Public Disclosure Authorized

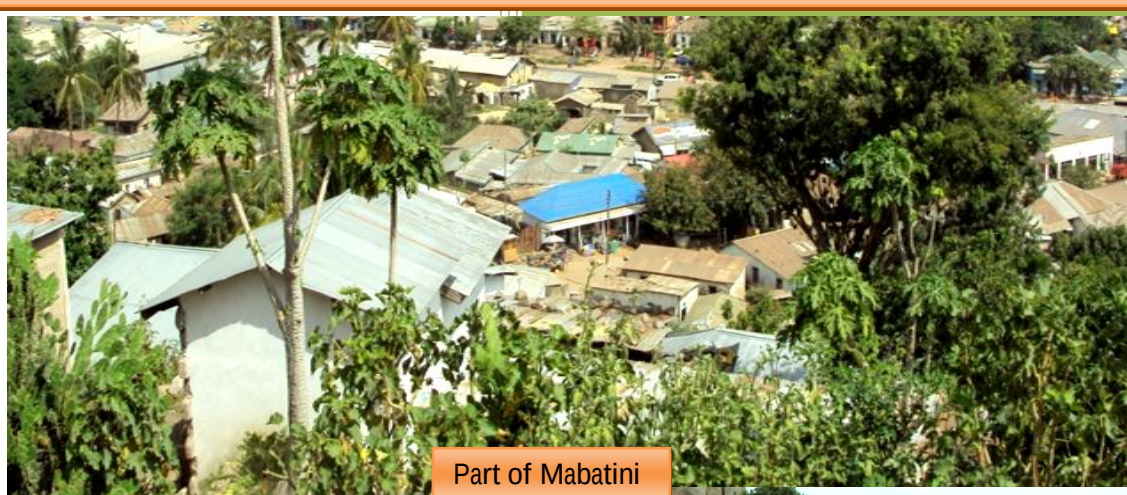
Public Disclosure Authorized

Public Disclosure Authorized

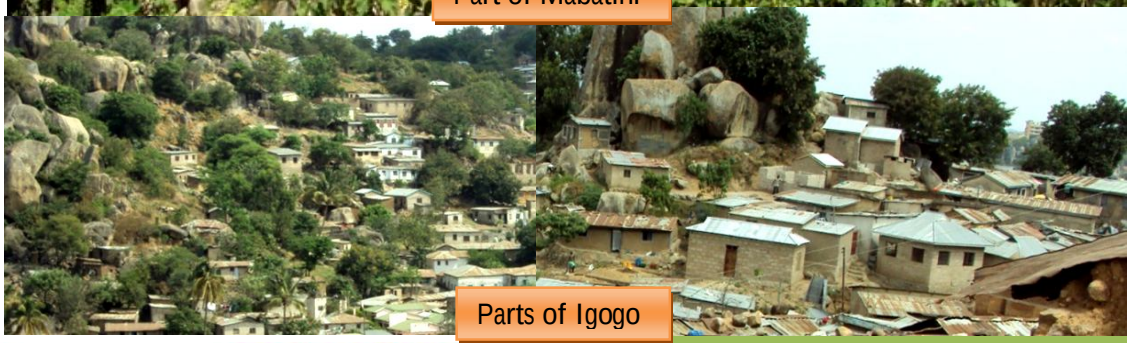
E4760 V8

Mwanza Urban Water and Sewerage Authority
(MWAUWASA)
P.O. Box 317, Mwanza Tanzania
Tel: +255 28 2500547; Fax: +255 28 2503251
Email: mwauwasa@yahoo.com

Environmental and Social Impact Assessment for Construction of Simplified Community Sewerage System for Mabatini and Igogo Areas in Mwanza City



Part of Mabatini



Parts of Igogo

Prepared by

Environmental BENCHMARK
Consulting Engineers
EBm
P. O. Box 77222 - Dar es Salaam
Tel : 0754 / 0784 / 0715 - 353954 & 022 2775058
E-mail: admin@environmentalbenchmark.com

Submitted to

National Environment Management Council (NEMC),
Regent Estate Plot No. 29/30, P.O. Box 63154, Dar es Salaam,
Tel: 255 22 2774852/4889, Fax: 255 22 2774901;
Email Address: dg@nemc.or.tz

Submission Date: **18th December 2013**

Environmental and Social Impacts Assessment for Proposed Construction of Simplified Community Sewerage System for Mabatini and Igogo Areas in Mwanza City

Declaration

This Environmental and Social Impacts Assessment report has been prepared by

Name	Speciality and Responsibility	Signature
Eng. Venant E.K. RWENYAGIRA	Civil-Environmental Engineer, ESIA Team Leader	
Mr. Huruma Kisaka	Sociologist Responsible for undertaking Social Impacts Assessment	
Eng. Sanjo Msilanga Mgeta	Environmentalist responsible for undertaking environmental impacts assessment	
Ms Greven Msenga	Mass Communication Expert responsible to stakeholders Engagement and consultations	

Executive Summary

A. Title and Location of the Project:
Environmental and Social Impacts Assessment for Proposed Construction of Simplified Community Sewerage System for Mabatini and Igogo Areas in Mwanza City

B. Project Proponent:

Ministry of Water - Lake Victoria Environmental Management Project Phase II
P. O. Box 9153, Dar es Salaam

C. Environmental Firm of Experts:
Environmental BENCHMARK,
Consulting Civil-Environmental Engineers,
P.O. Box 77222 Dar es Salaam,
Tel: 0784/0754/0715-353954 and 022 2775058
Email: admin@environmentalbenchmark.com
Contact Person: Eng. Venant E.K. Rwenyagira – Environmental Expert

D. A Brief Outline and Justification of the Proposed Project

i. Introduction

Lake Victoria is the second largest freshwater Lake in the world with a surface area of about 68,000 km^2 shared by Kenya, Uganda and Tanzania. The catchment area for the Lake is about 197,500 km^2, extending to Republics of Rwanda and Burundi, with a population of more than 30 million people. Lake Victoria is the largest inland water and fishery sanctuary in East Africa, with an estimate annual fish catch of about 750,000 metric tonnes and an inland water transport linkage for the three states. The Lake is also a major reservoir and source of water for domestic, industrial, hydropower production and irrigated agricultural activities within the member states. Furthermore, the Lake acts as a repository for both treated and untreated wastes generated from various activities in the basin, some of which can alternatively be reused for valuable activities such as agriculture.

Over the years, the Lake has suffered from increasing pollution as the result of expansion of development activities and an ever increasing population growth in the basin.
As part of many initiatives to reduce further deterioration of the lake, the Government of Tanzania through the Ministry of Water planned and implemented remedial measures through Lake Victoria Environmental Management Project. The first phase of project ended in December 2005 and two was initiated in 2009 with an implementation period of eight (8) years (2009-2013 and 2014-2017).

Parts of Mwanza city, in the locations of Igogo and Mabatini, most of the households are unplanned and depend on on-site sanitation systems. The terrain of these areas is so rocky and steep such that individual construction of credible on-site sanitation systems becomes difficult. Some of these areas are used by low income earners to whom spending on good latrines is of a least priority. When these on-site facilities fill up, they cannot be easily emptied and the result is sewage overflows towards lower reaches ending up into Lake Victoria. In order to solve this problem the government proposed to construct Simplified Community Sewerage Systems for the respective areas. Based on the nature of the proposal, the Ministry of Water commissioned M/s Environmental BENCHMARK, Consulting Civil-Environmental Engineers of Dar es Salaam, to carry out Environmental and Social Impact Assessment for the proposed system.

ii. Proposed Project Description

The proposed simplified community sewerage system project in Igogo and Mabatini areas will be comprised of the house connections collecting wastewater from individual houses to the collector lines draining to the septic tanks linked to the drainage field or to the existing central sewerage system. The proposed total area to be served in Igogo ward is 235ha for 3520 households while for Mabatini sub ward the area to be served is 95 ha covering 1910 households. The project global environmental objectives are to:

- Improve collaborative management of the trans-boundary natural resources of LVB for the shared benefits of the EAC Partner States; and
- Reduce environmental stress in targeted pollution hotspots and selected degraded sub-catchments to improve the livelihoods of communities, who depend on the natural resources of LVB.

The first stage of the project will involve mobilization of the construction human resource, construction equipment and plant and construction materials. Also, as required, the Contractor will hire labour and erect necessary temporary facilities to cater for offices and storage yards within the construction site. Mobilization phase will also involve purchase and stockpiling of the materials such as aggregates, sand, cement, timber, sewer pipes and fittings and reinforcing steel. Other construction equipment such as jack hammers and compressors, will be mobilised to the site of works as need arises.

The construction phase will involve;

- setting out to demarcate sewer lines, work areas, clearing limits. Access footpaths and roads, detours, bypasses and protective fences,
- sites preparation
- Excavation of trenches for sewer lines and excavation of foundations for septic tanks and drainage fields.
- Pouring concreting bases for foundations
- Laying of pipe sanitary sewers
- Backfilling, disposal of overburden and surface restoration to at least match the condition that existed prior to the sanitary sewer construction

Once substructures of septic tanks and drainage fields are completed, other finishing works will be carried out ready for commissioning and operational monitoring followed by handing over of the system.

Contractor's demobilization phase will involve clearing all the site activities in terms of tiding up of all sites facilities and demobilization of all construction equipment. Upon completion of contractor's obligations, the structures will be handed over to the Project Proponent MWAUWASA for the operation phase.

During operation, the sewerage system will start its intended activity of collecting, conveying and treating the wastewater. The sludge from the communal septic tanks will be regularly removed and sent to the sludge treatment facility at Butuja also owned and operated by MWAUWASA.

iii. Policy, Administrative and Legal Frameworks

Relevant legislations pertaining to construction of a simplified sewerage system mainly in terms of environmental quality, health and safety of employees, pollution of ground and surface water, pollution of soil, land and land use control, forests, wildlife, protection of sensitive areas,

protection of endangered species among others, were examined in order to ensure that the proposed development project meets and abides by the existing regulations.

World Bank has keen interest in protection of the environment, particularly for investment projects supported by the Bank; these have to be in line with its safeguards policies. These policies provide guidelines, aimed at preventing and mitigating undue harm to people and the environment, when implementing development projects. The safeguard policies provide a platform for participation of stakeholders in project design and implementation. Relevant policies to this project include Environmental Assessment (OP/BP 4.01), Natural Habitats (OP/BP 4.04), Forests (OP/BP 4.36), Involuntary Resettlement (OP/BP 4.12), Indigenous Peoples (OP/BP 4.10), Pest Management (OP 4.09) and Physical Cultural Resources (OP/BP 4.11). Construction of the sewerage system project is likely to trigger some of these operational policies of the World Bank.

iv. Environmental and Social Baseline condition

About 75 percent of the estimated 65,500 housing units in Mwanza City are built in 18 unplanned settlements, spread over about 299 km^2 and accommodating 70 percent of the population. Most of the unplanned developments in Mwanza city take place on the hills around the inner city where tricky and rough terrain makes it difficult to provide access and other services including water, electricity and drainage to the dwellings. Sanitary conditions are despicable because it is not possible to construct credible pit latrines on these rocky grounds leading to frequent downhill flushing of human excreta which pollutes streams and rivers, which discharge filth laden water into Lake Victoria!

Unplanned settlements of Igogo and Mabatini are characterised by high congestion of buildings, poor accessibility and lack of physical infrastructures like electricity, water supply, sewerage system and roads. Public facilities like dispensaries are lacking, open spaces are non-existent and inadequate hygienic services like toilets, disposal of solid wastes etc.

Socio-Economic Activities

The analysis of social economic activities was carried out to determine income and expenditure pattern of people living in Mabatini sub ward and Igogo ward. In general, the per capital income of Mwanza residents stands at an average of TZS 33,600 (about USD 21) per month of which majority of residents depend on the following sectors:

Industries **-** There are about 60 different type of industries in Mwanza: fish processing (6); cotton seed oil industries (6); breweries (2), soft drink factory (1) bakeries and biscuits (100); medium & small milling machines; timber industries; garages; fabricating workshops; ginneries; foam & plastic industries; soap factories; quarry sites and animal food industries.

Fishing- Fishing is done mainly for commercial purposes, contrary to the traditional fishing which focused to household consumptions. The emergence of the Nile Perch trade has created new opportunities for development in the region. According to available statistics from the fish processing plants in Mwanza and Musoma towns, the fish industry has created direct employment for over 8,000 locals and outsiders and indirectly employed about 300,000 others.

Agriculture **-**Agricultural activities are undertaken in both urban and rural areas where both food and cash crops are cultivated. Food crops cultivated in both Ilemela and Nyamagana includes cassava, paddy, sweet potatoes, maize, sorghum, pulses, vegetables and fruits and cash crop cultivated is cotton.

Livestock **-** Livestock available in Mwanza City includes; Goats, sheep, cows, pigs, hens' indigenous bread, Broilers, jayerns and donkeys. Most of the urban-based wards are practicing poultry farming and zero grazing livestock keeping.

Timber Industries **-** There are industries which produce timbers of different sizes. The timber processed includes pines (mostly Pinus carribaea), *Pterocarpus angolensis* (mninga) and *brachystergia speciformis* (mtundu) from outside city.

Social Services

Water supply **-**The demand for water in Mwanza City and in study area in particular has been increasing rapidly due to high rate of population growth. Lake Victoria is the main source of water for the city. However the water quality is also becoming a matter for serious concern due to the declining quality of the Lake Victoria environment.

Energy - Mwanza City is supplied with electricity from the national grid but only about 33,000 customers are connected including some households in the project area. Rapid population increase and the high demand for charcoal and firewood has led to massive deforestation and to increased surface run off, siltation of streams, rivers and the lake, exposing the city to landslides, soil erosion and flooding.

Health facilities – Starting from the higher level, Mwanza city has 105 health facilities including 6 hospitals, 10 health centres, 87 dispensaries and 2 clinics. Two of the hospitals, three heath centres and 24 dispensaries are government facilities while the rest are private. Most facilities are located in the centre of the city and only few are dispersed in the periphery. The study area is served by two dispensaries, one in Igogo and another in Mabatini. Malaria is the leading disease affecting the majority of the population of all age groups. Communities are involved in managing health facilities though health facility and ward health committees and the City Health Board.
The diversity of its social and economic activities, its location and transport links attract many people to Mwanza making it a high HIV/AIDS prevalence city. According to the comprehensive council health plan for Mwanza City 2010 / 2011 the current prevalence is 5.6% of the population.

Education - There are 164 primary schools in the City including 142 government and 22 private schools. Classrooms are overcrowded and the few toilets available regularly overflow due to over-use, posing a danger to health.

Roads -Mwanza city has 863km of roads, 75% of which are unpaved. Plans are underway to use stones for road paving to reduce costs. In the study area the status of roads is poor, pathetic and in alarming situation making provision of transport limited in project areas, especially those on upper part of Mabatini and Igogo A and D. On average, 26 traffic accidents occur per month, five to six being fatal.

Solid Waste Management - Solid wastes in most of the unplanned settlements including Igogo and Mabatini, which are inaccessible, are disposed on site by burning or burying.

Liquid Waste Management **-** Due to poverty, inaccessibility and difficult terrain, most city residents especially in the unplanned settlements, use pit latrines. The shallow pit latrines overflow during heavy rains, releasing faecal matter into waterways draining into the Lake, likely contaminating waters of Lake Victoria which is the main source of water for domestic use. Most households that use septic tanks discharge waste water from kitchens and bathrooms into storm water drains.

Housing and Informal Settlements **-** Good housing has a close correlation with good health and other aspects of human dignity and well being. Through there is lack of clear-cut on which is proper and good housing facility but enough and well-ventilated rooms, kitchen and toilets provision were used to determine the quality of the shelter in the study area. Moreover type of structures and materials used in construction were also primarily used to determine the quality of the house in the study area. The situation of housing in the study area' exhibit typical two categories. One is housing in planned and surveyed areas and second is in unplanned (squatter) areas where our study focuses.

v. Stakeholders Consultation and Public Involvement

The Consultant conducted public participation for the proposed project to involve as many potential Interested and Affected Parties as possible. Public meetings were held, where views and concerns were raised. Accordingly, issues arising from this public participation process were incorporated in the report and used in determining mitigation measures for the project.

During consultation process, the consultants identified organization, groups and individuals considered to be regarded as "stakeholders". This identification was based on each ones roles and their relevance in the proposed sewerage system. Some of the stakeholders such as government authorities, municipality/district level, wards and sub-ward level that might be impacted by or have interest in the project or exercise some influence on the project were predetermined. Comments and concerns drawn from public meeting and corresponding response from the consultants have been presented in the main report.

vi. Identification, Assessment of Impacts and Project Alternatives

Construction of a simplified sewerage system which includes construction of lateral lines, in unplanned areas and partly busy areas of Igogo and Mabatini, there is a number of minor to major environmental impacts that are likely to occur from the planned activities ranging from site clearance to transportation of building materials, erection, construction and operation of the sewerage system. Such potential environmental and social positive and negative impacts likely to emerge in different phases of the project are;

Pre-construction, Planning and Design Phase

- Vegetation loss through clearance – the routes for sewers, site(s) for collector tanks, access road to sites of work
- Temporary obstruction of access roads by topographic survey and geotechnical investigation teams.
- Soil erosion from disturbed surfaces during planning and design stages
- Interference on daily activities/businesses as most of the works will be carried out adjacent to the businesses
- Noise from transport of equipment to facilitate detailed engineering design phase
- Likely motor accidents with pedestrians in the course of implementing planning phase activities

Mobilization Phase

- Vegetation clearance and deterioration of original land use, scenic and visual quality
- Displacement of properties for camp establishment

Construction Phase

- Disruption of services from relocation of infrastructures e.g. water pipes, electric poles, telephone lines etc

- Displacement of people and properties during construction of the septic tanks and drainage fields
- Demolition of paved surfaces during trenches excavation
- Interference with access routes and existing utilities
- Disturbances, particularly land scarring at borrow sites or sources of construction materials (sand, aggregates, stones,) -
- Nuisance from noise and vibration during construction ,
- Soil Erosion
- Likely accidents from increase in traffic levels in the project area.
- Increased safety risk to construction/project personnel
- Contamination of water from leakages of fuels and lubricants from construction equipment
- Poor air quality from dust and emissions around the construction site and material hauling routes
- Possible injuries to neighbours from falling into trenches and open pits for inspection chambers.
- Generation of construction solid and liquid wastes followed by poor disposal of the same

Socio-economic Impacts

- Increased transmission of communicable diseases(HIV/AIDs, STIs or STDs)
- Poor Safety during Construction
- Injuries from poor safety measures at work place -
- Safety risks

Demobilization Phase of Construction Activities

- The main impact from these demobilisation activities is generation of wastes

Operation Phase

- Continued pollution from some public places and other houses that have been left out the sewerage system.
- Poor safety of employees and neighbours from overflowing sewage in the streets
- Pollution to the nearby rivers leading to Lake Victoria
- Overflow of sewage in human settlements
- Health risks posed by generated Sludge
- Occupation safety health hazards and safety
- Odours
- Sewer system vandalism and Illegal connections
- Increased eutrophication
- Health risks related to polluted vegetables
- Failure to connect and non-payment of bills
- Lack of sufficient water to allow self cleansing of the system.

Positive impacts of the proposed project

- Improved quality of health from proper management of faecal matter
- Improved water quality in rivers and Lake Victoria
- Increased fish catch from depleted nutrients
- Increased employment and trading opportunities
- The government coffers will equally benefit from statutory contributions and value added tax from sales of materials.
- Treated sludge can be re-used as fertilizer to increase agricultural productivity. The use of decomposed sludge (compost) can also minimize the use of chemical fertilizers, which are potential pollutants of Lake Victoria. Similarly, the properly treated supernatant overflow from sludge digestion process can be used for land irrigation.

Project Alternative Considered-The proposed project is aimed at improving sanitation in unplanned areas of Mabatini and Igogo by construction of simplified community sewerage systems. Various alternative treatment and disposal of sewage from the project site have been considered including, No-Option alternative, on-site collector system, conventional sewerage system, Simplified Community Sewers.

vii. Recommendations and Plan for Mitigation of the Impacts

Construction related activities generally cause some alteration to the biophysical and social environment. The proposed sewerage system project is not an exception and therefore effective management strategies and mitigation measures have been presented under section 7 of the main report. The mitigation measures for the impacts likely to be caused by the proposed project focuses on key potential impacts identified in section 6 during different phases of the project development.

viii. Environmental and Social Management Plan

An Environmental and Social Management Plan (ESMP) is tool that can be used to ensure that avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented. ESMPs are therefore important tools for ensuring that the management actions arising from EIA processes are clearly defined and implemented through all phases of the project life cycle. The project proponent of the proposed sewerage system project is the Ministry of Water through its Lake Victoria Environmental Management Project (LVEMP II) who will be assisted by the design and supervision consultants. These two bodies will ensure that the contractor and sub-contractors who will win the tender for construction of the sewerage system adhere to the laid down procedures for construction and commissioning of the sewerage system. Chapter 8 of the main report outlines the actions of the ESMP. The organizational framework for the ESMP is designed to evolve as the project progresses through detailed engineering design, construction, commissioning and operation phases.

On reporting arrangements, the Ministry of Water Environmental Section (Sector Environmental Coordinator) and Consultant's Appointee to deal with Environmental Management will cooperate with other experts in Mwanza City to provide the Regional Environmental Management Expert (REME) under the Regional Secretariat with environmental reports as part of the progress reports and annual environmental monitoring reports. The Regional Environmental Management Expert is the link person between the region and the Sector Ministry Environmental Section (Sector Environmental Coordinator) and the Director of Environment as well as the Director General of NEMC.

ix. Proposed Monitoring and Auditing

Monitoring of the community sewerage system is the long term process that should begin at the start of the project construction and continue throughout the life of the project. Its purpose is to establish environmental benchmarks so that the nature and magnitude of anticipated environmental impacts are continually assessed. Monitoring involves the continuous or periodic review of mitigation activities to determine their effectiveness. Consequently, trends in environmental degradation or recovery can be established and previously unforeseen impacts can be identified and dealt with during the sewerage system life. Based on the monitoring plan presented in the report, the sewerage system contractor will prepare his Environmental and Social Monitoring Plan covering the mobilization, construction, commissioning and demobilization phases of the project.

During operation of the project, MOW/ LVEMPII/MWAUWASA will be responsible for monitoring the environmental and social impacts. The Environmental Specialist at the Mwanza

City Office will be in-charge of the environmental and social monitoring of issues related with the sewerage system if it is meeting all the statutory requirements.
Among other things, the appointed City Environmental Management Officer should deal with

- monitoring water quality from various pollutants from the sewerage system; monitoring if collector lines are functioning as required
- monitoring air pollution from the obnoxious smell at various locations including sewer manholes, pumping station and at the waste stabilization ponds
- Monitoring any nuisance from the sewage pumping stations
- environmental degradation control measures such as soil erosion;
- risk to sewage overflow from gravity sewer lines from blockages and pressure main in case there pipe rupture; changes in socio-economic status;

x. Resource Evaluation and Cost Benefit Analysis

Cost Benefit Analysis is a tool used either to rank projects or a guide to choose the most appropriate project option. The ranking or decision making associated with projects is based on the expected economic costs and benefits. The general rule is that the project should be undertaken if lifetime expected benefits exceed all expected costs.
The aim of Cost Benefit Analysis (CBA) is to present the lifetime costs and benefits of a project as a single number that can be compared to either the interest rate prevailing or the costs and benefits to the social and physical environment. The process of conducting the environmental cost benefit analysis involves;

- Description of the project and corresponding capital costs.
- Identification of the project consequences in time frame order and obtain their monetary values.
- Determination of the type of Environmental Cost Benefit Analysis

The project total costs of investment, environmental remedy and avoided costs are estimated to be USD 2.2 Million calculated from a combination of methods. This implies that the cost of the project and mitigation of impacts (including investment, management and monitoring costs estimated are all worth less than 3 million dollars.

Proper sanitation is a necessity for any town; otherwise the town will not worth a name! A sewerage system is meant to convey the waste water away from the human dwellings and treat it for final disposal where there are minimum impacts to the human beings and the surrounding environment. A city like Mwanza which was built so many years ago, still misses this important infrastructure in some of its areas. The existing on–site sanitation facilities in Mwanza city, Mabatini and Igogo areas in particular, are the ones that have resulted into some of diseases recorded in the nearby health facilities. If the costs implication of these diseases were calculated over the lifetime of the project, then the reason for implementing the sewerage system project would be straight forward and evident on the table!

In Mwanza city there are various sources of water supply including Lake Victoria. The presence of water and subsequent improvements there on, will result into significant increase in wastewater and therefore without the efficient sewerage system, the on–site sanitation facilities will not be able to cope! This will be a major factor in further spread of poverty-related waterborne diseases in the city and increasing air pollution from the stench of overflowing on-site sanitation facilities that come from the hills around Mwanza City.

xi. Decommissioning

Decommissioning is the final phase in the life cycle of the project after sitting, design, construction, commissioning and operation. Most often, it is a process involving operations such as dismantling and demolition of the worn-out structures and management of resulting

materials. All these activities take into account of the environmental health and safety requirements for the operating personnel, the general public and any implications to the environment.

The simplified community sewerage system is not like a manufacturing facility whereby the methods used to manufacture some products are increasingly replaced by modern technology or a production process! The demolition of the sewerage system after its useful life can be thought of in terms of replacement of the defective sections of sewer line, replacement of the manholes and inspection chambers, replacement of parts of the sewer or repairs and maintenance of the system. The life span of plastic pipes and concrete structures for manholes can live up to 25 years or so. Therefore in this project as long as human beings are there and they continue to use water, sewerage systems will always be required. Therefore decommissioning the sewerage system is not seen as an activity which will be needed in a near future besides the stated improvements and regular maintenance.

However, if at any time, parts of the sewerage system become obsolete, life threatening or unsafe to a state where demolition is necessary, may be to pave a way for improvement or construction of a new sewerage system project, then a new environmental impact assessment study will be required as provided for in the Environmental Management Act Cap 191. The project proponents will therefore set aside a budget estimated to about USD 2,000,000 to facilitate replacement and/or rehabilitation, reinstatement of the area to match the surroundings. The estimated budget of replacement will be raised from charges that will be set to the users of the community sewerage system.

xii. Summary and Conclusions

This ESIA report is intended to offer an objective assessment on the concerns that were raised during the scoping phase of the study as well as those issues noticed by the assessment team in the project area based on the technical expertise that lies within Environmental BENCHMARK's environmental experts. Ultimately, the report should give NEMC and other interested stakeholders the opportunity to make an informed decision regarding the proposed community sewerage system project and its various options.

The construction and operation of the proposed sewerage system can result in a variety of impacts on the natural environment as well on the neighbours in the vicinity of areas. The issues related to the proposed sewerage system were identified with various stakeholders, discussed with the technical personnel and assessed by the ESIA consultants. Some of mitigation measures were proposed by stakeholders, reviewed and also included in the main report. The issue of alternative to the project was discussed as either to remain with the on-site sanitation system that is "Do-Nothing Option" or to go for a proposed system. The "no-project" can be justifiably dismissed as an alternative due to the need and desirability of the sewerage system in the respective areas of Igogo and Mabatini. The on-site sanitation systems for Igogo and Mabatini areas are in pathetic condition and they really need a concentrated effort to avert the pollution problem that continues to affect Lake Victoria.

The findings of environmental impact assessment of the proposed simplified community sewerage system are positive overall on the health and social–economic environment of the respective areas. However, the impact of the project on the bio-physical environment is potentially slightly negative in pre-construction, construction, commissioning and operation phases of the project.

In addition to this, the impacts expected from the proposed development can be mitigated to acceptable and satisfactory standards except those associated disturbances during construction, which are rated to be of low significance. With adequate management of the identified impacts,

as required by the EMP, the environmental risks and impacts of the proposed project can be minimized to acceptable levels.

Good operation and maintenance (O&M) is essential for the long-term sustainability of any sewerage system, but particularly for simplified sewerage, since small (100mm) diameter pipes and lack of experience in using the sewers may make the system more vulnerable to clogging.
The concept of householders being responsible for O&M of the sewers has not worked well in the long term. Studies of simplified sewerage systems in other countries such as Brazil have shown that effective maintenance of sewers by utilities companies has often been the result of community pressure by neighbourhood associations. Without such pressure maintenance by utilities has often been inadequate, and community maintenance has not been effective either.
Community participation process provides a good opportunity for complementary actions like hygiene promotion, which can have a significant impact on public health at a relatively limited cost. For this to work well, a Community Liaison Office (CLO) must be established and must comprise of the key stakeholders from the wards, contractor, City Council and MWAUWASA. During construction the committee must continue to function as the key role player and during operation, the composition of the committee must be changed to suit the conditions of the project to ensure good co-existence of the sewerage system with the surrounding resident communities.

Contents

Table of Figures

List of Tables

Acknowledgements

A number of individuals participated in on-site environmental and social impacts assessment and later in the preparation of this report. More importantly, these people committed their time and effort to make this assignment possible in the available short duration.

The Ministry of Water is grateful to all those who contributed in one way or another to this assessment in particular the Team Leader Eng. Venant Rwenyagira, Sociologists Mr. Huruma Kisaka and Ms. Haikael Mpangavo, the Environmental Engineer and Registered EIA expert Mr. Sanjo Mgeta, Mass communication expert and Ms. Greven Msenga and assistant environmental assessment expert, Graduate Engineer Mr. Weisiko M. Magoto and the team driver, Mr. Ladslaus K. Mayowa.

The Ministry of Water is as well grateful to the Mwanza City authorities, Mbuga and Igogo wards leadership, without forgetting the residents of Igogo and Mabatini sub-wards for their good turn-out during the assessment and consultation meetings. The support offered by MWAUWASA personnel especially the Managing Director Eng. Sanga, the Operations and Maintenance Engineer Eng. Gombe Swila in this assessment was immeasurable and instrumental in preparation of this report. We believe that since MWAUWASA will be the ultimate operator of the community sewerage system, the team wholeheartedly provided the information that will lead into successful operation of the sewerage system. The company and inputs offered by other MWAUWASA support staff is highly appreciated.

The Ministry of Water is greatly indebted to the residents of the respective wards of Mbuga and Igogo in Mwanza City for their time to participate in public consultation process and provide immeasurable input into this work. The support of various staffs from different government institutions, private companies, non-governmental organizations, who at different stages of the study were involved in supplying relevant information to the study team, is highly appreciated.

Acronyms and Abbreviations

^{0}C	Degrees centigrade (units temperature)
CBA	Cost Benefit Analysis
CBOs	Community Based Organization
CCDO	City Community Development Officer
CITES	Convention on International Trade of Endangered Species of Wild Fauna and Flora
CLO	Community Relations Officer
CPLO	City Planning Officer
dB (A)	Noise level on decibel in level (a)
EAC	East African Community
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Project
ESMP	Environmental and Social Management Plan
GDP	Gross domestic Product
GEF	Global Environmental Facility
HIV/AIDS	Human Immunodeficiency Virus /Acquired Immune Deficiency Syndrome
HSE	Health Safety and Environment
I&AP	Interested and Affected Persons or parties
IGA	Income Generating Activities
Kg	Kilogram
LVB	Lake Victoria Basin
LVBC	Lake Victoria Basin Commission
LVEMPII	Lake Victoria Environmental Management Project Phase II
M^3	Cubic meter
masl	Meters above sea level
MEAS	Multilateral Environmental Agreements
MOW	Ministry of Water
MWAUWASA	Mwanza Urban Water and Sewerage Authority
NAWAPO	National Water Policy
NEMC	National Environment Management council
NESC	National Environmental Standards committee
NGOS	Non-Governmental Organization
O&M	Operation and Maintenance
OP/BP	Operational Policy and Best Practise
OSHA	Occupational Safety and Health Authority
PLHA	People Living with HIV/AIDs
PMT	Project Management Team
PPE	Personal Protective Equipment
R.E.	Revised Edition
SIDA	Swedish International Development Agency
TZS	Tanzania Standards
VP	Vice President
WDC	Ward Development committee
WSP	Waste Stabilization Ponds

1. Introduction

1.1 Background of the Project

Lake Victoria is the second largest freshwater Lake in the world with a surface area of about 68,000 km^2 located in the proportions of 6%, 43% and 51% in Kenya Uganda and Tanzania respectively. Its catchment area is about 197,500 km^2, extending to Republics of Rwanda and Burundi as well, with a population of more than 30 million people living in the Lake Victoria Basin. The coverage of Lake Victoria basin is as indicated in Figure 1 below. Lake Victoria is the largest inland water and fishery sanctuary in East Africa, with an estimate annual fish catch of about 750,000 metric tonnes and an inland water transport linkage for the three East African P/BP 4.12 Involuntary Resettlement 37
36 Forests 38
repository for both treated and untreated wastes generated from various activities in the basin, some of which can alternatively be reused for valuable activities such as agriculture.

Over the years, the Lake has suffered from increasing pollution as the result of expansion of development activities and an ever increasing population growth in the Lake Victoria basin.

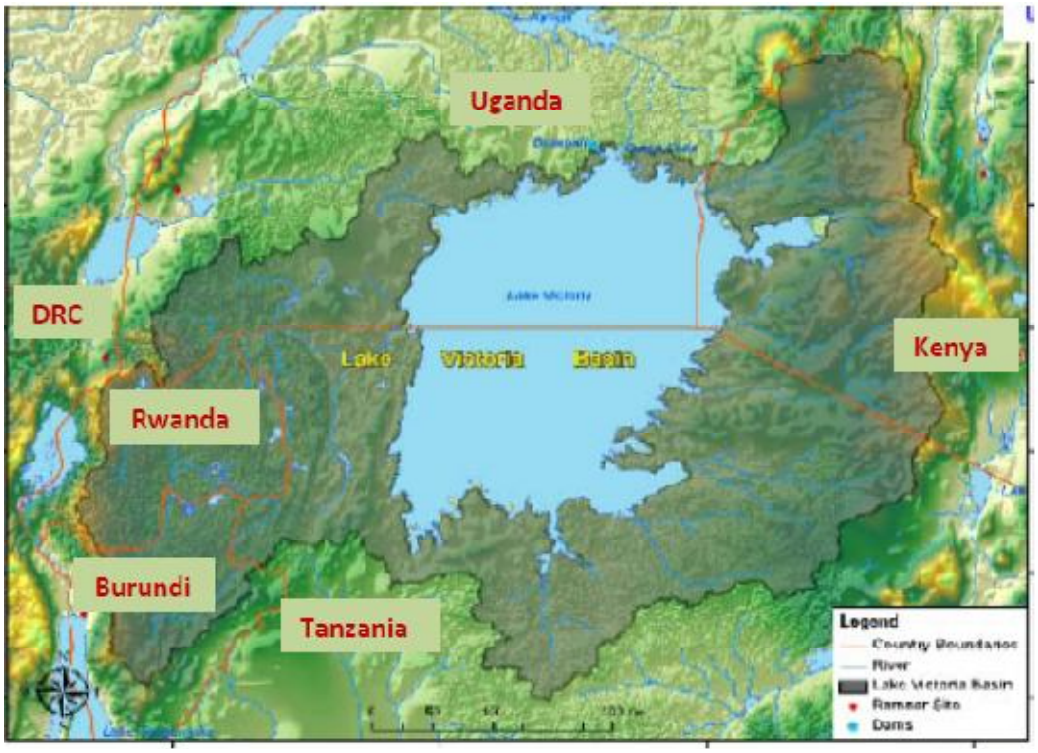


Figure 1: Lake Victoria Basin and its boundaries

As part of many initiatives by East Africa Community Partner States to reduce further deterioration of the lake the Government of Tanzania through the Ministry of Water under its Lake Victoria Environmental Management Project (LVEMP I) planned and implemented some remedial activities around Lake Victoria. The LVEMP I ended in December 2005 followed by Lake Victoria Environmental Management Project Phase Two (LVEMP II) in 2009, which is somewhat a compliment and an upscale of LVEMP I Works, with an implementation period of eight (8) years (2009-2013 and 2014-2017).

Similarly, this second phase is equally a regional initiative and a multi-sectoral approach on the management of the Lake Victoria Basin implemented in the five East African Community (EAC) Partner States, Burundi, Kenya, Rwanda, Tanzania and Uganda. Lake Victoria Basin Commission (LVBC) coordinates the project regionally through the Regional Project Coordination Team (RPCT) based in Kisumu, Kenya. The Ministry of Water is the Focal Point Ministry on the Tanzanian side. In Tanzania the project became effective on 20th August 2009, covering a total of 23 districts in Mara, Shinyanga, Mwanza and Kagera Regions. The Project is [illegible] Tanzania and

During LVEMP I, it was observed that many rivers and streams flowing into Lake Victoria and the near-shore areas are heavily polluted, particularly by;

a. Raw and partially treated city/municipal and industrial effluents;
b. Contaminated urban surface runoff;
c. Unsanitary conditions of the shoreline settlements; and
d. Pollutants carried in eroded sediments, particularly nitrogen (N) and phosphorus (P).

These pollutants bring into the lake, coliforms of faecal origin; oxygen demanding organic substances; heavy metals, such as chromium, lead and mercury; and pesticide residues. The increased inflow of pollutants has resulted in changing the lake chemical and bio-physical characteristics, increased eutrophication; nutrients balance problems, health problems to riparian communities, and proliferation of water hyacinth.

The overall objective of LVEMP II is to contribute to achieve the vision of the EAC for the Lake Victoria Basin (LVB) of *"having a prosperous population living in a healthy and sustainably managed environment, providing equitable opportunities and benefits"*

Among others, LVEMP II objectives and key outputs targets at reducing pollution into the lake by reducing discharge of untreated effluent from city/municipal waste by supporting public investments, including:

i. rehabilitating and improving selected wastewater treatment facilities to reduce discharge of untreated effluents into the lake,
ii. connecting primary treated effluent discharge to constructed/restored wetlands; and
iii. providing on-site sanitation facilities.

In Mwanza city, some of the households depend on on-site sanitation systems which sometimes due to filling up, the wastewater overflows directly or indirectly ending up in Lake Victoria. This practice endangers other users of the Lake including the aquatic life. Generally, management of waste water in unplanned settlements such as Mabatini and Igogo may prove to be difficult especially when one is planning to contain further pollution.

In order to tackle part of these problems, the Government of Tanzania through the Ministry of Water under its Lake Victoria Environmental Management Project (LVEMP II), proposes to construct t Simplified Community Sewerage Systems for Mabatini and Igogo areas in Mwanza City. It is expected that the proposed simplified community based sewerage systems will offer cost effective and practical solutions for collecting waste water from various hilly areas and therefore reduce amount of pollutants discharged into the rivers and Lake Victoria without any treatment.

In order to implement the proposed project sustainably, the Ministry of Water commissioned M/s Environmental BENCHMARK, Consulting Civil-Environmental Engineers of Dar es Salaam, to carry out an Environmental and Social Impact Assessment for the proposed community sewerage system. In this regard the EIA Consultant on behalf of the project

proponent registered a project with the National Environment Management Council (NEMC) through submission of the EIA application form and a Project Brief describing a proposed undertaking. The screening decision by NEMC, presented under Appendix I, directed the proponent to conduct a scoping exercise which culminated into undertaking the Environmental and Social Impact Assessment for the project, which provided a significant input into preparation of this report.

Initially this assessment was carried out in June - July 2012. After sitting with the project proponent during initial stages of the assessment it was later decided to add some more areas which were initially left out. The second assessment was carried out in March-April 2013, which included more areas in Mabatini which were not in the initial plan.

1.2 Environmental Impact Assessment Requirement

According to the First Schedule of the Environmental Impact Assessment and Audit Regulations, 2005 made under sections 82(1) and 230 (2) (h) and (q) of the Environmental Management Act No. 20 of 2004, the proposed project directly falls under the list of projects requiring EIA and therefore the full Environmental Impact Assessment is mandatory.

Listed under the first schedule of the EIA and Audit Regulations 2005, the project is classified under item 20 which describes the type of project in sub section (iii) and (iv) as night soil collection and transport and construction of sewage system, as shown on the extract below from the EIA and Audit Regulations 2005 (Table 1) .

Table 1: Extract from the List of Project Requiring EIA

A: LIST OF PROJECTS REQUIRING EIA (MANDATORY LIST)
20. Waste treatment and disposal
(c) Municipal Sewage
(i) Construction of waste water treatment plant
(ii) Construction of marine out fall
(iii) Night soil collection transport and treatment.
(iv) Construction of sewage system

1.3 Scope of the Environmental impact Assessment

The scope of the environmental and social impacts assessment study as amplified in the Terms of Reference submitted to NEMC earlier in the assessment process may be presented in the summary form as follows:

i. Describe and evaluate the present baseline data and the relevant environmental characteristics of the area proposed for the simplified community sewerage system development outline the national policies, legislation and administrative framework within which the environmental management of the proposed works will be carried out.

ii. Identify, analyse and assess potential environmental and social impacts that will result from the proposed works, based on the proposed design.

iii. Propose costs-effective mitigation measures for minimizing or eliminating adverse social and environmental impacts of the proposed works, including recommendations on design changes if deemed necessary.

iv. Propose modalities and arrangements for collection of stakeholders views ensuring participation of key public and civil society representatives

v. Prepare an environmental and social management plan for implementing the mitigation measures and recommend institutional administrative and management framework for monitoring of the project.

1.4 Methodology of the Environmental Impact Assessment

The methodology used in this assessment is corresponding with the Environmental Impact Assessment and Audit Regulations of 2005, adopting the approach of identifying, collecting and analysing information which included;

i. Undertaking the activities initiated during the scoping phase including involvement of key stakeholders and collecting of the baseline information on both natural and built environment including socio economic conditions surrounding the project area and Mwanza city at large.
ii. Analysis of data for identification, prediction and evaluation of the impacts both beneficial and adverse ones from the proposed project development and operation. This was achieved through use of checklists, simple matrices and use of engineering judgment, standards and guidelines.
iii. Identifying and proposing mitigation measures aimed at minimising and where possible eliminating the potential negative impacts and enhancing positive ones using expert judgment.
iv. Preparing environmental and social management and monitoring plans for easy follow up during implementation and follow up during project operation
v. Presenting the information in the Environmental Impact Statement.

The assessment was done by superimposing project components such as proposed simplified sewer lines and its appurtenances into the existing environmental conditions surrounding the project site.

The methodology took into account likely impacts on the physical and biological environment (e.g. on air quality in terms of obnoxious smell, soil, ground water quality and vegetation. The methodology is further elaborated under section 6 on the analysis of environmental and social impacts

Other methodologies used in this assessment include literature reviews, consultative meetings with respective offices including the government offices in Mwanza, city officials and ward members and their respective leaders and visual observations through familiarization visits in the project area. Thus the following approaches/techniques were used in data collection.

In-depth discussions with key informants

In-depth discussions with key informants such as government officials working at ward level and other influential people in the project area were also conducted.

Public Consultative meetings

Public meetings were held with project wards members whereby issues related to construction of the simplified community sewerage system were presented through which the local communities raised their concerns as indicated in the section for public consultation.

Visual observation

Observation was made through transect walks whereby the consultants observed among other things areas to receive intensive works in terms of the collector tanks. Also existing sanitation infrastructures including toilets at the household level, business infrastructure, settlement patterns and other economic activities were critically observed.

Literature review

Documents and records were reviewed to obtain existing secondary data and information relevant to the study area. The major source of such information includes district socio-economic and investment profiles, education, health and community development reports, The recently released National 2012 Population Census and Settlement Development and other relevant reports were also reviewed to see how they match with the projected population in the project areas..

1.5 Structure of the ESIA Report

The report is presented in accordance with the requirements of regulation 18 (1), (2) of the Environmental Impact Assessment and Audit Regulations of 2005, with the following chapters;

- ✓ Cover page – with the title of proposed project, location of the project, developer, lead consultants, contact address and phone and date of submission
- ✓ executive summary
- ✓ Acknowledgements,
- ✓ Acronyms
- ✓ Introduction
- ✓ Project Background and Description
- ✓ Policy, Legal and Administrative Framework
- ✓ Baseline and Existing Conditions
- ✓ Stakeholders Engagement and Public Consultation
- ✓ Assessment of Impacts and Identification of alternatives
- ✓ Impacts management, Environmental Mitigation measures
- ✓ Environmental and Social Management Plan
- ✓ Environmental and social Monitoring Plan
- ✓ Cost Benefit Analysis
- ✓ Decommissioning
- ✓ Summary and conclusions
- ✓ References and
- ✓ Appendices

2. Proposed Project Description

Definition

Simplified sewerage is a low-cost sewer system that collects all household wastewater from kitchen and toilets in small-diameter pipes laid at fairly flat gradients. Simplified sewers are laid in the front yard or under the pavement (sidewalk) or - if feasible - inside the back yard, rather than in the centre of the road as with conventional sewerage. It is suitable for existing unplanned low-income areas, as well as new housing estates with a regular layout. The simplified sewerage is characterised by frequent blockages such that frequent management arrangements are needed than working with conventional sewers. This concept of simplified sewerage emerged in parallel in Natal, Brazil and Karachi, Pakistan in the early 1980s. In all situations particular emphasis was given to community mobilization, an essential element for the success of simplified sewerage.

Existing Sanitation in the Project Area

Only a small portion (about 8%) of Mwanza City is provided with the central sewer system. The hilly areas surrounding this City are all built up with houses lacking this important facility and therefore contribute significantly to the pollution of the Lake Victoria and the nearby streams and rivers. These areas are not only hilly but also rocky with housing set-up in squatter's style lacking proper planning which makes the situation even worse. The construction of the acceptable individual sanitary systems is missing in these surrounding areas. When the pit latrines or septic tanks fill up they cannot be served by the cesspit emptier due to poor accessibility. The only way is to empty the pits manually and sometimes when it rains, the pit contents are allowed to flow downstream towards planned areas of Mwanza City ending up in the Lake with consequential results of water pollution and associated health risks.

2.1 Objective and Purpose of the Proposed Project

The overall objective of LVEMP II is to contribute towards achieving the vision of the EAC of "creating a prosperous population living in a healthy and sustainable managed environment and providing equitable opportunities and benefits". The Project development/global environmental objectives are to:

- Improve collaborative management of the trans-boundary natural resources of LVB for the shared benefits of the EAC Partner States; and
- Reduce environmental stress in targeted pollution hotspots and selected degraded sub-catchments to improve the livelihoods of communities, who depend on the natural resources of LVB.

The simplified sewerage system construction project in Mabatini and Igogo in Mwanza city will be one of LVEMP II initiative to improve management of the Transboundary natural resources mainly to reduce pollution of Lake Victoria by reducing discharge of untreated effluent from city/municipal waste through implementing off-site sanitation system. Other purposes include;

- To improve quality of health from proper management of faecal matter
- To improve water quality in rivers and subsequent reservoir downstream- Lake Victoria
- To increase fish catch from depleted nutrients which normally support the growth of water hyacinth and algae
- To solve the problem of pit latrines overflowing during the wet season from Mabatini and Igogo areas

2.2 Location of the Proposed Project

The proposed project for construction of Simplified Community Sewerage System for Mabatini and Igogo areas will be implemented in Mwanza City in Mwanza Region. The project region is as shown on the administrative map of Tanzania in Figure 2 below.

Figure 2: Administrative Map of Tanzania showing Mwanza region where the proposed project will be constructed.

Igogo and Mabatini areas are located in Nyamagana district, one of the two districts under Mwanza City. Another district in the City is Ilemela. Formerly Mwanza region had six districts

which included Geita, Sengerema, Misungwi, Kwimba, Magu and Nyamagana. In the recent rearrangement, Geita district has been moved into a new region of Geita. Mabatini area is located in Mbuga ward. The locations of the proposed project in Nyamagana district is shown on Figure 3 below.

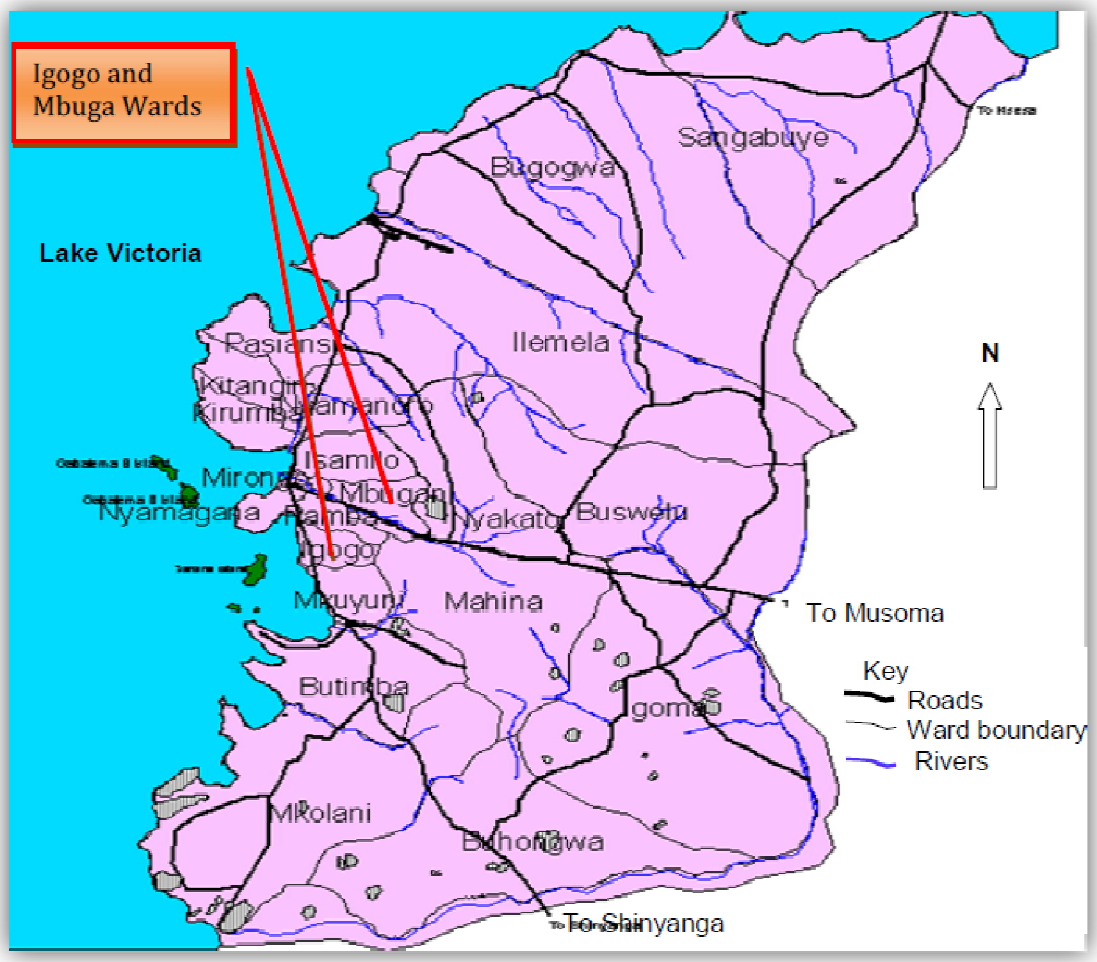


Figure 3: Sketch map of Nyamagana District showing the location of the two wards (Igogo and Mbugani) where the project will be implemented (Source: Mwanza City Profile 2011)

In Mbuga ward, the area to be served is known as Mabatini which is approximately 95ha with estimated 1910 households with about 55,756 persons to be served. The image presented as Figure 4 below shows the extent of the buildings in Mabatini area.

Figure 4: Mabatini sub-ward area, part of Mbugani ward

Igogo ward is one of the twenty (20) wards of Mwanza City Council located adjacent to the central business district of the City. It is bordered by Pamba ward in the North, Mkuyuni ward in the South, Lake Victoria in the West, and Nyakato ward in the East. The ward with an estimated area of about 235 ha, lies between elevation 1138 masl at the lakeshore and 1280 masl in the extreme West, right on the hilly areas of the project area. The ground slope varies between 40% in the North to 12% in the South. Slopes in the unplanned central Igogo area, with scattered rocky hills formations exceed 40%. The area is extending to the lakeshore; with mixed use area east of Kenyatta Road, with some industrial plots, commercial and institutional plots; the unplanned high-density area in the middle area; and a medium to low density area further up the hills above elevation 1220 meters above sea level.

A small high-density planned area exists between the mixed-use area and the unplanned high-density area. A very small area adjacent to Pamba ward, close to Bugando hospital is planned with low to medium density plots. Igogo area which is approximately 235ha with estimated 3520 households with a population of about 46,815 will be served. The approximate location of the project area in Igogo is as shown in Figure 5 below.

Figure 5: Aerial image of Igogo area

2.3 Project Activities

2.3.1 Mobilization Phase

This will be the first phase of the project implementation which will involve mobilization of the construction human resource, construction equipment and plant, construction materials and erection of temporary worker's camps (portable cabins or corrugated iron sheets) and construction material storage yards within the project area in available open spaces. The location of the temporary camps will be agreed by both parties including the leadership, land owners and the contractor. The solid wastes generated during this phase will be mainly packaging materials, including sacks, wrapping papers, cardboard boxes, plastic and wood crates, metal straps and the like. Such wastes will need to be segregated for recycling or incinerating at designated sites.

Also, as required, the contractor will hire labour to erect necessary temporary facilities to cater for offices and storage yards within the construction site as it may be agreed and permitted by the Mwanza City and respective wards authorities. Mobilization phase will also involve purchase and stockpiling of the materials such as aggregates, sand, cement, timber and reinforcing steel. Other construction equipment such as scaffolding, will be mobilised to the site of works as need arises.

2.3.2 Construction Phase

Upon completion of preliminary activities the actual construction work of simplified sewer lines will start which will involve;

- Setting out to demarcate rights of way, work areas, clearing limits. Access paths, detours, bypasses and protective fences or barricades should all be in place before sanitary sewer construction begins
- Relocation of properties which are within the areas where the sewers and retention tanks will be constructed
- Excavation of trenches for sewer lines and excavation of foundations for retention tanks or collector tanks. The retention tanks will be constructed in areas with difficult access for placing the sewers and will be shared by a number of households.

- Trench sheeting and bracing to protect collapsible trench side walls.
- Placing concrete to bases of foundations
- Laying of pipe sanitary sewers
- Construction of retention tanks,
- Laying pipes from household to the retention tanks;
- Construction of tertiary and secondary sewers in the community settlements;
- Construction of secondary sewers from the project area of Igogo to Mwanza South main sewer;
- Construction of secondary sewers from the project area of Mabatini to Central Sewer;
- Backfilling, disposal of overburden and surface restoration to at least match the condition that existed prior to the sanitary sewer construction

All project activities under this phase are supposed to be carried out along the tracks or streets and access paths within the boundaries of the identified project sites without disturbing or obstructing the neighbours and businesses. In order to ensure this, the project contractor will have to fence off the sites perimeter for communal septic tanks with corrugated iron sheets or any other suitable material as it will be determined during project implementation. In case of trenches, proper barricades have to be applied to warn and protect the people of impending dangers of falling into open pits and trenches.

2.3.3 Demobilization Phase

Demobilization phase will involve clearing all the site activities in terms of tiding up of all sites facilities and removal from site all the unwanted stuff. Disposal of any remaining unwanted material will also be carried out during this contractor's demobilization phase.

Various wastes will be generated during this stage of which the same methods used to manage waste for previous phases will apply. These will include solid wastes from packaging materials, wood and steel crates, cardboard, wrapping materials, boxes, sacks, drums, cans and chemical containers and any other unused materials. Along with this, the damaged areas will be restored before commissioning the project.

After the project completion, temporary workers especially unskilled ones will have to be paid all their dues and terminal benefits (if any) and released to go back to other places for other works. Upon completion of contractor's obligations, the structures will be handed over to the Project Proponent MWAUWASA for the operation phase.

2.3.4 Operation Phase

Operation phase of the constructed simplified sewerage facilities refers to wastewater collection and transportation to the main sewer and disposal sites and maintenance of the structures and sewer appurtenances. There will be a need of linking the retention tanks to the secondary sewer line where the wastewater will be conveyed by gravity to the main sewer for further conveyance to the pumping station and later lifted to the waste stabilization ponds (WSP) located at Butuja.

In general during the operation phase, among other activities the major activities to be performed include:

- Conveyance of wastewater to the treatment plant;
- Pre-treatment of wastewater in retention tanks;
- Desludging of retention tanks, sludge from the communal septic tanks will be collected by using suction trucks and disposed into sludge beds to dry and later be used as manure.

Where accessibility is a problem due to narrow pathways small tricycles with suction pumps could be used to collect the sludge for appropriate disposal, and

- Maintenance of the system.

During operation phase the wastes to generated include the wastewater and sludge from the retention tanks

For successful operation of a simplified sewerage scheme, there must be an effective partnership between the community (Igogo and Mabatini residents) served and the sewerage operating authority (MWAUWASA). In particular, it is important that both parties are clear about their duties and responsibilities. The community needs to be educated about the proper usage of the sewerage system mainly the activities which may result to the system success or failure. Issues related to what residents should not dispose off (e.g. solid objects) in simplified sewers. Also maintenance of storm water, gully traps, how to report blockages and leaks should be well clear to the community.

2.3.5 Decommissioning Phase

Sewerage facilities are always on demand to the community. In view of this, decommissioning of the project is not seen as significant because all efforts will be geared towards prolonged life of the sewerage facilities. The life expectancy of the sewerage system can be very high more than 15 years on condition that regular maintenance is carried out. Due to the demand of sewerage systems instead of abandoning or condemning the system, strict plans and efforts shall be geared towards maintaining the structures to have prolonged life.

2.4 Project Design Concept

Generally, the sewerage system will comprise of a network of sanitary sewers buried underground which will be carrying wastewater from domestic, institutional and commercial premises to the existing main sewer and finally lifted by the pumps to the Waste Stabilization Ponds (WSP) for treatment before discharging to Lake Victoria. The waste water will be discharged in Lake Victoria according to the requirements of the discharge permit issued by Lake Victoria Water Basin Office in Mwanza City. But there are areas where construction of sewer network may become difficult, in such areas, the onsite collector system will comprise of the communal retention tank, the pipe network connecting 6-10 housing units to the retention tank. The proposed sewerage system for Mabatini will be linked to the existing sewerage system by connecting to the existing manhole at the Mabatini Police Station Barracks.

Sewer lines will be at shallow depth in order to conform to the prevailing nature of rocky terrain in the project area. It is proposed to provide a minimum cover of 40 cm over the pipes. This will minimize the amount of excavation and therefore cut down the overall cost of sewer line installation. Protection of the sewer cover from erosion will also be considered. The sewer line network will be connected in such a way that it will minimize the unnecessary demolition of facilities including human settlement. These sewerage system networks are shown in figures 6 and 8.

2.4.1 Proposed Sewerage Network Measures

The proposed Mabatini Simplified sewerage system will cover the two streets of Mabatini Kaskazini and Mabatini Kusini with area of about 95 ha. The sewer diameters of the size 100mm and 200mm is proposed and expected to serve approximately 1910 households in Mabatini project area.

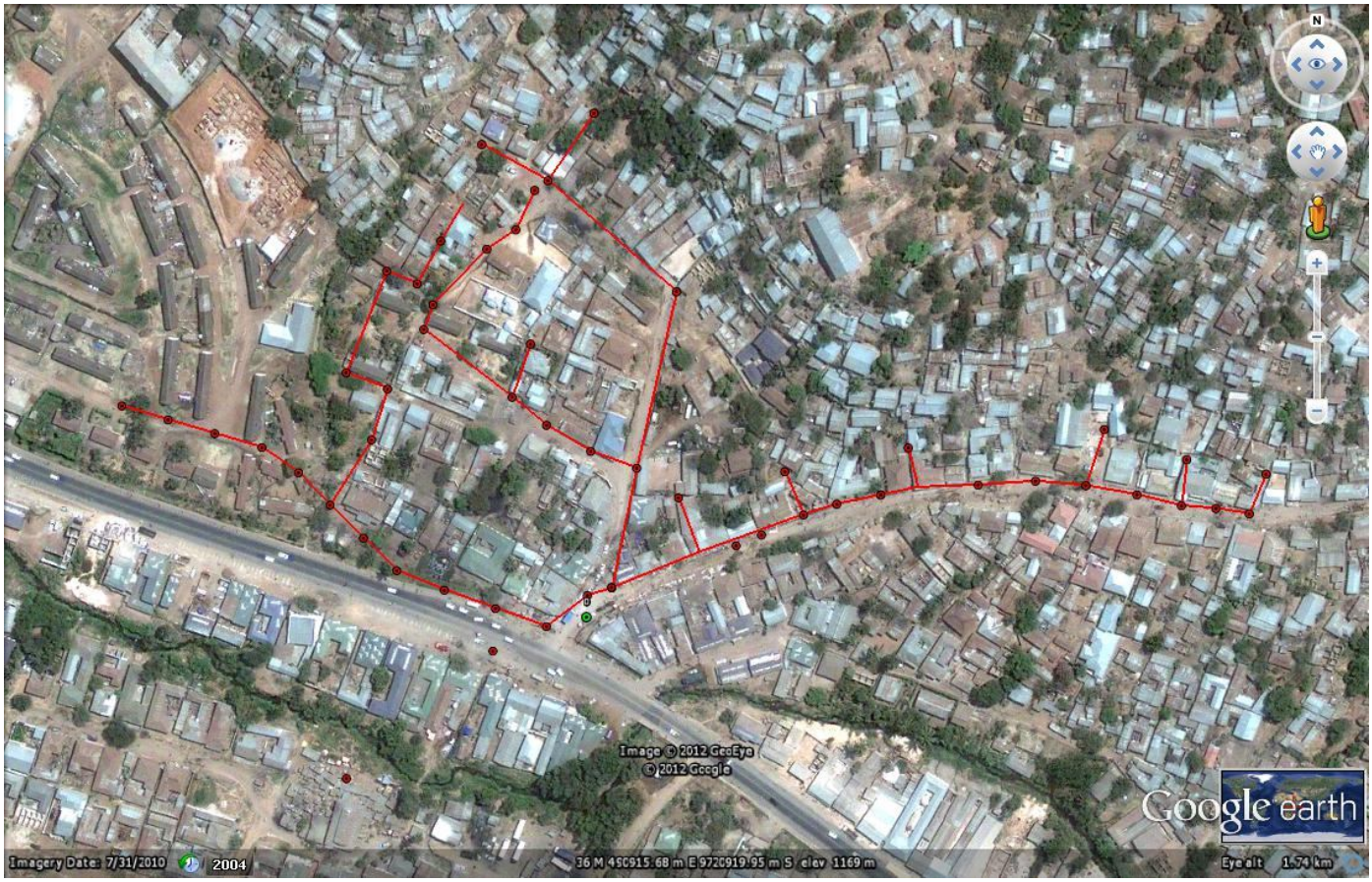


Figure 6: Proposed Sewerage Network in Mabatini area

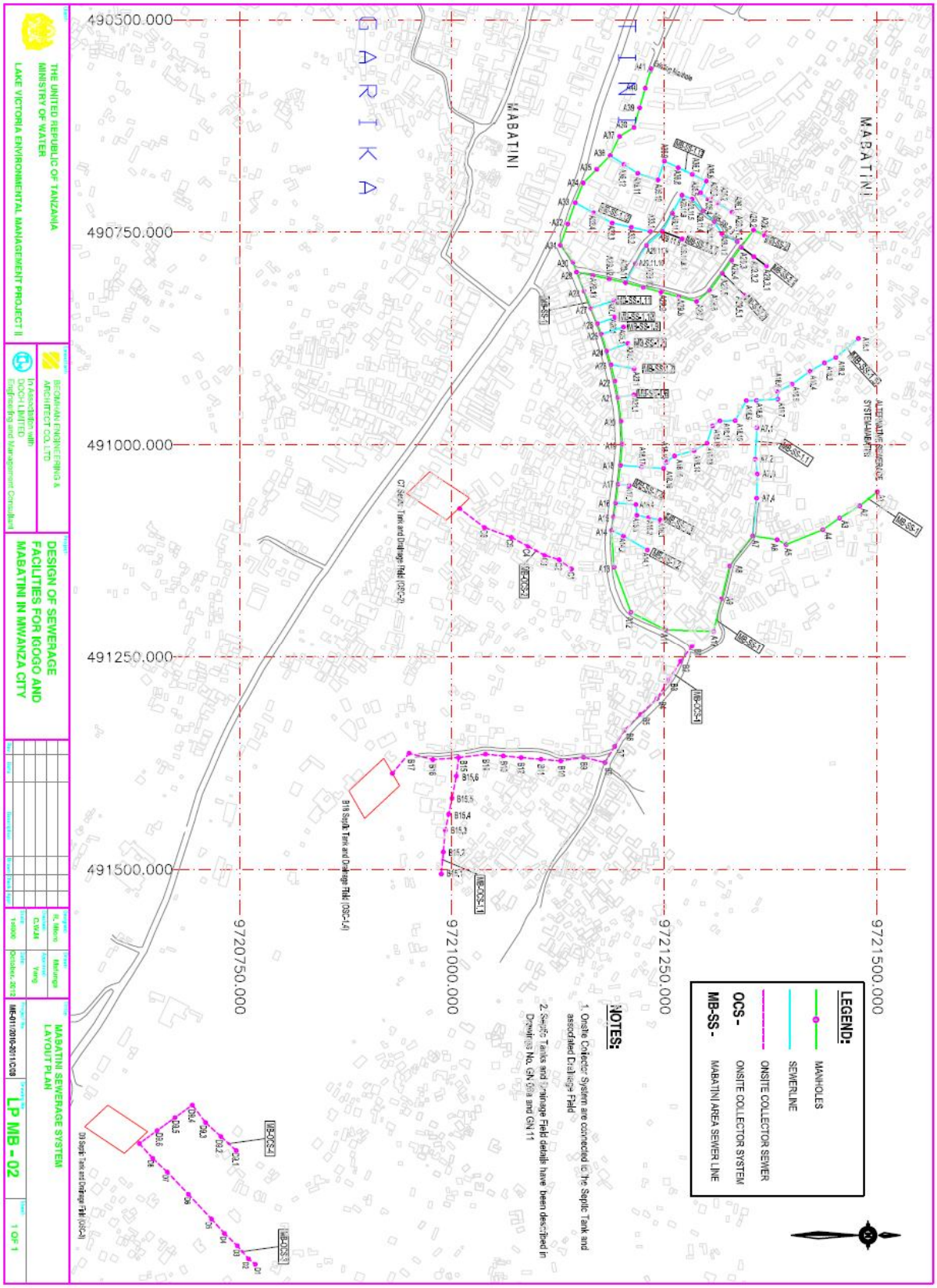


Figure 7: Mabatini layout plan

The Igogo simplified sewerage system covers an area of about 235 ha. Proposed sewerage system is expected to serve the streets of Igogo Kaskazini A, Kaskazini D, Kusini C and D, expecting 3520 households to connect to the system. The new sewerage system has been

planned to discharge to the existing manholes. The total flow expected to be captured by this network is 24 l/s.

Figure 8: Proposed Sewerage Network in Igogo area

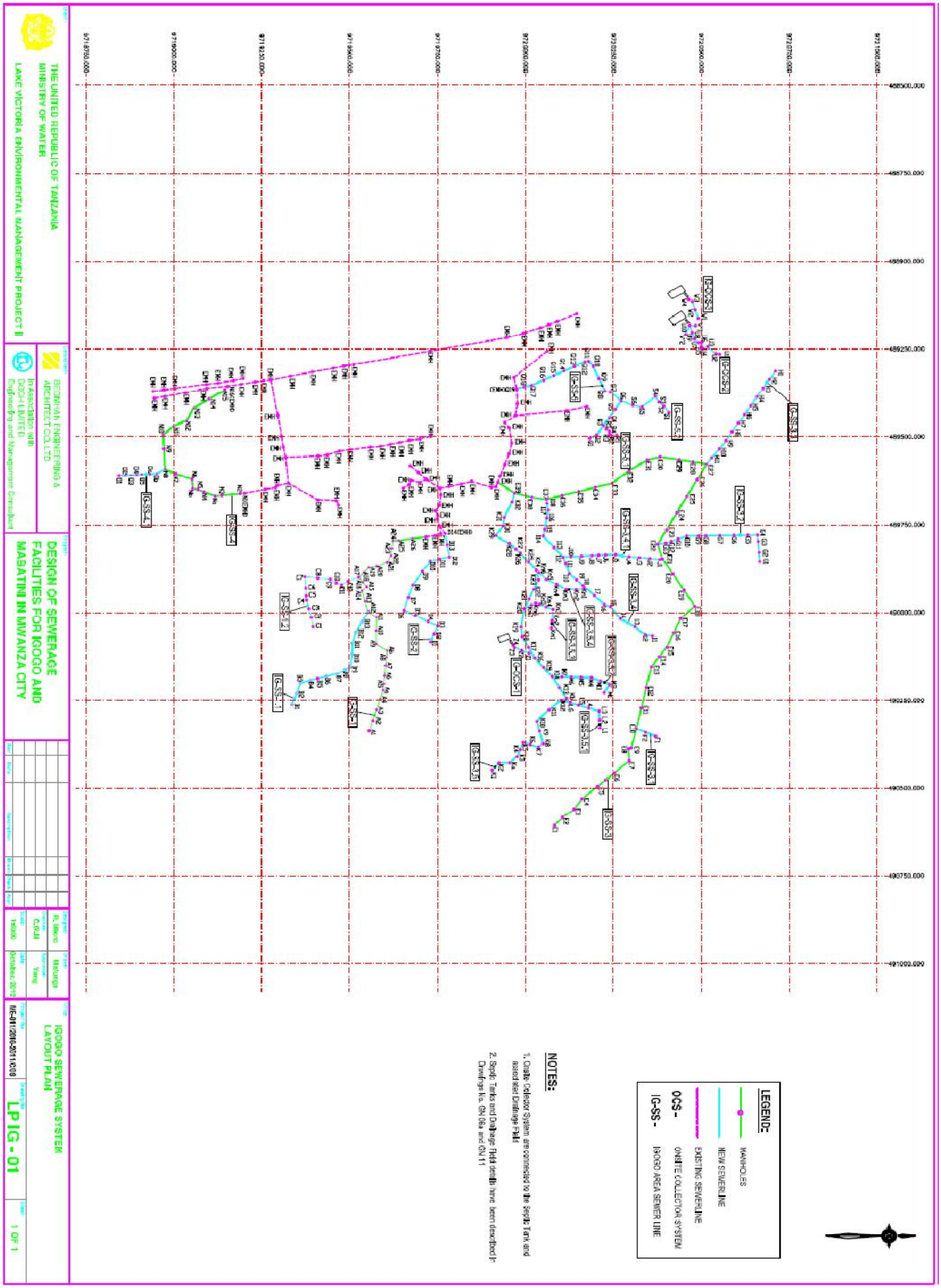


Figure 9: Igogo Sewerage system layout plan

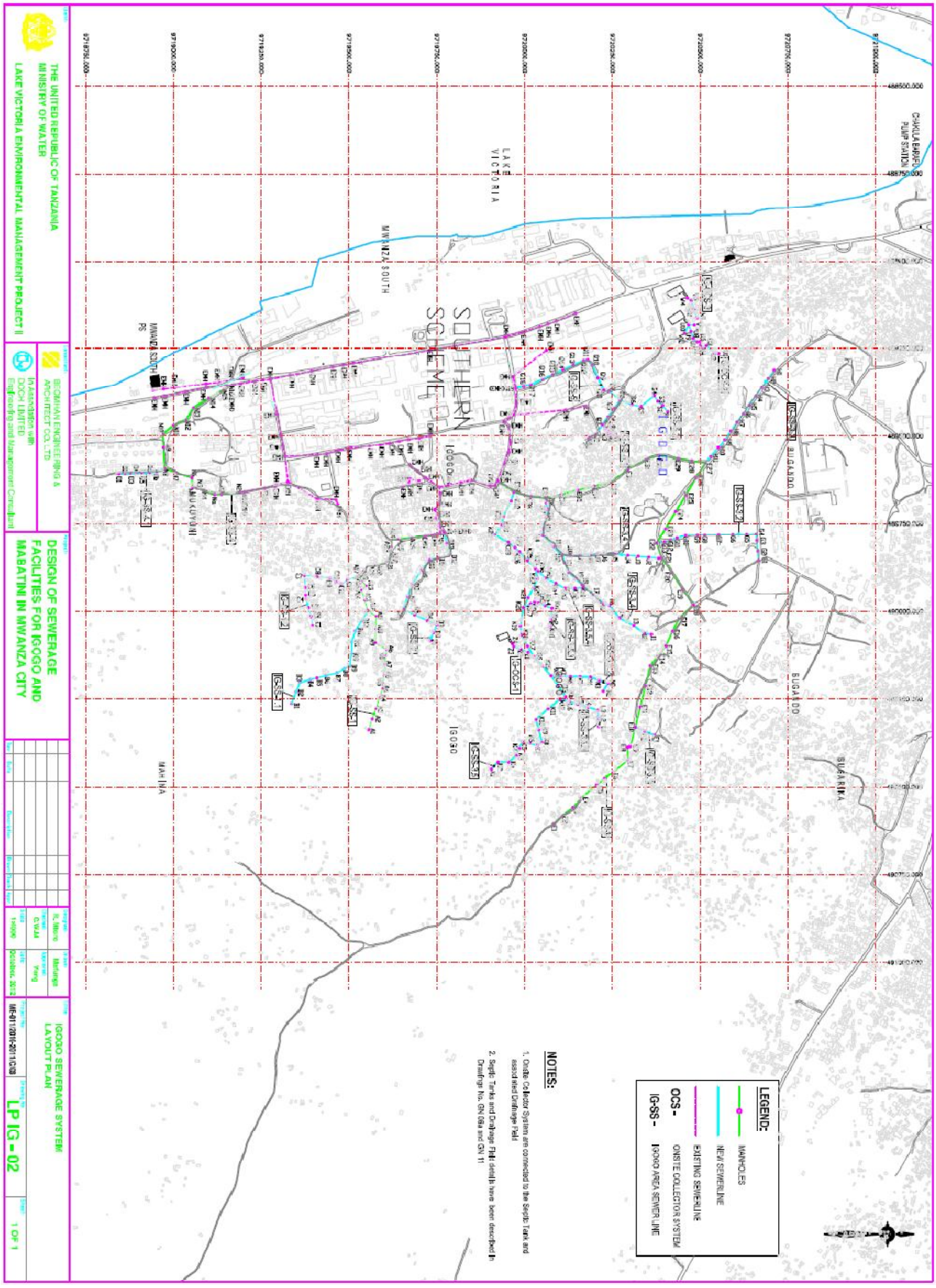


Figure 10: Igogo layout plan as matched to the existing buildings (for details see drawings on the appendices

2.4.2 Numerating collectors, Sections and Manholes

Sewer collectors, sections and manholes are numerated according to their respective waste water catchment areas. The extension of the sewerage system in the Igogo and Mabatini areas of Mwanza are in two catchment areas.
Proposed sewerage for Igogo area will have 5 main sewer lines, 12 branches and 6 sub branches, while Mabatini will have main sewer lines, 16 branches and 1 sub branch.
The coding of collectors, sections and manholes is according to the following principle:

- Every section has the same name as the upstream manhole
- The numeration of manholes is consecutive and follows the waste water flow in the network
- The numeration of collectors follows the waste water flow in the network. Collectors with the longest extensions have a higher priority for numeration. See figure below.

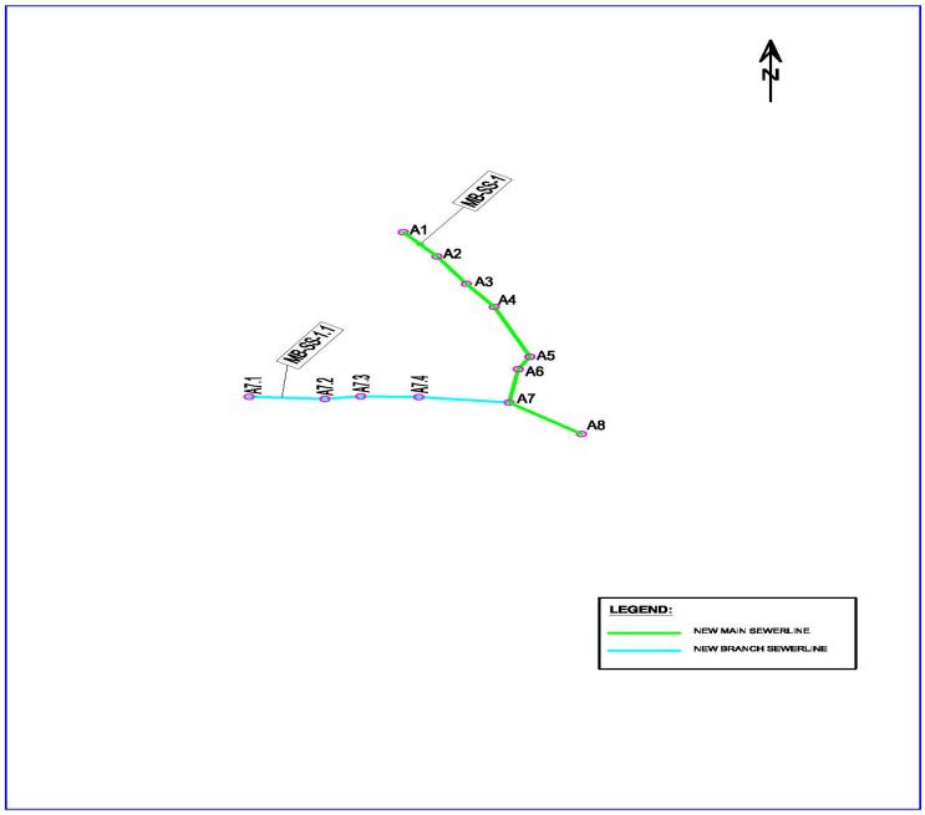


Figure 11: Numeration of sewer lines, branches and manholes

Most of the sections in the project areas of Igogo and Mabatini will be able to accommodate the shallow sewers which depend to a great extent on elevation deference to function effectively by gravity flow. However in flat area minimal slope will have to be adopted to maintain the shallow depth which is prerequisite for simplified sewerage system.

2.4.3 On-site Sanitation Measures

Mabatini

On-site collector system in Mabatini area will have three onsite collector systems. These systems will comprise of collector sewers that will empty into communal septic tanks for initial treatment and then effluent discharged into drainage fields for final treatment. First collector system will

serve 30 households; second collector system will serve 10 households while the third will serve 20 households.

Igogo

Igogo will have three on-site collector systems that will be connected to the septic tanks and drainage fields. Six among the planned onsite collector systems have been absorbed into proposed Simplified sewerage system for Igogo as branches/sub branches which are expected to serve 3520 households and eventually linking to Mwanza sewerage system.

Table 2: Types of Septic Tanks proposed

S/no	Description	Type of Septic Tank		
		A	B	C
		m	m	m
1	Depth of tank	1.5	1.8	2
2	Width of tank	1.43	1.85	2.14
3	Length of first compartment	2.9	3.7	4.28
4	Length of second compartment	1.43	1.85	2.14
5	Total length of the tank	6.64	7.89	8.78

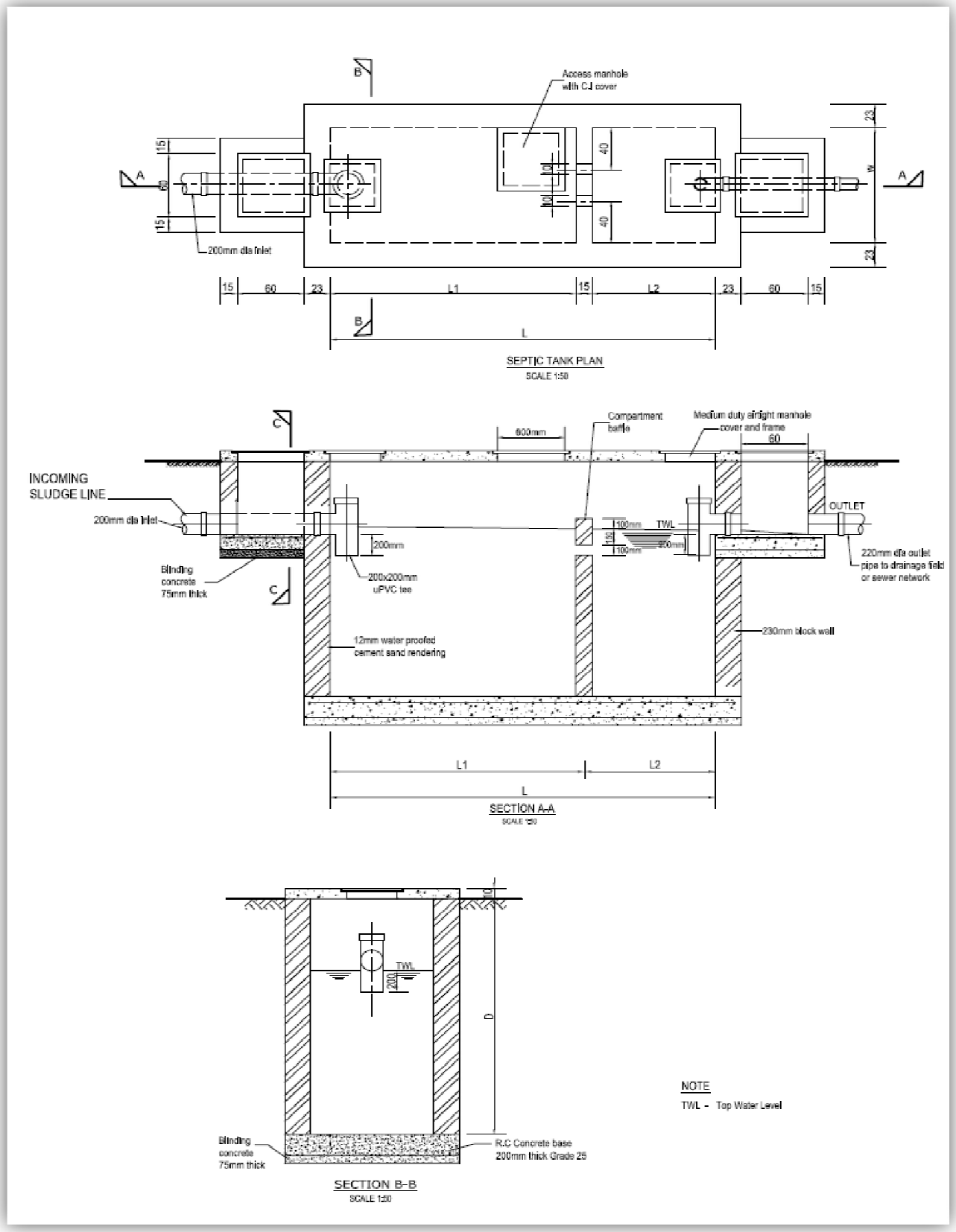


Figure 12: Typical drawing of the proposed septic tanks

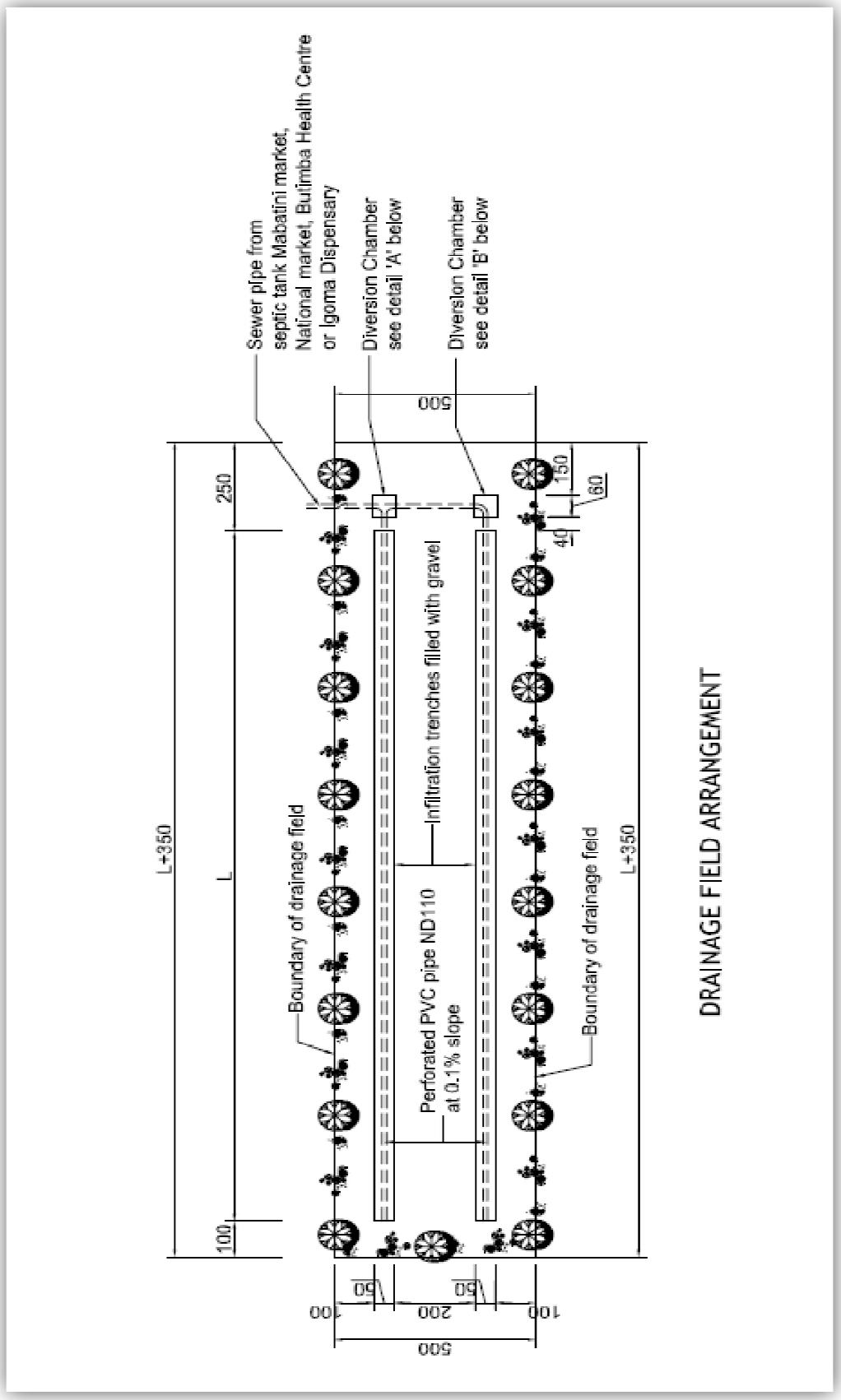


Figure 13: Drainage Field arrangement

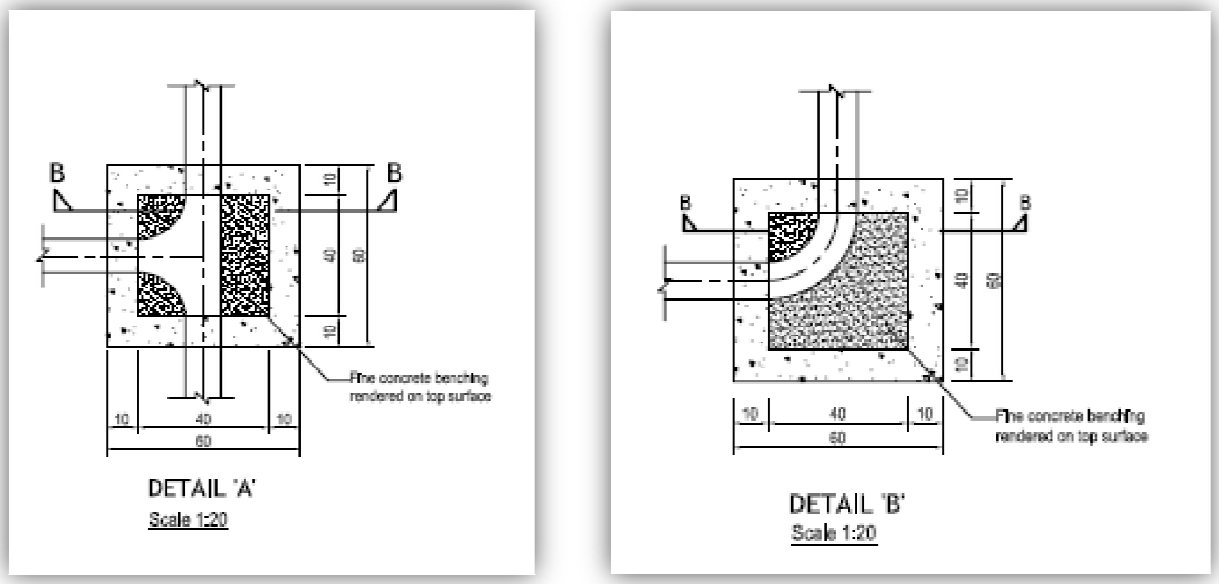


Figure 14: Diversion Chambers details

2.5 Project Requirements and Waste Management

2.5.1 Construction Materials

Since the collector or retention tanks and inspection chambers will be mainly constructed of reinforced concrete structure, the main construction materials will be aggregates, cement, sand, reinforcing steel and water. Other requirements such as timber, formwork, scaffolding etc, will also be required as included in the Table 1 below. Borrow materials to be used for construction will be collected from the identified borrow areas such as those used for road construction in the City, such as those in Buhongwa areas. The rough estimate of construction materials for the proposed project is also as shown in Table 2 below. The numbers may increase or decrease when the detailed engineering design is completed.

Table 3: Materials Estimated Quantities

Construction Materials / Equipments	Estimated Quantity
Stones / Aggregates	600 tons
Cement	150 tons
Sand	1500 tons
Reinforcing steel/bars, binding wire etc	250 tons
Water	50 m^3 per day
Nails	350 kg
Formwork (Marine Plywood)	750 sq. m
Timber	1,000 m^3
Scaffolding	1,000 m
PVC pipes (100-200mm dia) Mabatini	2700m
PVC pipes (100-200mm dia) Igogo	8500m
Cast Iron manhole covers	400 nos

2.5.2 Wastes

Biodegradable materials wastes such as food leftovers, cardboards, papers will be collected and disposed off along with other City solid wastes in sanitary landfills. Other materials such as plastics, metal straps, reinforcing bars, unusable timber crates, steel cable pieces, pipes, etc., will be collected and transported to recycling centres within Mwanza City premises. Wastes resulting from excavation will be used as fill materials in restoration of scarred areas.

2.5.3 Wastewater Drainage and Treatment

There is currently no central sewer system running along the streets in the project area. Therefore any waste water generated as the result of the proposed works will be lead to the temporary pits or septic tanks constructed as part of the temporary contractors' buildings. The waste water from the construction sites, particularly the toilets will be linked to the nearby temporary septic tanks or improved pit latrines and thereafter to be removed when the works are completed.

2.6 Project Boundaries

Due to the nature of the project, it is expected that it will exert it pressure in different areas, thus the essence of demarcating the project area of influence. The area of influence of the project covers the whole neighbourhoods and the road networks which will be linked to the project area in the course of transferring equipment, debris and construction materials during different phases of the project. The project which will be within the unplanned premises particularly in Mabatini and Igogo areas, will require construction materials from distant places which are currently used as borrow sites for construction materials such as aggregates, sand, hardcore stones etc. All these locations may be considered to be within project boundaries as the project may influence its impacts to these locations. Looking at this area of influence it is evident that the boundary of the project can be considered in terms of spatial, temporal and institutional boundaries as presented below in the subsequent sub-sections.

2.6.1 Spatial Boundaries

Spatial boundaries refer to impact area coverage. Some of impacts have local (sub-ward, district) or regional or international implications. On impact area coverage, we can consider two concentric influence zones namely;

Simplified Sewerage System Area,- The proposed project for construction of simplified community sewer lines will take land adjacent to the houses or housing blocks but once the trenches are backfilled the land will revert to ordinary use except in locations where retention tanks will be constructed The proposed simplified sewerage system will be constructed to serve the local communities but there may be members who do not see the advantages of the system thus feeling disturbed by the proposal. The access road to the works sites will pass through residential houses which were haphazardly constructed. All these areas will be treated as receptors of project impact during construction and operation phases. Undoubtedly these will equally have a significant impact if proposed mitigation measures are not implemented.

Wider Project Area, this is the area that will coincide with the road network that will be used by project trucks during delivery of building materials. This will be dictated by the equipment needed for works. Therefore the project impacts either positive or negative are likely to extend beyond the boundaries of the project area following the access road network to sources of construction materials and back to the project site. During operation phase the effluent from retention tanks may also cause pollution to receiving bodies if these facilities do not work as

planned, this may extend project impact beyond the boundaries as it may affect the aquatic life and the ecosystem as whole. The detailed Environmental Impact Assessment has carried out a thorough analysis of these spatial boundaries. Of course the sewerage system will serve surrounding areas and improve livelihood and health of others using Lake Victoria.

2.6.2 Temporal Boundaries

Temporal boundaries are referring to project life span and the reversibility of impacts. The project under consideration is envisaged to last for over 10 to 15 years from the date of construction to the date when it requires rehabilitation. Therefore the assessment involved looking into areas that will be impacted by the project activities and recovery status. These impacts include influence to a nearby stream, borrow pits, quarries, sand pits, water sources, ways for delivering construction materials to site, social impacts such as sexually transmitted diseases, to name a few.

2.6.3 Institutional boundaries

These boundaries refer to those administrative and institutional boundaries in which the project lies or interacts with. These can be determined from the legislations, ministries/departmental mandates. The project area is in the Mwanza City where there are districts and various divisions, wards and sub-wards. There is a long chain of authority in the local government, with three intermediate levels between the City Administrative levels to the sub-ward chairman. Each administrative unit is governed by its own council, responsible for environmental measures. Therefore starting from the Ministry of water where the project proponent falls, the project will need to interact with the, city, districts, divisions, wards and sub-wards administrative levels.

3. Policy, Administrative and Legal Frameworks

3.1 Introduction

Construction of the simplified sewerage system like many other development projects may result into a number of environmental impacts that must be adequately addressed during the project lifecycle. The activities associated with pre-construction, preparation of the project, construction, lying of the sewer pipes, operation and decommissioning of the project, have various positive and negative environmental and social impacts. While there will be efforts to mitigate and enhance negative and positive impacts respectively, the project proponent must ensure total compliance with various policies, legal frameworks in cooperation with the administrative structures in place. This section provides the summary of the various national and sectoral legal frameworks that govern the environment and social aspects. International treaties and donor agency policies relevant to the project are also presented.

In Tanzania, the main sources of the environmental legislation are common laws and statutory laws in the form of principal legislation and subsidiary legislation.

Common law refers to binding rules and principles of laws developed by the courts over time as opposed to the laws enacted by Parliament. According to the concepts in environmental law, the common law and rules that are applicable in Tanzania are those developed by the Tanzanian courts, both colonial and post-colonial, as well as those that were in force in England.

Due to the limitations of the common law, Parliaments have also enacted statutory laws to deal with various aspects of environmental protection. All laws enacted by the Parliament in Tanzania are known as principle legislations or Acts.

Subsidiary legislations or regulations are rules, government notices or orders having force of law and are issued by a competent authority under specific provisions of the principle legislations for the purpose of operationalising the principle legislation. Regulations vest wide powers, mostly on Ministers of relevant Ministries, to permit, limit, control or prohibit the carrying out of any activities over which they have regulatory competence.

Relevant legislations pertaining to development of sewerage system project mainly on the environmental management in terms of quality, health and safety, pollution of ground and surface water, pollution of soil, land and land use control, aquatic environment, wildlife, protection of sensitive areas, protection of endangered species among others, were examined in order to ensure that the proposed development project meets and abides by the existing regulations. In this section, a full analysis of different policies, administrative and legal frameworks and relevant international treaties and conventions as they apply to this project are discussed.

3.2 Environmental Related Laws and National Policies

The National Environmental Policy, NEP (1997)

It highlights sustainable development as its core concept. NEP states that Tanzania is committed to sustainable development in the short, medium and long-terms. Section 4 of the NEP stresses the importance of Environmental Impact Assessment in the implementation of the Environmental National Action Plan. It asserts that although it is important to tackle immediate environmental problems, precautionary, anticipatory and preventive approaches, used in EIAs, are the most effective and economical measures in achieving environmentally sound development. In observing the requirements of this policy the project proponent has initiated the environmental impacts assessment process.

The National Land Policy (1996)

It promotes and ensures a secure land tenure system to encourage the optimal use of land resources, and to facilitate broad-based social and economic development without upsetting or endangering the ecological balance of the environment. In recognizing that land has value and can facilitate access to capital, the government has instituted a land policy that supports responsible use, allocation ownership or leasehold, management and land administration. The land policy supports investments in agriculture and other development. It also provides for "full fair and prompt compensations" when land is acquired for development. In the case of this simplified sewerage system development project, the identified land for project is mainly along the access roads on pavements where people pass and the land earmarked for the collector tanks will be acquired following acquisition and compensation procedures in progress. Of course efforts will be made to relocate a few houses as much as possible and those whose cost for compensation will be easily made.

The National Water Policy (2002)

The National Water Policy (NAWAPO) of 2002 directs an adoption of a holistic basin approach that integrates multi-sectoral and multi-objective planning and management that minimizes negative impacts on water resources development so as to ensure sustainability and protection of the resource and its environment. The policy underscores the importance of a holistic approach by stating that "all water abstractions and effluents discharges into water bodies shall be subjected to a water use permit or discharge permit to be issued only for a determined beneficial use and for a specified period of time.

On policy issues in urban water supply and sewerage, the policy has a goal of having wastewater treatment systems which are environmentally friendly. And to ensure that domestic and industrial wastewater is not haphazardly discharged to contaminate water sources, the following relevant actions to the project are planned;

i. Simplified sewerage system will be constructed
ii. Cesspit emptying services will be established and/or contracted to the private operators , cesspit emptier will be required to discharge only at the permitted locations

The project proponent is indeed targeting to meet the goal of the policy through all the activities planned and indeed all requirements of the policy will be observed during implementation and later operation of the project.

The Cultural Policy (1997)

This covers a wide range of topics relating to both living cultural heritage and historical and archaeological remains ("cultural property"). The policy requires that "all land development shall be preceded by Cultural Resource Impact Studies". No historical or cultural sites have been observed in the project areas, however, MWAUWASA and the contractor will follow the requirements of this policy and in case such historical or cultural sites are discovered, appropriate measures will be taken to involve local and national authorities in their conservation.

The National Policy on HIV/AIDs (2001)

This is a policy which provides for the framework, direction and general principles in the national response interventions in the prevention, care and support of those infected and affected by the epidemic and mitigation of its impact. The specific objectives of the policy are

- Prevention of transmission of HIV/AIDs
- HIV/AIDs testing through voluntary testing with pre-and-post test counselling

- Care for people living with HIV/AIDs (PLHAs)
- To strengthen the role of all the sectors, public, private, NGOs, faith groups, PLHAs, CBOs and other specific groups to ensure that all stake holders are actively involved in HIV/AIDS work and to provide a framework for coordination and collaboration
- Research on HIV/AIDs
- To create legal framework by enacting a law on HIV/AIDS with a view to establishing multi-sectoral response to HIV/AIDS and to address legal and ethical issues in HIV/AIDS and to revise the legal situation of families affected by HIV/AIDS in order to give them access to family property after the death of their parent(s).
- Other objectives include
  - To monitor the efforts towards community mobilization for living positively with HIV/AIDS in order to cope with the impact of the epidemic while safeguarding the rights of those infected or affected directly by HIV/AIDS in the community.
  - To identify human rights abuses in HIV/AIDS and to protect PLHAs and everyone else in society against all forms of discrimination and social injustice.
  - To provide appropriate effective treatment for opportunistic infections at all levels of the health care system
  - To work closely with the Ministry of Home Affairs, NGOs and Faith Groups in the fight against drug substance abuse that increases the risk of HIV transmission
  - To prohibit misleading advertisements of drugs and other products for HIV/AIDS prevention, treatment and care.

In order to contribute towards observing the objectives of the National Policy on HIV/AIDs, the project proponent will have HIV/AIDs programme aimed at promoting awareness of HIV/AIDs among its service providers and its employees.

The National Employment Policy (1997)

The policy aims at
- Preparing the conducive environment for the unemployed to employ themselves by directing more resources to the self employment sectors,
- Identifying potential areas for employment and to lay down strategies of how to utilize such areas in promoting employment in the country,
- To prepare a special procedure for coordination and developing sources of employment including creation of a body that will supervise implementation of the employment policy,
- Identify and elaborate on the status and roles of various stakeholders in promoting and sustaining employment.
- To strengthen (through removal of bottlenecks the relationship between formal sector and that of self employment.
- To develop the self employment sector in rural areas so as to reduce the rate of migration to urban areas.
-To ensure that activities initiated on self employment act as a basis for development of the economy and are an inspiration for the culture of self reliance, etc

In view of the Government efforts in development of National Employment Policy, the contractor in collaboration with MWAUWASA intends to supplement these efforts by providing some few employments during the project implementation. During this period, transfer of technology can be attained among those who will be employed and after their contract terms they can engage in self employment activities in the informal sector with abundant wealth which has not been exploited significantly. A few will be engaged by the project proponent in attending the project during operation phase.

Women and Gender Development Policy (2000)

The Women and Gender Development policy's overall objective is to promote gender equality and equal participation of men and women in economic, cultural and political matters. Also focuses on fairer opportunities for women and men and access to education, child care, employment and decision making. Therefore during project implementation the proponent intends to give fair opportunities for both women and men.

National Construction Industry Policy (2003)

The main objectives of the Construction Industry Policy include:

- To improve the capacity and competitiveness of the local construction enterprises (contractors, consultants and informal sector)
- To develop an efficient and self-sustaining roads network that is capable of meeting the diverse needs for construction upgrading and maintenance of civil works for trunk, regional, districts and feeder roads network.
- To improve the capacity and performance of the public sector and private sector clients so as to ensure efficient, transparent and effective implementation and management of construction projects.
- To ensure efficient and cost effective performance of the construction industry that will guarantee value for money on constructed facilities in line with best practices.
- To promote 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.
- To ensure application of practices, technologies and products which are not harmful to both environment and human health
- To mobilize adequate resources from both the public sector and the private sector for construction and maintenance of public infrastructure.
- To enhance participation in regional and international co-operation arrangements for the purpose of promoting the capacity and competitiveness of the industry and developing markets for export of its services and products.
- To improve co-ordination, collaboration and performance of the institutions supporting the development and performance of the construction industry.

With respect to environmental protection and conservation, section 8.2.2 of the National Construction Industry Policy addresses a number of issues regarding the environment. The construction industry is generally said to be a major source of environmental damage and occupational health problems. A number of the industry's activities are environmentally unsustainable partly owing to lack of awareness of environmentally sound practices and technologies.
Moreover, construction activities affect the environment in many ways: through resource deterioration, physical disruption and chemical pollution. Large civil engineering projects can easily destabilize fragile hill slopes. As a step towards observing the requirements of this policy, the proponent has facilitated carrying out of the Environmental Impacts Assessment to safeguard the environment and intends to use the services of a locally registered contractor who is aware of the environmental issues who will be asked to prepare an ESMP based on the schedule of construction works.

3.3 Laws, Regulations and Guidelines

3.3.1 Acts dealing with environment or relate to EIA

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

The administrative and institutional arrangements for environmental management for all sectors in Tanzania are stipulated in the Environmental Management Act, Cap 191 (No. 20 of 2004). EMA Cap 191 gives National Environment Management Council (NEMC) the overall responsibility for undertaking the enforcement, compliance, review and monitoring of Environmental Impact Assessment and in this regard facilitates public participation in environmental decision-making. NEMC is responsible for screening and reviewing various investments and projects of the national significance. All these requirements are observed and the proponent is closely collaborating with NEMC to ensure that nothing slips unnoticed.

Environmental Impact Assessment and Audit Regulation of 2005

These regulations were prepared under EMA Cap. 191 and require developers to conduct an Environmental Impact Assessment for any project likely to have negative impacts on the environment. Application for an Environmental Impact Assessment certificate is necessary for such project. In observing the requirements of these regulations the proponent has initiated the assessment of the impacts of the proposed sewerage system.

3.3.2 Acts Dealing with Land Use Planning

Land Act Cap. 113, (No. 4 of 1999)

The Land Act, Cap 113 establishes three categories of land: general, village and reserved. In addition, land may be declared 'hazard land' where its development might lead to environmental damage, e.g. locations such as wetlands, mangrove swamps and coral reefs, steep lands and other areas of environmental significance or fragility. The Act recognizes customary tenure as of equal status to granted rights of occupancy. Importantly the land Act promotes gender equality by recognizing equal access to land ownership and use by all citizens- men and women – and giving them equal representation on the land committees. Under this project the proposed activities are to be carried out mainly along the access roads and on pavement to minimise the impacts of relocation. However, any land which will be interfered with, that belongs to the private persons, the requirements of the Land Act, Cap, 113 will be observed.

The Land (Forms) Regulation 2001

The Land Regulations were made under section 179 of the Land Act Cap 113, and provide all specific forms required for Management and Administration, Granted Right of Occupancy, Mortgage, Lease, Easement, Co-occupancy and others including compensation forms (Forms 69 and 70). Some land acquisition such as land portions for retention tanks may be required which will call for compensation. In case this happens then appropriate measures of land acquisition and corresponding compensation will be undertaken as provided for in the said regulations.

The Land Acquisition Act, Cap 118 R.E. 2002

The Land Acquisition Act of 2002 requires the minister responsible for land to pay compensation as may be agreed upon or determined in accordance with the provisions of the Act. The Act stipulates that no compensation shall be awarded in respect of land, which is vacant ground, or to be limited to the value of the un-exhausted improvement of the land, in case the development of the land is deemed in adequate.

The Act defines the circumstances in which public interest could be invoked, e.g., for exclusive government use, public use, for or in connection with sanitary improvement of any kind or in connection with laying out any new city, municipality, township or minor settlement or extension or improvement of any existing city. Other purposes are in connection with development of any airfield, port or harbour; mining for minerals or oils; for use by the community or corporation within community; for use by any person or group of persons as the President may decide to grant them such land. The acquisition of the land for the public use as well as for the resettlement sites is within the provision of this Act. Further the Act specifies other requirements prior to the acquisition of the land such as investigation for the land to be taken, issuing notice of intention to take land and mode in which notices will be served. It further defines the requirements for and restrictions on compensation.

The Urban Planning Act No. 8 of 2007

The Act provides for the orderly and sustainable development of land in urban areas to preserve and improve amenities. It also provides for the grants of consent to develop land and powers of control over the use of land and to provide for other related matters.

Section 4.1 of the urban planning Act, 2007, identifies the objectives of urban planning to which all persons and authorities exercising powers under, applying or interpreting this act shall be to:

- facilitate efficient and orderly management of land use;
- empower landholders and users, to make better and more productive use of their land;
- promote sustainable land use practices;
- ensure security and equity in access to land resources;
- ensure public participation in the preparation and implementation of land use policies and plans;
- facilitate the establishment of a framework for prevention of land use conflicts;
- facilitate overall macro-level planning while taking into account regional and sectoral considerations;
- provide for inter-sectoral co-ordination at all levels;
- ensure the use of political and administrative structures and resources available at national, regional, district and village levels; and
- Provide a framework for the incorporation of such relevant principles contained in the national and structural policies as may, from time to time, be defined by the government.

The activities of the project will observe the requirements of urban land use planning and will abide to all such other development as it may be guided from time to time during the course of the project execution.

3.3.3 Acts Dealing with Natural Resources

Forest Act No. 14 of 2002

This Act deals with the protection of forests and forest products in forest reserves and the restrictions and prohibitions in forest reserves. Any contravention of the restrictions and prohibition is considered an offence under this ordinance and subject to enforcement. The Forest Act No. 14 of 2002 requires that for any development including mining development, construction of dams, power stations, electrical or telecommunication and construction of building within a Forest Reserve, Private Forest or Sensitive Forest, the proponent must prepare an Environmental Impact Assessment for submission to the Director of Forestry. The law also requires licenses or permits for certain activities undertaken within the national or local forest reserves, such as, among others, felling or removing trees, harvesting forest produce, entering a forest reserve for the purpose of tourism or camping, mining activities, occupation or residence within the reserve, cultivation, erecting any structures. The proposed project does not touch any of the forest reserves,

however the requirement of this Act will be observed through limiting use of the forest products such as timber for sustainability of the forests.

The Mining Act No. 14 of 2010

This Act provides for prospecting of minerals, mining and dealing in minerals. It also provides for building materials including all forms of rock, stones, gravel, sand, clay, volcanic ash or cinder or other minerals being used for the construction of buildings, roads, dams, and aerodromes or similar works. The Legislation makes EIA mandatory as a precondition for granting various categories of mining licenses. In this project borrow material and all forms of rock stones, gravel, clay and sand will be mined from existing borrow area or new ones developed whereby all the requirements of the Act will be met in parallel with other development projects in Mwanza city or in agreement to respective authorities and owners.

The Water Resources Management Act No. 11 of 2009

Water legislation has been updated to bring it in line with the National Water Policy 2002. This Water Resources Management Act No. 11 of 2009 provides for institutional and legal framework for sustainable management and development of water resources; outlines principles for water resources management; provides for the preventions and control of water pollution; provides for participation of stakeholders and the general public in implementation of the National Water Policy; repeals the Water Utilization (Control and Regulation) Act, 1974 and vests all water in the country The President of Tanzania on behalf of the citizens to the Government of United Republic of Tanzania and sets procedures and regulations for the extraction of water resources, but does not provide for the wetland resource management.

Section 63 of the Act states that; the discharge of any effluents from any commercial, industrial, or agricultural source or from any sewage works or trade waste systems or from any other source into surface water or underground strata requires a "Discharge Permit" from the Basin Water Board. In accordance with section 65, the water quality and effluent standards to be applied to the discharge permit shall be made and published by the Minister in accordance with the requirements of the Environmental Management Act Cap 191. A provisional discharge permit may be granted in cases where pollutants are already being discharged, subject to conditions and terms set under section 67.

The location of the simplified sewerage system being closer to Lake Victoria, where any failure of its actions may cause a significant pollution to the Lake, will comply with all provisions of this Water Management Act in order to ensure efficient management of the lake near the project area. Compliance with the requirements of this Act will be through implementation of the Environmental Management and Monitoring Plans set as part of this EIS.

The Environment Management (Water Quality Standards) Regulations, 2007

These environmental management regulations were made under section 143, 144, and 230(2) (s) of the EMA Cap191 with the following objectives

a. protect human health and conservation of the environment
b. enforce minimum water quality standards prescribed by the National Environment Standards Committee (NESC)
c. Enable NESC to determine water usages for the purposes of establishing environmental quality standards and values for each usage and
d. Ensure all discharges of pollutants take account the ability of the receiving waters to accommodate contaminants without detriment to the uses specified for the waters concerned

Under the first schedule, the regulations give the permissible limits for municipal and industrial effluents for both physical, inorganic organic and microbiological components. Since these limits are now readily available the project proponent will ensure that the objectives of regulations are totally observed to safeguard the environment around the project area.

The Water Resources Management (Water Abstraction, Use and Discharge) Regulations, 2010

Among other things, these regulations contain forms that are used for application for permit to discharge wastewater to the Basin Water Officer. The information required on the discharge application include the volume of discharge during the dry weather, maximum rate of discharge, average daily volume of trade effluent, method of measurement of flows from the works (V-notch/weir/current meter etc, maximum temperature of effluent discharge and maximum concentrations of any contaminants known to be present in the discharge. The above submission shall also include the plan of the discharging facility and the adjoining properties, body of water referred to; and the point on the body of water where it is desired to discharge effluent. These are standard requirements components of such a similar project. Therefore the project proponent will apply for the discharge permit according to the laid down procedures.

The Water Supply and Sanitation Act No. 12 of 2009

The Water Supply and Sanitation Act No. 12 of 2009 has been enacted to provide for sustainable management and adequate operation and transparent regulation of water supply and sanitation services with a view to give effect to the National Water Policy (2002). It further provides for the establishment of water supply and sanitation authorities as well as community owned water supply organizations. The project will be implemented in total observance of the requirements of this Act.

The Public Health Act, 2009

This is an Act to provide for the promotion, preservation and maintenance of public health with a view to ensuring the provisions of comprehensive, functional and sustainable public health services to the general public and to provide for other related matters. Part IV section 93 to 125 of this Act describes the sewerage and drainage service to the public requirements. The project proponent will observe all the requirements of this Act in order to have smooth execution of its sewerage system development activities.

3.3.4 Acts Dealing with Trades and Professional Ethics/Conduct

The Engineers Registration Act No.15 of 1997, R.E. 2002

This is an Act which formed the Engineers Registration Board, a statutory body with the responsibility of monitoring and regulating engineering activities and the conduct of engineers and engineering consulting firms in Tanzania through registration of engineers and engineering consulting firms. Under the law, it is illegal for an engineer or an engineering firm to practice Engineering profession if not registered with the board. The board has also been given legal powers and has the obligation to withdraw the right to practice from registered engineers if found guilty of professional misconduct or professional incompetence. Registration with the board is, thus, a license to practice engineering in Tanzania.

Construction of a simplified sewerage system construction project is an engineering assignment and the project proponent is observing all the requirement of this Act through engaging the services of personnel and firms that are registered with the Engineers Registration Board.

The Contractors Registration Act No. 17 of 1997 R.E. 2002

This is an Act which provides for registration of contractors and also establishment of the Contractors Registration Board, the body responsible for regulating the conduct of contractors in Tanzania. The project proponent will equally abide by all requirements of this Act in terms of supporting the activities of the board during inspection of any site for access road patching, installation, erection or demobilizing works for the purpose of verifying and ensuring that the works are being undertaken by registered contractors; and that the works comply with all governing regulations and laws of the country.

The Occupational Health and Safety Act No. 5 of 2003

This Act sets provisions for the safety, health and welfare of persons at work in factories and other places of work. It is also meant to provide for the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with activities of persons at work; and to provide for connected matters. The sewerage system construction project will eventually be a place of work to be registered as per OSHA regulations that govern the places of work and observe all safety and health practices at work sites by its consultants, contractors and sub-contractors.

The Surface and Marine Transport Regulatory Authority Act No. 9 of 2001

This is an Act which established the Surface and Marine Transport Regulatory Authority (SUMATRA) mainly dealing with surface and marine transport sectors. The Act presents a "regulated sector" environment in which SUMATRA executes its duties. This regulated sector includes rail transport, ports and maritime transport, public passenger road transport and commercial road transport:

The Act gives the duties of SUMATRA to include

a) Perform, the functions conferred on the Authority by sector legislation;
b) subject to sector legislation
    i. to issue, renew and cancel licenses;
    ii. to establish standards for regulated goods and regulated services;
    iii. to establish standards for the terms and conditions of supply of the regulated goods and sources;
    iv. to regulate rates and charges;
    v. to make rules.
c) To monitor the performance of the regulated sectors, including, in relation to-
    (i) levels of investment;
    (ii) availability, quality and standards of services;
    (iii) the cost of services;
    (iv) the efficiency of production and distribution of services, and
    (v) other matters relevant to the Authority;

Since all these elements are core to the success of the proposed simplified community sewerage system construction project, any transportation elements of construction equipment will follow the set requirements.

The Roads Act No. 13 of 2007

This Roads Act provides for road financing, development, maintenance, management and other related matters. Since the project intends to use the existing roads to access the project areas any relevant clauses of the Roads Act will be observed in totality. The Act also provides for offences, penalties and recovery on destroying bridges, causing damage to public roads, obstructions on roads, nuisance on roads, stretching of ropes over public roads etc. The fines are also prescribed under the offences committed on the public roads. The project proponent will observe all the

requirements of this Act in order to have smooth execution of its sewerage system development activities.

The Explosives Act, CAP. 45, R. E 2002

The Act requires all persons wanting to use explosives in their activities to hold an explosives license. For this project this applies to use of explosives to clear ways for sewer lines and materials from any quarries and borrow pits where blasting is to be employed or wherever explosives may be involved. Also in some sections of the proposed sewer alignment rocks may be encountered thus requiring the use of the dynamite to remove rocks. In this case the requirements of this act will be fully observed.

3.3.5 Acts with a Bearing on Environment at the Municipal / District Level

Local Government (Municipal / District) Authorities Act No. 7 of 1982

The Act provides for; inter alia, the establishment, composition, functions and legislative powers of district, township councils and village authorities. At the sub ward level, the government structure is comprised of a sub-ward assembly consisting of all persons aged 18 and above. There are also sub-ward committees covering such matters as planning, finance, economic affairs, social services, security, forest protection, water resources etc [Section 35].

The sub ward council's functions and roles include planning and coordinating activities, rendering assistance and advice to the members engaged in agriculture, forestry, horticultural, industrial or any other activity, and to encourage ward residents to undertake and participate in communal enterprises. As an administrative subdivision between the sub-ward and the district, the ward reviews the proposed sub-ward council's projects in its jurisdiction and approves them for passage up the line to the District Development Committee.

Local Government (District) Authorities Act of 1982 as amended by Act No. 6 of 1999 establishes the Ward Development Council (hereinafter referred to as "WDC). The WDC is responsible for developing general development plans for the ward. Further, the WDC must manage disasters and environmental related activities within its ward.

Local Government (District) Authorities Act, No. 7 of 1982 also provides for the protection and management of the environment on the part of the district council. This is deduced from section 111 of the Act, which promotes social welfare and economic well being of all residents within its area of jurisdiction.

Protection and management of the environment is further provided for under section 118 of Act number 7 of 1982. District councils are required to take the necessary measures to control soil erosion and desertification; to regulate the use of poisonous and noxious plants, drugs or poison; regulate and control the number of livestock; maintain forests; manage wildlife; ensure public health; provide effective solid and liquid waste management protect open spaces and parks etc. The Act also has provisions for a scheduled timetable and management of the environment. Since the project will be touching the areas where the local government authorities have roles to play, the village will work hand in hand with City Council and other local government structures for the success of the project.

3.3.6 Other Relevant International Treaties and Conventions

Tanzania has ratified a number of Multilateral Environmental Agreements (MEAs) and consequently has duties under those agreements. In this simplified community sewerage system project, work will be carried out in environments likely to be affected if mitigation measures are not strictly applied.

Table 4: Multilateral Environmental Agreements (MEAs), Treaties and Conventions to which Tanzania is a party

Type of Convention	Name of Convention	Relevance to the Project **
Bio-diversity related Conventions	1. Convention of Biological Diversity, (1992) ratified by Tanzania in 1996).	Project activities involve clearing of vegetation. The City Council will work with the respective communities in conservation of available plant and animal species.
	2. Convention to combat, desertification, particular Africa, Paris 1994	
	3. The Cartagena Protocol on Bio safety to the convention on Biological Diversity (2000)	
Other Conventions	1. The convention on International Trade and Endangered species of Wild Fauna and Flora (CITES), Washington (1973)	The project operations are likely to encounter area with endangered flora and fauna species, though no such species were observed during the study. The project staff, villagers and the Contractors staff will in no event involve themselves with trade of these species
	2. The convention concerning the Protection of World Cultural and Natural Heritage, Paris, (1972)	
	3. The convention of Wetlands of International Importance especially as water fowl Habitat (The Ramsar Convention) (1971) ratified by Tanzania in 1998).	
Climatic change Conventions	1. The United Nations Framework convention on climatic change (1992)	The project will prevent further clearance of vegetation in order to improve and maintain carbon dioxide consumption
	2. Kyoto Protocol (1997)	
Regional conventions	1. The Convention on the conservation of Nature and Natural Resources, 1968 Algiers, (1968)	
	2. The Bamako convention on the Ban of the import into Africa and the control of Trans boundary movement of Hazardous Wastes within Africa, 1990	
	3. Nairobi Convention for the	

	protection, management and development of the Marine and Coastal environment of Eastern African Region, 1985 and the related protocols.	
	4. Lusaka Agreement on cooperative enforcement operations Directed at illegal Trade in Wild Fauna and Flora (1994)	The project operations are likely to encounter area with endangered flora and fauna species. The project staff, local communities and the contractors staff will in no event involve themselves with trade of these species

3.4 The World Bank's Safeguard Policies

The World Bank has keen interest in protection of the environment, particularly for investment projects supported by the Bank; they have to be in line with its safeguards policies. These policies provide guidelines, aimed at preventing and mitigating undue harm to people and the environment, when implementing development projects. The safeguard policies provide a platform for the participation of stakeholders in project design and implementation and the relevant policies to this project are:

- Environmental Assessment (OP/BP 4.01)
- Involuntary Resettlement (OP/BP 4.12)
- Natural Habitats (OP/BP 4.04)
- Forests (OP/BP 4.36)
- Indigenous Peoples (OP/BP 4.10)
- Physical Cultural Resources (OP/BP 4.11)

The construction of the sewerage system project triggers some of these operational policies of the World Bank as presented below;

3.4.1 OP/BP 4.01 Environmental Assessment Policy

The objective of this policy is to ensure that Bank-financed projects are environmentally sound and sustainable, and that decision-making is improved through appropriate analysis of actions and of their likely environmental impacts. This policy is triggered if a project is likely to have potential (adverse) environmental risks and impacts on its area of influence. OP 4.01 covers impacts on the natural environment (air, water and land); human health and safety; physical cultural resources; and trans-boundary and global environment concerns.

Depending on the project, and nature of impacts a range of instruments can be used: EIA, environmental audit, hazard or risk assessment and environmental management plan (EMP). When a project is likely to have sectoral or regional impacts, sectoral or regional EIA is required. The Borrower is responsible for carrying out the EIA.

Under this project, the project proponent, Ministry of Water (LVEMP II) has facilitated the undertaking of Environmental and Social Impact Assessment to assess the social and environmental impacts of the project.

3.4.2 OP/BP 4.12 Involuntary Resettlement

The policy acknowledges that development projects that displace people generally give rise to economic, social and environmental problems. Its objective therefore, is to minimize involuntary resettlement where feasible, by exploring all viable alternative project designs. OP 4.12 is intended to assist displaced persons in maintaining or improving their living standards. It encourages community participation in planning and implementing resettlement; and in providing assistance to affected people, regardless of the legality of title to the land they posses, which has to be acquired for project activities. The Bank guidelines therefore, prescribe measures to minimize the negative impacts to ensure that the displaced community benefits from the project and to ensure that the affected persons are:

- compensated for their losses at full replacement costs prior to the actual move;
- assisted with the move and supported during the transition period in the resettlement site;
- assisted in their effort to improve (or at least restore) their former living standards, income earning capacity and production levels;
- Integrated socially and economically in the host communities, so that adverse impacts in the host communities are minimized. This is best achieved through appropriate planning and consultation, involving affected people.

In addition; land, housing, infrastructure and other compensation should be provided to the adversely affected population, indigenous groups, ethnic minorities, and pastoral people who may have customary rights to the land and other resources taken for the project. The absence of legal title to land by such groups should not be a bar to compensation.
The policy is triggered not only if physical relocation occurs, but also by any loss of land resulting in relocation or loss of shelter; loss of assets or access to assets; loss of income sources or means of livelihood, whether or not the affected people must move to another location.

The existing policies, land laws and regulations regarding land acquisition and compensation in the country should be generally consistent with the World Bank Operational Guidelines. Therefore, if necessary at all, compensation could still be handled within the existing regulations, without contradicting the World Bank Policy requirements. Even though this respective policy is triggered but fortunately the community sewerage system project was identified by the respective communities having realised the impacts exerted on surrounding environment and later into Lake Victoria. Also the effected people are the residents of the city who are now suffering with others and they are equally going to benefit from the proposed project.

3.4.3 OP/BP 4.04 Natural Habitats

This policy recognizes that the conservation of natural habitats is essential to safeguard their unique biodiversity and to maintain environmental services and products for human society and for long-term sustainable development. The Bank therefore supports the protection, management, and restoration of natural habitats in its project financing, as well as policy dialogue and economic and sector work. The Bank supports, and expects borrowers to apply, a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development. Natural habitats are land and water areas where most of the original native plant and animal species are still present. Natural habitats comprise many types of terrestrial, freshwater, coastal, and marine ecosystems. They include areas lightly modified by human activities, but retaining their ecological functions and most native species.

This policy is triggered by any project (including any sub-project under a sector investment or financial intermediary) with the potential to cause significant conversion (loss) or degradation of natural habitats, whether directly (through construction) or indirectly (through human activities induced by the project).

The policy is slightly triggered as it is going to use some of the natural habitat which might be supporting other ecosystems. Environmental Impact Assessment has identified these natural habitats and mitigation measures are presented.

3.4.4 OP / BP 4.36 Forests

The objective of this policy is to assist borrowers to harness the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development and protect the vital local and global environmental services and values of forests. Where forest restoration and plantation development are necessary to meet these objectives, the Bank assists borrowers with forest restoration activities that maintain or enhance biodiversity and ecosystem functionality. The Bank assists borrowers with the establishment of environmentally appropriate, socially beneficial and economically viable forest plantations to help meet growing demands for forest goods and services.

This policy is triggered whenever any Bank-financed investment project (i) has the potential to have impacts on the health and quality of forests or the rights and welfare of people and their level of dependence upon or interaction with forests; or (ii) aims to bring about changes in the management, protection or utilization of natural forests or plantations.

The policy is slightly triggered as some of the areas where trees would have grown are the ones that will be used for construction of the proposed simplified sewerage system.

3.4.5 OP / BP 4.11 Physical Cultural Resources

The objective of this policy is to assist countries to avoid or mitigate adverse impacts of development projects on physical cultural resources. For purposes of this policy, "physical cultural resources" are defined as movable or immovable objects, sites, structures, groups of structures, natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings, and may be above ground, underground, or underwater. The cultural interest may be at the local, provincial or national level, or within the international community.

This policy applies to all projects requiring a Category A or B Environmental Assessment under OP 4.01, project located in, or in the vicinity of, recognized cultural heritage sites, and projects designed to support the management or conservation of physical cultural resources.

The policy may be triggered during excavation of fill materials at both existing and new borrow sites however it is not expected that physical cultural resources will be affected.

3.4.6 OP / BP 4.10 Indigenous Peoples

The objective of this policy is to (i) ensure that the development process fosters full respect for the dignity, human rights, and cultural uniqueness of indigenous peoples; (ii) ensure that adverse effects during the development process are avoided, or if not feasible, ensure that these are minimized, mitigated or compensated; and (iii) ensure that indigenous peoples receive culturally appropriate and gender and inter-gene rationally inclusive social and economic benefits.

The policy is not triggered as it is not expected that indigenous peoples will be affected by the proposed sewerage system project and above all the project was initiated by the respective communities.

3.5 Administrative Framework

3.5.1 Central Government Agencies

Environment Matters at the National Level

At the national level, the Minister responsible for Environment (VP Office) is the overall responsible for all matters relating to environment, responsible for all policy matters, necessary for the promotion, protection, and sustainable management of Environment in Tanzania.

The institutional and legal framework for sustainable management and development of Sewerage system project falls under the Ministry of Water. The ministry issues policy guidance and provides legal frameworks, water permits, certificate of compliance and project monitoring.

Under the legal framework, the Water Resources Management Act No. 11 of 2009, assigns the following mandates;

- The Minister is responsible for management of water resources through the national water policy and strategy formulation and ensuring the execution of the functions connected with the implementation of the Water Resources Act No. 11 of 2009
- The Minister is assisted in the discharge of his duties by the Director of Water Resources.

The overall structure of Water Resources Management includes:

1. Minister of Water
2. Director of Water Resources
3. National Water Board
4. Basin Water Boards
5. Catchment and Sub-catchment Water Committees

When it comes to fulfilment of connected legal frameworks, the Act states that. "Any proposed development in a water resource area or watershed to which the Act applies, whether that development is proposed by or is to be implemented by a person or organization in the public or private sector shall carry out an Environmental Impact Assessment in accordance with the provisions of the Environmental Management Act cap 191". In this respect, then comes the Vice Presidents office with the following institutions;

- Division of Environment who coordinate environmental management activities like coordination of environmental policy and issuing environmental clearance or EIA approvals.
- National Environment Management Council (NEMC) - coordinating the Environmental Impact Assessments, Monitoring and Auditing.

The Director of Environment coordinates various environmental management activities being undertaken by other agencies and promotes the integration of environment consideration into policies, plans and programmes, strategies and projects.

EMA Cap 191 gives NEMC the overall responsibility of undertaking enforcement, compliance, review and monitoring of Environmental Impact Assessment.

3.5.2 Regional and District Administrative Structures

Environment at Regional and District Levels

The Regional Administration Act No. 9 of 1997 provides for Regional Commissioners to oversee Regional Secretariats, with District Commissioners directly supervising the District

Councils. Local authorities oversee the local planning processes, including establishing local environmental policies.

The National Environmental Policy establishes a policy committee on Environment at Regional level chaired by the Regional Commissioner, mirrored by environmental committee at all lower levels, i.e. at the District, Division, Ward and sub-ward or "Mtaa" Councils.

Under EMA Cap 191, the Regional Secretariat is responsible for coordination for all advice on environmental management in their respective region and in liaison with the Director of Environment. At Local Government level, an Environmental Management Officer should be designated or appointed by each City, Municipal, District or Town Council. In each City or Municipality or District, Environmental Committees should be established to promote and enhance sustainable management of the Environment. The Ward Development Committee is responsible for proper management of the environment in their respective areas. The District or Municipal Council designates for each administrative area as township, ward, village, *'mtaa', 'kitongoji'* and Environmental Management Officer coordinates all functions and activities related to protection of environmental in their areas. In all levels starting at the regional level towards village level- (i.e. Mwanza Region, Mwanza City, Mabatini and Igogo wards, to the lower level of sub-wards, such environmental structures are developed and the Consultants consulted and worked with the Ward Development Committee and the Village Council at the ward and village levels respectively.

3.5.3 Institutional Responsibilities

The Lake Victoria Environmental Management Project Phase Two (LVEMP-II), will be responsible for implementing the program. It is proposed that the Ministry of Water (MoW), through Mwanza Urban Water and Sewerage Authority (MWAUWASA), assists (LVEMP-II), to manage and coordinate the implementation. The Project Management Team (PMT) will need to be established or Management Consultant will be appointed with the responsibility of managing the implementation of this program.

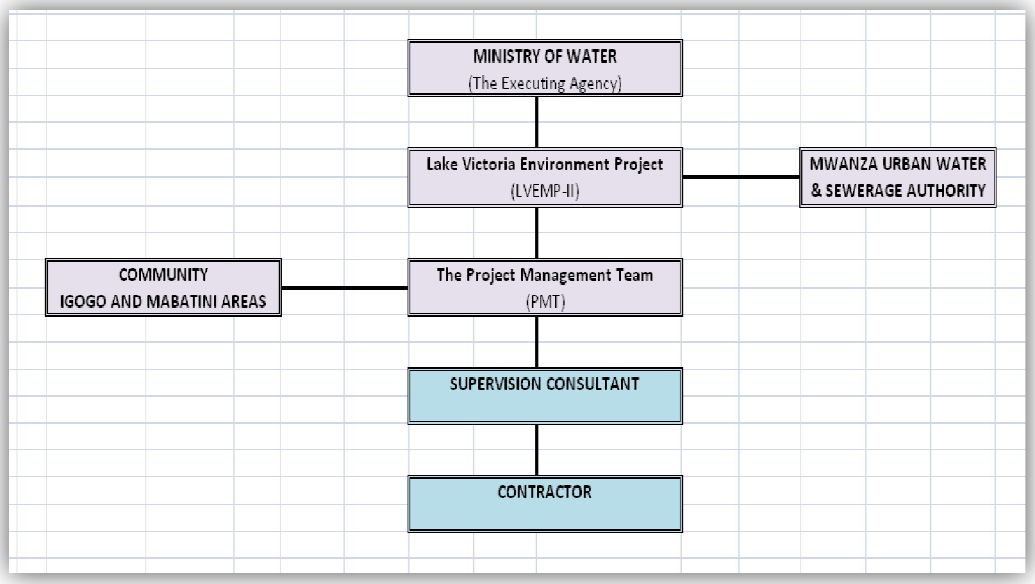


Figure 15: Proposed institutional arrangement

The followings are anticipated responsibilities of each institution involved in project implementation:

(i) Ministry of Water **(MoW)** will be the government agency accountable for the overall implementation of the project.

(ii) **LVEMP-II /** Mwanza Urban Water and Sewerage Authority **(MWAUWASA)** will provide the organizational framework needed to implement the programme and for monitoring and evaluation.

(iii) The Project Management Team (**PMT)** established or the Management Consultant to appointed by MoW / LVEMP-II /MWAUSA will:

a. Train local extension personnel to implement the project.
b. Assist LVEMP-II /MWAUWASA in mobilization / sensitization of the selected communities' projects.

(iv) **Communities** will be the project beneficiaries and will manage their onsite sanitation facilities.

4. Environmental and Social Baseline Conditions

4.1 Project Location

Mwanza City is located on the southern shores of Lake Victoria in northwest Tanzania. On the north it is bordered by Lake Victoria and Ukerewe district, Misungwi district to the south, Sengerema district to the West, and Magu District to the East. It is situated between latitudes 2^0 15 south – 2^0 45 just South of the equator and between longitudes 32^0 45' – 33.00^0 east. The city lies at an altitude of 1,140 metres above the sea level. It covers an area of 1324km^2 out of these 424km^2(32%) is dry land and 900km^2 (68%) is covered by water.
The study area is located in Mabatini sub ward in Mbugani ward and Igogo ward in Nyamagana District. Nyamagana district is on the south of Ilemela district, to the west it is bordered by Lake Victoria leading towards Sengerema district, it is also bordered by Magu and Missungwi on the east and south respectively. The district lies between latitude 2º 31' and 2º 45' south of Equator and between longitude 32º 45' and 33º east of Greenwich. The total area coverage of Nyamagana district is 256.45km^2 of which 71.55km^2 (28%) is covered by water and the remaining 184.90km^2 (72%) is the dry land. The study area covers an area of 6.61 (km^2) (Igogo 2.820 and Mbugani 3.790).

Historical Development

Mwanza town was founded in 1892 as a regional administration and commercial centre to control mainly export production of the cotton growing areas in the Lake Victoria zone. In 1978 Mwanza obtained the status of Municipality in line with the local government structure established in 1972. In 2000, Mwanza was further promoted to a City status.

Prominence

Mwanza City is the major industrial and commercial centre of the Mwanza Region as well as the key industrial and commercial centre in the north-western part of Tanzania. In addition to many light and service industries, Mwanza accommodates large water intensive industries including textile mills, leather tanning factories, bottling industries, vegetable oil factories, fish processing plants, soft drink manufacturers and cosmetic/soap factories.

There are numerous institutions in Mwanza City including hospitals, dispensaries and health centres and many primary and secondary schools and a private university.

Unplanned Settlements

About 75 percent of the estimated 65,500 housing units in Mwanza City are built in 18 unplanned settlements, spread over about 299 km^{2}and accommodating 70 percent of the population. Failure to deliver affordable housing to the rapidly growing population, cumbersome and bureaucratic procedures for acquiring planned and serviced land, unaffordable building standards, acute poverty, a lack of housing finance mechanisms and lack of community awareness on planning are the main causes of unplanned settlements development in the city. Most of the unplanned development in Mwanza city takes place on the hills around the inner city where difficult terrain makes it difficult to provide access and other services including water, electricity and drainage to the dwellings. Sanitary conditions are despicable because it is not possible to construct pit latrines on the rocky ground leading to frequent downhill flushing of human excreta from the shallow pits, which pollutes streams and rivers, including River Mwirongo that discharges filth laden water into Lake Victoria. Guided development has taken place in part of Capri Point hill where surveyed plots are develop with high value, low density residences. The land acquisition process involved demarcating and incorporating land

purchased informally from traditional small holders into the city plan, setting aside land for roads and other public utilities.

Regularization and Upgrading of Unplanned Settlements:

Mwanza City authorities have also initiated a regularization program of several unplanned settlements through participatory planning, with communities mobilized to contribute resources of demarcation of property boundaries. Residents volunteer part of their land parcels or accept minimal compensations for land in order to crate space for access roads and other basic public utilities. The council plans to upgrade and redevelop some of the unplanned settlements in collaboration with private sector developers with displaced residents being resettled in planned residential areas. It has laid-out and surveyed residential plots in the undeveloped hills around the city to pre-empt further encroachment with unplanned development and it has surveyed and allocated 3,300 plots through a Plot Survey Revolving Fund. The survey of 9,700 other plots including an industrial estate, a large site of a shopping mall with banks and other commercial facilities was in progress.

Planned settlements in Mwanza:
Zone O: Central area
Zone A: Capripoint, Isamilo
Zone B: Bwiru and Nyakato block F and G
Zone C: Nyakato, Nyegezi, Nyamanoro, Ilemela, Kiseke, Kilolelí and Pasiansi.
Zone D: Other planned areas (Not much developed).
Zone E: Unplanned settlements (Igogo, Bugarika, Mabatini, Butimba, Igoma) etc.Unplanned settlements accommodate about 70 of the City population.

Unplanned settlements are characterised by:

- High congestion of buildings
- Poor accessibility
- Lack of physical infrastructures like electricity, roads, and telephones as well as public facilities like dispensaries, open spaces etc.
- Inadequate hygienic services like toilets, disposal of solid wastes etc.

4.2 Physical Environment

Topography, Soils and Vegetation
The City is characterized by gently undulating granites and granodiorite physiography with isolated hill masses and rock inselbergs. The soils are usually associated with inselbergs of between 1100-1600 metres in height. Mwanza topography is alluvial normally fertile. It is also characterized by well-drained sandy loamy soil generated from course grained cretaceous.
The natural vegetation consists of isolated tall trees scattered on grassy hills. Areas near the lake are greenish throughout the year whereas others are dry in some period of the year, especially between the month of July and September.

Four distinct typology use areas characterize Igogo ward:

Industrial area occupies the flat area West of Kenyata road and extends to the lakeshore. The area with an estimated area of 65 ha is reported to have about 16 active industries.
This is a mixed use area consisting of institutional, and commercial and residential premises occupying an area of about 30 ha East of Kenyata Road. Some industrial plots are also located in this area. The ground slope in this area is mild. The area is fairly well serviced with infrastructure services of water supply, roads and storm water drainage. Unplanned – high –

density area with rock outcrops and with limited infrastructure services access, storm water drainage, water supply and sanitation; occupies the area east of the mixed-use area.

The estimated size of this area, which is fully built up, is about 95 ha. The number of housing units per ha in this area varies between 20 and 40. Medium to low density unplanned area exist further up the hill above elevations of 1120 masl. This area also includes a cemetery. Three schools and one dispensary have recently been constructed in this area. According to the City Council, the area, which is estimated to be about 4ha, is planned to be surveyed for residential development. A small high-density planned area exists between the mixed-use area and the unplanned high-density area. This area includes the hamlets of Kwimba, Guinea, Mchafukoge, Mlungushi and Tanesco. This planned high-density area covers an area of less than 10ha. A small low to medium density planed area also exists adjacent to Pamba ward, close to Bugando hospital.

Rainfall Patterns and Seasons

The City receives heavy rainfall almost throughout the year. It experiences between 700mm and 1000mm of rainfall per annum, falling in two fairly distinct seasons i.e. between the months of October and December, and between February and May.

Temperatures

The temperature variations are minimal but influenced by altitude and proximity to the Lake Victoria amongst other factors. The mean temperature of Mwanza city ranges between 25^{O}C and 30.2^{O}C in hot season and 15.4 ^{O}C and 18.6^{O}C in the cooler months.

4.3 Biological baseline

The vegetation of the project area is varied consisting of both indigenous and exotic tree species. The most common tree species found in the project areas are Panga uzazi (*Terminalia species*), Misira *(Maesopsis eminii),* Carribea, Miboyo (*Melia azadirach*), and Eucalyptus species. Others are Mlonge (*P. longifolia*), Michungwa (*Citras sinensis*), Maembe (*Mangifera indica*), Papai (*Carica papaya*), Mzambarau *(Syzygium cuminii*), Grevillea robusta and Mijohoro (*Senna siamea*). The main purposes of the tree species are demands for shades, beauty, fruits and some construction work.

Another tree species planted is jatropher whose seeds can be processed to produce bio fuel. Researches and trials are still going on. If succeeds then it will save due purposes as energy provider but also as environment conserver.

4.4 Socio-Economic Baseline

4.4.1 Population

According to the recent countrywide 2012 Population and Housing Census, the total population of Mwanza Region is 2,772,509 people where by 1,360,381 are male and 1,412,128 are female. Mwanza city area lies on two districts (Nyamagana and Ilemela). Average annual population growth rate for the entire region is 3.0 which is slightly above the national average of 2.7. The household size in the region is 5.7 which is also above the national average of 4.8. The population density of the region is 293

The study area is located in Nyamagana district and average household size in both areas of the study area is 5.8 in Mabatini and 5.0 in Igogo while the population distribution is as follows:

Table 5: Number of people and households in the study area

Ward	Sub Ward / Mtaa	Male	Female	Total	No. of H.H
IGOGO	Kaskazini A	2422	4259	6681	**1322**
	Kaskazini B	1574	2931	4505	**1150**
	Kaskazini C	2759	3192	3467	**1389**
	Kaskazini D	2519	2712	5231	**1523**
	Sub Total	**6774**	**10384**	**16558**	**5384**
MBUGANI	Mabatini Kaskazini	1721	1774	3445	**1165**
	Mabatini Kusini	1365	1385	2750	**917**
	Sub Total	**3086**	**3159**	**6245**	**2082**
GRAND TOTAL		**9860**	**13543**	**23403**	**7466**

Source: Igogo and Mbugani Ward Profiles. 2012

4.4.2 Socio – Economic Activities in Study Area

Income Generating Activities (IGA)

The analysis of social economic activities was carried out to determine income and expenditure pattern of people living in Mabatini Sub ward and Igogo ward. Although men are still regarded as the family breadwinner gender relationships reflect the importance of both men and women in the present socio-economic set-up and activities in the area.

In access to, and utilization of production resources, both genders are involved. Both men and women are in industrial works, fishing, agriculture, retail business, operating food-vending, casual labour and forestry products. Ownership of means of production such as land, basic capital assets (house, furniture's etc) is almost balanced between men and women. In some cases ownership of agricultural harvest is based on the male domination where, husband and wife (wives) have separate plots. However, at the end men are regarded as the owner and final decision maker over the family resources.

According to anecdotal information industry sector contributed about 40 % of the GDP, followed by business operations 30 %, formal employment 7 %, fishing 17% and 6 % from other activities. The per capital income of Mwanza residents stands at an average of US $21 per month of which majority of residents depend on the following sectors:

Industries

There are about 60 different type of industries in Mwanza: fish processing (6); cotton seed oil industries (6); breweries (1), soft drink factory (1) bakeries & biscuits (100); medium & small milling machines; timber industries; garages; fabricating workshops; ginneries; foam & plastic industries; soap factories; quarry sites & animal food industries. This number is expected to increase due to the Government's efforts to build good roads and the rapid growth of the information technology sector.

Fishing:

Fishing in Lake Victoria has a long historical background. However, the introduction of Nile perch or lattes niloticus to the Lake has changed both the social and economic nature of the sector. Today fishing is done mainly for commercial purposes, contrary to the traditional fishing which focused to household consumptions.

The emergence of the Nile Perch trade has created new opportunities for development in the region. According to available statistics from the fish processing plants in Mwanza and Musoma towns, the fish industry has created direct employment for over 8,000 locals and outsiders and indirectly employed about 300,000 others.

At the same time, an estimated three million people living around Lake Victoria in Mwanza,Mara and Kagera regions have been also benefiting from the Nile perch trade (popularly known as marine gold) in one way or another, causing the rapid growth of social and economic activities in the region. There are also about 52,000 fishermen on the Tanzanian side of Lake Victoria who benefit directly from Nile perch. Sources indicate that in 1999/2000, local fishermen earned Tsh 182 million ($ 182,000) daily from selling their catch to the fish processing plants.

It is also estimated that local fishermen earn about Tsh 65.5 billion ($ 65.5 million) annually from the sale of Nile perch to 12 fish processing plants that have sprung up around the lake. There are chances that, these earnings may rise by 40 per cent depending on market prices and the availability of the fish (Nile perch) from the lake. Trade in the fish contributes about Tshs 1.7 billion ($ 1.7 Million) annually in levies to the Mwanza City Council alone.

According to the 2009 economic development report issued by the Regional commissioner, Mwanza City Council received about Tshs 1.3 billion ($1.3 million) in fish levy from the sale of fresh Nile perch processed by the fish plants between April and December 2001. Earnings for the central government in taxes and royalty from exportation of Nile perch fillets were estimated at Tshs 10 billion ($ 10 million) annually.

Agriculture

Agricultural activities are undertaken in both urban and rural areas where both food and cash crops are cultivated. Food crops cultivated in both Ilemela and Nyamagana includes cassava, paddy, sweet potatoes, maize, sorghum, pulses, vegetables and fruits and cash crop cultivated is cotton.

Livestock

Livestock available in Mwanza City includes; Goats, sheep, cows, pigs, hens' indigenous bread, Broilers, jayerns and donkeys. Most of the urban-based wards are practicing poultry farming and zero grazing livestock keeping. The City is enjoying livestock products such as milk, eggs, cattle meat and skins. Liters of milk produced at Nyamagana District were 18,428,280 litres by the year 2009 from indigenous cattle, dairy cattle and dairy goats which was valued at Tsh 13,985,760,000/=.

Timber Industries

There are industries which produce timbers of different sizes. The timber processed includes pines (mostly Pinus carribaea), Pterocarpus angolensis (mninga) and brachystergia speciformis (mtundu) from outside city. The city has about 29 reserved Forests from which 10 are from Ilemela district and 19 from Nyamagana district with the total area of 2,955Ha for both districts.

4.4.3 Provision of Social Services

Water supply

The demand for water in Mwanza City and in study area in particular has been increasing rapidly due to high rate of population growth. Lake Victoria is the main source of water for the city. Other sources include rivers, and springs and ground water especially in peri-urban areas

such as in Buhongwa ward. The water sources, storage and distribution facilities have adequate capacity to meet existing demand of 65,000km3 per day but pumping capacity is only 42,000km3 per day. Water quality is also becoming a matter for serious concern due to the declining quality of the Lake Victoria environment.

Energy

Mwanza City is supplied with electricity from the national grid but only about 33,000 customers are connected. Rapid population increase and the high demand for charcoal and firewood has led to massive deforestation and to increased surface run off, siltation of streams, rivers and the lake, exposing the city to landslides, soil erosion and flooding.

Health facilities

Starting from the higher level, Mwanza city has 105 health facilities including 6 hospitals, 10 health centres, 87 dispensaries and 2 clinics. Two of the hospitals, three heath centres and 24 dispensaries are government facilities while the rest are private. Most facilities are located in the centre of the city and only few are dispersed in the periphery. The study area is served by two dispensaries, one in Igogo and another in Mabatini. Malaria is the leading disease affecting the majority of the population of all age groups. Communities are involved in managing health facilities though health facility and ward health committees and the City Health Board. They prioritize health problems and participate in planning rehabilitation and renovation of public health facilities. A cost sharing programme contributes resources for improving the quality of in the public health services in the city.

HIV/AIDS

The diversity of its social and economic activities, its location and transport links attract many people to Mwanza making it a high HIV/AIDS prevalence city. According to the comprehensive council health plan for Mwanza City 2010 / 2011 the current prevalence is 5.6% of the population. HIV/AIDS Committees have been initiated and more than 14,201 have obtained counselling and testing services at 17 Voluntary Counselling and Testing Centres in the city in 2011. Some patients are accessing ARV drugs. The number of orphans is increasing rapidly in the city.

Education

There are 164 primary schools in the City including 142 government and 22 private schools up from 63 in 1998 due to implantation of the Primary Education Development Programme. The schools face shortages of 948 teachers, 1,634 Classrooms, 26,327 Desks, 2,517 Toilets and 2,654 teachers' houses. Classrooms are overcrowded and the few toilets available regularly overflow due to over-use, posing a danger to health. Mwanza City has 38 secondary schools, of which 22 are government and 16 are private schools. Public secondary schools face shortage of teachers, laboratories, libraries, classrooms, desks and tables, teachers' houses, books and toilets. There are 36 Vocational Training Centres (VTCs) that provide a wide variety of skills training.

Roads

Mwanza City has 863 km of roads of which 75 percent are unpaved. Plans are underway to use stones for road paving to reduce costs. The City Council has acquired a stone cutting machine for the purpose. In the study area status of roads (poor roads) is alarming whereby provision of transport is very limited in those areas especially upper part of Mabatini and Igogo A and D. On average, 26 traffic accidents occur per month, five to six being fatal.

Solid Waste Management:

Mwanza city generates about 385 tonnes a day of domestic solid waste and about 500 tonnes of industrial refuse per day, through most industries do not keep records of the quantity of waste generated. Some of the fish processing industries dispose the wastes on a dig and fill basis but often the waste is left abandoned in open areas becoming a potential health hazard. The capacity of the council is limited to 5 refuse trucks, 4 side loaders, 2 wheel loaders, 1 skip loader and 25 skip buckets. About 45 percent of the solid waste is collected by CBOs and a private company. Residents and business pay refuse collection charges but many communities are unwilling to do so. Domestic refuse is collected from 13 of the 21 collecting centres. Solid waste in most of the unplanned settlements which are inaccessible is disposed on site by burning or burying. Management of hazardous hospital waste is poor and only one of the three public hospitals has a properly functioning incinerator. Solid waste is disposed at the Buhongwa dumpsite, 18km from the city centre. The facility was designed as a sanitary land fill site, but dumping of waste is crude and disorderly and none of the equipment is in working order. There is no weighting bridge and the site is not fenced to prevent unauthorized access.

Liquid Waste Management

Due to poverty, inaccessibility and difficult terrain, most city residents especially in the unplanned settlements including the project area (Igogo and Mabatini), use pit latrines. The shallow pit latrines overflow during heavy rains, releasing faecal wasters into waterways draining into the lake and contaminating the main city water intake at Capri Point. Most households who use septic tanks discharge waste water from kitchens and bathrooms into storm water drains. Both septic tanks and a reticulated sewerage system are used in the city centre. There is a reticulated sewerage system with a capacity of 5,000 km3 per day but only 2,300 km2 per day is utilized. On average, 10 to 12 trips of liquid waste are delivered for disposal at the Buhongwa site per day, where only two of the 18 cells are operational. Most fish processing factories discharge vast amounts of harmful wastewater into the lake.

Figure 16: Type of toilets constructed between rocks in Igogo A

Housing and Informal Settlements

Shelter is one of most important human basic needs. Good housing has a close correlation with good health and other aspects of human dignity and well being. Through there is lack of clear-cut on which is proper and good housing facility but enough and well-ventilated rooms, kitchen and toilets provision were used to determine the quality of the shelter in the study area. Moreover type of structures and materials used in construction were also primarily used to determine the quality of the house in the study area.

The situation of housing in the study area' exhibit typical two categories. One is housing in planned and surveyed areas and second is in unplanned (squatter) areas where our study focuses.

As stated before about 75 percent of the estimated 65,500 housing units in Mwanza City are built in 18 unplanned settlements, spread over about 299 $km^2$and accommodating 70 percent of the population.

Unplanned settlements accommodate about 70% of the city population. Unplanned settlements are characterised by: High congestion of buildings Poor accessibility, lack of physical infrastructures like, roads, and electricity as well as public facilities like dispensaries, open spaces etc. and inadequate hygienic services like toilets, disposal of liquid and solid wastes.

Figure 17: Unplanned Settlements in Mabatini

Income and expenditure

Poverty is an important factor accounting for, and endowment failure in accessing social services. The wide spread income and asset poverty in the study area has negative implication to the livelihood by limiting people's ability to access basic social provisions such as food, sanitation services and health. Household wealth and access to basic needs is impeded by low levels and patterns of household income and expenditure, as well as poor capital assets that the households posses. The two variables were considered basic in assessment of household wealth and their capacity in accessing social services. Since all of these measures are sensitive to the extent that households did not want to reveal such information to strangers or have forgotten them. The following were also noted as limiting factors to reliability of the data and information obtained:

i) Absence of the habit to keep records. The majority of respondents showed strong uncertainty in estimating their incomes and expenditure, even those referring to short duration of time such as a day or two.
ii) Incomes and expenditure vary strongly with seasons, the tendency being that households spend highly as received while they spend too little or almost nothing when there is no cash flowing in.
iii) Since the economy is basically subsistent in some households, the households fail to demarcate between amounts of food that come from own production and the market as well as the food that is produced for home consumption and from the market.

iv) Several transactions and transfers, including remittances from relatives staying away from the villages under study, are in kind or materials rather than cash. Family members are not able to determine precisely the monetary value of such incomes and expenses.

Income of the households

The average annual income for the interviewed household ranges between Tshs.2,198,076/= and 2,623,512 which is Tshs. 183,173 and Tshs. 218,626 per month. Majority of the population earn between 1,500,000/= and 1,800,000/= which is 65% of the entire population. Collected information show that households and individual generate their income from one or more of the following activities, presented in an ascending order of importance; Industrial employment, micro and small-scale enterprises, public service employment and informal employment. Furthermore it was surprisingly revealed that although a household has a common resources and income, wife (wives) tend to separate their income from that of the household due to uncertainties and insecurities within the marriages caused by polygamy practices. Looking at the gender, anecdotal evidence indicates that incomes from micro enterprise and agriculture, on average, are higher for female than male. The difference in the overall earning among gender is basically attributed to the fact that women in the household are engaged in other multi- income activities (such as local brew selling, handcraft, petty trade and foodstuff vending) and have low expenditure compared to men.

Households' expenditure

Collected data reflect that annual household expenditures goes to food (49%) followed by transport (12%), clothing (9%), medical charges (7%), water bills (8%), energy (6%) school fees (5%), and others take 4%. The figure below illustrates the ranks.

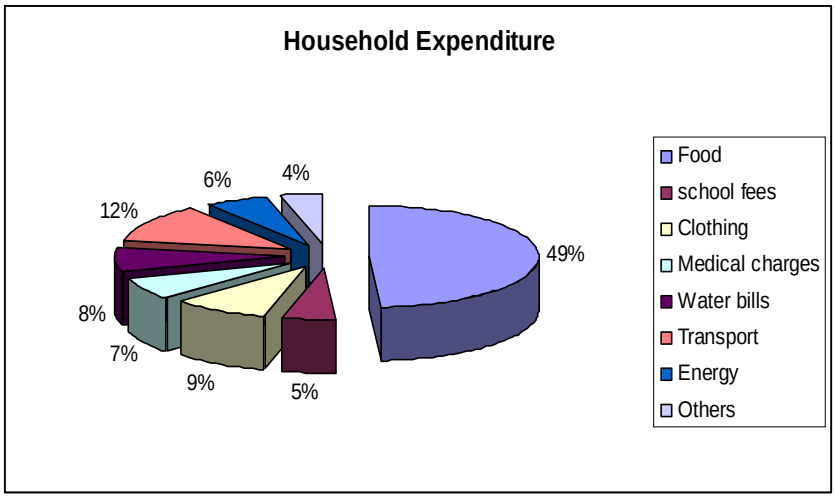


Figure 18: Expenditure items at household level (Source: Field survey data, 2012)

The data revealed that more than 26 percent of the interviewed household is getting less than 50,000 a month. When this is distributed among food and non-food expenditure, access to other basic needs may adversely be affected including sanitation services. The data show that food expenditure alone takes 49 percent of the total household expenditure. This implies that about 50 percent is left for non-food expenditure including investments.

Expenditures on water, energy and transport take 50.9% of the remained 51 percent. Rationally, one would argue that with such low income, if health care expenditure exceeds more than 15 percent of the remained sum of non-food expenditures, then family would not

afford to pay for proper health care. This suggests that majority of low income earning households suffer some kind of inability to afford or exclusion from basic needs.

The general observation through the analysis of income and expenditure and other observations is that the low income earning households in the area are below the soft-core poverty line.

5. Stakeholders Consultation and Public Involvement

5.1 Introduction

Public Participation in all stages of project development is of great importance particularly from the initial stages of the project preliminary design to detailed engineering design including stages of environmental assessment, scoping phase as well as preparation of the ESIA report to final stages of implementation and operation of the proposed sewerage system.

Firstly the consultant carried out an identification of stakeholders and analysis of their roles followed by identification of the means of public involvement through considering either use of public consultation meetings, advertisements and notices, surveys, interviews and questionnaires, workshops and/or advisory groups. Each of the methods was weighed against each other to come up with the best options for public participation. One to one consultation and Public meetings were finally chosen to be best options for the majority of stakeholders in the project areas

The consultant conducted the public meetings which involved the necessary potential Interested and Affected Parties (I&APs). Public involvement through stakeholders' consultation achieved the following:

- a vehicle for receiving public input and also facilitated negotiated outcomes;
- it created trust and partnerships;
- it is envisaged that negative impacts will be minimized;
- positive impacts will be enhanced; and
- It provided an up-front indication of issues that may prevent project continuation, that can cause costly delays at a later stage, or result in enhanced and shared benefits.

The Consultant conducted the public participation for the proposed project to involve as many potential Interested & Affected Parties as possible. Accordingly, issues arising from this public participation process will be incorporated into the subsequent reports and used in determining mitigation measures for the project.

5.2 Stakeholders Identification and Analysis of their roles

The consultants identified organization, groups and individuals considered to be regarded as "stakeholders". This identification was based on each ones roles and their relevance in the proposed simplified sewerage system development project in Igogo and Mabatini. Some of the stakeholders such as government authorities, city/district level, wards and sub-ward level that might be impacted by or have interest in the project or exercise some influence on the project were predetermined as shown under each level in form of tables.

5.2.1 Authorities or Decision Makers

Table 6: Stakeholders Identification and their roles and responsibilities

Level	Institutions	Roles and responsibilities
National Level	Prime Minister´s Office Regional Administration and Local Government	- Issuing policies - Providing legal frameworks - Issuing licenses, provision of compliance - certificates - Enforcement of laws and regulations - Setting operational standards for effluents including wastewater - Project monitoring
	Vice Presidents Office Division of Environment and NEMC,	- Coordination of the Environmental Management Policy, Act and guidelines - Environmental Monitoring and Auditing - Advise to the government on all environmental matters
	Ministry of Water	- Parent Ministry for the Project Proponent - Issuing polices on water resources management and planning - Enforcement of laws and regulations in the water resources planning sector - Setting operational standards - Activities monitoring in planning - Providing legal frameworks in energy
	Ministry of Lands and Human Settlement Development (Sector Environmental Section)	- Authority over the national land including the project area - Enforce law and regulations in the area of influence of the project
	Occupational Safety and Health Authority (OSHA)	- Issuing certificates of compliance and Designated Authority for occupational safety issues
Zone Level	Basin Water Office in Mwanza	- Overseer of the Lake Victoria Basin office - Issuance of the discharge permits
Regional Level	Mwanza Regional Administrative Secretary	- Oversee and advise on implementation of national policies at regional level - Oversee enforcement of laws and regulations - Advice on the implementation of development projects and activities at the regional level.
	Regional Land Advisory Committee	- Overall supervision of all activities pertaining to land use in the respective in the region

City Level	City Director's Office	- Chief executive officer for all development activities in City - Land use approval - Oversee and advice on implementation of national policies at city level - Oversee enforcement of laws and regulations
	MWAUWASA	- Project implementation - Consultation with stakeholders - Project monitoring and internal auditing
	City Natural Resources Department	- Plan and coordination of community based natural resources - Enforcement of laws and regulations - Overseer of rights to utilize resources in the city premises
	Land and Environment	- Land use planning at city level - Environmental management
	City Planning/Health/Community Development Departments	- Baseline data on social and economic conditions - Extension services
	City Engineer	- Overseer of engineering activities in the city
	City Environmental Management Officer	- Coordination of environmental matters at the City level
Ward Level	Ward Development Committees Ward Environmental Committee	- Oversee general development plans for ward level - Provide information on local conditions and extension services - Project monitoring in their area of jurisdiction
Sub-wards level	'Environmental Committee	- Oversee general development plans at sub-ward level - Provide information on local conditions and extension services in the village - Project monitoring in their area of jurisdiction

5.2.2 Developer

Level	Institution	Roles and responsibilities
National /Regional level	LVEMP II	- Facilitate EIA study - Project implementation - Project monitoring and internal auditing

5.2.3 Affected Parties (Directly and indirectly affected)

Level	Institution	Course of action
Utility Companies	- TANESCO - TTCL - MWAUWASA	- Electrical reticulation - Phone lines - Water supply pipes
Community Level	Residents in respective sub-wards	- Residents in sub-wards of Igogo and Mabatini - Project Monitoring - Project beneficiaries

5.2.4 Interested Parties

Level	Institution	Roles and responsibilities
Community Level	NGOs/CBOs	- Environmental conservation groups - Social well being (SACCOS, HIV/AIDS) groups - Project Monitoring - Project beneficiaries

5.3 Public Participation Process

5.3.1 Participation objectives

The overall goal of the consultation process was to disseminate project information to the community and to incorporate their views in the design and also including mitigation measures against negative social impacts. The specific aims of the consultation process were to inform the community about;

- Impacts related to land disturbance resulting from construction of the simplified community sewerage system.
- Social relations resulting from activities on the site, presence of people on the site and health and safety impacts from the operation of the facility including , infectious diseases such as HIV/AIDS , social conflicts, property theft dust and noises
- Impacts on air quality (pollution) resulting from construction of the sewerage system such as dust, oil, and others.
- Impacts on noise and vibration resulting from construction of the sewerage system.
- Impacts on surface and underground water quality during construction and operation phases of the project (e.g. oil spillage and waste generated)
- Disruption of norms and values of the given place due to interaction of new workers who will be working on the site.
- Obtained the main concerns and perceptions of the population and their representatives regarding the project;
- Operational costs anticipated during operation of the project.

Key stakeholders were directly informed on the proposed simplified sewerage system through physical visits in their respective areas and office in two separate visits. The first visit was made from 22nd to 28th June 2012 and the second visit was made from 07th to 12th March 2013. Meetings and consultations were held with Act. City Director, City Planning Officer (CPLO), Water Technician, City Community Development Officer (CCDO), Acting Director General of MWAUWASA and MWAUWASA Sewerage and Sanitation Officers. The discussions focused on existing water supply, Sanitation and land use pattern in the project site, socio-economic situation, anticipated impacts (both positive and negative) and demographic trend along the project area.

Also surrounding communities were sensitized to participate in the process through consultation meetings which were communicated to the respective communities though

their sub-ward Executive Office. Pictures of public consultation meetings are presented below from figure19 through to figure 23

The meetings were intended to ensure that the community discussed issues related to the Simplified Community Sewerage System 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 community in general. Majority of the community members from the project area participated well and held calm consultative meetings. A total number of 230 participants attended the meetings as presented under Appendix III

Figure 19: Consultation meeting in Igogo Ward offices

Figure 20: Public Consultative Meeting in Igogo

Figure 21: Public consultation meeting for Mbuga Ward held at Pamba C Primary School

Figure 22: Consultation meeting at Igogo

Figure 23: Public Consultations at Igogo area

5.4 Concerns / Issues Raised by Stakeholders

During the consultations it was mentioned that in some instances the sanitation situation is so pathetic that faeces are scattered along alleys and valleys. During rainy seasons the situation is worse that faeces and liquid waste ooze downstream to the residential areas.

Concrete reasons behind this situation rest on the fact that:

1. Some households (houses) do not have toilets at all, as such the residents of these houses depend on neighbours, open night pit latrines or use of plastic bags. Field data has revealed that in Mabatini 25% and Igogo 10% of total households have no toilets.
2. Some houses had been able to construct toilets and even septic tanks (Igogo 80% and Mabatini 35%) but the question still lies with when they get filled up. In situation like these the households release the refuse during the rains down the hill and to Lake Victoria.
3. Most of the houses on the hills have very shallow pit latrines (Igogo 10% and Mabatini 40%) that get filled up in a short period thus forced to release the faeces any time of the year. This creates nuisance to the neighbourhood.
4. According to participants the situations have been a major cause of foul smell, filth conditions and uncomfortable life. The scattered faeces and filthy situation have resulted in sporadic and rampart spread of diarrheal diseases, intestinal worms and eye infections transmitted by flies from this haphazard excreta disposal.

The respondents in the study area and other stakeholders advised the following solutions to curb sanitation problems in the area

- In areas where there are roads, sewerage system can be constructed and residential, commercial houses, public institutions like schools and religious buildings can connect to the system. The area which is suitable for this service is lower part of Mabatini where former survey of 2004 put marks (pegs) and Igogo B and C where road network is impressive.
- In areas without roads particularly Upper part of Mabatini and Igogo A and D on site disposal will be ideal. A group of houses may share a communal septic tank that all houses around it can connect pipes from their toilets. The septic tank can then be connected to the nearby sewerage system as shown in the diagram below:

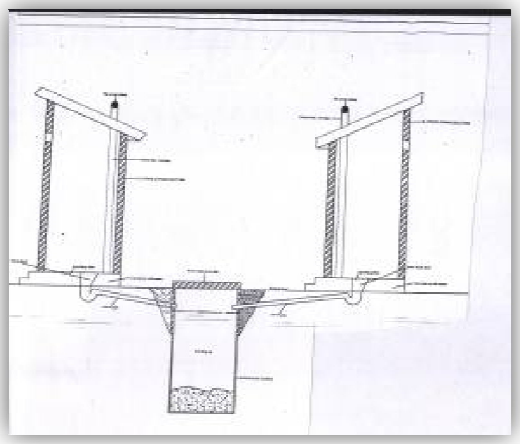


Figure 24: Sketch of proposed toilets with communal septic tank

It was further mentioned that the connection of pipes from the toilets to the septic tank may be short lived because the tank will be full of sludge after a short period. Construction of

roads is necessary to allow on site disposal. According to geographical set up of the area construction of wide roads may not be possible due to high costs of compensation or replacement, streets of 3 to 4 metres wide can accommodate tri cycle cars (Bajaji) to dispose the sludge from the tanks. This type of tricycle with tank is used in Temeke and Ilala Municipalities in the squatter areas and running cost is reasonable that even people of low income can afford. The photograph below illustrates the tricycle

Figure 25: Example of the tricycle with a tank suitable for onsite disposal that may be adopted in tricky areas of Mabatini and Igogo.

5.4.1 Perceived positive Impacts of the Project

People in the study area are eager to get the sewerage system constructed. Such feelings emanate from their expectation that the system will bring the following advantages to their localities:

- Constant removal of liquid waste with minimum cost as well as raising hygienic status of the area.
- The project will eradicate the scattered faeces and filth situation which resulted in sporadic and rampart spread of diarrhoea, intestinal worms and eye infections transmitted by flies from this uncontrolled excreta disposal.
- The project may influence improvement of roads and streets which will be used in sludge management and regular maintenance of the system
- The project will add value to their houses thus increasing the rent which will be a benefit to the landlords)
- During sewerage construction there will be employment opportunities to local people (youths and women) either directly or indirectly. Through employment local people will acquire capital for further investments. Indirect impact is for women to carry out businesses such as selling of food staff to the construction employees and casual labour employment.
- Stimulation of technology and skills is another positive impact. There will be interaction and exchange of technology between the local people and the new immigrants hence stimulate the adoption of new technologies.

Overall, the construction of the sewerage system will have tremendous positive impacts on the wards and Mwanza City economy and the entire nation.

5.4.2 Perceived negative Impacts of the Project

Peoples' worries over the project include the following:

- Environmental degradation resulting from nuisances such as noises, dust, soil erosion and air pollution.

- Culture interference may cause moral decays among the youth.
- Influx of job speculators from other parts of Lake Zone and neighbouring regions will increase interaction, consequently an increase in HIV/AIDS infections. The presence of HIV/AIDS will likely increase the number of orphans in the project area. Infidelity among job speculators and local people may lead to divorce and separation of some families
- Destruction and removal of residential and commercial houses
- Little or no compensation for properties destructed

Table 7: Summary of issues raised and consultant's response on the issues raised

S/No	Issues	Description
1	Improvement of sanitation in the project area	The construction of simplified sewer will improve sanitation condition in the project area and reduce pollution of lake Victoria and the nearby streams and rivers
2	Resettlement	Construction of sewer will involve demolition of building structures to provide space for construction of retention tanks, sewer and access roads
3	Compensation of Affected people	The smooth implementation of compensation of affected people is always affected by the delays in getting fund for compensation. The delay in compensation has to be addressed as early as possible to avoid frustrating the project implementation
4	Creation of employment	The project will create employment to local people as well as new comers, for both skilled and unskilled labour.
5	Payment of the services to be provided	As the project will be implemented in the communities which are relatively poor, the payment of bills for the service may be problems to some individuals and this may jeopardise the project implementation.
6	Production of Noise and Vibrations	Noise and vibrations will be generated due to increase in traffic movements, construction activities and during blasting of rocks for pipe laying.
7	De-sludging the retention tanks	As the project will be implemented in squatter areas, the accessibility may cause a problem in de-sludging the retention tanks when they are full.
8	Vandalism of manhole covers	The manhole covers are likely to be vandalised
9	Cost sharing in the construction of the project	The individuals will have a responsibility to construct a pipeline from their house to retention tanks or secondary sewer
10	Overflow of sewage in the human settlements	There will be overflow of sewage into human settlements due to malfunction of the sewerage system
11	Pollution of Lake Victoria	Due to discharging of untreated wastewater from the project area into Lake Victoria, the lake is highly polluted thus affecting water quality and increase eutrophication in the lake ,

Table 8: Summary of views of stakeholders during consultative meetings

Stakeholders	Issue	Response / Advice
Mabatini Sub-ward and Igogo Ward Residents	Workers Camp (If any)	• Should be located near the construction site and after completion of the project the buildings can be used as community welfare centre • HIV/AIDS prevention programme should be prepared and implemented.
	Dust	• Is likely to affect both human beings and properties. Contractor should water the earth regularly to minimize the dust.
	Noise	• Since the area has granite rocks, the noises will be high during crashing stones so it should be minimized.
	Vibration	• Houses and other buildings may be affected by heavy equipment during sewerage construction.
	Cultural Tension	• Contractors/Mow/LVEMP, MWAUWASA should maintain regular meetings with community representative by allowing friendly communication for community members to communicate their concerns about the behaviours of construction workers.
	Construction of roads/ streets in the rocky hills	• Few structures might be affected and this may require compensation • As for construction related accidents, the contractor should be brought to knowledge and abide by standards of human safety during construction. • Training of construction workers on proper use of construction machines
	HIV/AIDS	• Workers camp (If located in the study area) should be the focus for HIV campaigns. • Identify local capacity in dealing with HIV/AIDS. • The contactor should arrange for HIV/AIDS prevention programme targeting both the construction workers and local communities. • Positive discrimination (HIV Testing) in favour of resident workers to minimize risk of increased infection among local population • Programme on HIV/AIDS should target groups at risk such as commercial sex workers (specifically in the study area), barmaids as well as food vendors, and business women at the construction area • NGOs and CBOs working for HIV/AIDS prevention in the area should be consulted during the implementation of HIV prevention
	Temporary Employment	• Sewerage System construction may stimulate individual's income for those who will be employed by the project • The contractors should use local casual labourers. • Skills acquired during recruitment and construction will remain as asset to community members

	Income generation	• Youth and women will benefit from doing business with construction workers selling foods, drinks ,etc • Expenditure of workers will add to community income.
	Investors increase	• The impact may happen beyond the project area

6. Identification, Assessment of Impacts and Project Alternatives

6.1 Introduction

The Environmental Impact Assessment procedure involves investigations to identify main project positive and negative impacts. The analysis also requires the assessor to identify alternatives for the proposed project. Therefore, under this section, it is required that a number of possible proposals and alternatives for accomplishing the same objectives be considered. In principle, these alternatives should include an analysis of the location, timing, input and design alternatives as well as the do-nothing option.

Construction of a proposed simplified community sewerage system will include construction of lateral lines, collector sewer lines, retention tanks and associated infrastructures. Such a project in a busy area with a combination of residence and business like Mabatini and Igogo areas is likely to result in a number of minor to major environmental impacts. The impacts are likely to emanate from initial preparations of site clearance to transportation of building materials, erection, construction and operation of the community sewerage system. Such potential environmental and social impacts likely to emerge in different phases of the project are presented under this section. The impacts are a result of interference, prohibition, hindrance, impediment of various elements in the respective project areas. There are two categories of impacts; positive and negative impacts.

6.2 Pre-construction, Planning and Design Phase

This phase will involve confirmation of the sewer route to ensure that the selected route is optimum in terms of cost and ease to implement, identification of suitable areas for camp sites, identification of locations for collector tanks, identification of sources of natural construction materials (gravel, building sand, aggregates and water) and transportation of construction equipment to site.

a) Positive Impacts

- Creation of employment opportunities

The pre-construction/planning phase creates employment opportunities to various professionals directly or indirectly linked to the project. The proposed project during this phase will create employment to the following teams

- Consulting Engineering teams for concept and design development
- Environmental and social impacts studies teams
- Building economists or Quantity Surveyors to establish quantities of construction materials and assessing project economic viability
- Surveying teams and technicians for topographical and geotechnical investigations
- Local laboratories for construction materials testing.
- Identification of locally available materials will also create employment to local people working on those borrow sites.

The preconstruction phase is envisaged to involve about 75 employees in all cadres

b) Negative Impacts

The negative impacts expected to emanate from the activities during this phase include

- Vegetation loss through clearance – the routes for sewers, site(s) for collector tanks, access road to sites of work
- Temporary obstruction of access roads by topographic survey and geotechnical investigation teams.

Figure 26: Topographical surveys for the sewerage system

- Soil erosion – during detailed engineering design and geotechnical investigations, soils will become loose due to pits digging to facilitate these soil investigations. There is evidence in the project area that soil erosion is a serious problem due to the sloping terrain as shown on the picture below near Pamba C Primary School

Figure 27: Soil erosion near Pamba C Primary School in Mabatini area

- Interference on daily activities/businesses as most of the works will be carried out adjacent to the businesses (see figure 28 below)

Figure 28: One of the busy main streets in Mabatini area

- Noise from transport of equipment to facilitate detailed engineering design phase
- Likely motor accidents with pedestrians in the course of implementing planning phase activities

6.3 Mobilization Phase

The negative environmental impacts speculated during this phase are:

- **Vegetation clearance and deterioration of original land use, scenic and visual quality**

  Presently, the proposed sites are unplanned with some urban vegetation. These vegetations are few and scattered and will change the landscape when removed. Indeed when removed the landscape will be affected by losing the common aesthetic view of the area. Also some of the vacant land is either accommodating some vegetation as it can be seen on the right hand side of the above picture or it is used for other business activities. In this case, there are limited alternatives to spare the only vegetation in the area. Either the access road is used for the works or the vegetation on the road side is cleared to give way for the proposed works. If the above picture is used as an example, the left hand side accommodates the storm water channel and electric power reticulation poles. Therefore all these vegetations will be lost and thus loosing the familiar aesthetic view of the area.

- **Displacement of Properties for camp establishment**

  The project area will require land space for camp construction. The properties in this area will be affected and requires resettlement.

- **Resettlement and disturbance to some of the residents particularly at the area where septic tanks and drainage fields will be constructed**

  In the areas proposed for collector septic tanks and drainage fields, there are people living nearby or there are businesses in progress. All such business will be interfered with.

6.4 Construction Phase

The possible negative environmental impacts during this phase include:

- **Disruption of services from relocation of infrastructures e.g. water pipes, electric poles, telephone lines etc**

  Most of the people in the project area are connected to water supply system by either kiosk public tap, yard tap or house connection. These utilities and others like electric poles and telephone lines will be affected.

- **Displacement of people and properties**

  The project area is a squatter area; therefore, to get space for excavation of trenches, construction of septic tanks, drainage field and for access during construction will necessitate relocation of some properties especially buildings.

- **Demolition of paved surfaces during trenches excavation**
  Some areas that are paved with concrete (see figure below) will be broken/demolished to allow excavation of trenches for laying sewer pipes.

Figure 29: Disturbance to paved areas may leave this pavement demolished in Mabatini area

- **Interference with access routes and existing utilities**

  Construction of the sewerage network in the steep areas of the city may cause temporary interference and blockage to traffic and pedestrian routes activities and other facilities and amenities. This has the potential to cause frustrations and complaints.

- **Disturbances, particularly land scarring at borrow sites or sources of construction materials** (sand, aggregates, stones,) - Borrow materials to be used for construction of the sewerage system will be collected from sources far from the construction site. The immediate impact of borrow sites is land scarring.

- **Nuisance from noise and vibration during construction** ,

  Noise will result from construction works such as demolition of structures, blasting of rocks to create space for sewer pipes, excavation of trenches and breaking or crushing the stones.

  Noise may pose a problem to the population living or working in places next to construction site. In some areas if rocks are encountered and they need to be removed by explosives, then explosives may also add to the noise. The intensity of this impact vary according to the degree of severity or sensitivity of those affected, the most sensitive recipients to noise and vibration are schools, hospitals and residential areas.

- **Soil Erosion**

  Since the project area is hilly, the slopes are steep up to 40%, thus any mismanagement of earthworks may result to soil erosion leading to Lake Victoria. Soil excavation for installation of sewerage system will trigger soil erosion which will affect aquatic system on the adjacent Lake Victoria. The removal of trees and other vegetation will accelerate soil erosion, which if not abated it will result into gully erosion. Excavated soil from construction sites may also be washed away as runoff if the construction activities will be carried out during rainy season. The runoff has the potential to cause siltation of the aquatic system including Lake Victoria.

  Silt particles increase the water turbidity and reduce its transparency thus causing low light penetration. This affects the photosynthetic organisms as they depend on light for photosynthesis process. Siltation in aquatic system will therefore reduce aquatic

production and it may result to mortality of the affected phytoplankton and benthic algae and other forms of life that depend on primary producers.

- **Likely accidents from increase in traffic levels in the project area**. During construction there will be heavy duty vehicles that come to construction site to deliver various construction materials. This will increase congestion of vehicles in town roads.

- **Increased safety risk to construction/project personnel**

  Occupational hazards as a result of poor instruction and/or awareness on safety regulations, ignorance and reckless personnel may result from construction works.

- **Contamination of water from leakages of fuels and lubricants from construction equipment**

  Ground water and surface water contamination would also occur if the contractors do not follow pollution control measures. Ground water can be contaminated through leaching of contaminated soil both during construction and operation phases of the project

- **Poor air quality from dust and emissions around the construction site and material hauling routes**

  The potential impacts on air quality will be located mostly in the areas subject to excavation for trenches, in the circulation area for vehicles and other equipment used at construction areas. Re-suspension of dust may occur as a result of land cleaning, demolitions, paving and circulation of vehicles on non-paved roads, either next to the working faces or in the way to support areas. This is likely to happen when these activities are developed within relatively long time under dry weather conditions.

  Atmospheric pollution due to fuel combustion during construction may also occur as a consequence of the flow of vehicles and equipment on work, operation of industrial facilities (i.e. concrete plants)

- **Possible injuries to neighbours from falling into trenches and open pits for inspection chambers.**

  Trenches have to be excavated for the proposed sewer lines. Once these trenches are dug, pipes cannot be laid in them immediately, they have to wait to ensure that the pipes are laid in a required slope and the bedding material will not consolidate or swell to change the slope of the pipe. All these activities take time and it is this duration that may pose a danger to the neighbours who may want to cross open trenches for any reason.

- **Generation of construction solid and liquid wastes followed by poor disposal of the same**

  Since the sewerage system involves clearing the vegetation and excavation of trenches some unexpected issues may emerge, such as encountering bad soil which is not even suitable for use in backfilling the trenches, one may also encounter collapsible soils such that timber for supporting the walls is required. All these works result into generation of wastes in all forms (liquid or solid). These wastes will eventually need to be handled with care otherwise they can be a nuisance to the neighbours.

Socio-economic Impacts

- **Increased transmission of communicable diseases(HIV/AIDs, STIs or STDs)**

  Construction activities in projects tend to attract migrant labour population that results into social interaction with the resident community. The proposed construction site will be a place of work where job seekers and other service providers such as food vendors commonly known as "Mama Lishe" will gather for the purpose of work and services. As a result of the mixed population, differences in behaviour and norms particularly those related to sexual practise might lead to spread of sexually transmitted diseases such as HIV/AIDS, gonorrhoea and syphilis.

- **Safety during Construction**

  Construction of sewerage system, like any other development sites, are inherently dangerous places and safety of the people around, who may not be aware of the hazards, must be assured, particularly the open and un-barricaded trenches that may be left open overnight in places that are not well lit. Children may be eager to see construction trench and possibly ply "hide and seek" games. Health and safety hazards associated with construction activities may be related to:

  - exposure to open trenches during inspection chamber construction
  - exposure to sharp objects cuts and other occupational injuries to construction labourers and other people especially children playing around the construction sites
  - exposure to dust and emission from construction equipments

- **Injuries from poor safety measures at work place -**

  Most of the employees tend to work without safety gear thus exposing themselves to occupational injuries. The experience gained from other construction projects indicate that either the safety gear is not supplied by the employer or the employees tend to keep away from safety gear due to lack of safety awareness

  Such equipment include hard hats, ear plugs or ear muffs, dust coats or overalls, gloves, dust masks, goggles for eye protection, hard toed boots, safety harness etc.

- **Safety risks**

  Once the construction site is active, there are chances that many people may come to these places prospecting for employment. While this is their right but roaming or wandering the construction site can be dangerous to these people in case of any accident such as falling into open trenches prepared to receive sewer pipes.

The positive impacts during construction phase include:

- Temporary employment and creation of new business at construction site will be direct benefits to the neighbouring communities during the construction phase of the project. This may range from food vending to service related activities such as transport, it is also likely to boost the household incomes and improve the living standards of the local community and other populations from the neighbouring and other areas.

6.5 Demobilization Phase of Construction Activities

Demobilization activities will involve activities related to completion of the construction phase of the sewerage system and will include the following activities:

- Removal/demolition of temporary infrastructures that were installed to support the construction phase, removal of installations and equipments from the workshop and campsite
- Dismantling and transporting of equipment such as front wheel loaders, excavators etc
- Rehabilitation of the campsite, workshop, stockpile yard, to match the surrounding conditions of the project site
- Clearing and disposal of various waste including used hydrocarbons, sewage, solid wastes (plastics, wood, metal and plastic crates, packaging materials, papers, etc)
- Disposal of wastes to authorized dumping place

The main impact from these demobilisation activities is generation of wastes

6.6 Operation Phase

6.6.1 Negative Impacts

a. Continued pollution from some public places and other houses that have been left out the sewerage system.

Pamba C Primary School (see figure 27) may be used as an example of the institutions or properties that have been left out of the proposed scheme. This school is located in Mabatini North sub-ward in Mbugani ward. Since some of these properties are not connected, they will continue to use their present sanitation systems which are sometimes overflowing due to a number of reasons including the big number of users such as school children.

Figure 30: Pamba C Primary School which seem to have been let out of the sewerage system despite of being closer to the proposed sewerage system

b. Poor safety of employees and neighbours from overflowing sewage in the streets

Poor management of the simplified sewerage system may result to sewerage overflowing which may later find its way to water sources used by residents. This may result into eruption of water borne diseases such as cholera. The presence of septic tanks in areas that have no access for cess pit emptier may make the system worse.

c. Pollution to the nearby rivers leading to Lake Victoria

If simplified sewerage system does not function as planned, there may be some sewage overflows thus leading to polluting soils and nearby river/streams. Also failure of Drainage Field to contain the waste water may cause significant impact to Lake Victoria which is the receptor of both untreated and treated water that may emanate from septic

tanks. The consequential results of endangering aquatic life and the ecosystem as whole cannot be over emphasized.

d. Overflow of sewage in human settlements

Use of solid materials in the sewer line or lack of sufficient water may lead to blockage of sewer line. If the sewer line does not allow smooth flow then the waste water surcharge the system thus leading to overflows in the human settlements. This may pose health hazards and affect the aesthetic condition of the human settlements.

e. Generation Sludge

The sludge will be produced at the retention tanks to be provided. This sludge will pose health risks to the community in the project area.

f. Occupation safety health hazards and safety

The operation and maintenance of sewerage system like at the deep sewer chambers involves use of machinery and tools. Poor operational practices and use of insufficient safety measures will increase accidents and risks in the working area.

g. Odours

The sewerage system is always accompanied by obnoxious smell particularly at the leakage points or in places where there is no ventilation pipes to allow obnoxious smell from the sewer system. This will significantly reduce the quality of air in all residential areas including recreational areas located in human settlements.

h. Sewer system vandalism and Illegal connections

Vandalism of sewerage facilities and illegal connection to sewer line is possible. The illegal connections will weaken the sewer and thus increases the maintenance cost of the sewer and sometime increase public health risk through cross contamination with water supply.

i. Increased eutrophication

There is a possibility of increased eutrophication from plentiful supply of nutrients in Lake Victoria due sewage leakage which may result from overflow of untreated waste water to the lake.

j. Health risks related to polluted vegetables

The local community is likely to use wastewater from leaking pipes to irrigate the vegetables.

k. Failure to connect and non-payment of bills

There will be operational problems particularly on failure to connect and bill payment for sewerage service particularly in the project area where the community are relatively poor.

l. Lack of sufficient water to allow self cleansing of the system

For any sewer system to function well there should be enough water to generate self cleaning mechanism of the system. Lack of water may lead into clogging of the system with the result of overflows.

6.6.2 Positive impacts of the proposed project

1) Improved quality of health from proper management of faecal matter that would otherwise be dumped haphazardly and drain into rivers where others may become in contact.
2) Improved water quality in rivers and subsequent reservoir downstream- Lake Victoria
3) Increased fish catch from depleted nutrients which support the growth of water hyacinth and algae. The growth of the two plants has the tendency of depleting light and oxygen, respectively in the water bodies detrimental to the life of fish and other aquatic life.
4) Employment and trading opportunities will be direct benefits to the neighbouring communities during the construction and operation phase of the project. This is likely to boost the household incomes and improve the living standards of the local community and other populations from the neighbouring and other areas.
5) The government coffers will equally benefit from statutory contributions made by the contractor for his employees. Sales from construction materials will have value added tax that goes to the government.
6) It is also anticipated that properly treated sludge can be re-used as fertilizer to increase agricultural productivity. The use of decomposed sludge (compost) can also minimize the use of chemical fertilizers, which are potential pollutants of Lake Victoria. Similarly, the properly treated supernatant overflow from sludge digestion process can be used for land irrigation.

6.7 Project Alternatives

The proposed project is aimed at improving sanitation in unplanned areas of Mabatini and Igogo by construction of simplified community sewerage systems. Various alternative treatment and disposal of sewage from the project site have been considered. Among others, the following alternatives have been discussed with various stakeholders and experts to opt for the optimum alternative for design and implementation:

6.7.1 No Option Alternative: This option implies that the situation will be left as it is now. This option will maintain the status quo of the existing situation. In this regard the sanitation condition in this area will continue to deteriorate thus posing health problems among the communities and also to the aquatic life where the waste goes when it rains. This will also increase the pollution loading in Lake Victoria. This option was not supported by both stakeholders and experts and therefore it was dropped. No project alternative would be defeating the purpose of LVEMP II and its key outputs targeting at reducing pollution into the lake by reducing discharge of untreated effluent from city/municipal waste through supporting public investments.

6.7.2 Technology and Design Alternatives

The onsite collector system - this system comprises of the communal retention tank, the pipe network connecting 6 -10 housing units to the retention tank. The waste water from the households would be connected to the common retention tanks where waste water will infiltrate in the underground and the sludge will be emptied by cesspit emptier tankers. This option was also not adopted as due to the nature of the slope in the project area the waste water which will infiltrate in the underground may resurface in the human settlement and overflow to the settlements thus posing health problems and further pollution of Lake Victoria.

Conventional sewerage system: This option would be comprised of the sewer lines in the project area. The wastewater from the households would be collected through lateral sewers connected to secondary sewers, main sewer and ultimately to Mirongo Pumping Station, where the wastewater will be pumped to Waste Stabilization Pond at Butuja. Due to the nature of settlements in the project area which is unplanned and includes hilly and rocky patterns, it is not feasible to construct this conventional sewerage system. This option is only feasible in a planned area. In this regard this option was not favoured by the stakeholders and experts and the costs would be very high. These systems have disadvantages of high cost and an in-house water supply which is missing in most of the houses in the project area.

Simplified community sewers: This option is comprised of the tertiary and secondary sewer lines and retention tanks. Where the area is easily accessible, the retention tanks will be constructed to collect wastewater from the household. The retention tanks will be constructed at accessible place to allow the emptying trucks to collect sludge from the tanks. The wastewater will be conveyed through the sewer line up to the waste water treatment plant. This option was adopted by the stakeholders and experts.

6.7.3 Alternative location of underground line

The location of underground line is proposed to follow the existing sewerage system around Igogo area as it consists of sewer lines at the police station and some neighbourhood areas and also at some lower areas of Igogo. The proposed new Simplified sewerage systems will as much as possible connects to the existing central sewerage system in order to secure small area for replacement and resettlements.

The project area of Mabatini does not have extensive sewerage system coverage. Consequently the proposed sewerage system for Mabatini will be linked to the existing sewerage system by connecting to the existing manhole at the Mabatini Police station Barrack.

6.7.4 Alternative source of raw materials

Gravel, hardcore stones, aggregates and sand for construction activities will be extracted from the existing parches of rocks which are currently used as borrow sites for construction materials. No other borrow areas will be opened unless the existing ones are depleted and there is an agreement with the regional and the responsible district authorities.

Sand will equally be extracted from existing sources with adequate supply as will be determined during the detailed assessment of the project area. Water for works mainly for preparation of concrete, curing and other construction activities may be drawn from the nearby streams or other public source unless it is determined beyond doubts that the characteristics of the water and it is thus unsuitable for construction works. The samples from this nearby source will be tested for suitability.

7. Environmental and Social Impacts Mitigation Measures

7.1 Introduction

Construction related activities, the world over, generally cause some alteration to the biophysical and social environment. The proposed simplified community sewerage system project is not an exception as it will involve land preparation in form of vegetation clearance, excavation for trenches to lay pipes, excavation of pits to construct manholes septic tanks and later the drainage field, cut and fill to construct an access road to project area, followed by construction of sewerage system appurtenances. In the previous section (Section 6) a thorough understanding of the extent of potential environmental and social impacts assessment from the proposed project has been developed and therefore effective management strategies and mitigation means are presented in this section.

7.2 Negative Impacts and the Corresponding Mitigation Measures

The mitigation measures for the impacts likely to be caused by the proposed project will focus on key potential impacts identified in section 6 during different phases of the project development. The list of potential impacts are listed on column 2 of the table below

Table 9: Impacts and mitigation measures during different phases of the project

Pre-construction, Planning and Design phase		
a)	**Vegetation loss through clearance**	- Geotechnical Investigations and other engineering surveys will be limited to very small areas meant for receiving permanent works of the project. - Therefore limit vegetation clearance to the area required for topographical survey and geotechnical investigation only.
b)	**Temporary obstruction of access roads by topographic survey and geotechnical investigation teams.**	- Signage to direct drivers to alternative free routes shall be placed at all areas or routes due to be surveyed or subjected to geotechnical investigations. - Community sensitization shall be carried out before these activities start (geotechnical investigation and topographical survey.
c)	**Soil erosion**	- Earthworks for geotechnical investigation may be carried out during the dry season to prevent soil from being washed away. - Implementation of erosion control measures on disturbed surfaces such as planting vegetation that hold soils together, terracing in steep slopes and securing the available vegetated area (surfaces not required for works shall not be disturbed)
d)	**Interference on daily activities / businesses as most of the works will be carried out adjacent to the businesses**	- Community sensitization to give way
e)	**Noise from transport of equipment to facilitate detailed engineering design phase**	- where the noise is from the geotechnical investigation equipment- it shall be well maintained and fitted with noise silencers such as mufflers - Noise levels should be monitored and where it happens to be higher than 85dB (A), PPE in form of ear muffs or ear plugs

		shall be provided to all those working near the equipment including the operators.
f)	**Likely motor accidents with pedestrians in the course of implementing planning phase activities**	- Sensitise drivers of project vehicles to observe speed limits in all area and institute punishment to traffic rules offenders
Mobilization phase		
a)	**Vegetation clearance and deterioration of original land use, scenic and visual quality**	- Such vegetation clearance will try as much as possible to minimize loss of indigenous species - Specific consultation will be carried out during project implementation determine what mitigation measures should be followed. - Minimum and necessary clearance will be enforced to reduce vegetation loss. - The vegetation clearance will be minimised as much as possible to minimize cutting or uprooting trees outside the permanent construction work area, if possible the design can be modified on site to specific area in order to minimize tree uprooting. This is important because the project area is in rocky and hilly, thus very few trees have successfully grown and they are growing in areas of good soil especially between rocks.
b)	**Displacement of Properties for camp establishment**	- Implement compensation for the properties to be affected, - Renting an area for campsite to offset the impact of relocation to accommodate these temporary camps.
c)	**Resettlement and disturbance to some of the residents particularly at the area where septic tanks and drainage fields will be constructed**	- Compensation to those whose areas will be taken to accommodate the works
Construction Phase		
a)	**Disruption of services from relocation of infrastructures e.g. water pipes, electric poles, telephone lines etc**	- Communities shall be informed in advance regarding storage of water and other utilities when are about to be relocated to pave the way for construction works. - Water pipes, electric poles, telephone lines crossing the trenches may be moved slightly away from the trench or provision of service duct may be considered. - Replace the affected utilities
b)	**Displacement of people and properties**	- Compensation. [Note: The valuation of the properties to be affected is currently taking place by (a separate consultant) and the summary will be included in the final report].
c)	**Demolition of paved surfaces during trenches excavation**	- Minimization of disturbance shall exercised where possible - Replacement of the demolished paved surfaces to prevent further deterioration and soil erosion
d)	**Interference with access routes and existing footpaths**	- Traffic management to minimize inconveniences where possible - The Contractor shall be responsible for the protection of the public, and public property, from any dangers associated with construction activities, and for the safe and easy passage of pedestrians and traffic in areas affected by activities performed. Any excavations, material dumps, spoil dumps or

		other obstructions likely to cause injury to any person or thing shall be suitably fenced off and at night marked by red warning lights. - Site vehicles shall be permitted only within the demarcated construction sites or on existing roads, as would be required to complete their specific tasks. - The Contractor should provide appropriate road signs, road diversions and footpaths where necessary
e)	**Disturbances, particularly land scarring at borrow sites or sources of construction material**	- Liaison with the mining licence holders at respective borrow pits to see what can be done to restore the gaping holes
f)	**Nuisance from noise and vibration during construction**	- Construction workers exposed to noise of the order above 85 dB (A) will be provided with the ear protective devises such as ear muffs and ear plugs. - The residents will have to be informed at least one day before the day of carrying out activities which may result to noise.
g)	**Soil erosion**	- Soil erosion control measures in the area shall be applied such as re-vegetation with the local species and cover with concrete in erosion susceptible areas shall be implemented.
h)	**Likely accidents from increase in traffic levels in the project area**	- Sensitization of the project drivers to observe strict conditions in the project areas - Introduce speed limit within the congested area (20km/hr) - Positive reinforcements to drivers and punishment wherever there is violation of the traffic
i)	**Increased safety risk to construction/project personnel**	- Proper occupational and health safety training programmes shall be done
j)	**Contamination of water from leakages of fuels and lubricants from construction equipment**	- Dripping pans to be used to contain all hydrocarbon leakages on construction equipment - Re-fuelling on designated areas - In case of hydrocarbon spills, the contaminated soils will be collected and treated to remove the hydrocarbon and prevent the hydrocarbons from being washed away in storm water to the nearby water bodies.
k)	**Poor air quality from dust and emissions around the construction site and material hauling routes**	- Water sprinkling to reduce the dust at the construction sites - Use of dust masks to operators and those working in the dusty areas - Use of goggles for all operators - Construction machines/equipment will be well maintained to ensure total fuel combustion. All vehicles involved in construction works will be frequently checked and well serviced during the whole construction period so that the level of exhaust emissions is reduced - Speed of vehicles hauling construction materials shall be reduced and the construction materials will be covered with tarpaulins.
l)	**Possible injuries to neighbours from falling into trenches and open pits for inspection chambers**	- Lighting at night to be provided to all open trenches - Barricading all open trenches - Immediate backfilling the open trenches in dangerously placed areas
m)	**Generation and Poor disposal of solids and liquid**	- Site housekeeping to minimise solid and liquid wastes

	wastes resulting from works	generated from construction and other related activities such as food vending and petty businesses - Allocate a special area for petty business such as food stalls provided with garbage bins - Post appropriate signage such as "DO NOT LITTER" or "USITUPE TAKA" at all strategic sites. - Assign Contractor's Environmental or Safety Officer the responsibility to ensure that the surroundings are kept clean. - Trash and waste shall be well collected and removed from the site to sanitary land fill in Mwanza City. - Solid wastes generated from land clearing shall be collected and disposed off in sanitary land fill at authorised site. - Decomposable materials shall be collected and combined with city wastes to the city sanitary landfill; plastics and other recyclable materials will be collected and sent out for recycling - All excavated spoils should be well managed through levelling or tipped into borrow pits which are no longer useful or in depressions.
n)	**Increased transmission of communicable diseases (HIV/AIDs, STIs or STDs)**	- Sensitization and health awareness campaigns to all involved in the project including service providers - Construction workers to undergo health screening according to the National HIV/AIDs Policy, - Project will assist the nearby health facility in sensitization of those involved in a project
o)	**Poor public Safety during Construction**	- Therefore the public particularly the children shall not be allowed to come closer to the swing area of excavators or other equipment at site. - In places where there are vehicles transporting construction materials and also at turning places towards the construction site, appropriate warning signage shall be posted.
p)	**Injuries from poor safety measures at work place -**	- All employees working on the construction site will be sensitized to use Personal Protective Equipment (PPE) when at work to minimize or reduce occupational risks. Such equipment include hard hats, ear plugs or ear muffs, dust coats or overalls, gloves, dust masks, goggles for eye protection, hard toed boots, safety harness etc.
q)	**Safety risks**	- Barricading all open trenches and dangerous spots - Proper directive to job seekers - Security personnel to keep un invited guests away from site
Operation phase		
a)	**Overflow of sewage in human settlements**	- In order to control sewage overflow from the system, there is a need for regular monitoring and replacement /maintenance of the existing malfunctioning facilities. Also sensitization of the local communities towards proper use of the sewer line in terms of what may be allowed into the sewer system.
b)	**Generation Sludge**	- The retention sludge should be desludged frequently and disposed at sludge drying beds located at Butuja Waste Stabilisation Ponds

c)	**Occupation safety health hazards and safety**	- Operator (MWAUWASA) will produce a health and safety plan covering the hazards that may occur during the operation of its systems, the rules and standards to be used in assessing risk and in undertaking work and the methods that be will employed to ensure compliance with his plan. The Health and Safety Plan shall include details of the following: o details of all potential risks and the proposals for dealing with such hazards; o controls to regulate risks that occur during all undertaking of maintenance and testing works; o measures to avoid health risk in connection with the use, handling, storage and transportation of hazardous and harmful substances (e.g. used hydrocarbons, etc) o safety equipment and training proposals in respect of equipment referred to ensure safety. - The workers should be provided with safety working gears like gum boots, groves, helmets etc when working in the sewerage systems.
d)	**Odours**	- In order to control any leakage from the sewerage, there is a need for regular monitoring and replacement /maintenance of the existing malfunctioning facilities. - The system will be provided with ventilation pipes at strategic location to minimize foul smell from the proposed system
e)	**Vandalism and Illegal connections**	- There is a need to sensitize the local community and raise awareness on the importance of the sewerage services to them and instil a sense of ownership. - To reduce the impact of illegal connections, it will be essential to increase the number of sewerage connections. - Furthermore, community based police should be implemented.
f)	**Increased eutrophication**	- In order to curb any overflow from the sewerage, there is will be regular monitoring and replacement /maintenance of the malfunctioning facilities.
g)	**Health risks related to polluted vegetables**	In order to curb any overflow from the sewerage, there is a need for regular monitoring and replacement /maintenance of the existing malfunctioning facilities.
h)	**Failure to connect and non-payment of bills**	- With regard to the tariff structure, in order to minimize operational problems, the sewerage authority shall arrange to charge lower rates for connection to the simplified sewerage so that it encourages more poor people to be connected to the simplified sewerage system. - In poor areas, initial connection fees are likely to create payment problems, and these should be transferred into monthly charges. MWAUWASA shall also look at the ability of the residents to pay for the simplified sewerage service. The combined water and sewerage charges in areas served with simplified sewerage should be affordable and linked to the household income, otherwise, the project may end up in installing the sewer line, where a few people are connected. - In order to minimize negative social and environmental impacts due to this project and ensure the long-term

		sustainability of simplified sewer systems, MWAUWASA has to ensure good partnership with community served by simplified sewerage though good design, good construction, good maintenance and an adequate, but affordable tariff structure. - MWAUWASA in consultation with community to prepare the reasonable tariff system - Enforce bylaws to all people in the area in order to ensure that they are all connected - Community awareness on the benefits and objectives of the project should be raised at all time
i)	**Lack of water for self cleaning mechanism, misuse of the system, use of solids!**	- Sensitization of the communities to know that without sufficient water, waste will not smoothly flow to disposal point otherwise it will clog the system. Also use of the solids will block the system. - MAUWASA to ensure that there is adequate water in the system to generate self cleansing velocity - MWAUWASA maintenance teams should regularly inspect the system and flush it regularly to ensure smooth flow.

7.2. Project Positive Impacts and Enhancement Measures

Table 10: Project Positive Impacts and Enhancement Measures

Impact	Enhancement measures
Improved quality of health from proper management of faecal matter	It is anticipated that the project will improve health as most of the diseases were emanating from overflowing sewage, where children and adults were coming in contact with, thus contracting all sorts of diseases
Increased fish catch from depleted nutrients	Increased fish catch from depleted nutrients which support the growth of water hyacinth and algae. The growth of the two plants is facilitated by nutrients contained in human excreta and other sources carried along with wastewater to lakes. These nutrients have the tendency of depleting light and oxygen, respectively in the water bodies detrimental to the life of fish and other aquatic life, thus the problem will be alleviated through constructing, managing and monitoring of the sewerage system and wastewater treatment facilities efficiency.
Increased employment and trading opportunities	Project Construction will create temporary employment opportunities to local communities through unskilled labour, food vending and transport provisional services and to the following staff directly or indirectly linked to the project. - Supervising engineering team; - Contractor's staff (managerial, skilled and unskilled labour force); - Suppliers of plants, machinery, materials, and essential services; - Construction monitoring personnel from various government agencies (Architectural and Quantity Surveyors Registration Board, Engineers Registration Board, Contractors Registration Board, etc).

The government coffers will equally benefit from statutory contributions and value added tax from sales of materials.	Material to be purchased and services to be provided on the proposed sewerage system project will all be subjected to the value added tax. This evenly goes into the government coffers. Companies and employments will equally give their share to the statutory contributions to the government. Overall, this is a positive impact from the proposed project that require enhancement through respective environmental permit upon submission of this Environmental Impact Assessment.
Improved water quality in rivers and Lake Victoria	The construction and proper management of simplified sewerage system will alleviate the problem sewage overflows which leads to soils and water pollution. Also the Drainage Field to contain the waste water may reduce significant sewer pollution to Lake Victoria which is the receptor of both untreated and treated water that emanates from community sanitation facilities. The consequential results of protecting aquatic life and the ecosystem as whole will be realised.
Treated sludge can be re-used as fertilizer to increase agricultural productivity.	It is also anticipated that properly treated sludge can be re-used as fertilizer to increase agricultural productivity. The use of decomposed sludge (compost) can also minimize the use of chemical fertilizers, which are potential pollutants of Lake Victoria. Similarly, the properly treated supernatant overflow from sludge digestion process can be used for land irrigation. This will also depend with the willingness of the community on using sludge as fertilizer, thus the community should be sensitized on the advantage of using sludge as fertilizer to avoid nuisance of using it.

8. Environmental and Social Management Plan

8.1 Introduction

An Environmental and Social Management Plan (ESMP) can be defined as "*an environmental and social management tool that can be used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced".* ESMPs are therefore important tools for ensuring that the management actions arising from Environmental Impact Assessment (EIA) processes are clearly defined and implemented through all phases of the project life cycle

The objectives of this Environmental and Social Management Plan (ESMP) are to describe;

- ✓ the legislative and administrative frameworks in the country on Environmental Impact Assessment Management,
- ✓ implementation arrangements for the project specific ESMP,
- ✓ the environmental monitoring programme and reporting arrangements and
- ✓ Design consideration regarding environmental, health, safety and social impacts.

In Tanzania the Environmental Assessment framework is guided by the following two key national legislations:

- The Environmental Management Act (EMA) Cap 191 (No. 4 of 2004)
- The Environmental Impact Assessment and Audit Regulations, 2005

Environmental Impact Assessment of the proposed development of the simplified community sewerage system for Igogo and Mabatini areas is like any other development projects which are under the Vice Presidents' Office, where the Minister of Environment falls. Therefore for environmental assessments including the proposed sewerage system, the main players are the following:

- Minister of Environment who approves or disapproves the EIA and gives the environmental permit,
- NEMC, who arranges for EIAs, undertakes enforcement, compliance, review and monitoring of EIA.

8.2 Implementation Arrangement of the ESMP

The project financier of the proposed sewerage system project is the Ministry of Water through its Lake Victoria Environmental Management Project (LVEMP II) who will be assisted by the design and supervision consultants. These two bodies will ensure that the contractor and sub-contractors who will win the tender for implementing the simplified sewerage system project adhere to the laid down procedures for construction and commissioning of the sewerage system. To be able to minimize potential environmental and social negative impacts, the project will require the support of various institutions in the project area. Table 10 below outlines the actions of the ESMP. The organizational framework for the ESMP is designed to evolve as the project progresses through detailed engineering design, construction, commissioning and operation phases.

8.3 Reporting Arrangements

The Ministry of Water Environmental Section (Sector Environmental Coordinator), the and Consultant's Appointee to deal with Environmental Management will cooperate with other experts in Mwanza City such as City Land Officer and City Environmental Management Officer to provide the Regional Environmental Management Expert (REME) under the Regional Secretariat with environmental reports of the project implementation as part of the progress reports and annual environmental monitoring reports. The Regional Environmental Management Expert is the link person between the region and the Sector Ministry Environmental Section (Sector Environmental Coordinator) and the Director of Environment as well as the Director General of NEMC.

8.4 Cost estimates for ESMP

The costs for implementing the mitigation measures have been estimated based on previous similar projects and engineering judgment. The actual costs will be as presented by the successful contractors during bidding exercise. The priced bills of quantities for environmental and social impact mitigation measures shall be made part of the contract for these mitigation measures to be effective.

Table 11: Environmental and Social Management Plan

Pre-construction Phase							
Impact	**Management Measures**	**Responsible for mitigation**	**Time Frame**	**Target level / standard**	**Reporting to**	**Estimated Cost (USD)**	**Remarks**
Vegetation loss through clearance	- Limit vegetation clearance to area required for topographical survey and geotechnical investigation only.	Design Engineer	One month from start of activities	Vegetation cleared in necessary areas only	City Natural Resources Offices	3,000	Part of Design engineers cost
Temporary obstruction of access roads and footpaths	- Signage to direct drivers to alternative free routes shall be placed - Community sensitization	Design Engineer	At the start of the project	Ensure no complaints from foot path and access road users	City Engineer	2,000	
Soil erosion	- Earthworks carried out during dry season to prevent soil from being washed away. - Implementation of erosion control measures on disturbed surfaces	Design Engineer	At the start of the project	Soil erosion is controlled	City Environmental Engineer	3,000	Part of the project cost
Interference on daily activities / businesses	- Community sensitization to give way	Design Engineer	At the start of the project survey	Minimum interferences	City Engineer	1,000	
Noise from transport of equipment to facilitate design phase	- Maintenance of equipment for geotechnical investigation and fitted with noise silencers such as mufflers - Noise levels should be monitored and where it happens to be higher than 85dB (A), PPE in form of ear muffs or ear plugs.	Design Engineer	Once every week	Noise within set limits	City Health Officer	2,500	
Likely motor accidents with pedestrians	- Sensitise drivers of project vehicles to observe speed limits in all area	Design Engineer	Every day during	No motor vehicle	Traffic police in case of	2,000	

	- Institute punishment to traffic rules offenders		investigations	accidents	accidents		
Mobilization phase							
Impact	**Management Measures**	**Responsible for mitigation**	**Time Frame**	**Target level / standard**	**Reporting to**	**Estimated Cost (USD)**	**Remarks**
Vegetation clearance and deterioration of original land use, scenic and visual quality	- Minimize loss of indigenous species - Site specific consultation to determine site specific mitigation measures. - Minimum and necessary clearance will be enforced	Contractor supervised by the Engineer	During mobilization	Vegetation cleared in necessary areas only	City Natural Resources Offices	2,000	
Displacement of Properties for camp establishment	- Implement compensation for the properties to be affected, - Renting an area for campsite to offset the impact of relocation to accommodate these temporary camps.	Contractor	During mobilization	During mobilization	City Land Officers	As determined on site on area required	
Resettlement and disturbance to some of the residents particularly at the area where septic tanks and drainage fields will be constructed	- Compensation to those whose areas will be taken to accommodate the works	Project Proponent (Mwauwasa)	Before start of the activities	During mobilization	City Land Officers	75,000	As per Valuation report

Construction phase							
Impact	**Management Measures**	**Responsible for mitigation**	**Time Frame**	**Target level / standard**	**Reporting to**	**Estimated Cost (USD)**	**Remarks**
Disruption of services from relocation of infrastructures e.g. water pipes, electric poles, telephone lines etc	- Communities shall be informed in advance regarding storage of water and other utilities when are about to be relocated to pave the way for construction works. - Water pipes, electric poles, telephone lines crossing the trenches may be moved slightly away from the trench or provision of service duct may be considered. - Replace the affected utilities	Contractor	Before start of construction	Services restored in a short time	MAUWASA	15,000	MWAUWASA to coordinate with Utility companies
Displacement of people and properties	- Compensation	Contractor	Before start of construction	No complaints	City Land Officer	25,000	
Demolition of paved surfaces during trenches excavation	- Minimization of disturbed surfaces shall exercised where possible - Replacement of the demolished paved surfaces to prevent further deterioration and soil erosion	Contractor	During trenching	Restore paved areas once trench is backfilled	City Land Officer	5,700	
Interference with access routes and existing footpaths	- Traffic management to minimize inconveniences - Any excavations, material dumps, spoil dumps or other obstructions likely to cause injury to any person or thing shall be suitably fenced off and at night marked by red warning lights. - Site vehicles shall be permitted only within the demarcated construction sites or on existing roads, as would be	Project Constructor	At the start of the project	Ensure no complaints from foot path and access road users	City Engineer	2,000	

	required to complete their specific tasks. - Provide appropriate road signs, road diversions and footpaths where necessary						
Disturbances, particularly land scarring at borrow sites or sources of construction material	- Liaison with the mining licence holders at respective borrow pits to see what can be done to restore the gaping holes	Contractor	During sources of construction materials	As set in the EMP for borrow pits/sites	Mining License Holder	2,500	
Nuisance from noise and vibration during construction	- Construction workers exposed to noise of the order above 85 dB (A) will be provided with the ear protective devises such as ear muffs and ear plugs. - The residents will have to be informed at least one day before the day of carrying out activities which may result to noise.	Contractor	Once every week	Noise within set limits	City Health Officer	1,500	
Soil erosion	- Soil erosion control measures in the area shall be applied such as re-vegetation with the local species and cover with concrete in erosion susceptible areas shall be implemented.	Contractor	Measures applied as construction works proceed otherwise once every month during construction	All loose soils and bare soils protected from erosion	City Natural Resources Officer	5,000	Part of the contractor BOQ

Likely accidents from increase in traffic levels in the project area	- Sensitization of the project drivers to observe strict conditions in the project areas - Introduce speed limit within the congested area (20km/hr) - Positive reinforcements to drivers and punishment wherever there is violation of the traffic	Contractor	Once every week during construction phase	Zero Accidents	Regional Traffic Office/City Engineer	5,000	
Increased safety risk to construction /project personnel	- Proper occupational and health safety training programmes shall be done	contractor	Once a week	Zero incidents of injury	OSHA offices in Mwanza city	5,000	
Contamination of water from leakages of fuels and lubricants from construction equipment	- Dripping pans to be used to contain all hydrocarbon leakages on construction equipment - Re-fuelling on designated areas - In case of hydrocarbon spills, the contaminated soils will be collected and treated to remove the hydrocarbon and prevent the hydrocarbons from being washed away in storm water to the nearby water bodies.	Contractor	Once every day	No spillage of lubricants	City Environmental Officer	1,500	Contractor's ESMP
Poor air quality from dust and emissions around the construction site and material hauling routes	- Water sprinkling to reduce the dust at the construction sites - Use of dust masks to operators and those working in the dusty areas - Use of goggles for all operators - Construction machines/equipment well maintained to ensure total fuel combustion. - All vehicles involved well serviced.	Contractor	Once every day	Within limits	City Environmental Officer	3,500	

	- Speed of vehicles hauling construction materials shall be reduced and the construction materials will be covered with tarpaulins.						
Possible injuries to neighbours from falling into trenches and open pits for inspection chambers	- Lighting at night to be provided to all open trenches - Barricading all open trenches - Immediate backfilling the open trenches in dangerously placed areas	Supervising Engineer/ Contractor	Every day	Zero injuries	City Health Officer /OSHA	3,500	
Generation and Poor disposal of solids and liquid wastes resulting from works	- Site housekeeping to minimise solid and liquid wastes generated from construction and other related activities such as food vending and petty businesses - Allocate a special area for petty business such as food stalls provided with garbage bins - Post appropriate signage such as "DO NOT LITTER" or "USITUPE TAKA" at all strategic sites. - Assign Contractor's Environmental or Safety Officer the responsibility to ensure that the surroundings are kept clean. - Trash and waste shall be well collected and removed from the site to sanitary land fill in Mwanza City. - Solid wastes generated from land clearing shall be collected and	Supervising Engineer. Contractor	Every day	Good house keeping	City health officer	7,500	Project cost

	disposed off in sanitary land fill at authorised site. - Decomposable materials shall be collected and combined with city wastes to the City sanitary landfill; plastics and other recyclable materials will be collected and sent out for recycling - All excavated spoils should be well managed through levelling or tipped into borrow pits which are no longer useful or in depressions.						
Increased transmission of communicable diseases (HIV/AIDs, STIs or STDs)	- Sensitization and health awareness campaigns to all involved in the project including service providers - Construction workers to undergo health screening according to the National HIV/AIDs Policy, - Project will assist the nearby health facility in sensitization of those involved in a project	Contractor	Once every week on weekends	All employees sensitized and examined	City Medical Officer / City Aids Control Coordinator	20,000	Part of HIV/AIDS sensitization program
Poor public Safety during Construction	- Therefore the public particularly the children shall not be allowed to come closer to the swing area of excavators or other equipment at site. - In places where there are vehicles transporting construction materials and also at turning places towards the construction site, appropriate warning signage shall be posted.	Contractor	Once every week	Zero incidents	City Medical Officer/OSHA	2,500	Barricading the project areas and signage
Injuries from poor safety measures at	- All employees working on the construction site will be sensitized to use Personal Protective Equipment (PPE) when at work to reduce or	Contractor	Once every week	Zero incidents	City Medical Officer/OSHA	3,500	PPE provision

work place -	minimize occupational risks. Such equipment include hard hats, ear plugs or ear muffs, dust coats or overalls, gloves, dust masks, goggles for eye protection, hard toed boots, safety harness etc.						
Safety risks	- Barricading all open trenches and dangerous spots - Proper directive to job seekers - Security personnel to keep un invited guests away from site	Contractor	Once every week	Zero incidents	City Medical Officer/OSHA	2,500	Barricading the project areas and signage
Total Cost for Environmental and Social Management during Construction Phase						**201,700**	
Operation phase							
Impact	**Management Measures**	**Responsible for mitigation**	**Time Frame**	**Target level/ standard**	**Reporting to**	**Estimated Cost (USD)**	**Remarks**
Overflow of sewage in human settlements	- In order to control sewage overflow from the system, there is a need for regular monitoring and replacement /maintenance of the existing malfunctioning facilities. Also sensitization of the local communities towards proper use of the sewer line in terms of what may be allowed into the sewer system and the need for adequate water.	Project Operator (MWAUWASA)	Monthly during operation	No sewer blockage /no overflows	City Environmental Health Officer	200/ month	Budget to salaries to attendants
Generation Sludge	- The retained sludge should be desludged frequently and disposed at sludge drying beds located at Butuja Waste Stabilisation Ponds	Project Operator (MWAUWASA)	Monthly during operation	Ensure desluging is carried out once every year	City Environmental Health Officer	2000/ month	Budget to salaries to attendants
Occupational	- Operator (MWAUWASA) should	Project Operator	Monthly	Zero	City Health	200/	Budget to

health and safety hazards	produce a health and safety plan covering the hazards that may occur during the operation of its systems, the rules and standards to be used in assessing risk and in undertaking work and the methods that be will employed to ensure compliance with his plan. - The workers should be provided with safety working gears like gum boots, groves, helmets etc when working in the sewerage systems.	(MWAUWASA)	during operation	incidents from occupational health and safety hazards	Officer	month	salaries to attendants
Odours	- In order to control any leakage from the sewerage, there is a need for regular monitoring and replacement /maintenance of the existing malfunctioning facilities. - The system will be provided with ventilation pipes at strategic location to minimize foul smell from the proposed system	Project Operator (MWAUWASA)	Daily during operation	Ensure normal smell non-objectionable	City Environmental /Health Officer	1000 per month	Budget for attendant
Vandalism and Illegal connections	- There is a need to sensitize the local community and raise awareness on the importance of the sewerage services to them and instil a sense of ownership. - To reduce the impact of illegal connections, it will be essential to increase the number of sewerage connections. - Furthermore, community based police should be implemented.	MWAUWASA	Daily during operation	All households connected to the community sewer		200/ month	Budget for sensitization
Increased	- In order to curb any overflow from	MWAUWASA	Once a week	Zero	City	200/month	Budget for

eutrophication	the sewerage, there is will be regular monitoring and replacement /maintenance of the malfunctioning facilities.			overflows	Environmental Management Officer		operation
Health risks related to polluted vegetables	- In order to curb any overflow from the sewerage, there is a need for regular monitoring and replacement /maintenance of the existing malfunctioning facilities.	MWAUWASA	Once a week	Zero overflows	City Environmental Management Officer	200/month	Budget for operation
Failure to connect and non-payment of bills	- With regard to the tariff structure, in order to minimize operational problems, the sewerage authority shall arrange to charge lower rates for connection to the simplified sewerage so that it encourages more poor people to be connected to the simplified sewerage system. - In poor areas, initial connection fees are likely to create payment problems, and these should be transferred into monthly charges. MWAUWASA shall also look at the ability of the residents to pay for the simplified sewerage service. The combined water and sewerage charges in areas served with simplified sewerage should be affordable and linked to the household income, otherwise, the project may end up in installing the sewer line, where a few people are connected. - In order to minimize negative social and environmental impacts due to this project and ensure the long-term	MWAUWASA	Once a week	Zero overflows	City Environmental Management Officer	200/month	Budget for operation

	sustainability of simplified sewer systems, MWAUASA has to ensure good partnership with community served by simplified sewerage though good design, good construction, good maintenance and an adequate, but affordable tariff structure.						
Lack of water to facilitate self cleansing mechanism	- Plentiful supply of water for domestic use	MWAUWASA	Daily during operation	No clogging of the system	City Environmental Management Officer	MWAUWASA operational budget say 1,500/month	
Total Budget for Environmental and Social Management during the first year of operation						**68,400**	**Total Cost for the first year**

9. Environmental and social Monitoring Plan

9.1 Introduction

Monitoring of the simplified community sewerage system and its environmental related activities is the long term process that should begin at the start of the project construction and continue throughout the life of the project. Its purpose is to establish environmental benchmarks so that the nature and magnitude of anticipated environmental impacts are continually assessed. Monitoring involves the continuous or periodic review of mitigation activities to determine their effectiveness. Consequently, trends in environmental degradation or recovery can be established and previously unforeseen impacts can be identified and dealt with during the sewerage system life.

Environmental audits are also usually carried out some few years after completion of the project. These audits assess the relevance, efficiency and impact of any mitigation measures administered. The project proponent, MOW/LVEMP II in collaboration with MWAUWASA may initiate such audit processes to cover all its projects activities.

The sewerage system contractor should prepare an Environmental and Social Monitoring Plan which will cover the mobilization, construction, commissioning and demobilization phases of the project. Tasks to be covered and monitored during each phase are presented below.

Monitoring during Pre-construction Phase

- If appointment of the Health, Safety and Environment (HSE) Officer is carried out and carries out his/her responsibility.
- If maintenance and checking of construction equipment ready for work at site and during the actual works;
- If training and sensitization of the staff on safety aspects and environmental issues is carried out;
- If HIV/AIDS sensitization campaign have been planned and will actually be carried out
- If compensation has been carried out to all PAPs;

Monitoring during Construction Phase

- If mitigation measures are implemented;
- HIV/AIDs sensitization campaigns are done in regular periods
- Occupational health and safety measures (conditions at materials storage places, borrow sites, equipment, personal protective equipment (PPE), etc,) are implemented.

Data collection and analysis of baseline data on air and water quality, noise levels and socio-economic aspects as indicated in the EIA study are carried out

During commissioning phase

- If the constructed sewerage system is performing as designed and constructed in term of water quality and smell around the sewerage system is within limits
- If solid and liquid wastes generated are taken care of in the manner specified in the environmental management plan
- If mitigation measures are effectively mitigating the impacts identified before the project start

Demobilization phase of the Contractor

- If the resulting demobilization waste is managed in planned order

9.2 Environmental and Social Monitoring During Operation

MOW/ LVEMPII/MWAUWASA will be responsible for monitoring the environmental and social impacts after construction and handing over of the sewerage system project by the contractor to MWAUWASA. The Environmental Specialist working with Mwanza City Council Office together with the City Health Officer can be in-charge of the environmental and social monitoring of issues related with the sewerage system if it is meeting all the statutory requirements.

Among other things, the appointed City Environmental Management Officer should deal with

- monitoring water quality from various pollutants from the sewerage system; monitoring if collector lines are functioning as required,
- monitoring air pollution from the obnoxious smell at various locations including sewer manholes and septic tanks.
- environmental degradation control measures such as soil erosion;
- risk to sewage overflow from gravity sewer lines from blockages
- changes in socio-economic status;

9.3 Environmental and Social Monitoring Plan and Cost Estimates for Monitoring

Table 12: Environmental and Social Monitoring Plan

Project Phase - Pre-construction and Mobilization					
Impact	**Monitoring Action**	**Monitoring Frequency**	**Responsible for monitoring**	**Parameter/ Target Level**	**Estimated Cost (USD)**
Vegetation loss through clearance	Clearance limited to areas for geotechnical investigations only	Once before investigations	MoW/MWAUWASA	Vegetation loss Target – Only area necessary for geotechnical investigation works	500
Temporary obstruction of access roads and footpaths	Traffic jam is eased at locations near investigation sites	Daily during geotechnical investigation	MoW/ MWAUWASA	Smooth traffic flow	300
Soil erosion	Erosion control measures in place	Once a week during geotechnical works	MOW / MWAUWASA	No soil erosion	300
Interference on daily activities/businesses	No intentional obstruction to businesses	Daily during investigations and planning survey	MWAUWASA	No complaints on business obstruction /impediment	150
Noise from transport of equipment to facilitate design phase	Reported incidents	Daily during surveys and geotechnical	MOW/ MWAUWASA	Noise< 60 dB(A)	400

		investigations			
Likely motor accidents with pedestrians	Traffic rules are observed	Daily and continuously during geotechnical investigation	MOW / MWAUWASA	Zero incidents	400
Vegetation clearance and deterioration of original land use, scenic and visual quality	Ensure cleared vegetation is on area to receive permanent works	Once before construction after demarcating area for permanent works	MOW/ MWAUWASA	Vegetation loss Target - necessary for permanent works	800
Displacement of Properties for camp establishment	Ensure valuation and compensation to all PAPs	Once before start of construction of sewerage project	MOW/ MWAUWASA	No PAP still on site during construction	700
Resettlement and disturbance to some of the residents particularly at the area where septic tanks and drainage fields will be constructed	Ensure valuation and compensation to all PAPs	Once before start of construction of sewerage project	MOW/ MWAUWASA	all PAP are compensated and relocated from site of works	700
Construction Phase					
Impact	**Monitoring Action**	**Monitoring Frequency**	**Responsible for monitoring**	**Parameter/ Target Level**	**Estimated Cost (USD)**
Disruption of services from relocation of infrastructures e.g. water pipes, electric poles, telephone lines etc	Restoration of utilities	Before the works start	MWAUWASA	All utilities are restored to match the original condition and no complaints from users	300
Displacement of people and properties	Compensation	Before the works start	MWAUWASA	Compensation and relocation to all targeted areas	200
Demolition of paved surfaces during trenches excavation	Restoration of paved surfaces	After backfilling the trenches	MWAUWASA/ City Engineer	All disturbed paved surfaces are restored	150
Interference with access routes and existing footpaths	Alternative routes	During trenching on access roads	MWAUWASA	All routes/ footpaths are restored	175
Disturbances, particularly land scarring at borrow	Ensure construction materials are from regular old	Once during purchase of construction materials	MOW/ MWAUWASA	Materials sourced from operating borrow sites	350

sites or sources of construction material	borrow pits	before haulage to site			
Nuisance from noise and vibration during construction	Registered complaints	Once a month	MOW/ MWAUWASA /OSHA	Noise < 60 dB(A) as per TBS requirement	350
Soil erosion	Erosion control measures in place	Once a week during construction	MOW/ MWAUWASA	No soil erosion in project area.	600
Likely accidents from increase in traffic levels in the project area	Ensure sensitization is carried out to communities	Once a week during construction	MOW/ MWAUWASA / OSHA	No injury incidents	500
Increased safety risk to construction/project personnel	Monitor use of PPE Monitor use of tagging and signage	Weekly	MOW/ MWAUWASA	Use of PPE Target – all use PPE all places needing tags are	600
Contamination of water from leakages of fuels and lubricants from construction equipment	Monitor soundness of equipment	Once a week during construction	MOW/ MWAUWASA	Ensure no leakages and spills	700
Poor air quality from dust and emissions around the construction site and material hauling routes	Ensure mitigation action are in place	Daily during construction	MOW/ MWAUWASA	Air Quality as per TZS4: 1979	350
Possible injuries to neighbours from falling into trenches and open pits for inspection chambers	No open trenches that are not barricaded	Daily during construction	MOW/ MWAUWASA	Ensure backfilling trenches on daily basis or barricading on open trenches	1,500
Generation and Poor disposal of solids and liquid wastes resulting from works	Monitor handling and removal of solid and liquid wastes from construction sites	Weekly during construction	MOW/ MWAUWASA	Collection of waste and trash- Ensure tidy environments	800
Increased transmission of communicable diseases (HIV/AIDs, STIs or STDs)	Monitor pre-employment testing, sensitization (HIV/AIDS) education and treatment programmes	Once a month for 6 months	MOW/ MWAUWASA	Employees screening Target – Every employee screened and treated for ailments	3,000

Safety risks	Monitor use of PPE Monitor use of tagging and signage	Weekly	MOW/ MWAUWASA	Use of PPE Target – all use PPE all places needing tags are	600
Poor public Safety during Construction	Ensure sensitization is carried out to neighbouring communities	Once a week during construction	MOW/ MWAUWASA / OSHA	No injury incidents	500
Injuries from poor safety measures at work place -	Monitor use of PPE Monitor use of tagging and signage	Weekly	MOW/ MWAUWASA	Use of PPE Target – all use PPE all places needing tags are	600
Operation Phase					
Impact	Monitoring Action	Monitoring Frequency	Responsible for monitoring	Parameter/ Target Level	Estimated Cost (USD)
Overflow of sewage in human settlements	Check overflows	Once every week	MWAUWASA	Sewage overflows	200
Generation Sludge	Quality of effluent from septic tank	Once every year	MWAUWASA	Depth of sludge in Septic tanks	500
Occupational health and safety hazards	Monitor use of PPE Ensure constant surveillance of overflows	Daily	MOW/ MWAUWASA	Use of PPE Target – all use PPE at all places of work operation	600
Odours	Monitor quality of air	Once a week during operation	MOW/MWAUWASA	Air Quality as per TZS4: 1979	800
Vandalism and Illegal connections	Sensitization and Sewer line surveillance	Once a week during operation	MWAUWASA	All members are sensitized and there are no illegal connections	300
Increased eutrophication	Sample and test effluent to Lake Victoria	Once a week during operation	MOW/MWAUWASA	Ensure Discharge limits are met	300
Health risks related to polluted vegetables	Check overflows	Once every week	MWAUWASA	Sewage overflows	200
Failure to connect and non-payment of bills	Sensitization and compliance follow up	Once a week during operation	MWAUWASA	All members are sensitized and bills are effected	300
Lack of sufficient water	Supply of sufficient water	Once a week during operation	MWAUWASA	Ensure no clogging and no overflows	300
			Total Monitoring Cost (USD)		**19,025**

10 Cost Benefit Analysis

10.1 Introduction

Resource Evaluation or Cost Benefit Analysis is a tool used either to rank projects or a guide to choose the most appropriate project option. The ranking or decision making associated with projects is based on the expected economic costs and benefits. The general rule is that the project should be undertaken if lifetime expected benefits exceed all expected costs mainly environmental costs.

The aim of Cost Benefit Analysis (CBA) is to present the lifetime costs and benefits of a project as a single number that can be compared to either the interest rate prevailing or the costs and benefits to the social and physical environment. To get this indication, the stream of net benefits (benefits minus costs) is discounted.
The process of conducting the environmental cost benefit analysis involves;

- Description of the project and corresponding capital costs.
- Identification of the project consequences in time frame order and obtain their monetary values.
- Determination of the type of Environmental Cost Benefit Analysis

In the following sections, the environmental cost benefit analysis of the proposed sewerage system project in Mabatini and Igogo areas in Mwanza city is presented.

10.2 Investment Costs and Associated Environmental and Social Costs

The project estimated investment costs to meet the design requirements are presented on the table below;

Table 13: Project Estimated costs

Description	Total (USD)
Preliminaries and General Items	220,000
Sewerage Network - Mabatini	256,236
Sewerage Network - Igogo	824,992
On site Collector Systems - Igogo	108,158
On site Collector Systems - Mabatini	152,659
Total	1,562,045

The project negative impacts during pre-construction, construction; commissioning and operation of the sewerage system were presented under Section 6.

In estimating the costs for each of the impacts, various known environmental and social costs valuation techniques were considered, each with its advantages and disadvantages as presented below;

1. Market Price Method – This technique estimates economic values for ecosystem products or services that are bought and sold in commercial markets. However, the market price method does not deduct the market value of other resources used to

bring ecosystem products to market, and thus may overstate benefits. Secondly, the market data are only available for a limited number of goods and services provided by an ecological resource and may not reflect the value of all productive uses of a resource. Therefore, this method was not considered as a measure for estimation of environmental and social costs in this project area. The major consideration of the project area especially Igogo and Mabatini areas was its nature. These areas have not been a protected hence turned into squatter areas with no ecological value

2. Productivity Method – The method estimates economic values for ecosystem products or services that contribute to the production of commercially marketed goods. Since not all services may be related to the production of marketed goods then the inferred value of a particular impact may understate its true value to society. Therefore based on this limitation the method was not considered for use in estimating the environmental economic value of the proposed project area.
3. Hedonic Pricing Method – This method estimates economic values for ecosystem or environmental services that directly affect market prices of some other goods. Most commonly applied to variations in housing or residential accommodation prices that reflect the value of local environmental attributes. In other words this method uses real estate prices. The logic is that the land or house prices or rents of houses near the project area may go up or down due to their closeness to proposed project. While considering using this method, it was noted that the land value and rents in Igogo and Mabatini area could increase due to the nature of the proposed project. The improvement in water supply and corresponding sewerage system may significantly contribute towards increasing the value of the area in terms of rent and land value. Therefore the cost considered here was benefits the owners in project area will get as the result developing the project. Therefore this method was reasonably used in combination with the other methods in estimating the environmental cost of the project.
4. Travel Cost Method – The method estimates economic values associated with sites that are used for recreation. Since this sewerage system site was not used for recreation activities, it is rather used for residential activities, then the time and travel cost expenses that people would incur when coming home does not represent any revealed willingness as it the only home one has. Therefore this method was also not adopted for use in this analysis.
5. Damage Cost Avoided, Replacement Cost, and Substitute Cost Methods – These methods estimate economic values based on costs of avoided damages resulting from lost ecosystem services, costs of replacing ecosystem services, or costs of providing substitute services. This method was considered for use in the evaluation of the costs for improved health of the people since proper waste disposal will improve health of many children who were being exposed to faecal matter and Lake Victoria will no longer receive untreated wastewater. Also damage of the lake will be avoided as most of the wastewater will be treated on site and the other portion will be channelled through a treatment process. Therefore this method was equally used in estimating the environmental benefits and costs emanating from this project.
6. Contingent Valuation Method – This estimates economic values for virtually any ecosystem or environmental service. The most widely used method for estimating non-use, or "passive use" values. The method involves asking people to directly state their willingness to pay for specific environmental services or their willingness to accept compensation for destruction of the resource based on a hypothetical scenario. The difference between these two is relevant when an allocation of property rights or a redistribution of income is a project feature. Since the project land is owned by the individuals in respective places, the usefulness of this method

seems to be of low value even though there are a few people who will be compensated to pave the way for works. In other words one can have double benefits in being compensated for the service he or she ought to seek! However, this method was used in combination with the other methods (e.g. damage cost avoided) in the estimation of the costs of the impacts and benefits.

7. Contingent Choice Method – The method estimates economic values for virtually any environmental service. Based on asking people to make tradeoffs among sets of ecosystem or environmental services or characteristics. The method major attribute does not directly ask for willingness to pay—this is inferred from tradeoffs that include cost as an attribute. The limitations of this method include
    i. Some tradeoffs are difficult to evaluate, because they are unusual.
    ii. The respondents' behaviour underlying the results of a contingent choice study is not well understood. Respondents may resort to simplified decision rules if the choices are too complicated, which can bias the results of the statistical analysis.
    iii. When presented with a large number of trade-off questions, respondents are likely to lose interest or become frustrated.
    iv. Contingent choice may extract preferences in the form of attitudes instead of behavioural intentions.
    v. By only providing a limited number of options, the method may force respondents to make choices that they would not voluntarily make.
    vi. Contingent ranking requires more sophisticated statistical techniques to estimate willingness to pay.
    vii. Translating the answers into dollar values, may lead to greater uncertainty in the actual value that is placed on the good or service of interest.
    viii. Although contingent choice has been widely used in the field of market research, its validity and reliability for valuing non-market commodities of environment is largely untested.

    Therefore this method was also not adopted for use in this project.

8. Benefit Transfer Method – The method estimates economic values by transferring existing benefit estimates from projects already completed for another location. There was information of the similar project implemented at lower reaches of Mabatini in Mwanza city where the benefits are profound and anyone in a served area if asked on the benefits, s/he would certainly come with numerous and nobody served talks negatively about the project! Therefore this method was equally adopted for use in this assignment.

Based on the combination of adopted methods, the cost of these impacts (including investment, management and monitoring costs estimated under Chapter 9, all worth about less than three million dollars as estimated below on Table 27.

Table 14: Cost estimates for Investment, Environmental and Social Impacts Mitigation measures

Item description	**Unit Rate (USD)**	**Quantity**	**Total (USD)**
a. Disruption of services from relocation of infrastructures e.g. water pipes, electric poles, telephone lines etc	Estimated		50,000
b. Displacement of people and properties	(As per valuation report)		75,000
c. Demolition of paved surfaces during trenches excavation	Lumpsum		25,000
d. Interference with access routes and existing utilities	diversions		15,000
e. Disturbances, particularly land scarring at borrow sites or sources of construction materials	Restoration		15,000
f. Nuisance from noise and vibration during construction, (cost of PPE per person and sensitization)	50	100 persons	5,000
g. Soil Erosion			Part of contractors BOQ
h. Likely accidents from increase in traffic levels in the project area(based on cost for signage)	500	12	6,000
i. Increased safety risk to construction/project personnel (cost of PPE)	100	100	10,000
j. Contamination of water from leakages of fuels and lubricants from construction equipment(based on cost of preventing contamination – equipment service/month	700	12 months	8,400
k. Poor air quality from dust and emissions around the construction site and material hauling routes (based on water sprinkling and equipment maintenance)	500	12 months	6,000
l. Possible injuries to neighbours from falling into trenches and open pits for inspection chambers (Lighting and barricading)	500	12 months	6,000
m. Generation of construction solid and liquid wastes followed by poor disposal of the same (based on cost of removal and cleaning)	2,000	12 months	24,000
n. Increased transmission of communicable diseases	5,000	12 months	60,000

(HIV/AIDs, STIs or STDs) (based on cost for, IEC materials, First Aid Kit, training and sensitization of employees, supply of condoms/month)			
o. Poor public safety during construction (barricading and sensitization of public/month)	200	12	2,400
p. Injuries and Safety risks from poor safety measures at work place - (PPE and sensitization)	150	12	1,800
q. Waste and trash generation (based on cost of removal and cleaning	2,000	12 months	24,000
r. Add Environmental and Social Management Costs under chapter 8			252,100
s. Add monitoring costs under Chapter 9			19,025
t. Add estimated project construction costs			1,570,000
Total Costs of Investment, Environmental Remedy and Avoided Costs (Say USD 2.2 Million)			**2,174,625**

10.3 Lifetime Expected Benefits of the Proposed Project

Proper sanitation is a necessity for any known and developing town; otherwise the town environment we live in will not worth a name! A sewerage system is meant to convey the waste water away from the human dwellings and treat it for final disposal where there are minimum impacts to the human beings and the surrounding environment. A city like Mwanza which was built so many years ago, still misses this important infrastructure in some areas close to the central business area. The existing on–site sanitation facilities in Mwanza city, Mabatini and Igogo areas in particular, are the ones that have resulted into some of diseases recorded in the city hospitals. If the costs implication of these diseases were to be singled out over the lifetime of the project, then the reason for implementing the sewerage system project would be straight forward and evident on the table!

In Mwanza city there are various sources of water supply including Lake Victoria. The presence of water and subsequent improvements there on, will result into significant increase in wastewater and therefore without the efficient sewerage system, the on–site sanitation facilities will not be able to cope! This will be a major factor in further spread of poverty-related waterborne diseases in the city and increasing air pollution from the stench of overflowing on-site sanitation facilities that come from the hills around Mwanza City.

11. Decommissioning

11.1 Introduction

Decommissioning is the final phase in the life cycle of the project after sitting, design, construction, commissioning and operation. Most often, it is a process involving operations such as dismantling and demolition of the used structures and management of resulting materials. All these activities take into account of the environmental health and safety requirements for the operating personnel, the general public and any implications to the environment.

The simplified community sewerage system is not like manufacturing facility whereby the methods used to manufacture some products are increasingly replaced by modern technology or process! The demolition of the sewerage system after its useful life can be thought of in terms of replacement of the defective sections of sewer line, replacement of the manholes and inspection chambers, replacement of parts of the sewer or repairs and maintenance of the system. The life span of plastic pipes and concrete structures for manholes can live up to 25 years or so. Therefore in this project as long as human beings are there and they continue to use water, sewerage systems will always be required. Therefore decommissioning the sewerage system is not seen as an activity which will be needed in a near future besides stated improvements.

Alternatively if at any time, parts of the sewerage system become obsolete, life threatening or unsafe to a state where demolition is necessary, may be to pave a way for improvement or construction of a new sewerage system project, then a new environmental impact assessment study will be required as provided for in the Environmental Management Act Cap 191.

11.2 Reinstatement

The decommissioning plan considered here will be removal of the obsolete items such as damaged plastic pipes, demolition of the manholes and inspection chambers structure, removal of concrete debris from these sewer appurtenances, replacement of the present sewer fittings and returning the area closer to the original form through planting grass and other natural vegetation to match the surroundings.

The major result of demolition for replacement of sewer lines and will be pipes and large volume of concrete debris. This debris will need to be handled through collection, loading and transportation to the final disposal site. Wastes must be disposed off according to the procedure drawn up during the replacement plan to become due about two years before the actual replacement activity. NEMC who will approve the detailed rehabilitation or replacement plan can provide further guidance on the management of the resulting waste. Disposal of all wastes must be in accordance with the "Duty of Care" and the conditions of the environmental performance bond.

11.3 Replacement or Improvement Budget

Replacement or rehabilitation of the sewerage system is envisaged to involve large sums of money. The project proponents will therefore set aside a budget estimated to about USD 2,000,000 to facilitate replacement and/or rehabilitation, reinstatement of the area to match the surroundings. The estimated budget of replacement will be raised from charges that will be set to the users of the community sewerage system.

12 Summary and Conclusions

12.1 Summary

This ESIA report is intended to offer an objective assessment on the concerns that were raised during the scoping phase of the study as well as those issues noticed by the assessment team in the project area based on the technical expertise that lies within Environmental BENCHMARK's EIA consultants. The purpose of this report is to identify and assess the potentially significant environmental and social issues and environmental impacts. Ultimately, the report should give NEMC and other interested stakeholders the opportunity to make an informed decision regarding the proposed community sewerage system project and its various options.

The construction and operation of the proposed sewerage system can result in a variety of impacts on the natural environment as well on the neighbours in the vicinity of areas where trenches will be dug to install the sewer pipes, and locations for septic tanks and drainage fields. The issues related to the proposed sewerage system were identified with various stakeholders, discussed with the technical personnel and assessed by the ESIA consultants. Mitigation measures were listed and the possible remedial options reviewed. The issue of an alternative to the proposed project was discussed as either to remain with the on-site sanitation system which involves pit latrines, septic tanks and soak away pits for wastewater management options. Equally important, the consideration of "Do-Nothing Option" was discussed in sub-section 6.7. The "no-project" can be justifiably dismissed as an alternative due to the need and desirability of the sewerage system in the respective areas of Igogo and Mabatini. The on-site sanitation systems for Igogo and Mabatini areas are in pathetic condition and it really needs a concentrated effort to avert the pollution problem that continues to affect Lake Victoria. It is evident that the experience gained so far from diseases outbreak and the pathetic conditions of Lake Victoria and need to safeguard it are the reasons that lead to the present proposal. If there were ready made numerical figures to know how much damage the on-site sanitation facilities have caused, then these figures would have aided the decision of getting the sewerage system immediately and at any cost!

12.2 Conclusion

The findings of environmental impact assessment of the proposed simplified community sewerage system are positive overall on the health and social–economic environment of the respective communities. However, the impact of the project on the bio-physical environment is potentially slightly negative in pre-construction, construction, commissioning and operation phases of the project.

In addition to this, the environmental impacts expected from the proposed development can be mitigated to acceptable/satisfactory standards except those associated disturbances during construction, which are rated to be of low significance. However, the impacts mentioned in here are not of sufficient importance to stop the proposed sewerage system project. The management of the identified negative impacts will require implementation of the necessary mitigation measures detailed within Section 7 of this document and in the Environmental Management Plan, EMP prepared under section 8 of this EIS report. With adequate management of the identified impacts, as required by the EMP, the environmental risks and impacts of the proposed project can be minimized to acceptable levels.

Furthermore, in order to ensure that the construction of this proposed development does not result into potential negative impacts on site and in the surrounding area, a detailed engineering design must be carried out taking into consideration of the concerns raised by the neighbours particularly on safety of the people and amicable resolve of the land areas to be acquired to accommodate septic tanks and drainage fields.

Good operation and maintenance (O&M) is essential for the long-term sustainability of any sewerage system, but particularly for simplified sewerage, since the low diameter of pipes and lack of experience in using the sewers may make the system more vulnerable to clogging.

The concept of householders being responsible for O&M of the sewers has not worked well in the long term. A study of simplified sewerage systems in other countries such as Brazil has shown that effective maintenance of sewers by utilities companies has often been the result of community pressure by neighbourhood associations. Without such pressure maintenance by utilities has often been inadequate, and community maintenance has not been effective either.

Community participation process provides a good opportunity for complementary actions like hygiene promotion, which can have a significant impact on public health at a relatively limited cost.

For this to work well, a Community Liaison Office (CLO) must be established and must comprise of the following key stakeholders:

- Three members of from each of the wards of the Igogo and Mbuga Wards Development Committees.
- Contractors HSE officer
- City Environmental Management Officer/ City Community Development Officer
- MWAUWASA Project Administrative Officer

During construction the committee must continue to function as the key role player to ensure that the contents of the EMP are complied with. This committee will also be responsible for dealing with or addressing any issues associated with the proposed sewerage system project. The composition of the committee must be changed during operation to suit the conditions of the site based on its use and this will ensure the good co-existence of the sewerage system with the surrounding resident communities.

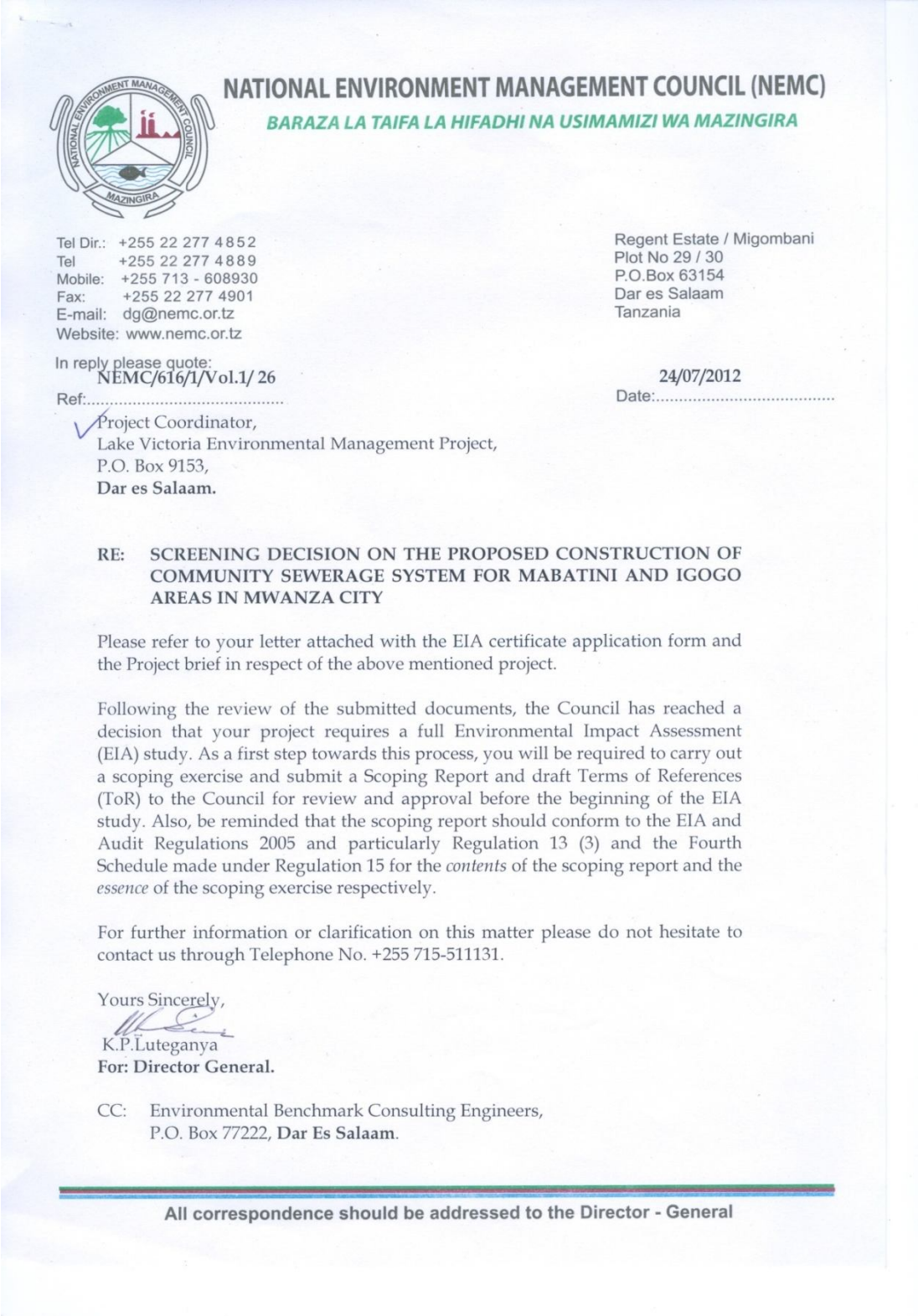
References

1. LVEMP/MWAUWASA: Mwanza Water Supply and Sanitation: Impact Survey Report. May, 2004
2. LVEMP/MWAUWASA: On site Sanitation Social Survey Report July, 2007
3. LVEMP: Feasibility Study and Preliminary Design for Community Based Simplified Sewerage System at Igogo Ward Mwanza City, Socio-economic Report. November, 2002
4. MCC: Mwanza City Council Socio-economic Profile, 2012
5. TACNE: Background Studies for the Preparatory Phase of the SoCR. June, 2009
6. The Cartagena Protocol on Bio safety to the convention on Biological Diversity (2000)
7. The convention concerning the Protection of World Cultural and Natural Heritage, Paris, (1972)
8. The Convention of Biological Diversity, (1992) ratified by Tanzania in 1996).
9. The convention of Wetlands of International Importance especially as water fowl Habitat (The Ramsar Convention) (1971) ratified by Tanzania in 1998).
10. The convention on International Trade and Endangered species of Wild Fauna and Flora (CITES), Washington (1973)
11. The Convention on the conservation of Nature and Natural Resources, 1968 Algiers, (1968)
12. The convention on the prevention of Marine Pollution by dumping of Wastes and other wastes, London, (1972)
13. The convention on the prevention of Marine Pollution from ships (MARPOL) (1973)
14. The Convention to combat, desertification, particular Africa, Paris 1994
15. The Land Acquisition Act of 1967,
16. The Montreal protocol on substances that deplete the ozone layer, Montreal, 1987
17. The National Land Policy (1996),
18. URT: National Environmental Action Plan, NEAP (1994)
19. URT: 2012 Population and Housing Census
20. URT: Environmental Impact Assessment and Audit Regulation of 2005
21. URT: Forest Act No. 14 of 2002
22. URT: Land Act Cap 113, (No. 4 of 1999)
23. URT: Land Use Planning Act No. 6 of 2007
24. URT: Local Government (District) Authorities Act No. 7 of 1982
25. URT: MKUKUTA- Annual implementation Report, 2009/2010 November, 2010
26. URT: National Water Policy (2002)
27. URT: The Agricultural and Livestock Policy (1997)
28. URT: The Contractors Registration Act No. 17 of 1997
29. URT: The Engineers Registration Act No. 15 of 1997
30. URT: The Environmental Management Act (EMA), Cap 191 (No. 20 of 2004)
31. URT: The Land (Forms) Regulation 2001
32. URT: The Land Acquisition Act, Cap 118 of 2002
33. URT: The Mining Act No. 5 of 1998
34. URT: The National Environmental Policy, NEP (1997)
35. URT: The National Land Policy (1996)
36. URT: The National Policy on HIV/AIDs (2001)
37. URT: The Occupational Health and Safety Act No. 5 of 2003
38. URT: The Roads Act No. 13 of 2007

39. URT: The Surface and Marine Transport Regulatory Authority Act No. 9 of 2001
40. URT: The Village Land Act, Cap 114 (No. 5 of 1999)
41. URT: The Water Resources Management Act No. 11 of 2009
42. URT: Water Supply and Sanitation Act No. 9 of 2009
43. URT: Wildlife Conservation Act, No. 5 of 2009
44. URT: Women and Gender Development Policy (2000)

Appendices

Appendix I: Screening decision for undertaking of environmental and social impact assessment



NATIONAL ENVIRONMENT MANAGEMENT COUNCIL (NEMC)

BARAZA LA TAIFA LA HIFADHI NA USIMAMIZI WA MAZINGIRA

Tel Dir.: +255 22 277 4852
Tel +255 22 277 4889
Mobile: +255 713 - 608930
Fax: +255 22 277 4901
E-mail: dg@nemc.or.tz
Website: www.nemc.or.tz

Regent Estate / Migombani
Plot No 29 / 30
P.O.Box 63154
Dar es Salaam
Tanzania

In reply please quote:
Ref: NEMC/616/1/Vol.1/ 26

Date: 24/07/2012

Project Coordinator,
Lake Victoria Environmental Management Project,
P.O. Box 9153,
Dar es Salaam.

RE: SCREENING DECISION ON THE PROPOSED CONSTRUCTION OF COMMUNITY SEWERAGE SYSTEM FOR MABATINI AND IGOGO AREAS IN MWANZA CITY

Please refer to your letter attached with the EIA certificate application form and the Project brief in respect of the above mentioned project.

Following the review of the submitted documents, the Council has reached a decision that your project requires a full Environmental Impact Assessment (EIA) study. As a first step towards this process, you will be required to carry out a scoping exercise and submit a Scoping Report and draft Terms of References (ToR) to the Council for review and approval before the beginning of the EIA study. Also, be reminded that the scoping report should conform to the EIA and Audit Regulations 2005 and particularly Regulation 13 (3) and the Fourth Schedule made under Regulation 15 for the *contents* of the scoping report and the *essence* of the scoping exercise respectively.

For further information or clarification on this matter please do not hesitate to contact us through Telephone No. +255 715-511131.

Yours Sincerely,

K.P.Luteganya
For: Director General.

CC: Environmental Benchmark Consulting Engineers,
P.O. Box 77222, **Dar Es Salaam**.

All correspondence should be addressed to the Director - General

Appendix II: Approved Terms of Reference for ESIA for Simplified Sewerage System for Mabatini and Igogo Areas in Mwanza City

1.0 Background

On the basis of the issues that have been identified during the scoping exercise the detailed Terms of Reference for conducting the Environmental and Social Impact Assessment (ESIA) were prepared. This provides a formal and clear guidance to the ESIA team on the issues that must be addressed in the Environmental Impact Statement (EIS).

2.0 Scope of Consulting Services

The Consultant shall carry out environmental and social impact assessment to address environmental impacts resulting from implementing the proposed project. The Consultant shall review all available and relevant documents like the relevant Environmental and Social Impact Assessment Reports, Scoping Reports, project, maps and previous studies if any to assist in the undertaking of ESIA. In the assignment, the Consultant has to prepare Environmental and Social Impact Assessment report including the development of Environmental and Social Management Plan.

The consultancy services will be carried out in accordance with the provided Terms of Reference which are in accordance with the requirements of the applicable national legislations as well as World Bank requirements for undertaking Environmental and Social Impact Assessment. In this regard, the Environmental and Social Impact Assessment (ESIA) should be undertaken in line with the requirements of:

(i) The Environmental Management Act (2004) Cap 191,
(ii) Environmental Impact Assessment and Audit Regulations 2005; and
(iii) World Bank Safeguard Policies.

The Consultant shall perform all impact analyses related to services as described therein with due care and diligence to attain the objective of the assessment, among others, the Consultant will perform the following tasks:

Task (i): Brief on Project Background

The Consultant shall provide description or profile of the developer, background to the project proposal and its justification, need and purpose of undertaking the study, ESIA study methodologies and approaches applied and structure of the report.

Task (ii): Description of the Proposed Project

The Consultant shall describe project components and activities to be implemented in each phases of project life i.e. pre construction or mobilization, construction, operation and post-construction (demobilization). This part intends to give a general idea of what the project will entail. To avoid unnecessary details, focus on the project activities based on project phases i.e. mobilization or pre-construction phase, construction phase, operation phase and demobilization phase. The description shall include the following information:

(a) Background information

Background information shall include: Title of the proposed project and developer; project justification and objectives; funds and source of funding or financier(s); project location including maps of appropriate scale; project design, size and capacity; area of influence of the project works; project life span and project components and land size required;

(b) Project activities

Description of project activities shall be based on phases of project life cycle i.e. mobilization or pre-construction, construction, operation and maintenance, demobilization and decommissioning phases:

(i) Mobilization or Pre-construction activities;

Describe activities pertaining to land acquisition; construction camp and site workshop; project design; land dispossession and property valuation; relocation and compensation arrangements;

(ii) Construction activities;

Describe all associated activities during construction work such as construction materials and water indicating its types and sources; blasting; cut and fill; land clearance; soil and gravel compaction and levelling, demolition of structures along the sewer line reserve; types, sources and amount of liquid and solid waste generation and including their disposal; dust etc.

(iii) Operation and maintenance activities;

Identify and describe all the associated activities to be conducted during project operation and maintenance such as project health and safety measures, operation and management of project facilities along the project such as public toilets, etc.

(iv) Demobilization Activities

Identify and elaborate on the activities to be conducted during or decommissioning of the project including movement and demolition of construction facilities, restoration of borrow pits, termination of the temporary workers' employment, waste management, etc.

(c) Project Requirements

Identify all types, sources and quantities of construction materials, equipments and chemicals required by the project. Source and quantities of water, energy, manpower (Staffing and support) and other facilities and services required in each phase of project life etc

Task (iii): Provide Baseline Condition or Description of the Environment

In order to forecast the impacts, it will be necessary to determine the initial reference or baseline state. It is therefore, required to describe the existing environment that would be directly and/or indirectly affected by the construction of the proposed project. The 'environment' to be affected must be based on the project definition of the term that would include physical, biological socio-economic, cultural and historical factors. Only those environmental factors that are necessary to understand the impacts of the planned development should be considered. Assemble, evaluate,

and present baseline data on the relevant environmental characteristics of the study area. Include information on any changes anticipated before the project commences.

(a) **Physical environment**: This shall cover geology; topography; soils; climate and meteorology; ambient air quality; surface and groundwater hydrology; existing sources of air emissions; existing water pollution discharges; receiving water quality; traffic data etc

(b) **Biological environment**: flora, fauna, rare, threatened or endangered species, ecologically important or sensitive habitats, significant natural sites; species of commercial importance; and species with potential to become nuisances, vectors, or dangerous (of project site and potential area of influence of the project); and

(c) **Socio-economic and socio-cultural environment:** population; land use; planned development activities; community structure; employment; livelihood means, distribution of income, goods and services; recreation; public health; Gender issues and HIV/AIDS, cultural/historic properties; tribal peoples; and customs, aspirations, and attitudes to the project.

The Consultant shall indicate sources of data and methodologies used to acquire data. The relevant international and national standards of noise levels, water and air quality etc. must be applied when comparing between the existing and anticipated impacts of project.

Task (iv): Describe the Policy, Legal and Institutional Framework

Describe the policy, legal, institutional framework as well as regulations, strategies, standards, international conventions and treaties that are of relevance to the environmental management and the proposed undertaking in particular. They should be those, which relate to but not limited to environmental quality, health and safety, protection of sensitive areas and protection of endangered species. The objective of this section is to show compliance of the developer with the existing policies, laws administrative/institutional conditions both at national and international levels.

The following, but not limited to, are the relevant policies and legislation to be cited in relation to the proposed project undertakings.

Relevant Legislation and Policies for the Proposed Project	
Legislations	**Policies**
Environmental Management Act, Cap 191;	National Environmental Policy (1997)
Environmental Impact Assessment and Audit Regulations (2005);	National Human Settlements Development Policy (2000)
HIV and AIDS (prevention and Control) Act No. 28/08 (2008);	National Water Policy (2002);
Local Government Laws (Miscellaneous Amendments) Act (1999);	Women and Gender Development Policy (2000)
The Land Use Planning Act No 6 of 2007;	National Mineral Policy (2009)
Town and Country Planning Ordinance , Cap 378 (1961);	Construction Industry Policy (2002)

Mining Act (2010);	National Energy Policy (2003)
Water Resources Management Act 2009;	National Land Policy 1995 (revised in 1997)
Mining Act , 2010;	National Policy on HIV/AIDS, 2001
Mining (Environmental Management and Protection) Regulation (1999);	
Energy and Water Utilities Authority (EWURA) Act (2001);	
Occupational Health and Safety Act (2003);	
Explosives Act, CAP,45 R. E 2002;	
The Employment and Labour Relations Act, 2004	

Furthermore, the Consultant shall clearly describe the linkage between the functions of the relevant institutional or administrative frameworks in Tanzania and the proposed project undertakings;

Task (V): Stakeholder Consultations and Public Involvement.

The Consultant shall identify and consult all the relevant stakeholders at national, regional and local levels. These include the Government Agencies, local NGOs, affected groups and other interested parties in order to obtain their views regarding the proposed project works. Indicate who they are, where they are, why they are important in this project, which issues are critical to them and how they will be involved in the ESIA study. Particular attention shall be paid to the disadvantaged groups (e.g. children, the elderly and women) that may be affected by the proposed project.

The Consultant shall describe methodology applied during stakeholder consultations and public participation such as consultative meetings, household, focus groups interviews and other most appropriate methods to establish public views on the proposed project. Meetings with local authorities and the public shall be held to obtain their views on the project and its implication to the environment and social aspects.

Consultant shall propose public consultation programme during the ESIA study and the most appropriate methods to establish public views should be used. The consultation process should be open and transparent to ensure that the views of interested and affected parties are incorporated in the project design. A summary of issues and response in table form indicating sections which address them should be prepared.

There should be evidence in the Environmental and Social Impact Statement (EIS) to the effect that there were stakeholders' consultations at all levels. Photographs, minutes of the meetings, names and signatures of consulted people could be necessary in this regard.

Among others, the consultations should ensure the involvement of the following:

(i) Vice President's Office - Division of Environment;
(ii) Ministry of Water;
(iii) Ministry of Energy and Minerals;
(iv) Ministry of Lands, Housing and Human Settlement Development;
(v) Local Governments in the project area;
(vi) Mwanza Water Supply and Sewerage Authority;

(vii) National Environment Management Council;
(viii) Tanzania National Roads Agency(TANROADS);
(ix) Utility Companies;
(x) Local Communities; and
(xi) Regional Authorities.

International/Regional Organizations

(i) World Bank; and
(ii) Other organizations supporting some projects in the areas influenced by the project proposal.

Task (vi): Analysis of Alternatives to the Proposed Project

The Consultant shall describe different project alternatives that were examined in the course of designing the proposed project and identify other alternatives, which would achieve the same objectives. Including the 'No action' alternative to demonstrate environmental and social conditions without the project, consideration of alternatives should extend to sitting, design, technology, construction techniques, phasing and schedule, and operating and maintenance procedures alternatives.

Compare alternatives in terms of potential environmental and social impacts; capital and operating costs; suitability under local conditions; and institutional, training, and monitoring requirements. When describing the impacts, indicate which are irreversible or unavoidable and which can be mitigated. To the extent possible, quantify the costs and benefits of each alternative, incorporating the estimated costs of any associated mitigating measures.

Various environmental and social criteria should be developed to select the best project alternatives.

(VII): Impact Identification and Assessment

The Consultant shall identify, analyze and assess environmental and social impacts (positive and negative) of the proposed project works on natural resources, human beings and the ecosystems based on the phases of project life cycle i.e. mobilization or pre-construction phase, construction phase, operation phase and decommissioning and demobilization phase. Methods applied in impact identification and the criteria used in evaluating the levels of impacts significance of the proposed project works must be specified.

The impacts analysis should focus on both positive and negative impacts and be able to state whether the impacts are positive or negative; direct or indirect; short term or long term; reversible or irreversible. The Assessment should focus on the potential for negative environmental and social impacts caused by planned and unplanned (spontaneous) in-migration of people; clearing of forest lands for agriculture; increased pressure on fuel wood, fodder and water resources; social disruptions and conflicts; and threats to woodlands and wildlife species composition and habitats.

The assessment should also examine the potential for linear resettlement that usually involves projects producing linear patterns of land acquisition. An overview shall be provided of different groups of people and their cultural, ethnic, and socio-economic characteristics, and how they are likely to benefit and/or be negatively affected by the project. Negative impacts may include but not be limited to physical relocation, loss of land or other physical assets, or loss of access to livelihood.

The ESIA study should clearly identify and analyze cumulative, residue and trans-boundary impacts. Wherever possible, describe impacts quantitatively, in terms of environmental components affected (area, number), environmental and social costs and benefits. Assign economic values when feasible. Characterize the extent and quality of available data, explaining significant information deficiencies and any uncertainties associated with the predicted impacts.

The Consultant should take into consideration existing by-laws, national and international environmental standards, legislation, treaties, and conventions that may affect the significance of identified impacts. The Consultant shall use the most up to date data and methods of analysing and assessing environmental and social impacts. Uncertainties concerning any impact shall be indicated.

The Consultant shall conduct a review of gender issues in the project area, the study shall include the project section influence to the lives of men, the elderly, women, children, and disabled so as to come up with a quantifiable analysis of the benefits which will accrue to them during and after the project construction.

Task (VIII): Propose Impact Mitigation Measures

The Consultant shall suggest cost-effective measures for minimizing or eliminating adverse impacts of the proposed project works. Measures for enhancing positive or beneficial impacts should also be recommended. The costs of implementing these measures shall wherever possible be estimated and presented.

The Consultant shall review the ongoing measures on HIV/AIDS awareness creation within the project area and propose for the mitigation measures. The proposal shall include a plan of action which will identify responsible key implementers, time frame and expected output.

The proposed mitigation measures and cost estimate shall be included in the Bills of Quantities (BOQ) for the project and should also include cost of supervision for the implementation of mitigation measures. Also measures to address emergencies should be covered.

Task (IX): Cost Benefit Analysis.

The Consultant shall review the economic study undertaken during the Preliminary engineering design to ascertain the economic viability taking into account the environmental and social issues. The Economic Internal Rate of Return (IRR) and Net Present Value (NPV) of the project at recommended discount rate of 12% should be calculated and interpretation of the results be provided.

Task (X): Development of Environmental and Social Management Plan (ESMP)

The Environmental and Social Management Plan focuses on three generic areas: implementation of mitigation measures, institutional strengthening and training, and monitoring. The Consultant shall prepare Environmental and Social Management Plan which will include proposed work programme, budget estimates, schedules, staffing and training requirements and other necessary support services to implement the mitigation measures. Institutional arrangements required for implementing this management plan shall be indicated. The cost of implementing the monitoring and evaluation including staffing, training and institutional arrangements must be specified. Where monitoring and evaluation will require inter-agency and inter-Governments collaboration, this should be indicated.

Identify institutional needs to implement environmental assessment recommendations. Review the authority and capability of institutions at local, regional, and national levels and recommend how to strengthen the capacity to implement the environmental and social management and monitoring plans. The recommendations may cover such diverse topics as new laws and regulations, new agencies or agency functions, inter-sectoral arrangements, management procedures and training, staffing, operation and maintenance training, budgeting, and financial support.

ESMP should specify impact mitigation plan and environmental monitoring plan requirement. The costs, responsibility and timeframe for mitigating each impact and monitoring of each environmental parameter should be provided. Impact Mitigation plan and monitoring plan should be based on the project phases i.e. mobilization or Pre-construction, Construction, Operation, Demobilization and Decommissioning phase.

Task (XI): Reporting

Notwithstanding the above requirements, the contents and the structure of the Environmental and Social Impact Assessment Report should be in accordance with the Environmental and Impact Assessment and Audit Regulations.

The ESIA should be concise and limited to significant environmental Issues. The main text should focus on actions supported by summaries of the data collected and citations for any references used in interpreting data. Detailed or un-interpreted data are not appropriate in the main text and should be presented in appendices or a separate volume. Unpublished documents used in the ESIA may not be readily available and should also be assembled in appendices.

3.0 Team of Experts

A team of key staff for undertaking Environmental and Social Impacts Assessment will be comprised of:

- Registered Environmental Impact Assessment Expert
- Sociologist, and
- Civil Engineer with the bias in Water Supply and Sewerage systems

In addition to the above key staff the Consultant shall determine the Support and Backup staff deemed necessary to assist with successful completion of the assignment.

Appendix III –Consulted Stakeholders

Stakeholders' Consultation for Environmental and Social Impacts Assessment for LVEMP II Works for Construction of Artificial Wetlands and Sewerage Facilities in Mwanza City and Solid Waste Disposal Facility and Charco Dam in Magu District

OFFICIALS CONSULTED

NO.	DATE	NAME	POSITION	MOBILE NO./EMAIL	SIGNATURE
1	27/6/12	Cheruncis Joseph	Ag- RAS	0787 174317	
2	27/6/12	Mark George	Afisa Tawala	mark_gmos@yaho.com 0715 464836	
3	27/6/12	ELIAS M. MAKORI	DAS	0754-415458 NYAMAGANA	
4	27/6/12	DAVID LYAMONGI	DAS- ILEMELA	0767 363426	
5	27/6/12	PETER K. MICHAEL	A/TARAFA-ILEMELA	0754327550	

OFFICIALS CONSULTED

NO.	DATE	NAME	POSITION	MOBILE NO. /EMAIL	SIGNATURE
1	22/6/2012	Tito Jeremiah Mabiaga	AS CD	0756145400	
2	22.6.2012	Patricia Karangwa	City Economist	0786-274472	
3	22.06.2012	Francis Mnkabenga	City Agric. officer	0784410615	
4.	22/6/012	Eng. T. P. Buriku	AGCE	0765 210710	
5.	22.06.12	Jumma Samwel	AG CCDO	0758-381444	
6.	22/06/2012	SIMON N2AGI	ENVIRONMENTAL PLANNER	0754-031149	

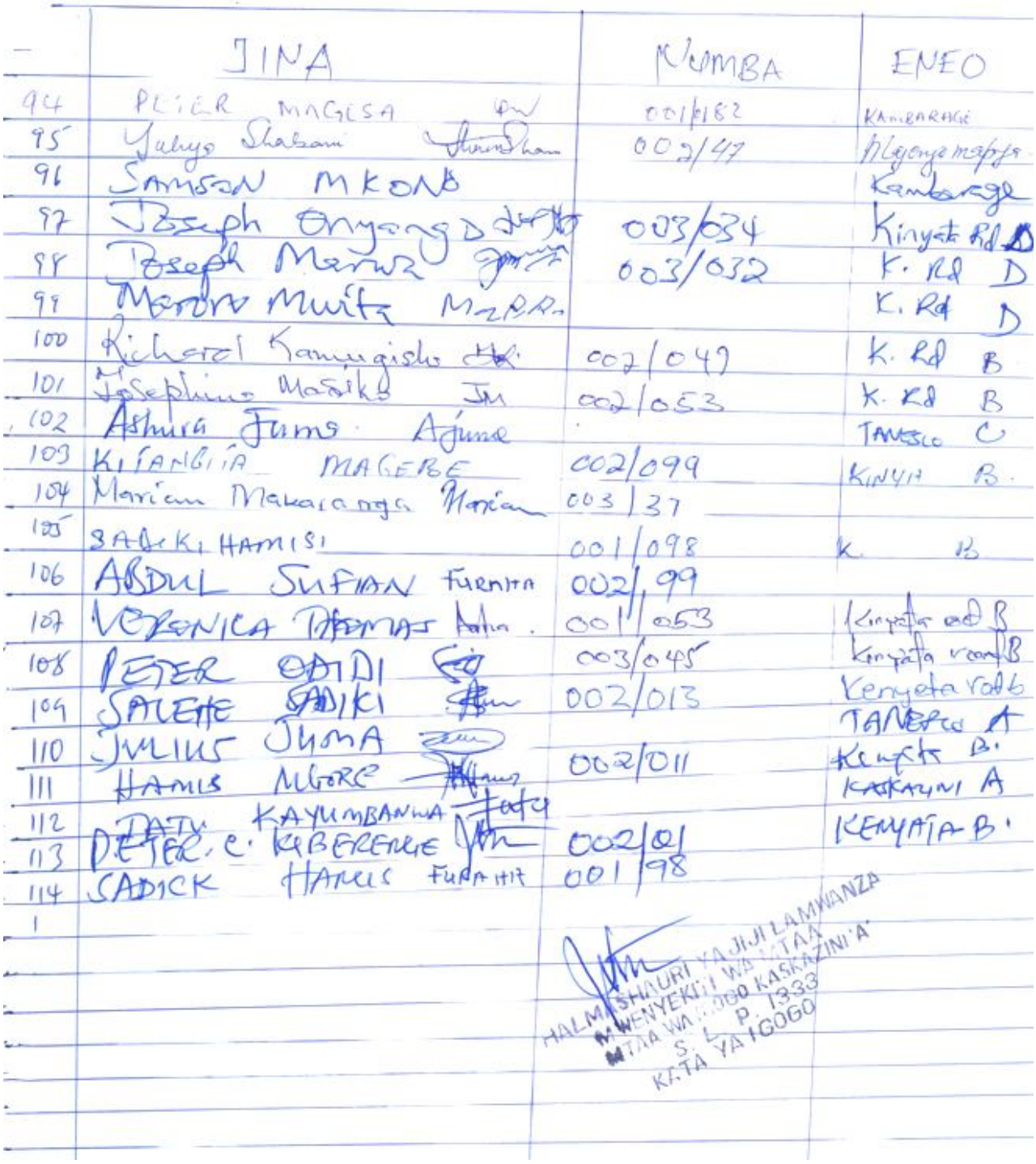
MKUTANO WA HADHARA.
23-06-2012.

	JINA.	NYUMBA	ENEO.
1.	Stephen Marwa	001/070	Kenyatta rd A (Ghetto KSKA)
2.	Deo E. Msulwa		TANESCO A
3	Wambura Chacha		Kambarage
4.	Ladis Kenji	091/175	Kambarage (Igogo block A)
5	Joseph Amata	001/004	Kenyatta A (Igogo block A)
6	EMMANUEL BERNARD	081/083	Kenyatta road C
7	MASATU MANYORI	002/0038	Kenyata road 'B'
8	SALEH SADIKI ALLY	002/023	Kenyatta rd 'B'
9.	Edward Kimola	003/003	Kenyatta road "A"
10.	OMARI SEREMANI OMARI	002/050	kenyeta road B.
11	THEREZA JOSEPH TELEZA	005/000	Kenyata road.
12	DALUDI ONESMO	004/040	Kenyata Road 'A'
13.	Juma NYANCHABO	002/100	Kenyatta Road K.
14	BONIFACE KOROSSO	00/022/23	
15.	MARIA M MKONO	001/106	KAMBARAGE
16.	MAREDA		
16.	SAMWEL LUCAS	003/051	KENYATTA ROAD
17.	MKUTA CHACHA	001/110	KAMBARAGE
18.	MICHAELO OKINYA	003/043	KENYATTA ROAD C
19.	SABASTIAN PETER	001/189	KAMBARAGE
20	JOSEPH KITENDE	001/105	KAMBARAGE
21	MRS PROSPER CHRISTOPHAR	005/038	TANESCO B
22	MAURIDI SITEVEN	001/047	KENYATTA ROAD. A
23	BENADI KICHA.	003/052	KENYATTA ROAD C.
23	MUSSA BUNDU.	003/036	KENYATTA ROAD C
24	N-yangi Bhoke	002/068	KEK. R. B
25	WERENA NYAMUHANGA	008/085	KENYATTA ROAD A
26	MUONO MSETI	001/49	KENYATTA ROAD. "A"
27	NYABANGE ORWARU	002/096	KENYATA ROAD = B
28	MWITA NTONDO	002/021	KENYATTA ROAD = B
29	PRISKA KAYAYA	002/0116	KENYATTA ROAD = B

HALMASHAURI YA JIJI LA MWANZA
MWENYEKITI WA MTAA
MTAA WA IGOGO KASKAZINI 'A'
S.L.P. 1333

	JINA.	NYUMBA	MIAA: LIVED
30	BIKE M. IGOTI	002/051	M. K. R. B.
31	JASTIN · MAIGA	002/076	Kenyata B (144 KSK A
32	JOHN MMANYI	003/018	Kenyata C (144 KSK A)
33	ROBI MASIAGA	001/137	Kambarage (144 KSK A)
34	LUCIA CHACHA	001/133	Kambarage (144 KSK A)
35	Peter Masuki	002/092	Kenyata B (144 KSK A
36	Victor Kayanda	002/110	Kenyata B (144 KSK A)
37	Zakaria Thobias ZAKARIA	002/083	Kenyata B (144 KSK A
38	Charles Makuvi	001/101	Kambarage (144 KSK A)
39	Thobias Machanche	002/091	Kenyata B (144 KSK A)
40	Joseph Onyango	003/034	Kenyata C (144 KSK B)
41	Jackson Nkumbye	001/055	Kenyata A (144 KSK A)
42	Fadhili Omary	002/095	Kenyata B (144 KSK A)
43	Petro Amdo	003/026	Kenyata C (144 KSK B)
44	Fatuma Petro	001/134	Kambarage (144 KSK A)
45	Muungane Saimon	004/047	Tanesco A (144 KSK B)
46	Wilkiste Thobias	003/039	Kenyata C (144 KSK B)
47	Lameck Sambare	001/086	Kenyata (A) 144 KSK A)
48	Jumanne Peter Ogenga	001/176	Kambarage 144 KSK A
49	Magret Sokio	002/144	Kenyata B (144 KSK A)
50	Asha Slyvester	002/103	Kenyata B (144 KSK A)
57	Richard Slivanus	003/036	Kenyata C (144 KSK B)
52	James Mwakaabe	002/015	Kenyata B (144 KSK A)
53	Jatu Ruta	002/107	Kenyata B (144 KSK A)
54	Thadi Nusita	002/074	Kenyata B (144 KSK A)
55	Bruno Nas Joseph Manga	003/032	Kenyata C (144 KSK B)
56	Moren Joseph	002/079	Kenyata B (144 KSK B
57	Maria M Bruno	001/187	Kenyata A (144 KSK A)
58	Emanuel Mwita Sadi	003/047	Kenyata C (144 KSK B)
59	Jums Mhoji	002/069	Kenyata B (144 KSK A)
60	Nyangi Boke Nyangi	017/068	Kenyata B (144 KSK A
61	Richard Samson	002/019	

NO.	JINA		NYUMBA	ENEO
67	Joseph	Masiko	009/053	Kinyata road B
68.	Charas	Makuli	001/109	Kambaraga
64	Mwita	Khabaha	002/063	Kinyata road B
65.	Chacha	Mwita	002/069	Kinyata road B
66.	Mtera	Magige.	003/044	Kinyata road C
67	Michael	Masatu Maiko	003/058	Kinyata road C
68	Shaban	Mohamed. Mahaya	001/061	Kinyata road A
69.	Shaban	Mohamed. Mahaya	001/062	Kinyata road A
70.	Willison	Mhaga.	001/173	Kinyata road B.
91	Mariam	Said Mfaki	001/041	Kinyata road A
98	Seling	festo.	003/023	Kinyata road C
73.	Wankuly	Mwita		
74	Saiph	Musa.	0	
75	Charas	Mfoga Machanchu	009/097	Kinyata road B
76.	Musa	Patris	09/118	Kinyata road B.
77.	Chacha	Marwa.	001/141	Kambaraga
78.	Shimene	Masula	00/069	Kambaraga
79	Christopha	Masunga.	09/009	Kambaraga
80	Willam	Raphael	046 005/046	Tanesco.
81	Mtafiro	Charas	003/036	Tanesco.
82.	Maunda	Maganda	003/034	Tanesco.
83.	Pius	Andrea P. Anders.	009/038.	
84	Mwita	Mgusuhi	00 080	Kinyata road B.
85.	Agustino	Nyamuanga V. Agostino.	002/019	Kinyata road B
86.	Hapiness	Joseph	001/177	Kambaraga
87	Fanda	Hussein	001/168	Kambaraga
88	HALIMA.	MAKIMA	002/109	KASKAZINI "A"
89	WELENIA	MUSIA	002/104	"
90	JUSIAR	JOSEPHO JACKISON	001/111	KAMUBALAGE
91	[illegible]	MUSIA	002/108	KASKAZINI "A"
92	BAKARI	MUHINA	003/040	KENYATA C
93	HALIMA	MAKIMA	001/038	KENYATA "A"



–	JINA	NAMBA	ENEO
94	PETER MAGESA	001/182	KAMBARAGE
95	Yahya Shaban	002/47	Nyegezi mapya
96	SAMSON MKONO		Kambarage
97	Joseph Onyango	003/034	Kinyata Rd
98	Joseph Marwa	003/032	K. Rd D
99	Mabula Mutta		K. Rd D
100	Richard Kamugisha	002/049	K. Rd B
101	Josephine Masika	002/053	K. Rd B
102	Ashura Juma Ajuma		TANESCO C
103	KISANGIA MAGERE	002/099	KINYA B.
104	Mariam Makaranga	003/37	
105	SADICK HAMISI	001/098	K. B
106	ABDUL SUFIAN	002/99	
107	VERONICA	001/053	Kinyata road B
108	PETER ODIDI	003/045	Kinyata road B
109	SALEHE SADIKI	002/013	Kenyata road
110	JULIUS JUMA		TANESCO A
111	HAMIS MOORE	002/011	Kinyata B.
112	DATY KAYUMBANWA		KASKAZINI A
113	PETER. E. KABEREGE	002/01	KENYATA B.
114	SADICK HAMIS FUPA HII	001/98	

HALMASHAURI YA JIJI LA MWANZA
MWENYEKITI WA MTAA
MTAA WA ... KASKAZINI 'A'
S. L. P. 1333
KATA YA IGOGO

MKUTANO WA WANANCHI WA MITAA WA IGOGO KASKAZINI A-D UHADHAISHU MFUMO WA MAJI TAKA TAREHE 23/06/2012

MUHTASARI

- Mkutano ulifunguliwa na M/kiti ulifunguliwa na M/kiti Saa 4:20 Asubuhi Kwa Kumwadimba wananchi wa Mitaa Miwili ya Igogo KSK A na D Kwa ajili ya Swala Zima la Maji taka.

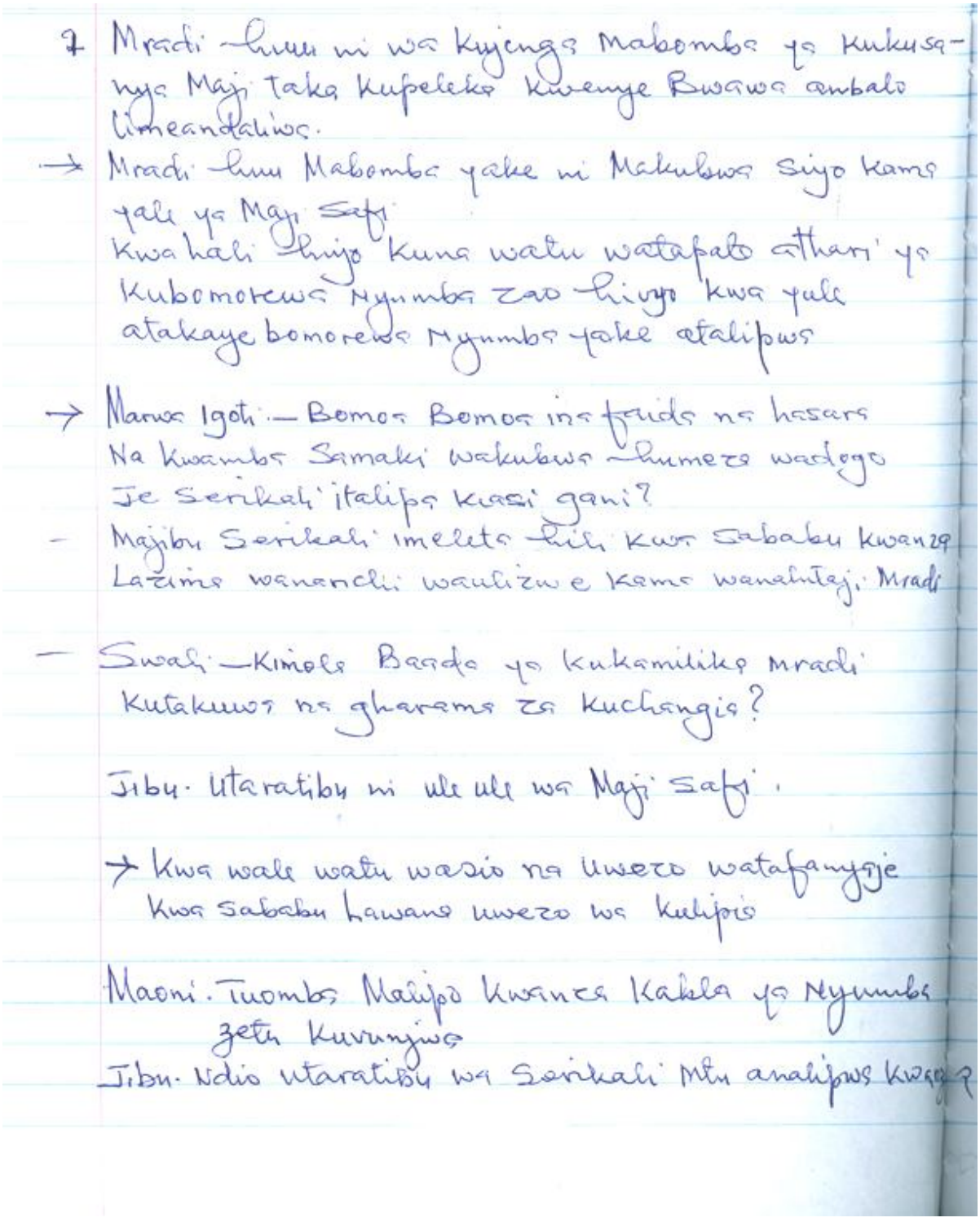
Kiini cha Mkutano ni juu ya Athari za Maji Taka.

Wageni Ni Weisko Magoto
Mgeta – Mhandisi
Huruma Kisaka

- 1L1 Mradi huu ufanikiwe lazima athari za Mradi Zifahamike na Kwamba Zitatatuliwa vipi ndio Maana tuko hapa leo. Leo Tumekuja Kujadiliana Kuhusu faida na hasara za Mradi.

Bwana Mgeta alisema kuwa Mradi huu ni wa wananchi Sio wa Mwauwasa. Pia aliwauliza wananchi Kama wanaupokea ~~wana~~ au wanauhataa, wananchi wengi walisema wanautaka.

1 Kama Mradi utapita Kwenye Nyumba ya Mtu Mhusika atalipwa vipi?



7 Mradi huu ni wa kujenga Mabomba ya kukusanya Maji taka kupeleka kwenye Bwawa ambalo limeandaliwa.

→ Mradi huu Mabomba yake ni Makubwa Sijo kama yale ya Maji Safi
Kwa hali hiyo kuna watu watapata athari ya kubomolewa Nyumba zao hivyo kwa yule atakaye bomolewa Nyumba yake atalipwa

→ Mawa Igoti — Bomoa Bomoa inafaida na hasara
Na kwamba Samaki wakubwa huwezo wadogo
Je Serikali italipa kiasi gani?
- Majibu Serikali imeleta hili kwa Sababu kwanza Lazima wananchi waulizwe kama wanahitaji Mradi

— Swali — Kinola Baada ya kukamilika Mradi Kutakuwa na gharama za kuchangia?

Jibu. Utaratibu ni ule ule wa Maji Safi.

→ Kwa wale watu wasio na Uwezo watafanyaje Kwa Sababu Lawama uwezo wa kulipia

Maoni. Tuombe Malipo kwanza Kabla ya Nyumba zetu Kuvunjwa
Jibu. Ndio utaratibu wa Serikali Mtu analipwa kwanza?

- Joseph — Yeye alisema kuwa ~~ang~~ anaunga mkono mradi kwa asilimia 100.

Je tutakuwa tunalipia kama tunavyolipia bill za ~~ume~~ Umeme.?

Ufafanuzi kwa wale ambao watakuwa wamebanana sana watachagua Eneo la kujenga Shimo la kukusanyia Maji yao na baada ya hapo litawekwa Bomba kubwa kwenda kwenye bomba la kusafirisha maji kwenda kwenye Bwawa kuu.

Na kwamba gharama za kutoka kwenye choo chako ama kutoka kwenye bafu yako mpaka pale penye Shimo kuu ni za Mwenye Nyumba. Sio Mwauwasa.

- Na kwamba Mradi huu ni lazima uvunjaji uwepo. Mwezeshaji aliendelea kusema kuwa Mradi ni wa kweli na kwamba kwa faida yetu tunapaswa kuungana kwa ushirikiano ili pale itakapokuwa Tank limejaa tuwe Tayari kuchangishana gharama za kuziondoa taka zile

Ushauri - Aje Mhandisi Mkuu wa Mradi ili watu wafahamike ambao watakathiriwa na Mradi huu na wakubaliane jinsi ya kulipwa.

- Tibu Hiki sio kikao cha Mwisho na cha Maamuzi bado watakuja wataalamu zaidi kwa ajili ya kuongezea jinsi ya kufidisha njia zile za Mabomba.

→ Mimi nyumba yangu ni sh 10,000/= wewe unakuja unataka kunionesha kwa sh 1,000/= inawezekana?

Utaratibu wa Serikali ni kufanya uthamini wa Mali ya Mtu kabla kumwonea kwa ajili ya Malipo ya Mali yake. Na baada ya uthamini huwa Mtu huliipwa na kuyaenga ama kununua ~~kitu~~ kitu kingine kikubwa zaidi hayapo Mapunjo hata Sikuu moja kwa watu

Swali — Tayari sasa mradi umepita na kila kitu Tayari je yale Magari ya Kuja kuchukua ule uchafu gharama zitakuwa za Nani.
Zitakuwa chini ya Mwauwasa.

→ Tunaomba Mradi ufanyiwe haraka zaidi ili wale watakaovujiwa walipwe haraka kulingana na ~~thamani~~ thamani ya hela kwa sasa.

Jibu — wale watakao bainika kuathirika watalipwa Mapema kabla ya uvunjaji. na kwamba Mabomba yatoke juu kuteleka kule chini.
— Msanifu ndio ataangalia jinsi ya kupitisha ~~Maji~~ Mabomba yale.
Pia Mwezeshaji alishauri kuwa Mtu apewe taarifa Mapema ili ajipange vizuri kwa wale watakaoathirika.

— Wengine walihofu kuhusu Matumizi ya Maji kwamba wengine hawana Mabomba ya Maji na Matumizi ya Maji kwa familia zao ni kidogo kiasi kwamba mabomba

Tatazibo. Je tufanyeje.
Kwa ~~Hotel~~ Mantiki hii shati Mwauwasa waeneze ~~mg~~ Maji kwa wingi katika eneo hili, kwa ajili kusafrisha uchafu ule hadi kwenye main point. Na kwamba Mabomba yale lazima yazikwe chini kwa ajili kuepusha Madhara yasiyo ya lazima.

> Kwa kumalizia Mwezeshaji aliwaambia wananchi kuwa ili Mradi kama huu upate baraka ni lazima watu wa Mazingira waidhinishe na kwamba wapo watu wengine watakuja kujilidhisha kama kweli vikao vya kwanza vilifanyika. Kwa hiyo pasitokee mtu wa kusema kuwa vikao vya kwanza havikufanyika.

Afisa Maendeleo jamii aliwaeleza wananchi kuwa kuna sthari gani nyingine kwenye Eneo lao.

Je ni Mabomba ya Aina gani yatawekwe
Ni Mabomba ya plastiki lakini yale Makubwa Tofauti na yale ya Maji ya kawaida na kwamba yatachimbiwa chini sana. Kuepusha hasara

Pia Mwezeshaji aliwaambia wananchi kuwa Mradi haujengwi kesho unaweza ukaja baada ya Miezi Sita ama Mwaka 1 kwa Sababu mpaka waje Mainjinia wa kufanya usanifu na baada ya waziri wa Mazingira Kusaini.

Na hata Mdhamini akija hatakuwa na Majibu
ya Moja kwa Moja.
Yeye atafanya Udhamini na kupeleka Taarifa
yake kwa Mfadhili ambaye pengine ni Serikali
ama ni Taasisi nyingine.
baada ya hapo ndipo linapatikana fungu la
kulipa gharama zilizobainika katokana na
Uthamini wenyewe.

— Mtendaji aliwambia wananchi kuwa Katika
jiji la Mwanza Kata zilizopata bahati ya Mradi
huu ni Igogo, Mbugani na Pasiansi. Na kwamba
Mradi unapelekwa Serikeni kuna faida na Hasara
Mara nyingi huwa kuna faida kwa asilimia kubwa
kwa hiyo Sisi tutapata faida kubwa. hivyo Upokeeni
mradi.

Mwisho
M/kiti wa Mtaa aliwaambia wananchi kuwa
hakuna kitakachofanyika bila Mhusika
kuhusishwa ni lazima Ushirikishwe, Na kwamba
Maendeleo yeyote lazima yawe na Ubomoaji au
Uharibifu wa Mali za watu. Kwa hiyo wananchi wa
Mitaa hii ambayo ni kenyata A, B, C, Tanesco A na B Mradi
huu ni wao Tuingane kwa pamoja
Mkutano uliahirishwa Saa 4'53 Asubuhi

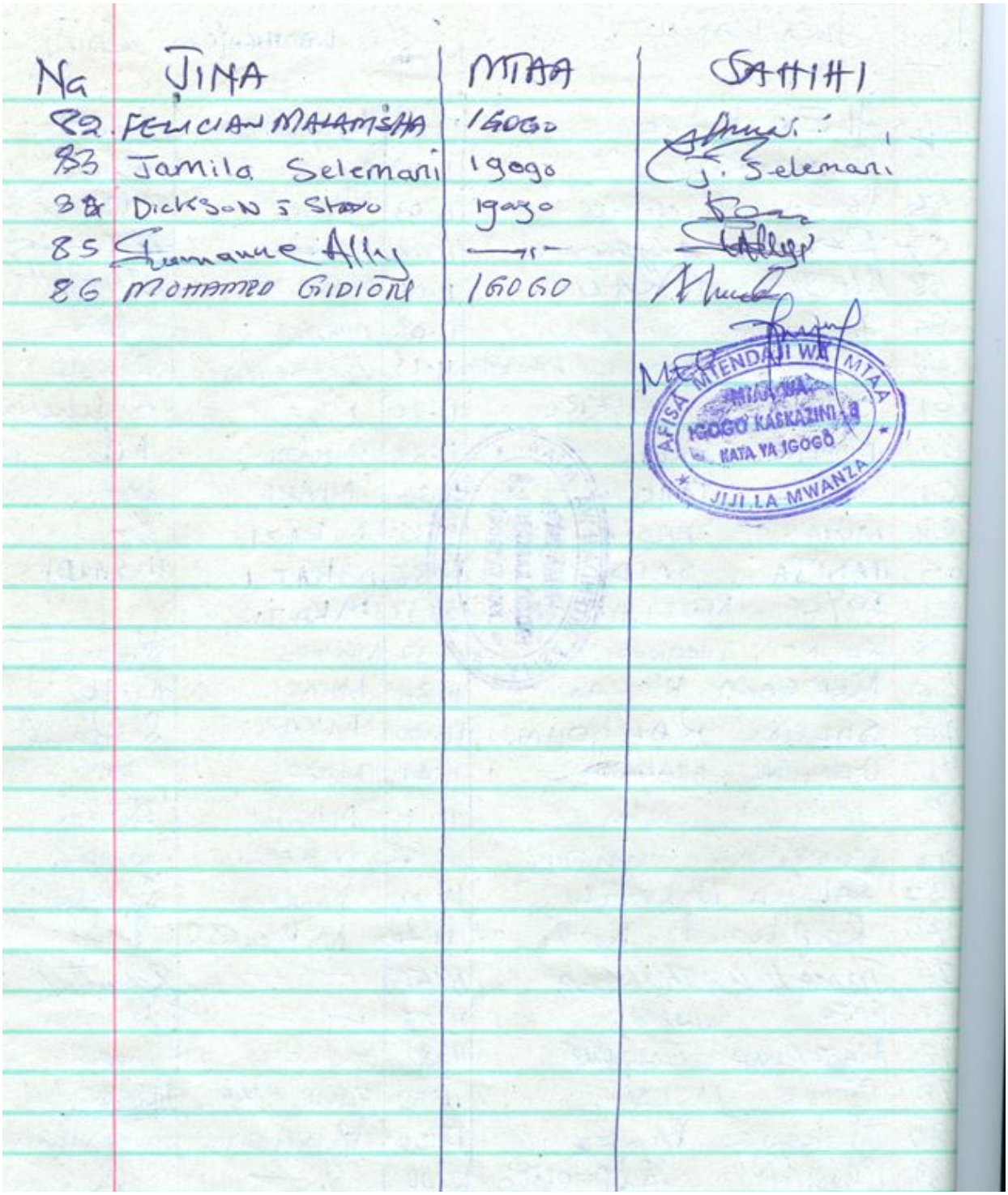
23/6/2012
HALMASHAURI YA JIJI LA MWANZA
MWENYEKITI WA MTAA
MTAA WA IGOGO KASKAZINI 'A'
S. L. P. 1333
KATA YA IGOGO

S/NO	JINA KAMILI	SAINI
1	JUMA R. MASANJA	
2	JOHN MUNGA	
3	JOSEPH MADUHU	
	RULAMYE J.S.	
5	ANTHONY MIHONJO	
6.	MAULID HAMAD	
7	MARIJANI OMARI	
8	CHACHA OMARI	
9	HAMZA MGUNYA	
10	Mohamed Paston	
11	Musa Julius	
12	William John	
13	MAGORI CHEGE	
14.	DENIS KASHULIZA	
15	JACKSON	
16	RADSLAUS KHAMIS	
17	PIETER MARCO	
18.	GORDON	
17.	CECILIA PETRO SANANE	
18	Mary Chiami Mwandika	
19	Bertha Malaba	
20		
21		
22	ASHA MATHIAS	
23.	FINIAS WARIOBA	
24.	MICHAEL MANGORA PAUL	
25.	RICHARD ISAVA	

	Jina Kamili	Muda	Cheo/Wadhifa	Saini
26	JAPHETH K. ULOMI	10.25	~~MJEDI~~	[illegible]
27	LAMECK METUSELA	10.30	MKAZI - [illegible]	[illegible]
28	MARIAM MARKO	10.31	MKAZI	M-Marko.
29	ISHENGOMA JOSEPH	"	MKAZI	[illegible]
30	SAIGON ERNEST	"	MKAZI	[illegible]
31	DEOGRATUS CLEMENT	"	MWANAFUNZI	[illegible]
32	EDWALD BENARD	"	MWANZA	[illegible]
33	JUMANNE KASUSURO	10.36	MKAZI	J. Kasusuro
34	NYAMWOWE NYAMBEHO	10.38	MKAZI	[illegible]
35	JULIUS CLEMES	10.39	MKAZI	[illegible]
36	ROBERT JOHN	10.39	MKAZI	[illegible]
37	MAJID MHANDU	10.40	MKAZI	[illegible]
38	BALTAZAR LYIMO	10.41	"	[illegible]
39	ABDUL MCHELE	10.42	"	[illegible]
40	RAMADHAN DANIEL	10.43	MKAZI	[illegible]
41	JOHN ALFRED	10.43	MKAZI	[illegible]
42	JOHN SAMMAJI	10.44	MKAZI	[illegible]
43	SABATO RABBONI	10.44	MKAZI	[illegible]
44	F. Kalunga	10.44	MKAZI	[illegible]
45	Justus Toyi	10.45	Mkazi	Toyi
46	HARUNA CHAKAMBE	10.45	Mkazi	Chakambe
47	WILFRED KALIHO	[illegible]	[illegible]	Kaliho
48	SAMWEL KAKAJA	[illegible]	MKAZI	S. Kakaja
49	Nyakanya Said	10.47	Mkazi	N Said
50	KUDRA HARUNA	10.47	MKAZI	K. HARUNA
51	SALIMA TOY	10.48	MKAZI	S. Toy
52	MAUA LUNYEMA	10.48	MKAZI	M. Lunyema
53	JACOB NGAMBILO	10.49	MKAZI	[illegible]

AFISA MTENDAJI WA MTAA IGOGO KONKAKITI KATA YA IGOGO JIJI LA MWANZA

S/NO	JINA KAMILI	MUDA	WADHIFA/CHEO	SAINI
54	ALEX HILILA	11:00	MUKAZI	
55	RAMADHA SALUMU	11:02	MKAZI	
56	ISSACK NICOLAUS	11:03	MKAZI	
57	RAYMOND ALPHONCE	11:04	MKAZI	
58	MESHACK KALIHO.	11:05	MKAZI	
59	JOSEPHAT W. MLAY	11:06	MKAZI	
60	SHINJE KANOLO KAPERA	11:15	MASHALA	
61	EVELINA SEHERO	11:20	MKAZI	E. Sehelo
62	FIDELIS KILEKE	11:33	MKAZI	F.C
63	AMBROSE PAULO	11:34	MKAZI	
64	MWASITI MALI	11:35	MKAZI	
65	HADIJA SAI	11:36	MKAZI	H. SAIDI
67	JOYCE RUFU	11:37	MKAZI	
68	REVINA THEONEST	11:37	MKAZI	
69	MERISIANA THOMAS	11:39	MKAZI	M. T
70	SALUM RAMADHAN	11:40	MKAZI	S. Ramd
71	GENUINE MANANA	11:41	MKAZI	
72	Iddy H Shitu	11:41	MKAZI	
73	Miskilina Josephatiki	11:45	MKAZI	
74	SALIMA MGAFILI	11:45	MKAZI	
75	Raphael Kopi	11:46	MKAZI	
76	JUMA H. MASHOLALA	11:55	—11—	
77	RAFIA WINANI	11:55	—11—	
78	MAJARIWA JUMANNE	11:30	—11—	
79	PETER MSESE	11:59	FUNDI RANG	
80	YUSSUF MARE	12:00	MKAZI	
81	CASSIAN ALPHONCE	12:00	11 —	



Na	JINA	MTAA	SAHIHI
82	FELICIAN MAHAMBHA	IGOGO	
83	Jamila Selemani	Igogo	J. Selemani
84	Dickson Stanslo	Igogo	
85	Emmanuel Ally	—"—	
86	MOHAMED GIDION	IGOGO	

i

MKUTANO WA WADAU WA MRADI WA MFUMO WA MAJI TAKA KATA YA IGOGO 24-06-2012
MITAA YA KASKAZINI 'B' NA KASKAZINI 'C'

MUHTASARI

Mkiti wa mtaa Igogo kaskazini C JUMA R. MASANJA Alifungua kikao ili kuwa saa 4:00 Asubuhi na kumkaribisha mgeni wa mradi wa maji taka ndugu URUMA KISAKA(?) gendelee na mada ya maji Taka. na alianza kwa kuwakaribisha na kuwatambulisha wale alioambatana nao. nao walifanya hivyo.

- Baada ya Utambulisho huo, ndugu KISAKA alieleza kuhusu mradi wetu siku ya kwanza walipo fika na leo wamefika kwa ajili ya MAKISIO ya jinsi sehemu mradi utakapopita (assment) na Athari zake, ili wote wakubaliane, iwapo mradi wa maji taka wakati utakapo kuwa unafanyika inawe Zekana eneo la mtu likaguswa, je tutafanyaje.
- pia ujenzi wa septic tank inawezekana pia Eneo hilo likaguss mtu au Eneo la Mtu Je Tutafanyaje? kwa hiyo ndiyo maana tumefika hapa ili wananchi wenyewe mkubaliane kuhusu mradi huu.
- Baada ya Ufafanuzi huo ndipo Muhandisi wa maji taka alisimama na kuanza kuzungumza na wananchi wa Mitaa hii miwili, kuwa Lengo ni kuona Mazingira ya wananchi na kuyaweka Safi, kuwa na vyoo safi, na kupunguza magonjwa pia kuzia utililishaji wa maji machafu ovyo, Hii ni kutokana na uchafuzi wa mazingira, watoto wetu wanaathirika na magonjwa mbalimbali.

II

Kwa hiyo Wananchi waaombwa kutoa Mapendekezo yao kuhusu Mradi huu.

(1) - Ndugu STEPHANO COSTANTINE: Aliuliza kwa Maji mengi Mvua inaponyesha yanaelekea Ziwa Victoria, je kuna sehemu ambayo mnaweza ili maji haya yasielekee Ziwa Victoria.

(2) - Iwapo Bomba litelenga nyumba ya mtu Serikali itafanya fidia yoyote?

MAJIBU

- Maji haya yatasafishwa Mabwawa ya Maji taka na yatawekwa katika chujio na baadaye ndipo yatapelekwa Ziwa Victoria kwani kwa kuchujwa tayari maji haya yatakuwa salama.
- Iwapo Bomba litapita Sehemu ya nyumba ya mtu na kuonekana kuleta Athari au kuhitajika kuondoa jengo hilo, fidia itafanyika bila Tatizo lolote, kwa kufanyiwa Tasimini ya Athari zake.

USHAURI

Iwapo mradi utatekelezwa tunaomba ujenzi wa Main hole (inspection chambers) kuweke vile vya kuziba HARUFU mbaya katika maeneo yetu. Pia Wajenzi wa Mradi huu wawe Makini zaidi. Na Iwepo Michoro.

- Pia ushauri huu ukipokelewa na wataalamu wetu bila Tatizo na kusaidia kufanyika kazi ili isilete Athari kwa Wananchi.

III – Suala michoro, michoro ita kuwepo na wataalam wako mezani mpaka sasa kwa ajili ya maandalizi ya mradi huu.

SWALI

– Ndugu SAMSONI ERNEST. Je kuna gharama za kuweka bomba, au kuunganisha katika bomba hilo?

– JIBU – Ndiyo, uchangiaji na utekelezaji ili mfumo uendelee kuwepo. (gharama nitaelezwa)

SANJO MGETA – Mgeni wa mradi. (mhandisi)
Alisisitiza na kusema kwa kuwaomba wananchi kwamba mradi huu utakamilika tunatakiwa kuulinda mradi huu, kuna watu wanaweza kuingiza chamber au kusababisha mradi kuziba – na kusababisha mradi kutofanya kazi ipasavyo.

SWALI

CASIAN ALPHONCE – Choo ya aina gani itaunganishwa? (2) Sehemu zote za Pande mbili za barabara zinaruhusiwa kuunganishwa.

– Majibu: Choo yoyote inayoweza kutiririsha uchafu kwenda kwenye Bomba – huu.

– Ndiyo sehemu zote zitaruhusiwa na kuwezekana. Kwani wataalam watafika kufanya michoro hiyo.

– SWALI

(STEPHANO) COSTANTINE – Je mwananchi ataweza kufaidika na mradi kwenda Bomba huu?

v USHAURI

Mh Diwani Minja alishauri kuwa kuwekwe Upanuzi wa Mradi hii ili kuweza Mahitaji ya Huduma hii kwa Wananchi.

MAJIBU

- Suala la Huduma ya Bure siyo Sahihi, Bali Mtu ataliwa kuchangia kama Anavyochangia huduma zingine kama vile Maji, Sefi, Umeme n.k. kwa hili ni Bure Tuliowaeleza kwenye Mawazo yetu na Aliwaomba wananchi kusema Athari za Mradi.
- Pia Viongozi hao wa mradi walikubali kupokea Ushauri wa Mh. Diwani na kusema Suala hili watalizingatia Sana.

SWALI

JUMANNE KASUSUMO — Iwapo Bomba litaziba je nani anawajibika kuziba?

JIBU — MWAUSA watashughulikia Bomba kwa ile la nyumbani kwako utaziba wewe Mwenyewe, na Wananchi wameombwa kutotumia Madaso magumu, au Magunzi, nywele n.k. na kuombwa wote watumie maji ili Mabomba yasizibe, pia Wananchi wawe walinzi wa mradi huu wao wenyewe na Iwapo Uhamuona mtu anaharibisha mradi huu, mripoti haraka mejo sehemu husika.

SWALI JOSEPH PAULO — Je ni choo tu ndiyo inapeleka maji machafu ziwani

JOHN SIMON — Je Sehemu ya mitaimu Bomba litafikaje?

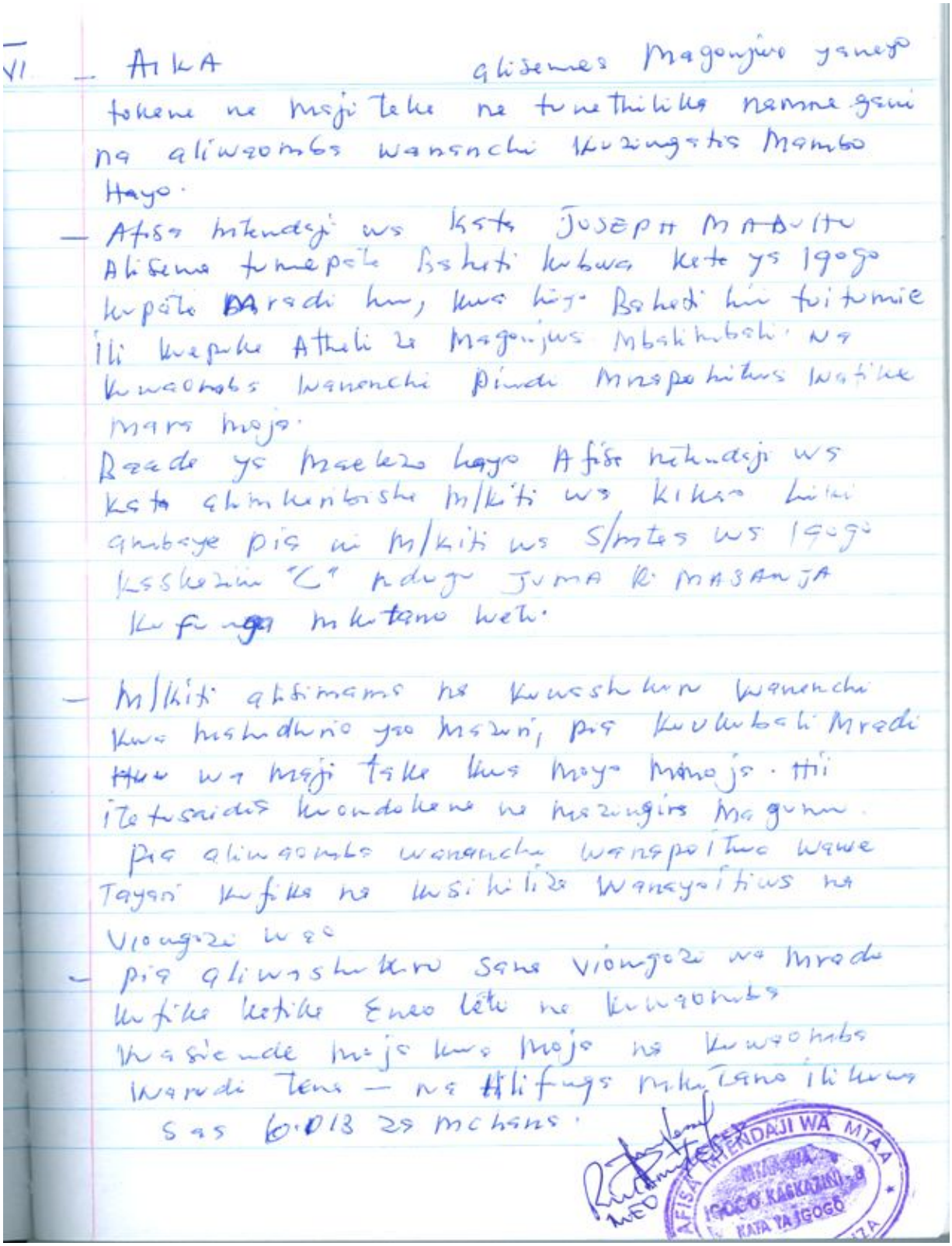
V Ndg. FELISIANI MALANSHA –
Je wata wa michoro wamepita.

– JUMANNE ALLY — Iwapo barabara yetu ya mawe itabomolewa ili mradi upite, pamoja mabomba ya maji safi je mtashughulikia Athari hizo.

MH: DIWANI MINJA — Athari ya ya kusambaa wa maji machafu yanayotiririka ovyo, na sasa maji taka wametuletea mfumo safi wa maji taka ambayo yataondoa Athari hizo zote. Pia viongozi wa S/Mtaa watawashughulikia wale ambao watasababisha Athari za mradi huo kwa kutaka shena ndogo ndogo.

MAJIBU

– Katika utaratibu wa ujenzi Iwapo Unaharibu barabara Au kukata Bomba la mtu, Mradi huo Utalazimika kutengeneza barabara hiyo au mabomba hayo.
– Michoro ya SAVEY Bado haijafanyika Lakini wataalamu watakuja.
– Sehemu za milimani zenye mawe, Mabomba yatapita na mawe yatapasuliwa.
– Siyo choo tu iliyokuwepo, Bali kuna matatizo mengi yanayotokea, Lakini Tunaanza na tatizo la choo kwanza. Hatuwezi kutatua matatizo yote mara moja.



VI – ATKA alisemwa Magonjwa yanayo tokana na maji taka na tunathibitisha nanna gani na aliwaombea wananchi kuzingatia Mambo Hayo.

– Afisa mtendaji wa kata JOSEPH MABULU Alisema tumepata Bahati kubwa kata ya Igogo kupata Mradi huu, kwa hiyo Bahati hii tuitumie ili kuepuka Athali za Magonjwa mbalimbali na kuwaombea wananchi pindi mnapohitaji Matibabu mara moja.

Baada ya maelezo hayo Afisa mtendaji wa kata alimkaribisha M/kiti wa kikao Limi ambaye pia ni M/kiti wa S/mtaa wa Igogo Kisheria "C" ndugu JUMA R. MASANJA kufungua mkutano huo.

– M/kiti alishimama na kuwashukuru wananchi kwa mshikamano yao mazuri, pia kuvumbali Mradi huu wa maji taka kwa maya manoja. Hii itatusaidia kwondokana na mazingira magumu. pia aliwaomba wananchi wanapoitwa wawe Tayari kufika na kusikiliza wanayoitiwa na Viongozi wao

– pia aliwashukuru sana Viongozi wa mradi kufika katika Eneo letu na kuwaombea Wasiendelee maji kwa maji na kuwaombea Wardi Tena – na Hilifunga mkutano ilikuwa saa 6:013 za mchana.

MKUTANO WA WADAU WA MRADI WA UJENZI WA MFUMO WA MAJITAKA ENEO LA MABATINI JIJINI MWANZA

MAHUDHURIO

NA	TAREHE	JINA	MTAA	SAHIHI
1	27-06-012	JUMA NGEREJA	MABATINI KUSINI	[signature]
2		ANTONY MSAFIRI	—"—	[signature]
3		MASUDI RAJABU	—"—	[signature]
4		JOSEPH PAULO	— —	[signature]
5		GILBARI MARTIN	—"—	[signature]
6		Dismas Malola		D. Malola
7		Abdallah Radidi	— —	[signature]
8		TABU ABRINUS	—"—	[signature]
9		CHAUSIKU	—"—	[signature]
10		ELIZABETH SHIGELLA	—"—	E.Shigella
11		TEREZA NILLA	——	T. Nilla
12		Zaituni Masilila	— —	Z. Masilila
13		KALEKWA MOHAMED	—"—	K. Mohamed
14		BORE NGAZULA	—"—	[signature]
15		MIHAYO WILIAMU	—"—	M. W.
16		MKULA KAZERO	—"—	Tembo
17		JOHN SATARA	—"—	[signature]
18		Titus Kipumbya	—"—	[signature]
19		Yusuph S. Njalula		[signature]
20		Migongwe J. Kazungu	—"—	[signature]
21		MREE KUNGA	"	[signature]
23		ELIAS DEUS	—"—	[signature]
24		SHABAN JUMA	—"—	[signature]

OFISI YA M/KITI WA SERIKALI
MTAA WA MABATINI KUSINI
KATA YA MBUGANI
JIJI LA MWANZA

YOHANA MNONO
[signature]
27.06.2012

25.	27/06/18	KAPALA KASAMBA SYA	m/ KUSINI	—	
26		MAGEMBE KAJERI	〃		
27		HAPYNESS MSENGI	〃		
28		ELIPENDO STEPHANO	〃		
29		ADIJA OMARI	〃		
30		ZAINA JUMA	〃		ZAINA
31		SHIJA MAIGE	〃		Maige.
32		ABDALLAH J. MSANGI			
33		ISHEIBONA AZON	〃		
34		SELEMA SAIDI	〃		
35		MCH SEMAHI KILINGA			
36		JOHN CHACHA			
37		CHARLES MAPEMBE	〃		
38		WITNESS MAKALE	—	0754-827797	

OFISI YA M/KITI WA SERIKALI
MTAA WA MABATINI KUSINI
KATA YA MBUGANI
JIJI LA MWANZA

JOHANA MNONO
27-06-2018

MAHUDHURIO

NA	TAREHE	JINA	MTAA	SAHIHI
39	27/6/012	BW. ABBASY SHOKUR NYALUSHO	M/Kusini	[signature]
40	-"-	THABIT NAMNGA	———	[signature]
41	-"-	JUMA SHABANI	-"-	Juma
42	-"-	JOYSEY MADAMA	-"-	J.W.
43	-"-	SAADA DAUDI	-"-	[signature]
44	-"-	SALMA RAJABU	-"-	[signature]
45	-"-	DORIS MABUYAWA	-"-	[signature]
46	-"-	YOHANA MNONO	M/Kiti/Mabatini Kusini	[signature]
47	-"-	LUCY P. MASAGANYA	KATIBU	[signature]
48	-"-	DIANA MWAKY	M/Kusini	AM
49	-"-	JOSEPH NYAKANA	-"-	[signature]
50	-"-	DEVOTA ANTONY	-"-	D. [signature]
51	-"-	Aurelia Mosha.	M/Kusini	[signature]
52	-"-	GABRIEL MARI	-"-	[signature]
53	-"-	MUSSA MKOTA.	-"-	[signature]
54	-"-	JOSEPH Mhele	-"-	[signature]
55	-"-	EMANUEL LYAMBA	-"-	[signature]
56	-"-	NYANGETA PETER	-"-	[signature]
57	-"-	FRENK KASEMBE	—	F.K
58	-"-	PATIRICK JEMS	—	[signature]
59	-"-	Dalali Kaseta	—	[signature]
66	-"-	MARTHA JOHN	—	MILA
67	-"-	Sikujua Jumanne	-"-	S.J.

OFISI YA M/KITI WA SERIKALI
MTAA WA MABATINI KUSINI
KATA YA MBUGANI
JIJI LA MWANZA

YOHANA MNONO
[signature]
27.06.2012

MAHUDHURIO

NA	TAREHE	JINA	MTAA	SAHIHI
68	27/6/012	Gresy Makori	M/Kusini	gressy
69	"	Maria Nyombi	"	Nyombi
70	"	Greasy Thomas	"	Greasy
71	"	Massumbuko Paulo	"	Paulo
72	"	Venetus Kusekwa	"	
73	"	William John	"	
74	"	KAZIMIR KAIJAGE	"	

OFISI YA M/KITI WA SERIKALI
MTAA WA MABATINI KUSINI
KATA YA MBUGANI
JIJI LA MWANZA
27.6.2012

MKUTANO WA WADAU WA MRADI WA UJENZI WA MFUMO WA MAJI TAKA ENEO LA MABATINI
JIJI LA MWANZA TAR 27/06/2012

MHUTASARI

Mwenyekiti alianza kwa kuwashukuru wajumbe waliofika na kuwaomba watoe michango wa maoni ili kufanikisha jambo hili - Mradi ni wetu

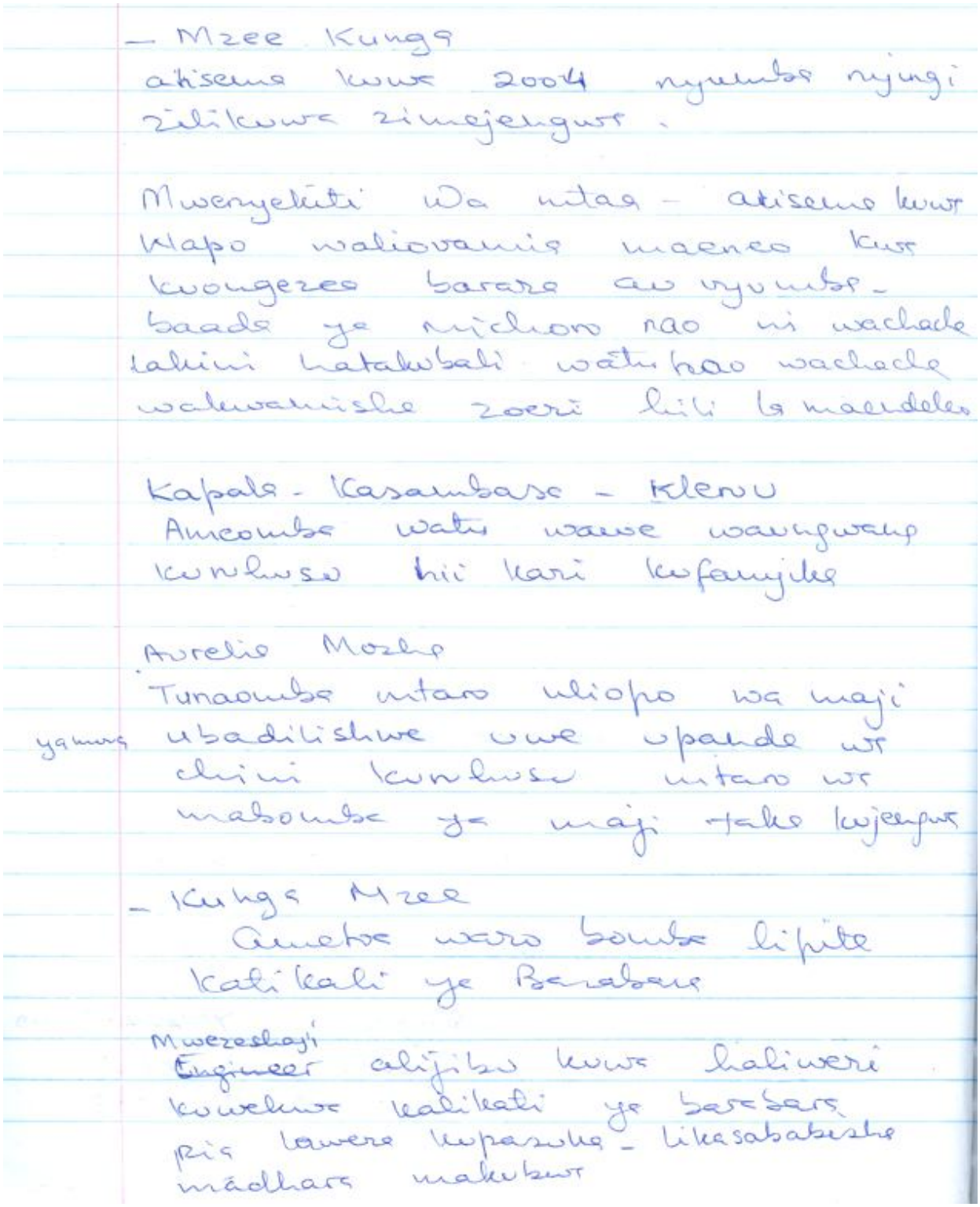
1. Mjumbe - Karungu Migongwe
amesema kwa kuna mradi utaguasa mali ya watu aliyejenga sehemu iliyochorwa kwa kupitisha bomba basi yeye apishe ujenzi ufanyike

Kwa wale watakaovamiwa na bomba walipwe fidia.

Mr. Kisaka - Mwereshaji
Amesema fedha ni za MAUWSA na Liemp haina fedha za fidia bali za kuweka mabomba ya maji taka

2. Joseph Nyakana - naye ni mjumbe alisema Mabatini eneo lenye mi halijapimwa itakuwaje mtu aonekane kwa mvamizi wa eneo la mitaro.

OFISI YA M/KITI WA SERIKALI MTAA WA MABATINI KUSINI KATA YA MBUGANI JIJI LA MWANZA
YOHANA · MANONO
27.06.2012



- Mzee Kunga
atiseme kuwa 2004 nyumba nyingi zilikuwa zimejengwa.

Mwenyekiti wa mtaa - atiseme kuwa Wapo waliovamia maeneo kwa kuongezea barara au nyumba - baada ya mjichon nao ni wachache lakini hatakwbali watu hao wachache wakwamishe zoezi hili la maendeleo

Kapala - Kasambase - Kleru
Amesema watu wawe wavumilivu kwakuwa hii kazi kwaajili

Aurelio Mosha
Tunaomba mtaro uliopo wa maji yamvua ubadilishwe uwe upande wa chini kwakuwa mtaro wa maboma ya maji taka kujengwa

- Kuhga Mzee
Amesema wana bomba lipite katikati ya Barabara

Mwezeshaji
Engineer alijibu kuwa haliweri kuwekwa katikati ya barabara Ric lawere kupasuka - likasababisha madhara makubwa

Witnes Makale -
Ameanza kwa kuwapongeza viongozi wa Mtaa - na kwa wakazi wajumbe walikubali kwa kuwa ni kwa maendeleo yetu -
Pts

✓ Ramadhani aliuliza Utatekelezwa lini mradi
Engineer - Mwezeshaji
Mradi hautaanza mpaka itoke ripoti ya tathmini ya athari ya mazingira -
na wananchi wawe waangalifu kutoa maamuzi kwani madai ya fidia huchelewesha mradi

-
Madhara ya mfumo wa maji taka -
- nani atatunza chamber?
-

Juma Ngeleja -
Ametoa mawazo kwa ni vizuri tupunguze hasara ya mgumba zitakazotokea kwa kupunguza eneo linaloingia kwenye mchoro au mtaro wa maji taka badala ya eg. Mt. 4 iwe Mt 2

OFISI YA M/KITI WA SERIKALI MTAA WA MABATINI KUSINI KATA YA MBUGANI JIJI LA MWANZA

YOHANA · MNONO
24 · 6 · 2012

- Nyakana - Joseph aliuliza Swali
Bill za maji Safi
Bill za maji taka
Bomba likiziba ktk eneo lako atazibua nani
- Walijibu ni sisi wenyewe - na ni ndogo

Eng - Mwezeshaji
anasema kutakuwa na kamati ya kulinda huu mfumo wa maji taka -

Abdala Rashid
Aliuliza gharama ya kuweka mabomba kutoka eneo la milimani kushuka kwenye tank kubwa atalipa nani -
Eng - Alijibu kuwa raia watalipia bomba la kutoka kwenye nyumba yake hadi kwenye chamber
MWAUWASA itaweka hayo mabomba mengine
Pia alijibu swali la ndugu Ramadhani kuwa hautachukua muda mrefu
- Pengine mwakani tu kwani fedha zimeshapatikana.

~~Rash~~ Rashidi pia aliuliza nani ataweka mabomba taka kwenye vyoo kwani italitaji utaalamu - Alijibiwa kuwa hata mafundi wa ujenzi walawezs

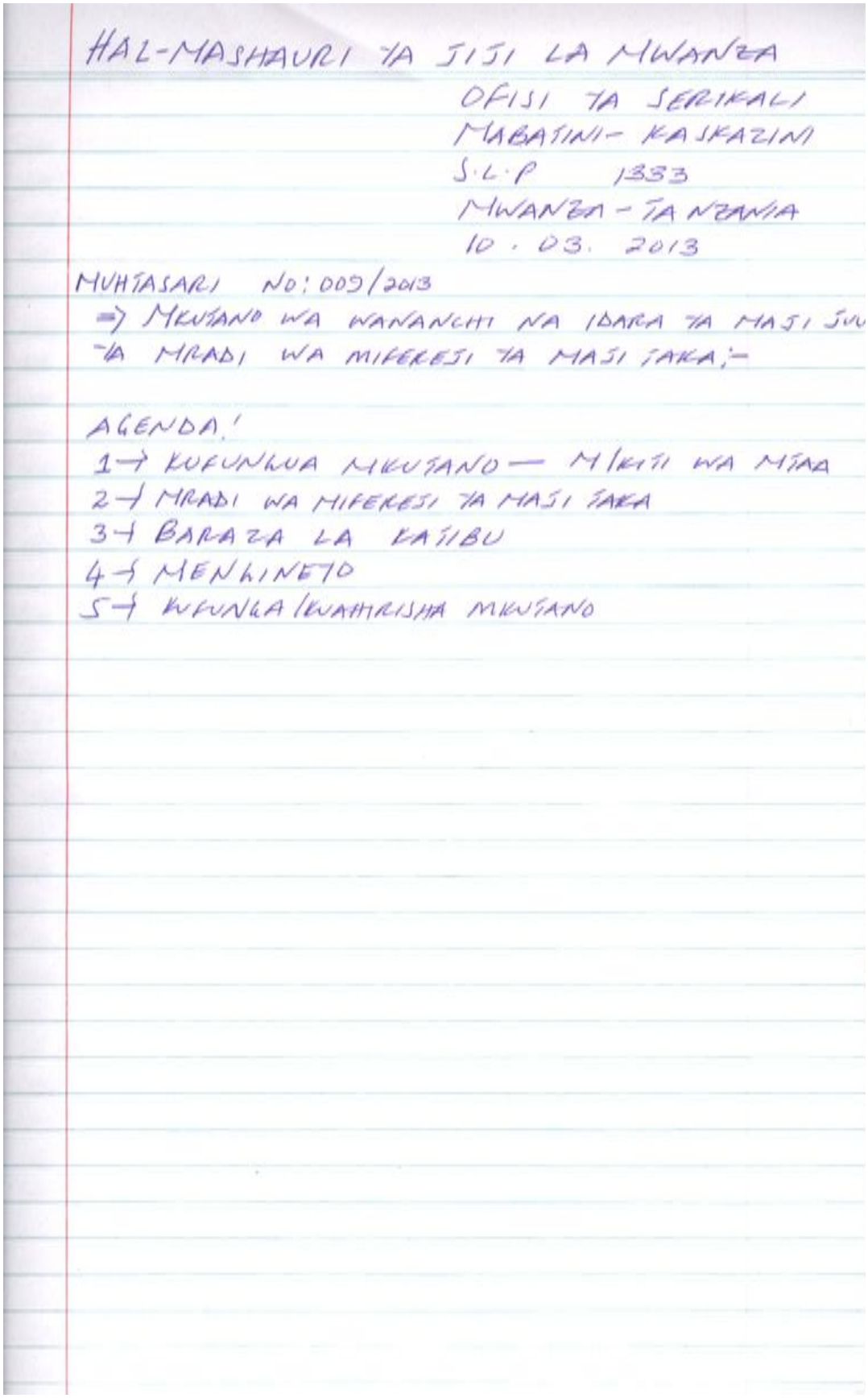
- Pia kwa wale walio na vyoo vya shimo watawajibika kutengeneza vyoo vya kisasa ili vya kutumia maji ili kujiunga na mtandao wa maji taka.

Wananchi wote walio hudhuria Wamekubali mradi na kupendekeza kwa wale watakaoathirika na mradi wapewe fidia
Ila kwa kupunguza gharama basi waliotumia Mt 4 wapunguziwe iwe Mt 2,
Wameshukuru kwa ajili ya Mradi huu na kuomba mambo yafanyike haraka waondokane na taabu ya kutapisha vyoo

1. Mwenyekiti wa mtaa aliwaashauri wananchi kuitikia wito kila wanapoitwa - Ni kwa faida yao
2. Pia aliwaomba wananchi kwa mabalozi wa kuwaelimisha wenzao kwa hili 2001 la Mradi wa maji taka kwani wengine wanaweza kuelewa. Mradi ni wetu na ni kwa faida yetu na vizazi vijavyo.
3. Aliseme Amewashukuru wananchi kwa kukubali Mradi wa Maji taka kwani ni Hatua ya Maendeleo.
4. Pia amaliza kwa kuwaomba wenzake watu wakilishe vizuri huko waendako ili Tufanikishe

OFISI YA MTENDAJI WA SERIKALI
MTAA WA MABATINI KUSINI
KATA YA MBUGANI
JIJI LA MWANZA
YOHANA MSOTO
27.6.2012

Appendix IV: Minutes and Attendance of the Consultation Meetings held in March 2013



HAL-MASHAURI YA JIJI LA MWANZA
OFISI YA SERIKALI
MABATINI - KASKAZINI
S.L.P 1333
MWANZA - TANZANIA
10.03.2013

MUHTASARI NO: 009/2013
=) MKUTANO WA WANANCHI NA IDARA YA MAJI JUU
YA MRADI WA MIFEREJI YA MAJI TAKA;-

AGENDA:
1→ KUFUNGUA MKUTANO — MWENYEKITI WA MTAA
2→ MRADI WA MIFEREJI YA MAJI TAKA
3→ BARAZA LA KAZIBU
4→ MENGINEYO
5→ KUFUNGA/KUAHIRISHA MKUTANO

YAH: MAHUDHURIO NA MKUTANO WA WADAU WA MRADI WA MAJI TAKA (MIFEREJI) PAMOJA NA WANANCHI WA - MABATINI - KASKAZINI. 10/03/2013

Mkutano uliofunguliwa na M/Kiti wa mtaa Nyegu - NIOBI A. NIOBI.
Mkutano uliofunguliwa saa 10:05 asubuhi. M/Kiti wa - Mtaa, Aliwaza kwa kuwashukuru Wananchi kwa - Mahudhurio Mazuri.

M/Kiti wa mtaa Aliwaza kuzisoma Agenda zilizopo Mezani. Baada ya hapo M/Kiti aliwaza kuwatam - burisha viongozi wa Serikali ya mtaa wa Mabati ni - Kaskazini.

Baada ya kuwatamburisha Wajumbe wa Serikali - ya mtaa. M/Kiti alimkaribisha Afisa mtendaji wa Mtaa wake Mr. MAPUNDA.

Baada ya hapo A/mtendaji aliwatambulisha Wage ni alivyozana nao ili kuja kuongea na Wanan chi wa Mabatini - Kaskazini.
Wageni walikuwa ni: (1) Ndg: Vincent RWENYAGIRA 0784 353954
(2) - " - Huruma Kisaka - 0754 292348
(3) - " - Charles Mayala 0754301966
(MWAUWASA)
MWENYEKITI WA MTAA MTAA WA MABATI NI/KASKAZINI KATA YA NYEGEZA-MWANZA
Wageni wanatoka Kampuni ya BENCHMARK - Ambayo makao yake makuu yako Dar-es-salam Lengo ni kuboresha mitalo ya maji taka ili kubo - resha mazingira ya maeneo husika.

Mhandisi wa Kampuni ya Benchmark, Aliwaeleza kwa kusema. Ni lazima tukumbuke kuwa KHK. Huu mkoa wa Mwanza, Tuna ziwa Victoria.
Na mifumo ya maji ni mibovu inatakiwa iboreshwe kwani hili ziwa tunalitumia kwa maji, samaki na HK.

Lengo la mradi huu ni kuboresha mifumo mbovu

PTO7

ya mitaro ya maji Taka.
Mhandisi wa mradi huu kwa utengenezaji wa mifere ji hii alienda kufafanua kwamba mradi huu uta-saidia kutengeneza mazingira kuwa safi na Bora.

Mhandisi amendelea kusema Serikali itagharamikia kujenga Mabomba ya mfumo mzima wa maji Taka. ila kutoka KTK choo yako kuunganisha kusenya-Bomba kuu au Chemba. Kwa gharama zake mwanan-chi mwenyewe.

Wananchi Walipokea Maelezo haya yaliyoelezwa na mh-Mhandisi. Lakini waliuliza kwamba je? Endapo Mradi utapima ikaonekana Ramani zinapita kwa – Mtu KTK. Eneo lake ni lazima mtu yule alipwa na Serikali. Hiyo ni Fidia yake.

Baada ya hapo KTK Agenda ya mradi wa Mfumo wa Maji Taka na kuunganisha mabomba ya maji – Taka watu au wananchi Wamepokea kwa Pamoja na kupitisha.

~~AGENDA YA NO(2) Tangazo la utaratibu wa –~~

M/Kiti wa mtaa Alisimama na kuwashukuru – wananchi kwa utulivu na usikivu wao. Kwa Pamoja wananchi wamepitisha kwa makubaliano hii ya suala la mradi huu.

Mhtasari huu Umeandikwa na Katibu wa M/Kiti wa mtaa.

MANSOOR S/o SADICK

[signature]

MWENYEKITI WA MTAA
MTAA WA MABATINI/KASKAZINI
KATA YA MBUGANI
MWANZA-MJINI

0754-976841 / 0783-386107
0714-103339

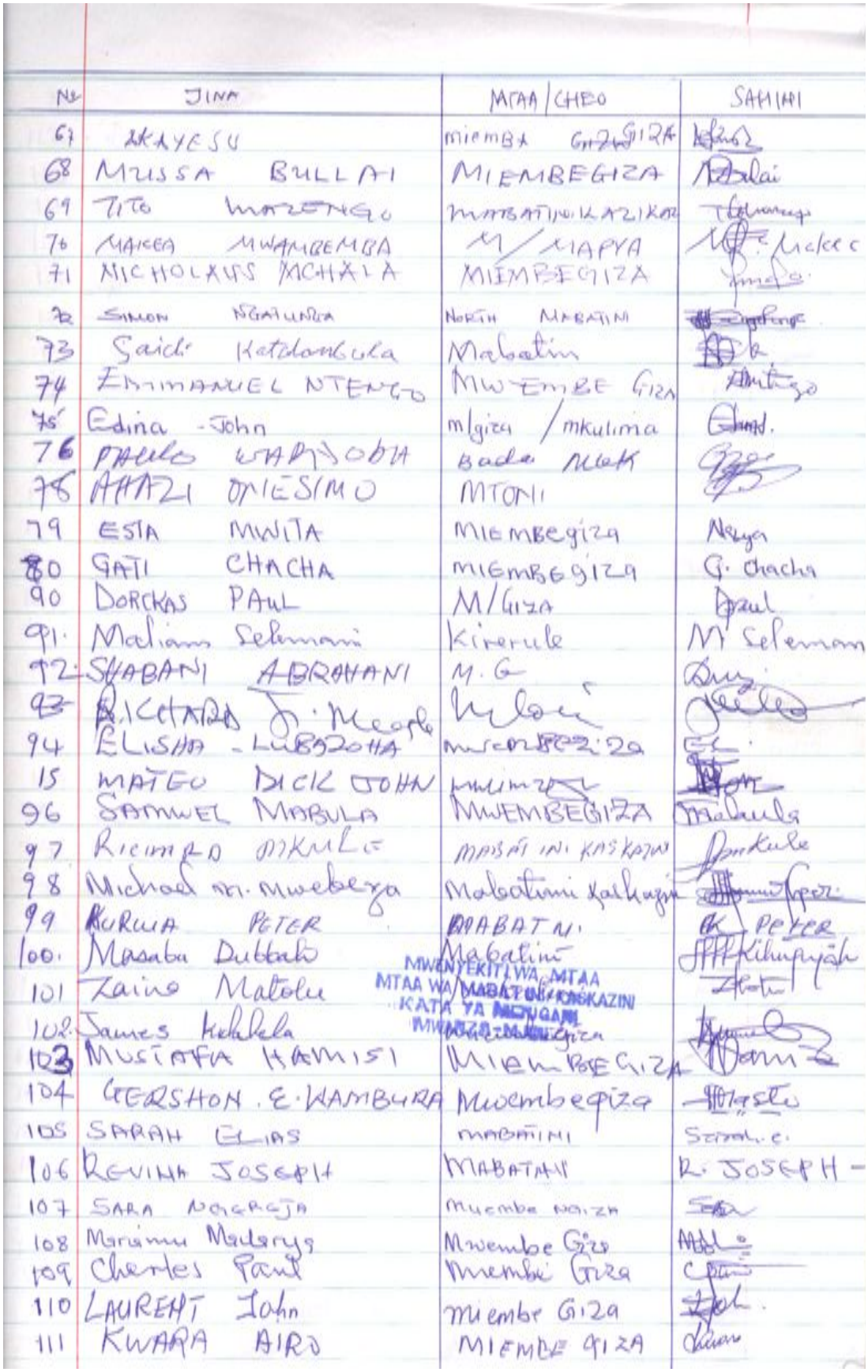
MAHUDHURIO YA MKUTANO WA WADAU WA MRADI WA MIFEREJI YA MAJI TAKA MTAA WA MABATINI – KASKAZINI

Nº	JINA	MTAA/CHEO	SAHIHI
1.	NIOBI B. NIOBI	MIKITI WA MTAA	
2.	MANJOOR SADICK	KATIBU WA MTAA	
3.	ROBERT K. KISURA	MJUMBE WA MTAA	
4.	HAMIS N. SHABAN	MJUMBE MTAA	
5.	MWIRU NYIKWE	MWANANCHI	
6.	BAKARI IBRAHIMU	〃	
7	ULIKI TESHA	MWANANCHI	
8.	TADEO MSELE	MWANANCHI	
9	PIUS JOSEPH	MWANANCHI	
10	James Charles	Mwananchi	
11	CHARLES MAYALA	MWAUWASA	
12	MSSA CHARLES	PASTOR	MSSA
13	John Moris	Mwembegiza	
14	Justo Wilson	Mwembegiza	
15	WAZIRI KASERA	Mwembegiza	
16.	Richard Sefu	Mwembegiza	
17.	Mwasi Mwasi	Mwembegiza	
18	SELEMANI AUSII KHALIDI	MIKUSINI	
19	FRANCIS mtuli	Mabatini Sinai	
20	GODFREY MABAHA	MABATINI KAS	
21	FELICIAN MKIRIA	MABATINI	
22	YUSTASI WILLAMU	MABATINI KA	
23	MATHEW FRANCIS	NDT KSK	
24	KASEKA GEORGE	MIEMBEGIZA	
25.	TINGISHA KASELA	〃	
26	DAUD K. WASINDI	ALICUSI	
27	DOTTO	MIEMBEGIZA	
	VEREDIANA JOSEPH	MIGIZA	
28	John Mwizombi	〃	
29	Emmanuel MAJI	〃	
30	FRANK SARONGE	〃	
31	RENATUS M. PATRICK	〃	

MWENYEKITI WA MTAA
MTAA WA MABATINI/KASKAZINI
KATA YA MBUGANI
MWANZA-MJINI

NO.	JINA	MTAA / CHEO	SAHIHI
32	FRANK DAUD	-//-	
33	PAULO SEN	-//-	
34	MARTIN KIKENE	-//-	
35	Masumbuko Abdu	-	
36	Silivesita Chelesi	—	
37	IADY KAIIMBA	MABATINI KASK	
38	ROZANTI MWALUKO	MABATINI KSK	
39	MARY ORLANDO	-//-	
40	YUSIA MACHIAW	-//-	
41	AGNES LEO	-//-	
42	Richard Manewu	-//-	
43	JOHN O ADESA	-//-	Adesa
44	NYARONGO MIKO	-//-	
45	JUMA MBAYA	-//-	
46	David M. Samuel	-//-	
47	MAGESA MAGESA	-//-	Gesa
48	KASSIM HAMIS	-//-	
49	Peter Charles	-//-	Peter
50	Kevin Goerge	Mwiemba Giza	
51	BUSUMBA LUKAWA A	-//-	
52	CONSALATA ABEL	-//-	
53	BOSCO KADADI	-//-	Bosco
54	Ray Peter		Peter
55	ESTA PAULO	Miembe giza	Ester
56	Cristina Kimpata	miembe giza	
57	Mery William	miembe giza	M. William
58	Advehtina Kusiusa	Miembe giza	Kusiusa
59	Lucina Venance	- - - -	
60	DICKSON WOLTAR	- -	
61	DEOGRATIAS PASTORY	0763357 M. KIZA	
62	Setivini John	miembe giza	S. john
63	Zainabu Shabani	- - - -	Zainabuni
64	Imelda Kateme	-//-	
65	Leonida Donatus	miembegiza	L.D.
66	SIMON KABAKE	MABATINI	

MWENYEKITI WA MTAA
MTAA WA MABATINI/KASKAZINI
KATA YA MIRONGO
MWANZA



Na	JINA	MTAA/CHEO	SAHIHI
67	[illegible]	[illegible]	[illegible]
68	MUSSA BULLAI	MIEMBEGIZA	[illegible]
69	TITO [illegible]	[illegible]	[illegible]
70	[illegible] MWAMBEMBA	[illegible]	[illegible]
71	MICHOLAUS [illegible]	MIEMBEGIZA	[illegible]
72	SIMON [illegible]	NORTH MABATINI	[illegible]
73	Said [illegible]	Mabatini	[illegible]
74	EMMANUEL NTENGO	MWEMBE GIZA	[illegible]
75	Edina - John	m/giza / mkulima	[illegible]
76	[illegible]	[illegible]	[illegible]
78	[illegible]	MTONI	[illegible]
79	ESTA MWITA	MIEMBEGIZA	[illegible]
80	GATI CHACHA	MIEMBEGIZA	G. Chacha
90	DORCKAS PAUL	M/GIZA	[illegible]
91	Mariam Selemani	Kirerule	M' Selemani
92	SHABANI ABRAHANI	M. G	[illegible]
93	[illegible]	[illegible]	[illegible]
94	ELISHA - [illegible]	[illegible]	[illegible]
15	MATEO DICK JOHN	[illegible]	[illegible]
96	SAMWEL MABULA	MWEMBEGIZA	Mabula
97	RICHARD MKULE	MAISAI INI KASKAZINI	[illegible]
98	Michael [illegible]	Mabatini Kaskazini	[illegible]
99	[illegible] PETER	MABATINI	[illegible]
100	Masaba Dubbalo	Mabatini	[illegible]
101	Zaina Matolu	[illegible]	[illegible]
102	James [illegible]	[illegible]	[illegible]
103	MUSTAFA HAMISI	MIEMBEGIZA	[illegible]
104	GERSHON . E . WAMBURA	Mwembegiza	[illegible]
105	SARAH ELIAS	MABATINI	[illegible]
106	REVINA JOSEPH	MABATINI	R. JOSEPH
107	SARA [illegible]	[illegible]	[illegible]
108	Mariamu Madanga	Mwembe Giza	[illegible]
109	Charles Paul	Mwembe Giza	[illegible]
110	LAUREHT John	Miembe Giza	[illegible]
111	KWARA AIRO	MIEMBE GIZA	[illegible]

MWENYEKITI WA MTAA
MTAA WA MABATINI KASKAZINI
KATA YA NYAMAGANA
MWANZA

Nº	JINA	MTAA / CHEO	SAHIHI
112	Anton malma	miembe giza	[illegible]
113	Masatu kabaka	Miembe giza	M. kabaka
114	Johnson E Kigwasho	Mwembegiza	[illegible]
115	EMMANUEL MANENO	MIEMBE GIZA	[illegible]
116	CHARLES OMARY	Miembe Giza	[illegible]
116	Elina	M. GIZA	[illegible]
117	Thomas James	M/Giza	[illegible]
118	EDWIN KI GYARUZI	M – GIZA	[illegible]
119	LAMECK LUCAS	M- GIZA	[illegible]
120	KAYANDA ELISHA	M. GIZA	[illegible]
121	JAFALY MOHAMEDY	M – GIZA	[illegible]
122	WISTON WILSON	M – GIZA	[illegible]
123	HUSSEIN ATHUMA	M, GIZ	[illegible]
134	Zeph masud	M giza	S. masud
135	DAUD BENIEL	M. GIZA	[illegible]
136	Sungu Peres	M. giza	[illegible]
137	MASUMBUKO GODFREY	M. giza	[illegible]
138	MUSSA Waindi	M. giza ~~M. waindi~~	~~M. waindi~~
139	maenga sita	M. giza ~~sita~~	M. sita
140	STEVEN [illegible]	M. giza	[illegible]
141	Lina Herein	Mgiza	[illegible]
142	HAMISI .S. MALONGO	M. GIZA	Malongo.
143	~~Fredra~~ Rispal chanes		R. chanes
144	Thobias Mwenela		T. Mwenela
145	MARY – EMANUEL	M GIZA	MARIA
146	ALPHONCE NDALAWA	mabatini	[illegible]
147	MASUNGA MASHAURI	MWEMBEGIZA	[illegible]
148	HULDA ROBERT	MASENGO MAAYA	Msunte
149	Costantini Zephelini	mtoni	[illegible]
150	Alfred W. Paulo	Mabatini Kaskazini	[illegible]
151	SELEMANI SAIDI	MABATINI KASKAZINI	[illegible]
152	RICHARD MAPANZA	MWEMBEGIZA	[illegible]
153	MAIKO CHACHA	MWEMBEGIZA	[illegible]
154	DEBORA CHRISTOPHER	M/KASKAZINI	Debora
155	Maico Chanes	M/kaskazini	

MWENYEKITI WA MTAA
MTAA WA MABATINI KASKAZINI
KATA YA MBUGANI
MWANZA-NYAMAGANA

No	JINA	MTAA / CHEO	SAHIHI
156	MATALIWA SYLVESTER	MWEMBEGEZA	[illegible]
157	GODFREY M DIURU	MWEMBEGEZA	[illegible]
158	DAVID P. KWILIGWA	MWEMBEGEZA	[illegible]
159	AMOS [illegible]	M/kaza	
160	Sylvanus Wandiba	mwembe gez[illegible]	[illegible]
161	ERICK YUSUPH	[illegible] M/GIZA	[illegible]
162	Angela George	M. kaskazin	A. G
163	Rahel Atieno	M. kaskazin	
164	MUSSA M. MIRAMBO	M KAZI	[illegible]
170	HAMISI JUMA. R	M KAZI	[illegible]
171	JOSEPH - JUMANNE	M.J KA. MWE	[illegible]
172	KRISTINA - NDEGE	M - KAZ. MWZ	[illegible]
173	BESTINA JOSIAH	M. KAM KATIKA	[illegible]
174	AMINATH IBRAHIM	M. KZ. FUMA	[illegible]
175	IMELDA MACHUNDE	Mwembegiza	[illegible]

MWENYEKITI WA MTAA
MTAA WA MABATINI/KASKAZINI
KATA YA MKUDUMBA
MWANZA-MJINI.

Imethibitishwa [illegible] 16/03/2013

Appendix V: Comments Response Table

Comments' Response Table made on the Draft Final Report for Environmental and Social Impacts Assessment for Proposed Construction of Simplified Community Sewerage System for Mabatini and Igogo Areas in Mwanza City

	Item	Response
N	**Specific comments**	
	Review area 1: Description of the development, local environment and baseline conditions	
1.	Page 10 section 2.4.2 state the number of households to be served by retention tanks	Number of households to be served by retention tanks described under section 2.5, page 12
2.	Page 12; state the final disposal of the sludge from the retention tanks after desludging	Explained further under section 2.4.4 as required.
3.	Page 19 provide clear number of onsite collector system and number of household to be connected	The comment observed and described under section 2.5, page 12
4.	Discuss the current practise of disposing domestic liquid waste at Mabatini and Igogo areas	Discussed under section 4.4.3
5.	Include the final design of the sewer line and mention the new route that the sewer line will pass.	The final sewer line design drawings appended under appendix VI
6.	The EIS should tell the source of raw materials for construction activities	The source for construction raw materials described under Section 2.6.1 of the report
7.	Baseline information for noise level and vibration level should be established before commencement of the project	Noise and vibration level information can be established at a specific location and it is difficult to establish such level for sewer network area
Review area 2: Identification and evaluation of key impacts		
1.	Impacts should be elaborated according to project phases (construction, operation and decommissioning phase) i.e. operation phase handling of chemicals, spillage and oil spills	Impacts elaborated according to project phases
2.	Include impacts during construction phase e.g. Employment, generation of construction waste, influx of new people to the area, HIV/AIDS etc. These impacts should be analyzed and mitigation measures should be provided	The impacts analysed under section 6.4 and the mitigation measures provided under chapter 7
3.	Identify safety and health hazards	Safety and health hazard identified under section 6.4

	associated with construction phase	
Review area 3: Alternatives, mitigation and commitment		
1.	Include/ Consider other alternatives in term of technology, project design, and alternative location of underground line, input or supply alterative. The main environmental advantages and disadvantages of each option should be discussed and the reasons for the final choice given	Alternatives in term of technology, project design, alternative location of underground line, and input alterative including their environmental advantages and disadvantages incorporated under section 6.7
2.	Provide the enhancement measures for the positive impacts	Positive impacts enhancement measures given under section 7.3
Review area 4: Public participation and communication of results		
1	The contents and the organization of the EIS should comply with the requirement of Part V of the EIA and Audit Regulation, 2005. This is with regard to requirement related to the Executive Summary and the non technical Executive Summary	The EIS presented according to the requirement of Part V of the EIA and Audit Regulation, 2005
2	NEMC telephone and fax numbers should be updated (see cover page of the report);	NEMC's contact address updated
3	Issue-response table to show how people's concerns have been incorporated in the EIS is missing	People's concerns and consultancy response have been incorporated in the EIS (see table 7)
4	All typological and morphological mistakes should be corrected throughout the report	Proofreading of the report was done and all typological and morphological mistakes corrected.
5	Provide the actual date of submitting the report to NEMC (see the cover page)	The comment observed
6	Both Swahili and English version of Non-Technical Executive summary are missing in the report contrary to the requirements of the EIA and Audit Regulations, 2005	Included in separate bound document.

Appendix VI: Detailed Project Drawings