THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF WATER

Dar es Salaam Water supply & Sanitation Authority
DAWASA Building, Dunga/Malaga Street, Mwananyamala Area
P. O. Box 1573, Dar es Salaam. TANZANIA.
Tel. +25522276006/15; Fax: +255222762480; E-mail: dawasaceo@dawasa.co.tz

Comprehensive Project Brief for the Proposed Simplified Sewerage System to be constructed at Ukwamani Mtaa, Kawe Ward, Kinondoni District, Dar es Salaam Region

Submitted to:

National Environment Management Council,

Head Office, Kambarage Tower, 6th Floor, P. O. Box 2724, Dodoma.

Phone: +255 262960098, 0713608930,

Email Address: nemcdg@nemc.or.tz

Website: www.nemc.or.tz

Lead Consultant:
Prof. Rubhera RAM Mato (PhD), CEng. (T), Reg. EIA Expert

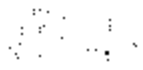
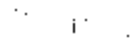
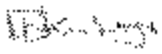
Mobile: +255754898592; E-Mail: rubheramato@gmail.com

Submission date: **29th November 2022**

ACKNOWLEDGEMENT

The Proponent (DAWASA) wishes to convey a heartfelt thanks and appreciation to all stakeholders who in one way or another supported the completion of this work. Thanks very much all of you. Special thanks to the Kinondoni Municipal Council Officers for their prompt assistance during the fieldwork. Last but not least we thank the local community and wards leaderships in the project vicinity for their cooperation. A sincere appreciation for all experts and assistants who participated in data collection and preparation of this report.

THE STUDY TEAM

NAME	POSITION	NEMC Reg. No.	SIGNATURE
Prof. Rubhera RAM Mato	Environmentalist and ESIA Team Leader	Registered NEMC/EIA/0092	
Mr. Robert Kishiki	Sociologist	Not Registered	
Mr. Emmanuel Rajab	Environmental Engineer	Registered EC/EE-EIA/2021/0015	
Mr. Melkizedeck Stephano	Environmentalist	Not Registered	

ABBREVIATIONS

AAQ	Ambient Air Quality
AIDS	Acquired Immuno-Deficiency Syndrome
DAWASA	Dar es Salaam Water Supply and Sanitation Authority
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Monitoring Plan
GoT	Government of Tanzania
HIV	Human Infection Virus
IDA	International Development Association
LGA	Local Government Authority
NEMC	National Environment Management Council
NEP	National Environment Policy
OGSP	Off-Grid Sanitation Project
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
RAP	Resettlement Action Plan
STDS	Sexual Transmitted Diseases

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Comprehensive Project Brief for the Proposed Simplified Sewerage System to be constructed at Ukwamani Mtaa, Kawe Ward, Kinondoni District, Dar es Salaam Region

Proponent: DAWASA

Proponent's Contact: DAWASA House, **Dunga/Malanga Street/Mwananyamala**
P.O Box 1573 DSM
Tel: +255222760006/15
Fax: +255222762480
Email Address: info@dawasa.go.tz

EIA Expert: **Prof. Rubhera RAM Mato**
(PhD), CEng. (T), Reg. EIA Expert
Mobile: +255754898592
E-Mail: rubheramato@gmail.com

INTRODUCTION

The Government of the United Republic of Tanzania (GoT) through the Dar es Salaam Water and Sewerage Authority (DAWASA) under the Ministry of Water intends to implement an Off-Grid Sanitation Project (OGSP) in Dar es Salaam City to serve peri-urban areas not connected to the central sewerage system. DAWASA has received financing from the International Development Association (IDA) in the form of a credit to implement the project. Before implementing the project, the law in Tanzania requires an Environmental Impact Assessment to be conducted and approved by the relevant authority. To comply with the law in Tanzania, the DAWASA intends to apply a portion of the proceeds of the credit to eligible payments for consulting services for Preparation of Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) Report for the construction of off-grid sanitation projects.

Dar es Salaam is the largest and most important commercial and industrial center in Tanzania. The city has an estimated population of about 5.0 million and is projected to double at the end of the project horizon of 25 years. About 10% of the population is served by sewers and the rest almost depend on on-site sanitation systems. The sewer coverage is only limited to the area within the city center with a total length of 67.8km and the system is based on a separate system and discharges their effluent into oxidation ponds, and into the sea through a sea outfall of about 1.03km long. The onsite sanitation systems result in Faecal sludge of which handling and management throughout the sanitation chain (from domestic containment, transportation as well as disposal and treatment) is currently hygienically inadequate thus posing environmental and public health risks. The Off-Grid project is intended to address these challenges. The Off-Grid project is divided into several subprojects which will be implemented in the five municipalities of Dar es Salaam City. One of these is the Construction of Simplified Sewerage System at Ukwamani street, in Kawe Ward, Kinondoni Municipality. The project is planned to connect 280 households with an estimated population of 24,603 people.

This study was conducted following the Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations, 2018 along with the Environmental Impact Assessment and Audit Regulations of 2005. These Regulations provide legal procedures for implementing the requirements of the Environmental Management Act Cap.191 of 2004. The Regulations give a mandate to NEMC to oversee the EIA process, which culminates with an award of the EIA Certificate by the Ministry responsible for Environment.

Following the EIA Regulations, NEMC is mandated to screen projects and make decisions of the level of EIA required as well as evaluating the adequacy of respective environmental statements. Considering the nature and size of the proposed "Simplified Sewerage System in Kinondoni Municipality", the project falls under Category "B2" (Non-Mandatory) following Reg.4 (1)(c) and First Schedule of the amended 2018 Regulations which categorizes the *night soil collection and*

treatment being under the '*List of small-scale activities and enterprises that require registration but shall not require Environmental Impact Assessment. Further, the projects shall not require screening and scoping, rather, the Project Brief shall be examined and issued with an Environmental Impact Assessment Certificate*'. The regulations require developers to prepare and submit to the National Management Council (NEMC) filled EIA registration forms and "Project Briefs" for all B2 projects. The preparation and content of the "Project Briefs" are provided under Regulation 6(1) of Environmental Impact Assessment and Audit Regulations, 2005. The same has been followed in preparing this "Project Brief". The study for preparing this project brief was conducted from July to October 2020.

This project brief for the Proposed Construction of Simplified Sewerage System in Kinondoni Municipality is being submitted to NEMC together with EIA Registration Forms for EIA Certificate decision.

PROJECT DESCRIPTION

Kawe is an administrative ward in the Kinondoni district of the Dar es Salaam Region of Tanzania at Latitude -6.737975° and Longitude 39.227269°. According to the 2002 census, the ward has a total population of 94,535, Kawe ward lies along India ocean on the North-Eastern part of the region making it susceptible to fluvial floods, the ward comprises of four streets that is Ukwamani, Mzimuni, Mbezi beach A, Mbezi beach B. Most of streets in Kawe ward are unplanned settlement with restricted access roads for feacal sludge emptying trucks. Furthermore, the ward is characterized by having underlying geographical formation setback where water table is significantly high.

Currently, this area is being served through on site sanitation management that involve domestic containment and emptying trucks that are not satisfactory managed. Apart from illegal emptying, underground seepage of faecal sludge may also contaminate ground water leading to water related diseases within this area. To address above challenges, we recommend construction of simplified sewerage

system as the solution of faecal sludge management within the area. The project will be implemented at Kawe Ukwamani street.

The proposed project intends to use the existing alleys (*vichochoro)* for installing the simplified sewer pipelines. The local government in the project area has agreed with DAWASA through a formal meeting held on 16/10/2020 to use the alleys whether formal or non-formal for the construction of a simplified sewerage system and the associated appurtenances to improve the sanitation conditions.

POLICIES, LEGISLATION AND INSTITUTIONAL ARRANGEMENTS

Sector policies that were reviewed when executing the proposed development are;

- National Environment Policy 2021
- National Land Policy of 1997
- Construction Industry Policy (2003)
- National Health Policy (2003)
- National Gender Policy of 2000
- National Human Settlements Development Policy (2000)

Principal Acts, regulations and guidance that support and provide guidelines to implement the intended project are;

- Environmental Management Act (2004)
- The Environmental Management (Fees and Charges) Regulations, 2021
- The Environmental Management (Control of hazardous Waste) regulations, 2021
- The Environmental Management (Control of Noise and vibration) regulations, 2015

- The Environmental Management (Prohibition of Plastic Carrier bags) regulations, 2019
- The Environmental Management (Solid Waste Management) regulations, 2007
- The Environmental Management (Water Quality) regulations, 2009
- The Environmental Management (Air Quality) regulations, 2009
- The Environmental Management (Soil Quality) regulations, 2009
- Occupational Health and Safety Act 2003
- The Water Supply and Sanitation Act No. 12 of 2009
- Engineers Registration Act and its Amendments 1997 and 2007
- The Contractors Registration (Amendment) Act, 2008
- The Architects and Quantity Surveyors Act (1997)
- The Urb World Bank guidelines for Environmental Managementan Planning Act (2007)
- Public Health Act (2009)

STAKEHOLDERS ISSUES AND CONCERNS

Different stakeholders were consulted. Among of the issues that arise during consultation at the Kinondoni Municipal Council and community at Ukwamani Mtaa are:

Facilities to be developed

- Proper awareness to people on best ways to dispose pads and other waste in order to avoid system blockage
- The proposed facilities should be well protected

Awareness to the community

- Awareness to the people on the system operation, since it is a new technology
- Awareness to the community to avoid riots in the future

- Educate the community to avoid the use of detrimental disinfectants to the system so as to avoid system failure and contaminated manures.

PROJECT REQUIREMENTS AND WASTE GENERATION

Project requirements

The main materials for construction of Simplified sewerage system include cement, aggregates (stones), water, steel, sand, timbers, blocks, PVC pipes, and gravels. During the construction phase the project will require not less than 100 workers both skilled and non-skilled laborers for each phase of project construction. During operational phase it is estimated that 30 unskilled workers will be retained for operating the system.

Equipment expected to be used during the construction works are Tippers, Concrete Mixers, poker vibrators, Wheel barrow, Compactor, etc.

Wastes generation

The major wastes generation associated with the project are solid wastes and liquid waste. During the maximum operation phase a total of 100m^3 per day of liquid waste is estimated to be received at the downstream receiving chamber of the Fecal sludge treatment facility close to the project site. During construction it is expected that at least 60kg of solid wastes will be produced.

POTENTIAL IMPACTS

The following impacts were identified to be likely to occur during mobilization phase:

- Employment opportunities
- Noise pollution
- Air pollution from dust emission
- Blockage of paths

The following impacts were identified to be likely to occur during the construction phase;

- Employment opportunities
- Increased socio-cultural interaction
- Increased Revenue to the nation through taxes, both direct and indirect
- Cost reduction for sewage management
- Increased HIV/AIDS and other sexual related diseases
- Land degradation and increased erosion
- Noise pollution
- Air Pollution from dust emission
- High Risk of Health associated with construction work
- Waste generation during construction
- Sewer leakage/overflow
- Blockage of paths

The following impacts were identified to be likely to occur during the operational phase;

- Improved social-economic livelihood and dignity within the beneficiary society
- Increased Revenue to the nation through taxes, both direct and indirect
- Cost reduction for sewage management
- Sewer leakage/overflow

MITIGATION MEASURES AND ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

The options to minimize or prevent the identified adverse social and environmental impacts as well as a monitoring plan have been suggested in this report and are contained in the ESMP. Many of them are based on good engineering practices and the timely responsiveness of the responsible institution. The ESMP describes the implementation schedule of the proposed mitigation measures as well as planning for long-term monitoring activities. It defines the roles and responsibilities of different actors of the plan. The Approach environmental and social costs amount to Tshs 38,000,000.00. The estimated annual costs for carrying out the

proposed environmental and social motoring program amounts to TSH 28,000,000.00.

DECOMMISSIONING PLAN

The decommissioning is not anticipated in the foreseeable future. However, if this will happen, may entail change of use (functional changes) or demolition triggered by change of land use. In view of this, specific mitigation measures pertaining to environmental impacts of decommissioning works cannot be proposed at the moment with a reasonable degree of certainty.

CONCLUSION

The proposed project is of greater profit to the community and the country at large as it promotes and improve sanitation in the streets. When there is good and improved sanition, then the outbreak of diseases like diarhoea and associated stomach and waterborne diseases are also reduced and prevented hence improved public health.

The impacts identified are preventable and of less negativity to the community, therefore the developer can be provided with the environmental clearance certifacte in order to commence the implimentation of the project.

It is, therefore, concluded that implementation of the proposed construction of the Simplified sewerage system at Ukwamani Mtaa will entail no detrimental impacts provided that the recommended mitigation measures are adequately and timely put in place. The identified adverse impacts shall be managed through the proposed mitigation measures and implementation regime laid down in this EIS. DAWASA is committed to implementing all the recommendations given in the EIS and further carrying out the environmental auditing and monitoring schedules.

Comprehensive Project Brief for the Proposed Simplified Sewerage System to be constructed at Ukwamani Mtaa, Kawe Ward, Kinondoni District, Dar es Salaam Region

1.0 BACKGROUND AND JUSTIFICATION

The Government of the United Republic of Tanzania (GoT) through the Dar es Salaam Water supply and Sanitation Authority (DAWASA) under the Ministry of Water intends to implement an Off Grid Sanitation Project (OGSP) in Dar es Salaam City to serve peri-urban areas not connected to the central sewerage system. DAWASA has received financing from the International Development Association (IDA) in the form of a credit to implement the project. Prior to the implementation of the project, the law in Tanzania requires an Environmental Impact Assessment to be conducted and approved by relevant authority. In order to comply with the law in Tanzania, the DAWASA intends to apply a portion of the proceeds of the credit to eligible payments for consulting services for Preparation of Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) Report for construction of off grid sanitation projects.

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This project brief for the Proposed Construction of Simplified Sewerage System in Kinondoni Municipality is being submitted to NEMC together with EIA Registration Forms for EIA Certificate decision.

1.1 NATURE OF THE PROJECT

The proposed project concerns construction of Simplified sewerage system for public use at Ukwamani street, Kawe Ward, Kinondoni Municipality. The nature of the project enhances environmental protection through proper handling and disposal of domestic sewage. According to First Schedule of the EIA and Audit Regulations (Amended) of 2018, the nature of the project is small and entails no significant impacts. The project can be categorised as Type B2, which according to the regulations are "small-scale activities and enterprises that require registration but shall not require Environmental Impact Assessment. Further, the projects shall not require screening and scoping, rather, the Project Brief shall be examined and issued with an Environmental Impact Assessment Certificate".

2.0 PROJECT DESCRIPTION

2.1 Project Location

Kawe is an administrative ward in the Kinondoni district of the Dar es Salaam Region of Tanzania at Latitude -6.737975° and Longitude 39.227269°. According to the 2002 census, the ward has a total population of 94,535, Kawe ward lies along India ocean on the North-Eastern part of the region making it susceptible to fluvial floods, the ward comprises of four streets that is Ukwamani, Mzimuni, Mbezi beach A, Mbezi beach B. Most of streets in Kawe ward are unplanned settlement with restricted access roads for feacal sludge emptying trucks.

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figure 1.

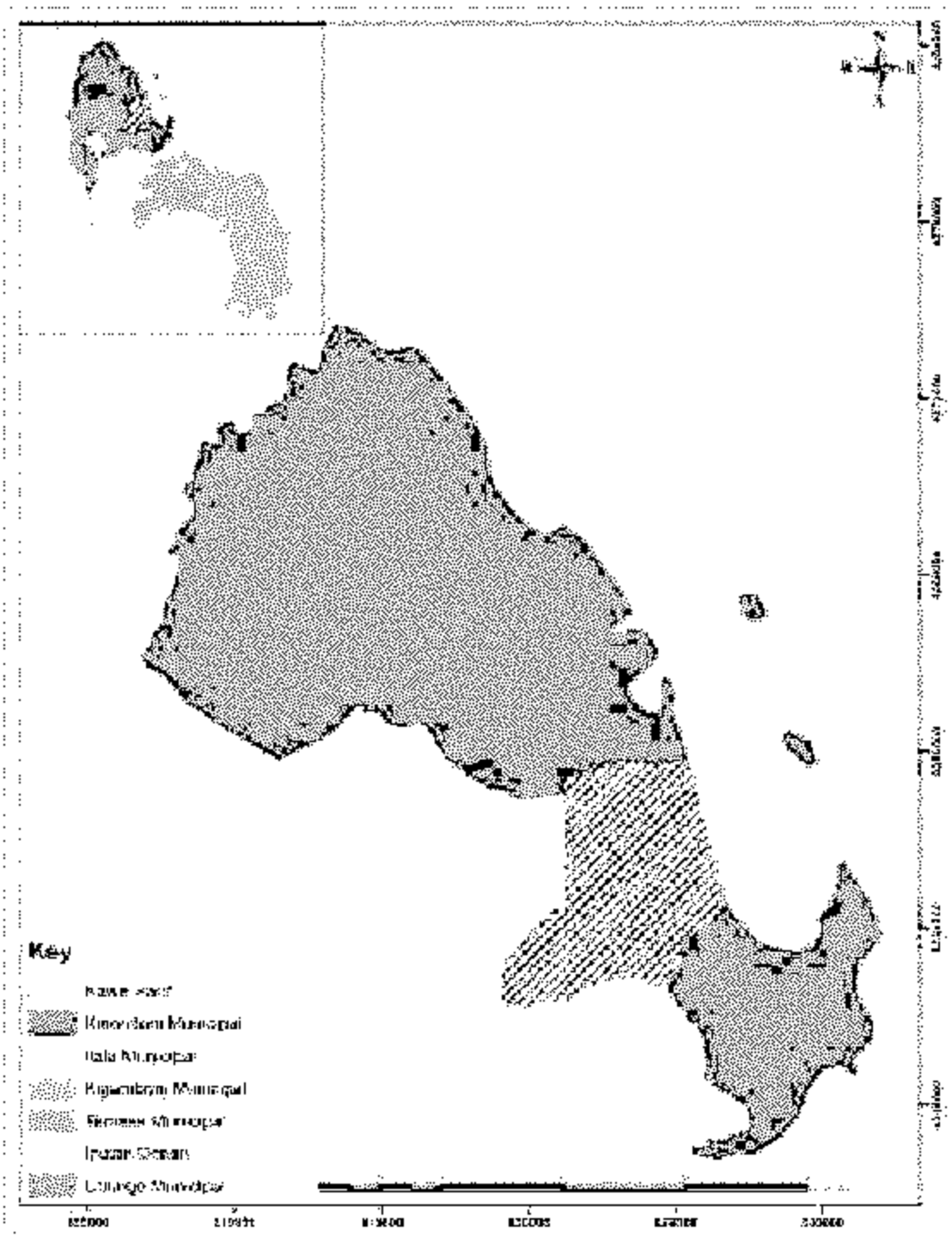


Figure 1: A Map of Dar es salaam region showing the project Municipal

Figure 2: An Extract Google view to show the Location of the project area

2.2 Accessibility

The project area is accessible via Ali Hassan Mwinyi road and Mwai Kibaki road, from City Centre, the site is at the left side 1.5 Km from Mwai Kibaki road. The project area is unplanned settlement with restricted access roads for feacal sludge emptying trucks.

2.3 Specific Features

The proposed project site is characterized with ground vegetation and short grasses, residential buildings can be observed afar from the project site. The project site is located adjacent to the Lugalo Military base main waste water sewer.

2.4 Adjacent Land Use

The project site is surrounded by residential buildings and few commercial and institutional buildings like Mzimuni Primary school. The permit to use the alleys for implementation of the project has been appended along with the Memorandum of Understanding between DAWASA and Kinondoni Municipal council, appendix IV.

2.5 PROJECT ACTIVITIES

2.5.1 Mobilization or pre-construction phase

This phase entails mobilization of labour force, and equipment as well as acquisition of various permits as required by the law.

Other activities during this phase include;

- Topographical Survey for setting out purposes,
- Construction Materials' source Investigation,
- Material transportation, storage and material preparation,

2.5.2 Construction phase

This phase entails all the necessary installations, site grading and placement of the facility components. The major activities include;

- Trench excavation and laying of 4" and 6" PVC pipes for collection of wastewaters from households.
- Backfilling and paving of excavated trenches
- Construction of inspection chambers/junction boxes
- Construction of receiving chambers
- Connection of customers' latrines to the constructed network

2.5.3 Demobilization phase

This phase will involve the dismantling of temporary structures such as scar fording and removing/spreading spoil materials for proper restoration of the site. Other activities include;

- General cleanliness of the area, that is clearance of all sorts of solid wastes (plastics, wood, metal, papers, etc);
- Deposit all wastes to the authorized dumpsite;

2.5.4 Operation phase

The phase entails the actual usage of the Simplified sewerage system where as the individual household will be discharging night soil directly to the system. The main task will be occasional clearance of the blockages and timely replacement of leaking pipes undertaken by DAWASA with the sole cooperation from household owners at the vicinity.

2.5.5 Decommissioning Phase

Decommissioning is not anticipated in the foreseeable future as the completed facility will be serving a number of houses which at present incur many costs to dispose fecal sludge and if not so tend to discharge illegally. However, if this will happen, may entail change of use (functional changes) or demolition triggered by change of land use.

2.6 PROJECT DESIGN

Kawe Simplified sewerage system will involve construction of a simplified sewerage network at Kawe Ukwamani street discharging wastewater into existing sewer line to Lugalo wastewater stabilization ponds with the design capacity of 3,802m^3/day with only 869 connections and will be receiving 69m^3/day that will be generated from the proposed Ukwamani Mtaa Simplified sewerage system project, Appendix V. The system is planned to collect wastewater from surrounding households using 4" PVC pipes laid in shallow depth trenches. The system will operate under controlled gravity flow in accordance to designed gravity and velocity. Collected sewage will be treated at the existing Lugalo

wastewater stabilization ponds and treated effluent discharged upon attaining required standards.

2.6.1 Design criteria

Conceptually, simplified sewerage is the same as Conventional Gravity Sewerage, but without unnecessarily conservative design standards and with design features that are better adapted to the local situation. The pipes are usually laid within the property boundaries, through either the back or front yards, rather than beneath the central road, allowing for fewer and shorter pipes.

Some of the criteria and standards for the design of the sewers are:

- Minimum velocity in pipe
- Minimum slopes of pipes
- Minimum pipe diameter
- Design peak flow factor

2.6.2 Technology description

2.6.2.1 Layout

To avoid deep excavations, long trunk pipes to interceptors, and large pumping stations, serious consideration is given to splitting the network into two or more smaller systems, Appendix V. Although network layout is also an important part of conventional design, the optimization of pipe lengths and network subdivisions takes on even greater importance in this system. The total length of the sewer line is 5.2Km.

2.6.2.2 Hydraulics

Design period

Another approach to sewerage systems that can bring major benefits to the project is to reduce the design period of the sewerage system. A great advantage of using shorter term periods is that it avoids uncertainties of population growth and reduces the high costs of maintenance of large sewer

systems with low flow. Other benefits of the reduced design period, are that it can also facilitate financing and achieve greater coverage with the same investment.

Design flow

Wastewater flow quantities are necessarily lower than the quantity of water supplied because water is lost through leakage, garden watering, house cleaning, etc. To determine the expected amount of wastewater, it is important to keep records of pumpage for each day and fluctuations during the day.

Where water use information is not available, the simplified sewerage system is - designed for a minimum flow of 1.5 l/s, infiltration is assumed to be 0.05-1.0 1/s/km of pipe.

2.6.3. Service Connection

In the simplified design, a 60-cm connection (or inspection) box is placed between the building and the service line. All the sewers or drains from the house or building enter the box. This box is usually located under the sidewalk in the public right of way

2.6.4 Depth of sewers

For any type of sewer connection, it is standard to have a minimum depth in which the pipes are laid should be sufficient to make house connections and have a layer of soil over the crown to protect the pipe against structural damage from external loads and frost. On simplified connections, the minimum sewer depths are usually much shallower than the conventional systems. Being as shallow as 0.65-m below sidewalks, 0.95-1.50-m below residential streets (depending on distance from the centerline of street), and 2.5-m below heavily traveled streets.

2.6.5 Manholes and other appurtenances

One of the most important differences between conventional and simplified sewer systems is that the former utilizes many manholes, whereas the latter type avoids its use as much as possible. The conservative criteria for manhole

use contributes to the high cost of sewerage. The use of shallower depths is one way of reducing these costs.

In conventional systems, manholes are generally located at:

- The upper ends of all laterals
- Changes in direction and slope
- Pipe junctions, except building connections
- At intervals not greater than 100m for pipes up to 600mm diameter

2.6.6 Construction Material

The types of materials used in SSS are similar to those used in conventional sewers. The most commonly used and readily available in the market are polyvinyl chloride (PVC) pipes. Additionally, PVC pipes offer the advantage of longer sizes, fewer joints (i.e less infiltration), light weight, water tightness and uniformity.

2.6.7 Typical SSS house connection layout

The proposed construction of simplified sewerage system will have the similar appearance as the typical layout shown in figure 3;

2.7 Utilities

Water

The main source of water for all project phases is expected to be DAWASA.

Power supply

Power will be supplied from TANESCO whenever necessary,

Manpower.

The project is expected to provided employment to about 100 people directly and indirectly for both skilled and unskilled labors.

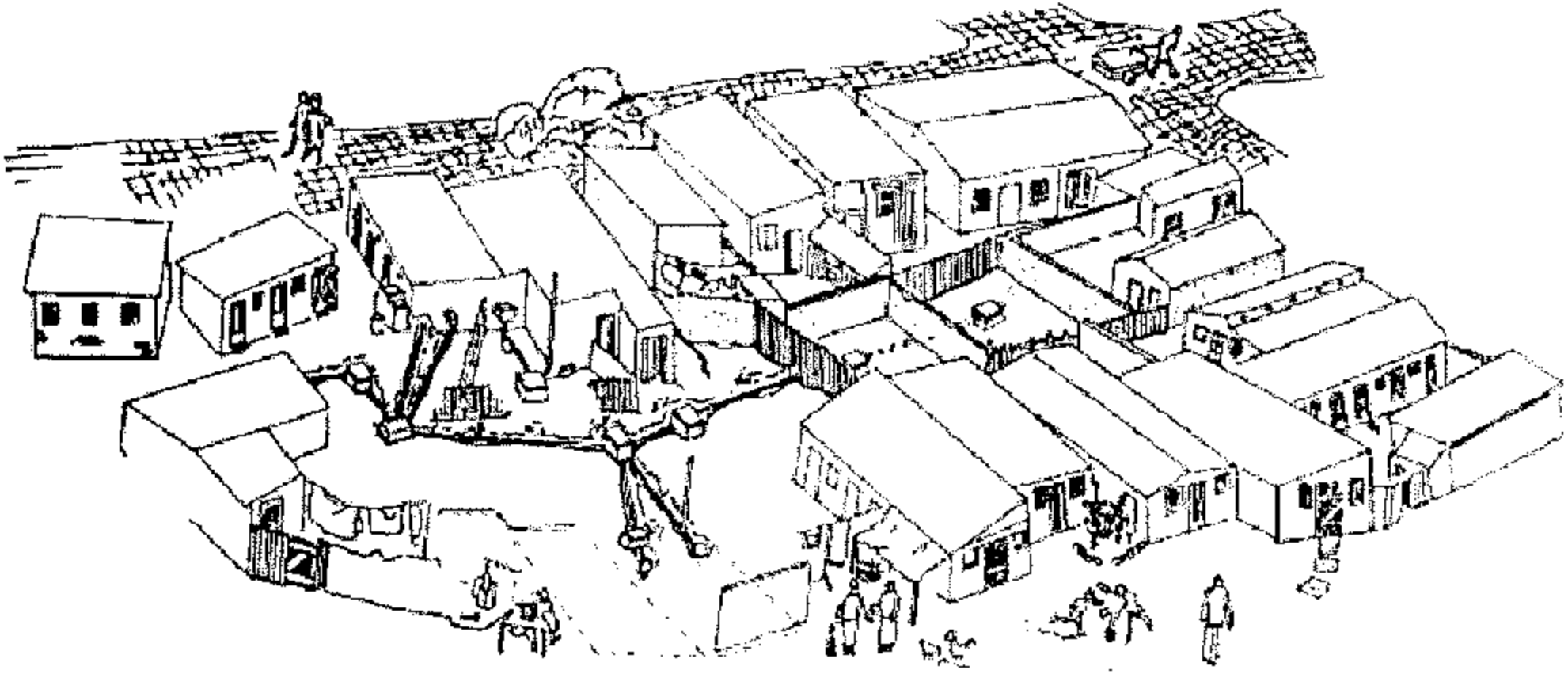


Figure 3: Typical Simplified Sewerage system layout aerial view

3.0 POLICIES, LEGISLATION AND INSTITUTIONAL ARRANGEMENTS

According to the fundamental principles of environment, any developmental activities of this nature such as construction of simplified Sewerage System would have socio-economic and somehow environmental impacts that must be addressed and governed in order to serve public interest and sustainable development. Given the many existing and developing environmental laws, regulations and standards in Tanzania, it is worth considering resorting to constitutional provisions to protect and manage the environment. With increasing environmental awareness in recent decades, the environment has become a higher political priority and many constitutions now expressly guarantee a 'right to a healthy environment', as well as the procedural rights necessary to implement and enforce the substantive rights granted. The public or national interest in this aspect is addressed through government Policies and regulated by Principal Acts and Regulations. The implementation of the proposed project shall touch various sectors; therefore, the developer has to comply with number of cross-sectorial policies and legislations relevant to this project. Also, the listed institutions involved in environmental management for the project is included in this chapter.

3.1 RELEVANT POLICIES

This section focuses on various policies which guide the development aspects for sustainable vision, apart from the national environmental policy, there are numbers of sector policies that are to be reviewed when executing the proposed development and these include;

3.1.1 National Environment Policy 2021

The National Environmental Policy of 2021 has just been launched in February 2021. The new policy formulation is a revision of the National Environmental Policy of 1997. The Policy serves as a national framework for planning and sustainable management of the environment in a coordinated, holistic and adaptive approach taking into consideration the prevailing and emerging environmental challenges as well as national and international development

issues. Effective implementation of this policy requires mainstreaming of environmental issues at all levels, strengthening institutional governance, and public participation in environmental management regimes. The long-term vision of this policy is geared towards the realization of environmental integrity, assurance of food security, poverty alleviation, and increased contribution of the environmental resources to the national economy. It also recommends strong institutional and governance measures to support the achievement of the desired objectives and goals.

The policy seeks to promote the economy and livelihoods of people while promoting sustainable utilization of natural resources in the country. The policy provides the framework for the formulation of plans, programmes, and guidelines for the achievement of sustainable development.

The policy overall objective is to provide a national framework for guiding harmonized and coordinated environmental management for the improvement of the welfare of present and future generations. The specific objectives are i) to strengthen coordination of environmental management in sectors at all levels; ii) to enhance environmentally sound management of land resources for socioeconomic development; iii) to promote environmental management of water sources; iv) to strengthen conservation of wildlife habitats and biodiversity; v) to enhance conservation of forest ecosystems for sustainable provision of environmental goods and services; vi) to manage pollution for the safe and healthy environment; vii) to strengthen the national capacity for addressing climate change impacts; viii) to enhance conservation of aquatic system for the sustained natural ecosystem; ix) to ensure safety at all levels of application of modern biotechnology; x) to promote gender consideration in environmental management; xi) to promote good governance in environmental management at all levels; and xii) to ensure predictable, accessible, adequate and sustainable financial resources for environmental management.

3.1.2 National Land Policy of 1997

The National Land Policy states that "the overall aim of a National Land Policy is to promote and ensure a secure land tenure system, to encourage the optimal use of land resources, and to facilitate broad-based social and economic development without upsetting or endangering the ecological balance of the environment". This study partly responds to this requirement.

3.1.3 Construction Industry Policy (2003)

Among the major objectives of the policy, which supports a sustainable building development sector, include the promotion and application of cost effective and innovative technologies and practices to support socio-economic development activities such as sanitation, water supply, buildings, road-works, shelter delivery and income generating activities and to ensure application of practices, technologies and products which are not harmful to either the environment or human health. Proposed project is in-line with this policy as ultra-modern technology is used during construction and its operation.

3.1.4 National Health Policy (2003)

The Health Policy is a vital guide towards health development of any country. It is particularly, important in a country like ours where resources and technology are more limited than in other countries, which are relatively better off in both technology and resources. This Policy is a revision of the 1990 Health Policy, which emphasized on the need for increasing community involvement in health development and improved access and equity in health and health services.

The Policy recognizes the challenges of consolidating the principles of the previous health policy in community involvement, improved health services provision, access and equity while addressing the different dimensions of reforms that are taking place in the Public Sector.

The proposed project will adhere to policy requirements to ensure no transmission of such communicable diseases between construction workers and the community, protect workers from all sorts of health risks and hazards;

and provide adequate sanitation services within the project and ensure that its activities are not a source of health issues.

3.1.5 National Gender Policy of 2000

The overall objective of the Gender and Development Policy is to promote gender equality and equal participation of men and women through facilitation of access to education, child care, and employment and decision making. Also this policy is to provide guidelines that will ensure that gender-sensitive plans and strategies are developed in all sectors and institutions. While the policy aims at establishing strategies to eradicate poverty, it emphasizes gender quality and equal opportunity of both men and women to participate in development undertakings and to value the role played by each member of society. The proposed project will adhere the requirements addressed under this policy.

3.1.6 National Human Settlements Development Policy (2000)

Among the objectives of this policy is to improve the level of the provision of infrastructure and social services for the development of sustainable human settlements and to make serviced land available for shelter to all sections of the community. Such infrastructure and services constitute the backbone of urban/rural economic activities. Simplified Sewerage System is one among of the important infrastructure for the Mnyamani community and country at large

3.2 PRINCIPAL LEGISLATIONS AND REGULATIONS

The ESIA team reviewed several legislations relevant to the construction of Simplified Sewerage System. These encompass Principal Acts that support and provide guidelines to implement the intended project as discussed below.

3.2.1 Environmental Management Act (2004)

Among the major purposes of the EMA are to provide the legal and institutional framework for sustainable management of the environment in Tanzania; to outline principles for management, impact and risk assessment, the prevention

and control of pollution, waste management, environmental quality standards, public participation, compliance, and enforcement; to provide the basis for the implementation of international instruments on the environment; to provide for the implementation of the National Environmental Policy; to provide for the establishment of the National Environmental Fund and to provide for other related matters.

Part III, Section 15(a) states that "*in matters about the environment, the Director of Environment shall coordinate various environment management activities being undertaken by other agencies to promote the integration of environmental considerations into development policies, plans, programs, strategies projects and undertake strategic environmental assessments to ensure the proper management and rational utilization of environmental resources on a sustainable basis for the improvement of the quality of human life in Tanzania*". Part X of the law deals with Environmental Quality Standards. Section 140 of this act states that "*The National Environmental Standards Committee of the Tanzania Bureau of Standards established under the Tanzania Bureau of Standards Act, 1975 shall develop, review and submit to the Minister proposal for environmental standards and criteria concerning; water quality; discharge of effluent into the water; air quality; control of noise and vibration pollution; sub-sonic vibrations; soil quality, control of noxious smells; light pollution; and any other environmental quality standard*" Some of these standards have already been published in the government *gazette* while others are not in place. This project shall take into account all the standards specified by this act.

3.2.2 The Environmental Management (Fees and Charges) Regulations, 2021

These Regulations shall apply in relation to an act or service in respect of which fees and charges are payable under the Act and Regulations made thereunder. The regulations emphasize that "a person shall not, upon payment of fees and charges prescribed in the Schedule to these Regulations, carry on any of the following":

- Environmental Impact Assessment;

- Environmental Compliance Monitoring and Audit;
- Registration of Environmental Experts;
- Environmental Quality Standards;
- Noise and Vibrations; or
- other activities related to the environment

This project complies with the regulations since the proponent has already paid registration fees and review charges as directed by NEMC.

3.2.3 The Environmental Management (Control of hazardous Waste) regulations, 2021

The objective of these regulations is to protect the environment and human health by preventing or reducing the generation of Hazardous waste, the adverse impacts of the generation and management of hazardous waste and by reducing overall impacts of resource use and improving the efficiency of such use, which are crucial for the transition to a circular economy. The regulation requires that "any person generating, collecting, storing, transporting, treating, recycling, reusing, recovering and disposing of hazardous waste or any person exercising jurisdiction under these Regulations shall, assure that there are no adverse impacts to be generated or caused by the activity conducted. Project developer will comply with the requirements of this regulation by reducing the construction materials which may generate hazardous impacts, as well as proper handling of such waste such as in use of fuels for various purposes etc.

3.2.4 The Environmental Management (Control of Noise and vibration) regulations, 2015

The regulations focus on the maintenance of a healthy environment for all the people in Mainland Tanzania, the tranquility of their surrounding and their psychological well-being by regulating noise and vibration levels to prescribe the maximum permissible noise and vibration levels from a facility or activity to which a person may be exposed. The project developer will make sure that all

the guidelines under this policy will be considered to ensure the healthy environment to everyone.

3.2.5 The Environmental Management (Prohibition of Plastic Carrier bags) regulations, 2019

Regulations are meant to impose a total ban on the import, export, manufacturing, sale, and use of plastic carrier bags regardless of their thickness. Plastic carrier bags has a wide definition in the Regulations, as a bag made of plastic film, with or without handles, or gussets and to which its layer is in any thickness. The Regulations also categorically state that no person shall sell or offer for sale beverages or other commodities wrapped in plastics unless the nature of such commodities require wrappings by plastics, and restricts any licensing authority from issuing any licenses after the Regulations come into force. Project developer will make sure that there will be no use of plastic bags within the project site and the whole project life time, also in case of the need of carrier bags the proponent will make sure that there will be an alternative bags which are allowed by the regulations. For the commodities that are wrapped in plastic, then the proponent will make sure that such plastic will be handled properly.

3.2.6 The Environmental Management (Solid Waste Management) regulations, 2007

The solid waste management regulation of 2007, provides general directive on management of solid waste as follows: -

Regulation detail the requirements and responsibilities for managing solid waste in Tanzania

Highlight waste minimization and cleaner production principles alongside the duty to safeguard the public health and the environment from adverse effects of solid waste. Detail permitting requirements, notably that any person dealing with solid waste as collector, transporter, waste depositor or manager of a transfer station will apply to the LGA for a permit. The local authority will also issue licenses to individuals or companies qualified to operate solid waste

disposal sites; permit is required to operate an LGA waste disposal site. The proposed project is expected to generate solid waste in construction phase. Therefore, to comply with this regulation the Project developer will engage the registered solid waste collection contractor.

3.2.7 The Environmental Management (Water Quality) regulations, 2009

Regulations provide for institutional and legal framework for sustainable management and development of water resources; to outline principles for water resources management; to provide for the prevention and control of water pollution; to provide for participation of stakeholders and the general public in implementation of the National Water Policy. These regulations require the sustainable management of water sources and proper use of the available sources without causing any damage towards such sources. Also, the regulations emphasize that it is every one's responsibility to conserve and preserve the available water sources in Tanzania. During all phases of the project there will be water demand, hence the project developer will make sure that there will be a sustainable use of water. Also during construction and maintenance phase the developer will make sure that the water supply pipes will not be damaged in either ways

3.2.8 The Environmental Management (Air Quality) regulations, 2009

The Regulations were formed in order to: -

- Prohibit emissions and releases of hazardous substances into the environment
- Prescribe permissible emission limits and quantities of emissions of sulphur oxide, carbon monoxide, black smoke and suspended particulate matters, nitrogen oxide, ozone, hydrocarbons, dust and lead
- Empower NEMC to issue air pollutant emission permits, enforce compliance, undertake emergency prevention and issue stop orders
- Set baseline parameters on air quality and emissions based on a number of practical considerations and acceptable limits and ensure protection of human health and the environment from various sources of pollution.

The proposed project will adhere the requirements of this Act, emission limits will be monitored to the permissible limits.

3.2.9 The Environmental Management (Soil Quality) regulations, 2009

These Regulations, made by the Minister of State under sections 143, 144 and 230 of the Environmental Management Act, concern soil pollution and soil quality standards and provide with respect to a soil protection permit and compliance system. They also concern measures of enforcement. The object of these Regulations is to

- Set limits for soil contaminants in agriculture and habitat;
- Enforce minimum soil quality standards prescribed by the National Environmental Standards Committee.

Also, the regulations require that, the contaminants of volatile organic compounds in habitat and agricultural soils shall comply with parameters and upper limits as prescribed and contaminants of heavy metals in habitat; agricultural soils shall comply with parameters and upper limits as prescribed and contaminants of pesticides in habitat and agricultural soils shall comply with parameters and upper limits as prescribed. Local government authority may prescribe special or specific measures and guidelines for soil conservation applicable to their respective areas of jurisdictions which are not below standards prescribed under these Regulations. The Project developer will comply with the requirements made under these regulations.

3.2.10 Occupational Health and Safety Act 2003

The provisions of this law require employers to provide decent working environment to employees to guarantee their health and safety. Occupational health and safety services are important for sustainable development of a country, as they reduce occupational accidents and diseases which can have huge economic burden to individuals, enterprises and the nation as whole. Improving health and safety of workers will significantly increase productivity at the workplaces to encourage more investments, increase job creation, higher morale, and job satisfaction hence industrial harmony The law also entails

employers to fulfil obligations of ensuring safety of the equipment's used by workers and providing proper safety gears as required.

3.2.11 The Water Supply and Sanitation Act No. 12 of 2009

This is also a new legislation that provides for sustainable management and adequate operation and transparent regulation of water supply and sanitation services; provides for establishment of water supply and sanitation authorities as well as community owned water supply organizations; and provides for appointment for service providers. The main aim of this law is to ensure the right of every Tanzanian to have access to efficient, effective and sustainable water supply and sanitation services for all purposes by taking into account among others protection and conservation of water resources and development and promotion of public health and sanitation; and protection of the interest of customers. Under this law, the Minister responsible for water affairs shall establish water authority and cluster water authorities in order to achieve commercial viabilities.

3.12 Engineers Registration Act and its Amendments 1997 and 2007

The Acts regulate the engineering practice in Tanzania by registering engineers and monitoring their conduct. It establishes the Engineering Registration Board (ERB), the law requires any local or foreigner engineer to register with ERB before practicing in the country. Project developer will continue to comply as it has utilized the services of registered engineering firm for its structural designs which it will continue to use to supervise the construction process.

3.2.13 The Contractors Registration (Amendment) Act, 2008

The Contractors Registration Act requires contractors to be registered by the Contractors Board (CRB) before engaging in practice. It requires foreign contractors to be registered by the Board before gaining contracts in Tanzania. Project Developer shall comply with the law requirement during the recruitment of contractors for project implementation.

3.2.14 The Architects and Quantity Surveyors Act (1997)

The Act requires Architects and Quantity Surveyors to be involved in the project to be registered by the Architects and Quantity Surveyor Board (AQSB) before engaging in practice. It also requires foreign contractors to be registered by the Board before gaining contracts in Tanzania. Project Developer has complied with the law requirement during the recruitment of architects who have designed the project and will continue to utilize registered persons in the project implementation.

3.2.15 The Urban Planning Act (2007)

The law provides for the orderly and sustainable development of land in urban areas, to preserve and improve amenities; to provide for the grant of consent to develop land and powers of control over the use of land and to provide for other related matters. Under Section 3, among others the law seeks to improve level of the provision of infrastructure and social services for sustainable human settlement development. This act established planning authorities which include the city, municipal, town and township councils in the country which have responsibilities including:

- Secure the orderly and environmentally sustainable development of area under its jurisdiction;
- Prepare general and detailed planning schemes;
- Control building densities and access to buildings;
- Recommending approval of building schemes and subdivision of plots by developers;
- Secure cooperation of all agencies, utility bodies, land owners and other bodies and institutions involved in the preparation and implementation of planning process;

3.2.16 Public Health Act (2009)

Provide for the promotion, preservation, maintenance of public health with a view to ensuring the provisions of comprehensive, functional and sustainable public health services to the general public. Part III (e) of the act requires premises owners to keep their premises free of mosquitoes and other disease

vectors, vermin or causative agents; Section 54 prohibits causing or suffering from nuisance likely to be injurious or dangerous to health, land, premises, air or water; Part IV (c) assigns responsibility to City council to remove or appoint an agent to collect, transport and dispose solid and liquid waste and charge fees to beneficiaries of this service and responsibilities for prescribing types of wastes and guidelines for their collection and disposal; Section 101 it gives rights to any private sewer to connect it to any available public sewer to discharge foul or storm water therefore the project may connect to and discharge sewage or storm water into the available trunk main. However, the quality of the sewage should be as per agreed with the water authority.

The Contracting Authority will ensure that the project design, construction and operation does not constitute a nuisance; meets the requirements meets public health requirements

3.2.17 World Bank guidelines for Environmental Management

The main objective of this EMP is to establish a set of mitigation and monitoring measures to minimize the adverse social and environmental impacts that can take place during the implementation stage of the subproject. The measures especially focus on sensitive receptors or sensitive locations. The EMP also provides specific information about the monitoring program during construction stage including locations, frequency and reporting process. This project complies with these guidelines as it has ESMP which contains mitigation and monitoring plans of the identified impacts.

4.0 BASELINE INFORMATION

4.1 INTRODUCTION

This section provides baseline data on the relevant environmental characteristics of the project area. Much of the description of the environment is site specific. Other aspects such as that of climate and socio-economic issues are broad covering the whole Kinondoni District. The Consultant relied on primary data as collected from the site as well as secondary data and information gleaned from the literature for the project area.

4.2 PHYSICAL CHARACTERISTICS

4.2.1 Climate

The project area as compared to many other areas in Dar es Salaam city is influenced by coastal climatic conditions. The area experiences a modified type of equatorial climate.

- **Temperature, Sun hours and Radiation**

The region is generally hot and humid throughout the year with an average temperature of 29ºC. The hottest season is from October to March during which temperatures can raise up to 31ºC. It is relatively cool between July to September, with temperature around 20ºC. The maximum sun hours is 9 experienced from August to October, from November to January the sun hours is 8 while in February to March and May to July is 7 hours and the minimum is 5 hours in April. That means from October to March the operation in the project site will probably need more electricity for the purposes of culling at the office, while during coolest monthlies which is from July to September the consumption might go down see figure 4.1

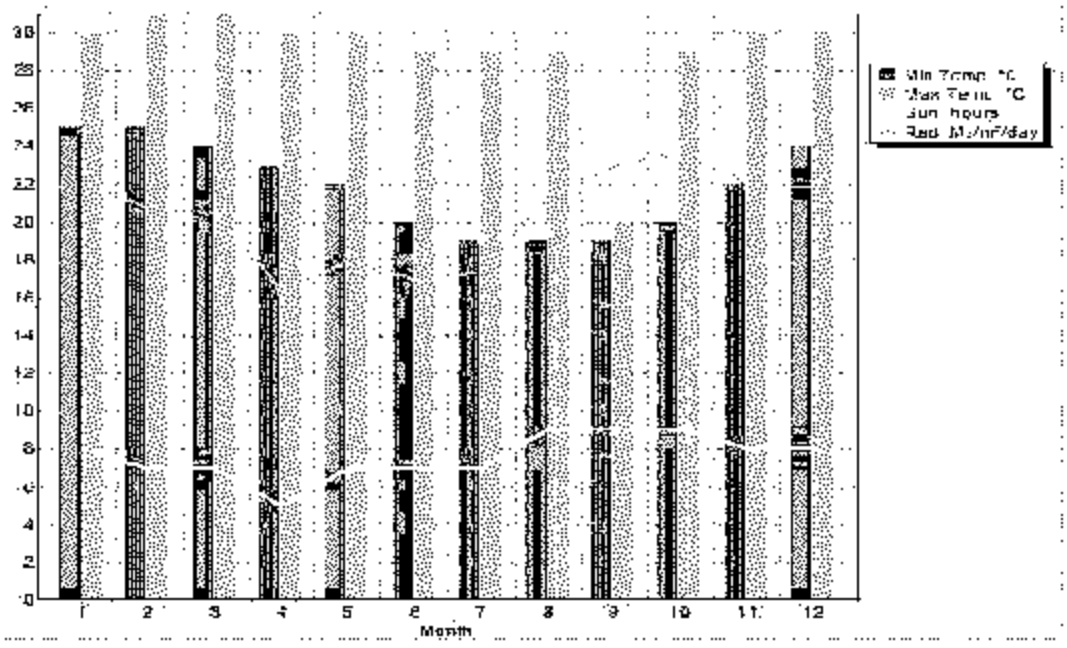


Figure 4.1: Annual temperature, sun hours and radiation of the site

The average radiation of an area is 20.3 MJ/m^2/day, with 16.3 MJ/m^2/day being the minimum in April and 23.7 MJ/m^2/day maximum in October.

- **Wind Speed**

The region experiences the average wind speed of 5.74 m/s. The maximum wind speed is 7.63 m/s experienced in June which blows from the South South East (SSE) direction which means if the project site will produce and air pollutant all activities downstream of SSE direction will be prone to that pollution. The wind is calm around December to March. The climate is also influenced by the south-westerly monsoon winds from April to October and north-westerly monsoon winds between November and March.

- **Rainfall**

There are two main rain seasons; a short rain season from October to December and a long rain season between March and May. Figure 3.4 shows the effective rainfall received at Dar es Salaam region.

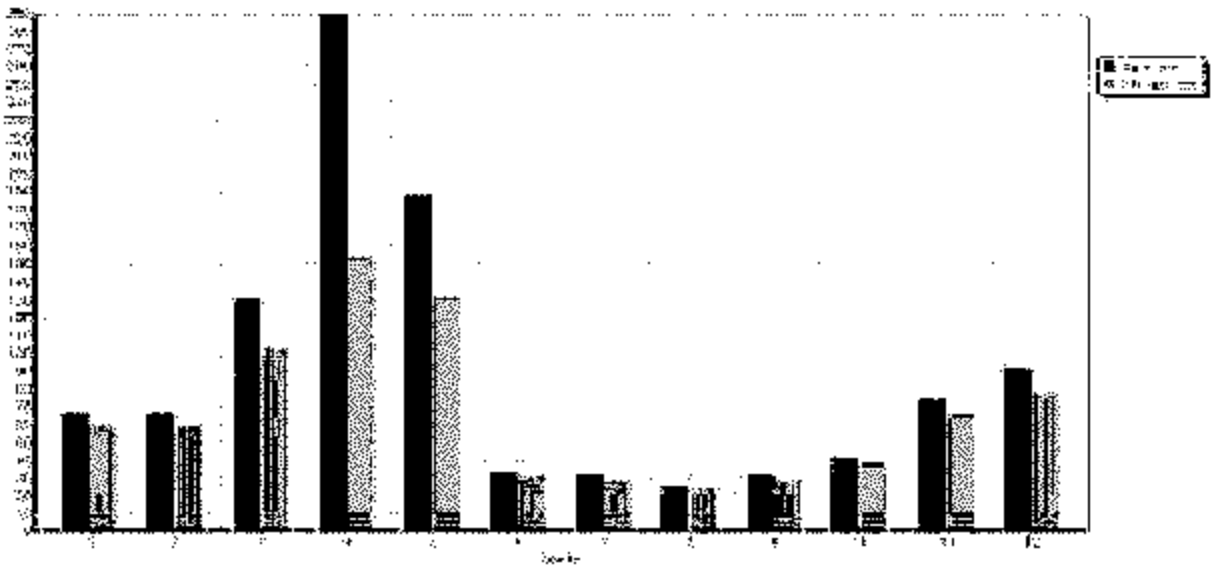


Figure 4.2: Average annual rainfall data for the site (Source Socio-Economic profile 2019)

4.2.2 Groundwater sources

Groundwater is abundant in almost the entire Dar es salaam City. This is because of the sea level rise. The major direct impacts of sea-level rise include

inundation of low-lying areas, loss of coastal wetlands, increased rates of shoreline erosion, saltwater intrusion and increased salinity in estuaries and coastal aquifers, and higher water tables and higher extreme water levels leading to coastal flooding (Nicholls et al., 2007; Bicknell et al., 2009).

4.2.3 Topography

The landscape of the project site is highly manipulated to make the topography flat and suitable for storage activities. The highest contour elevation at the project site is 96.5m Above Mean Sea Level (AMSL) on the western side while the lowest contour elevation is94m AMSL at eastern part of the project site, that means the rainfall runoff at the project site are directed towards southern eastern side.

4.2.4 Air Quality and Noise Level

The ambient air quality at the project area was observed to be good because the area is for residential purposes only, just because of daily activities there will be particulate matter like dust.

4.2.5 Noise and Vibration

The noise and vibration levels at the project site are rated negligible as the only source of noise at the project site are motor vehicles using the street feeder road adjacent to the project area.

5.0 PROJECT REQUIREMENTS AND WASTE GENERATION

5.1 Project requirements

5.1.1 Construction materials and labour force

The main materials for construction of Simplified sewerage system include cement, aggregates (stones), water, steel, sand, timbers, blocks, PVC pipes, and gravels. All materials are available in the local sources in Tanzania. The estimated quantities of the materials to be included in the BoQ.

5.1.2 Labour force

The labour force will be determined by the Contractor; nevertheless, it is projected that during the construction phase the project will require not less than 100 workers both skilled and non-skilled laborers for each phase of project construction.

5.1.3 Machinery and Equipment

The proposed project development will employ various standard construction equipment and machinery. Equipment expected to be used during the construction works are Tippers, Concrete Mixers, poker vibrators, Wheel barrow, Compactor, etc. All equipment and machineries for construction works needed by the proposed project will be determined when the bill of quantities (BoQ) and selection of Contractor is finalized. This equipment shall be temporary and shall be demobilized once project is completed.

5.2 Wastes generation

The major wastes generation associated with the project are solid wastes and liquid waste. The solid wastes so produced will be collected and properly disposed at the collection points ready for transportation to the dumpsite.

5.2.1 Liquid waste management

During the maximum operation phase a total of 1,575m^3 per day of liquid waste is estimated to be received at the downstream receiving chamber of the Fecal sludge treatment facility close to the project site. This assumes that 80% of the 80 liters per capita per day demand for the 24,603 people is discharged as waste water.

5.2.2 Solid waste management

From experience point of view, households connected to the simplified sewerage system tend to throw solid wastes especially used sanitary pads into their toilet sinks thinking flushing will help but he results has always been immediate blockage.

The project design will ensure installation of garbage screen at each household level to prevent the system blockage from single individual's fault. This among

others will render the household with the blockage to ensure the situation is well and timely handled at their own costs.

Therefore, solid wastes should be properly disposed at the collection points waiting for solid waste pickup trucks. Table 1 below shows solid and liquid wastes to be generated by the project and the methods of their disposal.

Table 1: Management of construction and operation wastes

Solid waste		
Type of waste	**Sources**	**Disposal / Management procedure**
- Biodegradable materials mainly domestic waste (food, paper, wood etc.)	- Construction crew	Accessible litter bins within the camp site and later to the city waste disposal system (engage a private company)
- Non- biodegradable materials (plastic, glass)	- Construction crew	Recycling/ reuse (Plastics to be sent to plastic recyclers and glass bottles to be sent to glass recyclers)
Liquid waste		
Type of waste	**Sources**	**Disposal / Management procedure**
- Excreta (domestic) human - Grey water /cleaners	- Toilets and floor cleaning	Use of septic tanks and when full will use the constructed Simplified sewerage system for further treatment downstream

6.0 POTENTIAL IMPACTS

6.1 Positive impacts

6.1.1 Improved living conditions and economic growth

The project will improve the living conditions in Kinondoni Municipal specifically Ukwamani street whereby the project operation phase will do away with illegal faecal sludge dislodging especially during rainy season or during the night. The monthly charged fee for each connected household will be such as affordable

by the intended customer. Thus, there will be increased money circulation that result into increased income consequently better standard of living of people in the project area.

6.1.2 Employment opportunities

Labour force for the project will be originated from Kawe Ward and the surrounding communities in Kinondoni areas. Even though during construction the employment will be on short term basis, employees will have been benefiting from the project. Some will witness their incomes and livelihood improvement.

6.1.3 Increased socio-cultural interaction

Increased socio-cultural interaction is another anticipated positive impact. The implementation of the project will bring many people from different cultural backgrounds. The interactions may bring about social changes in the communities around the project areas. Interaction with technocrats as a result of new immigrants (customers) into the area will stimulate adoption of the new technologies.

6.1.4 Increased Revenue to the nation through taxes, both direct and indirect

DAWASA is expected to increase its revenue collection on implementing this project. This will be through monthly payment of sanitation services by the respective household. The revenue collected will contribute towards expansion of the water supply and sanitation service within DAWASA service area.

6.1.5 Cost reduction for sewage management

The proposed facility will make it easier for the Institutions and households which at present incur unbearable costs for proper dislodging the septic tanks when full. That simply means the households in the vicinity and the institutions will benefit through direct connection to the downstream treatment facility depending on the nature of topography.

6.2 Negative impacts

6.2.1 Increased HIV/AIDS and other sexual related diseases:

Local communities surrounding the project area have to be aware of the fact that HIV/AIDS is present in their areas but accede to it not being at an alarming rate. The communities were worried that with an influx of people into the project area the pace of spread will accelerate especially during the construction phase.

Mitigation Measures

- Contractor shall enforce a code of conduct in the project area to encourage respect for the local community and to maintain self-cleanliness of the working area at all times.
- The contractor shall deploy locally available labour to reduce risk of spreading communicable diseases (especially STDs).
- In order to prevent more HIV/AIDS infection, during the implementation phase, the project should include information education and communication component (IEC) in its budget. This will help to raise more awareness on HIV/AIDS, and means to suppress its incidence.
- A safety, health and environment induction course shall be conducted to all workers, putting more emphasis on HIV/AIDS, which has become a national disaster.

6.2.2 Land degradation and increased erosion

Establishment of new facility within the project area might result into land degradation and promote soil erosion.

Mitigation Measures

- Unnecessary trench excavation close to the buildings and sensitive re-alignments shall be avoided.
- Lined drainage channels at sensitive terrains shall be provided to control speed and volumes of storm-water.
- The contractor should plant grass or any other vegetation cover to minimise exposed soil surface.

- Directing flow to properly designated channels within the facility site.
- Timely backfilling

6.2.3 Noise pollution

Noise pollution is likely to occur due to the application of construction equipment and generators at the site.

Mitigation Measure

- The proponent shall maintain equipment in good running conditions to ensure that ambient noise level and vibrations pollution into the environment is very minimum to comply with Tanzania standards.

- The noisy construction activities will be scheduled at normal working hours. Regular inspection and maintenance of construction vehicles and equipment will be done to ensure that they have mufflers installed and worn parts are replaced

6.2.4 Air Pollution from dust emission

Air pollution is likely to occur due to the emission of suspended particulate matter (dust) to the atmosphere from the construction activities.

Mitigation Measure

- Mixing equipment shall be sealed properly and vibrating equipment will be equipped with dust removing devices.

- Also all vehicles that generate excessive black smoke will not be used.

- Adequate training and use of personal protective equipment (PPE) such as eye glasses and dust masks will be ensured in order to reduce risks associated with dust.

6.2.5 High Risk of Health associated with construction work

Construction activities exposes the workers to a lot of risks for example risk of getting into contact with fecal sludge matter, injuries, COVID-19 pandemic etc

Mitigation measure

- The project proponent shall ensure that all personnel are provided with appropriate protective gear.
- All works shall be planned and conducted in accordance with relevant OHS Guidelines. First Aid Kit as well as regular medical check-ups for the workers will be provided during the entire working hours.
- Adequate number of firefighting equipment/extinguishers will be provided in every few distance to help putting off fire in case of occurrence.
- Excavated pits should be protected by warning tape and guardrails to prevent workers and passersby from falling
- Provision of hand washing equipment and soap at every entrance and exit and at random passage ways within the construction site.
- Ensure all workers to take precautionary measures against COVID-19 by washing hands with soap frequently, practicing social distancing and using face masks of their preference.

6.2.6 Waste generation during construction

A lot of waste will be generated especially during construction stage. For example, pipework is likely going to produce some plastics which need to be disposed of. Construction of waste water chambers will both generate wastes. Other wastes will be generated from cleaning of construction equipment and containers like mixers and paint buckets.

Mitigation measures:

- Stick to the design specifications
- Provide waste containers
- Provide training to workers and orient them towards environmental protection values

7.0 ACTION PLAN FOR PREVENTION AND MANAGEMENT OF ACCIDENTS DURING IMPLEMENTATION STAGE

The project shall be implemented in compliance to labour laws in Tanzania, in particular, the Occupational Health and Safety Act (2003). Clauses to protect the health and safety of workers shall be included in the contract documents for implementation stage.

7.1 Health and Safety

The proponent is committed to protect the health and safety of its employees and those of its contractors, to ensuring that activities are conducted in a manner that protects the environment and people. The Contractor shall provide and enforce the use of appropriate personal protective equipment for all workers e.g. overalls, gloves, masks, etc. (wherever required). Tanzanian/international construction standards will be followed for quality and safety to workers. First aid facility will be installed at the construction site.

7.2 Security

The whole proposed project will take care of security matter of the site by fencing the storage area and provide gates for entrance and exit purpose. The project proponent shall have a 24 hours security services from a private company to secure the whole project premise at the site. Also since the nature of investment involves fecal sludge management facility with the potential of biogas production. The project proponent will install the best firefighting system at site. The purpose of fire protection is to protect life, good and activities within the project site.

The following are some of the active and passive fire-fighting equipment that will be employed;

- Fire detection system
- Fire hydrant system
- Portable Fire Extinguishers

7.3 Monitoring, Maintenance and repair

The management of the facility will be upon DAWASA to ensure the approved design or plan is implemented accordingly. Furthermore, provision of basic services will be executed at high quality as intended.

8.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

8.1 Environmental and Social Management Plan

The Environmental and Social Management Plan (ESMP) presents the implementation schedule of the proposed mitigation measures for both environmental and social impacts. The ESMP for the proposed Construction of Simplified Sewerage System at Ukwamani street Kawe Ward is summarized in Table 2. The ESMP also indicates environmental costs needed to implement the recommended mitigation measures. The site selection process has been done, however engineering designs are being prepared and will soon be incorporated with the mitigation measures recommended in this report. Additional recommendations are provided in the ESMP to enable the Simplified sewerage system to be constructed and operated in environmentally friendly manner.

DAWASA shall be the main implementer of the ESMP through. The environmental measures incorporated in the detailed engineering design will be attached to the Bills of Quantities and Contract Documents. Moreover, there will be an Environmental, Social, Health and Safety (ESHS)Code of Conduct to be signed by the Contractor(s) to show their commitment in the implementation of the Environmental, Social, Health and Safety. The implementation of the Code will be supervised by DAWASA or his consultant.

The ESHS Code is a set of Guidelines attached to the Bidding Document and Contract to be adopted by Contractor during project implementation. It contains the commitment and obligations of the Contractor and its subsidiaries (i.e. Sub-Contractors and staff) to undertake construction activities in accordance with all applicable Laws, Rules, and Regulations. The Contractor and its subsidiaries shall comply with the Code of Conduct with high ethical standards. Failure to

observe the Code, will subject the firm to disciplinary action, including Contract termination. Violation of the Code, is violation of Law which may result to civil and/or criminal penalties to Contractors, Supervisors or Firm.

Some of the issues to be included in the ESHS shall include;

- Site specific **ESMP**, **HSMP**,
- Traffic Management Plan **(TMP), where applicable**
- HIV/AIDS Awareness Program,
- Occupational Health and Safety Awareness Program.
- Sexual Harassment Prevention Policy
- Child Labour Prevention Policy

The environmental and social mitigation and enhancement measures incorporated in the detailed engineering design will be attached to the Contract Documents. The Contractor shall take stock of the contents of the Project Brief.

Table 2: Environmental and Social Management Plan for the Proposed Construction of Simplified sewerage system at Ukwamani street, Kawe Ward, Kinondoni Municipal

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
Mobilization Phase				
Increased waste generation	○ Stick to the design specifications ○ Provide waste containers ○ Provide training to workers and orient them towards environmental protection values	Contractor/DAWASA/Kinondoni Municipal Council	To be included in the BOQ	
Noise pollution during construction	○ The proponent shall maintain equipment in good running conditions to ensure that ambient noise level and vibrations pollution into the environment is very minimum to comply with Tanzania standards ○ All construction works will be scheduled at normal working hours.	Contractor/DAWASA/Kinondoni Municipal Council	500,000.00	

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
	○ Proper inspection and maintenance of construction vehicles and equipment will be done to ensure that they have mufflers installed and worn parts are replaced			
Construction Phase				
Increased waste generation	○ Stick to the design specifications ○ Provide waste containers ○ Provide training to workers and orient them towards environmental protection values	Contractor/DAWASA/Kinondoni Municipal Council	To be included in the BOQ	
Increased HIV/AIDS and other STD	○ Contractor shall enforce a code of conduct in the project area to encourage respect for the local community and to maintain self-cleanliness of the working area at all times.	Contractor/DAWASA/Kinondoni Municipal Council	5,000,000.00	

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
	○ The contractor shall deploy locally available labour to reduce risk of spreading communicable diseases (especially STDs). ○ In order to prevent more HIV/AIDS infection, during the implementation phase, the project should include information education and communication component (IEC) in its budget. This will help to raise more awareness on HIV/AIDS, and means to suppress its incidence. ○ A safety, health and environment induction course shall be conducted to all workers, putting more emphasis			

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
	on HIV/AIDS, which has become a national disaster.			
Land degradation and increased erosion	o The contractor should Plant vertiver grasses to minimize exposed soil surface. o To obtain the construction materials official negotiated should be performed with wards leaders in order to avoid conflict.	Contractor/DAWASA/Kinondoni Municipal Council	25,000,000	
Noise pollution during construction	o The proponent shall maintain equipment in good running conditions to ensure that ambient noise level and vibrations pollution into the environment is very minimum to comply with Tanzania standards	Contractor/DAWASA/Kinondoni Municipal Council	1,000,000.00	

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
	○ All construction works will be scheduled at normal working hours. ○ Proper inspection and maintenance of construction vehicles and equipment will be done to ensure that they have mufflers installed and worn parts are replaced			
Dust generation during construction	○ Mixing equipment shall be sealed properly and vibrating equipment will be equipped with dust removing devices. ○ Also all vehicles that generate excessive black smoke will not be used. ○ Adequate training and use of personal protective equipment (PPE) such as eye glasses and dust masks will be ensured in	Contractor/DAWASA/Kinondoni Municipal Council	3,000,000.00	

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
	order to reduce risks associated with dust.			
Health Risks associated with construction works	○ The project proponent shall ensure that all personnel are provided with appropriate protective gear. ○ All works shall be planned and conducted in accordance with relevant OHS Guidelines. First Aid Kit as well as regular medical check-ups for the workers will be provided during the entire working hours. ○ Adequate number of firefighting equipment/extinguishers will be provided in every few distance to help	Contractor/DAWASA/Kinondoni Municipal Council	3,000,000.00	

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
	putting off fire in case of occurrence. ○ Excavated pits should be protected by warning tape and guardrails to prevent workers from falling ○ The developer to ensure adequate supply of provisions ○ Adhere to good maintenance			
Demobilization phase				
Noise pollution during construction	○ The proponent shall maintain equipment in good running conditions to ensure that ambient noise level and vibrations pollution into the environment is very minimum to comply with Tanzania standards	Contractor/DAWASA/Kinondoni Municipal Council	500,000.00	

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
	○ All construction works will be scheduled at normal working hours. ○ Proper inspection and maintenance of construction vehicles and equipment will be done to ensure that they have mufflers installed and worn parts are replaced			
Operational Phase				
Health Risks associated with construction works	○ The project proponent shall ensure that all personnel are provided with appropriate protective gear. ○ All works shall be planned and conducted in accordance with relevant OHS Guidelines. First Aid Kit as well as regular medical check-ups for the workers will be	Contractor/DAWASA/Kinondoni Municipal Council	Depend on the operational manual	

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
	provided during the entire working hours. ○ Adequate number of firefighting equipment/extinguishers will be provided in every few distance to help putting off fire in case of occurrence. ○ Excavated pits should be protected by warning tape and guardrails to prevent workers from falling ○ The developer to ensure adequate supply of provisions ○ Adhere to good maintenance			
Total			**38,000,000.00**	**38,000,000.00**

9. 0 MONITORING PLAN

9.1 Environmental Monitoring

The national EIA guidelines require the developer to prepare and undertake monitoring plan of implemented development projects. Monitoring is needed to check if and to what extent the impacts are mitigated, benefits enhanced and new problems addressed. Recommendations for monitoring have been included in the Table 3. The monitoring plan also assigns responsibilities for different actors. Moreover, the ward and street environmental committees will shoulder the long-term monitoring of the project.

Table 3: Monitoring Plan for the Proposed Construction of Simplified sewerage system at Ukwamani street, Kawe Ward, Kinondoni Municipal

Parameter	Monitoring Frequency	Sampling Area	Measurement Unit	Method	Target Level/Standard	Responsibility for monitoring	Estimated Annual (or once cost (TZS)
Mobilization Phase							
Dust	Daily	Immediate working area	Presence of nuisance dust	Physical-visual	-	Contractor/Kawe ward	None
Air Quality	Daily	In and around the Faecal Sludge Plant	Presence of smells	Smelling (nasal)	Absence of nuisance smells	Kawe Ward/DAWASA/Kinondoni Municipal Council	2,500,000.00
Waste Generation	Weekly	At the working area	Amount of waste	Physical measurement or estimation	All waste contained	Contractor/Kawe Ward/DAWASA/Kinondoni Municipal Council	In BOQ
Health risks	Daily	At working area	Accidents	Counting	NO accident	Contractor/Kawe Ward/DAWASA/Kinondoni Municipal Council	In BOQ
HIV/AIDS	Monthly	Workers	Training	Numbers	One per month during construction phase only	Contractor/Kawe Ward/DAWASA/Kinondoni Municipal Council	5,000,000.00

Parameter	Monitoring Frequency	Sampling Area	Measurement Unit	Method	Target Level/Standard	Responsibility for monitoring	Estimated Annual (or once cost (TZS)
Biodiversity	Once (at commencement)	Working area	Destruction of habitat or removal of biodiversity	Area affected	Minimal disturbance to biodiversity	Contractor/Kawe ward/DAWASA/Kinondoni Municipal Council	1,000,000.00
Construction phase							
Dust	Daily	Immediate working area	Presence of nuisance dust	Physical-visual	-	Contractor/Kawe ward	None
Air Quality	Daily	In and around the Faecal Sludge Plant	Presence of smells	Smelling (nasal)	Absence of nuisance smells	Kawe Ward/DAWASA/Kinondoni Municipal Council	2,500,000.00
Waste Generation	Weekly	At the working area	Amount of waste	Physical measurement or estimation	All waste contained	Contractor/Kawe Ward/DAWASA/Kinondoni Municipal Council	In BOQ
Health risks	Daily	At working area	Accidents	Counting	NO accident	Contractor/Kawe Ward/DAWASA/Kinondoni Municipal Council	In BOQ
HIV/AIDS	Monthly	Workers	Training	Numbers	One per month during construction phase only	Contractor/Kawe Ward/DAWASA/Kinondoni Municipal Council	5,000,000.00

Parameter	Monitoring Frequency	Sampling Area	Measurement Unit	Method	Target Level/Standard	Responsibility for monitoring	Estimated Annual (or once cost (TZS)
Biodiversity	Once (at commencement)	Working area	Destruction of habitat or removal of biodiversity	Area affected	Minimal disturbance to biodiversity	Contractor/Kawe ward/DAWASA/Kinondoni Municipal Council	1,000,000.00
Demobilization Phase							
Dust	Daily	Immediate working area	Presence of nuisance dust	Physical-visual	-	Contractor/Kawe ward	None
Air Quality	Daily	In and around the Faecal Sludge Plant	Presence of smells	Smelling (nasal)	Absence of nuisance smells	Kawe Ward/DAWASA/Kinondoni Municipal Council	2,500,000.00
Waste Generation	Weekly	At the working area	Amount of waste	Physical measurement or estimation	All waste contained	Contractor/Kawe Ward/DAWASA/Kinondoni Municipal Council	In BOQ
Health risks	Daily	At working area	Accidents	Counting	NO accident	Contractor/Kawe Ward/DAWASA/Kinondoni Municipal Council	In BOQ
HIV/AIDS	Monthly	Workers	Training	Numbers	One per month during construction phase only	Contractor/Kawe Ward/DAWASA/Kinondoni Municipal Council	5,000,000.00

Parameter	Monitoring Frequency	Sampling Area	Measurement Unit	Method	Target Level/Standard	Responsibility for monitoring	Estimated Annual (or once cost (TZS)
Biodiversity	Once (at commencement)	Working area	Destruction of habitat or removal of biodiversity	Area affected	Minimal disturbance to biodiversity	Contractor/Kawe ward/DAWASA/Kinondoni Municipal Council	1,000,000.00
Operation phase							
Dust	Daily	Immediate working area	Presence of nuisance dust	Physical-visual	-	Contractor/Kawe ward	None
Air Quality	Daily	In and around the Faecal Sludge Plant	Presence of smells	Smelling (nasal)	Absence of nuisance smells	Kawe Ward/DAWASA/Kinondoni Municipal Council	2,500,000.00
Waste Generation	Weekly	At the working area	Amount of waste	Physical measurement or estimation	All waste contained	Contractor/Kawe Ward/DAWASA/Kinondoni Municipal Council	In operation manual
Health risks	Daily	At working area	Accidents	Counting	NO accident	Contractor/Kawe Ward/DAWASA/Kinondoni Municipal Council	In operation manual
HIV/AIDS	Monthly	Workers	Training	Numbers	One per month during construction phase only	Contractor/Kawe Ward/DAWASA/Kinondoni Municipal Council	In operation manual

Parameter	Monitoring Frequency	Sampling Area	Measurement Unit	Method	Target Level/Standard	Responsibility for monitoring	Estimated Annual (or once cost (TZS)
						Total	28,000,000.00

10.0 PROJECT BUDGET

The investment cost for the proposed Simplified sewerage system is estimated to be around Tshs. 1.0 billion that will be financed by the World Bank.

11.0 STAKEHOLDER VIEWS ON THE PROPOSED PROJECT

During this study, different stakeholders were consulted. Among these include the Kinondoni Municipal Council and community at Ukwamani street (see Figure 4). Consultations were made through meetings.

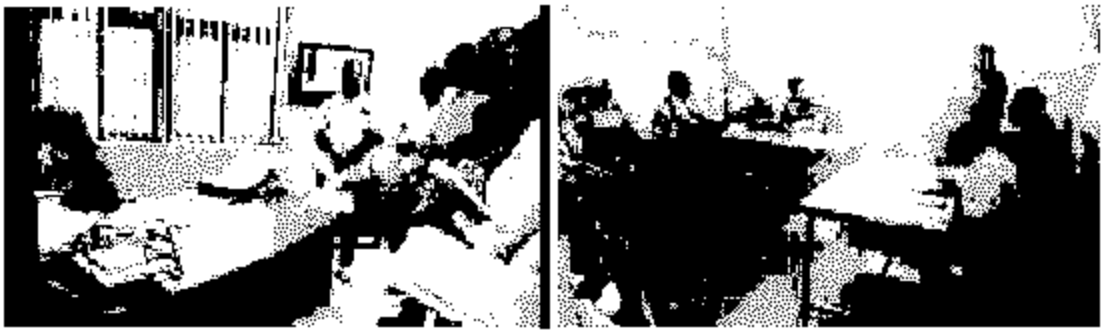


Figure 4: Stakeholder's consultation meeting at Kinondoni Municipal office and Ukwamani street community

During the meeting, the consultant gave a brief explanation on the proposed Simplified sewerage system. The project description covered proposed location, type and design (a typical design was displayed). The stakeholders were given chance give their views on the project. Moreover, the consultant offered chance to clarify issues where stakeholders wanted to be given more explanations. The comments by stakeholders were analyzed and incorporated in the design of mitigation measures. Table 4 summarizes the issues raised. The names of the stakeholders consulted are given in Appendix I, while the minutes of community consultation meetings are given in appendix II.

Table 4: Stakeholders issues and concerns

TFS	Dr. Masota Abel	Manager Forest Resources, MFR	-Ensuring a large number of households are connected to the facilities so as to maximize positive results
TFS	John Rutagwaba	Principal Forest Officer	-Awareness to the people to accept the effluent for normal irrigation use
KINONDONI MUNICIPAL COUNCIL	Aron T. Kagurumjuli	MD-KMC	-The proposed DEWATs should be designed such that no any ground water intrusion is allowed especially at places with high water table. -Proposed a massive DEWAT at Jangwani Area taking the advantage of closeness to Indian Ocean so as to save the largest part of the City.
KINONDONI MUNICIPAL COUNCIL	Kennedy Mrina	EHO-KMC	-In case of direct discharge to the Ocean has the possibility of transmitting diseases like earthworm to fishes and then back to human consumer
KINONDONI MUNICIPAL COUNCIL	Eng. Leopold Runji	MANAGER AT TARURA-KMC	-The DEWAT design at Bondeni ground should put into consideration the ongoing sinza river lining project under DMDP
KINONDONI MUNICIPAL COUNCIL	Maduhu K. Ilaga	MUNRO-KMC	-The proposed Rasco ground as the project site should be shifted to Bondeni ground.

References

1. Bicknell, J.; Dodman, D., and Satterthwaite, D., (eds.), 2009. Adapting Cities to Climate Change: Understanding and Addressing the Development Challenges. London, UK: Earthscan, 397p.

2. Nicholls, R.J., Wong, P.P., Burkett, V.R., Codignotto, J.O., Hay, J.E., McLean, R.F., Ragoonaden, S. and Woodroffe, C.D. 2007. Coastal systems and low-lying areas. In: M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden, and C.E. Hanson, (Eds), Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, UK, p. 315-356.

3. Population and Assets Exposure to Coastal Flooding in Dar es Salaam (Tanzania): Vulnerability to Climate Extremes

4. Kinondoni Municipal Socio-economic profile 2018

Appendix I: List of Stakeholders Consulted

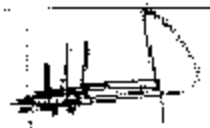
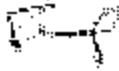
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR CONSTRUCTION OF OFF GRID SANITATION PROJECTS, DAR ES SALAAM

LIST OF STAKEHOLDERS CONSULTED

SN	DATE/TAREHE	NAME/JINA	INSTITUTION/TAASISI	POSITION/CHEO	PHONE NO./SIMU	SIGNATURE/SAINI
	[illegible]	[illegible]	KMC	[illegible]	[illegible]	[signature]
	[illegible]	[illegible]	[illegible] KMC	[illegible]	[illegible]	[signature]
	[illegible]	[illegible]	KMC Environment	MEMO	0716-[illegible]	[signature]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[signature]
	[illegible]	[illegible]	KMC	[illegible]	[illegible]	[signature]

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR CONSTRUCTION OF OFF GRID SANITATION PROJECTS, DAR ES SALAAM

LIST OF STAKEHOLDERS CONSULTED

S/N	DATE/TAREHE	NAME/JINA	ORGANIZATION/TAASISI	POSITION/CHEO	PHONE NO./SIMU	SIGNATURE/SAINI
	16/10/2019					
	16/10/2019					
	16/10/2019					
	16/10/2019					
	16/10/2019					