

# THE UNITED REPUBLIC OF TANZANIA



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## **Comprehensive Project Brief for the Proposed Fecal Sludge Treatment Plant to be constructed at Masaki Mtaa, Toangoma Ward, Temeke District, Dar es Salaam Region**

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**Submission date: 28<sup>th</sup> December 2023**

## **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 Temeke Municipal Council Officers for their prompt assistance during the fieldwork. We also thank the local community and wards leaderships in the project vicinity for their cooperation. In addition to that sincere, appreciation to all experts and assistants who participated to collect data and prepare a report.

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## **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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## EXECUTIVE SUMMARY

### Comprehensive Project Brief for the Proposed Fecal Sludge Treatment Plant to be constructed at Masaki Mtaa, Toangoma Ward, Temeke District, Dar es Salaam Region

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## 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. Prior to implementing 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.

Dar es Salaam is the largest and most important commercial and industrial centre 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 city centre with a total length of 67.8km and the system is based on a separate system and discharge their effluent into oxidation ponds, and into the sea through sea outfall of about 1.03km long. The onsite sanitation systems result into 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 a Fecal Sludge Treatment Plant at Masaki Mtaa in Toangoma Ward, Temeke Municipality. The FSTP will mostly serve the people at Masaki.

The ESIA study was conducted in accordance with 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 mandate to NEMC to oversee the EIA process, which culminates with an award of the EIA Certificate by the Ministry responsible for Environment.

The ESIA study was conducted in accordance with 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 mandate to NEMC to oversee the EIA process, which culminates with an award of the EIA Certificate by the Ministry responsible for Environment.

In accordance with the EIA Regulations, NEMC is mandated to screen projects and make decisions of level of EIA required as well as evaluating the adequacy of respective environmental statements. Considering the nature and size of the proposed “Faecal Sludge Project in Ilala Municipality”, the project falls under Category “B2” (Non-Mandatory) in accordance with Reg.4 (1)(c) and First Schedule of the amended 2018 Regulations. 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” is provided under Regulation 6(1) of Environmental Impact Assessment and Audit Regulations, 2005. The same has been followed in preparing this “Project Brief”. The project brief was conducted in July-August 2020.

This project brief for the Proposed Construction of Faecal Sludge Treatment Plant in Ilala Municipality is being submitted to NEMC together with EIA Registration Forms for EIA Certificate decision.

## **PROJECT DESCRIPTION**

The project area is accessible through both Kilwa road and Kibada road via Kigamboni. The project site is about 5 km from Kilwa road and is in the left-hand side for Toangoma to Kigamboni direction.

The proposed project site is characterized with both natural and artificial vegetation. There are tall and short grasses and shrubs around the site area (Figure 3). The project site is located adjacent to TAZAMA pipeline route and to an open channel within which drains to Indian Ocean. Generally, the project site is lowland with the potential to connect nearby households particularly NSSF Houses through simplified sewerage system to the proposed facility

## **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 Urban World Bank guidelines for Environmental Management and 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 Ilala Municipal Council and community at Masaki 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 Faecal Sludge Treatment Plant include cement, aggregates (stones), water, steel, sand, timbers, blocks, uPVC pipes, IPS 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.

The proposed project development will employ various standard construction equipment and machinery. Equipment expected to be used during the construction

works are Excavators, 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.

### **Wastes generation**

The major wastes generation associated with the project are spoil soils resulting from earthworks during the foundation excavations, solid wastes and liquid waste. The spoil soil shall be stock piled around the public toilet for further use in landscaping the site at the end of the project.

A total of 120m<sup>3</sup> per day of liquid waste is estimated to be received at the receiving chamber of the proposed facility during the maximum operation phase. On the other hand, about 0.5-1 tons per month of domestic refuse and other solid wastes is estimated to be generated and trapped at the garbage screen during the project construction and operation phase respectively. A well-established solid waste collection system will be instituted. The system will involve among other things wastes segregation at source, recycling or reuse of some wastes and final disposal to the approved dumpsite / landfill.

### **POTENTIAL IMPACTS**

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

- Employment opportunities
- Improved urban agriculture
- Increased socio-cultural interaction

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

- Increased HIV/AIDS and other sexual related diseases

- Loss of biodiversity
- Land degradation and increased pollution
- Noise pollution
- Air pollution from dust emission
- High risk of Health associated with construction work
- Waste generation during construction

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
- Biogas production potential
- Minimized forest harvesting
- Sewer leakage/overflow
- Improved urban agriculture

### **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 70,000,000.00. The estimated annual costs for carrying out the proposed environmental and social monitoring 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 sanitation, then the outbreak of diseases like diarrhoea 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 certificate in order to commence the implementation of the project.

It is, therefore, concluded that implementation of the proposed construction of the Faecal sludge treatment plant at Masaki 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 Fecal Sludge Treatment Plant to be constructed at Masaki Mtaa, Toangoma Ward, Temeke 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 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. Prior to implementing 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.

Dar es Salaam is the largest and most important commercial and industrial centre in Tanzania. The city has an estimated population of about 5.0 million (ToR) 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 city centre with a total length of 67.8km and the system is based on a separate system and discharge their effluent into oxidation ponds, and into the sea through sea outfall of about 1.03km long. The onsite sanitation systems result into 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 a Fecal Sludge Treatment Plant at Masaki Mtaa in Toangoma Ward, Temeke Municipality. The FSTP will mostly serve the people at Masaki.

The ESIA study was conducted in accordance with 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 mandate to NEMC to oversee the EIA process, which culminates with an award of the EIA Certificate by the Ministry responsible for Environment.

In accordance with the EIA Regulations, NEMC is mandated to screen projects and make decisions of level of EIA required as well as evaluating the adequacy of respective environmental statements. Considering the nature and size of the proposed “Fecal sludge Treatment plant in Temeke Municipality”, the project falls under Category “B2” (Non-Mandatory) in accordance with 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” is provided under Regulation 6(1) of Environmental Impact Assessment and Audit Regulations, 2005. The same has been followed in preparing this “Project Brief”. The ESIA study that ends at the project brief stage since it is a B2 type, was conducted from July 2020 to August 2020. The subsequent corrections following NEMC reviews have been concluded in December 2022.

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This project brief for the Proposed Construction of Faecal Sludge Treatment Plant in Temeke Municipality is being submitted to NEMC together with EIA Registration Forms for EIA Certificate decision.

## **1.2 NATURE OF THE PROJECT**

The proposed project concerns the construction of a small size an engineered Faecal Sludge Treatment plant for public use at Masaki, Toangoma ward in Temeke Municipality with the capacity of treating 50m<sup>3</sup> per day. 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”.

## **3.0 POLICIES, LEGISLATION AND INSTITUTIONAL ASPECT**

According to the fundamental principles of environment, any developmental activities of this nature such as construction of Faecal Sludge Treatment Plant 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

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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**

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

#### **3.4.1 National Environmental Policy (NEP, 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

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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, programs, and guidelines for the achievement of sustainable development.

The policy's 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

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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. Feacal Sludge Treatment Plant (FSTP) is one among of the important infrastructure for the Chanika community and country at large

## **3.2 PRINCIPAL LEGISLATIONS AND REGULATIONS**

The ESIA team reviewed several legislations relevant to the construction of Feacal Sludge Treatment Plant. 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 PROJECT DESCRIPTION

##### 4.1 Project Location

The project site is located at Masaki Mtaa, Toangoma ward, Temeke Municipal within Dar es Salaam Region. The project site is geographically located at 37S UTM zone with coordinates in Table 1. The site is 17 Kilometers from Dar es Salaam city centre via Kilwa road. (Refer Figure 1, and Figure 2).

**Table 1: The coordinates of the project area**

S/n	Coordinates	
	Easting	Northing
1	534457	9237311

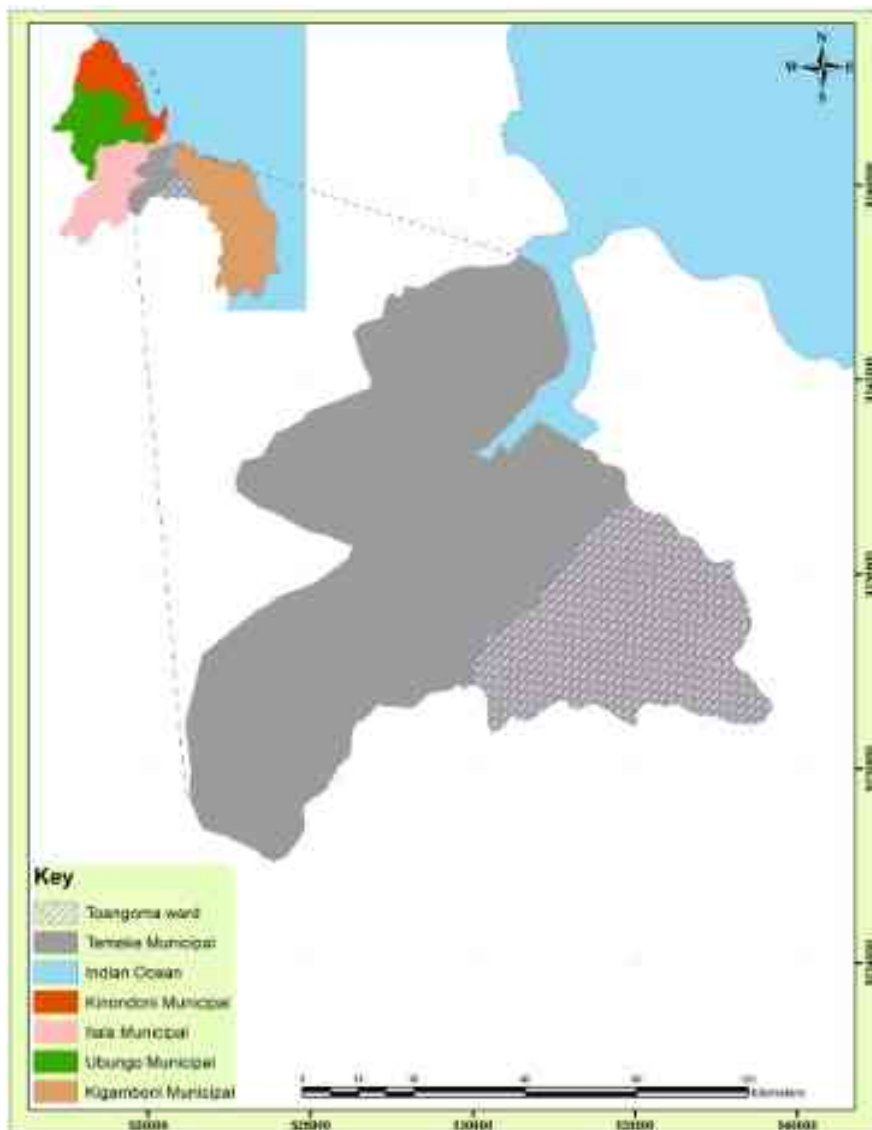


Figure 1: A Map of Dar es salaam region showing the project Municipal



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

#### **4.2 Accessibility**

From the City center, the project area is accessible through both Kilwa road and Kibada road via Kigamboni. The project site is about 5 km from Kilwa road and is in the left-hand side for Toangoma to Kigamboni direction.

#### **4.3 Specific Features**

The proposed project site is characterized with both natural and artificial vegetation. There are tall and short grasses and shrubs around the site area (Figure 3). The project site is located adjacent to TAZAMA pipeline route and to an open channel within which drains to Indian Ocean. Generally, the project site is lowland with the potential to connect nearby households particularly NSSF Houses through simplified sewerage system to the proposed facility, figure 4.



Figure 3: Natural Vegetation within and around the project site



Figure 4: TAZAMA pipeline infrastructures close to the project site

#### **4.4 Adjacent Land Use**

The proposed project site is an open space under the jurisdiction of Temeke Municipal Council. However, the site has been encroached by some small-scale farming activities, figure 5. The project site is mainly surrounded by farms, residential buildings and NSSF houses as seen from afar.



Figure 5: Paddy, cassava and yams farms close to the project site

## **4.5 Baseline information**

### **4.5.1 Water Table and water quality analysis**

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).

### **4.5.2 Air quality**

The air quality observations indicate that the general air quality in the project area is good as there is no any strange activity contributing to air pollution. However, seasonal variation as well as localized and temporal deterioration in air quality does occur. Smokes and greenhouse gases such as carbon dioxide, carbon monoxide are expected to be emitted from moving vehicles due to the burning of fossil fuels which passes at Toangoma road which and other street roads closer to the project area. During construction phase, air quality of the area will be impacted and the proponent will be advised to use good quality material transportation vehicles.

### **4.5.3 Noise levels**

The noise level at the project area is mainly due to moving vehicle along the road, moving air (wind) or rain and birds. Project activities during construction will change patterns and amplitude of noise in the project area. Operations of construction machines may cause adverse impacts on local residents, and on workers. The proponent have to ensure proper provision of ear mask to the workers and all works have to be executing during the day time.

### **4.5.4 Climate**

Toangoma ward in Temeke Municipality of Dar es Salaam Region in which the proposed site is located is close to the warm Indian Ocean. Thus, the area experiences a tropical wet and dry climate with hot and humid weather throughout the year. Generally, site area has two distinct rainy seasons, 'long'

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rains during April and May, and 'short' rains during October and November with a mean annual rainfall of between 800 – 1200mm. The average annual daily temperatures range between 21.9°C and 29.6°C. The climate is also influenced by the south-westerly monsoon winds from April to October and north-westerly monsoon winds between November and March (Temeke Socio-economic profile). Implementation of the Faecal Sludge Treatment Facility project will not affect the climate in Toangoma area.

#### **4.5.5 Topography and Drainage**

The proposed project site is located on a gentle sloppy area in Toangoma, Zingiziwa area, Temeke Municipality-Dar es Salaam Region. There is rain water drainage channel/seasonal stream at the downstream of the project area. Topography of the proposed project site will be impacted by the project as it will disturb the natural landform of the area.

### **5.0 PROJECT ACTIVITIES**

#### **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,
- Geo-technical Investigation for the areas allocated with the balancing tank and Anaerobic Baffled Reactor (ABR)
- Construction Materials' source Investigation,
- Land acquisition,
- Material storage and material preparation,

This phase is expected to take 2 Months to mobilize all necessary tools, materials, manpower and machineries to the project site.

#### **5.2 Construction phase**

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

- Vegetation clearance and earthworks (foundations excavation),

- Dewatering
- Site access road formation and drainages construction;
- Construction of parking lot and access ramp for tankers;
- Construction of Garbage screen, balancing tank, Biogas digester, Anaerobic Sludge Reactor (ABR) and sludge drying beds;
- Construction of Plant Office, guard house and storage room;
- Preparation of planted gravel filter;
- Plumbing work connecting all treatment units up to the effluent; and
- Installation of biogas collection system to the intended end user.

This phase is expected to take 2 years to full completion. Whereas the facility will have the lifespan of 20years with minimum maintenances.

### **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;

This phase is expected to take 2 Months to demobilize all tools, spoil materials, construction wastes, manpower and machineries from the project site.

### **5.4 Operation phase**

The phase entails the actual usage of the Faecal sludge Treatment Plant. Faecal sludge will be desludged using vacuum takers and disposed of at the proposed facility for further treatment. DAWASA will decide on the mode of operation of the Facility. To ensure the health and safety of workers (operators) and neighboring communities during the operation phase, a Generic safety management plan (including emergency preparedness and response) for the biogas system has been appended in annex I.

## 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.

## 6.0 PROJECT DESIGN

### 6.1 Design criteria

The proposed technology and construction design follows the objective to execute an engineering design of fecal sludge management facility (one in number at the stated site) which will be of medium size with the capacity of treating 120m<sup>3</sup> of wastewater per day, cost effective/efficient, easy to operate and maintain performance standards which conform to NEMC.

Technology selection was based on the following four main aspects;

- **Land availability:** Available land 22,299m<sup>2</sup> whereas the required area is 16,500m<sup>2</sup> making percentage of built up area to be 74%., Appendix V.
- Context of the location of the treatment sites (existing infrastructures)
- Local operation and maintenance management capacity
- Revenue generation through by-products
- **Effluent disposal potential:** Presence of farming activities at the downstream of the treatment plant which makes the effluent rich in nutrients suitable for irrigation

### 6.2 Technology Description

#### 6.2.1 Garbage Screen

Domestic sludge is dispersed directly onto the screening inlet chamber to retain the incoming debris before it goes to the preliminary treatment process.

### **6.2.2 Balancing tank**

The incoming wastewater is stored in the balancing tank to allow sludge stabilization and controlling flow when it goes to the next treatment units. This tank play key role to reduce shocking loads towards the system especially when the hydraulic loading surpasses plant designed holding capacity.

### **6.2.3 Biogas digester**

This unit is designed to separate the incoming wastewater in liquid and solid form as well as the biologically digestion of organic solids. The digestion process takes place without oxygen input, under anaerobic conditions, and generates biogas useful for cooking, lighting and heating. The generated biogas will benefit the nearby community through direct connection.

### **6.2.4 Anaerobic Baffled Reactor (ABR)**

The baffled reactor consists of series of chambers in which the wastewater flows up-stream. Here, the suspended and dissolved solids in the pre-settled waste water undergo anaerobic degradation. The activated sludge settles at the bottom of each chamber and the influent wastewater is forced to flow through this sludge blanket where anaerobic bacteria make use of the pollutants for their metabolism. Progressive decomposition occurs in the successive chambers. A part of the last chambers can optionally be filled up with coarse filter material like, stones, cinder or plastic rings. The filter materials act as carrier material for an attached bio-film, which consumes the organic water pollutants. In ABR plants the BOD removal efficiency is up to 90% and the pathogen removal ranges between 40-75%. The baffled reactor is resistant to shock load and variable inflow. It operates by gravity and maintenance is reduced to desludging of the chambers at intervals of 1-2 years. This unit is advantageous since its sub-soil construction saves space.

### **6.2.5 Planted Gravel filter**

Planted Gravel Filter (PGF) is a constructed wetland suitable for wastewater with low percentage of suspended solids that have already been removed by pre-treatment. The main removal of treatment mechanisms are biological

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conversion, physical filtration and chemical absorption. The PGF is made of planted filter bodies consisting of graded gravel. The bottom slope is 1% and the flow direction is mainly horizontal. The main plants used in this filter bed are; *Canna indica*, *Reed juncus*, *Papyrus*, *Phragmites* and *Arundo donax*. The plant selection is mainly based on their ability to grow on waste water and have their roots go deep and spread wide. Plants transport oxygen via their roots into the ground. However, in the present DEWATS design the use of plants is only to act as catalysts rather than actually be a treatment medium. BOD removal ranges between 75-90% efficiency on the other hand pathogen removal efficiency is over 95%. The operation and maintenance of the system are simple and spatial requirements for construction are compensated through beautifying landscapes.

### **6.2.6 Sludge Drying Bed (SDB)**

This unit is designed for storage and drying of dislodged sludge after 3-6 months from the Biogas Settler, the sludge drying is mainly by using solar energy which kills pathogens. Sludge can then be used as compost in agricultural fields to grow various crops especially bananas.

### **6.3 Sludge loading intensity**

There is a wide range of sludge loadings and intervals of reed beds according to previous researches, when operated with septage and pit latrine sludge. Maximal sludge loading rate of 250kg DM per m<sup>2</sup> and per years are recommended for septage, meaning sludge from septic tanks have a fairly good degree of stabilization. For this project with a mixture of sludge coming from septic tanks and lined and un-lined pit latrines the receiving sludge is considered as partly anaerobic.

### **6.4 Proposed Processing steps**

The treatment process of the proposed facility follows the cross-section flow diagram in figure 6 from the influents to the effluent.

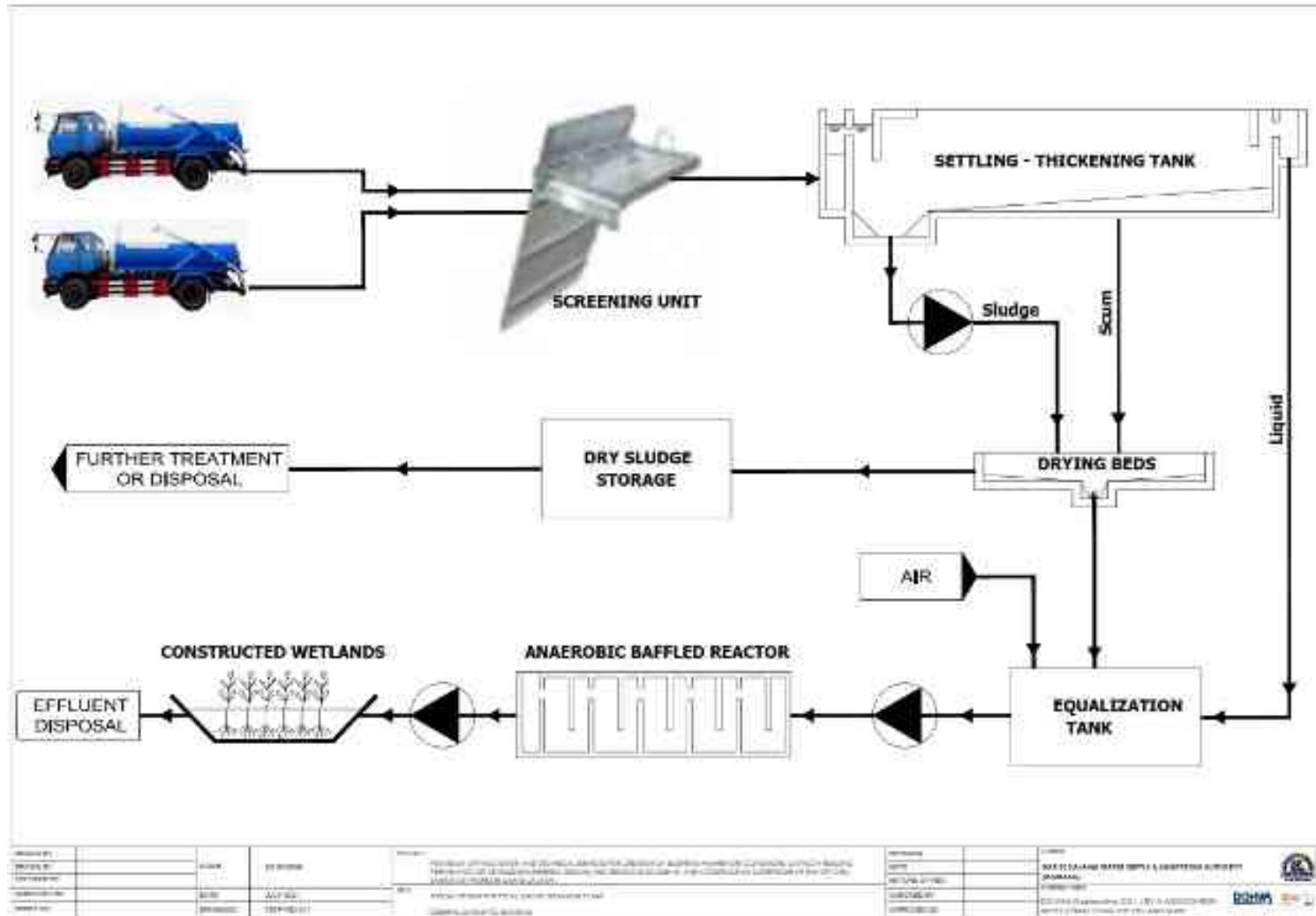


Figure 6: The Fecal Sludge Treatment Facility cross-section diagram

## **7.0 PROJECT REQUIREMENTS AND WASTE GENERATION**

### **7.1 Project requirements**

#### **7.1.1 Construction materials and labour force**

The main materials for Faecal Sludge Treatment Plant include cement, aggregates (stones), water, steel, sand, timbers, blocks, uPVC pipes, IPS 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.

In addition to that, material such as stone and gravels can be acquired from registered dealers such as M/S Even Enterprises Company Limited who has a license to mine at Lugoba area in Bagamoyo District, Appendix VI.

#### **7.1.2 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. During operational phase it is estimated that 5 skilled and semi-skilled workers will be retained for operating the facility.

#### **7.1.3 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 Excavators, Tippers, Concrete Mixers, poker vibrators, Wheel loader, Motor Grader for earthworks, 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. On the other hand, the hand tools which will be used during construction phase constitutes; Shovels, hoes, hammer, pickaxe, buckets etc.

### **7.2 Wastes generation**

The major wastes generation associated with the project are spoil soils resulting from earthworks during the foundation excavations, solid wastes and liquid

waste. The spoil soil shall be stock piled along the treatment unit alignment for further use in landscaping sites at the end of the project.

### **7.2.1 Liquid waste management**

A total of 50m<sup>3</sup> per day of liquid waste is estimated to be received at the receiving chamber of the proposed facility during the maximum operation phase. The project operations will conform to the National Effluent Standard of Tanzania with regard to waste water produced by the plant. After the treatment process is done, the effluent which is rich in nutrients is expected to cater for irrigation taking the advantage of the ongoing agriculture fields adjacent to the project site. However, in case the nutritious effluent will not be used for irrigation, there is a possibility of discharging direct to the river within the marsh which drains to Indian Ocean.

### **7.2.2 Solid waste management**

About 0.5-1 tonnes per month of domestic refuse and other solid wastes is estimated to be generated and trapped at the garbage screen during the project construction and operation phase respectively. A well-established solid waste collection system will be instituted. The system will involve among other things wastes segregation at source, recycling or reuse of some wastes and final disposal to the approved dumpsite / landfill.

The project management team will provide waste bins and recycling receptacles of different type to enable sorting. Compostable materials will be sent direct to the city dumpsite area. Table 2 below shows solid and liquid waste wastes to be generated by the project and the methods of their disposal.

**Table 2: Management of construction and operation wastes**

<b>Solid waste</b>			
<b>Type of waste</b>	<b>Sources</b>	<b>Estimated Quantity (Kg)</b>	<b>Disposal / Management procedure</b>
Debris and Rubble (overburden)	Site clearance	5,000-10,000	Fill material for road potholes, etc.

Biodegradable materials mainly domestic waste (food, paper, wood etc.)	- Construction crew	(500-1,000) per month	Accessible litter bins within the camp site and later to the city waste disposal system (engage a registered private company)
Non- biodegradable materials (plastic, glass)	- Construction crew	(2-5) per day	Recycling/ reuse (Plastics to be sent to authorised plastic recyclers and glass bottles to be sent to glass recyclers)
<b>Liquid waste</b>			
<b>Type of waste</b>	<b>Sources</b>	<b>Estimated Quantity (m<sup>3</sup>) per day</b>	<b>Disposal / Management procedure</b>
- Excreta (domestic) human - Grey water /cleaners	- Toilets and floor cleaning	50	Use of septic tanks and when full will empty to the wastewater treatment facility

## **8.0 POTENTIAL IMPACTS**

### **8.1 Mobilization Phase**

#### **8.1.1 Positive impacts**

##### **8.1.1.1 Employment opportunities**

Labour force for the project will be originated from Toangoma ward and the surrounding communities particularly business people using the Toangoma Bus Stand. 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 family level of life improved.

#### **8.1.2 Negative impacts**

##### **8.1.2.1 Noise pollution**

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

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**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

**8.1.2.2 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.

**8.2 Construction Phase**

**8.2.1 Positive Impacts**

**8.2.1.1 Employment opportunities**

Labour force for the project will be originated from Toangoma ward and the surrounding communities particularly business people using the Toangoma Bus Stand. 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 family level of life improved.

#### **8.2.1.2 Improved living conditions and economic growth**

The project will improve the living conditions in Temeke Municipal whereby the project operation phase will do away with open urination. The charged fee for using the facility will be such as affordable by the intended user. Thus, there will be dignity and increased money circulation that result into increased income consequently better standard of living of people in the project area.

#### **8.2.1.3 Improved public health**

In crowded areas particularly Toangoma area, it is normally hard to ensure safety to public health without the establishment of sound infrastructures. With the Faecal Sludge Treatment facility at Ferry which offers some services under one umbrella ranging from Faecal sludge treatment, production of manure, and biogas production, it is anticipated that the general health condition will not be endangered from health risks.

#### **8.2.1.4 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.

#### **8.2.1.5 Increased Revenue to the nation through taxes, both direct and indirect**

The treatment facility will be constructed and operated by DAWASA. Therefore, it is expected to increase government revenue collection at Municipal and at National level. This will be enhanced by time to time payment of service by users. The revenue collected will contribute towards economic development within the municipal and the country at large.

#### **8.2.1.6 Biogas production potential**

Among other positive impacts gas production for domestic uses is anticipated to serve the local communities and institutions. In this case, the Community which is in proximity to the project site will be the immediate beneficiary of the produced biogas.

#### **8.2.1.7 Minimized forest products harvesting**

Source of energy for cooking in most of the households originates from the forest products. Charcoal and firewood are the most commonly used for domestic purposes. The biogas production from the plant will minimize the use of forest products as to why the gas will be availed to the local community. However, the quantity of the biogas produced depends on the quality of influent to the facility.

### **8.2.2 Negative impacts**

#### **8.2.2.1 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.

**8.2.2.2 Destruction and infringement of properties**

Adjacent to the proposed project site there small scale paddy farms, cassava farms and TAZAMA Pipeline. The construction of the Faecal Sludge Treatment Facility might affect both directly and indirectly the farms and structures respectively.

**Mitigation Measures**

- Close supervision of construction works shall be observed in order to confine land clearance within the area where the construction activities are to take place to avoid unnecessary demolition.

**8.2.2.3 Noise pollution**

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

**Mitigation Measure**

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- 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

#### **8.2.2.4 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.

#### **8.2.2.5 Potential communicable diseases transmission**

Many people from different places and of different health status will be using the Facility. This creates a premise for potential transmission of different communicable diseases of wide range including diarrheas, typhoid, COVID-19 etc.

##### **Mitigation measures**

- Ensure supply of adequate provisions like water, toilet papers, soaps, disinfectants etc
- Maintain high level of cleanliness
- Install guidelines on the usage of the Facility

#### **8.2.2.6 Smells and flies in facility**

Inadequate attention to the facility may render the facility a liability to adjacent land users and businesses. Drainage system blockage due to improper handling of the facility can be a source of sewage overflows and hence the area around becoming a nuisance to people. Overflowing sewage will produce the awful smell of decomposing organic matter that lowers the air quality in the vicinity of society.

### **Mitigation measures**

- The developer to ensure proper handling of the facility
- Adhere to good maintenance and good housekeeping
- Timely desludging

#### **8.2.2.7 High Risk of Health associated with construction work**

Construction activities exposes the workers to a lot of risks for example risk of falling into the excavated pits more than 3metres deep, risk of injuries from falling objects or sharp pointed objects e.t.c

#### **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 from falling

#### **8.2.2.8 Waste generation during construction**

A lot of waste will be generated especially during construction stage. For example excavation of foundations will generate a lot of spoil materials that will need to be disposed of. Construction of walls and roof will both generate

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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

**8.2.2.9 Groundwater contamination from soil sterilization**

Ground water contamination from soil sterilization chemicals is likely to occur because some of the chemicals listed above are toxic to animal and plant life.

**Mitigation measures:**

- Stick to the design specifications
- Chemicals must be applied only with caution by an experienced person
- Treatment shall not be made when soils of fill are excessively wet or immediately after heavy rain.
- Precautions must also be taken to prevent disturbance of the treatment by animals or human contact with the treated soil.
- The treated area is to be covered as quickly as possible after treatment.
- The rate of application is to be 5 litres per square metre and the areas measured include those under floor and round wall and column foundations.

**8.2.2.10 Loss of biodiversity**

Loss of biodiversity will be experienced during the site clearance for the construction activities to start. Huge biomass will be cleared that may include important and rare species.

**Mitigation Measures**

- Close supervision of earthworks shall be observed in order to confine land clearance within the area where the construction activities are to take place.

## **8.3 Operation Phase**

### **8.3.1 Positive Impacts**

#### **8.3.1.1 Improved social-economic livelihood and dignity within the beneficiary society**

The project will improve the living conditions in Temeke Municipal specifically at Toangoma bus stand whereby the project operation phase will do away with open defecation and urination. Thus, there will be increased money circulation that result into increased income consequently better standard of living of people in the project area.

#### **8.3.1.2 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 daily payment of facility usage services by the respective customer. The revenue collected will contribute towards expansion of services to other parts of Dar es Salaam.

#### **8.3.1.3 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 treatment facility depending on the nature of topography.

### **8.3.2 Negative Impacts**

#### **8.3.2.1 Smells and flies**

Inadequate attention to the facility may render the facility a liability to adjacent land users and businesses. Drainage system blockage due to improper handling of the facility can be a source of sewage overflows and hence the area around becoming a nuisance to people. Overflowing sewage will produce the

awful smell of decomposing organic matter that lowers the air quality in the vicinity of society.

### **Mitigation measures**

- The developer to ensure proper handling of the facility
- Adhere to good maintenance and good housekeeping
- Timely Desludging
- Provision of Education on the usefulness of the end products of the facility will clear the doubt of feces nuisance

## **9.0 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.

### **9.1.1 Emergency Action Plan, EAP**

A major objective of an EAP is to develop response protocols to specific emergencies so that if an accident occurs the facility will conduct the appropriate actions in the correct sequence. As a general recommendation, each situation should be broken down into the following components.

1. Assess the extent of damage in the following order:
  - a. Human health
  - b. Environmental health
  - c. Mechanical integrity
2. Correct the problem immediately if possible.
3. Contact the appropriate agencies and personnel to resolve the problem.

The contents of an EAP should be well organized in a binder or an electronic file and distributed to all employees so that they are informed of the proper safety protocols. The facility should provide local emergency departments with a copy of the EAP and invite them for a tour of the operation so they can become familiar with the facility. Also, the facility should post a copy in a highly visible area where visitors enter the facility.

To maintain an effective EAP, the facility should perform an annual review of the document to keep it up to date. Conducting annual training sessions will ensure that employees have a basic understanding of the EAP. The following sections present the recommended content to be included in an EAP.

### **9.1.2 Directions to FSTP facility**

Often, the facility is not visible from the main road, especially if it is located in an agricultural setting. Therefore, detailed driving directions from the closest major road, intersection or town to the physical location of the FSTP facility should be included in the EAP.

### **9.1.3 Contact information**

The EAP should provide a list of emergency and non-emergency contacts, including the job title and cell phone number of each person. Recommended contacts are:

- FSTP owner
- FSTP operators
- Emergency and nonemergency responders
  - o Fire department
  - o Poison control
  - o Law enforcement
  - o Hospital
- Electric and gas utilities
- Contractors
  - o Electrical

o Excavation

- State health and safety officials

Contact information should identify the appropriate after-hours emergency contact information as well. The contact list should be posted in multiple locations throughout the FSTP facility and farm so that in the event of an emergency, there is quick and easy access to this information. The contact list must be updated routinely to make sure all information is current.

#### **9.1.4 Site map**

The EAP should include a detailed site map that identifies and labels relevant structures and major equipment (e.g., Thickening tanks, drying beds, ABR, etc) at the FSTP facility, as well as the location of emergency equipment. It should also clearly identify the locations of biogas supply shutoff valves and the primary electrical disconnect and control panel.

#### **9.1.5 State and local health and safety requirements**

The EAP should include National health and safety regulations for the facility, as well as all OSHA documents, guidelines, and certifications, including confined space entry training documents.

#### **9.1.6 Equipment vendor manuals**

The EAP should include the vendor manuals for all equipment at the FSTP facility. These materials should be well organized so that in the case of a mechanical failure, an operator can locate and reference a specific vendor manual quickly and easily.

#### **9.1.7 Safety and Emergency Equipment**

The following sections list recommended supplies and equipment the FSTP facility should have available for normal daily operation or in the event of an emergency. The list is divided into supplies and equipment to be maintained on-site, so employees can access it within minutes, and equipment that should be locally available and could be delivered to the site within a few hours. A

logbook of equipment inspections and expiration dates and the equipment manuals should be located with the safety equipment.

Personal protective equipment	<ul style="list-style-type: none"> <li>o Gloves</li> <li>o Safety glasses</li> </ul>
Hearing protection	<ul style="list-style-type: none"> <li>o SCBA (provided employees are properly trained and fitted for using the equipment).</li> <li>• First aid kit</li> <li>• Fire extinguishers (ABC)</li> <li>• Explosion-proof instruments (e.g., flashlight, ventilation blower, hand tools)</li> <li>• Rigging equipment for rescue of a person</li> <li>o Hoist, winch, or pulley</li> <li>o Safety harness</li> <li>• Multi-gas detector with extension hose</li> <li>• Ring buoy</li> <li>• Shovel</li> </ul>
Locally (able to be onsite within a few hours)	<ul style="list-style-type: none"> <li>• Excavation equipment (e.g., bulldozer, backhoe, excavator)</li> <li>• Self-contained breathing apparatus, SCBA, and trained individual</li> </ul>

**9.18 Baseline environmental conditions**

During startup and for the first 6 to 12 months of use, operators should collect operational parameters and air quality measurements around the FSTP facility every week to establish baseline/normal operating conditions. Basic operational parameters should include pressure and temperature readings on pipelines where gauges are installed. Using a handheld multi-gas meter, employees should check the air quality inside all structures or rooms, along with the conditions in below-grade chambers, near the base of digester tanks, and along biogas pipelines. At a minimum, the concentration levels of hydrogen

sulfide, carbon monoxide, and methane should be measured and recorded. By establishing baseline operating conditions, the FSTP operator has a point of reference for troubleshooting operational problems and determining when hazardous conditions are developing or already exist.

### **9.1.9 Personal Protective Equipment**

Personnel at an FSTP facility should be provided with proper-fitting personal protective equipment (PPE). The employer is responsible for communicating and educating the employees on the proper use of PPE (Occupation Safety and Health Act, 2003). At a minimum, OSHA recommends protective gloves, splash-proof goggles, hearing protection, and steel toe shoes for employees associated with the digester system. For visitors to the facility, safety glasses and hearing protection should be available and worn while on site.

### **9.1.10 Accident Prevention Signs and Tags**

Accident prevention signs and tags should be visible at all times when work is being performed where a hazard may be present and should be removed or covered promptly when the hazards no longer exist. Also, caution signs should be designed to be understood by non-English speakers. The EAP should include resources documenting where proper signs or tags can be obtained for potential facility hazards

## **9.2 Security**

The whole proposed project will take care of security matter of the site by fencing the whole project 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 firefighting equipment that will be employed;

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

### **9.3 Monitoring, Maintenance and repair**

The management of the facility will be upon both DAWASA and Temeke Municipal Council to ensure the approved design or plan is implemented accordingly. Furthermore, provision of basic services will be executed at high quality as intended for. However, the facility users will also have to ensure they are responsible with the common matters such as general cleanliness of the facility through, paying service fees, etc

## **10.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN**

### **10.1 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 Fecal Sludge Treatment Facility at Masaki Mtaa is summarized in Table 3. The ESMP also indicates environmental costs needed to implement the recommended mitigation measures. The Fecal Sludge Treatment Facility site selection process and engineering designs have already included some of the mitigation measures recommended in this report. Additional recommendations are provided in the ESMP to enable the Fecal Sludge Treatment Facility to be constructed and operated in environmentally friendly manner.

DAWASA in collaboration with Temeke Municipality 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

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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 3: Environmental and Social Management Plan for the Proposed Construction of Fecal Sludge Treatment Plant at Masaki Mtaa, Toangoma ward, Temeke Municipality**

Impact	Mitigation Measure	Responsible Institution	Estimated Time Cost (TZS)	One	Estimated Annual cost (TZS)
<b>Mobilization Phase</b>					
Increased waste generation	<ul style="list-style-type: none"> <li>○ Stick to the design specifications</li> <li>○ Provide waste containers</li> <li>○ Provide training to workers and orient them towards environmental protection values</li> </ul>	DAWASA	1,000,000.00		
Noise pollution during construction	<ul style="list-style-type: none"> <li>○ 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</li> <li>○ All construction works will be scheduled at normal working hours.</li> </ul>	DAWASA	500,000.00		

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<b>Impact</b>	<b>Mitigation Measure</b>	<b>Responsible Institution</b>	<b>Estimated One Time Cost (TZS)</b>	<b>Estimated Annual cost (TZS)</b>
	<ul style="list-style-type: none"> <li>○ Proper inspection and maintenance of construction vehicles and equipment will be done to ensure that they have mufflers installed and worn parts are replaced</li> </ul>			
<b>Construction Phase</b>				
Increased waste generation	<ul style="list-style-type: none"> <li>○ Stick to the design specifications</li> <li>○ Provide waste containers</li> <li>○ Provide training to workers and orient them towards environmental protection values</li> </ul>	DAWASA	1,000,000.00	
Increased HIV/AIDS and other STD	<ul style="list-style-type: none"> <li>○ 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.</li> </ul>	DAWASA	5,000,000.00	

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
	<ul style="list-style-type: none"> <li>○ The contractor shall deploy locally available labour to reduce risk of spreading communicable diseases (especially STDs).</li> <li>○ 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.</li> <li>○ A safety, health and environment induction course shall be conducted to all workers, putting more emphasis on HIV/AIDS, which has</li> </ul>			

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<b>Impact</b>	<b>Mitigation Measure</b>	<b>Responsible Institution</b>	<b>Estimated One Time Cost (TZS)</b>	<b>Estimated Annual cost (TZS)</b>
	become a national disaster.			
Land degradation and increased erosion	<ul style="list-style-type: none"> <li>o The contractor should pave the walkways prone to erosion whose quantities are shown in the BoQ</li> <li>o To obtain the construction materials official negotiated should be performed with wards leaders in order to avoid conflict.</li> </ul>	DAWASA	25,000,000	
Noise pollution during construction	<ul style="list-style-type: none"> <li>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</li> </ul>	DAWASA	1,000,000.00	

**Project Brief of the Proposed Fecal Sludge Treatment Plant at Masaki Mtaa**

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
	<ul style="list-style-type: none"> <li>○ All construction works will be scheduled at normal working hours.</li> <li>○ Proper inspection and maintenance of construction vehicles and equipment will be done to ensure that they have mufflers installed and worn parts are replaced</li> </ul>			
Dust generation during construction	<ul style="list-style-type: none"> <li>○ Mixing equipment shall be sealed properly and vibrating equipment will be equipped with dust removing devices.</li> <li>○ Also all vehicles that generate excessive black smoke will not be used.</li> <li>○ Adequate training and use of personal protective equipment (PPE) such as eye glasses and dust masks will be ensured in</li> </ul>	DAWASA	3,000,000.00	

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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	<ul style="list-style-type: none"> <li>○ The project proponent shall ensure that all personnel are provided with appropriate protective gear.</li> <li>○ 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.</li> <li>○ Adequate number of firefighting equipment/extinguishers will be provided in every few distance to help</li> </ul>	DAWASA	33,000,000.00	

<b>Impact</b>	<b>Mitigation Measure</b>	<b>Responsible Institution</b>	<b>Estimated Time Cost (TZS)</b>	<b>One</b>	<b>Estimated Annual cost (TZS)</b>
	<ul style="list-style-type: none"> <li>○ putting off fire in case of occurrence.</li> <li>○ Excavated pits should be protected by warning tape and guardrails to prevent workers from falling</li> <li>○ Sensitization/Awareness of the beneficiary community on the importance of the Facility and the associated benefits</li> </ul>				
<b>Demobilization phase</b>					
Noise pollution during construction	<ul style="list-style-type: none"> <li>○ 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</li> </ul>	DAWASA	500,000.00		

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
	<ul style="list-style-type: none"> <li>○ All construction works will be scheduled at normal working hours.</li> <li>○ Proper inspection and maintenance of construction vehicles and equipment will be done to ensure that they have mufflers installed and worn parts are replaced</li> </ul>			
<b>Operational Phase</b>				
Health Risks associated with Operation works	<ul style="list-style-type: none"> <li>○ The project proponent shall ensure that all visitors and personnel are provided with appropriate protective gear.</li> <li>○ An adequate number of firefighting equipment/extinguishers will be provided every few distances to help to put off the fire in case of occurrence.</li> </ul>	DAWASA/Temeke Municipal	Depend on the operational manual	

**Project Brief of the Proposed Fecal Sludge Treatment Plant at Masaki Mtaa**

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Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
	<ul style="list-style-type: none"> <li>○ Adhere to good maintenance</li> <li>○ Sensitization/Awareness of the beneficiary community on the importance of the Facility and the associated benefits</li> </ul>			
<b>Total</b>			<b>70,000,000.00</b>	<b>70,000,000.00</b>

## **11.0 MONITORING PLAN**

### **11.1 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 5. 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 5: Monitoring Plan for the Proposed Construction of Fecal Sludge Treatment Plant at Masaki Mtaa in Toangoma Ward, Temeke Municipality**

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

**Project Brief of the Proposed Fecal Sludge Treatment Plant at Masaki Mtaa**

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

**Project Brief of the Proposed Fecal Sludge Treatment Plant at Masaki Mtaa**

Parameter	Monitoring Frequency	Sampling Area	Measurement Unit	Method	Target Level/Standard	Responsibility for monitoring	Estimated Annual (or once cost (TZS)
		n chambers					
Waste Generation	Weekly	At the working area	Amount of waste	Physical measurement or estimation	All waste contained	DAWASA	In BOQ
Health risks	Daily	At working area	Accidents	Counting	NO accident	DAWASA	In BOQ
HIV/AIDS	Monthly	Workers	Training	Numbers	One per month during construction phase only	DAWASA	5,000,000.00
Biodiversity	Once (at commencement)	Working area	Destruction of habitat or removal of biodiversity	Area affected	Minimal disturbance to biodiversity	DAWASA	1,000,000.00
<b>Operation phase</b>							
Air Quality	Monthly	Around the Inspection chambers	Presence of smells	Smelling (nasal)	Absence of nuisance smells	DAWASA	500,000.00
Waste Generation	Monthly	At the working area	Amount of waste	Physical measurement or estimation	All waste contained	DAWASA	In operation manual
Health risks	Monthly	At working area	Accidents	Counting	NO accident	DAWASA	In operation manual

**Project Brief of the Proposed Fecal Sludge Treatment Plant at Masaki Mtaa**

<b>Parameter</b>	<b>Monitoring Frequency</b>	<b>Sampling Area</b>	<b>Measurement Unit</b>	<b>Method</b>	<b>Target Level/Standard</b>	<b>Responsibility for monitoring</b>	<b>Estimated Annual (or once cost (TZS)</b>
HIV/AIDS	Annually	Workers	Training	Numbers	One per month during construction phase only	DAWASA	In operation manual
<b>Total</b>							<b>24,000,000.00</b>

## 12.0 PROJECT BUDGET

The investment cost for the proposed Fecal Sludge Treatment Plant is estimated to be around Tshs 300 million that will be financed by the World Bank.

## 13.0 STAKEHOLDER VIEWS ON THE PROPOSED PROJECT

During the conduction of this study, different stakeholders were consulted. Among these include the Temeke Municipal Council and community at Masaki Mtaa . Consultations were made through meetings held on 2<sup>nd</sup> July 2020.

During the meeting, the consultant gave a brief explanation on the proposed Fecal Sludge treatment plant. The project description covered proposed location, type and design of Fecal Sludge treatment plant (a typical design was displayed), construction materials. 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 6 summarizes the issues raised. The names of the stakeholders consulted are given in Appendix I while minutes of meetings conducted are given in appendix I.

**Table 6: Issues and concerns rose by stakeholders**

Institution	Name	Position	Issues/ concerns	Response
TEMEKE MUNICIPAL COUNCIL	Dr. Gwamaka Mwaulambo	MMOH	-It is likely for people to dump their waste water to the FSTP even from far places as long as the facility is close.	Section 2.0 Section 4.4
TEMEKE MUNICIPAL COUNCIL	Ally Hatib	MWEO	-The proposed FSTP works best with small communities, one truck has the capacity up to 15metric cubes, thus only 3 trucks will be served per day	Section 2.0

<b>Institution</b>	<b>Name</b>	<b>Position</b>	<b>Issues/ concerns</b>	<b>Response</b>
TEMEKE MUNICIPAL COUNCIL	Hanifa Mruma	Ag. MCDO	-Sensitization to the local leaders and the community on how the FSTP works and its benefits	Section 7.3.2.1 Table 3
TEMEKE MUNICIPAL COUNCIL	Veronica Koko	Ag. MUNRO	-Some proposed projects have ownership issues, for instance UVIKIUTA is still a nightmare -Proposed <b>Kisewe mtaa</b> for purchase of open piece of land for project purposes	Appendix II
TEMEKE MUNICIPAL COUNCIL, MASAKI MTAA	Hamza Juma	Mtaa Chair person	-Wanted to know if it will be possible for all people to be connected to the FSTP	Section 2.0
TEMEKE MUNICIPAL COUNCIL	Vaileth M. Mtete	Mjumbe	-Was concerned about the farmers conducting their activities within the proposed project site, though they were allowed to cultivate temporary crops until when the Government puts the area in use.	Section 7.2.2.2

#### **14.0 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 sanitation, then the outbreak of diseases like diarrhoea 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 certificate in order to commence the implementation of the project.

It is, therefore, concluded that implementation of the proposed construction of the Faecal sludge treatment plant at Masaki 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.


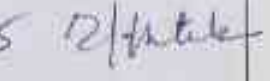


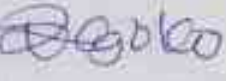

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2. Investment profile of Temeke Municipal council
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4. Population and Assets Exposure to Coastal Flooding in Dar es Salaam (Tanzania): Vulnerability to Climate Extremes
5. Temeke Municipal Socio-economic profile 2010/2011

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
1	25-06-2020	DR GWAMUKA MWAIBUKAMBO	TEMEKE MC	MUNOH	0715130050	
2	25-06-20	Ally Hatika	TEMEKE MC	MUNFD	0717368585	
	25-06-20	Jennifer Ussis	TEMEKE MC	IA	0784 644134 0715 151561	
	01/07/2020	HANIFA MIZAMU	TEMEKE MC	Ag, MCD	0657662699	
	01/07/2020	VERONICA GOICO	TEMEKE	Ag MUNRO	0756763945	
	01/7/2020	RETHEMA SABIQU	TEMEKE	MHO	0754395669	

## Appendix II: Permit to use the Open Space for construction of FSTP

### HALMASHAURI YA MANISPAA TEMEKE

[Barua zote zipelekwe kwa Mkurugenzi wa Manispaa Temeke]

Simu: +255 22 292 8132/22-292 8138  
22-292 8139  
Fax: +255 22-292 8137  
Barua pepe: temeke@temekemc.go.tz  
Tovuti: <http://www.temekemc.go.tz>



S.L.P. 46343,  
92 BARABARA YA MANDELA/TAIFA,  
15883 DAR ES SALAAM,  
TANZANIA.

**Kumb Na.TMC/MD/0.15/4**

**Tarehe:04/05/2020**

MAMLAKA YA MAJI SAFI NA  
MAJI TAKA DAR ES SALAAM,  
S.L.P 1573,  
SIMU:+255222760006/15  
FAX:25522 2762480  
**DAR ES SALAAM**

**YAH: UTEKELEZAJI WA MRADI WA AFYA NA USAFI WA MAZINGIRA  
MAENEO YA PEMBEZONI**

**Somo: Uhakiki na Upimaji wa Maeneo kwa Ajili ya Ujenzi wa Mradi ya Majitaka**

Kichwa cha habari hapo juu chahusika.

Pia barua yako yenye kumbukumbu namba DAWASA/KINO/DOC/2020/02 ya tarehe 23/03/2020.

Ofisi inakiri kupokea barua yako na kufanyia kazi, ambapo hatua ya kwanza wataalam wa ardhi na wataalam wa idara ya maji manispaa ya Temeke wakishirikiana na wataalam kutoka DAWASA walitembelea maeneo husika kwa ajili ya ukaguzi.

Baada ya maeneo kukaguliwa, ilibainika kuwa eneo la Vikunai lililopo katika kata ya Toangoma linafaa kwa ujenzi wa mfumo wa kuchakata majitaka (Decentralized Wastewater Treatment Facilities).

Hivyo ofisi inapenda kukutaarifu kuwa eneo la Vikunai lililopo katika kata ya Toangoma limethibitika kuwa tayari kwa ajili ya utekelezaji wa mradi wa ujenzi wa mfumo wa uchakataji maji taka.

Veronica . I. Malangwa  
Kny: MKURUGENZI WA MANISPAA  
TEMEKE

**NAKALA:** Mkurugenzi wa Mansispaa  
TEMEKE - Kwa taarifa

Katibu Tawala (W)  
TEMEKE - Kwa taarifa



Appendix IV: Minutes of Meetings with stakeholders

TATHIMINI YO BITHAJI KWA Mazingira na Jamii na  
Uhamasishaji kwa Jamii kuhusu mipango wa makazi mada  
la na fidia zitokanazo na mabadi wa ujenzi wa miunduo-  
mbano ya uchakataji maji taka na vyoo vya umma mkub  
wa Dar-es-Salaam Kituo cha Twangoma

02/07/2020

1. Kufungua kikao
2. Maelezo kuhusu mabadi wa uchakataji maji taka
3. Maswali / Maoni kutoka kwa wadau
4. Kuahirisha kikao

VISA MTEGEMBI YA MTAJI  
MASIKI

Kufungua kikao

Kikao kilifunguliwa na Mwanjuzi udugu Cheddie Mchiri  
Mnamo munda wa saa 8:00 na kuanzambulidha kigani  
kutoka kampuni ya Royal Associate Engineering JV & PES LTD  
Ikwa na Mwekezaji wao Dawasa.

Maelezo kuhusu mabadi wa uchakataji maji taka

Mwalimu kutoka Dawasa udugu Adam alieleza  
Dawasa ipo kabika uradi wa uchakataji wa maji  
-taka na yemi na vyo kuyo kabika katikani  
ya kiuazingira na jamii mwana mwanajuzi  
mhandisi Mshauri ili awaze kiyanga katikani  
ya kiuazingira na jamii.

Udugu Robert Kishiki alisimama na kueleza kwa  
amekiga kuangalokatikani ya Mazingira na jamii  
kinyo kubakuwa na yemi wa chos cha umma  
eneo la 20 kwa 20 na eneo la senkali.

Choo kilakachojengwa ni kwa ajili ya wote wanawake na wanawake na waji yatakuvwepo. Vyo vitakuwa vya kulipia na hii hasaidia kuleta waji katika eneo hili kwa kupata huduma ya choo.

3. MASWALI / MACHO KUTOKA KWENI LUMBA

Babu Nyoni - Eneo lildopimwa kuna kisima cha waji inakowaga k'afya.

Mtaalamu ndugu Emmanuel aljibu hilo kumelichukua na kunalifanya kazi.

wananchi waliomba waku wa kuangoma wajiidito na fursa zitakaropakana katika huu mradi.

Pia waliomba DAWASA wachimbe kesiua kivi kwa ajili ya wananchi wa Kuangoma.

4. KUAHIRISHA KIKAO

Kikao kilahirishwa na Mwenyekiti Mnamo Muda wa saa 8.30 uchiang.

AFISA MTEMDUJI YA MTAJI  
MAY 2011

Sahibi ya Mkuonyekaji

*(Signature)*

CHEDILE NIICOLUS  
0716219881, 0789015529

Sahibi ya Mkuonyekaji  
Ripapapa Mtaa  
AFISA MTEENZI WA MAA  
MASAKI

TATHIMINI YA ATHARI KWA MAZINGIRA NA JAMII NA UHAMASHAJI KWA JAMII KUHUSU MPANGO WA MAKAZI MBADALA NA FIDIA ZITOKANAZO NA MRADI WA UENZI WA MIUNDOMBINU YA UCHAKATAJI MAJI TAKA NA VYOO VYA UMMA MKOA WA

DAR ES SALAAM

MAHUDHURIO KWA AJILI YA MIKUTANO, MAJADILIANO

MWKEZAJI: DAWASA  
 WILAYA: TETEKE  
 KATA: TOAN-GOMA  
 MSHAURI: ROYAL ASSOCIATES ENGINEERING JV G-PES LTD  
 MTA: MASAKI  
 TAREHE: 02/10/2020

S/N	JINA	WADHIFA	NAMBA YA SIMU	SAHIHI
1	ABDULLAH O SAIDI	MTANDAJI WA MTAJI	0714694888	[Signature]
2	DAVID SHITA	MTANDAJI WA MTAJI	0762686517	[Signature]
3	Abubakar Mubwani Fundi	MTANDAJI WA MTAJI	0723305022	[Signature]
4	KWAMISI ALY MACHIN		0656418001	[Signature]
5	SELEMANI YAGAME		0710734672	[Signature]
6	SADICK JUMU		0742708152	[Signature]
7	REGINALDUS M. MWIJUKYA		0687927485	[Signature]
8	HARIS HASTENI		0675983605	[Signature]
9	LUGENZI S. DITHA A		0788243205	[Signature]
10	FATUMA MUBWANI		065645032	[Signature]
11	ABDULLAH SALUMU		0718-297370	[Signature]
12	FATUMA RAHABHANI		0683-959294	[Signature]
13	HUSSEIN A. KWAMBO		0787-014194	[Signature]
14	BABU J. NYONI		0715193911	[Signature]
15	OMARY B. KARUNGU		0715443833	[Signature]
16	ALBERT J. GOMBE		0786665594	[Signature]
17	JUMA KIGUMI		0684628619	[Signature]
18	ZARIA MOHAMMED		0683907922	[Signature]
19	CCV. MUMU		0717452712	[Signature]
20	FATIMA SAFO		0784762941	[Signature]
21	AMINA KUMEDI		0713589764	[Signature]
22	ZAWENA ISAI		0717112427	[Signature]
23	AMINA A. A. P. S.		0713589764	[Signature]

WAFISA MTENDAJI WA MTAJI  
 MASAKI

TATHIMINI YA ATHARI KWA MAZINGIRA NA JAMII NA UHAMASISHAJI KWA JAMII KUHUSU MPANGO WA MAKAZI MBADALA NA FIDIA ZITOKANAZO NA MRADI WA UENZI WA MIUNDOMBINU YA UCHAKATAJI MAJI TAKA NA VYOO VYA UMMA MKOA WA

DAR ES SALAAM

MAHUDHURIO KWA AJILI YA MIKUTANO, MAJADILIANO

MISHAURI: ROYAL ASSOCIATES ENGINEERING JV G-PES LTD

MWEKEZAJI: DAWASA

TAREHE: 02/07/2020

WILAYA: TEMBEKE

KATA: DAPANGOMA

MTAA: MASAKI

S/N	JINA	WADHIFA	NAMBA YA SIMU	SAHIHI
1	CHEDIGU NIKOLMS	MIKITI MANSUGI	0716219881	<i>[Signature]</i>
2	HAWA FURAHISHA	MJUMBE	0710741550	<i>[Signature]</i>
3	FURA NJOWIKA	MJUMBE	0652798988	<i>[Signature]</i>
4	ASHA ALI	MJUMBE	0688091077	<i>[Signature]</i>
5	SALWA NANG'AO	MJUMBE	0712184678	<i>[Signature]</i>
6	MWANAMBAYANA MOHAMEDI	MJUMBE	0718256100	<i>[Signature]</i>
7	SALAMA J. KWELI	MJUMBE	0768-940103	<i>[Signature]</i>
8	QUEENFRIDA STEVEN	MJUMBE	0750080013	<i>[Signature]</i>
9	IBRAHIM C. MAINDE	MJUMBE	07418483615	<i>[Signature]</i>
10	OMPRI S. MDIRU	MJUMBE	07587870110	<i>[Signature]</i>
11	MATHEO JUMBA	MJUMBE	07926721779	<i>[Signature]</i>
12	KUBER MOHAMEDI	MJUMBE	0683634329	<i>[Signature]</i>
13	MARINE JUMARNE	S.S	0688197063	<i>[Signature]</i>
14	YOHANA EACS	S.S	06512532008	<i>[Signature]</i>
15	LALIA JUMBE	S.S	0783061420	<i>[Signature]</i>
16	Moses Kemba	S.S	0688393972	<i>[Signature]</i>
17	ISA CHAMLA MOTIO	S.S	07183970916/065820083	<i>[Signature]</i>
18	LEDDY P. KAKULLU	S.S	0654275771	<i>[Signature]</i>
19	ALY H. SABALA	S.S	06776268744	<i>[Signature]</i>
20	MARWENA M. SHOMARI	S.S	0684395577	<i>[Signature]</i>
21	SALIMU S. LUPAMBA	S.S	075795584	<i>[Signature]</i>
22	ASHA MASUDI	S.S		<i>[Signature]</i>

AFISA MTEKUNU YA MTAI  
MASAKI



**Appendix V: Memorandum of Understanding between DAWASA and Dar  
es Salaam Municipal councils**



**MEMORANDUM OF UNDERSTANDING**  
**BETWEEN**  
**MINISTRY OF WATER**  
**AND**  
**THE DAR ES SALAAM WATER SUPPLY AND**  
**SEWERAGE AUTHORITY,**  
**REGIONAL ADMINISTRATIVE SECRETARIAT**  
**AND**  
**DAR ES SALAAM MUNICIPAL COUNCILS**  
**(Kinondoni, Ilala, Temeke, Ubungo, Kigamboni)**

**JANUARY 2019**

## **ACRONYMS**

BC	Beneficiary Community
CEO	Chief Executive Officer
CPM	Critical Path Method
CV	Curriculum Vitae
DAWASA	Dar es Salaam Water and Sewerage Authority
DDCA	Drilling and Dam Construction Agency
DEWATS	Decentralized Wastewater Treatment System
DSM	Dar es Salaam
EMP	Environmental Management Plan
ESA	Environmental and Social Assessment
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
EWURA	Energy and Water Utilities Regulatory Authority
FDR	Final Design Report
FSM	Feacal Sludge Management
GIS	Geographic Information System
GoT	Government of the United Republic of Tanzania
H&S	Health and Safety
ICB	International Competitive Bidding
IFRs	Interim Financial Report
LGAs	Local Government Authorities
m <sup>3</sup>	Cubic meter = 1,000 litres
MD	Managing Director
MKUKUTA	National Strategy for Growth and Reduction of Poverty
MoEVT	Ministry of Education and Vocational Training
MoHCDEC	Ministry of Health, Community Development, Gender, Elderly and Children
MoU	Memorandum of Understanding
MoW	Ministry of Water
NCB	National Competitive Bidding
NEMC	National Environment Management Council

NGO	Non-Governmental Organization
NWSDS	National Water Sector Development Strategy
O&M	Operations and Maintenance
PAP	Projected Affected Person
PERT	Program Evaluation Review Technique
PIM	Project Implementation Manual
PIP	Program Implementation Plan
PO	Private Operators
PO-RALG	Presidents Office Regional Administration and Local Government
PPRA	Public Procurement Regulatory Authority
RAP	Resettlement Action Plan
RAS	Regional Administrative Secretary
RS	Regional Secretariat
RFP	Request for Proposals
SDG	Sustainable Development Goal
SPS	Small Piped Water Supply
TBS	Tanzania Bureau of Standards
ToR	Terms of Reference
UWSA	Urban Water and Sewerage Authority
WC	Water Committee
WSDP	Water Sector Development Program
WSS	Water Supply and Sanitation.
WSSP	Water Sector Development Program
WSSPII	Second Water Sector Support Project

**A MEMORANDUM OF UNDERSTANDING  
FOR THE IMPLEMENTATION OF THE OFF- GRID WATER SUPPLY AND  
SANITATION PROJECTS UNDER THE SECOND WATER SUPPLY AND  
SANITATION PROJECT USING EARMARKED FINANCING**

Memorandum of Understanding (“MoU”) between the Ministry of Water on one part and the Dar es Salaam Water Supply and Sewerage Authority (“DAWASA”), the Dar es Salaam Regional Secretariat (RS), and the five municipalities of Dar es Salaam (collectively referred to as “the MUNICIPALITIES”) on the other part.

**WHEREAS** in recognition of the importance and contribution of the water sector to the social and economic development of the United Republic of Tanzania, the Government has developed a water sector support framework set out in the following documentation: (a) the National Strategy for Growth and Reduction of Poverty (“MKUKUTA, as amended”), (b) the National Water Sector Development Strategy (“NWSDS”) and (c) the Water Sector Development Program (“WSSP”).

**WHEREAS** after being satisfied with the objectives of the WSSP II, parties to this Memorandum have expressed their willingness to participate fully in its implementation;

**WHEREAS** The WSSPII project development objective is to strengthen the capacity for the integrated water resources planning and management in the United Republic of Tanzania and improve access to water supply and sanitation services in an operationally efficient manner in Dar es Salaam. The project has four components namely: Integrated Water Resources Management, Dar es Salaam Water Supply improvement, Dar es Salaam Sanitation Improvement, and Project Management and Implementation support.

**WHEREAS** the project is being financed by IDA Credit through Investment Project Financing, the recipient has declared its commitment to the objectives of the Project.

**WHEREAS** on the other part DAWASA has committed itself to the principle of harmonization and strive for the highest degree of alignment with the Government’s budgetary and accountability systems and local financial framework so as to enhance effective implementation, reduce the administrative burden on the Government, and minimize transaction costs; and

**NOW THEREFORE**, the parties hereby agree to cooperate in coordinating the implementation of the off-grid water supply and sanitation part of WSSP II in accordance with the principles and procedures set forth in this MoU; provided, however, that in case of any conflict between the provisions of this MoU AND THE PROJECT Financing Agreement, the provisions of the Financing Agreement shall prevail.

## 1. DEFINITIONS

Unless the context otherwise requires, several terms defined in the Preamble of this MoU have the respective meanings set forth therein, and the additional terms referred to below have the following meanings:

1. **Off Grid water supply** means the activities which will provide water supply services to people of Dar es Salaam, who are not connected to the formal network. The proposed solutions include decentralized Interventions, which may be an interim measure to be integrated to the grid network as it expands in the future. Schemes to be implemented include mostly independent water supply distribution systems supplied from point sources (e.g boreholes) or a bulk water supply from the DAWASA distribution system. In areas where the existing grid network is not available, independent stand-alone Small Piped Water Supply (SPS) systems will be implemented. These projects, typically involve a source of water (for example, borehole), a community-based distribution system and water points at a community and/or household level. The operations and maintenance will be supported from the tariff collected from the users.
2. **Off-Grid Sanitation** means activities which will provide sanitation services in Dar es Salaam to areas without access to sewers. This activity will support installation of improved toilets; safe emptying and transportation of the waste to a treatment facility; and treatment and safe disposal of treated waste into the environment. This will include piloting decentralized systems and other new technology.
3. **Environmental and Social Management Framework or ESMF** means the framework dated September 2006, prepared by the Government and cleared by the International Development Association, setting forth an environmental and social screening process that will enable WSSP II Implementing Agencies to identify and assess potential adverse environmental and social impacts, and offset and reduce them to acceptable levels, or enhance positive impacts, and in accordance with which environmental and social management plans will be prepared by WSSP II Implementing Agencies.
4. **MKUKUTA II** Means the Government's National Strategy for Growth and Reduction of Poverty dated July 2010, covering the period from 2011 – 12 to 2016 – 17 and subsequent versions that may be introduced by GOT.
5. **Resettlement Policy Framework** or RPF means the governing framework dated September 2006, prepared by the Government and approved by the International Development Association, for land acquisition, resettlement and compensation under the WSDP, and in accordance with which resettlement action plans will be prepared,

as necessary, as the same may be amended from time to time with the concurrence of the International Development Association;

6. **WSSP Implementation Manual** means the Project Implementation Manual (PIM) specifying implementation arrangements for the Second WSSP, including institutional arrangements; procedures for procurement, disbursement of funds, financial management, environmental and social management, and monitoring and evaluation; and progress reporting requirements, including annexes to the said manual.
7. **Project Management Team** means a team set up by DAWASA for day to day management of the off-grid water supply sub-project. Same for management of off-grid sanitation sub-project.
8. **Facilitation Team** A team appointed by the Municipal Director of the respective Municipal Council from Dar es Salaam region for the purpose of facilitating the implementation of the Off-Grid water supply projects and Off- Grid Sanitation projects. The scope of their responsibility are detailed in the PIM and summarized in this MoU.

## **2. UNDERLYING PRINCIPLES**

2.1 The MoW, DAWASA, RS and Municipalities agree that the following are the underlying principles that govern this partnership:

- (a.) Commitment to the fulfilment of the aspirations of the National Development Vision 2025;
- (b.) Compliance with defined budgeting, procurement and public financial management rules and regulations;
- (c.) Good governance and accountability of the Government to its citizens, including an active fight against corruption;
- (d.) Coordinating the implementation of the off-grid water supply and sanitation sub-projects cost effectively; and
- (e.) Each party executing its respective roles in a timely manner

## **3. GENERAL PROVISIONS**

### **3.1 Purpose**

This MoU outlines the responsibilities of the **MoW, DAWASA, RS and Municipalities** with respect to the implementation of off-grid water supply and sanitation sub-projects and sets forth common institutional, environmental and social measures, monitoring and evaluation, audit and reporting arrangements. The WSSP II Implementation Manual complements procedures and arrangements set out in this MoU.

### 3.2 Status of the MoU

This MoU is not intended to create any legally binding obligations and the parties take due cognizance of the separate sector laws and regulations between the Government Institutions, and this MoU is adopted pursuant to and subject to any such regulations. In case of any conflict between the provisions of this MoU and the project Financing Agreement, the provisions of the Financing Agreement shall prevail.

## 4. OFF GRID WATER SUPPLY

### 4.1. Commitment

The DAWASA declares its commitment to the objectives of the **Second Water Sector Support Project** and will act with due diligence and efficiency to facilitate the successful implementation of the projects. To this end, DAWASA, as an Implementing Agency will effectively carry out its roles and responsibilities in the implementation of the off-grid water supply and sanitation sub-projects as defined in the WSSP II Project Implementation Manual. The Ministry of Water, as the Responsible Agency for WSSP II will have overall responsibility for the coordination and implementation of the off-grid water supply and sanitation sub-projects.

### 4.2 Institutional Arrangements

The institutional framework for overseeing the implementation of the WSSP II comprises the following key bodies, as set out in the Sections below, and in greater detail in the WSSP Implementation Manual:

1. Ministry of Water;
2. Prime Minister's Office Regional Administration and Local Government;
3. Ministry of Health, Community Development, Gender, Elderly and Children
4. Municipal Councils
5. Beneficiary Communities ("BC");

#### 4.2.1 Ministry of Water (MoW)

The MoW will be responsible for provision of overall coordination and oversight. The Ministry will also provide technical and administrative support in the implementation of WSSP II, including without limitation the following activities:

1. Coordinating and consolidating the quarterly WSSP II IFRs (Interim Financial Report); semi-annual and annual progress reports; and ensuring that funds earmarked for implementation of WSSP II activities are duly considered in the annual work plans

and budgets of the implementing agencies; and that the WSSP II procurement plans are consistent with WSSP II work plans and budgets;

2. Ensuring quality and consistency of the documents referred to in subparagraph (a) above prior to consolidation as indicated in the Programme Implementation Manual and submission to the Off-Grid WSS SC for discussion;
3. Monitoring the implementation of the Annual Work Plans and Budgets by the WSSP II Implementing Agencies, at least on quarterly basis;
4. Providing oversight on financial management, controls, audit and reports; and
5. Ensuring that management decisions made by the Off-Grid WSS Steering Committee are communicated to the Implementing Agencies, implemented and monitored.

#### **4.2.2 DAWASA**

DAWASA will be responsible for overall coordination and implementation of off grid water supply activities. The off-grid water supply shall be implemented under the Directorate of Infrastructure Development (for construction arrangements) in collaboration with the Communication Unit (for coordination arrangements). The Communication Unit will be generally responsible for:-

1. Coordinating inputs as required from other units within DAWASA such as Procurement, Technical Services, and Finance, etc.
2. Supervising and monitoring contracts / agreements
3. Setting up Sub-project Agreements with beneficiary communities
4. Monitoring and reporting overall progress of the off-grid water supply sub-component.
5. Reviewing and evaluating the operation and management of the water supply sub-projects.
6. The financial aspects for off- grid water supply sub-projects will be managed as per Project Implementation Manual VOLUME II, and
7. Overall supervision of off-grid water supply activities.

#### **4.2.3 Municipal Councils (or DLGAs)**

The five Dar es Salaam Municipal Councils, through their respective Urban Planning Department, Legal Unit, Municipal Health and Water Department, will be responsible for the following tasks:

1. Creating awareness and mobilization of the communities.

2. Each DLGA will form a Municipal Facilitation Team comprising different specialists from Water, Health, Education, Community Development departments that will be tasked to assist consultants/contractors/PO on implementation and operation of Off Grid Water Supply facilities in their respective areas.
3. DLGAs through Legal unit, Health and Water department will coordinate the formation of Water Supply by-laws and regulations and thereafter enforcing for sustainability of Off Grid Water Supply facilities.
4. DLGAs will be responsible for identification and facilitation of Land acquisition for construction of Off- Grid Water Supply facilities

#### **4.2.4 WSS Steering Committee**

Given the multiplicity of institutions with varying roles, a WSS Steering Committee (SC) will be set up under the project to ensure coordination, synergy, and dovetailing. This SC will be newly set up or be adopted from some of the other projects (for example, Dar es Salaam Metropolitan Development Program [DMDP]) which may have similar steering mechanisms. This steering committee will be chaired by the Head of the Water Sector from RS and DAWASA will provide the secretary to WSS SC.

The RS will chair the Off Grid WSS Steering Committee, which will be comprised of representatives from the DAWASA, RS, WRBO, MOW, DLGAs i.e Temeke, Ilala, Kinondoni, Kigamboni and Ubungo. The Steering Committee will be responsible for providing general oversight of the selection and approval of sub-projects for implementation by the Off-Grid Water Supply and Sanitation. The key responsibilities of the Off Grid WSS Steering Committee include:

1. Reviewing overall Off Grid Sanitation implementation arrangements
2. Reviewing and approving Off Grid Sanitation sub-project operational guidelines
3. Reviewing and approving Off Grid Sanitation sub-project proposals
4. Reviewing overall Off Grid Sanitation progress and performance and providing guidance for improvements if needed
5. Conflict Resolution as per PIM.

#### **4.2.5 Beneficiary Community**

At the project level, Beneficiary Community will be involved in the project appraisal, that includes identification of sources, selection of appropriate sites, kiosk locations, and

protection of water source and infrastructures. DAWASA will be responsible for the efficient operation and management of the water supply systems.

#### **4.2.6 Private Operator**

The Private Operator (PO) may be engaged if the expansion of DAWASA grid network is beyond five years away. The PO would primarily have as its members the households from the community, with an operating body selected by the members from among themselves, with additional membership from DAWASA/DLGA. The regulation of these systems, including the tariff, would be undertaken by EWURA, as part of the overall regulation of the sector in Dar es Salaam.

Private Operator will operate, maintain, and manage the scheme under contract with DAWASA.

The Private Operator shall be responsible for keeping and maintaining appropriate records of its business activities. These shall include:

1. Customer details
2. Operation and maintenance records including volume of water produced and sold
3. Asset register, work as executed records, manuals of plant and equipment
4. Condition and expected life of assets
5. The details of network expansions as up to standards.
6. The Private Operator shall prepare monthly and quarterly operation and maintenance
7. Reports for the completed off-grid water supply subproject
8. Billing and payment records
9. Business accounts and financial statement

In general, the Operation and Maintenance Reports will address such issues as:

1. Number of registered customers in the service area
2. Number of people in the service area and number of people served
3. Business plan and budget
4. Level of service; proposed and actual
5. Revenue and expenses, progress against budget
6. Customer satisfaction
7. Maintenance activities, breakdowns, failures
8. Availability of ground /reliable water sources
9. Availability for land resources for project activities
10. Manage non-revenue water in the business area

### **4.3 SELECTION CRITERIA**

DAWASA, in consultation with the five municipalities Ilala, Temeke, Kinondoni, Kigamboni and Ubungo will identify communities which are eligible for the Off-Grid Water Supply sub-project under the WSSP II. The identification will follow the criteria below;

1. High population density
2. Low-income areas
3. Prevalence/risk of waterborne diseases
4. No wholesome water services
5. Near-trunk infrastructure
6. Availability of sufficient land for the interventions
7. Unplanned settlements
8. Community willingness

Each of these criteria will be allocated a score, and the communities prioritized according to their total score. Keeping in mind the decisions of other interventions (for example, The Dar es salaam Metropolitan Development Program - DMDP), WSSP-II will invest in those communities which have the highest need.

### **5.0 OFF-GRID SANITATION**

#### **5.1 Definition.**

The Off-Grid Sanitation components will provide much needed improvements to wastewater management services in areas of Dar es Salaam that are not served by DAWASA network. These improvements will be realised as a result of construction of Off-Grid sanitation stand-alone projects such as Decentralized Waste Water Treatment Systems (DEWATSs), faecal sludge treatment facilities, and condominial/simplified sewerage. The Off-Grid Sanitation Services will address the lack of sanitation services in unserved areas.

#### **5.2 Institutional Arrangements**

A strategy to address the poor sanitation in Dar es Salaam requires clarity and coordination among the various institutions involved in the sector. However, institutional responsibility is fragmented and unclear, being divided between National Ministries, City Utilities, Municipal Organizations, Regulatory Authorities, Community-Based Organizations, the Informal Private Sector and sanitation users themselves.

Currently sanitation service delivery is undertaken by a mixture of Utilities, Municipalities and Regulators. DAWASA will be responsible for overall coordination and supervision of Off-Grid sanitation activities. Other institution as detailed in PIM are summarised below:

1. MoHCDGEC,
2. MoW,
3. RS,
4. DLGAs,
5. NGOs,
6. PO

### **5.2.1 Ministry of Water**

Ministry of Water will be responsible with setting Policy and guidelines specific to FSM and overall project coordination and implementation support .

### **5.2.2 DAWASA**

DAWASA will provide a foundation and resources for the overall implementation of Off-Grid Sanitation.

Directorate of Infrastructure Development will be the department within DAWASA responsible for overseeing the implementation of the WSSP II including Off-Grid Sanitation Sub component. The head of this department will report directly to the DAWASA Chief Executive Officer and will generally be responsible for:

1. Coordination of the Off-Grid Sanitation Steering Committee as well as establishing a general agenda and timetable for Steering Committee meetings with consultation with Steering Committee Chairperson and providing secretariat services.
2. Coordinating inputs as required from other Directorates within DAWASA such as Procurement, Infrastructure Development, and Finance, etc.
3. Signing, supervising and monitoring contracts / agreements
4. Setting up Sub-project Agreements with successful communities.
5. Monitoring and reporting overall progress of the Off-Grid Sanitation
6. Reviewing and evaluating the operation and management of the community sanitation schemes.

In support of Sub Component 3.2: a Sanitation coordination team led by PO-RALG - Regional Secretariat will be established to coordinate implementation of the Off- Grid sanitation services. The technical department in the municipalities in coordination with DAWASA will be responsible for implementation of the off-grid sanitation component. DLGAs through Health, Legal unit and Water departments will coordinate the formation or improvement of existing Sanitation by laws and regulations and thereafter enforcing them for the sustainability of Off Grid Sanitation facilities. Areas where these facilities will be built people will be required to connect. DLGAs will be responsible for identification and facilitation of Land acquisition for construction of Off- Grid Sanitation facilities, and management of Public toilets.

**5.2.3 MoHCDGEC/MoW:**  
Policy and guidelines specific to FSM.

**5.2.4 DLGAS under Regional Secretariat:**

Roles and responsibilities of the DLGAs will include:

1. Creating awareness and mobilization of the community
2. Formulation of Municipal Facilitation Team comprised of specialists from Water, Health, Education, Community Development departments that will be tasked to assist consultants/Contractors/PO on implementation and operation of Off Grid Sanitation facilities
3. Coordination of the formation of Sanitation by-laws and regulations and thereafter enforcing them for sustainability of Off Grid Sanitation facilities through Legal unit, Health and Water Department
4. Identification and facilitation of land acquisition for construction of Off- Grid Sanitation facilities
5. Establish and capacitate the grievance redress mechanism (GRM) team
6. Monitor and evaluate project implementation, trouble shooting and responding to grievances raised by Grievance Redress Mechanisms (GRM) teams
7. Prepare and submit to WSS SC a monthly project implementation progress report

**5.2.5 WSS Steering Committee**

Given the multiplicity of institutions with varying roles, a WSS Steering Committee (SC) will be set up under the project to ensure coordination, synergy, and dovetailing. This SC will be newly set up or be adopted from some of the other projects (for example, Dar es Salaam Metropolitan Development Program [DMDP]) which may have similar steering mechanisms. This steering committee will be chaired by the Head of the Water Sector from RS and DAWASA will provide the secretary to WSS SC.

The RS will chair the Off Grid WSS Steering Committee, which will be comprised of representatives from the DAWASA, RS, WRBO, MOW, DLGAs i.e Temeke, Ilala, Kinondoni, Kigamboni and Ubungo. The Steering Committee will be responsible for providing general oversight of the selection and approval of sub-projects for implementation by the Off-Grid Water Supply and Sanitation. The key responsibilities of the Off Grid WSS Steering Committee include:

1. Reviewing overall Off Grid Sanitation implementation arrangements
2. Reviewing and approving Off Grid Sanitation sub-project operational guidelines
3. Reviewing and approving Off Grid Sanitation sub-project proposals

4. Reviewing overall Off Grid Sanitation progress and performance and providing guidance for improvements if needed
5. Conflict Resolution as per PIM.

#### **5.2.6 Private Operator (PO):**

The domestic private sector will be a major institution which will require to be involved for sanitation in low-income settlements. Their involvement will include approaches to empty faecal sludge from latrine pits and septic tanks. This could be through vacuum trucks, or in areas where access is difficult, small 'gulper' technologies.

Private Operator will form the basic unit for planning and eventually operating and managing the community-based sanitation schemes implemented under the off-grid sanitation. Off-grid sanitation POs, will be responsible for:

1. Possession of necessary registration as per requirements.
2. Undertaking training and development in operations and maintenance, financial management, monitoring and reporting.
3. Operating and maintaining the off-grid sanitation Scheme in a sustainable manner and providing equitable access to the service for everyone in the community
4. Maintaining adequate records and reporting on technical and financial performance to DLGAs and DAWASA.

#### **5.2.7 NGOs/ Consultant:**

NGO will be responsible for Capacity building, mobilization of community; media campaigns

DAWASA will contract with a reputable NGO active in the DAWASA service area as implementing agents for the off- grid Sanitation. The key roles of the off-grid sanitation NGO include:

1. Mobilising community groups to identify all sanitation needs and raising awareness within community groups about sanitation issues.
2. Assisting community members to obtain legal status if required and to set up the necessary bank accounts, for the community to qualify for funding from micro finance institution for toilet improvements.
3. Undertaking a needs analysis and preparing a subproject proposal design, budget, impact assessment, operational and maintenance of the sanitation facility
4. Preparing subproject proposals in association with the community members for consideration by the off-grid sanitation Steering Committee.
5. Sensitization and training of POs to operate, maintain, and manage off-grid sanitation systems.

6. Assisting DAWASA to develop suitable O&M guidelines/manuals and financial management guidelines for use by the POs in operating and managing the completed schemes.

### 5.3 SELECTION CRITERIA

DAWASA, in consultation with the five municipalities Ilala, Temeke, Kinondoni, Kigamboni and Ubungo will identify communities which are eligible for Off-Grid Sanitation sub-project under the WSSP II, in the eligible project area using the criteria mentioned in the PIM. The criteria will include the availability of land resources for the project activities as additional criteria.

Each of these criteria will be allocated a score, and the communities prioritized according to their total score. Keeping in mind the decisions of other interventions (for example, DMDP), WSSP-II will invest in those communities, which have the highest need.

The five municipalities will be the focal point for planning, prioritizing, and implementing the off-grid sanitation in their areas. A comprehensive master sanitation plan, based on empirical data and evidence, will form the basis for this planning and implementation.

The results of the ongoing efforts to map the city on the said indicators, will form the basis for the planning efforts by the stakeholders.

#### Summary of Institutional Roles for Sanitation Provision

MoH/MoW/PO-RALG	Policy and guidelines specific to FSM
MoW	Overall project coordination and implementation support
EWURA	Regulate performance of DAWASA
DAWASA	Facilitating the establishment and operation of treatment facilities (FSM and the like and facilitating the development of options for transportation and treatment of this waste, establishment and management of public toilets; regulating the services of transporters
Municipalities	Facilitating the upgrading of unimproved household toilets to improved ones and regulation of waste disposal; facilitating the availability of land for decentralized systems; provide licenses to private transport operators
Private sector	Development of infrastructure for transportation and treatment, operation
NGOs	Capacity building, mobilization of community; media campaigns

TBS	Setting up of standards for effluent disposal
NEMC	Regulation of disposal of effluent

**6.0 EFFECTIVENESS AND DURATION OF MoU**

- 6.1. This MoU will become effective on the date of signature by all parties.
- 6.2. This MoU shall remain in force until end Closure of the Second WSSP, or as shall be mutually agreed by the parties hereto.

**7.0 AMENDMENTS**

This MoU may be amended at any time with the written agreement of the parties hereto.

**8.0 CONFLICT RESOLUTION**

In the event of any differences arising with respect to the provisions of this MoU, the parties will endeavour to find a solution through dialogue and consultation.

**9.0 INFORMATION AND NOTICES**

- 9.1. The parties to this MoU will furnish to each other all such information in relation to the WSSP II as will be reasonably requested in a timely manner.
- 9.2. Any notices or documents given, made or sent by the parties in relation to this MoU will be in writing and will be deemed to have been duly given, made or sent to the organization or person to which it is addressed at the time of its delivery by hand, mail, or courier at its respective address, as listed in this MoU.
- 9.3. Any party hereto may, by written notice to the other parties, change the address to which any notice or request for the Participant so giving such notice will be addressed.
- 9.4. All communications and documents submitted to any party and by any part will be in the English language.
- 9.5. The following addresses are specified for purposes of Section 16.2.

**9.6 FOR THE PARTIES**

Permanent Secretary

Ministry of Water

Address

Tel:

E-mail:

Chief Executive Officer

DAWASA

Address

Tel:

E-mail:

Region Administrative Secretary

Dar es Salaam Region

**Address:**

**Tel:**

**E-mail:**

**Municipal Director**

Temeke Municipal Council

**Address:**

**Tel:**

**E-mail:**

**Municipal Director**

Ilala Municipal Council

**Address:**

**Tel:**

**E-mail:**

**Municipal Director**

Kinondoni Municipal Council

**Address:**

**Tel:**

**E-mail:**

**Municipal Director**

Ubungu Municipal Council

**Address:**

**Tel:**

**E-mail:**

**Municipal Director**



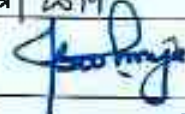

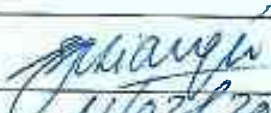


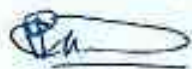
Kigamboni Municipal Council

**Address:**

**Tel:**

**E-mail:**

Signed by the duly authorized representatives of the parties as hereunder:

Permanent Secretary Ministry of Water	
	Date 18/2/2019
Regional Administrative Secretary Dar es Salaam	
	Date 12/2/2019
CEO DAWASA	
	Date 23.01.2019
Municipal Director Temeke	
	Date
Municipal Director Ilala	
	Date 11/02/2019
Municipal Director Ubungo	
	Date 07/02/2019
MD Kinondoni	
	Date 07/02/2019
Municipal Director Kigamboni	
	Date 09/02/2019

**Appendix VI: Approved source of construction materials**



## COARSE AGGREGATE:

### Project Specification: -

Coarse aggregate shall be clean, well-graded crushed granite stone or other equal and approved stone **from Msolwa or Lugoba quarry** and washed if required by the Structural Engineer. The pieces shall be angular or rounded in shape and shall have granular or crystalline or smooth (but not glassy) non-powdery surface. Flakey and laminated pieces, mica and shale shall only be present in such quantities as not to affect adversely the strength and durability of the concrete.

The four nominal aggregate sizes shall be 40mm (1½"); 20mm (¾"); 10mm (3/8"); 6mm (¼"); and the grading when analysed as described in BS. 812 shall be within the limits given in BS. 882. Structural Engineer will specify sizes of aggregates to be used in specific areas. For most work 20 mm maximum size aggregates will be used. The nominal maximum size of coarse aggregates should be not greater than ¼ of the minimum thickness of concrete section or element.

### Results:

#### **1. Relative and water absorption for aggregates**

- a. Relative density on an oven dry basis – 2.95
- b. Relative density on saturated surface dry basis – 2.97
- c. Apparent relative density – 2.99
- d. Water absorption – 0.4

(As per CML TEST 2.2, Ref BS 812: Part 2: 1975 which is in the specified limit)

#### **2. Aggregate Impact Value (AIV)**

- a. AIV (mean value) - 14

(As per CML TEST 2.8, ref BS 812: Part 112:1990 which is in the specified limit)

#### **3. Aggregate Crushing Value (ACV)**

- a. ACV (Mean value) - 23

(As per CML TEST 2.8, ref BS 812: Part 112:1990 which is in the specified limit)



**DAR ES SALAAM INSTITUTE OF TECHNOLOGY**  
**DEPARTMENT OF CIVIL ENGINEERING**  
**GEOTECHNICAL & HIGHWAY MATERIALS TESTING LABORATORY**  
**WORKING SHEET**

**RELATIVE DENSITY AND WATER ABSORPTION FOR AGGREGATES**

CONTRACTOR:	HELPDESK ENGINEERING CO.LTD	Date:	18.05.2022		
PROJECT:	SECOND WATER SECTOR SUPPORT PROJECT CONSTRUCTION OF PUBLIC TOILET IN DAR ES SALAAM				
SOURCE OF MATERIAL:LUGOBA					
TEST METHOD	CML TEST 2.2, ref. BS 812: Part 2: 1975				
Specimen reference		A	B	Mean	
Mass of saturated surface-dry aggregate in air	A	B	382.60	446.90	
Mass of vessel + sample filled with water	B	B	938.50	981.40	
Mass of vessel filled with water only	C	B	703.70	668.20	
Mass of oven-dry aggregate in air	D	B	381.30	444.70	
Relative density on an oven-dry basis	$\rho_s = \frac{D}{A - (B - C)}$	t/m <sup>3</sup>	2.58	3.33	2.95
Relative density on saturated surface-dry basis	$\rho_{ss} = \frac{A}{A - (B - C)}$	t/m <sup>3</sup>	2.59	3.34	2.97
Apparent relative density	$\rho_a = \frac{D}{D - (B - C)}$	t/m <sup>3</sup>	2.60	3.38	2.99
Water absorption	$W_a = \left( \frac{A - D}{D} \right) 100$	%	0.34	0.49	0.4

Sample Brought By:

CONTRACTOR:

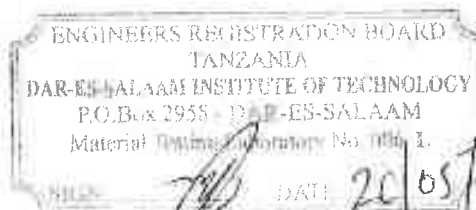
Tested by:

CHARLES JAMES

Certified by:

C.Eng.JULIUS Z.CHACHA

Head of Geotechnics and Transportation Engineering.



DATE 20/05/2022



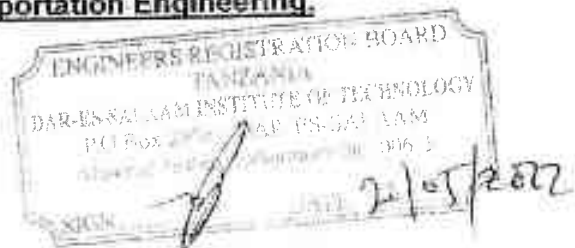
DAR ES SALAAM INSTITUTE OF TECHNOLOGY  
**DEPARTMENT OF CIVIL ENGINEERING**  
 GEOTECHNICAL & HIGHWAY MATERIALS TESTING LABORATORY  
**WORKING SHEET - HARD CORE**  
**AGGREGATE IMPACT VALUE (AIV)**

CONTRACTOR:	HELPDESK ENGINEERING CO.LTD			Date:	18.05.2022
PROJECT:	SECOND WATER SECTOR SUPPORT PROJECT CONSTRUCTION OF PUBLIC TOILET IN DAR ES SALAAM				
TEST METHOD	CML TEST 2.8, ref. BS 812: Part 112: 1990				
TEST CONDITION	DRY		WET		
14 - 10 mm	2.36 mm	STANDARD	SOURCE OF MATERIAL:LUGOBA		
TEST METHOD	CML TEST 2.2, ref. BS 812: Part 2: 1975				
Specimen reference			1	2	
Number of blows (normally 15 blows)		n	15	15	
Mass of tray + specimen (g)			581.8	526.7	
Mass of tray alone (g)			0	0	
Mass of original test specimen (g)		$M_1$	581.8	526.7	
Mass of tray + material passing separating sieve (g)			78.2	78.5	
Mass of tray alone (g)			0	0	
Mass of material passing separating sieve (g)		$M_2$	78.2	78.5	
Mass of tray + material retained on separating sieve(g)			502.4	447.6	
Mass of tray alone (g)			0	0	
Mass of material retained on separating sieve (g)		$M_3$	502.4	447.6	
Mass of passing and retained on separating sieve - Check versus $M_1$		$M_2 + M_3$	580.6	526.1	
Aggregate Impact Value (in %) - DRY		$(M_2/M_1) \times 100$	13.4	14.9	
Aggregate Impact Value (in %) - SOAKED		$(M_2/M_1) \times (15/n) \times 100$			
AIV = Mean value				14	
AIV = Median value				14	

Sample Brought By CONTRACTOR:

Tested by: **CHARLES JAMES**

Certified by: **C.Eng. JULIUS Z. CHACHA**  
 Head of Geotechnics and Transportation Engineering.





**DAR ES SALAAM INSTITUTE OF TECHNOLOGY**  
**DEPARTMENT OF CIVIL ENGINEERING**  
**GEOTECHNICAL & HIGHWAY MATERIALS TESTING LABORATORY**  
**WORKING SHEET - HARD CORE**  
**AGGREGATE CRUSHING VALUE (ACV)**

<b>CONTRACTOR:</b>	<b>HELPDESK ENGINEERING CO.LTD</b>		<b>Date:</b>	<b>18.05.2022</b>
<b>PROJECT:</b>	<b>SECOND WATER SECTOR SUPPORT PROJECT CONSTRUCTION OF PUBLIC TOILET IN DAR ES SALAAM</b>			
<b>TEST METHOD</b>	<b>CML TEST 2.8, ref. BS 812: Part 112: 1990</b>			
<b>TEST CONDITION</b>	<b>DRY</b>	<b>WET</b>		
Fraction tested	Separating sieve	<b>SOURCE OF MATERIAL: LUGOBA</b>		
14 - 10 mm	2.36 mm	<b>STANDARD</b>		
<b>TEST METHOD</b>	<b>CML TEST 2.2, ref. BS 812: Part 2: 1975</b>			
Specimen reference		<b>1</b>	<b>2</b>	
<b>LOADING LIMITS (400KN)</b>	<b>ACV</b>			
Mass of tray + specimen (g)		2574.5	2575.1	
Mass of tray alone (g)		0	0	
Mass of original test specimen (g)	<b>M<sub>1</sub></b>	2574.5	2575.1	
Mass of tray + material passing separating sieve (g)		584.9	585.1	
Mass of tray alone (g)		0	0	
Mass of material passing separating sieve (g)	<b>M<sub>2</sub></b>	584.9	585.1	
Mass of tray + material retained on separating sieve (g)		1988.3	1989.1	
Mass of tray alone (g)		0	0	
Mass of material retained on separating sieve (g)	<b>M<sub>3</sub></b>	1988.3	1989.1	
Mass of passing and retained on separating sieve - Check versus M <sub>1</sub>	<b>M<sub>2</sub> + M<sub>3</sub></b>	2573.2	2574.2	
<b>Aggregate Crushing Value (in %) - DRY</b>	<b>(M<sub>2</sub>/M<sub>1</sub>)100</b>	22.7	22.7	
<b>Aggregate Crushing Value (in %) - SOAKED</b>	<b>(M<sub>2</sub>/M<sub>1</sub>)x(15/n)100</b>			
ACV = Mean value			<b>23</b>	
ACV = Median value			<b>23</b>	

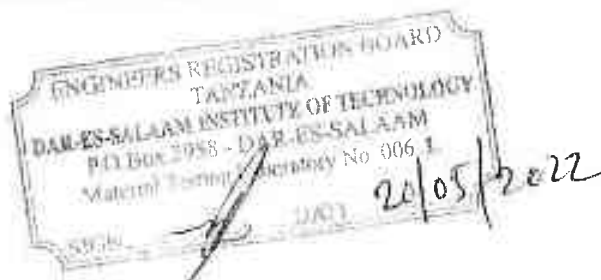
Sample Brought By **CONTRACTOR:**

*[Signature]*

**Tested by: CHARLES JAMES**

*[Signature]*

**Certified by: C.Eng. JULIUS Z. CHACHA**  
**Head of Geotechnics and Transportation Engineering.**



**FINE AGGREGATES: -**

**Project Specification: -**

The Contractor shall ensure that the grading of fine aggregate shall be such that not more than 10% by weight shall exceed 5mm in size and not more than 10% by weight shall pass a sieve BS. No. 100. Between these limits the grading shall conform to the grading for either zone 1, 2 or 3 (BS.882).

**Results:**

**1. Grading Fine aggregates:**

a. Grading Limits - 2.3

(As per Specific Limit 2.0 – 3.5, Hence it is passed)



Dar es Salaam Institute of Technology.  
Civil & Building Engineering  
Department. Materials Testing Laboratory.

**GRADING - FINE AGGREGATES**

FORM NO. AGG-SAND-0001

CONTRACTOR:	HELPDESK ENGINEERING CO.LTD	SOURCE:KISARAWA
PROJECT:	SECOND WATER SECTOR SUPPORT PROJECT CONSTRUCTION OF PUBLIC TOILET IN DAR ES SALAAM	
MATERIAL FOR	SIE: N/SAND	
TESTED BY	YONAS MMUYA	

Sample no.	1			2			Average Grading % Passing
	Wt. of Sample	320 g		Wt. Retained	320 g		
Sieve (mm)	Wt. Retained	% Retained	% Passing	Wt. Retained	% Retained	% Passing	
20.0							
14.0							
10.0	0	0.0	100.0	0.0	0.0	100.0	100
5	0	0.1	99.9	0.8	0.3	99.7	100
2.36	4	1.3	98.7	4.0	1.3	98.7	99
1.18	28	8.7	91.3	28.0	8.8	91.2	91
0.600	116	36.4	63.6	121.5	38.0	62.0	63
0.300	272	85.0	15.0	285.0	89.2	10.8	13
0.150	314	98.2	1.8	317.0	99.2	0.8	1
0.075	319	99.7	0.3	319.1	99.9	0.1	0
<b>FINENESS MODULUS</b>	<b>2.3</b>						

**FLAKINESS INDEX**

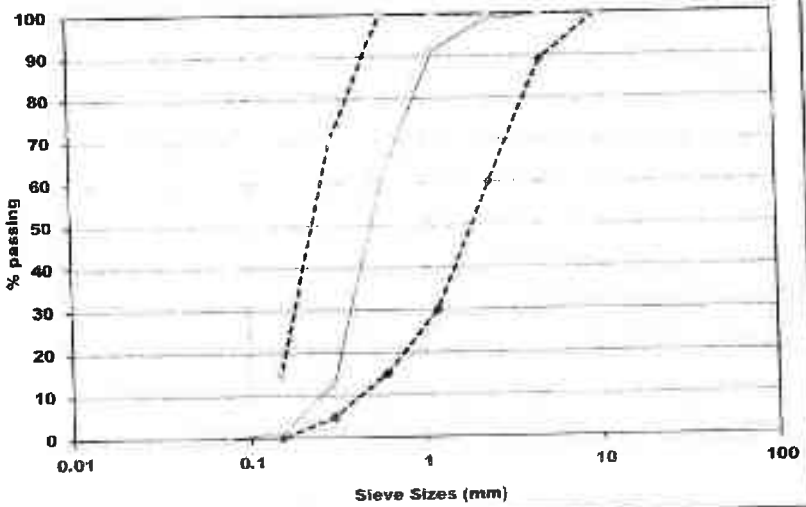
Sieve sizes (mm)	Total wt (g)	Wt. Retain (g)	Wt. Pass (g)
A 28-20			
B 20-14			
C 14-10			
D 10-6.3			

$FI = \frac{A + (2B + C + D) \times 100}{100}$

**ELONGATION INDEX**

Sieve sizes (mm)	Total wt. (g)	Wt. Retain (g)	Wt. Pass (g)
B 20-14			
D 10-6.3			

$EI = \frac{Wt. Retain (A+B+C+D) \times 100}{Total\ wt. (W+B+C+D)}$



**GRADING LIMITS**

Sieve sizes (mm)	% Passing
10.0	100
5.0	88
2.36	80
1.18	32
0.600	15
0.300	5
0.150	0

FM 2.3

SPEC LIMIT 2.0-3.5

ENGINEERS REGISTRATION BOARD  
TANZANIA  
DAR ES SALAAM INSTITUTE OF TECHNOLOGY  
DAR ES SALAAM  
20/6/2022

## Annex I: Generic Environmental Management for Construction Activities

### ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION ACTIVITIES

Proper environmental management of construction projects can be achieved only with adequate site selection and project design. As such, the Environmental and Social Assessment (ESA) for subprojects involving any new construction, or any rehabilitation or reconstruction for existing projects, should provide information as to screening criteria for site selection and design including the following:

#### 1.1 SITE SELECTION

Sites should be chosen based on community needs for additional projects, with specific lots chosen based on geographic and topographic characteristics. The site selection process involves site visits and studies to analyze: (i) the site's urban, suburban, or rural characteristics; (ii) national, state, or municipal regulations affecting the proposed lot; (iii) accessibility and distance from inhabited areas; (iv) land ownership, including verification of the absence of squatters and/or other potential legal problems with the land acquisition; (v) determination of site vulnerability to natural hazards, (i.e. intensity and frequency of floods, earthquakes, landslides, hurricanes, volcanic eruptions); (vi) suitability of soils and subsoils for construction; (vii) site contamination by lead or other pollutants; (viii) flora and fauna characteristics; (ix) presence or absence of natural habitats and/or ecologically important habitats on-site or in the vicinity (e.g. forests, wetlands, coral reefs, rare or endangered species); and (ix) historic and community characteristics.

#### 1.2 PROJECT DESIGN

Project design criteria include, but are not limited to, the consideration of aspects such as heating, ventilation, natural and artificial light energy efficiency, floor space (ft<sup>2</sup>) per bed/ward, requirements for x-ray rooms, adequacy of corridors for wheelchair/bed access, adequate water supply and sanitation systems, historical and cultural considerations, security and handicapped access.

#### 1.3 CONSTRUCTION ACTIVITIES AND ENVIRONMENTAL RULES FOR CONTRACTORS

The following information is intended solely as broad guidance to be used in conjunction with local and national regulations. Based on this information, environmental rules for contractors should be developed

for each project, taking into account the project size, site characteristics, and location (rural vs. urban).

After choosing an appropriate site and design, construction activities can proceed. As these construction activities could cause significant impacts on and nuisances to surrounding areas, careful planning of construction activities is critical. Therefore the following rules (including specific prohibitions and construction management measures) should be incorporated into all relevant bidding documents, contracts, and work orders.

### **1.3.1 Prohibitions**

The following activities are prohibited on or near the project site:

- Cutting of trees for any reason outside the approved construction area;
- Hunting, fishing, wildlife capture, or plant collection;
- Use of unapproved toxic materials, including lead-based paints, asbestos, etc.
- Disturbance to anything with architectural or historical value;
- Building of fires;
- Use of firearms (except authorized security guards);
- Use of alcohol by workers.

### **1.3.2 Construction Management Measures**

Waste Management and Erosion:

Solid, sanitation, and, hazardous wastes must be properly controlled, through the implementation of the following measures:

Waste Management:

- Minimize the production of waste that must be treated or eliminated.
- Identify and classify the type of waste generated. If hazardous wastes (including health care wastes) are generated, proper procedures must be taken regarding their storage, collection, transportation, and disposal.
- Identify and demarcate disposal areas indicating the specific materials that can be deposited in each.
- Control placement of all construction waste (including earth cuts) to approved disposal sites (>300 m from rivers, streams, lakes, or wetlands). Disposal of in authorized areas all of garbage, metals, used oils, and excess material

generated during construction, incorporating recycling systems and the separation of materials.

**Maintenance:**

- Identify and demarcate equipment maintenance areas (>15m from rivers, streams, lakes, or wetlands).
- Ensure that all equipment maintenance activities, including oil changes, are conducted within demarcated maintenance areas; never dispose of spent oils on the ground, in watercourses, drainage canals, or in sewer systems.
- Identify, demarcate and enforce the use of within-site access routes to limit the impact to site vegetation.
- Install and maintain an adequate drainage system to prevent erosion on the site during and after construction.

**Erosion Control**

- Erect erosion control barriers around the perimeter of cuts, disposal pits, and roadways.
- Spray water on dirt roads, cuts, fill material and stockpiled soil to reduce wind-induced erosion, as needed.
- Maintain vehicle speeds at or below 10mph within the work area at all times.

**Stockpiles and Borrow Pits**

- Identify and demarcate locations for stockpiles and borrow pits, ensuring that they are 15 meters away from critical areas such as steep slopes, erosion-prone soils, and areas that drain directly into sensitive water bodies.
- Limit extraction of material to approved and demarcated borrow pits.

**Site Cleanup**

- Establish and enforce daily site clean-up procedures, including maintenance of adequate disposal facilities for construction debris.

**1.3.3 Safety During Construction**

The Contractor's responsibilities include the protection of every person and nearby property from construction accidents. The Contractor shall be responsible for complying with all national and local safety requirements and any other measures necessary to avoid accidents, including the following:

- Carefully and mark pedestrian-safe access routes. ○ If school children are in the vicinity, include traffic safety personnel to direct traffic during school hours.
- Maintain a supply of supplies for traffic signs (including paint, easel, sign material, etc.), road marking, and guard rails to maintain pedestrian safety during construction.
- Conduct safety training for construction workers before beginning work.
- Provide personal protective equipment and clothing (goggles, gloves, respirators, dust masks, hard hats, steel-toed and –shanked boots, etc.,) for construction workers and enforce their use.
- Post Material Safety Data Sheets for each chemical present on the worksite.
- Require that all workers read, or are read, all Material Safety Data Sheets. Clearly explain the risks to them and their partners, especially when pregnant or planning to start a family. Encourage workers to share the information with their physicians, when relevant.
- Ensure that the removal of asbestos-containing materials or other toxic substances is performed and disposed of by specially trained workers.
- During heavy rains or emergencies of any kind, suspend all work.
- Brace electrical and mechanical equipment to withstand seismic events during the construction.

**1.3.4** Nuisance and dust control

To control nuisance and dust the Contractor should:

- Maintain all construction-related traffic at or below 15 mph on streets within 200 m of the site.
- Maintain all on-site vehicle speeds at or below 10 mph.
- To the extent possible, maintain noise levels associated with all machinery and equipment at or below 90 dB.
- Insensitive areas (including residential neighborhoods, hospitals, rest homes, etc.) more strict measures may need to be implemented to prevent undesirable noise levels.
- Minimize production of dust and particulate materials at all times, to avoid impacts on surrounding families and businesses, and especially to vulnerable people (children, elders).
- Phase removal of vegetation to prevent large areas from becoming exposed to wind.

- Place dust screens around construction areas, paying particular attention to areas close to housing, commercial areas, and recreational areas.
- Spray water as needed on dirt roads, cut areas, and soil stockpiles or fill material.
- Apply proper measures to minimize disruptions from vibration or noise coming from construction activities.

**1.3.5 Community Relations**

To enhance adequate community relations the Contractor should:

- Following the country and EA requirements, inform the population about construction and work schedules, interruption of services, traffic detour routes, and provisional bus routes, as appropriate.
- Limit construction activities at night. When necessary ensure that night work is carefully scheduled and the community is properly informed so they can take necessary measures.
- At least five days in advance of any service interruption (including water, electricity, telephone, bus routes) the community must be advised through postings at the project site, at bus stops, and in affected homes/businesses.

**3.1.6 Chance Find Procedures for Culturally Significant Artifacts**

The Contractor is responsible for familiarizing themselves with the following “Chance Finds Procedures”, in case culturally valuable materials are uncovered during excavation, including:

- Stop work immediately following the discovery of any materials with possible archeological, historical, paleontological, or other cultural value, announce findings to project manager, and notify relevant authorities;
- Protect artifacts as well as possible using plastic covers, and implement measures to stabilize the area, if necessary, to properly protect artifacts
- Prevent and penalize any unauthorized access to the artifacts o Restart construction works only upon the authorization of the relevant authorities.

**1.4**

**ENVIRONMENTAL  
CONSTRUCTION**

**SUPERVISION**

**DURING**

The bidding documents should indicate how compliance with environmental rules and design specifications would be supervised, along with the penalties for non-compliance by contractors or workers. Construction supervision requires oversight of compliance with the manual and environmental specifications by the contractor or his designated environmental supervisor. Contractors are also required to comply with national and municipal regulations governing the environment, public health, and safety.