited - Muriet road has considered installation of proper road signs and regular inspections for their presence
- Road accidents shall be reduced by provision of pedestrian lanes/walkway and street lights.

- Measures shall include installation of speed control devices like humps

8.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Introduction

The Environmental and Social Management Plan (ESMP) presents the implementation schedule for the proposed mitigation measures to both environmental and social impacts as well as planning for long-term monitoring activities. 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 become more environmental friendly.

8.1 Institutional Structure for Environmental and Social Management

The LGA Project Team in Arusha City is responsible for project implementation including environmental and social management requirements. PO - RALG is to provide overall coordination and technical support to the LGA Project Team including necessary link with national authorities (i.e. NEMC, MLHHSD). The approved ESIA report is fed back to the city council to guide implementation and monitoring by the Council Teams, EMOs, Construction supervision Consultants and Contractors.

8.2 Implementation procedure of the ESMP

During implementation the LGA Project Team will be responsible for:

- Ensuring that compensations for lost land rights and properties (if applicable to the sub-project) are implemented and completed before the commencement of any construction works.
- Ensuring that the implementation of the sub-project ESMP is part of the Contractor's contractual obligations. The LGA procurement section will supervise the tendering process for all service providers.
- Ensuring that the ESMP is implemented and approval conditions are observed during the mobilization, construction and operation of the sub-project.

If the project reaches a stage of decommissioning, the LGA Project Team shall prepare a decommissioning plan which will include environmental and social issues highlighted in the ESMP.

8.3 Environmental and Social Costs

The principal environmental and social cost includes the cost for implementing the mitigation measures proposed and that for carrying out monitoring of specific environmental and social parameters. The estimated costs are to be included in the Contractor's BOQ. Additional

costs for implementing environmental and social management measures have been estimated at USD 116,000.00 annually as described in Table 8.1.

8.2 Environmental and Social Costs

The principal environmental and social cost includes the cost for implementing the mitigation measures proposed and that for carrying out monitoring of specific environmental and social parameters. These costs are indicated in Table 8.1 to 8.3. It should be noted that most of the costs for mitigation measures are included in the bills of quantities of the overall works. The costs for the environmental and social supervisor shall be included in the overall supervision cost of the works. The supervisors shall be engaged for at least 15 man-days a month over the entire construction period.

Table 8.1: ESMP for the Proposed Rehabilitation of Unga Limeted-Murriet Roadand Burka Bridge

Environmental and Social Impacts	Mitigation Measure	Responsible Institution	Time Frame	Estimated Cost(USD)
Construction and Pre -Construction Phase				
Enhancement of positive impacts				
1. Job creation and increased income to the local communities	▪ The developer shall ensure sustainability of the proposed road by monitoring the operation of each facility, including the monitoring of revenue collection where applicable. ▪ The developer shall create awareness amongst the users and operators of the facilities ▪ The public shall be involved from initial stages to create a sense of ownership.	o Arusha City council, PO-RALG	Construction phase	**NA**
Mitigation of negative impacts				
2. Risk of water and soil pollution	▪ Portable or constructed toilets shall be provided on construction sites for use by the construction force. ▪ There shall be no direct discharges of wastewater to any nearby water body ▪ The developer shall use techniques such as flow diversion during construction to limit the exposure of disturbed sediments to the moving water ▪ The developer shall obtain all necessary wastewater disposal permits/licenses and/or finalize all necessary wastewater disposal contracts. ▪ Upon completion, wastewater collection tanks and septic tanks shall be safely disposed or effectively sealed off.	o Arusha City council, PO-RALG	Construction phase	8,000.00

Environmental and Social Impacts	Mitigation Measure	Responsible Institution	Time Frame	Estimated Cost(USD)
3. Noise, vibration and air pollution	▪ The developer shall comply with the relevant Tanzanian legislation with respect to noise and vibration ▪ The developer shall implement measures to reduce noise to acceptable levels; this should include silencers, mufflers, acoustically dampened panels ▪ The developer shall avoid, or minimize, heavy truck or noisy material processing facilities through or near residential areas. ▪ High noisy Activities shall be done during day time and thus reduce the level of disturbance at night	o ACC, PO-RALG	Design /Construction /Operation phase	3,000.00
4. Accelerated Soil Erosion	▪ . The developer shall follow the detailed drainage designs included in the construction plans, intended to prevent storm water from causing local flooding ▪ Areas of the site not disturbed by construction activities shall be maintained in their existing conditions. ▪ Earthworks, cuts, and fill slopes shall be maintained, in accordance with the construction regulations	o ACC, PO-RALG, CONTRACT0R	Construction phase	5,000.00
5. Increased Waste Generation	▪ The developer shall use nets and mats to trap debris and the trapped debris shall then be disposed of at the authorized dump site ▪ The developer shall obtain all necessary waste disposal permits or licenses before the start of construction works. ▪ At all work places, the developer shall provide	o ACC, PO-RALG	Construction phase	2,000

Environmental and Social Impacts	Mitigation Measure	Responsible Institution	Time Frame	Estimated Cost(USD)
	litter bins, containers and refuse collection facilities. ▪ All waste storage containers, shall to be tipping-proof, weatherproof and scavenger- proof. ▪ No burning, on-site burying or dumping of solid waste shall occur. ▪ Recyclable materials shall be collected and separated on-site from other waste sources for reuse, to be used as fill material, or for sale. ▪ Solid waste or construction debris shall be disposed off the sites and included in the solid waste plan.			
6. Loss of Vegetation	▪ The developer shall prepare a Clearance, Re-vegetation and Restoration Management Plan for prior approval by the Construction Supervision Engineer, as per Standard specifications for road works of 2000 section 5700 ▪ Cutting of any tree shall be banned unless explicitly authorized in above-referred plan.	o ACC, PO-RALG	Construction phase	1,500.00
7. Damage/relocation of Public Infrastructure and loss of access to Public Services	▪ PO-RALG and the developer shall collaborate with utility providers (TANESCO, DAWASCO and TTCL) to estimate the expected damage and related costs for provision of alternative services during the interruption. ▪ The developer shall provide information to affected households on work schedules as well as planned disruptions at least 5 days in advance. ▪ Damages to existing utility systems shall be reported to a respective authorities as soon as possible	o ACC, PO-RALG	Construction phase	1,400.00

Environmental and Social Impacts	Mitigation Measure	Responsible Institution	Time Frame	Estimated Cost(USD)
8. Worker's and Public Safety risk	▪ The developer shall comply with all Tanzanian regulations on Occupation Health and Safety Act, 2003.	○ ACC, PO-RALG	Construction phase	1,700.00
9. Lacking or slow restoration of areas impacted by construction	▪ The developer shall restore cleared areas such as borrow pits which are no longer in use, disposal areas, site facilities, workers' camps, stockpiles areas, working platforms and any areas temporarily occupied during construction of the project works ▪ The developer shall remove any soil contaminated with chemicals or hazardous substances and transport it to waste disposal areas for burial.	○ ACC, PO-RALG	Construction phase	9,000
10. Overburdened local authorities	▪ The developer shall coordinate with local authorities the agreed schedules of construction activities at areas nearby sensitive places or at sensitive times (e.g., religious festival days). ▪ Copies of the ESMPs and of other relevant environmental safeguard documents in Tanzanian shall be made available to local communities and to workers at the site. ▪ The developer shall inform local residents about construction and work schedules, interruption of services, traffic detour routes and provisional bus routes, blasting and demolition, as appropriate; ▪ Notification boards shall be erected at all construction sites providing information about the project, as well as the contact information of the site managers, environmental staff, and	○ ACC, PO-RALG	Design /Construction /Operation phase	3,400,000

Environmental and Social Impacts	Mitigation Measure	Responsible Institution	Time Frame	Estimated Cost(USD)
	health and safety staff.			
11. 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 developer 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 developer 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. •	o ACC, PO-RALG	Construction phase	4,400.00
12. Loss of definite materials and land degradation	o Construction materials shall be fetched from the existing sites/sources o The construction material shall be purchased and this will be officially negotiated with people and/or Local government in order to avoid conflicts. o The topsoil shall be stock piled for later use in reinstating the pit. Shallow slopes will encourage rapid re-vegetation thus preventing erosion.	o ACC, PO-RALG	Construction phase	1,500

Environmental and Social Impacts	Mitigation Measure	Responsible Institution	Time Frame	Estimated Cost(USD)
13. Land expropriation, loss of property and resettlement	▪ Development and implementation of the proposed resettlement action plan (RAP), consistent with the Land (Assessment of the Value of Land for Compensation) Regulations, 2001; the Land Act No. 4 of 1999 and the village land act no. 5 of (1999); and the World Bank environmental assessment (OP. 4.01). ▪ Timely payment of compensation			5,000
Operation Phase				
Enhancement of positive impact				
14. Improvements community life and services in	▪ The developer shall ensure periodic maintenance of all facilitates in order to have sustainable projects. ▪ The local community shall be involved in Operation and maintenance of the proposed investment subprojects. This will ensure a sense ownership throughout the life of the project.	○ ACC, PO-RALG	Design /Construction /Operation phase	2,000
15. Reduction of floods, erosion and siltation; and improved air quality	▪ The developer shall ensure that the roads and drainage system receive regular maintenance and cleaning. ▪ No waste shall be left over the drains sides, as these tend to fall back into the drains eventually. ▪ The road shall cleaned regularly to discourage dust accumulation and dispersion	○ ACC, PO-RALG	Design /Construction /Operation phase	3,000
Mitigation for Negative Impacts				
16. Occupational Health effects to workers	▪ The developer shall follow the requirements of the Occupation Health and Safety Act, 2003 ▪ The landfill workers shall be provided with			

Environmental and Social Impacts	Mitigation Measure	Responsible Institution	Time Frame	Estimated Cost(USD)
	protective gears such as masks, gloves, boots etc. ▪ Provision of well serviced fire extinguishers, and any detected fire shall be put out immediately. ▪ The landfill site is provided with facilities such toilets, clean and safe water, proper dining area etc to protect their health.	ACC, PO-RALG	Construction phase	2,000
17. Road Accidents	▪ Design of Unga Limited - Muriet road has considered installation of proper road signs and regular inspections for their presence ▪ Road accidents shall be reduced by provision of pedestrian lanes/walkway and street lights. ▪ Measures shall include installation of speed control devices like humps	ACC, PO-RALG	Construction /Operation phase	5,000
TOTAL				**51,600 .00**

Table 8.2: ESMP for the Proposed Construction of Additional Landfill cell

ENVIRONMENTAL AND SOCIALIMPACTS	MITIGATION MEASURE	RESPONSIBLE INSTITUTION	TIME FRAME	ESTIMATED COST(USD)
Construction and Pre -Construction Phase				
Enhancement of positive impacts				
1. Job creation and increased income to local communities	▪ The developer shall ensure sustainability of the proposed road by monitoring the operation of each facility, including the monitoring of revenue collection where applicable.	○ Arusha City	Design /Construction /Operation phase	9,500.00

ENVIRONMENTAL AND SOCIALIMPACTS	MITIGATION MEASURE	RESPONSIBLE INSTITUTION	TIME FRAME	ESTIMATED COST(USD)
	▪ The developer shall create awareness amongst the users and operators of the facilities ▪ The public shall be involved from initial stages to create a sense of ownership.	council, PMO-RALG		
Mitigation of negative impacts				
2. Risk of water and soil pollution	▪ Portable or constructed toilets shall be provided on construction sites for use by the construction force. ▪ Wastewater shall be discharged into a proper wastewater treatment facility at the landfill premises or in the leachete pond ▪ The developer shall obtain all necessary wastewater disposal permits/licenses and/or finalize all necessary wastewater disposal contracts.	o Arusha City council, PO-RALG	Operation phase	8,000.00
3. Noise, vibration and air pollution	▪ The developer shall comply with the relevant Tanzanian legislation with respect to noise and vibration ▪ The developer shall implement measures to reduce noise to acceptable levels; this should include silencers, mufflers, acoustically dampened panels ▪ The developer shall avoid, or minimize, heavy truck or noisy material processing facilities through or near residential areas. ▪ High noisy Activities shall be done during day time and thus reduce the level of disturbance at night	o ACC, PO-RALG	-Construction phase	3,000.00
4. Accelerated Soil Erosion	• Areas of the site not disturbed by construction activities shall be maintained in their existing conditions. ▪ Earthworks, cuts, and fill slopes shall be maintained, in accordance with the construction plans	o ACC, PO-RALG	Construction phase	5,000.00

ENVIRONMENTAL AND SOCIALIMPACTS	MITIGATION MEASURE	RESPONSIBLE INSTITUTION	TIME FRAME	ESTIMATED COST(USD)
5. Loss of Vegetation	▪ The developer shall prepare a Clearance, Re-vegetation and Restoration Management Plan for prior approval by the Construction Supervisor ▪ Cutting of any tree shall be banned unless explicitly authorized in above-referred plan.	o ACC, PMO-RALG	Construction phase	1,500.00
6. Worker's and Public Safety risk	▪ The developer shall comply with all Tanzanian regulations on Occupation Health and Safety Act, 2003.	o ACC, PO-RALG	Construction phase	1,700.00
7. Lacking or slow restoration of areas impacted by construction	▪ The developer shall restore cleared areas such as borrow pits which are no longer in use, disposal areas, site facilities, workers' camps, stockpiles areas, working platforms and any areas temporarily occupied during construction of the project works ▪ The developer shall remove any soil contaminated with chemicals or hazardous substances and send to waste disposal areas for burial.	o ACC, PO-RALG	Construction phase	9,000
8. Overburdened local authorities	▪ Copies of the ESMPs and of other relevant environmental and social safeguard documents in Tanzanian shall be made available to local communities and to workers at the site. ▪ Notification boards shall be erected at construction sites providing information about the project, the contact information of the site managers, environmental staff, and health and safety staff.	o ACC, PO-RALG	Construction phase	3,400,000
9. 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 developer shall deploy locally available labour to reduce risk of spreading of communicable diseases (especially STD).	o ACC, PO-RALG	Design /Construction phase	9,400.00

ENVIRONMENTAL AND SOCIALIMPACTS	MITIGATION MEASURE	RESPONSIBLE INSTITUTION	TIME FRAME	ESTIMATED COST(USD)
	▪ 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 developer 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.			
10. Loss of definite materials and land degradation	○ Construction materials shall be fetched from the existing sites/sources ○ The construction material shall be purchased and this will be officially negotiated with people and/or Local government in order to avoid conflicts. ○ The topsoil shall be stock piled for later use in reinstating the pit. Shallow slopes will encourage rapid re-vegetation thus preventing erosion.	○ ACC, PO-RALG	Construction phase	15,000.00
Operation Phase				
Enhancement of positive impact				
11. Improvements community life and services in the City	▪ The developer shall ensure periodic maintenance of the landfill facilitates in order to have sustainable projects. ▪ The local community shall be involved in Operation and maintenance of the proposed investment subprojects. This will ensure a sense ownership throughout the life of the project.	○ ACC, PO-RALG	Operation phase	20,000.00
12. Reduction of floods, erosion and siltation;	▪ The developer shall ensure that the storm-water management pond at the landfill is well functioning	○ ACC, PO-RALG	Operation phase	2,000.00

ENVIRONMENTAL AND SOCIALIMPACTS	MITIGATION MEASURE	RESPONSIBLE INSTITUTION	TIME FRAME	ESTIMATED COST(USD)
and improved air quality	▪ No waste shall be left over the storm-water pond sides, as these tend to fall back into the pond eventually.			
13. Improvement to Solid Waste Management in Arusha City	▪ The prepared Landfill Operational Manual shall be strictly followed and updated to as required, to ensure best performance and protection of the environment. ▪ Regular monitoring of leachate in leachate ponds and of ground water quality shall be done, and preventive actions taken as required.	o PO-RALG/ACC	Operation phase	12,000.00
Mitigation for Negative Impacts				
14. Interference to local hydrology	▪ Storm-water collected at the landfill shall be collected in existing storm water collection ponds.	o ACC, PO-RALG	Construction phase	5,000.00
15. Risk of ground water pollution by landfill leachate	▪ All surface run-offs shall be routed away from the site to prevent additional of water into the landfill, and also prevent pollution of the runoff, which ultimately feeds into Burka River ▪ The landfill shall be lined with synthetic liners to intercept leachate, and provided with leachate collection pipes, that will drain the leachate to treatment ponds. ▪ The construction of the landfill shall include construction properly designed leachate treatment ponds, which shall treat the collected leachate on site. ▪ Landfill waste shall be covered after each fill and at the end of the day be provided with a final cover. ▪ The landfill site shall be fenced to prevent scattering wind-blown waste materials.	o ACC, PO-RALG	Operation phase	17,000.00
16. Risks of explosions and fire hazards at	▪ Education to workers on fire hazards prevention and on proper use of fire extinguishers		Design /Construction	

ENVIRONMENTAL AND SOCIALIMPACTS	MITIGATION MEASURE	RESPONSIBLE INSTITUTION	TIME FRAME	ESTIMATED COST(USD)
the landfill	▪ Provision of well serviced fire extinguishers, and any detected fire shall be put out immediately. ▪ Workers shall be provided with protective gears. ▪ Activities such as cooking and cigarette smoking in the landfill shall be prohibited.	ACC, PO-RALG	/Operation phase	5,000.00
17. Occupational Health effects to landfill workers	▪ The developer shall follow the requirements of the Occupation Health and Safety Act, 2003 ▪ The landfill workers shall be provided with protective gears such as masks, gloves, boots etc. ▪ Provision of well serviced fire extinguishers, and any detected fire shall be put out immediately. ▪ The landfill site is provided with facilities such toilets, clean and safe water, proper dining area etc to protect their health.	ACC, PO-RALG	Construction phase	8,000.00
18. Public health problems due to pests and birds	▪ Pests: The waste shall be well compacted and covered, and, where rain water would tend to collect, filling depressions to eliminate breeding sites. ▪ 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. ▪ Birds: Noise production, distress calls, and use of captive birds of prey shall be used to control birds	ACC, PO-RALG	Operation phase	7,500.00
TOTAL				**142,000 .00**

Table 8.3: ESMP for the Proposed Extension of Bondeni Drainage

ENVIRONMENTAL AND SOCIALIMPACTS	MITIGATION MEASURE	RESPONSIBLE INSTITUTION	TIME FRAME	ESTIMATED COST(USD)
Construction and Pre -Construction Phase				

ENVIRONMENTAL AND SOCIALIMPACTS	MITIGATION MEASURE	RESPONSIBLE INSTITUTION	TIME FRAME	ESTIMATED COST(USD)
Enhancement of positive impacts				
1. Job creation and increased income to local communities	▪ The developer shall ensure sustainability of the proposed projects by monitoring the operation of each facility, including the monitoring of revenue collection where applicable. ▪ The developer shall create awareness amongst the users and operators of the facilities ▪ The public shall be involved from initial stages to create a sense of ownership.	o Arusha City council, PO-RALG	Construction phase	**NA**
Mitigation of negative impacts				
2. Risk of water and soil pollution	▪ Portable or constructed toilets shall be provided on construction sites for use by the construction force. ▪ Wastewater shall be discharged into a sealed holding tank and removed from the site ▪ There shall be no direct discharges to any nearby water body ▪ The developer shall obtain all necessary wastewater disposal permits/licenses and/or finalize all necessary wastewater disposal contracts. ▪ Upon completion, wastewater collection tanks and septic tanks shall be safely disposed or effectively sealed off.	o Arusha City council, PO-RALG	Construction phase	8,000.00
3. Noise, vibration and air pollution	▪ The developer shall comply with the relevant Tanzanian legislation with respect to noise and vibration ▪ The developer shall implement measures to reduce noise to acceptable levels; this should	o ACC, PO-RALG	Design /Construction	

ENVIRONMENTAL AND SOCIALIMPACTS	MITIGATION MEASURE	RESPONSIBLE INSTITUTION	TIME FRAME	ESTIMATED COST(USD)
	include silencers, mufflers, acoustically dampened panels ▪ The developer shall avoid, or minimize, heavy truck or noisy material processing facilities through or near residential areas. ▪ High noisy Activities shall be done during day time and thus reduce the level of disturbance at night		/Operation phase	3,000.00
4. Accelerated Soil Erosion	▪ . The developer shall follow the detailed drainage designs included in the construction plans, intended to prevent storm water from causing local flooding ▪ Areas of the site not disturbed by construction activities shall be maintained in their existing conditions. ▪ Earthworks, cuts, and fill slopes shall be maintained, in accordance with the construction	o ACC, PO-RALG	Construction phase	5,000.00
5. Increased Waste Generation	▪ The developer shall use nets and mats to trap debris and the trapped debris shall then be disposed of at the authorized dump site ▪ The developer shall obtain all necessary waste disposal permits or licenses before the start of construction works. ▪ At all work places, the developer shall provide litter bins, containers and refuse collection facilities. ▪ All waste storage containers, shall to be tipping-proof, weatherproof and scavenger- proof. ▪ No burning, on-site burying or dumping of solid waste shall occur.	o ACC, PO-RALG	Construction phase	2,000

ENVIRONMENTAL AND SOCIALIMPACTS	MITIGATION MEASURE	RESPONSIBLE INSTITUTION	TIME FRAME	ESTIMATED COST(USD)
	▪ Recyclable materials shall be collected and separated on-site from other waste sources for reuse, for use as fill, or for sale. ▪ Solid waste or construction debris shall be disposed off the sites and included in the solid waste plan.			
6. Loss of Vegetation	▪ The developer shall prepare a Clearance, Re-vegetation and Restoration Management Plan for prior approval by the Construction Supervision Engineer ▪ Cutting of any tree shall be banned unless explicitly authorized in above-referred plan.	o ACC, PO-RALG	Construction phase	11,500.00
7. Damage/relocation of Infrastructure and loss of access to services	▪ existing utility systems shall be reported to a respective authorities as soon as possible	o ACC, PO-RALG	Construction phase	3,000.00
8. Worker's and public Safety risk	▪ The developer shall comply with all Tanzanian regulations on Occupation Health and Safety Act, 2003.	o ACC, PO-RALG	Construction phase	1,700.00
9. Lacking or slow restoration of areas impacted by construction	▪ The developer shall restore cleared areas such as borrow pits which are no longer in use, disposal areas, site facilities, workers' camps, stockpiles areas, working platforms and any areas temporarily occupied during construction of the project works ▪ The developer shall remove any soil contaminated with chemicals or hazardous substances and transport it to waste disposal areas for burial.	o ACC, PO-RALG	ACC, Construction phase	9,000.00

ENVIRONMENTAL AND SOCIALIMPACTS	MITIGATION MEASURE	RESPONSIBLE INSTITUTION	TIME FRAME	ESTIMATED COST(USD)
10. Overburdened local authorities	▪ The developer shall coordinate with local authorities the agreed schedules of construction activities at areas nearby sensitive places or at sensitive times (e.g., religious festival days). ▪ Copies of the ESMPs and of other relevant environmental safeguard documents in Tanzanian shall be made available to local communities and to workers at the site. ▪ The developer shall inform local residents about construction and work schedules, interruption of services, traffic detour routes and provisional bus routes, blasting and demolition, as appropriate; ▪ Notification boards shall be erected at all construction sites providing information about the project, as well as the contact information of the site managers, environmental staff, and health and safety staff.	o ACC, PO-RALG	Construction phase	3,400,000
11. 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 developer 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,	o ACC, PO-RALG	Construction phase	9,400.00

ENVIRONMENTAL AND SOCIALIMPACTS	MITIGATION MEASURE	RESPONSIBLE INSTITUTION	TIME FRAME	ESTIMATED COST(USD)
	during the implementation phase, the developer 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.			
12. Loss of definite materials and land degradation	▪ Construction materials shall be fetched from the existing sites/sources ▪ The construction material shall be purchased and this will be officially negotiated with people and/or Local government in order to avoid conflicts. ▪ The topsoil shall be stock piled for later use in reinstating the pit. Shallow slopes will encourage rapid re-vegetation thus preventing erosion.	o ACC, PO-RALG	Construction phase	15,000
Operation Phase				
Enhancement of positive impact				
13. Improvements community life and services in	▪ The developer shall ensure periodic maintenance of all facilitates in order to have sustainable projects. ▪ The local community shall be involved in Operation and maintenance of the proposed investment subprojects. This will ensure a sense ownership throughout the life of the project.	o ACC, PO-RALG	Design /Construction /Operation phase	20,000
14. Reduction of floods, erosion and siltation; and improved air quality	▪ The developer shall ensure that the roads and drainage system receive regular maintenance and cleaning. ▪ No waste shall be left over the drains sides, as these tend to fall back into the drains eventually. ▪ The road shall cleaned regularly to discourage	o ACC, PO-RALG	Design /Construction /Operation phase	2,000.00

ENVIRONMENTAL AND SOCIALIMPACTS	MITIGATION MEASURE	RESPONSIBLE INSTITUTION	TIME FRAME	ESTIMATED COST(USD)
	dust accumulation and dispersion			
Mitigation for Negative Impacts				
15. Interference to local hydrology	▪ Storm water collected/diverged at construction sites shall be recycled back to the natural paths where possible	○ ACC, PO-RALG	Construction phase	15,000.00
16. Occupational Health effects to workers	▪ The developer shall follow the requirements of the Occupation Health and Safety Act, 2003 ▪ The workers shall be provided with protective gears such as masks, gloves, boots etc. ▪ Provision of well serviced fire extinguishers, and any detected fire shall be put out immediately. ▪ The construction site is provided with facilities such toilets, clean and safe water, proper dining area etc to protect their health.	ACC, PO-RALG	Construction phase	8,000.00
TOTAL				**116,000 .00**

8.4 Implementation of the ESMP

To facilitate effective implementation of the ESMPs, the Arusha City Council (ACC) Technical Support Team will:

(a) establish an Environmental and Social Team(EST) responsible for ensuring the timely implementation of the ESMP, including monitoring, reporting, and capacity building related to safeguards;

(b) assign the Construction Supervision Consultant (CSC) to be responsible for supervision of the contractor's safeguard performance as part of the construction contract and this requirement will be included in the CSC terms of reference (ToR); and

(c) Hire qualified national consultants as the Independent Environmental Management Consultant (IEMC) to assist the EST in performing these tasks.

ACC will be responsible for implementing the mitigation measures during the operation stage of the project; ACC will ensure that the mitigation measures are implemented and adequate budgets are provided. The City will provide the overall policy guidance and oversight for project implementation, including the ESMP. More details on organization, roles and responsibilities for the ESMP implementation and the monitoring program are described in the next Chapter.

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 ESMP and its effectiveness. The monitoring results are also used extensively during the environmental auditing. The ESMP for the road, Burka Bridge, storm water drain and landfill are given in Table 9.1, Table 9.2, Table 9.3 and Table 9.4 respectively

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 Unga Limited-Muriet Road and Burka Bridge

	Parameters	**Monitoring frequency**	**Sampling Area**	**Measurement Units**	**Method**	**Target level/ Standard**	**Responsibility for monitoring**	**Annual costs estimates (USD)**
Pre-construction stage								
Air quality	SO_2	Once before the construction starts	Project site		Detector tubes	No Tanzanian Standard	Arusha City Council/ Contractor	1200
	NO_x		Project site		Detector tubes			2000
	PM_{10}		Project site		Mini-Vol Sampler			2500
	CO_2		Project site		Detector tubes			3000
Noise Baseline	Noise level		Project site	dBA	Measurements			3500
Water pollution		Once before the construction work starts	Naura Stream /streams and shallow wells near the project sites				Arusha City Council/ Contractor	
	Nitrate			mg/l	Sampling and analysis (Spectrophotometer)	30		2000
	Lead			mg/l	Sampling and analysis (AAS)	0.05		2400
	Sulphate			mg/l	Sampling and analysis (Spectrophotometer)	600*		2000
	Turbidity			NTU	Sampling and analysis (Spectrophotometer)	35		1200
	Hydrocarbons			Mg/l	Sampling and analysis (HPLC)			2600
	pH			-	pH meter	6.5-9.2		500
Compensation	Rate of compensation for land and properties	Once before the construction starts	Project site	Once before construction begins	File records and inquiry.	-	Arusha City Council/ Contractor	-
Construction stage								
Air pollution	SO_2	Three times a year	Project site		Detector tubes	No Tanzanian Standard	Arusha City Council/ Contractor	2000
	NO_x	Three times a year	Project site		Detector tubes			1500
	PM_{10}	Three times a year	Project site		Mini-Vol Sampler			1500
	CO_2	Three times a year	Project site		Detector tubes			1500

	Parameters	**Monitoring frequency**	**Sampling Area**	**Measurement Units**	**Method**	**Target level/ Standard**	**Responsibility for monitoring**	**Annual costs estimates (USD)**
Noise pollution	Noise level	Once in a year	Project site	dBA	Measurements			1500
Water pollution	Nitrate	Three times a year	Naura Stream/streams and shallow wells near the project sites	mg/l	Sampling and analysis (Spectrophotometer)	30	Arusha City Council/ Contractor	1800
	Lead	Three times a year		mg/l	Sampling and analysis (AAS)	0.05		2100
	Sulphate	Three times a year		mg/l	Sampling and analysis (Spectrophotometer)	600*		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
	pH	Three times a year			pH Meter	6.5-9.2		300
Soil erosion		Once in three month for construction period	project area	Level of erosions	Site inspection	_	Arusha City Council/ Contractor	5000
Interference to local hydrology	Hydrometric	Once in a month during rain season in the construction period	Naura Stream /streams near the project sites	Flooding levels	Volumetric measurements	-	Arusha City Council/ Contractor	4,000
Vibration	Vibration levels	Three times a year	Project sites and all borrow pits	Number	Vibration meter	-	Arusha City Council/ 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	-	Arusha City Council/ Contractor	2500
Employment opportunity	Percentage of local construction	Three times a year	Project site	Number of local people employed in	Records, inquiries and observation	-	Arusha City Council	N/A

	Parameters	**Monitoring frequency**	**Sampling Area**	**Measurement Units**	**Method**	**Target level/ Standard**	**Responsibility for monitoring**	**Annual costs estimates (USD)**
	labourers			the project				
Occupational Safety and health risks	Number and type of safety equipment such as mask, helmet gloves and ear plugs. Health and sanitation facilities in camps.	Once a year	Project site	Number of safety measures provided	Records, injuries and inspection	-	Arusha City Council/ Contractor	3200
Dust	Water sprinkling	Twice a week	Project site	Frequency of water sprinkling	Inquiries and observation	Minimum dust emission	Arusha City Council/ Contractor	Included in the contract lamp sum
Operation stage								
Air pollution	SO_2	Twice every month for the first two years	Project site		Detector tubes	No Tanzanian Standard	Arusha City Council	1500
	NO_x	Twice every month for the first two years	Project site		Detector tubes			1000
	Dust pollution (PM_{10})	Twice every month for the first two years	Project site		Mini-Vol Sampler			14000
	CO_2	Twice every month for the first two years	Project site		Detector tubes			2000
Noise pollution	Noise level	Once in 3 months	Project site				Arusha City Council	2000
Water pollution	Nitrate	Three times a year				30	Arusha City Council	1800
	Lead	Three times a year	Naura Stream /streams and shallow wells near the project	mg/l	Sampling and analysis (Spectrophotometer)	0.05		1200
	Sulphate	Three times a year		mg/l	Sampling and analysis (AAS)	600*		1200
	Turbidity	Three times a year		mg/l	Sampling and analysis (Spectrophotometer)	30		1500
	Hydrocarbons	Three times a year		mg/l	Sampling and analysis			

	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility for monitoring	Annual costs estimates (USD)
			site		(Spectrophotometer)			1800
	pH	Three times a year			pH Meter	6.5-9.2		300
Soil erosion	erosion	Once in three month for construction period	project area	Level of erosions	Site inspection	-	Arusha City Council	3500
Safety of human beings	Road accidents and roads signs	Three times a year for the project life span	Project site	Road signs and number of accidents	Records, inquiries and inspection	Zero accident and sufficient no of road signs	Arusha City Council	2500
Total monitoring costs								**134,200**

Table 9.2: Environmental and Social Monitoring Plan for the Storm Water Drains

	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility for monitoring	Annual costs estimates (USD)
Pre construction stage								
Air quality	SO_2	Once before the construction starts	Project site		Detector tubes	No Tanzanian Standard	Arusha City Council/ Contractor	12000
	NO_x		Project site		Detector tubes			500
	PM_{10}		Project site		Mini-Vol Sampler			550
	CO_2		Project site		Detector tubes			500
Water pollution		Once before the construction work starts	Naura Stream				Arusha City Council/ Contractor	
	Nitrate			mg/l	Sampling and analysis (Spectrophotometer)	30		5000
	Lead			mg/l	Sampling and analysis (AAS)	0.05		2500
	Sulphate			mg/l	Sampling and analysis (Spectrophotometer)	600*		2400
	Turbidity			NTU	Sampling and analysis (Spectrophotometer)	35		1600
	Hydrocarbons			Mg/l	Sampling and analysis			2000

	Parameters	**Monitoring frequency**	**Sampling Area**	**Measurement Units**	**Method**	**Target level/ Standard**	**Responsibility for monitoring**	**Annual costs estimates (USD)**
					(HPLC)			
	pH			-	pH meter	6.5-9.2		2000
Construction stage								
Air pollution	SO_2	Three times a year	Project site		Detector tubes	No Tanzanian Standard	Arusha City Council/ Contractor	1500
	NO_x	Three times a year	Project site		Detector tubes			1500
	PM_{10}	Three times a year	Project site		Mini-Vol Sampler			1500
	CO_2	Three times a year	Project site		Detector tubes			1500
Noise pollution	Noise level	Once in a year	Project site	dBA	Measurements			1500
Water pollution	Nitrate	Three times a year		mg/l	Sampling and analysis (Spectrophotometer)	30	Arusha City Council/ Contractor	1800
	Lead	Three times a year	Naura Stream	mg/l	Sampling and analysis (AAS)	0.05		1200
	Sulphate	Three times a year		mg/l	Sampling and analysis (Spectrophotometer)	600*		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
	pH	Three times a year			pH Meter	6.5-9.2		1000
Vibration	Vibration levels	Three times a year	Project site and all borrow pits	Number	Vibration meter	-	Arusha City Council/ Contractor	1500
Loss of natural habitat	Trees and Grasses	Once in three month for construction period	Along the proposed route	-	Inspection	-	Arusha City Council/ Contractor	4800
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	-	Arusha City Council/ Contractor	2000
Employment opportunity	Percentage of local construction	Three times a year	Project site	Number of local people employed in	Records, inquiries and observation	-	Arusha City Council/ Contractor	N/A

	Parameters	**Monitoring frequency**	**Sampling Area**	**Measurement Units**	**Method**	**Target level/ Standard**	**Responsibility for monitoring**	**Annual costs estimates (USD)**
	labourers			the project				
Occupational Safety and health risks	Number and type of safety equipment such as mask, helmet gloves and ear plugs. Health and sanitation facilities in camps.	Once a year	Project site	Number of safety measures provided	Records, inquiries and inspection	-	Arusha City Council/ Contractor	5000
Operation stage								
Water pollution	Nitrate	Three times a year	Naura Stream /streams and shallow wells near the project sites			30	Arusha City Council	1800
	Lead	Three times a year		mg/l	Sampling and analysis (Spectrophotometer)	0.05		1200
	Sulphate	Three times a year		mg/l	Sampling and analysis (AAS)	600*		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
	pH	Three times a year			pH Meter	6.5-9.2		300
Total monitoring costs								**92,500**

Table 9.3: Environmental and Social Monitoring Plan for the Landfill

	Parameters	**Monitoring frequency**	**Sampling Area**	**Measurement Units**	**Method**	**Target level/ Standard**	**Responsibility for monitoring**	**Annual costs estimates (USD)**
Pre construction stage								
Air quality	SO_2	Once before the construction starts	Project site		Detector tubes	No Tanzanian Standard	Arusha City Council/ Contractor	2500
	NO_x		Project site		Detector tubes			1500

	Parameters	**Monitoring frequency**	**Sampling Area**	**Measurement Units**	**Method**	**Target level/ Standard**	**Responsibility for monitoring**	**Annual costs estimates (USD)**
	PM_{10}		Project site		Mini-Vol Sampler			1000
	CO_2		Project site		Detector tubes			500
	CO		Project site		Detector tubes			200
Noise Baseline	Noise level		Project site	dBA	Measurements			500
Ground Water pollution	pH	Once before the construction work starts	Ground water	-	pH Meter	6.5-9.2	Arusha City Council/ Contractor	
	Temperature			Centigrade	Thermometer	20-35		600
	Electric conductivity			µs/cm	Electrode Meter			400
	Ammonium Nitrogen			mg/l	Sampling and analysis (Spectrophotometer)			400
	Chloride			mg/l	Sampling and analysis (Spectrophotometer)	200		500
	BOD			Mg/l	Sampling and analysis (BOD Track)	30		500
	COD			mg/l	Sampling and analysis (Spectrophotometer)	60		500
Construction stage								
Air pollution	SO_2	Three times a year	Project site		Detector tubes	No Tanzanian Standard	Arusha City Council/ Contractor	1500
	NO_x	Three times a year	Project site		Detector tubes			1500
	PM_{10}	Three times a year	Project site		Mini-Vol Sampler			1500
	CO_2	Three times a year	Project site		Detector tubes			1500
Noise pollution	Noise level	Once in a year	Project site	dBA	Measurements			1500
Soil erosion		Once in three month for construction period	project area	Level of erosions	Site inspection	_	Arusha City Council/ Contractor	5000
Vibration	Vibration levels	Three times a year	Project sites and all borrow pits	Number	Vibration meter	-	Arusha City Council/ Contractor	2000
Frequency of	illness of	Once in a month for the	Project site		Health records	-	Arusha City	

	Parameters	**Monitoring frequency**	**Sampling Area**	**Measurement Units**	**Method**	**Target level/ Standard**	**Responsibility for monitoring**	**Annual costs estimates (USD)**
illness of construction workers	construction workers	construction period		Number of cases			Council/ Contractor	3000
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	-	Arusha City Council/ Contractor	N/A
Occupational Safety and health risks	Number and type of safety equipment such as mask, helmet gloves and ear plugs. Health and sanitation facilities in camps.	Monthly	Project site	Number of safety measures provided	Records, inquiries and inspection	-	Arusha City Council/ Contractor	12000
Dust	Water sprinkling	Twice a week	Project site	Frequency of water sprinkling	Inquiries and observation	Minimum dust emission	Arusha City Council/ Contractor	Included in the contract lamp sum
Operation stage								
Air pollution	SO_2	Twice every month	Project site		Detector tubes	No Tanzanian Standard	Arusha City Council	4000
	NO_x	Twice every month	Project site		Detector tubes			34000
	Dust pollution (PM_{10})	Twice every month	Project site		Mini-Vol Sampler			5000
	CO_2	Twice every month	Project site		Detector tubes			4000
	Methane	Once a week	Project site		Detector tubes			8,000
Noise pollution	Noise level	Once in 3 months	Project site				Arusha City Council	2000
Ground Water pollution	pH	Twice every month	Ground water	-	pH Meter	6.5-9.2	Arusha City Council	2400
	Temperature	Twice every month		Centigrade	Thermometer	20-35		2400
	Electric conductivity	Twice every month		µs/cm	Electrode Meter			3000

	Parameters	**Monitoring frequency**	**Sampling Area**	**Measurement Units**	**Method**	**Target level/ Standard**	**Responsibility for monitoring**	**Annual costs estimates (USD)**
	Ammonium Nitrogen	Twice every month		mg/l	Sampling and analysis (Spectrophotometer)			6000
	Chloride	Twice every month		mg/l	Sampling and analysis (Spectrophotometer)	200		6000
	BOD	Twice every month		Mg/l	Sampling and analysis (BOD Track)	30		16000
	COD	Twice every month		mg/l	Sampling and analysis (Spectrophotometer)	60		7500
Total monitoring costs								**137,500**

9.2 Role and Responsibilities during ESMP Implementation

The Project Coordinator in the President's Office-Regional Administration and Local Government (PC-PO RALG) will be responsible for the overall monitoring and quality assurance of the Project. While ACC through Technical Support Team (TST) shall be responsible for ESMP implementation, the Project (PC-PO RALG) will have a quality assurance and monitoring role including all safeguards aspects. ACC will submit all safeguards progress and monitoring reports to the (PC-PO - RALG).

The PO RALG will also be responsible for contracting and managing the Independent Environmental Monitoring Consultant (IEMC) who will monitor the environmental performance in all subprojects in Arusha City. The IEMC's costs are therefore part of the PO RALG budget, and do not form part of the ESMP implementation costs. The figure and subsequent table below summarize the roles and responsibilities of the key parties and their relationships with regard to the implementation of the ESMP.

The Developer has full responsibilities to ensure that the contractor abides to regulation and specifications. Contractors have the main responsibility for implementing mitigation measures. Those measures will be included in the bidding documents and the costs are to be included in their bids and the construction contracts.

CSC is responsible for supervising and monitoring the day-to-day implementation of mitigation measures. The associated costs are included in CSC service contracts. IEMC will be responsible for environmental monitoring which includes (i) support to the EST/TST for implementing supervision and monitoring, and (ii) reporting on the implementation through periodic monitoring reports. The relationship, roles and responsibilities of the EST, TST, CSC, and IEMC are outlined in Figure 9.1 and Table 9.4.

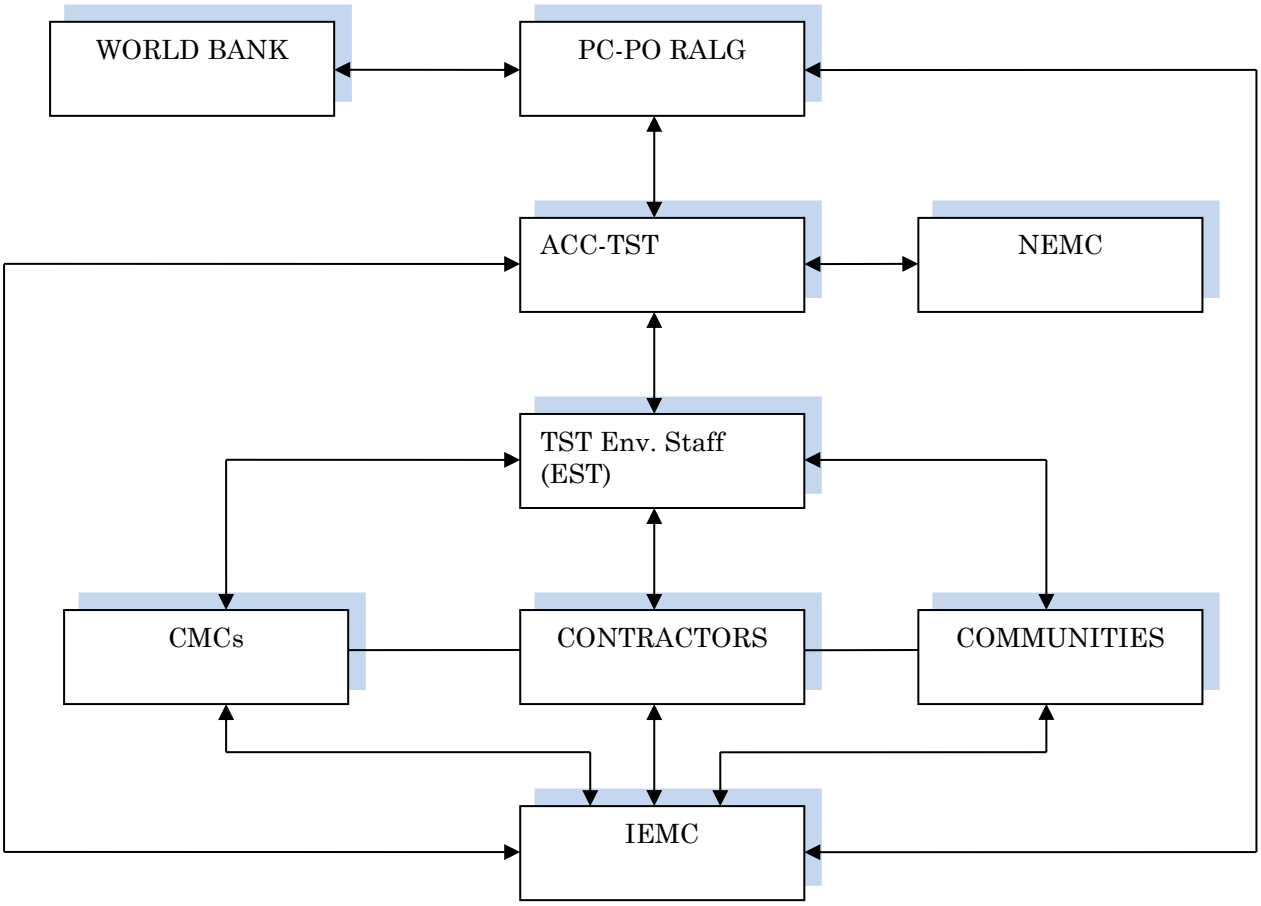


Figure 9.1: Environmental Management Organization Chart

Abbreviations: ACC= Arusha City Council, TST =Technical Support Team, IEMC=Independent Environmental Monitoring Consultant, EST= Environmental and Social Team,

Table 9.4: Role and Responsibilities of Key Parties for ESMP Implementation

Organ	Roles and Responsibilities
ACC-TST/ ESUs	-Responsible for implementing the ESMP during the detailed design and construction stages. ESMP implementation during operation stage is the responsibility of the Arusha City Council. The council -TST will set up an Environmental and Social Team (EST) to ensure timely and effective implementation of the ESMP, including preparation of reports on safeguard compliance as required by Government and WB.
	-Responsible for ensuring that the relevant sections in the bidding and contract documents for all construction works are in compliance with the ESMP; this means they contain the requirements of the ECOPs and site-specific ESMPs.
	-Responsible for communicating with relevant local, regional and national departments; and with the agencies responsible for implementing and supervising ESMP, especially with the National Environmental Management Council (NEMC), and with the concerned wards/Sub-wards during planning, monitoring, management and operation.
	-Will coordinate with community organizations to encourage them to actively participate in the planning, management, and implementation of the project, including monitoring of the contractor's performance.
	-To ensure effective monitoring and timely implementation of the ESMP, Arusha City Council -TST/ESTs will hire national environmental consultants to assist them with carrying out and monitoring the ESMP implementation.
	- In the course of supervising and monitoring the contractors' performance, Arusha City Council -TST will be responsible for: (a) checking project implementation indicators relating to the environment; (b) conducting unscheduled, surprise inspections to ensure that mitigation measures are being implemented as required in construction contract by contractor; (c) reviewing the periodic reports of the Construction Supervision Consultant (CSC) to ensure compliance with mitigation measures and ESMPs; and (d) based on the periodic reports by CSC and IEMC, preparation of reports on environmental compliance of subprojects, to be submitted to WB and NEMC (this will be part of the submission of progress report to WB every six months).
	-Coordinate closely with relevant supply utilities i.e. AUWASA and the Environmental Management department (sanitation and solid waste management) to monitor their interaction with the project during operation and maintenance phase.

Organ	Roles and Responsibilities
Construction Supervision Consultant (CSC)	-Responsible for monitoring the safeguard performance of the contractors during site clearance and construction, including oversight of the self-monitoring to be conducted by contractor. With regard to environmental safeguards, the CSC's main responsibility will include, but not be limited to, the following:
	-Assist IEMC to establish, collect and provide information essential environmental indicators, on-site and for the construction works.
	-Ensure that all work comply with the approved ESMPs, as set out in documents for environmental impact mitigation and monitoring.
	-Monitor the implementation of mitigation measures by the contractors, propose and deploy any necessary supplementary measures in time to improve mitigation measures to fully meet the environmental management and safety requirements of project.
	-Prepare action plans and/or propose urgent solutions to cope with environmental problems, emergency situations and damage that occurred during construction
	-Recommend to Arusha City Council -TSTs to suspend partially or completely construction work if labour safety and environmental protection requirements of the contract are not being complied with.
	-Organize regular discussions with relevant parties, agencies and other stakeholders to provide information about implementation plans to increase people's awareness of the need for environmental protection and management during construction process.
Construction Contractor	Responsibilities with respect to all aspects of the works, including the environmental aspects, are set out in the contract documents, signed with the Arusha City Council -TST.

Organ	Roles and Responsibilities
	-Construction contractors are responsible for carrying out environmental impact mitigation measures and for complying with the approved ESMP when implementing construction contracts. When preparing the "Contractors ESMP", the contractor will study the project's approved EIA report and propose a construction method that includes environmental mitigation and monitoring measures that are in line with the approved ESMP.
	-Contractor's ESMP will be submitted to Arusha City Council -TST and CSC for review, as well as to IEMC, as deemed necessary. Changes, if any, will be evaluated for their feasibility and for legal issues (laws, decrees, circulars and other regulations) before suitable adjustments are approved for specific cases on-site.
	- During the construction work, the construction contractors will be closely supervised by Arusha City Council-TST, CSC, IEMC, environmental authorities and the local community for their compliance with the ESMP.
Independent Environmental Monitoring Consultant (IEMC*)*	The IEMC will be responsible for assisting the Arusha City Council -TST with the ESMP implementation. This also includes advising the CSC, contractors and communities on environmental compliance, and on carrying out the monitoring program in accordance with regulations, procedures and policies of the Government and the WB, respectively. After the detailed implementation of the environmental monitoring programs was discussed by the Arusha City Council -TST and World Bank supervision staff, the IEMC will be responsible for quarterly checking, and for supporting the Arusha City Council -TST staff to supervise overall project activities to ensure that uniform environmental policies of the Government and World Bank are applied and supervised during project implementation. The IEMC will be responsible for: (1) providing training and capacity building for construction management Arusha City Council -TST/EST staff, including field engineers and/or consultants (CSC), in supervising the ESMP implementation by the contractors; (2) ensuring active participation of the local communities and schools in the project areas, (3) monitoring of environmental parameters to assess the overall impacts of the project, and (4) establish the environmental training program
	-Ensuring that the approved ESMP and all other relevant project legal agreements related to environmental safeguards are fully applied and complied with during project implementation.

Organ	Roles and Responsibilities
	-Assessing the effectiveness of mitigation measures which are applied by contractors and CSC during project implementation; providing proposals and recommendations to the Arusha City Council -TSTs on improvements needed to meet the safeguard requirements.
	-Reporting periodically (every 3 months) to the Arusha City Council -TSTs on actual ESMP performance during project implementation.
	-Establishing standard procedures, methods and forms to assist the Arusha City Council -TSTs and CSC to assess contractors' progress in implementing the required impact mitigation and monitoring measures.
	-Assisting the Arusha City Council -TSTs' environmental staff to review and check that relevant environmental sections (based on the ESMP) have been included in the bid packages and construction contract documents to ensure compliance with environmental policies and impact mitigation and monitoring requirements.
	- Measuring, taking samples and monitoring periodically the key environmental parameters, i.e. once every 3 months.
	-Assistance with the preparation of documents and implementation of training programs in environmental monitoring and supervision for contractors, CSC and relevant staff of the Arusha City Council -TST (environmental staff and coordinators of contract packages).
	-Via Arusha City Council -TST, discussing with relevant enterprises, as necessary, to find suitable solutions for unexpected risks relating to environmental sanitation.

9.3 Institutional Arrangements and Reporting Procedures

ACC-TST, 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 PO-LGRG; and, preparing annual environmental progress reports.

The purpose of environmental and social monitoring is to quantitatively measure the environmental effects of the road project. The environmental monitoring program will operate through the pre-construction, 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 a Contractor's Environmental manager and Engineer's Environmental and Social Specialist. They will conduct mitigation monitoring as part of the regular works inspections. The weekly inspection will be undertaken by the Contractor's Environmental Manager. When available and appropriate the inspection will also be attended by Engineer's Environmental and Social Specialist, the main Contractors site management staff and their specialist advisors (WB Specialists etc). A weekly Environmental Compliance Report will be produced following each inspection and will incorporate any actions identified during any PO-RALG/World Bank inspections. The inspection report will summarize the status of the site's compliance, and include photographic records if appropriate. The reports will cover, among other matters as appropriate, the following:

- Contractor's compliance with mitigation measures
- Wastewater and environmental sanitation issues
- Traffic congestion or disruption
- Performance of the water supply systems
- Potential project-related risks and risk management issues
- Quality of water in streams crossing the project roads
- Status of measures to assist project-affected people at the new resettlement sites on environmental aspects
- Consultation with local communities in key project areas

The responsibility for mitigation monitoring during the operation phase will lie with the Environmental Section in Arusha City .

ACC-TST will provide PO-RALG 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.

9.4 Capacity Building Program

So far Arusha City Council (ACC) has no staff specifically dedicated to Environmental and Implementation of Safeguard requirements. However, ACC have Urban Development, Natural Resources and Environment department which as a whole it oversee the Environmental Issues in the City. The department has got two one (1) environmental officers who solely deal with environmental issues on daily basis. Apart from this environmental officer other staffs in the department and the whole has limited knowledge of WB safeguard requirements; they may also lack experience in dealing with environmental and social issues. Such lack of capacity represents a risk to the implementation of safeguards requirements as contained in the ESMP and as required by the WB policy. It therefore is necessary to address this weakness through capacity building. It is proposed to provide capacity building through technical assistance that will support ACC during the implementation of the ESMP. The technical assistance will provide the necessary support to ACC in its work with contractors as well as other entities involved in the implementation of the ESMP.

The technical assistance will include support from experts and training that will cover (i) general knowledge of safeguards requirements and project procedures, and (ii) important specific knowledge in safeguard procedures and requirements for project staff, consultants, and national contractors. This will include, for example, assistance with the preparation of documents and implementation of training programs on environmental management and environmental monitoring for contractors and relevant staff of ACC (TST) to do their tasks. It will also include assisting ACC environmental and social staff with the review of contract documents to ensure compliance with the ESMP. It will also provide general environmental guidance as requested by ACC to enhance overall project implementation and performance.

Given the nature, locations, and scale of construction, it is anticipated that the safeguard technical assistance support and training will be provided at least during the first 3 years of the project implementation. The WB safeguard specialists will support this in the capacity building program, in particular in the training activities as appropriate.

Proposed Training Programs

Table 9.5 provides examples of the basic training programs for safeguards during project implementation. The training programs will be developed and delivered by the Technical Assistance team for the implementation of safeguards for the ACC training. The ACC trained staff with the support

of the Technical Assistance team for the implementation of safeguards will provide the training to contractors and other entities concerned.

Other more specific and tailored training will be developed and agreed upon between ACC and the Technical Assistance team for the implementation of safeguards during project implementation based upon a reassessment of needs and the status of safeguards implementation.

- *Target groups for the training:* ACC-TST, PO-RALG staff, Contractors and community representatives in the project area.
- *Training schedule:* at least 1 month before the construction of the first contract. The training can be adjusted in line with the implementation schedule of the subproject/contracts.
- *Training frequency*: The basic training programs proposed in table below will take place every six months on a yearly basis and its content updated and adapted to implementation issues. Training frequency and content will be reassessed during implementation depending on needs. It is foreseen that the training program for ACC staff will continue until year end of construction period. Three days of training for contractors are also planned to take place twice a year on an annual basis for at least two years.

Table 9.5: Training Programs for Capacity Building in Environmental Supervision and Management

Target Group	**PO-LARG Staff and ACC Staff**
Course Title	Environmental supervision, monitoring and reporting
Participants	Environmental staff and technical staff (Project Coordinator from PO-RALG, 20 ACC staff, 2 NEMC Staff, 2 Division of Environment Staff)
Training Frequency	Soon after project effectiveness but at least 1 month before start of construction of the first contract. Follow-up training will be scheduled as needed.
Time	Four days of training, to be held twice a year, and then to be repeated on a yearly basis until year three of implementation.
Content	General environmental management relating to the project, and covering the requirements of NEMC and WB; General aspects of environmental supervision; Implementation and supervision of mitigation measures; Community participation in environmental supervision monitoring; Guidance and supervision of contractors, Subcontractors and community representatives in the implementation of environmental supervision; Use of forms for environmental supervision; Risk response and control; Receipt and submission of reporting forms; and Other areas of training needs, as determined
Responsibilities	PO-RALG, ACC with support of the Technical Assistance team for the implementation of safeguards.
Target Groups	**CONTRACTORS, SUBCONTROCTORS, WARDS AUTHORITIES, COMMUNITY REPRESENTATIVES**
Course Title	Implementation of mitigation measures
Participators	On-site construction management staff; environmental staff of contractors; ward/group authorities.
Training frequency	After bidding, and determine based on needs
Time	3 days of training for contractors and 2 days of training for others, to be repeated twice a year on an annual basis depending on needs
Content	• Overview of environmental monitoring; • Requirements of environmental monitoring; • Role and responsibilities of contractors • Scope and methods of environmental monitoring; • Response and risk control; • Propagate monitoring forms and guide how to fill in the forms and risk report;

	• Preparation and submission of reports and Other areas to be determined.
Responsibilities	PO-RALG, ACC with support of the Technical Assistance team for the implementation of safeguards
Target Groups	**COMMUNITIES AND WORKERS**
Course Title	Environmental sanitation and safety
Participators	Representatives of community and/or worker leaders (as appropriate)
Training frequency	As appropriate
Time	One-day presentation and one-day on-the job training twice a year, to be repeated on as needed basis
Content	Preliminary presentation on environmental protection and environmental overview Key issues that require communities' and workers' attention to minimize safety risks (roads, waterways, equipment, machines, open excavations, etc.) as well as reduce pollution (dust, fumes, gases, oil/grease spills, waste management, etc.) Management of environmental safety and sanitation on work sites; Mitigation measures at construction sites; Safety measures on electricity, mechanical, transportation, air pollution; Procedures to deal with emergency situations; and Other areas to be determined.
Responsibilities	Contractor and ACC

10.0 DECOMMISSIONING AND DEMOBILISATION PLAN

10.1 Introduction

As the decommissioning Unga Limited-Muriet road and that of Bondeni storm drain is not anticipated in the remote future, the specific conditions for mitigation are generally inherently uncertain. The Landfill will however require decommissioning after sometime in use. Decommissioning will entail continued monitoring and regular maintenance of leachate ponds and that of landfill gas control systems.

The most important part of landfill closure and restoration plan, where ground water protection measures are in place, is to construct low permeability cover or cap, over the waste when the final elevations reached. The following procedures are typically proposed to close and restore a landfill:

1. Cover all the waste
2. Permit sufficient time for settling of any recently deposited waste
3. Apply final cover
4. Grade final slopes to around 5%
5. Install permanent systems of surface drainage channels on the landfill
6. Check sediments and erosion control and modify according to any changes in slopes
7. Dissemble temporary structures (i.e. campsite) and waste receiving areas not required for the after use of the site
8. Seed the final cover with appropriate mixture of grasses.
9. Outline a timetable to ensure that that the following features are inspected at appropriate regular intervals:
10. Settlement: Evaluate cover soil integrity and need for grading
11. Close check on sedimentation and erosion control facilities
12. Periodic monitoring of leachate and gas control facilities
13. Vandalism and squatting prevention measures
14. Selection and planting of vegetation cover, in preparation of the site for alternative use.
15. Fencing and installation of sign posts around the landfill area.

In view of this, specific mitigation measures pertaining to environmental impacts of decommissioning works cannot be proposed at the moment with a reasonable degree of certainty.
A Detailed decommissioning plan that takes environmental issues into consideration shall be prepared by the developer prior to the decommissioning works. Should it be done, decommissioning may entail change of use (functional changes) or demolition triggered by change of land use. Therefore what is presented here is just a preliminary

deccommissioning plan which give light to what shall be done if the need for decommissioning arise.

10.2 Preliminary Decommissioning Plan

This Section provides a brief outline of the works required to demolish the Proposed infrastructures on the site incase it happen. This Plan will be used as a reference document that provides the framework to ensure that demolition activities on the site do not adversely affect the health, safety, traffic or the environment of the public and neighbouring properties.
The Contractor will be required to prepare a detailed Demolition Plan and Construction Management Plan to the satisfaction of the Proponent and relevant Authorities prior to the commencement of works on site.

10.2.1 Demolition Methods

It is anticipated that the Contractor will prepare a detailed Demolition Plan prior to the commencement of work on site, however, the indicative demolition methodology will be as follows:

- The strip out and removal of non-structural elements will be undertaken utilising manual labour and small plant including – bobcats, 3-5t excavators and dingo type loaders.
- The materials will be removed from site using small to medium sized trucks.
- The structures will be demolished using larger plant and equipment including 15-40t hydraulic excavators. These machines will be equipped with rock breakers, pulverisers and the like which would be used in a sequential manner.
- During the demolition process erosion control measures will be established. These will include treatment of dust and potential discharge into stormwater systems.

10.2.2 Materials Handling

Materials handling will be by mechanical plant (including excavators and bobcats) loaded into trucks (bogie tippers and semi trailers). The debris will be carted offsite to an approved waste facility or recycling centre.
The contractor shall submit a Demolition Waste Management Plan to Arusha City council which outlines the objectives of:

- maximisation, reuse and recycling of demolition material
- minimisation of waste disposal
- evidence of implementation for specified arrangements of waste management

On-site storage of reusable materials will occur at Site. Recycling and disposal containers will also be accommodated at this location for

collection vehicles. Hazardous materials will be treated separately. A hazardous materials inspection will be undertaken by an accredited consultant and a report issued. Hazardous materials will be removed in accordance with EMA 2004. A final clearance report will be provided by the hygienist which will include the provision of tip dockets from waste centres.

10.2.3 Proposed Sequence

The Contractor will be required to prepare the following documentation prior to the commencement of demolition and/or excavation works:

- Dilapidation Survey
- Construction Waste Management Plan
- Demolition Management Plan

10.2.4 Protective Measures

An A Class hoarding will be erected around the perimeter of the construction site prior to the commencement of demolition works. Additionally, wherever the risk arises of material falling into public areas, overhead protection will be provided in the form of a B Class hoarding. Scaffolding will be erected to facades where materials could fall in excess of 4m. The scaffolding will be clad with chainwire and shadecloth to enclose debris and dust onto the site. During the demolition, dust control measures will be used to minimise the spread of dust from site. The Contractor will have a senior representative on site at all times to ensure compliance with the safety guidelines and agreed work methods.

10.2.5 Traffic Management

The management of construction traffic during the deccommissioning phase will be subject to the provision of a detailed traffic management plan. This plan will be prepared by the Contractor for the various stages of demolition. During demolition, all traffic will be held within the site boundaries. The site will remain closed to pedestrian traffic and will be generally manned by security.

11.2.6 Ocupational Health and Safety

A detailed OH&S Policy will be provided by the Contractor prior to work commencement. A detailed Site Safety Plan will be prepared for the specific project.

10.2.7 Environmental and Social Management Plan

A detailed Environmental Management Plan will be provided by the Contractor prior to the commencement of the work.

10.2.8 Potential Impacts and Mitigation Measures

Dust and Noise Pollution

The demolition activities for the remained part (foundation structure) shall be accompanied with emission of a lot of dusts since the demolition works are expected to be carried out by conventional method using mechanical breakers and jackhammers. However, alternative methods of demolition including explosive techniques can be used.

Mitigation Measures

- Water sprinkling shall be applied to open earth to reduce dust emission.
- Trucks transporting construction materials shall be covered if the load is dry and prone to dust emissions.
- The demolition area shall be fenced by iron sheets; this will prevent the dust at the ground to be picked up by the wind.
- Community notification shall be undertaken where appropriate where work is likely to cause dust impact on the public and nearby residents.
- Sound construction equipment, with noise sinks, shall be used
- Machine operators in various sections with significant noise levels shall be provided with noise protective gear.
- Construction equipment shall be selected, operated and maintained to minimize noise.

Increased Waste
A lot of demolition waste is expected as a result of the demolition of these blocks. These shall include blocks, concrete, reinforcements, pipes etc. Most of the block materials shall be salvaged and recycled.

Mitigation Measures

- All materials which can be reused shall be reused
- Materials that cannot be reused shall be sent to a the authorized dumpsite

10.2.9 Costs for Undertaking the Mitigation Measures

The cost for undertaking Mitigation measures during deccommissioning is estimated to be USD 52,300.

11.0 CONCLUSION AND RECOMMENDATIONS

The proposed investments sub-projects in Arusha City under TSCP - AF entail rehabilitation/ construction of the following: Upgrading of Unga Limited - Muriet road (6.4 km) to Asphalt Concrete (AC) including construction of Burka Bridge, extension of Bondeni storm water drain (300m) and construction of additional cell at Muriet landfill.

It was observed that community seemed very positive about the projects implementation and urged the City to contract competent contractors, and also involve the local community to enhance their sustainability.

A number of positive and negative impacts were predicted, and for each mitigations or enhancement measures have been provided. The most important social impact identified is the loss of property and land to about 132 PAPs along the Unga limited- Muriet road. PAPs were fully informed and are ready to relocate immediately after payment of compensation.

Comprehensive ESMPs and monitoring plans have been proposed. The developer is ready to implement these plans according to the Tanzania rules and regulations. Provisions in the ESMP will form part of the project contractors' contracts and the developer will ensure that the contractors comply with the provisions of the contract, including those relating to environmental issues.

It can be concluded that the proposed additional investment subprojects in Arusha City are environmentally feasible and consistent with the socio-economic development plans of the City, Arusha region and the nation at large. The estimated project benefit to the community welfare exceeds the predicted environmental and social impacts. Most of the predicted impacts are short term construction related impacts, for which adequate mitigation measures have been provided.

REFERENCES

1) Arusha City Socio economic Profile 2008
2) Arusha City Environmental Profile 2008
3) PMO-RALG (2014) Tanzania Strategic Cities Project (TSCP) Environmental and Social Management Framework (ESMF) for the Proposed TSCP Additional Financing Project

4) United Republic of Tanzania (2010), Environmental and Social Impact Assessment for proposed Investment Sub-projects in Arusha Municipal under the proposed Tanzania Strategic Cities Project.

5) United Republic of Tanzania (2014), 'Resettlement action plan report for the Unga Limited-Muriet road in Arusha City Council, Arusha region'.
6) United Republic of Tanzania (2003), National Transport Policy, Dar es Salaam, Tanzania.
7) United Republic of Tanzania (2001), National Policy on HIV/AIDS, Dar es Salaam, Tanzania.
8) United Republic of Tanzania (2007), The Road Act, Dar es Salaam, Tanzania.
9) United Republic of Tanzania (2009), The Standards Act No. 2, Dar es Salaam, Tanzania.
10) United Republic of Tanzania (2008), The HIV and AIDS (Prevention and Control) Act, Dar es Salaam, Tanzania.
11) United Republic of Tanzania (1997). National Environmental Policy (1997), Dar es Salaam, Tanzania.
12) United Republic of Tanzania (2003). Construction Industry Policy (2003), Dar es Salaam, Tanzania.
13) United Republic of Tanzania (1995). Land Policy (1995) , Dar es Salaam, Tanzania.
14) United Republic of Tanzania (2002). National Gender Policy (2002), Dar es Salaam, Tanzania.
15) United Republic of Tanzania (1992). Energy Policy (1992), Dar es Salaam, Tanzania.
16) United Republic of Tanzania (2004). Environmental Management Act No. 20 (2004), Cap. 191, Dar es Salaam, Tanzania.
17) United Republic of Tanzania (2009). Water Supply and Sanitation Act No. 12 (2009), Dar es Salaam, Tanzania.
18) United Republic of Tanzania (2007). The Land Act, 1999. The Urban Planning Act (2007), Dar es Salaam, Tanzania.
19) United Republic of Tanzania (2003). Occupational Health and Safety (2003),
Dar es Salaam, Tanzania
20) United Republic of Tanzania (2004). Employment and Labour Relations Act No. 6 (2004), Dar es Salaam, Tanzania.

21) United Republic of Tanzania (2007). Engineers Registration Act and its Amendments 1997, Dar es Salaam, Tanzania.
22) United Republic of Tanzania (1997). The Contractors Registration Act (1997), Dar es Salaam, Tanzania.
23) United Republic of Tanzania (1997). The Architects and Quantity Surveyors Act (1997), Dar es Salaam, Tanzania.
24) United Republic of Tanzania (2009). Public Health Act (2009), Dar es Salaam, Tanzania
25) United Republic of Tanzania (2000). The Tanzania Development Vision (2000), Dar es Salaam, Tanzania.
26) United Republic of Tanzania (2005). Impact Assessment and Auditing Regulations (2005), Dar es Salaam, Tanzania.
27) World Bank Operational Policy 4.01

APPENDICES

Appendix I: List of stakeholders Consulted

ESIA FOR PROPOSED ADDITIONAL SUB-PROJECTS IN ARUSHA CITY UNDER THE TANZANIA STRATEGIC CITIES PROJECT (TSCP)
STAKEHOLDERS CONSULTATION FORM

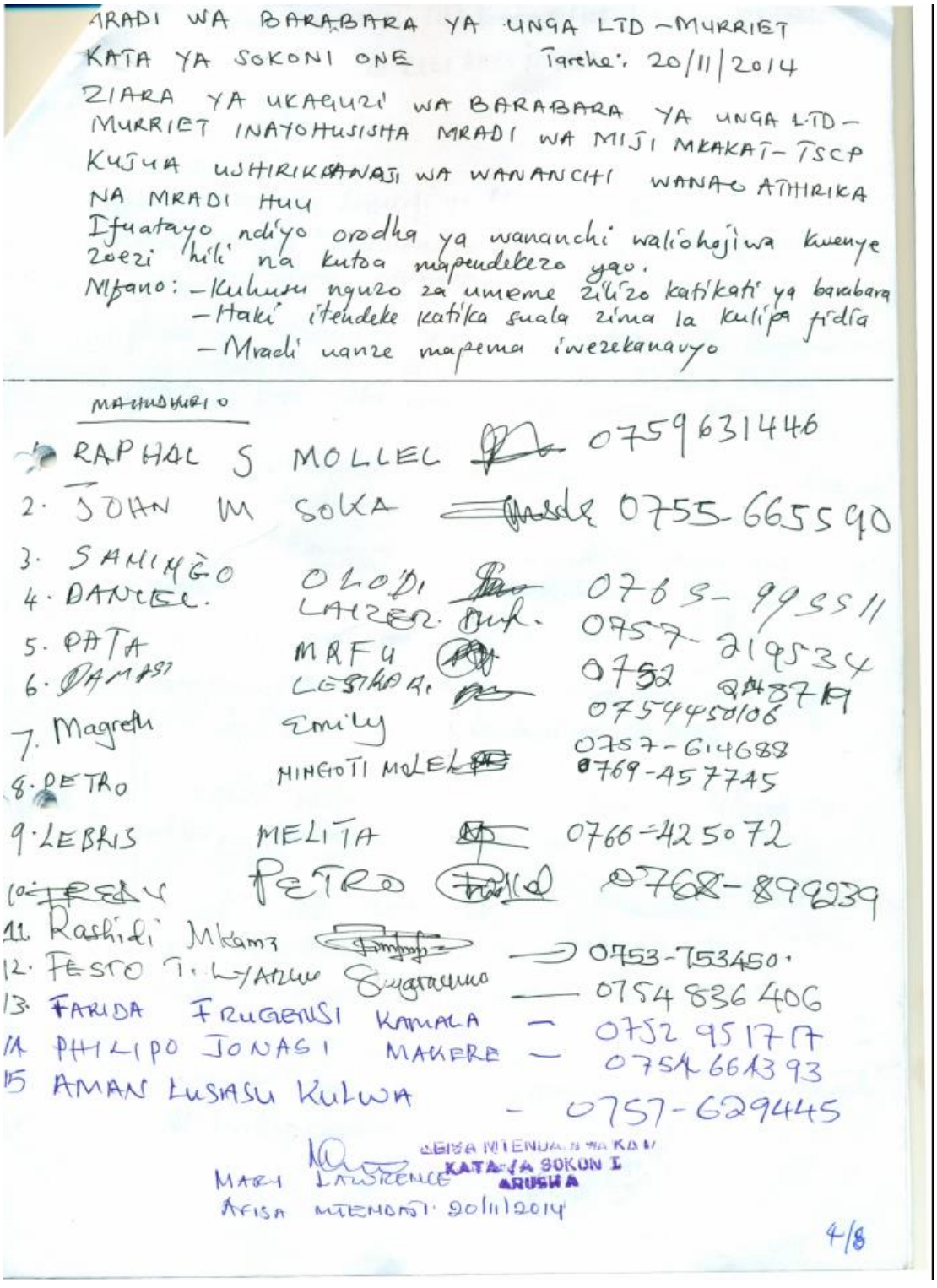
DATE	NAME	ORGANISATION	POSITION	CONTACT	SIGNATURE
10/03/2015	Ester Method	THEMI	WEO	0769 545 871	E. Method.
10/03/2015	MARY SIRIKWA	SOKONI	WEO	0467-242360	
10/03/2015	James Lobikoki	ACC	HOD	0752 659954	
10/03/2015	Eng A-G. MSUYA	ACC	CIC	0758 172002	
10/03/2015	Eng. Fordia Mwankenja	ACC	RE	0785352663	fmwankenja-
10/3/2015	FENSIA SHAYO	ACC	C2C	0754 381411	
10/03/2015	EVETHA T. MBOYE	ENGUTOTO	WEO	0754-285829	

ESIA FOR PROPOSED ADDITIONAL SUB-PROJECTS IN ARUSHA CITY UNDER THE TANZANIA STRATEGIC CITIES PROJECT (TSCP)
STAKEHOLDERS CONSULTATION FORM

DATE	NAME	ORGANISATION	POSITION	CONTACT	SIGNATURE
10.03.16	Eng. Gaston, GEP	Acc - Box 3013	CEng.	0766240370	
10.03.15	Eng. Genes G. Kaloro	TANESCO - Box 57	REGIONAL MANAGER	0784 902360	
11/3/2016	Eng. G. F. Mkame	AUWSA	PLANNING AND CONSTRUCTION ENG.	0784850850	

ESIA FOR PROPOSED ADDITIONAL SUB-PROJECTS IN ARUSHA CITY UNDER THE TANZANIA STRATEGIC CITIES PROJECT (TSCP)
STAKEHOLDERS CONSULTATION FORM

DATE	NAME	ORGANISATION	POSITION	CONTACT	SIGNATURE
20/11/2014					
1.	Eng. Kaston, EP	ACC.	CEng.	0766240370	
2.	Eng A. G. Mbuya	Acc	CIC	0758172002	
3.	BRUNO F HENA	4WP	Asst. Engineer	078350044	
4	MODESTUS LUPOGO	WEO-~~KARATU~~	WEO	0755783248	
5.	Michael Kweyo	Diwani SOKON ONE	DIWANI	0754245870	
6.	MARY L. SIRIKWA	WEO-SOKONI	WEO	0767-242360	
7.	Goodluck Anderson	WEO-SINON	WEO	0787 085095	
21/11/2014 8.	ESTER METHOD	WEO ACC	WEO	0712852178	
9.	SHABAN A. LESIAN	ACC MEO	MEO	0754668834	
10.	PUDENSIANA K' RUGANGIRA	ARUSHA CITY C.	AFISA KILIMO/MLF	0754476032	



MRADI WA BARABARA YA UNGA LTD – MURRIET
KATA YA SOKONI ONE Tarehe: 20/11/2014

ZIARA YA UKAGUZI WA BARABARA YA UNGA LTD – MURRIET INAYOHUSISHA MRADI WA MIJI MKAKATI – TSCP KUSUA USHIRIKISHAJI WA WANANCHI WANAO ATHIRIKA NA MRADI HUU

Ifuatayo ndiyo orodha ya wananchi waliohojiwa kwenye zoezi hili na kutoa mapendekezo yao.

Mfano: – Kuhusu ngazo za umeme zilizo katikati ya barabara
– Haki itendeke katika suala zima la kulipa fidia
– Mradi uanze mapema iwezekanavyo

MAHUDHURIO

1.	RAPHAEL S MOLLEL		0759631446
2.	JOHN M SOKA		0755-665540
3.	SAMWEGO	OLOIDI	0765-995511
4.	DANIEL.	LAIZER.	0757-219534
5.	PATA	MARU	0752 [illegible]
6.	DAMASI	LEGISHO A.	0754450106
7.	Magreth	Emily	0757-614688
8.	PETRO	NINGOTI MOLEL	0769-457745
9.	LEBRIS	MELITA	0766-425072
10.	FREDY	PETRO	0768-899939
11.	Rashidi Mkamz		0753-753450.
12.	FESTO T. LYAMUYA		0754 836 406
13.	FARIDA FRUGENSI	KAMALA	0752 951717
14.	PHILIPO JONASI	MAKERE	0754 661393
15.	AMANI LUSASI KULWA		0757-629445

MARY LAWRENCE
AFISA MTENDAJI WA KATA YA SOKONI I
ARUSHA
AFISA MTENDAJI: 20/11/2014

4/8

MAHUTASARI YA KIKAO CHA WANANCHI KATIKA HIFADHI YA RELI KATA YA THEMI ARUSHA.

TAREHE 21/11/2014

MIRADI

- Utengenezaji wa Mfereji ya Maji za mvua
- kuba tatizo kuhusiana na upanuzi wa Mfereji kwasababu kuna wakulima wanafanya shughuli zao

* Mkufunzi aliwauliza wakulima je hilo eneo wanalolima wamepatiwa na nani? Mjumbe mmoja alisema kuna hili eneo wamerithi kutoka kwa wazazi wao

* Mkufunzi aliwauliza kuwa eneo la reli haliruhusiwi kufanya shughuli za kilimo

1. Shumuni ni kuwakumbusha wakulima kuwa hawataruhusiwi kufanya kazi za kilimo
2. Mfereji utaendelezwa kupanua mpaka Ukomo
3. Watapasua eneo la bustani watakatiwa baadhi ya Miti kutoka katika eneo la bustani za watu.

* Pia serikali watawapa muda wa kuvuna Mboga zao kabla ya Mashine za kuchimbua.

Swali kutoka Wajumbe
Nyumba zilizopimbezwa watalipwa?
Mkufunzi alijibu kuwa mteo haufahiko.

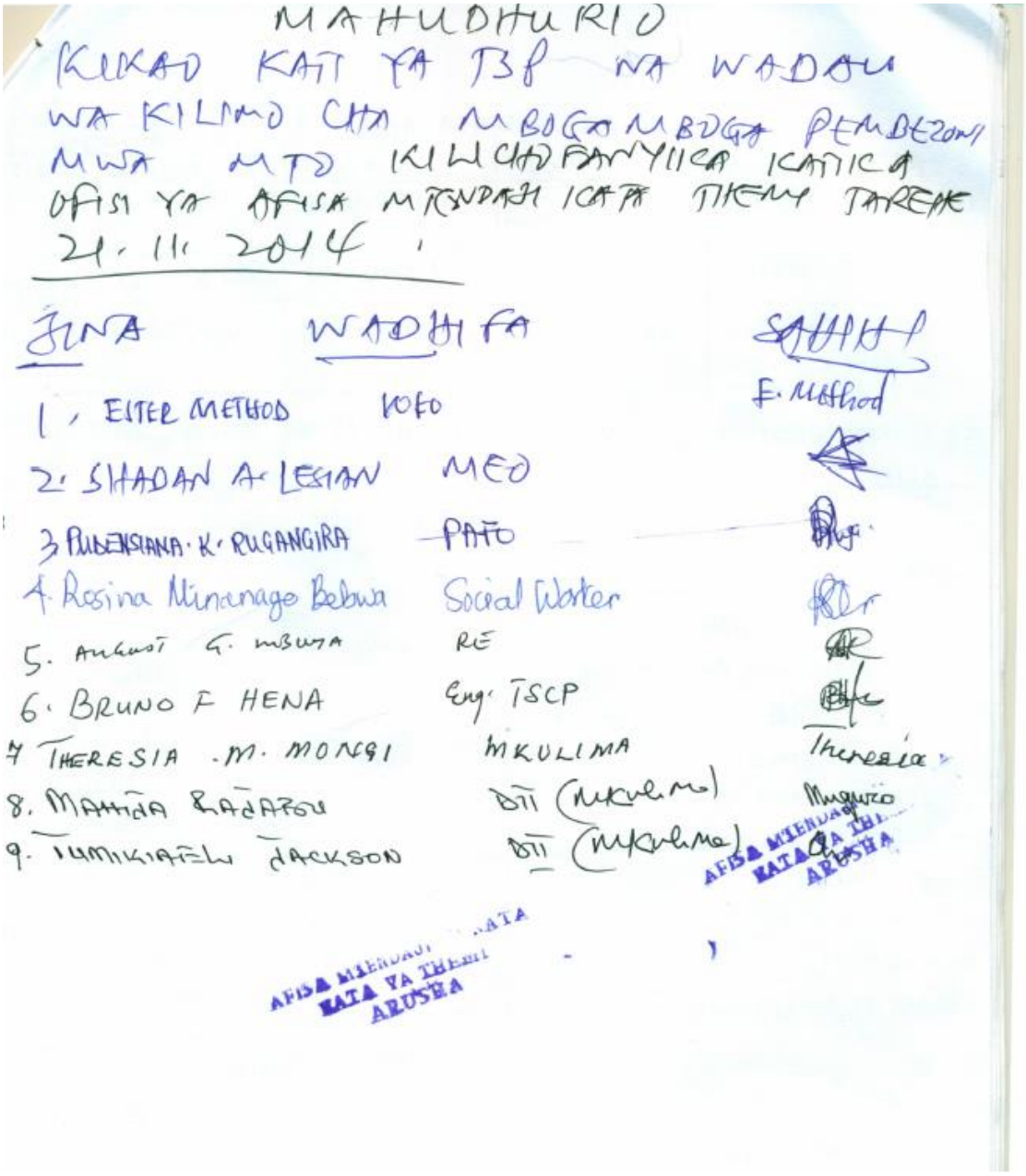
E.Methew

* Wajumbe wameelewa na wamekubaliana na mambo yote waliyo elezwa.

Ester Methew
E. Methew

AFISA MTENDAJI WA KATA YA THEMI ARUSHA

5/8



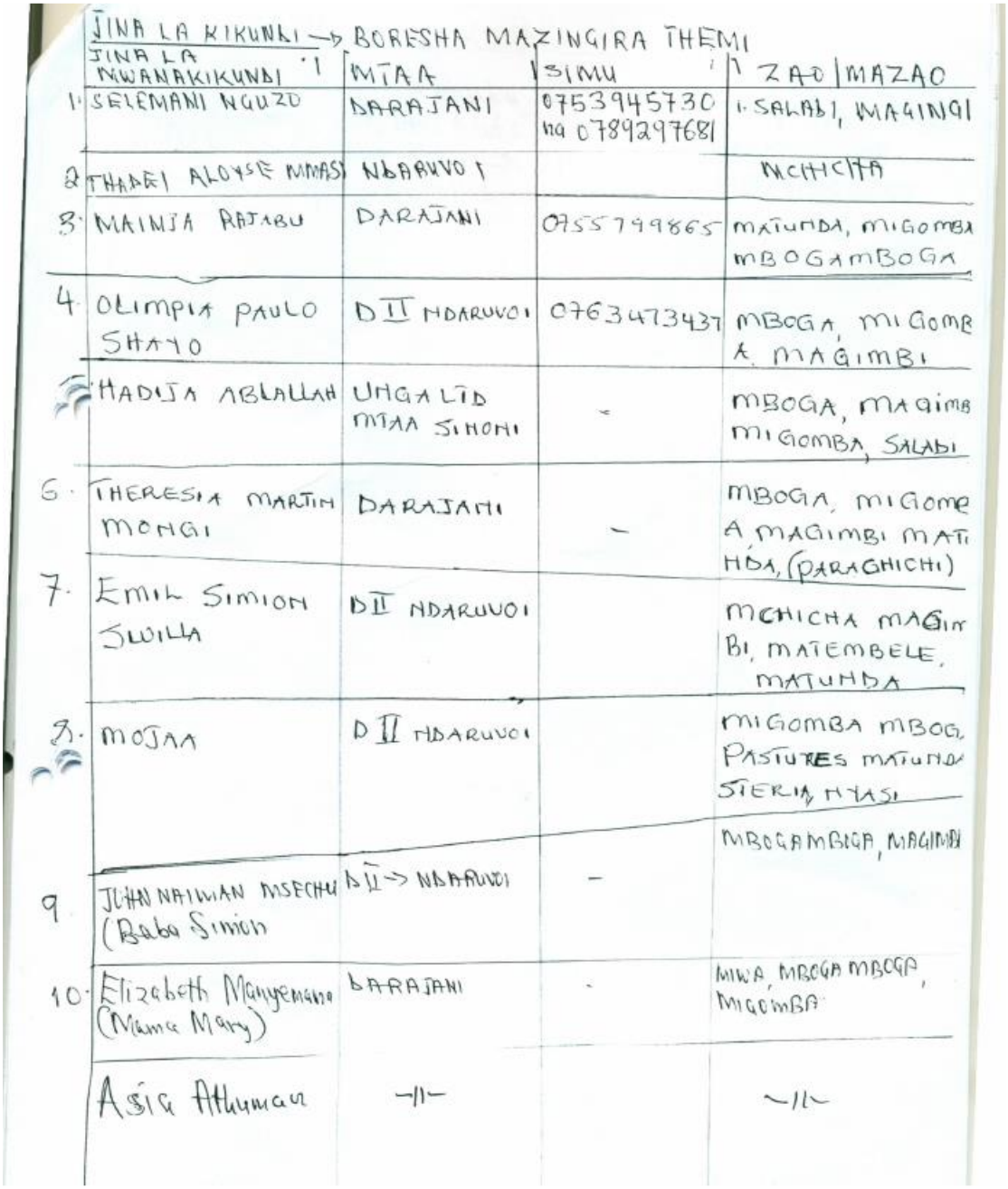
MAHUDHURIO

KIKAO KATI YA TBP NA WADAU WA KILIMO CHA MBOGAMBOGA PEMBEZONI MWA MJI KILICHOFANYIKA ICHANICA OFISI YA AFISA MIENDAJI ICHA TAREHE 21. 11. 2014

JINA	WADHIFA	SAHIHI
1. EITER METHOD	FOFO	E. Method
2. SHADAN A. LEGIAN	MED	
3. PULENSIANA K. PUGANGIRA	PATO	
4. Rosina Minanage Bebwa	Social Worker	
5. AUGUSTI G. MBUYA	RE	
6. BRUNO F HENA	Eng. TSCP	
7. THERESIA M. MONGI	MKULIMA	Theresia
8. MAMIDA RADAFOU	DTI (Mkulima)	
9. LUMIKIAELI JACKSON	DTI (Mkulima)	

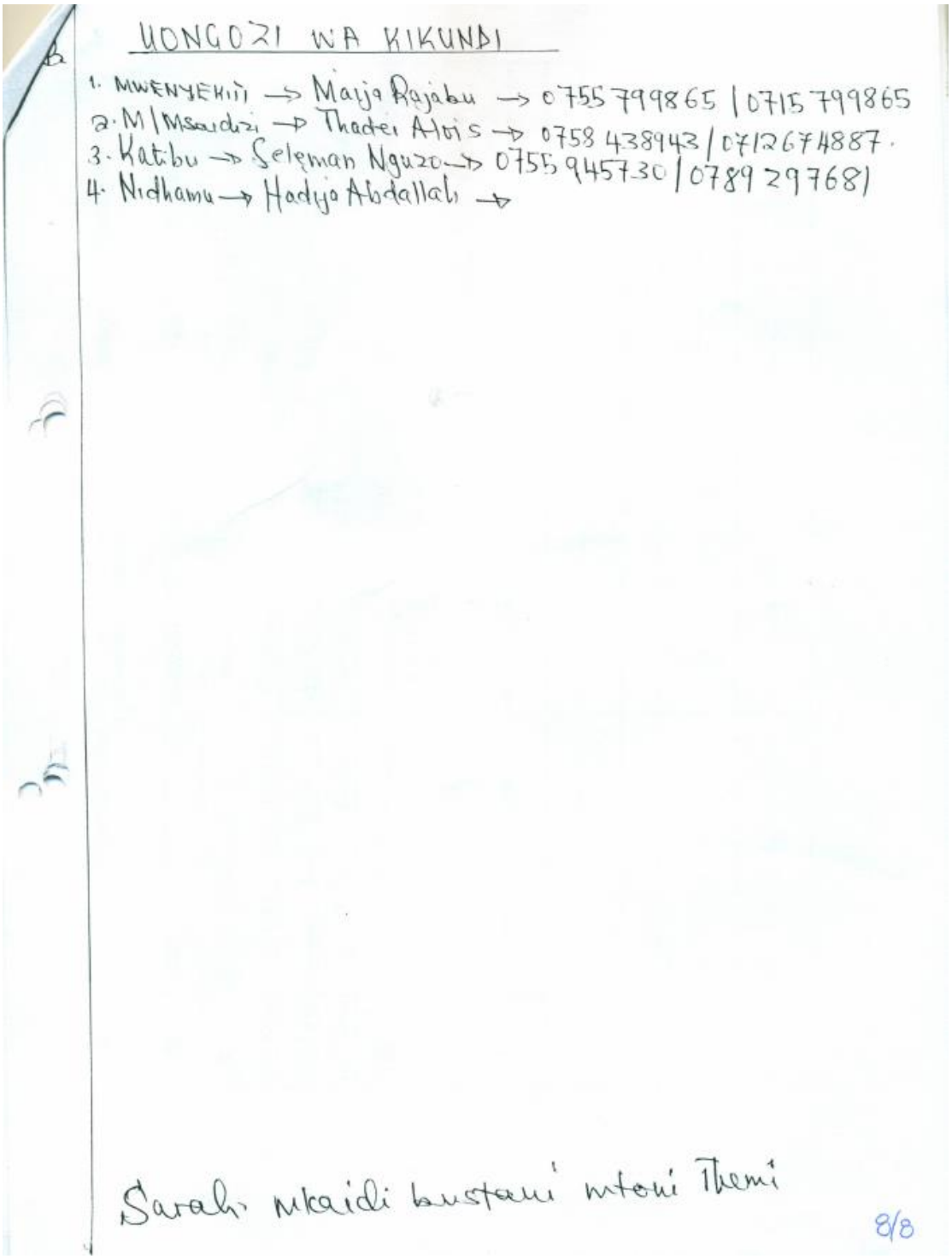
AFISA MIENDAJI MATA YA THEMI ARUSHA

AFISA MIENDAJI MATA YA THEMI ARUSHA



JINA LA KIKUNDI → BORESHA MAZINGIRA THEMI

	JINA LA MWANAKIKUNDI	MTAA	SIMU	ZAO / MAZAO
1.	SELEMANI NGUZO	DARAJANI	0753945730 na 0789297681	i. SALABI, MAGINGI
2.	THADEI ALOYSE MMASI	NDARUVOI		MCHICHA
3.	MAINJA RAJABU	DARAJANI	0755799865	MATUNDA, MIGOMBA MBOGAMBOGA
4.	OLIMPIA PAULO SHAYO	D II NDARUVOI	0763473437	MBOGA, MIGOMBA, MAGIMBI
5.	HADIJA ABLALLAH	UHGA LTD MTAA SIHONI	-	MBOGA, MAGIMBI MIGOMBA, SALABI
6.	THERESIA MARTIN MONGI	DARAJANI	-	MBOGA, MIGOMBA, MAGIMBI MATUNDA, (PARACHICHI)
7.	EMIL SIMION SWILLA	D II NDARUVOI		MCHICHA MAGIMBI, MATEMBELE, MATUNDA
8.	MOJAA	D II NDARUVOI		MIGOMBA MBOGA, PASTURES MATUNDA STERIA NYASI
9.	JUMA NAIMAN MSECHU (Baba Simon)	D II → NDARUVOI	-	MBOGAMBOGA, MAGIMBI
10.	Elizabeth Manyemana (Mama Mary)	DARAJANI	-	MIWA, MBOGA MBOGA, MIGOMBA
	ASIA Athumani	-11-		-11-



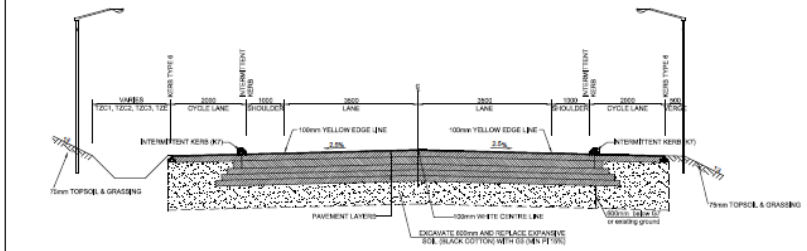
UONGOZI WA KIKUNDI

1. MWENYEKITI → Maija Rajabu → 0755 799865 | 0715 799865
2. M/Msaidizi → Thadei Alois → 0758 438943 | 0712 674887.
3. Katibu → Seleman Nguzo → 0755 945730 | 0789 297681
4. Nidhamu → Hadija Abdallah →

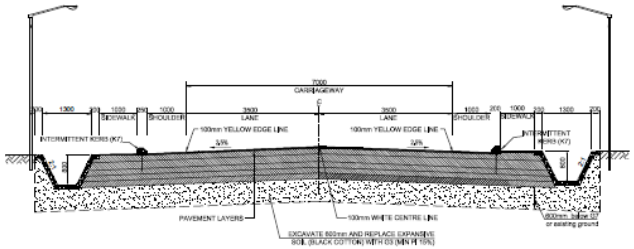
Sarah Mkaidi bustani mtoni Themi

8/8

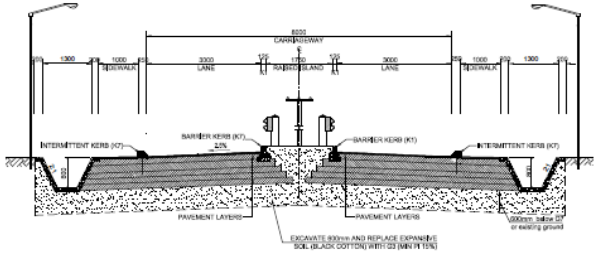
Appendix III: Engineering Drawings of the project facilities



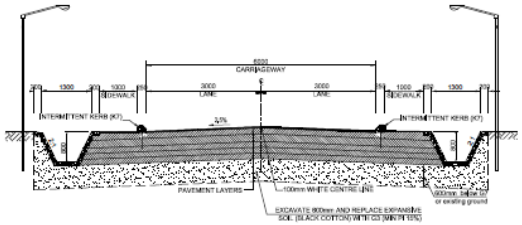
UNGA LTD MURRIET ROAD (CHAINAGE 0-4500)



UNGA LTD MURRIET ROAD (CHAINAGE 5300-5732)



UNGA LTD MURRIET ROAD (CHAINAGE 4550-5125)



UNGA LTD MURRIET ROAD (CHAINAGE 5000-5300)

PAVEMENT LAYERWORKS SPECIFICATION

30mm AC14 ASPHALT CONCREET WITH 60/70 PENETRATION GRADE BITUMEN
150mm CRR, CRUSHED STONE BASECOURSE
200mm C1, CEMENTED NATURAL GRAVEL
150mm G15, NATURAL GRAVEL IMPROVED SUBGRADE (UPPER LAYER)
150mm G7, NATURAL GRAVEL IMPROVED SUBGRADE (LOWER LAYER)
150mm G3, RIPPED IN-SITU AND RECOMPACT

EARTHWORKS IN EXPANSIVE SOILS

- Excavate and replace the expansive soil with G3 (PI ≥ 15%) to a depth of 600mm below bottom of G7 or existing ground.
- Locations of Expasive Soil from 0 - 0 + 200; 1+100 - 1+600; 1+800 - 4+300; and 4+800 - 5+400
- These locations to be confirmed during construction.

ELECTRICAL POLE

CLIENT: THE UNITED REPUBLIC OF TANZANIA, PRIME MINISTER'S OFFICE, REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT, LOCAL GOVERNMENT SUPPORT PROJECT, 3RD FLOOR COSTECH BLDG, KIJITONYAMA, ALI HASSAN MWINYI RD, P.O. BOX 34314, DAR ES SALAAM

LOCAL AUTHORITY: THE UNITED REPUBLIC OF TANZANIA, ARUSHA CITY COUNCIL, MUNICIPAL HALL, P.O. BOX 3013, ARUSHA

REV.	DATE	DESCRIPTION	CHECKED	SIGNED
1	FEB 2015	REVISED DRAFT FOR APPROVAL	F.MTUI	
0	MAY 2014	ISSUED FOR DISCUSSION	F.MTUI	

REVISIONS

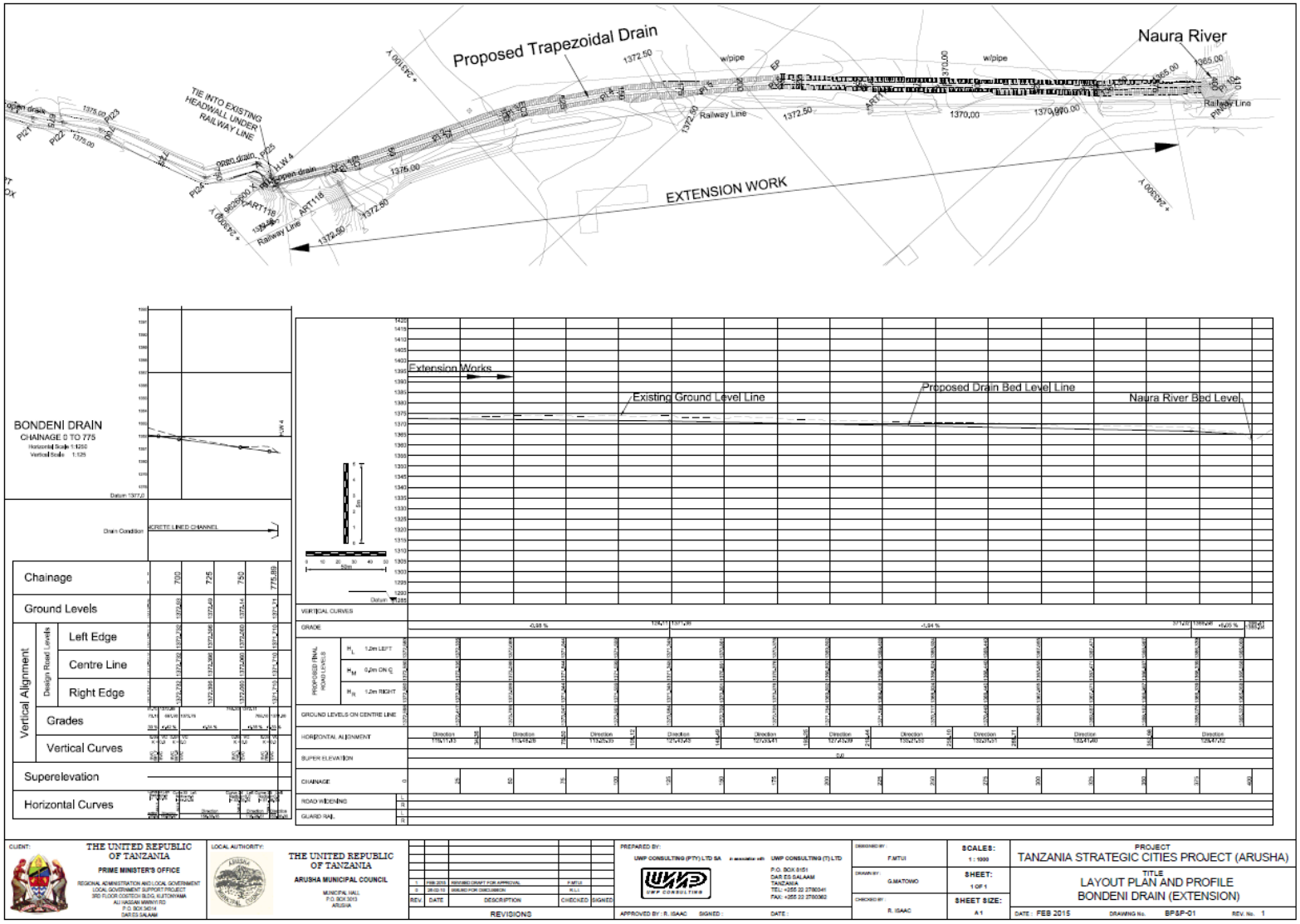
PREPARED BY: UWP CONSULTING (T) LTD, P.O. BOX 8151, DAR ES SALAAM, TANZANIA, TEL: +255 22 2780041, FAX: +255 22 2780362

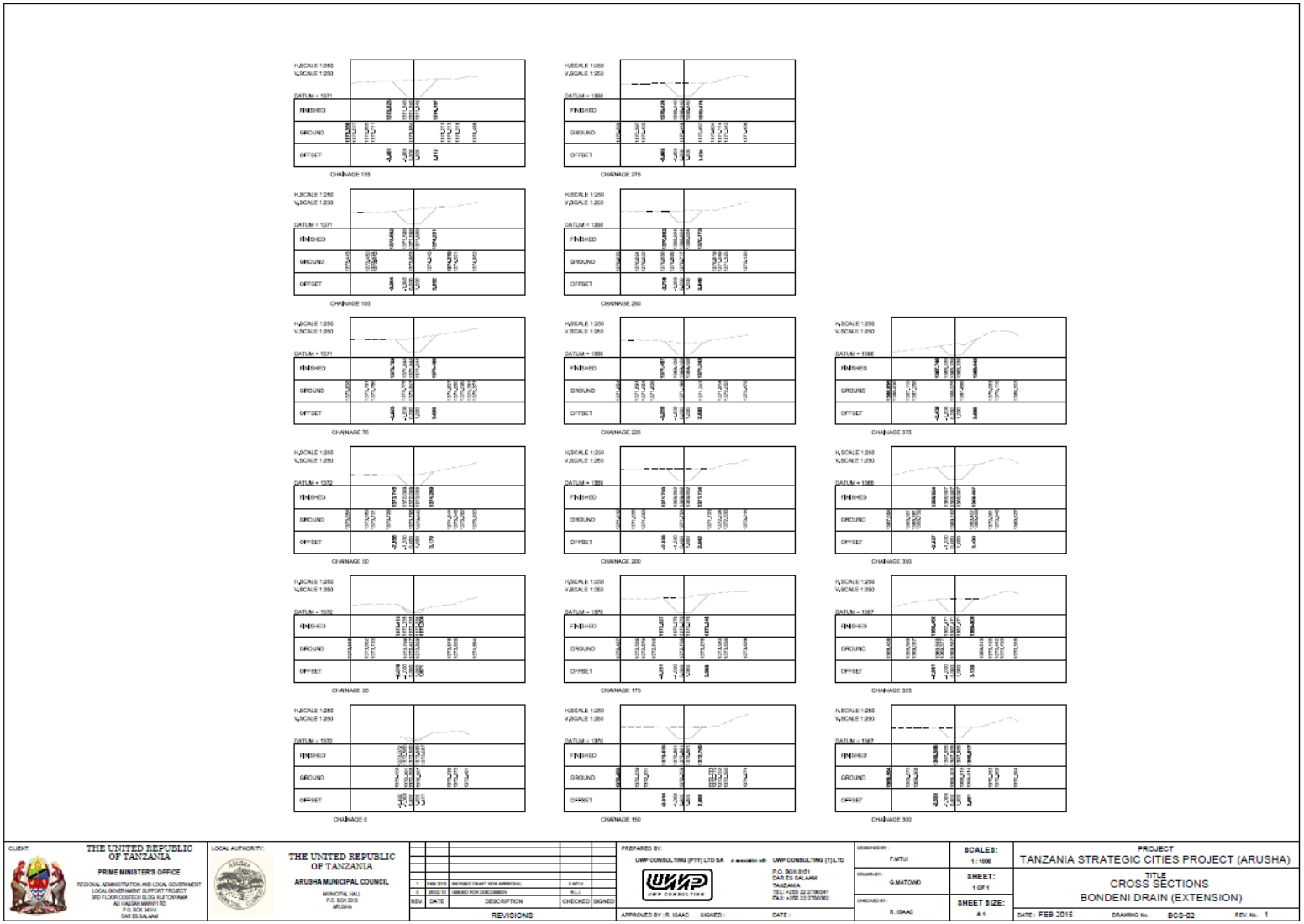
APPROVED BY : F. MTUI SIGNED : DATE :

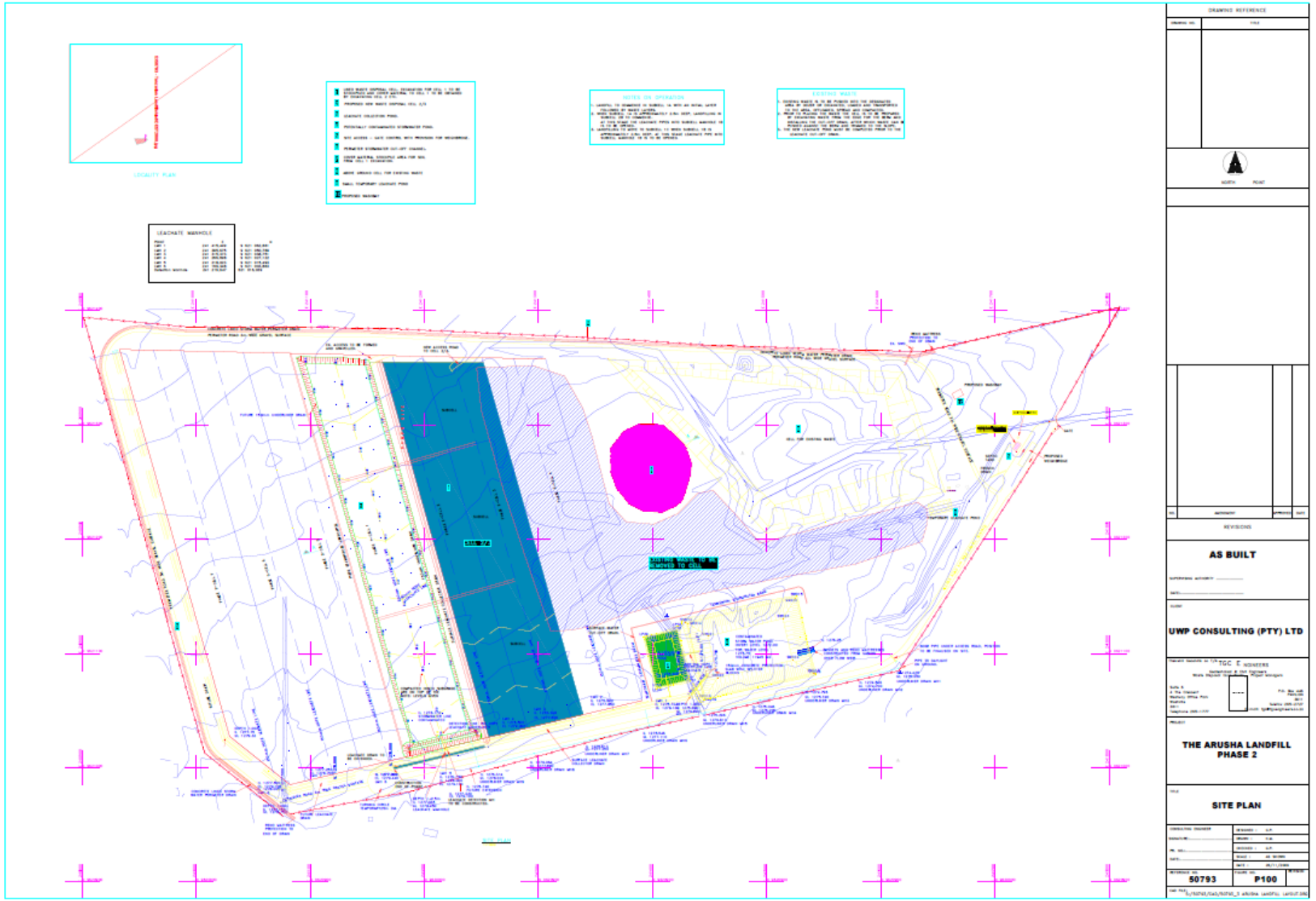
DESIGNED BY: J.P vde LINDE
DRAWN BY: G.MATOVO
CHECKED BY: L KISSAKWA

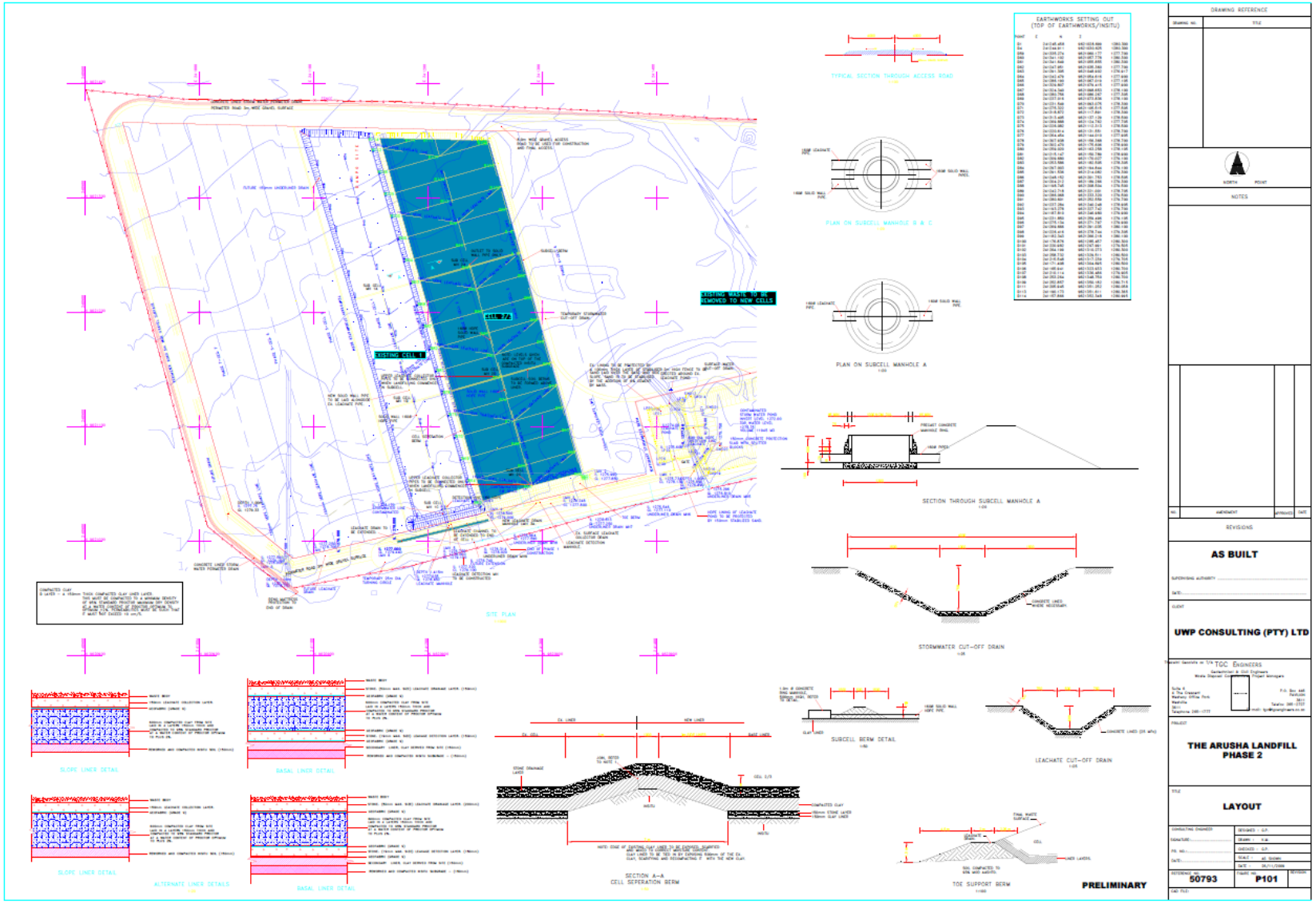
SCALES: AS SHOWN
SHEET: 1 OF 1
SHEET SIZE: A1

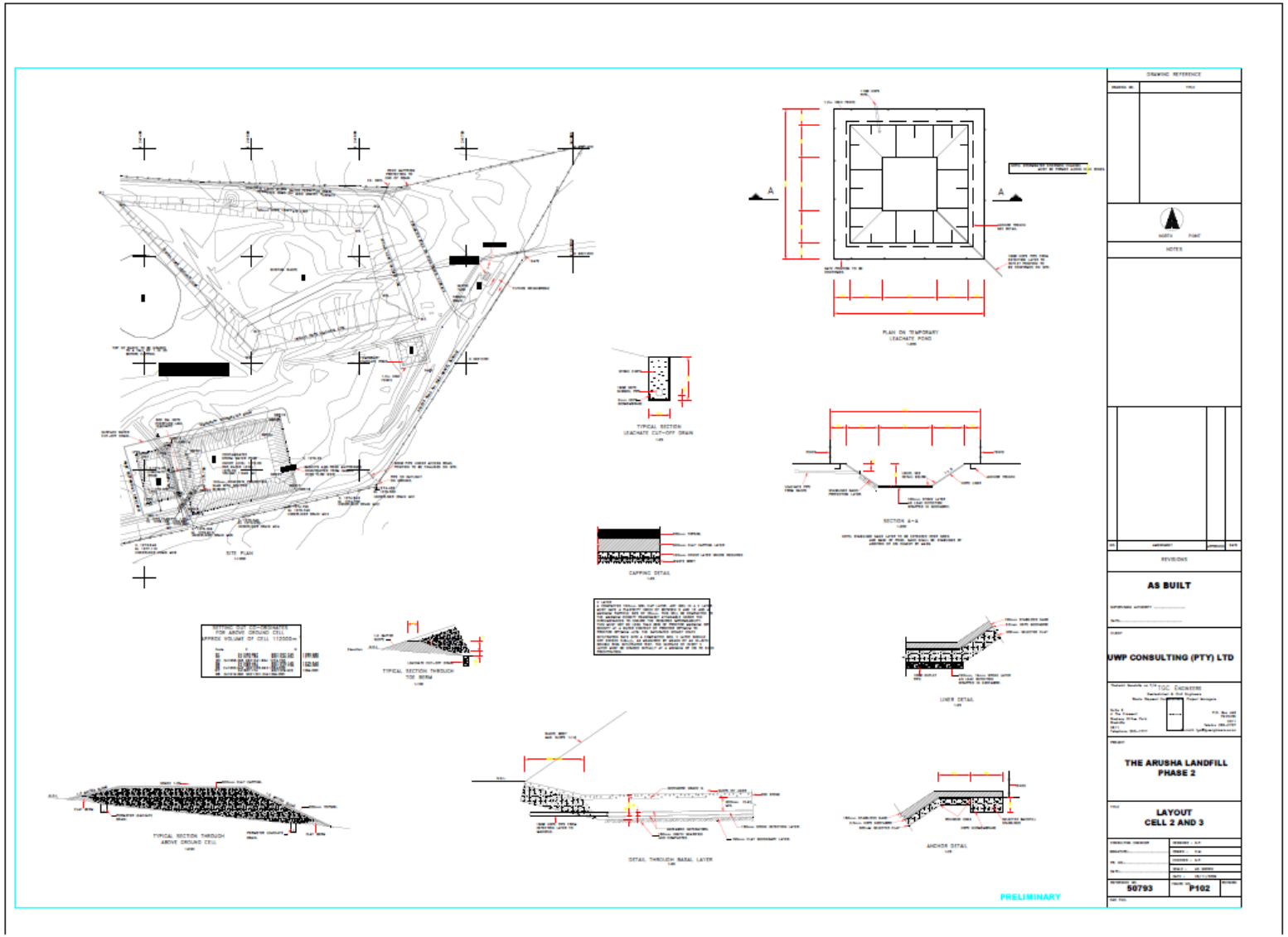
PROJECT: TANZANIA STRATEGIC CITIES PROJECT (ARUSHA)
TITLE: TYPICAL CROSS SECTIONS
DATE : FEB 2015 DRAWING No. TRCS-01 REV. No. 0


Proposed Trapezoidal Drain
Naura River
EXTENSION WORK
TIE INTO EXISTING HEADWALL UNDER RAILWAY LINE
Railway Line
BONDENI DRAIN
CHAINAGE 0 TO 775
Extension Works
Existing Ground Level Line
Proposed Drain Bed Level Line
Naura River Bed Level
Chainage
Ground Levels
Vertical Alignment
Left Edge
Centre Line
Right Edge
Grades
Vertical Curves
Superelevation
Horizontal Curves
THE UNITED REPUBLIC OF TANZANIA
PRIME MINISTER'S OFFICE
ARUSHA MUNICIPAL COUNCIL
UWP CONSULTING (PTY) LTD SA
UWP CONSULTING (T) LTD
TANZANIA STRATEGIC CITIES PROJECT (ARUSHA)
LAYOUT PLAN AND PROFILE
BONDENI DRAIN (EXTENSION)


CHAINAGE 125
CHAINAGE 275
CHAINAGE 100
CHAINAGE 250
CHAINAGE 75
CHAINAGE 225
CHAINAGE 375
CHAINAGE 50
CHAINAGE 200
CHAINAGE 350
CHAINAGE 25
CHAINAGE 175
CHAINAGE 325
CHAINAGE 0
CHAINAGE 150
CHAINAGE 300
CLIENT:
THE UNITED REPUBLIC OF TANZANIA
PRIME MINISTER'S OFFICE
LOCAL AUTHORITY:
THE UNITED REPUBLIC OF TANZANIA
ARUSHA MUNICIPAL COUNCIL
REVISIONS
PREPARED BY:
UWP CONSULTING (PTY) LTD S/A
UWP CONSULTING (T) LTD
P.O. BOX 9151
DAR ES SALAAM
TANZANIA
TEL: +255 22 2780341
FAX: +255 22 2780362
APPROVED BY : R. ISAAC
SIGNED :
DATE :
DESIGNED BY : F.MTUI
DRAWN BY : G.MATOWO
CHECKED BY : R. ISAAC
SCALES: 1 : 1000
SHEET: 1 OF 1
SHEET SIZE: A 1
PROJECT
TANZANIA STRATEGIC CITIES PROJECT (ARUSHA)
TITLE
CROSS SECTIONS
BONDENI DRAIN (EXTENSION)
DATE : FEB 2015
DRAWING No. BCS-02
REV. No. 1


AS BUILT
UWP CONSULTING (PTY) LTD
THE ARUSHA LANDFILL
PHASE 2
SITE PLAN
50793
P100


EARTHWORKS SETTING OUT
(TOP OF EARTHWORKS/INSITU)
TYPICAL SECTION THROUGH ACCESS ROAD
PLAN ON SUBCELL MANHOLE B & C
PLAN ON SUBCELL MANHOLE A
SECTION THROUGH SUBCELL MANHOLE A
STORMWATER CUT-OFF DRAIN
SUBCELL BERM DETAIL
LEACHATE CUT-OFF DRAIN
SECTION A-A
CELL SEPERATION BERM
TOE SUPPORT BERM
SLOPE LINER DETAIL
BASAL LINER DETAIL
SLOPE LINER DETAIL
ALTERNATE LINER DETAILS
BASAL LINER DETAIL
SITE PLAN
DRAWING REFERENCE
NOTES
REVISIONS
AS BUILT
UWP CONSULTING (PTY) LTD
TGC ENGINEERS
THE ARUSHA LANDFILL
PHASE 2
LAYOUT
50793
P101
PRELIMINARY


AS BUILT
UWP CONSULTING (PTY) LTD
THE ARUSHA LANDFILL
PHASE 2
LAYOUT
CELL 2 AND 3
50793
P102
PRELIMINARY

Appendix IV: Evidence of consultations and collaboration with utility providers

HALMASHAURI YA JIJI LA ARUSHA
(BARUA ZOTE ZIANDIKWE KWA MKURUGENZI WA JIJI)

simu: 2508073/2503494
Fax: 2505013

Ukumbi wa Jiji
S.L.P. 3013
Arusha - Tanzania

e- mail: arushamunico@yahoo.com.

Kumb. Na. CD/TSCP/PK5/02 **Tarehe 03/06/2014**

MKURUGENZI
MAMLAKA YA MAJI SAFI NA MAJI TAKA(AUWSA)
ARUSHA

YAH: KUPATIWA MTAALAMU KWA AJILI YA UTAMBUZI WA MIUNDOMBINU KWENYE BARABARA ZINAZOHUDUMIWA NA JIJI LA ARUSHA

Husika na kichwa cha habari hapo juu.

Jiji la Arusha linatarajia kufanya ukarabati mkubwa katika barabara za Unga Ltd-Murriet,Engira na St James.

Kwa barua hii tunaomba utupatie mtaalamu atakayesaidiana na wataalamu wa Halmashauri katika kufanya usanifu wa barabara hizi kwa mtaalamu wako kuonyesha wapi miundo mbinu yenu ya maji imepita kwenye barabara hizi na pia kutoa mchanganuo wa kuzihamisha kama ikibidi kwa kadiri ya usanifu utakavyoelekeza.

Zoezi hili linatarajiwa kuanza tarehe 16.06.2014 mpaka tarehe 18.06.2014.

Ni matumaini ya Jiji mtatupa ushirikiano wa kutosha

Eng Gaston P. Gasana
Kny MKURUGENZI WA JIJI
JIJI LA ARUSHA

MAMLAKA YA MAJISAFI NA MAJITAKA JIJI LA ARUSHA

Anwani ya Simu: : "MTO"
Simu nambari : 027-2506124
Fax: 255- 27-2504163
E-Mail: auwsa@habari.co.tz

S.L.P. 13600
ARUSHA
TANZANIA.

Kumb. Na. AUWS/P.10/3/VOL.XII/17

06 Novemba, 2014

Mkurugenzi wa Jiji,
S. L. P. 3031,
ARUSHA

YAH: GHARAMA ZA KUHAMISHA MIUNDOMBINU YA MAJISAFI KWENYE BARABARA YA A TO Z KUELEKEA MURIET DAMPING SITE

Tafadhali rejea mada tajwa hapo juu.

Napenda kuwasilisha kwako makisio ya gharama za kuhamisha mabomba ya majisafi yaliyoko kwenye barabara ya A to Z kuelekea Muriet damping site. Makadirio haya yamehusisha kuhamisha bomba, valves miundombinu yote inayohusiana na mtandao wa majisafi kwenye barabara husika. Kwa bomba za zamani ambazo si rahisi kuhamisha bila kuziharibu na pia zile za plastics, tumekadiria kwamba zibadilishwe kwa bomba mpya za plastics. Zile za DI imekadiriwa kwamba zitahamishika kwa kufanya marekebisho kadhaa. Mfumo wa majitaka utaendelea kubakia barabarani kwa kufanyiwa marekebisho ya chemba peke yake kwa maana ya kuhakikisha mifuniko inakuwa sambamba na usawa wa barabara. Gharama hizo zimejumuishwa pia.

Naambatanisha makisio hayo.

Ahsante kwa ushirikiano.

H.G. Matoi
KAIMU MKURUGENZI MTENDAJI
MAMLAKA YA MAJISAFI NA MAJITAKA
JIJI LA ARUSHA

ARUSHA UR WATER SUPPLY AND SEWERAGE AUTHORITY

THE FOLLOWING IS THE ESTIMATE COST FOR RELOCATING WATER INFRASTRUCTURE LOCATED ALONG THE ROAD

THE ROAD (A to Z - MURIET DUMPING SITE

	DESCRIPTION	DISTANCE (m)	UNIT COST	AMOUNT	REMARKS
	200mm DI pipe	340	80,000.00	27,200,000.00	This type of pipes are very strong so the assumption is that they can be shifted. What is needed is to dig and remove them and then excavete new trench and lay them
	40mm GS pipe	330	30,000.00	9,900,000.00	These pipes are very old so for this case they cannot be shifted without damaging them. What was considered here is replacing them with Class "D" uPVC pipes.
	200mm CI pipe	80	180,000.00	14,400,000.00	These pipes are very old so for this case they cannot be shifted without damaging them. What was considered here is replacing them with Class "D" uPVC pipes.
	150mm DI pipe	700	50,000.00	35,000,000.00	This type of pipes are very strong so the assumption is that they can be shifted. What is needed is to dig and remove them and then excavete new trench and lay them
	40mm POLY pipe	30	30,000.00	900,000.00	This pipe materials can easily be damaged when removing them from the ground. So it has been estimated that new pipes have to be bought to replace the existing.
	50mm PVC pipe	880	30,000.00	26,400,000.00	This pipe materials can easily be damaged when removing them from the ground. So it has been estimated that new pipes have to be bought to replace the existing.
	150mm CI pipe	60	80,000.00	4,800,000.00	These pipes are very old so for this case they cannot be shifted without damaging them. What was considered here is replacing them with Class "D" uPVC pipes.
	100mm PVC pipe	1070	40,000.00	42,800,000.00	This pipe materials can easily be damaged when removing them from the ground. So it has been estimated that new pipes have to be bought to replace the existing.
	Sub - total for pipes			**161,400,000.00**	
	Pipe fittings, various valves and valve chambers, etc			48,420,000.00	
	Total			**209,820,000.00**	
	Add 10% Repair of Sewerage manhole chambers, Unforesee			20,982,000.00	
	GRAND - TOTAL			**230,802,000.00**	

Page 1 of 1

HALMASHAURI YA JIJI LA ARUSHA
(BARUA ZOTE ZIANDIKWE KWA MKURUGENZI WA JIJI)

simu: 2508073/2503494
Fax: 2505013

Ukumbi wa Jiji
S.L.P. 3013
Arusha - Tanzania

e- mail: arushamunico@yahoo.com.

Kumb. Na. CD/TSCP/PK5/03 **Tarehe 03/06/2014**

MENEJA WA MKOA
TANESCO
ARUSHA

YAH: KUPATIWA MTAALAMU KWA AJILI YA UTAMBUZI WA MIUNDOMBINU KWENYE BARABARA ZINAZOHUDUMIWA NA JIJI LA ARUSHA

Husika na kichwa cha habari hapo juu.

Jiji la Arusha linatarajia kufanya ukarabati mkubwa katika barabara za Unga Ltd-Murriet,Engira na St James.

Kwa barua hii tunaomba utupatie mtaalamu atakayesaidiana na wataalamu wa Halmashauri katika kufanya usanifu wa barabara hizi kwa mtaalamu wako kuonyesha wapi miundo mbinu yenu ya umeme imepita kwenye barabara hizi na pia kutoa mchanganuo wa kuzihamisha kama ikibidi kwa kadiri ya usanifu utakavyoelekeza.

Zoezi hili linatarajiwa kuanza tarehe 16.06.2014 mpaka tarehe 18.06.2014. Ni matumaini ya Jiji mtatupa ushirikiano wa kutosha.

Eng Gaston P. Gasana
Kny MKURUGENZI WA JIJI
JIJI LA ARUSHA

"Tunayaangaza Maisha Yako" TANESCO "We light Up Your Life"

SHIRIKA LA UMEME TANZANIA
TANZANIA ELECTRIC SUPPLY COMPANY LIMITED

Ubungo Head Office, "Umeme Park", P.O. Box 9024, Dar Es Salaam, Tanzania, Tel: +255 22 2451130/9. Fax: +255 22 2452026

Our Ref: **Kumb;AR/SE/SL/14,** **21.11.2014**

ARUSHA MUNICIPAL COUNCIL
S.L.P 3013
ARUSHA.

Ndugu,

YAH: GHARAMA ZA MALIPO YA KUHAMISHA LAINI YA UMEME LT NA HT ENEO LA MURIETI – UNGA LTD

Tafadhali rejea barua ya tarehe 10.10.2014 yenye kichwa cha habari hapo juu. Unatakiwa kulipa gharama ya **Tsh 22,602,952.82** ikiwa ni gharama ya kuhamisha laini ya umeme iliyopo kwenye eneo la murieti kwa mchanganuo ufuatao;

i) Gharama za kuhamisha laini ya LT.....	Tsh.	17,154,985.47
ii) Ongezeko la Thamani VAT 18%.....	Tsh.	4,288,746.37
iii)Gharama za kuhamisha laini ya HT.....	Tsh.	982,390.66
iv)Ongezeko la Thamani VAT 18%.....	Tsh.	176,830.32
v) **Jumla ya Gharama..... .....**	**Tsh.**	**22,602,952.82**

Tafadhali tambua utalazimika kulipia gharama zozote zitakazoongezeka ambazo hazipo katika barua hii wakati kazi ikifanyika.Baada ya kulipia gharama zote unazohitajika kulipia ndipo taratibu ya kufanyika kazi yako itaendelea.

Kumbuka kuwa vifaa vyote hadi kwenye mita vitabaki kuwa mali ya shirika.

Wako Amini;

Kny: SHIRIKA LA UMEME TANZANIA.

Mhandisi. SERAPHIN MOSHY
Kaimu: Meneja wa Mkoa – Arusha.
SM/RPM/BR/hm

JAMHURI YA MUUNGANO WA TANZANIA
OFISI YA WAZIRI MKUU
TAWALA ZA MIKOA NA SERIKALI ZA MITAA

HALMASHAURI YA JIJI ARUSHA

Barua zote zitumwe kwa:
Simu: +255 27 2508073/2503494 (Direct
+255 27 2544330 (General)
Nukus hi: +255 27 2505013
Unapojibu tafadhali taja:

Mkurugenzi wa Jiji
S. L. P. 3013,
ARUSHA, TANZANIA
Barua Pepe: cd@arushacc.go.tz
Tovuti: www.arushacc.go.tz

Kumb. Na. ACC/T61/VOL 1V/77 **Tarehe:** 24/11/2014

Mkurugenzi
Mamlaka ya Maji Safi na Maji Taka(AUWSA)
ARUSHA

YAH: KUPATIWA MCHANGANUO WA GHARAMA ZA KUHAMISHA NA KUBADILISHA MIUNDOMBINU KWENYE BARABARA YA UNGA LTD-MURRIET

Husika na kichwa cha habari hapo juu.
Rejea barua yako yenye kumb na:AUWSA/P.10/3/VOL X11/17 ya kuhusu gharama za uhamishaji wa miundo mbinu ya maji safi.

Katika mchanganuo huu umetoa maelezo ya jumla ya kiutendaji(Lumpsum)kwa maana ya kununua bomba kuchimba na kuiweka au kuihamisha

Kwa barua hii tunaomba utupatie gharama husika kwa mchanganuo ufuatao:
(a)Mabomba husika
(b)Viunganishi vyake
(c)Gharama ya kufukua mabomba yanayohamishika,
(d)Kuchimba mitaro mipya,
(e)Kuhamisha mabomba yanayohamishika,
(f)Kufukia baada ya kulaza bomba.
(g)Gharama za usafiri na usafirishaji kama zipo.

Ni matumaini ya Jiji mtatupatia mchanganuo huu mapema ili tuweze kukamilisha taratibu zetu za kiutendaji.

Eng Gaston P. Gasana
Kny MKURUGENZI WA JIJI
JIJI LA ARUSHA

MAMLAKA YA MAJISAFI NA MAJITAKA JIJI LA ARUSHA

Anwani ya Simu: : "MTO"
Simu nambari : 027-2506124
Fax: 255- 27-2504163
E-Mail: auwsa@habari.co.tz

S.L.P. 13600
ARUSHA
TANZANIA.

Kumb. Na. AUWS/P.16/3/VOL.XII/17

06 Novemba, 2014

Mkurugenzi wa Jiji,
S. L. P. 3031,
ARUSHA

YAH: **GHARAMA ZA KUHAMISHA MIUNDOMBINU YA MAJISAFI KWENYE BARABARA YA A TO Z KUELEKEA MURIET DAMPING SITE**

Tafadhali rejea mada tajwa hapo juu.

Napenda kuwasilisha kwako makisio ya gharama za kuhamisha mabomba ya majisafi yaliyoko kwenye barabara ya A to Z kuelekea Muriet damping site. Makadirio haya yamehusisha kuhamisha bomba, valves miundombinu yote inayohusiana na mtandao wa majisafi kwenye barabara husika. Kwa bomba za zamani ambazo si rahisi kuhamisha bila kuziharibu na pia zile za plastics, tumekadiria kwamba zibadilishwe kwa bomba mpya za plastics. Zile za DI imekadiriwa kwamba zitahamishika kwa kufanya marekebisho kadhaa. Mfumo wa majitaka utaendelea kubakia barabarani kwa kufanyiwa marekebisho ya chemba peke yake kwa maana ya kuhakikisha mifuniko inakuwa sambamba na usawa wa barabara. Gharama hizo zimejumuishwa pia.

Naambatanisha makisio hayo.

Ahsante kwa ushirikiano.

H.G. Matoi
KAIMU MKURUGENZI MTENDAJI
MAMLAKA YA MAJISAFI NA MAJITAKA
JIJI LA ARUSHA

ARUSHA URBAN WATER SUPPLY AND SEWERAGE AUTHORITY

THE FOLLOWING IS THE ESTIMATE COST FOR RELOCATING WATER INFRASTRUCTURE LOCATED ALONG THE ROAD

THE ROAD (A to Z - MURIET DUMPING SITE

	DESCRIPTION	DISTANCE (m)	UNIT COST	AMOUNT	REMARKS
	200mm DI pipe	340	80,000.00	27,200,000.00	This type of pipes are very strong so the assumption is that they can be shifted. What is needed is to dig and remove them and then excavete new trench and lay them
	40mm GS pipe	330	30,000.00	9,900,000.00	These pipes are very old so for this case they cannot be shifted without damaging them. What was considered here is replacing them with Class "D" uPVC pipes.
	200mm CI pipe	80	180,000.00	14,400,000.00	These pipes are very old so for this case they cannot be shifted without damaging them. What was considered here is replacing them with Class "D" uPVC pipes.
	150mm DI pipe	700	50,000.00	35,000,000.00	This type of pipes are very strong so the assumption is that they can be shifted. What is needed is to dig and remove them and then excavete new trench and lay them
	40mm POLY pipe	30	30,000.00	900,000.00	This pipe materials can easily be damaged when removing them from the ground. So it has been estimated that new pipes have to be bought to replace the existing.
	50mm PVC pipe	880	30,000.00	26,400,000.00	This pipe materials can easily be damaged when removing them from the ground. So it has been estimated that new pipes have to be bought to replace the existing.
	150mm CI pipe	60	80,000.00	4,800,000.00	These pipes are very old so for this case they cannot be shifted without damaging them. What was considered here is replacing them with Class "D" uPVC pipes.
	100mm PVC pipe	1070	40,000.00	42,800,000.00	This pipe materials can easily be damaged when removing them from the ground. So it has been estimated that new pipes have to be bought to replace the existing.
	Sub - total for pipes			**161,400,000.00**	
	Pipe fittings, various valves and valve chambers, etc			48,420,000.00	
	Total			**209,820,000.00**	
	Add 10% Repair of Sewerage manhole chambers, Unforesee			20,982,000.00	
	GRAND - TOTAL			**230,802,000.00**	