THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF WATER

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Comprehensive Project Brief for the Proposed Fecal Sludge Treatment Plant to be constructed at DAWASA Yard Mtoni area, Mbuyuni Mtaa, Azimio Ward, Temeke District, Dar es Salaam Region

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS

AAQ	Ambient Air Quality
AIDS	Acquired Immuno-Deficiency Syndrome
DAWASA	Dar Es Salaam Water and Sanitation Authority
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Monitoring Plan
FSTP	Faecal Sludge Treatment Plant
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
SSS	Simplified Sewerage System
STDS	Sexual Transmitted Diseases
TANESCO	Tanzania National Electric Supply Company
WSP	Wastewater Stabilization Ponds

THE STUDY TEAM

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EXECUTIVE SUMMARY

Comprehensive Project Brief for the Proposed Fecal Sludge Treatment Plant to be constructed at DAWASA Yard Mtoni area, Mbuyuni Mtaa, Azimio 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 (National Census 2022)*. 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 in divided into several subprojects which will be implemented in the five municipalities of Dar es Salaam City. One of these is the Construction of Faecal sludge treatment plant at Mtoni area in Mbuyuni ward, Temeke District.

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 Temeke District”, 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 Temeke District is being submitted to NEMC together with EIA Registration Forms for EIA Certificate decision.

PROJECT DESCRIPTION

The proposed project site is covered with ground vegetation. There are short grasses around the site area. The project site is located adjacent to the railway, DAWASA canteen, lagoons, also there are trees of various species ranging from; *Mitomondo*, Neem Plant, Mango Trees and *Misonobari*.

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 DAWASAs Registration (Amendment) Act, 2008
- The Architects and Quantity Surveyors Act (1997)
- The 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 Temeke District and community at Mtoni area 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 DAWASA is finalized. These equipments 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 50m^3 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 durig 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 38,000,000.00. The estimated annual costs for carrying out the proposed environmental and social motoring program amounts to TSH 28,000,000.00.

DECOMMISSIONING PLAN

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

CONCLUSION

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

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

It is, therefore, concluded that implementation of the proposed construction of the Faecal sludge treatment plant at Mtoni area 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 DAWASA Yard Mtoni area, Mbuyuni Mtaa, Azimio Ward, Temeke District

1.0 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. According to the Tanzania National Census of August 2022, the City of Dar es Salaam has a population of 5,383,728 (sense.nbs.go.tz, accessed December 24, 2022)

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 in divided into several subprojects which will be implemented in the five municipalities of Dar es Salaam City. One of these

is the Construction of Faecal sludge treatment plant at Mtoni area in Mbuyuni Mtaa, Azimio ward, Temeke District.

The ESIA study was conducted in accordance with Regulation 6(1) of Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations, 2018. Cancel the subsequent phrase ending with 2005. 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. 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 Temeke District”, 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 Reg.6 (1). 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 Temeke District is being submitted to NEMC together with EIA Registration Forms for EIA Certificate decision.

1.1 NATURE OF THE PROJECT

The proposed project concerns construction of one engineered faecal sludge treatment facility for public use at Mtoni area, Mbuyuni ward, Temeke District on the available land area of 7,490 square meters. The nature of the project enhances environmental protection through proper handling and disposal of domestic sewage. According to First Schedule of the EIA and Audit Regulations (Amended) of 2018, the nature of the project is small and entails no significant impacts. The project can be categorised as Type B2, which according to the regulations are “small-scale activities and enterprises that require registration but shall not require Environmental Impact Assessment. Further, the projects shall not require screening and scoping, rather, the Project Brief shall be examined and issued with an Environmental Impact Assessment Certificate”.

2.0 PROJECT DESCRIPTION

2.1 Project Location

The project site is located at Mbuyuni Mtaa, Azimio 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 about 12 Kilometers from City Center via Kilwa road. (Refer Figure 1, and Figure 2).

Table 1: The coordinates of the project area

S/No.	Coordinates	
	Easting	Northing
1.	529419	9239640

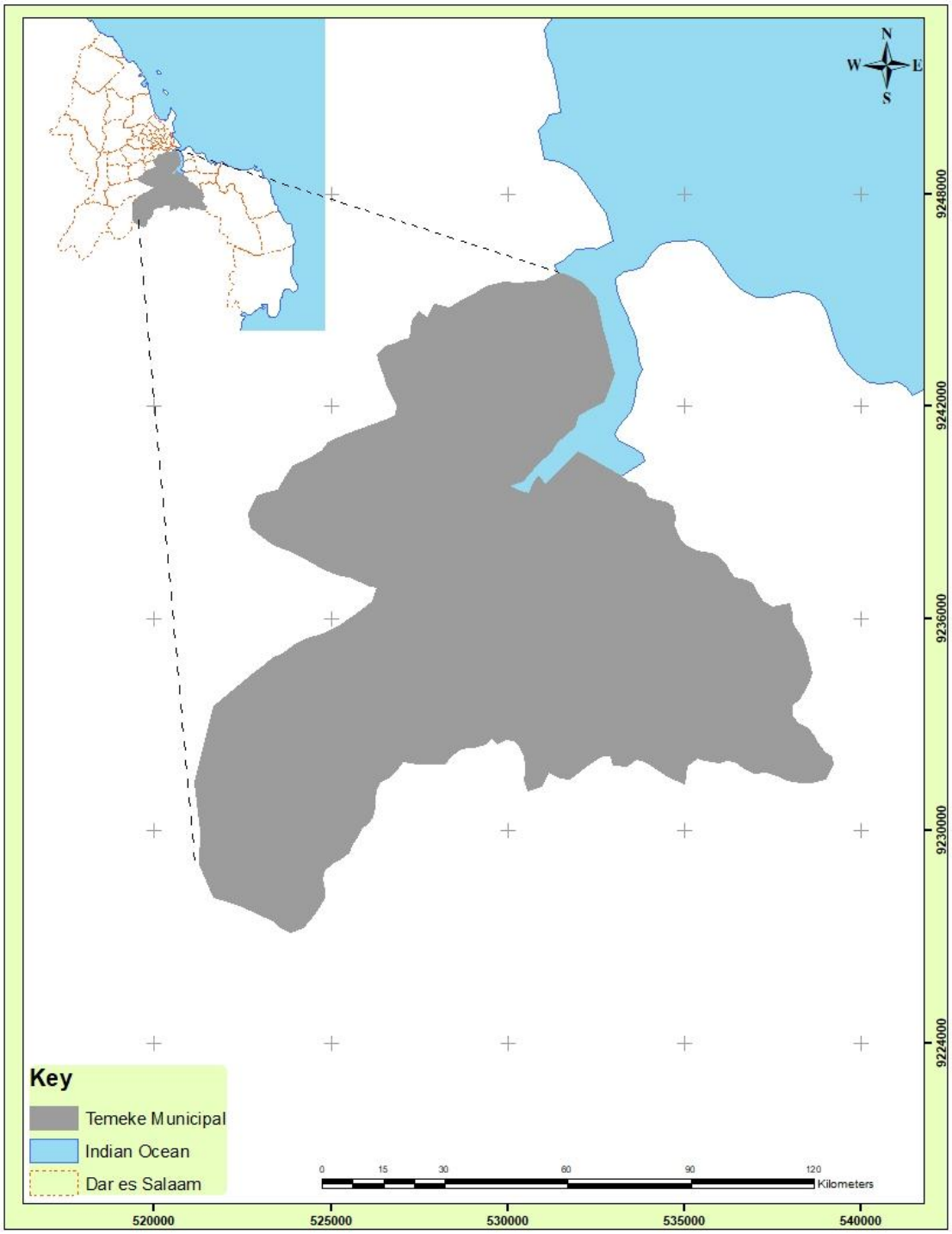

Figure 1: A Map of Dar es salaam region showing the project District

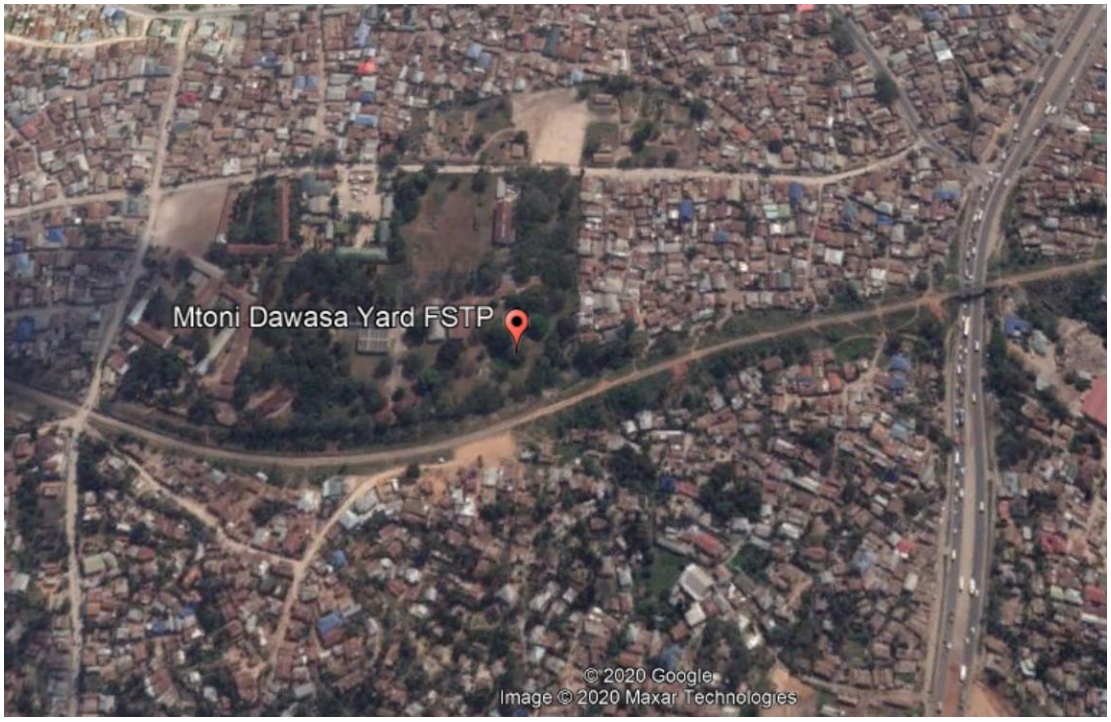

Figure 2: An Extract Google view to show the Location of the project area

3.2 Accessibility

The project area is accessible via Bibi Titi Mohammed road, then Gerezani st and Bandari road and finally Kilwa road, 12Kilometers from City Centre. Finally, from Kilwa road the project site is about 1 Kilometer away via rough road.

3.3 Specific Features

The proposed project site is covered with ground vegetation. There are short grasses around the site area (Figure 3). The project site is located adjacent to the railway, DAWASA canteen, lagoons, also there are trees of various species ranging from; Mitomondo, Neem Plant, Mango Trees and Misonobari.

Figure 3: Some of the natural vegetation species at site and lagoons (Source: Fieldwork 5th April 2022)

3.4 Adjacent Land Use

The project site is surrounded by several facilities within close proximity. Staff residences (approx. 60 meters) require noise and dust control measures to minimize disruptions. The DAWASA Water Treatment Plant (approx. 20 meters) offers potential infrastructure advantages but needs coordination to avoid service disruptions. The railway (approx. 30 meters) brings logistical benefits but necessitates safety and noise management. Nearby residential buildings (approx. 20 meters) call for measures to uphold quality of life and address community concerns proactively., figure 4.

Figure 4: Tree Nursery at the project site and residential buildings (Source: Fieldwork 5th April 2022)

2.4.1 Land Ownership

The proposed Faecal Sludge Treatment Plant at Mtoni area, project site is sorely owned by National Urban Water Authority (NUWA) Established under the Urban Water Supply Act No 7 of 1981 the then became Dar es Salaam Water Supply and Sanitation Authority, DAWASA. In 1997, the government reorganized the National Urban Water Authority (NUWA) to form DAWASA by merging NUWA's functions with the sewerage responsibilities of the Sewerage and Sanitation Department of the City Commission. The Land ownership document in this regard is appended in appendix II of this document.

2.5 PROJECT ACTIVITIES

2.5.1 Mobilization or pre-construction phase

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

Other activities during this phase include;

- Topographical Survey for setting out purposes,
- 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,
- Masonry work
- Finishing works
- Painting works

Duration 1-2 months

2.5.2 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.

Duration 18 months

2.5.3 Demobilization phase

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

Estimate duration 1 month

Other activities include;

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

2.5.4 Operation phase

The phase entails the actual usage of the Feacal sludge 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 Faecal Sludge Treatment Facility.

2.5.5 Decommissioning Phase

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

2.6 PROJECT DESIGN

2.6.1 Design criteria

The proposed public design was obtained partly using criteria stipulated in the Tanzania national documents, specifically, the National Guideline for Water, Sanitation and Hygiene for Tanzania Schools prepared by the Ministry of Education, Science and Technology (2016); and the Design, Construction Supervision, Operation and Maintenance (DCOM) Manual Volume II, Design of Sanitation Projects, Fourth Edition, prepared by the Ministry of Water (2020). The plant structures are ground surface structures hence it is accessible.

The proposed technology and construction design follow the objective to execute an engineering design of fecal sludge management facility (one in number at the stated site) which will be simple, 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

- Context of the location of the treatment sites (existing infrastructures)
- Local operation and maintenance management capacity
- Revenue generation through by-products

2.6.2 Technology description

2.6.2.1 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.

2.6.2.2 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.

2.6.2.3 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. Therefore, the project will produce biogas which will be harvested and used by the nearby facilities ie the nearby residents, but the number of users depends on the volume produced from the nature of the wastewater received in the facility.

2.6.2.4 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.

2.6.2.5 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 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.

2.6.2.6 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.

2.7 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^2 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.

2.8 Proposed Processing steps

The treatment process of the proposed facility follows the cross-section flow diagram in figure 5 from the influents to the effluent.

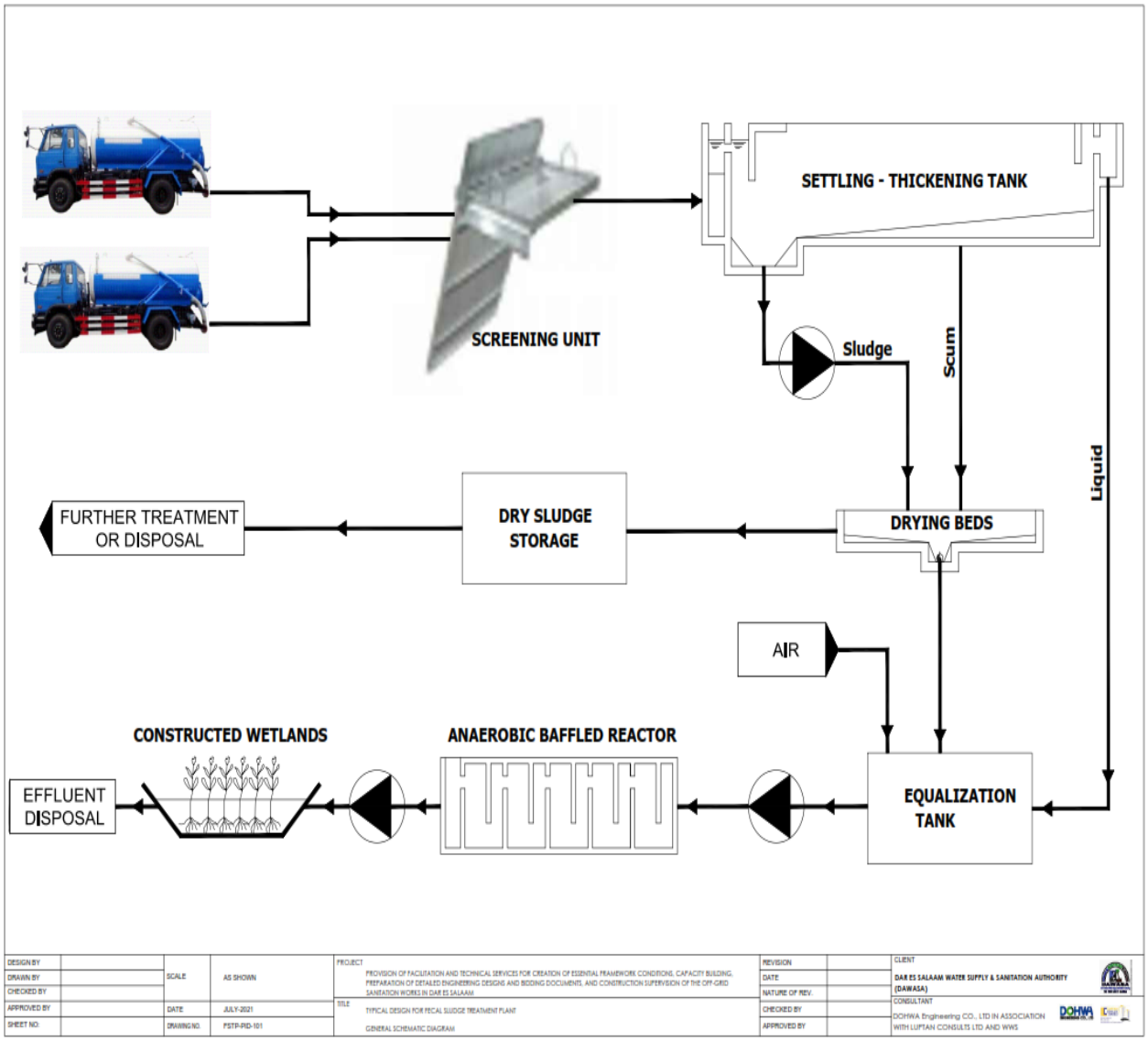

Figure 5: The Fecal Sludge Treatment Facility cross-section diagram

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 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 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 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 (2018)

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 Mtoni area 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 consider 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 DAWASA.

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 DAWASAs Registration (Amendment) Act, 2008

The DAWASAs Registration Act requires DAWASAs to be registered by the DAWASAs Board (CRB) before engaging in practice. It requires foreign DAWASAs to be registered by the Board before gaining contracts in Tanzania. Project Developer shall comply with the law requirement during the recruitment of DAWASAs 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 DAWASAs to be registered by the Board before gaining contracts in Tanzania. Project Developer has complied with the law requirement during the recruitment of architects who have designed the project and will continue to utilize registered persons in the project implementation.

3.2.15 The Urban Planning Act (2007)

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

include the city, municipal, town and township councils in the country which have responsibilities including:

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

3.2.16 Public Health Act (2009)

Provide for the promotion, preservation, maintenance of public health with a view to ensuring the provisions of comprehensive, functional and sustainable public health services to the general public. Part III (e) of the act requires premises owners to keep their premises free of mosquitoes and other disease vectors, vermin or causative agents; Section 54 prohibits causing or suffering from nuisance likely to be injurious or dangerous to health, land, premises, air or water; Part IV (c) assigns responsibility to City council to remove or appoint an agent to collect, transport and dispose solid and liquid waste and charge fees to beneficiaries of this service and responsibilities for prescribing types of wastes and guidelines for their collection and disposal; Section 101 it gives rights to any private sewer to connect it to any available public sewer to discharge foul or storm water therefore the project may connect to and discharge sewage or storm water into the available trunk main. However, the quality of the sewage should be as per agreed with the water authority.

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

3.2.17 World Bank guidelines for Environmental Management

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

4.0 BASELINE INFORMATION

4.0 BASELINE INFORMATION

4.1 INTRODUCTION

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

Temeke District Council is one of the Six (6) Councils in Dar-Es Salaam Region. Other Councils are Dar-Es Salaam City, Ilala Municipal, Temeke District, Kinondoni Municipal and Kigamboni Municipal. The Temeke Municipal Council was officially established through the Government Notes number 512 of year 2015 by the President's Office, Regional Administration and Local Government as an autonomous body. Temeke District Council came into existence due the large operating area and rapid increase of population at Kinondoni Municipal Council which in turn affected the council to provide quality services to its citizen. Hence the establishment of the new Council will improve service provision and reach community demands easily.

4.2 PHYSICAL CHARACTERISTICS

4.2.1 Climate

The project area as compared to many other areas in Dar es Salaam city is influenced by coastal climatic conditions. The area experiences a modified type of equatorial climate. The Municipal Council has humid temperatures that vary from 29^0C in August to 31^0C in December and January each year. The long rain season (March – May), receives an average monthly rainfall of 150mm – 300mm. The short rain season is between October and December with monthly average rainfall ranging from 75mm – 100mm.

- **Temperature, Sun hours and Radiation**

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

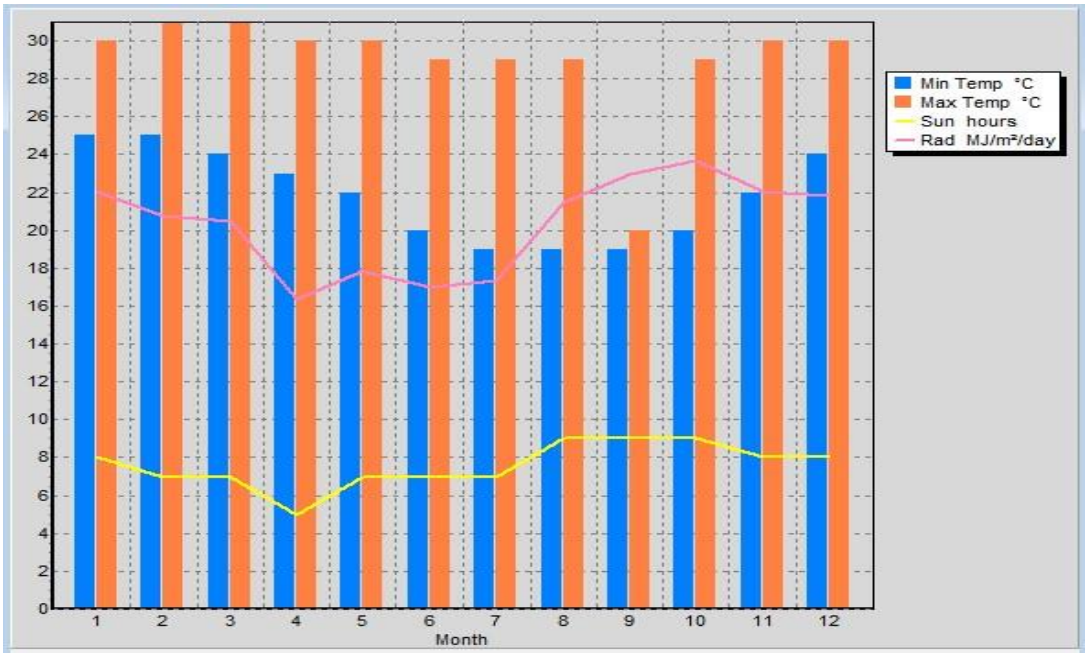

Figure 4.1: Annual temperature, sun hours and radiation of the site

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

- **Wind Speed**

The region experiences the average wind speed of 5.74 m/s. The maximum wind speed is 7.63 m/s experienced in June which blows from the South South East (SSE) direction which means if the project site will produce and air

pollutant all activities downstream of SSE direction will be prone to that pollution. The wind is calm around December to March. The climate is also influenced by the south-westerly monsoon winds from April to October and north-westerly monsoon winds between November and March.

- **Rainfall**

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

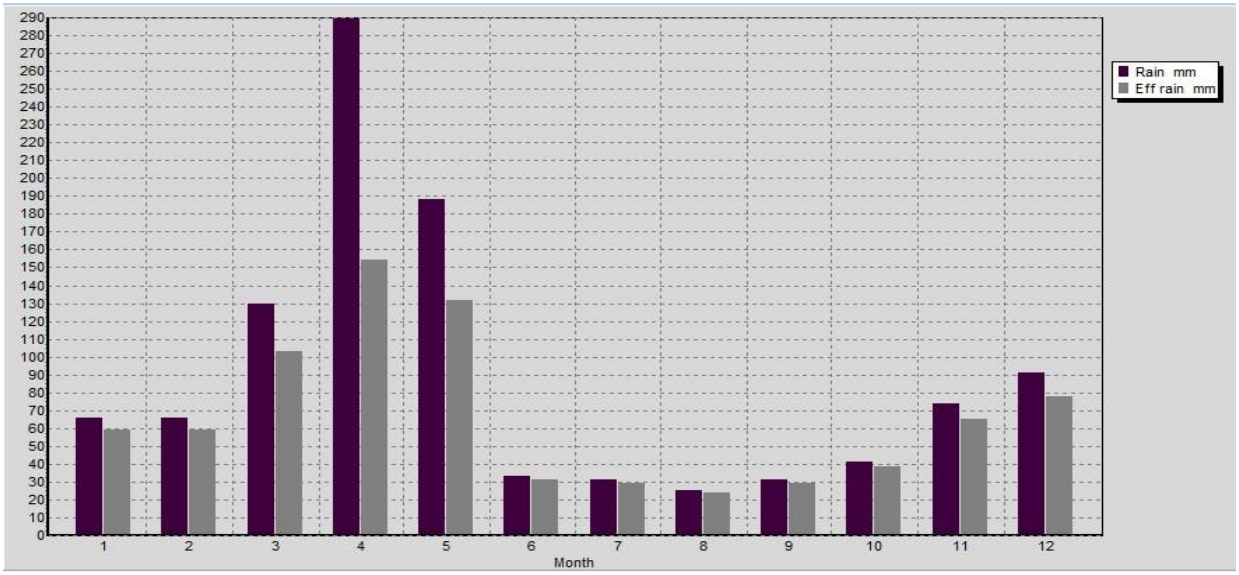

Figure 4.2: Average annual rainfall data for the site (Source Socio-Economic profile 2019)

4.2.2 Groundwater sources

Groundwater is abundant in almost the entire Dar es salaam City. This is because of the sea level rise. The major direct impacts of sea-level rise include inundation of low-lying areas, loss of coastal wetlands, increased rates of shoreline erosion, saltwater intrusion and increased salinity in estuaries and coastal aquifers, and higher water tables and higher extreme water levels leading to coastal flooding (Nicholls et al., 2007; Bicknell et al., 2009).

4.2.3 Topography

The landscape of the project site is highly manipulated to make the topography flat and suitable for storage activities. The highest contour elevation at the

project site is 96.5m Above Mean Sea Level (AMSL) on the western side while the lowest contour elevation is94m AMSL at eastern part of the project site, that means the rainfall runoff at the project site are directed towards southern eastern side.

4.2.4 Air Quality and Noise Level

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

4.2.5 Noise and Vibration

The noise and vibration levels at the project site are rated negligible as the only source of noise at the project site are motor vehicles using the street feeder road adjacent to the project area. During construction phase the constructor shall abide to national standards of 75dBA for an average noise level and 5mm/s PPV for ground vibration at all times.

4.4.8 Water Table and water quality analysis

Groundwater is abundant in almost the entire Dar es salaam City. While there is no permanent surface water sources in the vicinity of the proposed site for FSTP, groundwater resources is of concern. Groundwater is abundant in almost the entire city of Dar es Salaam. Data for Water quality from the project site were as presented in figure 4-1 and 4-1. However, the engineering design of the facility has taken on board all factors to ensure no contamination of groundwater is likely to occur.

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Client: WWS
Date: 20 July 2021
Source: Wastewater (DSM)

S/N	Parameters	Unit	KJDM-02	TMK DM-02	IUST 02	UBDM 02	KNIST-02	ILDM-02	KGIST-02	TMIST-02
1	pH		7.95	8.17	7.74	8.59	7.62	7.35	7.53	7.92
2	Temperature	^{0}C	24.4	24.8	24.10	24.20	25.30	23.90	24.6	24.30
3	Electric conductivity	µS/cm	2024	1312	1854	3335	1682	5250	1196	5786
4	Total Dissolved solids	mg/l	1023	658	917	1668	841	2496	598	2872
5	Total solids	mg/l	1114	5148	1190	2470	6252	13162	1104	3386
6	Volatile solids	mg/l	432	319	302	530	3280	7120	384	1298
7	Nitrate –Nitrogen	mg/l	11.50	7.50	6.25	70.0	46.25	24.50	3.50	2.50
8	Ammonia-Nitrogen	mg/l	675.2	660.4	632	728.4	696.8	881.2	614	926.8
9	Phosphate	mg/l	356	398	311	660	543	425	191	1097
10	Iron	mg/l	0.083	0.054	0.123	0.017	0.161	0.089	0.072	0.109
11	Chemical oxygen demand	mg/l	774	2970	314	694	1290	5032	260	1230
12	Biological oxygen demand	mg/l	166	398	95	213	435	278	87	429
13	Lead	mg/l	<0.01	0.235	0.062	<0.01	<0.01	0.141	0.114	0.391
14	Nickel	mg/l	0.041	<0.01	<0.01	0.020	0.024	<0.01	0.054	<0.01
15	Manganese	mg/l	0.068	0.061	0.084	0.101	0.068	0.059	<0.01	0.038
16	Copper	mg/l	<0.01	<0.01	<0.01	<0.01	0.012	<0.01	<0.01	<0.01
17	Zinc	mg/l	0.011	<0.01	0.026	0.012	0.013	<0.01	<0.01	<0.01
18	Cadmium	mg/l	0.033	0.038	0.029	0.031	0.048	0.159	<0.01	0.149
19	Chromium	mg/l	<0.01	0.254	0.036	<0.01	<0.01.	0.188	0.114	0.162
20	Faecal coliform	Count/100ml	$57*10^8$	$26*10^8$	$44*10^8$	$14*10^4$	$63*10^8$	$12*10^8$	$49*10^8$	$61*10^8$
21	Total coliform	Count/100ml	$72*10^8$	$43*10^8$	$68*10^8$	$25*10^4$	$94*10^8$	$39*10^8$	$76*10^8$	$83*10^8$

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Figure 4.1 Water quality test results (*Source Design Report 2021*)

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Our Ref.: WRE/WQL/08/2021

Date:- 27th August, 2021

WASTE WATER QUALITY TEST RESULTS

PROJECT NAME: DAWASA OFF GRID SANITATION PROJECT IN DAR ES SALAAM.

CLIENT: DOHWA ENGINEERING COMPANY LIMITED

Table 1: Summary of Physical, Chemical and Bacteriological Analyses of Waste Water samples tested.

S/N	PARAMETERS	UNITS	VALUE ATTAINED				
			KNIST-01	UBDM-01	TMDM-01	ILIST-01	ILDM-01
1	pH	-	7.1	7.3	7.5	7.5	6.9
2	Temperature	°C	28.7	29.3	31.5	29.7	30.2
3	E/Conductivity	uS/cm	5590	1380	4950	3430	2860
4	Total Dissolved Solids	mg/l	2800	700	2510	1720	1440
5	Total Suspended Solids (TSS)	mg/l	450	1770	2290	400	2980
6	Total Solids	mg/l	2810	3180	2502	1860	6750
7	Total Volatile Solids	% of TS	36	68	70	33	59
8	BOD_5	mg/l	700	3400	4700	800	4700
9	COD	mg/l	2800	11100	10700	3000	9600
10	Nitrate (NO_3-N)	mg/l	148	105	320	54	243
11	Ammonia (NH_3-N)	mg/l	115	70	117	30	465
12	Phosphate (PO_4^{-3})	mg/l	86	233	320	263	180
13	Fecal coli form	No/100ml	1.0×10^4	3.0×10^3	2.0×10^3	1.4×10^4	2.0×10^4
14	Total Coli form	No/100ml	1.5×10^8	9.0×10^7	1.5×10^8	2.3×10^8	1.5×10^8
15	Lead (Pb)	mg/l	0.62	1.70	1.06	1.56	0.55
16	Cadmium (Cd)	mg/l	0.017	0.026	0.038	0.037	0.012
17	Chromium (Cr)	mg/l	3.66	1.73	0.88	2.54	7.96
18	Nickel (Ni)	mg/l	0.80	0.66	0.36	0.83	0.94

Signed by: Shagega Date: 27th August 2021

F. Shagega
Water Quality Laboratory

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Figure 4.2 Water quality test results (*Source Design Report 2021*)

4.5 Ethnic Groups

The main native' ethnic groups in Temeke District are Zaramo but due to urbanization many people of different ethnicity have immigrated in making heterogonous tribal composition whereby no single ethnic group accounts for more than 50% of the total population. The rapid economic growth of the city

also attracts Rural Urban Migration from different corners of the country and outside the country.

4.6 Economic Infrastructure and Services

Temeke District enjoys good services of all important infrastructures. It can be easily accessed from all parts of the country by a well maintained tarmac road, Railway line, Air or by Sea. Telecommunication is well covered with TTCL. There are cellular phones operators namely Airtel, Tigo, Zantel, Vodacom and the new one in business being introduced by TTCL. A number of Internet services providers are also available. There are so many commercial banks including NBC Limited, National Microfinance Bank (NMB), CRDB Bank, Barclays, Baroda, BOA and Exim Bank, which offer financial services such as Current and Savings accounts.

4.7 Socio-economic activities

It is estimated that Temeke has the population of 1,078,928 among of those 733,671 are manpower whereby 61% are engaged in private sector, 35% are self-employed and 4% are employed in public sector. The activities engaged are private companies, institutions, business, petty traders, fish farming, livestock keeping and agricultural activities.

5.0 STAKEHOLDER VIEWS ON THE PROPOSED PROJECT

During the conduction of this study, different stakeholders were consulted. Among these include the Temeke District Council and community at Mtoni area area (see Figure 6). Consultations were made through meetings.

Figure 6: Stakeholder's consultation meeting at site area

During the meeting, the consultant gave a brief explanation on the proposed faecal sludge treatment Plant. The project description covered proposed location, type and design of the plant (a typical design was displayed). The stakeholders were given chance give their views on the project. Moreover, the consultant offered chance to clarify issues where stakeholders wanted to be given more explanations. The comments by stakeholders were analyzed and incorporated in the design of mitigation measures. Table 2 summarizes the issues raised. The names of the stakeholders consulted are given in Appendix II.

Table 2: Stakeholders issues and concerns

Institution	Name	Position	Issues/ concerns
TFS	Dr. Masota Abel	Manager Forest Resources, MFR	-The proposed FSTP will minimize the exploitation of wood biomass -The proposed facility will help to save the forest resources which are victims when there are no any energy source alternative -The nutritious effluent will be used to water tree nurseries -The proposed FSTP will help to minimize the escape of methane gas and hence mitigation on climate change -Ensuring a large number of households are connected to the facilities so as to maximize positive results
TFS	John Rutagwaba	Principal Forest Officer	-Awareness to the people to accept the effluent for normal irrigation use
DAWASA MTONI		Plant Officer	-The project must have its own access road, entrance and fence away from the treatment plant.
MBUYUNI MTAA	Mwalimu Musa Ramadhani	Mtaa Executive Officer	-The proposed FSTP will minimize the exploitation of wood biomass -The community is skeptical to whether the project will bring nuisance to the neighbourhood

6.0 PROJECT REQUIREMENTS AND WASTE GENERATION

6.1 Project requirements

6.1.1 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.

6.1.2 Labour force

The labour force will be determined by the DAWASA; nevertheless, it is projected that during the construction phase the project will require not less than 50 workers both skilled and non-skilled laborers for each phase of project construction.

6.1.3 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 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 DAWASA is finalized. These equipments shall be temporary and shall be demobilized once project is completed.

6.2 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 around the public toilet for further use in landscaping the site at the end of the project.

6.2.1 Liquid waste management

A total of 50m^3 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.

6.2.2 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 city/municipal dumpsite.

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

Solid waste			
Type of waste	**Sources**	**Estimated Quantity (Kg)**	**Disposal / Management procedure**
Debris and Rubble (overburden)	Site clearance	3,000-5,000	Fill material for road potholes, etc.
Biodegradable materials mainly domestic waste (food, paper, wood etc.)	- Construction crew	(50-100Kg) per Month	Accessible litter bins within the camp site and later to the city waste disposal system (engage a registered private

			company), Final disposal will be at Municipal dumpsite
Non-biodegradable materials (plastic, glass)	- Construction crew	(2-5) kg per day	Recycling/ reuse (Plastics to be sent to authorised plastic recyclers and glass bottles and scrape to be sent to the recyclers)
Hazardous waste, Scrap metals	- Worn out Machinery parts and other metal cuttings	(10-15) per day	Sold to authorised Scrap metal and waste oil dealers respectively
Liquid waste			
Type of waste	**Sources**	**Estimated Quantity (m^3) per day**	**Disposal / Management procedure**
- Excreta (domestic) human - Grey water /cleaners	- Toilets and floor cleaning	1.6	Use of septic tanks and when full will empty to the wastewater treatment facility
- Oils and greases	Machinery parts and trucks	- None	- Car maintenance will be done at proper garages

7.0 POTENTIAL IMPACTS

7.1 Positive impacts

7.1.1 Improved living conditions and economic growth

The project will improve the living conditions in Temeke District whereby the project operation phase will do away with illegal faecal sludge dislodging especially during

rainy season or during the night. The charged fee for emptying septic tanks and pit latrines will be such as affordable by the intended customer. Thus, there will be increased money circulation that result into increased income consequently better standard of living of people in the project area.

7.1.2 Employment opportunities

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

7.1.3 Improved urban agriculture

Farming activities in urbanised Temeke is vital to the economy of the local community. With the effluent rich in nutrients and manure from dried sludge the farming activities will have been moved to the high production level. That is to say, farming activities especially of bananas will be going on despite the driest months of June, July and August.

7.1.4 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.

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

DAWASA is expected to increase government revenue collection at Municipal Council and at National level. This will be enhanced by time to time payment of all charges to dislodge septic tanks and pit latrines of the respective household. The revenue collected will contribute towards economic development within the municipal and the country at large.

7.1.6 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.

7.1.7Minimized 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.

7.1.8 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.

7.2 Negative impacts

7.2.1 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

- DAWASA 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 DAWASA 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.

7.2.2 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.

7.2.3 Land degradation and increased erosion

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

Mitigation Measures

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

- Lined drainage channels at sensitive terrains shall be provided to control speed and volumes of storm-water.

- The DAWASA should plant grass or any other vegetation cover to minimise exposed soil surface.

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

7.2.4 Noise pollution

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

Mitigation Measure

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

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

7.2.5 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.

7.2.6 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 3 metres 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

7.2.7 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 wastes. Other wastes will be generated from cleaning of construction equipment and containers like mixers and paint buckets.

Mitigation measures:

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

7.2.8 High Risk of Health associated during operation

There will be unhealthy environment contaminated by human waste during emptying the tricycles of vehicles if not well managed.

Mitigation measure

- The project proponent shall ensure that all personnel are provided with appropriate protective gear.
- Awareness to the plant operators to avoid any technical failure
- Also awareness to the truck drivers/ operators on the best way of emptying or desludging their vehicles

8.0 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.

8.1 Health and Safety

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

8.2 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 fire-fighting equipment that will be employed;

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

8.3 Monitoring, Maintenance and repair

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

8.4 Project Alternatives

Consideration of project alternatives is crucial in ensuring that the developer and decision-makers have a wider base from which they can choose the most appropriate option. In this comprehensive project brief, the following alternatives are considered.

Hybrid Constructed Wetlands (CW)

Constructed Wetlands (CWs) are a natural, low-cost, Eco technological biological wastewater treatment technology designed to mimic processes found in natural wetland ecosystems, which is now standing as the potential alternative or supplementary systems for the treatment of wastewater *(Source Design Report 2021).*

No project alternative

The no project alternative entails retaining the current status quo without developing the proposed FSTP. Adopting this option would mean avoiding most of the negative effects associated with the establishment of the FSTP and missing all the positive benefits that would accrue such as improved community life and reduction of the communicable diseases and improving sanitation.

Analysis of alternatives: To improve the public health and sanitation at Mbuyuni ward and surrounding community, DAWASA and LGA selected the aforementioned location, which until this more is considered to be favorable place due to a need of the FSTP. Moreover, the selected design of this FSTP and technology for onsite wastewater treatment were chosen by considering the nature of the place and demand of surrounded community.

9.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

9.1 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 Faecal Sludge Treatment Plant at Mtoni area area is summarized in Table 3. The ESMP also indicates environmental costs needed to implement the recommended mitigation measures. The Faecal Sludge 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 Faecal Sludge Treatment Plant to be constructed and operated in environmentally friendly manner.

DAWASA in collaboration with Temeke District 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 DAWASA(s) to show their commitment in the implementation of the Environmental, Social, Health and Safety. The implementation of the Code will be supervised by DAWASA or his consultant.

The ESHS Code is a set of Guidelines attached to the Bidding Document and Contract to be adopted by DAWASA during project implementation. It contains the commitment and obligations of the DAWASA and its subsidiaries (i.e. Sub-DAWASAs and staff) to undertake construction activities in accordance with all applicable Laws, Rules, and Regulations. The DAWASA 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 DAWASAs, 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 DAWASA shall take stock of the contents of the Project Brief.

Table 3: Environmental and Social Management Plan for the Proposed Construction of Feacal Sludge Treatment Plant at Mtoni area, area, Mbuyuni ward, Temeke District

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
Increased waste generation	○ Stick to the design specifications ○ Provide waste containers ○ Provide training to workers and orient them towards environmental protection values	DAWASA	To be included in the BOQ	
Increased HIV/AIDS and other STD	○ DAWASA 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 DAWASA 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,	DAWASA	6,000,000.00	

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
	putting more emphasis on HIV/AIDS, which has become a national disaster.			
Land degradation and increased erosion	o The DAWASA should Plant vertiver grasses to minimize exposed soil surface. o To obtain the construction materials official negotiated should be performed with wards leaders in order to avoid conflict.	DAWASA	25,000,000	
Noise pollution during construction	o The proponent shall maintain equipment in good running conditions to ensure that ambient noise level and vibrations pollution into the environment is very minimum to comply with Tanzania standards o All construction works will be scheduled at normal working hours. o Proper inspection and maintenance of construction vehicles and equipment will be done to ensure that they have mufflers installed and worn parts are replaced	DAWASA	2,000,000.00	
Dust generation during construction	o Mixing equipment shall be sealed properly and vibrating equipment will be equipped with dust removing devices.	DAWASA	3,000,000.00	

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
	○ 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.			
Health Risks associated with construction works	○ The project proponent shall ensure that all personnel are provided with appropriate protective gear. ○ All works shall be planned and conducted in accordance with relevant OHS Guidelines. First Aid Kit as well as regular medical check-ups for the workers will be provided during the entire working hours. ○ Adequate number of firefighting equipment/extinguishers will be provided in every few distance to help putting off fire in case of occurrence. ○ Excavated pits should be protected by warning tape and guardrails to prevent workers from falling ○ The developer to ensure adequate supply of provisions	DAWASA	1,000,000.00	

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
	○ Adhere to good maintenance			
Total			**38,000,000**	**10,000,000.00**

10. 0 MONITORING PLAN

10.1 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 4: Monitoring Plan for the Proposed Construction of Feacal Sludge Treatment Plant at Mtoni area area, Mbuyuni ward, Temeke District

Parameter	Monitoring Frequency	Sampling Area	Measurement Unit	Method	Target Level/Standard	Responsibility for monitoring	Estimated Annual (or once cost (TZS)
Mobilization Phase							
Dust	Daily	Immediate working area	ppm	Physical-visual	TBS	DAWASA	None
Air Quality	Daily	Around the Inspection chambers	µg/m^3	Smelling (nasal)	TBS	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
Construction phase							
Dust (PM 2.5, PM 10)	Weekly	Immediate working area	ppm	Physical-visual	TBS	DAWASA	None
Air Quality	Twice a week	Around the Inspection chambers	µg/m^3	Smelling (nasal)	TBS	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

Parameter	Monitoring Frequency	Sampling Area	Measurement Unit	Method	Target Level/Standard	Responsibility for monitoring	Estimated Annual (or once cost (TZS)
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
Demobilization Phase							
Dust (PM 2.5, PM 10)	Weekly	Immediate working area	ppm	Physical-visual	TBS	DAWASA	None
Air Quality	Weekly	Around the Inspection chambers	$\mu g/m^3$	Smelling (nasal)	TBS	DAWASA	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
Operation phase							
Air Quality	Twice a week	Around the Inspection chambers	$\mu g/m^3$	Smelling (nasal)	Absence of nuisance smells	DAWASA	500,000.00

Parameter	Monitoring Frequency	Sampling Area	Measurement Unit	Method	Target Level/Standard	Responsibility for monitoring	Estimated Annual (or once cost (TZS)
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
HIV/AIDS	Annually	Workers	Training	Numbers	One per month during construction phase only	DAWASA	In operation manual
						Total	**28,000,000.00**

11.0 PROJECT BUDGET

The investment cost for the proposed Faecal Sludge Treatment Plant is estimated to be around Tshs.400 million that will be financed by The World Bank.

12.0 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 sanition, then the outbreak of diseases like diarhoea and associated stomach and waterborne diseases are also reduced and prevented hence improved public health.

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

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

References

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

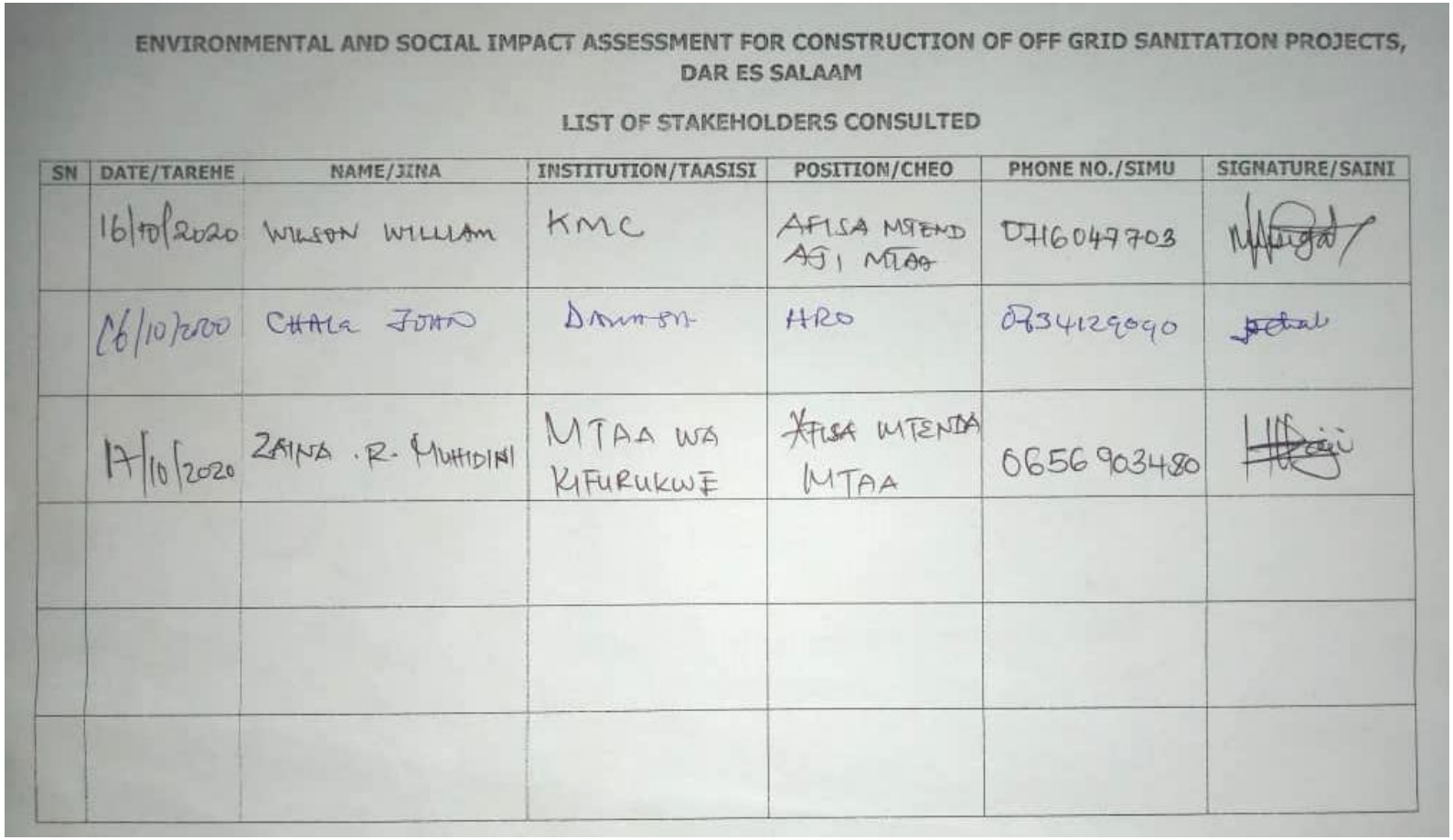
2. Investment profile of Temeke Municipal

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

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
	16/10/2020	WILSON WILLIAM	KMC	AFISA MTENDAJI MTAA	0716047703	
	16/10/2020	CHALA JUMA	DAWASA	HRO	0734129090	
	17/10/2020	ZAINA R. MUHIDINI	MTAA WA KIFURUKWE	AFISA MTENDAJI MTAA	0656903480	

Appendix II: Land Ownership Document

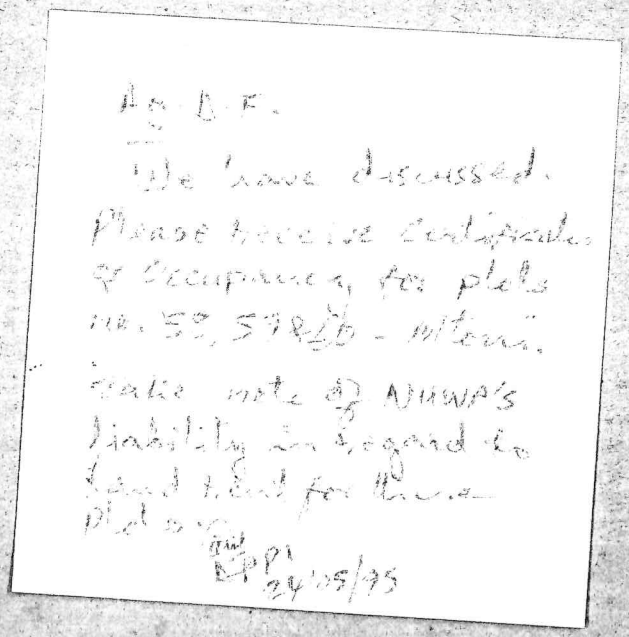
(10)

Land Form 51

TANZANIA

CERTIFICATE OF OCCUPANCY

(Issued under Section 9 of the Land Ordinance)



Date of Issue:

Title Number: 44444

Land Office Number: 153507.

Land: PLOT NO.59 & 60 MTONI DAR ES SALAAM CITY.

Term THIRTY THREE YEARS.

TITLE Land Form 33 44444

REGISTERED 31.3.1995

At 12:30 PM

Senior Asst. Registrar of Titles

LAND REGISTRY

TANGANYIKA STAMP DUTY ACT.

Stamp Duty Shs. 100/= L.D. No. 135507.

and Revenue Receipt No. A.0467140

13.10.1994 Issued. L.D. No. 156512.

Stamp Duty Officer

THE UNITED REPUBLIC OF TANZANIA

TANGANYIKA STAMP DUTY ACT

Stamp Duty Shs. 3190/=

and Revenue Receipt No. A.0467140

of 13.10.1994

Stamp Duty Officer

CERTIFICATE OF OCCUPANCY

(Section 9 of the Land Ordinance)

The 25th day of March One thousand nine hundred and ninety-five.

TITLE No.

THIS IS TO CERTIFY that NATIONAL URBAN WATER AUTHORITY ESTABLISHED UNDER THE URBAN WATER SUPPLY ACT, No. 1 of 1981 OF P.O. BOX 5340, DAR ES SALAAM. ----------

(hereinafter called "the Occupier") is entitled to a Right of Occupancy (hereinafter called "the Right") in and over the land described in the Schedule hereto (hereinafter called ("the Land") as joint tenants/as tenants in common in equal shares for a term of thirty-three --------- years from the first ---------- day of April ---------- One thousand nine hundred and ninety-two according to the true intent and meaning of the Land Ordinance and subject to the provisions thereof and to any regulations made thereunder and to any enactment in substitution therefor or amendment thereof and to the following special conditions:—

1. The Occupier having paid rent up to the thirtieth day of June, 1992, shall thereafter pay rent of Shillings sixty three thousand eight hundred fourty six (Shs.63,846/=) a year in advance on the first day of July in every year of the term without any deduction PROVIDED that the rent may be revised by the Minister for the time being responsible for Lands (hereinafter called "the Minister") on the first day of July in each of the years 2002, 2012 and 2022 or within three years thereafter in each case.

2. The Occupier shall:—

(i) Maintain on the land buildings (hereinafter called "the buildings") in permanent materials designed for use in accordance with the conditions of the Right and which conform to the building line (if any) decided by The Dar es Salaam City Council ---------- (hereinafter called "the Authority");

(ii) At all times during the term of the Right have on the land buildings as approved by the Authority and maintain them in good order and repair to the satisfaction of the Commissioner for Lands (hereinafter called "the Commissioner");

(iii) Not erect or commence to erect on the land any building except in accordance with building plans and specifications which shall have been first approved by the Authority;

(iv) Be responsible for the protection of all beacons on the land throughout the term of the Right Missing beacons will have to be re-established at any time at the Occupier expenses as assessed by the Commissioner for Surveys and Mapping.

Approval of plans of any building by the Authority shall not imply that the construction of such a building will satisfy the Occupier obligation under the conditions of the Right and shall not imply waiver or modification of any condition in the Right.

3. (i) The Occupier shall not subdivide the land or assign, sublet or otherwise dispose of or deal with the whole or any part of it or of any building on it without the previous written consent of the Commissioner PROVIDED that the consent of the Commissioner shall not be necessary;

~~to a single sub-letting of the whole of the land where the sub-lease contains conditions~~ sufficient to ensure compliance with the conditions of the Right;

state

to a sub-letting of the whole of the land or of the whole or any part of any building on it where the sub-lease contains conditions sufficient to ensure compliance with the conditions of the Right.

(ii) Occupation or use of the whole or any part of the land or buildings on it by any person other than the Occupier or its employees or agents or contractors or members of the household shall be deemed a dealing with the land or buildings.

4. Except as hereinbefore provided the Commissioner shall have an absolute discretion to give or withhold consent under condition 3.

5. The Occupier shall pay to the Minister on demand made by the Commissioner on his behalf:—

(i) any further fees or stamp duties which may be discovered to be payable by the Occupier in connection with the Right;

(ii) an amount equal to any contribution in lieu of rates which may be payable by Government for the land during the term of the Right;

(iii) such sum as the Commissioner shall assess as a proper share payable for the land of the cost of making up the road or improvement of same upon which the land fronts, abuts or adjoins, whether such demand is made before during or after such making or improvement thereof. This condition does not oblige the Government to make or improve roads.

6. USER: The land and the buildings to be erected thereon shall be used for Office Residential and water tank resevoir purposes only; Use Group 'G' (a), Group 'A' (a) and (c) and Use Group 'P' as defined in the Town and Country Planning (Use Classes) Regulations, 1960.

7. The President may revoke the Right for good cause or in Public interest.

SCHEDULE

ALL THAT land known as Plot NO.59 & 60 Mtoni Dar es Salaam Ci containing six point three eight four (6.384) hectares ----------

~~square feet~~ shown for identification only edged on the plan attached to this Certificate and defined on the registered survey plan numbered L deposited at the Office of the Commissioner for Surveys and Mapping at Dar es Salaam. L 24583.

GIVEN under my hand and seal and by Order of the Minister the day and year first above written.

COMMISSIONER FOR LANDS

THE within-named NATIONAL URBAN WATER AUTHORITY hereby accept the terms and conditions contained in the foregoing Certificate of Occupancy.

SEALED with the COMMON SEAL of the NATIONAL URBAN WATER AUTHORITY and DELIVERED in the presence of this 27th day of FEB. 1995.

Witness's Signature:.....

Postal Address: P.O.Box 5340 D'Salaam

Qualification: CORP. SECRETORY

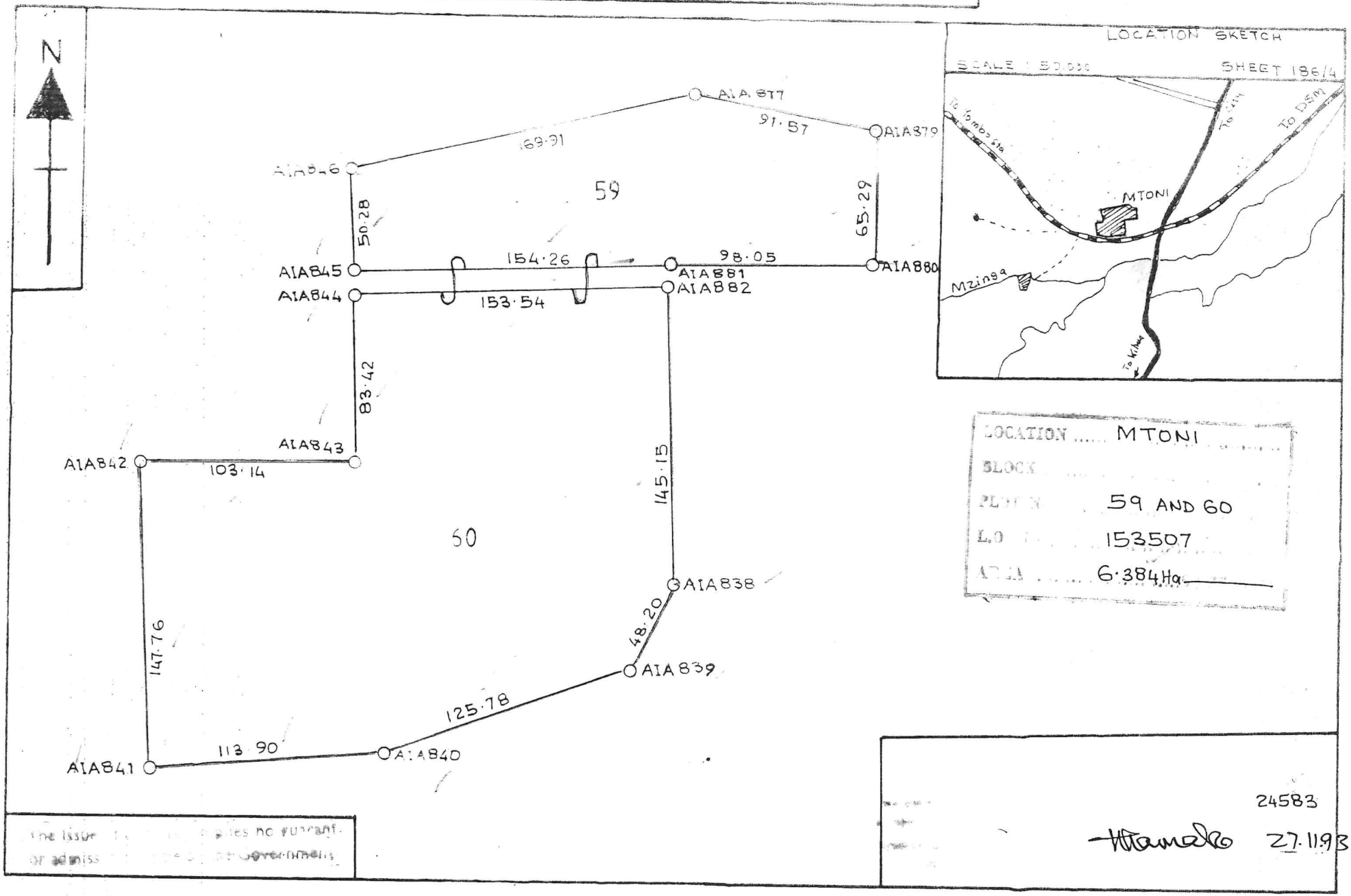
Signatute:.....

Postal Address: P.O.Box 1573 DAR ES SALAAM

Qualification: DIRECTOR GENERAL

G P Dsm

DAR ES SALAAM CITY



MINISTRY OF LANDS, HOUSING AND URBAN DEVELOPMENT

LAND REGISTRY,
P.O. Box 1191,
DAR ES SALAAM.

Ref. No. LR/T/ 44444/4 / May 18 1995

TO: NUWSA
P.O. BOX 5340 - DSM

TITLE NO. 44444 LAND OFFICE
NO. 153507 PLOT NO. 39/60
Kitonu DSM City

I have honour to enclose here with duplicate of the certificate of Title Numbered as above please.

REGISTRAR OF TITLES

Copy to: Commissioner for Lands,
Your LD. File No. 156512 refers.

(iv) Be responsible for the protection of all beacons on the land throughout the term of the Right Missing beacons will have to be re-established at any time at the Occupier expenses as assessed by the Commissioner for Surveys and Mapping.

Approval of plans of any building by the Authority shall not imply that the construction of such a building will satisfy the Occupier 's obligation under the conditions of the Right and shall not imply waiver or modification of any condition in the Right.

3. (i) The Occupier shall not subdivide the land or assign, sublet or otherwise dispose of or deal with the whole or any part of it or of any building on it without the previous written consent of the Commissioner PROVIDED that the consent of the Commissioner shall not be necessary;

~~to a single sub-letting of the whole of the land where the sub-lease contains conditions sufficient to ensure compliance with the conditions of the Right;~~

to a sub-letting of the whole of the land or of the whole or any part of any building on it where the sub-lease contains conditions sufficient to ensure compliance with the conditions of the Right.

(ii) Occupation or use of the whole or any part of the land or buildings on it by any person other than the Occupier or its employees or agents or contractors or members of the household shall be deemed a dealing with the land or buildings.

4. Except as hereinbefore provided the Commissioner shall have an absolute discretion to give or withhold consent under condition 3.

5. The Occupier shall pay to the Minister on demand made by the Commissioner on his behalf:—

(i) any further fees or stamp duties which may be discovered to be payable by the Occupier in connection with the Right;

(ii) an amount equal to any contribution in lieu of rates which may be payable by Government for the land during the term of the Right;

(iii) such sum as the Commissioner shall assess as a proper share payable for the land of the cost of making up the road or improvement of same upon which the land fronts, abuts or adjoins, whether such demand is made before during or after such making or improvement thereof. This condition does not oblige the Government to make or improve roads.

6. USER: The land and he the buildings erected thereon shall be used for Office and water tank resevoir purposes only Use Group 'G' (a) and Group 'P' as defined in the Town and Country Planning (Use classes) Regulations, 1960.

7. The President may revoke the Right for good cause or in Public interest.

SCHEDULE

ALL THAT land known as Plot NO.58 Mtoni Dar es Salaam City containing one point five one five zero (1.5150) hectares ~~square feet~~ shown for identification only edged on the plan attached to this Certificate and defined on the registered survey plan numbered 2458 deposited at the Office of the Commissioner for Surveys and Mapping at Dar es Salaam.

GIVEN under my hand and seal and by Order of the Minister the day and year first above written.

COMMISSIONER FOR LANDS

The within-named NATIONAL URBAN WATER AUTHORITY hereby accept the terms and conditions contained in the foregoing Certificate of Occupancy.

SEALED with the COMMON SEAL of the said NATIONAL URBAN WATER AUTHORITY and DELIVERED in the presence of us this 27th day of FEBRUARY 1995.

Witness's Signature: .....

Postal Address: P.O. Box 5340 D'SALAAM

Qualification: CORP. SECRETARY

Signature: .....

Postal Address: P.O. Box 1573 DAR ES SALAAM

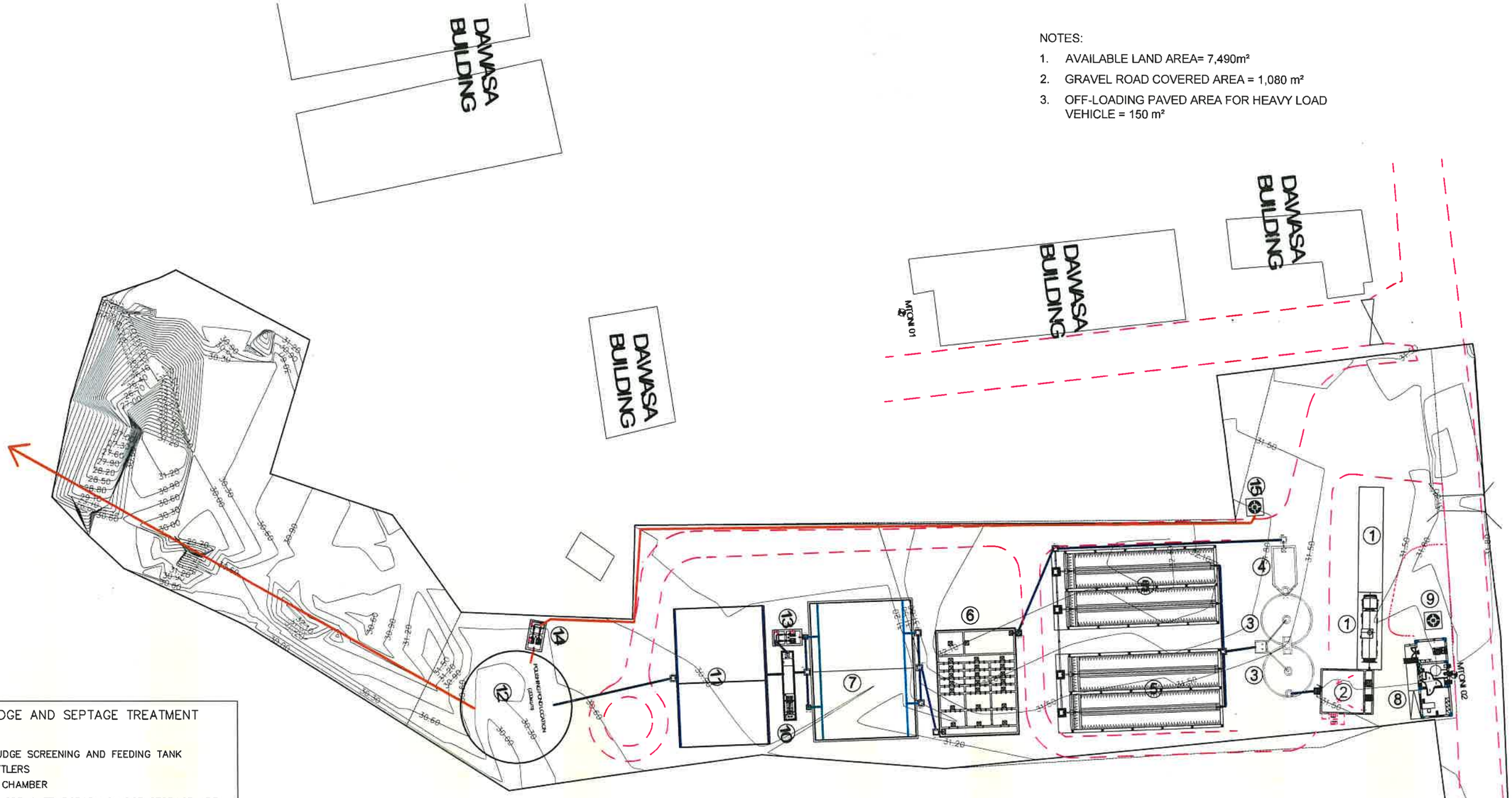
Qualification: DIRECTOR GENERAL

G P Dsm

Appendix III: Architectural drawings

NOTES:

1. AVAILABLE LAND AREA= 7,490m²
2. GRAVEL ROAD COVERED AREA = 1,080 m²
3. OFF-LOADING PAVED AREA FOR HEAVY LOAD VEHICLE = 150 m²



LEGEND:

FEACAL SLUDGE AND SEPTAGE TREATMENT

1. RAMP
2. FAECAL SLUDGE SCREENING AND FEEDING TANK
3. BIOGAS SETTLERS
4. EXPANSION CHAMBER
5. UNPLANTED SDB & TEMPORARY SLUDGE STORAGE AREA
6. INTEGRATED SETTLER, ABR & ANAEROBIC FILTER
7. HORIZONTAL FLOW CONSTRUCTED WETLAND
8. SERVICE BUILDING
9. POTABLE WATER TANK AND TOWER
10. HYDRO– MECHANICAL SIPHON
11. VERTICAL FLOW CONSTRUCTED WETLAND
12. POLISHING POND
13. PUMP STATION
14. TREATED WASTEWATER PUMP STATION – SOLAR POWERED
15. TREATED WASTEWATER TANK AND TOWER

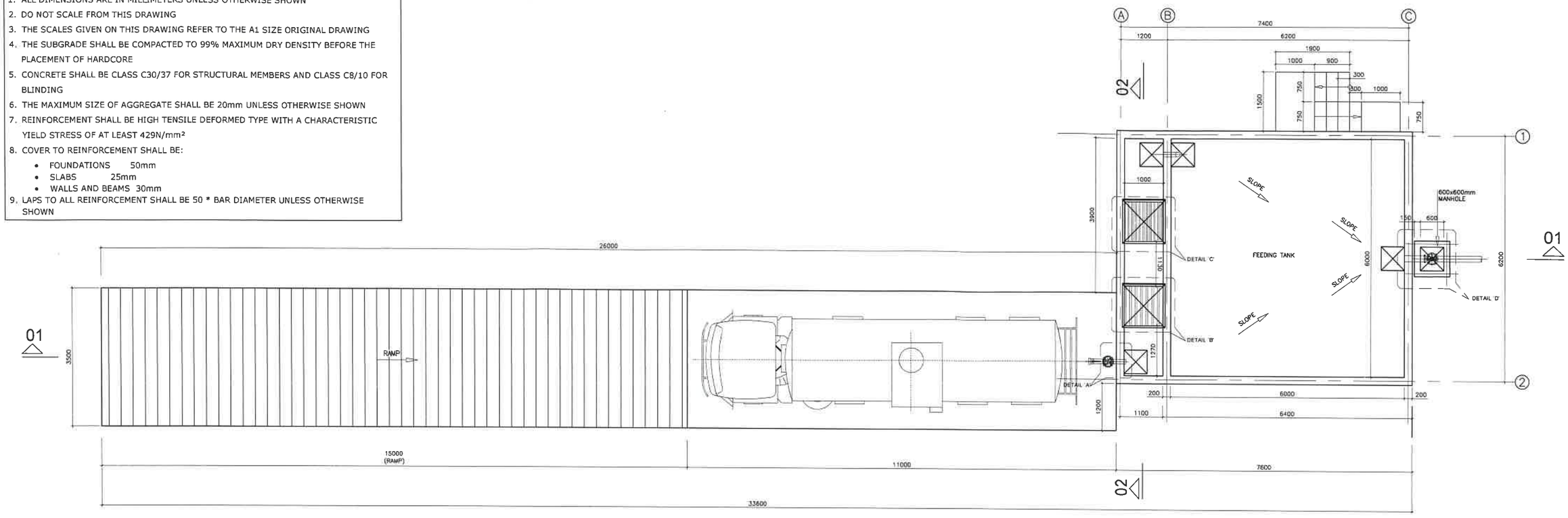
- WASTEWATER/SLUDGE PIPE
- EFFLUENT PIPE
- ACCESS ROAD
- RIVER/ STREAM/ DISCHARGE BODY
- FENCE

DOHWA ENGINEERING CO., LTD. DOHWA * REPUBLIC OF KOREA *

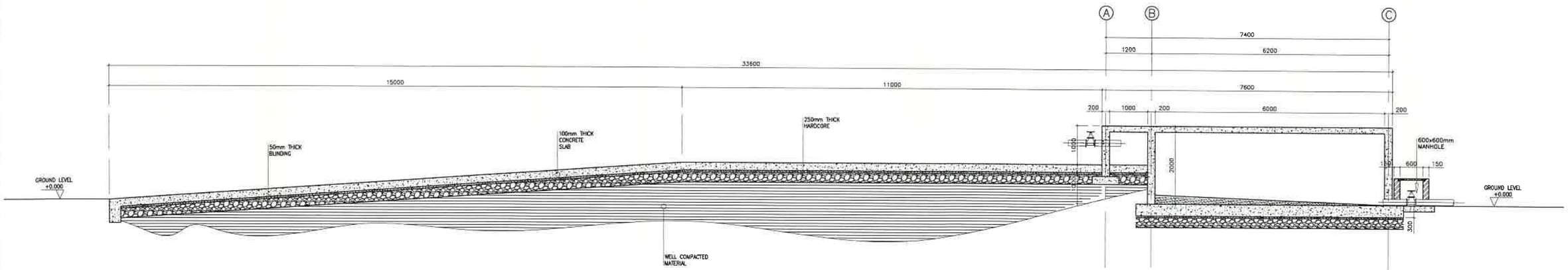
DESIGN BY		SCALE	1:300	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		
APPROVED BY		DATE	DECEMBER-2021	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50M³)	CHECKED BY		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
SHEET NO:		DRAWING NO.	FSTP-107	SITE PLAN FOR MTONI FECAL SLUDGE TREATMENT PLANT	APPROVED BY		

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN
2. DO NOT SCALE FROM THIS DRAWING
3. THE SCALES GIVEN ON THIS DRAWING REFER TO THE A1 SIZE ORIGINAL DRAWING
4. THE SUBGRADE SHALL BE COMPACTED TO 99% MAXIMUM DRY DENSITY BEFORE THE PLACEMENT OF HARDCORE
5. CONCRETE SHALL BE CLASS C30/37 FOR STRUCTURAL MEMBERS AND CLASS C8/10 FOR BLINDING
6. THE MAXIMUM SIZE OF AGGREGATE SHALL BE 20mm UNLESS OTHERWISE SHOWN
7. REINFORCEMENT SHALL BE HIGH TENSILE DEFORMED TYPE WITH A CHARACTERISTIC YIELD STRESS OF AT LEAST 429N/mm²
8. COVER TO REINFORCEMENT SHALL BE:
   - FOUNDATIONS 50mm
   - SLABS 25mm
   - WALLS AND BEAMS 30mm
9. LAPS TO ALL REINFORCEMENT SHALL BE 50 * BAR DIAMETER UNLESS OTHERWISE SHOWN



PLAN VIEW
SCALE 1:50



SECTION 01-01
SCALE 1:50

DOHWA ENGINEERING CO., LTD * REPUBLIC OF KOREA * DOHWA

DESIGN BY		SCALE	AS SHOWN	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - SLUDGE RECEIVING RAMP PLAN VIEW AND SECTIONS GENERAL ARRANGEMENTS	CHECKED BY		
SHEET NO:		DRAWING NO.	FSTP-107-01		APPROVED BY		

NOTES:

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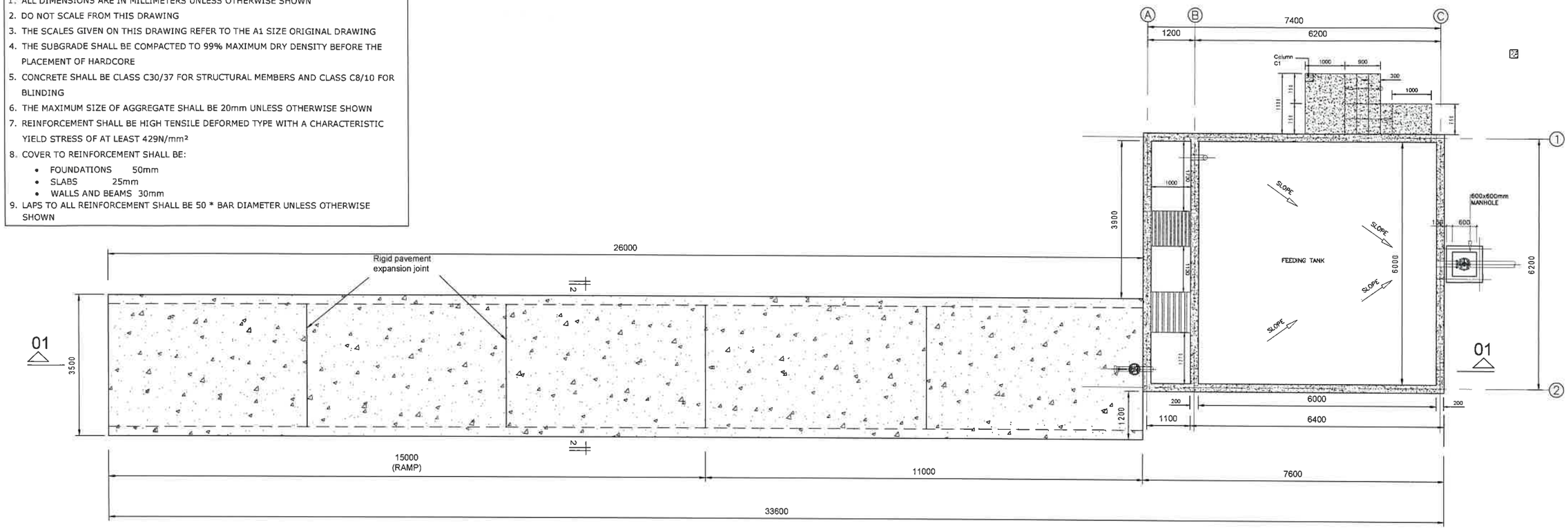
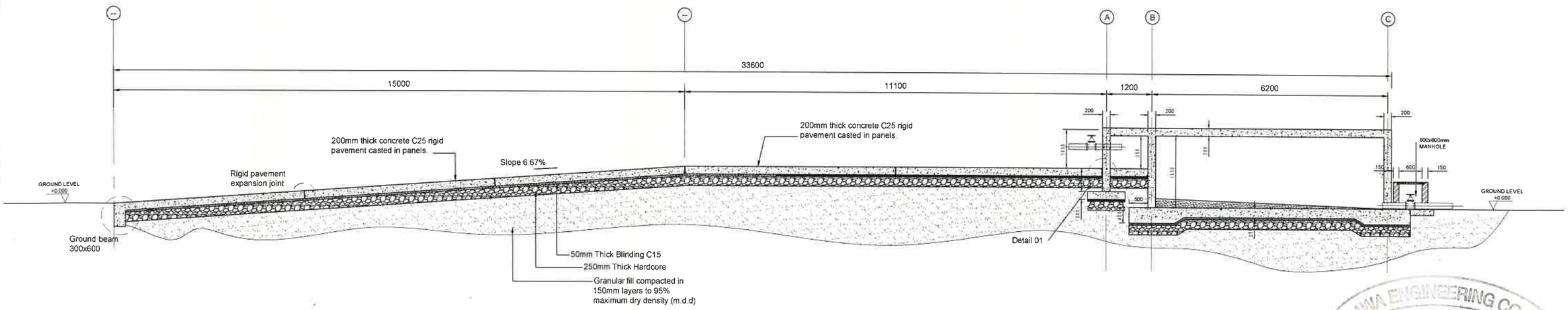


PLAN VIEW
SCALE 1:50



SECTION 01-01
SCALE 1:50

DOHWA ENGINEERING CO., LTD
DOHWA
REPUBLIC OF KOREA

DESIGN BY		SCALE	AS SHOWN	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - SLUDGE RECEIVING RAMP STRUCTURAL DRAWINGS - PLAN & SECTION GENERAL ARRANGEMENT DETAILS	CHECKED BY		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
SHEET NO:		DRAWING NO.	FSTP-107-01-1		APPROVED BY		

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN
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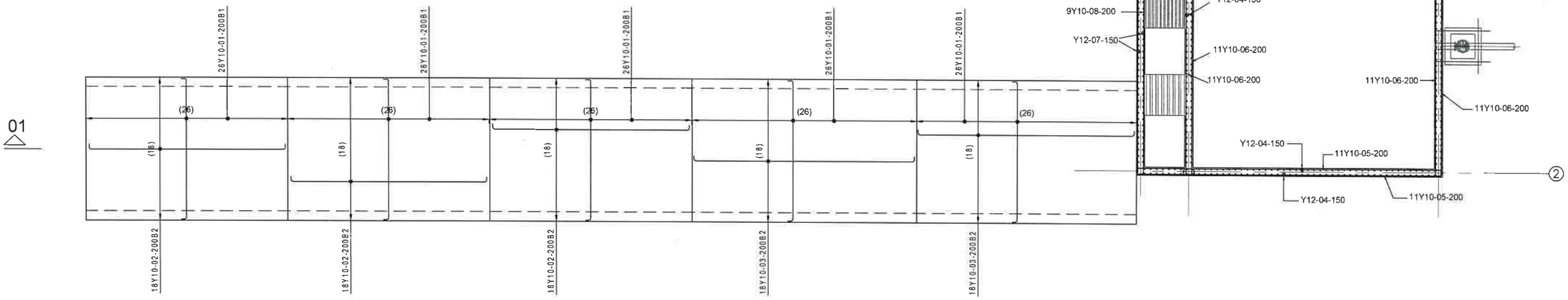

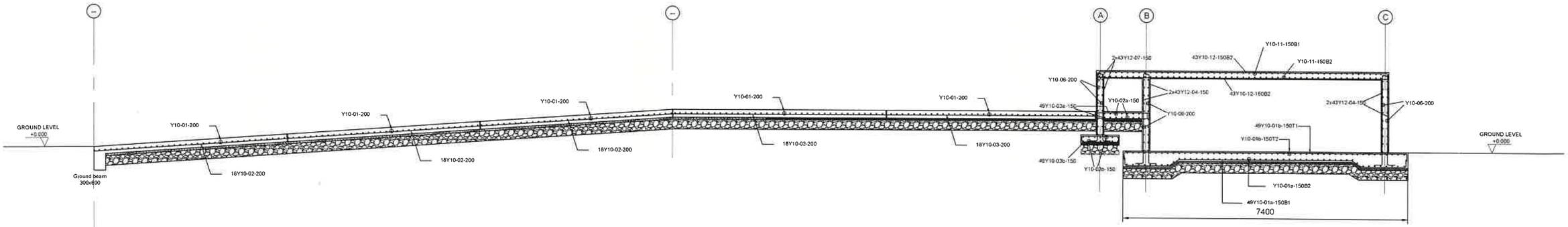

SECTION 01-01
SCALE 1:50

DESIGN BY		SCALE	AS SHOWN	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - SLUDGE RECEIVING RAMP STRUCTURAL DRAWINGS - FOUNDATION & WALLS REINFORCEMENTS DETAILS	CHECKED BY		
SHEET NO:		DRAWING NO.	FSTP-107-01-2		APPROVED BY		

NOTES:

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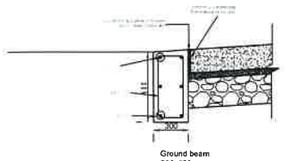
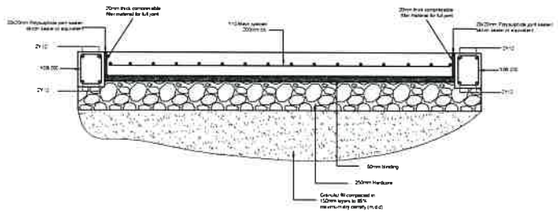
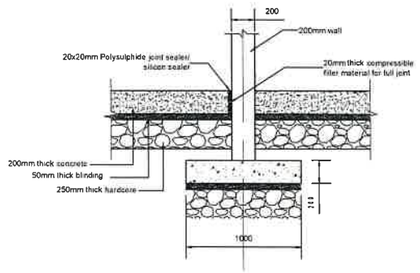


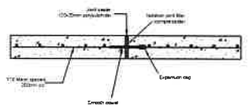
Ground beam 300x600
SCALE 1:25



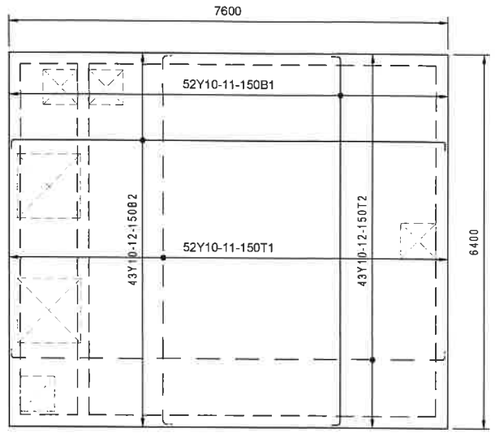
Section 2-2
SCALE 1:25



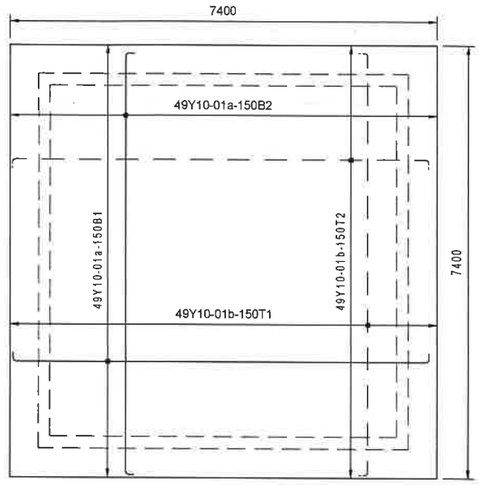
Isolation Joint for Ramp and Walls
SCALE 1:25



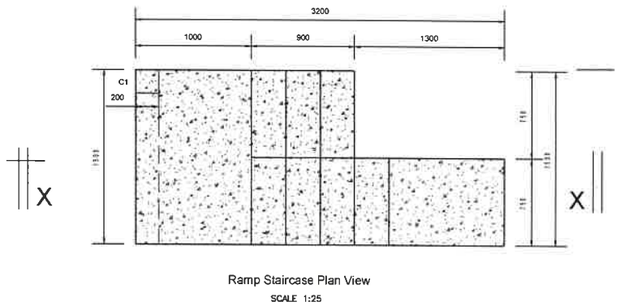
Rigid pavement expansion joint
SCALE 1:25



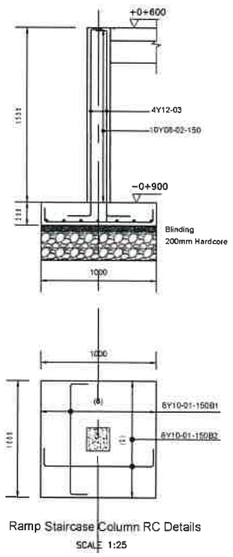
TOP SLAB



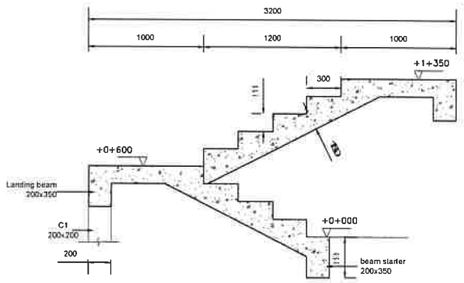
FOUNDATION BASE



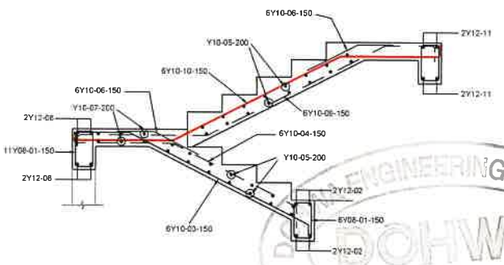
Ramp Staircase Plan View
SCALE 1:25



Ramp Staircase Column RC Details
SCALE 1:25



Ramp Staircase Section X-X
SCALE 1:25



Ramp Staircase RC Details
SCALE 1:25

DESIGN BY		SCALE	AS SHOWN	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - SLUDGE RECEIVING RAMP STRUCTURAL DRAWINGS - FOUNDATION, SLAB, COLUMN & STAIRCASE REINFORCEMENTS DETAILS	CHECKED BY		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
SHEET NO:		DRAWING NO.	FSTP-107-01-3		APPROVED BY		

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN
2. DO NOT SCALE FROM THIS DRAWING
3. THE SCALES GIVEN ON THIS DRAWING REFER TO THE A1 SIZE ORIGINAL DRAWING
4. THE SUBGRADE SHALL BE COMPACTED TO 99% MAXIMUM DRY DENSITY BEFORE THE PLACEMENT OF HARDCORE
5. CONCRETE SHALL BE CLASS C30/37 FOR STRUCTURAL MEMBERS AND CLASS C8/10 FOR BLINDING
6. THE MAXIMUM SIZE OF AGGREGATE SHALL BE 20mm UNLESS OTHERWISE SHOWN
7. REINFORCEMENT SHALL BE HIGH TENSILE DEFORMED TYPE WITH A CHARACTERISTIC YIELD STRESS OF AT LEAST 429N/mm²
8. COVER TO REINFORCEMENT SHALL BE:
   - FOUNDATIONS 50mm
   - SLABS 25mm
   - WALLS AND BEAMS 30mm
9. LAPS TO ALL REINFORCEMENT SHALL BE 50 * BAR DIAMETER UNLESS OTHERWISE SHOWN

Ramp and Feeding tank

Member	Mark	Diameter	Total Numbers	Length (mm)	Unit weight (kg/m)	Total weight (kg)	Bar bending shape
Rigid pavement	01	Y10	130	3700	0.616	297	
	02,03	Y10	90	5100	0.616	283	
Base	01a	Y10	196	7800	0.616	942	
	01b	Y10	196	7550	0.616	912	
	02a	Y10	14	7550	0.616	66	
	02b	Y10	14	7550	0.616	66	
	03a	Y10	98	1400	0.616	85	
	03b	Y10	98	1150	0.616	70	
	02a	Y10	14	7550	0.616	66	
Walls	04	Y12	172	2925	0.888	447	
	06	Y10	96	6500	0.616	385	
	07	Y12	118	2325	0.888	244	
	08	Y10	32	1350	0.616	27	
Top slab	11	Y10	104	6500	0.616	417	
	12	Y10	86	7600	0.616	403	
					Total	4710	

Access Staircase

Member	Mark	Diameter	Total Numbers	Length (mm)	Unit weight (kg/m)	Total weight (kg)	Bar bending shape
Footing	01	Y10	16	1200	0.616	12	
	02	Y10	10	850	0.312	3	
	03	Y10	4	1850	0.888	7	
Staircase	01	Y08	24	1130	0.312	9	
	02	Y12	4	1400	0.616	5	
	03	Y10	6	2400	0.616	9	
	04	Y10	6	2325	0.616	9	
	05	Y10	30	1000	0.616	19	
	06	Y10	12	700	0.616	5	
	07	Y10	6	1650	0.616	6	
	08	Y12	4	1700	0.888	6	
	09	Y10	6	3500	0.616	13	
	10	Y10	6	3500	0.616	13	
					Total	116	

DOHWA ENGINEERING CO., LTD
DOHWA
REPUBLIC OF KOREA

DESIGN BY		SCALE	NOT TO SCALE
DRAWN BY			
CHECKED BY			
APPROVED BY		DATE	JANUARY-2022
SHEET NO:		DRAWING NO.	FSTP-107-01-4

PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM

TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - SLUDGE RECEIVING RAMP STRUCTURAL DRAWINGS - REINFORCEMENTS BAR BENDING SCHEDULE

REVISION	
DATE	
NATURE OF REV.	
CHECKED BY	
APPROVED BY	

CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)

CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS

NOTES:

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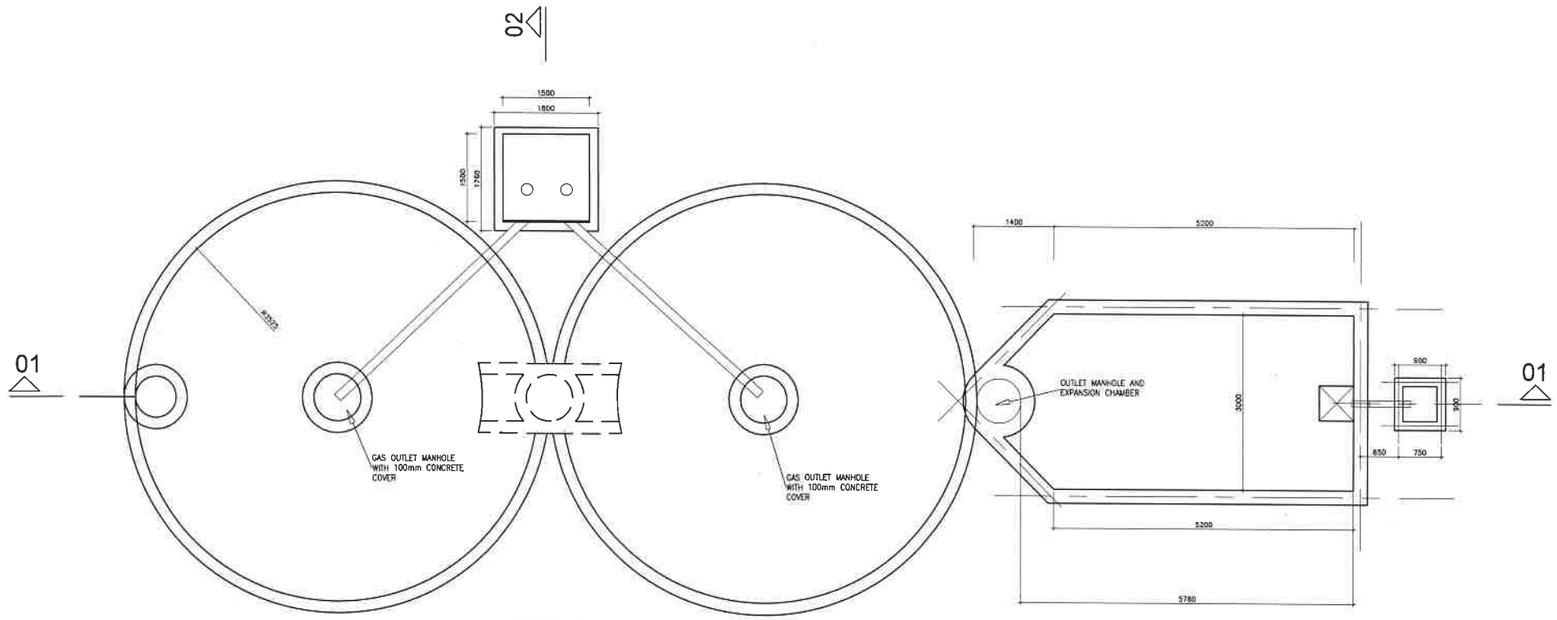
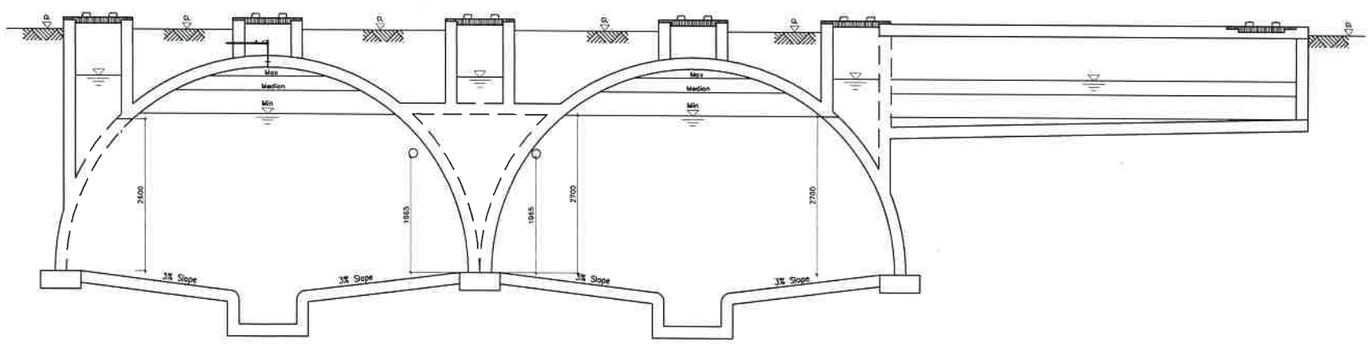
9. LAPS TO ALL REINFORCEMENT SHALL BE 50 * BAR DIAMETER UNLESS OTHERWISE SHOWN

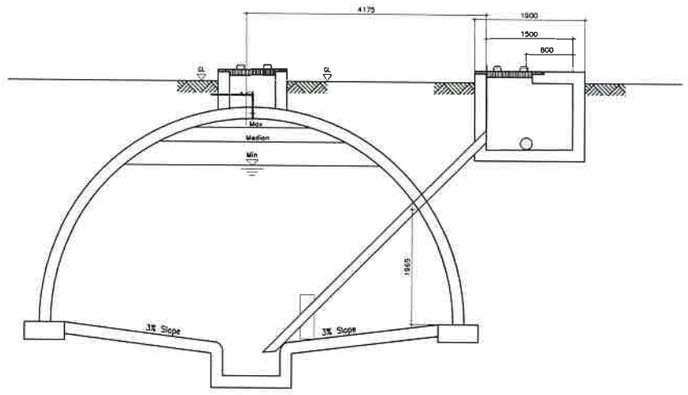


PLAN VIEW
SCALE 1:50

02



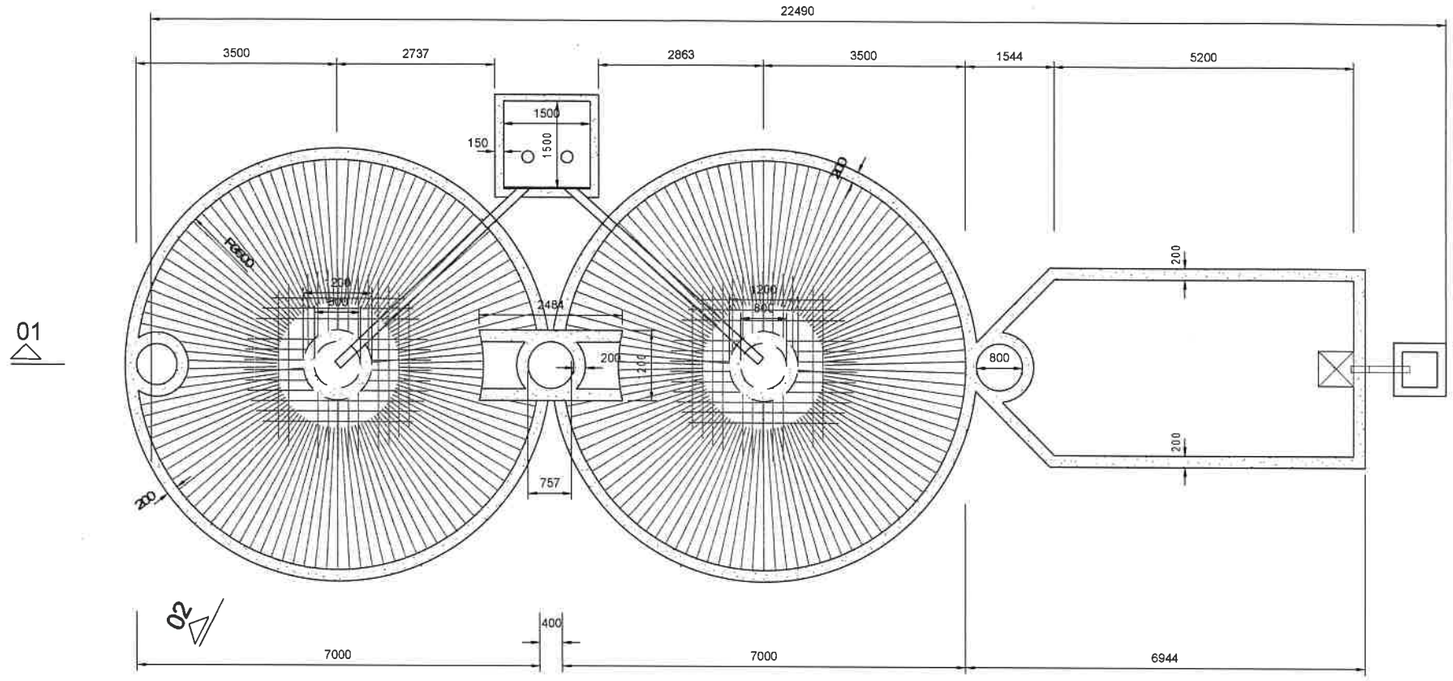
SECTION 01-01
SCALE 1:50



SECTION 02-02
SCALE 1:50

DOHWA ENGINEERING CO., LTD
DOHWA
REPUBLIC OF KOREA

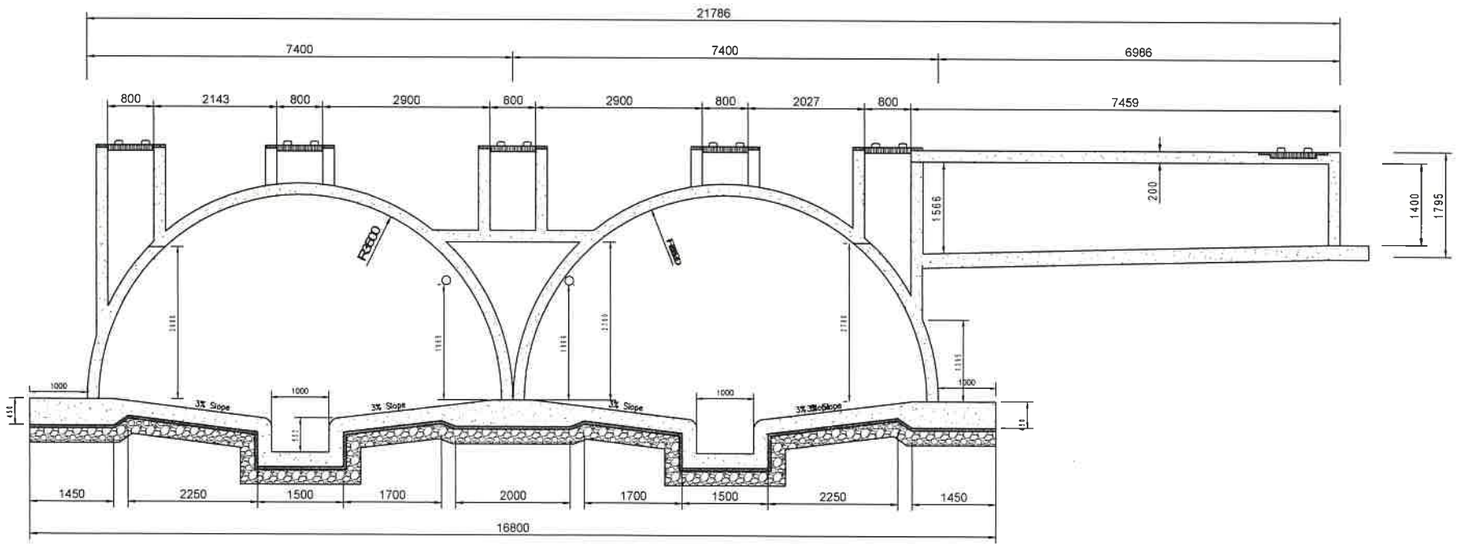
DESIGN BY		SCALE	AS SHOWN	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - BIOGAS DIGESTER PLAN VIEW AND SECTIONS GENERAL ARRANGEMENTS	CHECKED BY		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
SHEET NO:		DRAWING NO.	FSTP-107-02		APPROVED BY		



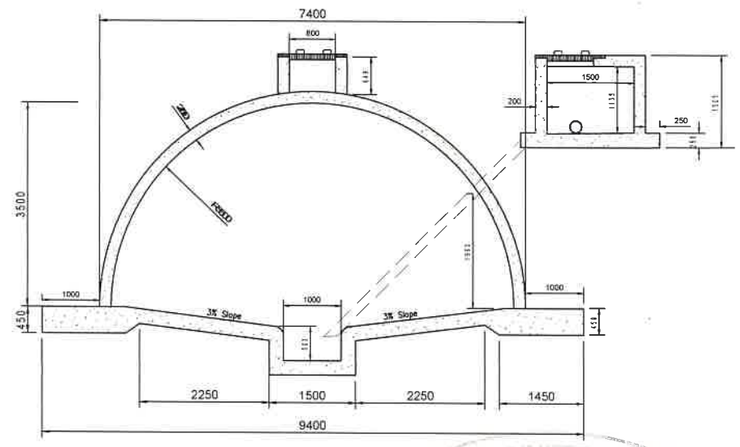
PLAN VIEW
SCALE 1:50

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN
2. DO NOT SCALE FROM THIS DRAWING
3. THE SCALES GIVEN ON THIS DRAWING REFER TO THE A1 SIZE ORIGINAL DRAWING
4. THE SUBGRADE SHALL BE COMPACTED TO 99% MAXIMUM DRY DENSITY BEFORE THE PLACEMENT OF HARDCORE
5. CONCRETE SHALL BE CLASS C30/37 FOR STRUCTURAL MEMBERS AND CLASS C8/10 FOR BLINDING
6. THE MAXIMUM SIZE OF AGGREGATE SHALL BE 20mm UNLESS OTHERWISE SHOWN
7. REINFORCEMENT SHALL BE HIGH TENSILE DEFORMED TYPE WITH A CHARACTERISTIC YIELD STRESS OF AT LEAST 429N/mm²
8. COVER TO REINFORCEMENT SHALL BE:
   - FOUNDATIONS 50mm
   - SLABS 25mm
   - WALLS AND BEAMS 30mm
9. LAPS TO ALL REINFORCEMENT SHALL BE 50 * BAR DIAMETER UNLESS OTHERWISE SHOWN



SECTION 01-01
SCALE 1:50



SECTION 02-02
SCALE 1:50

DOHWA ENGINEERING CO., LTD
DOHWA
REPUBLIC OF KOREA

DESIGN BY		SCALE	AS SHOWN	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - BIOGAS DIGESTER STRUCTURAL DRAWINGS - PLAN & SECTION GENERAL ARRANGEMENT DETAILS	CHECKED BY		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
SHEET NO:		DRAWING NO.	FSTP-107-02-1		APPROVED BY		

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN
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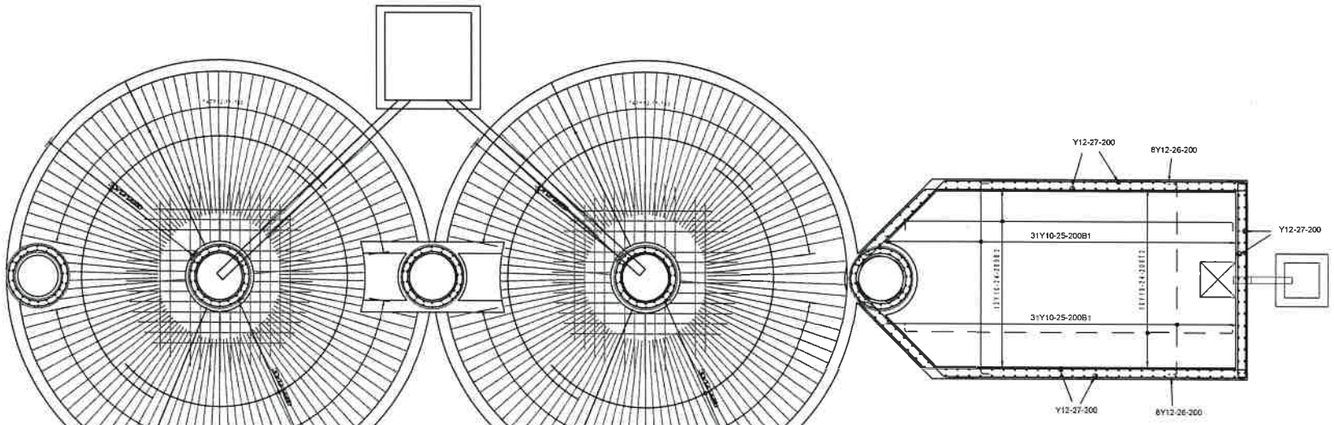
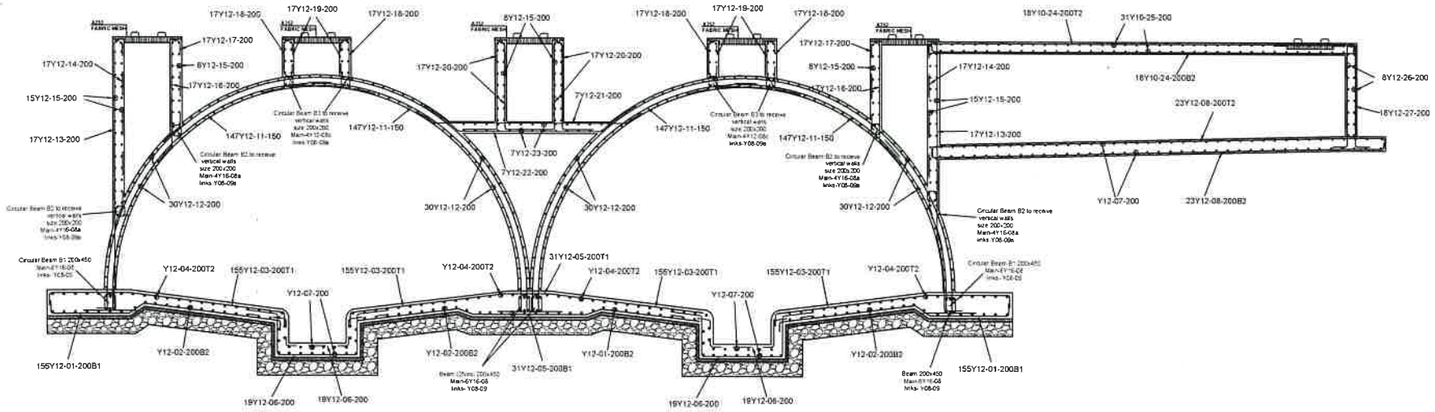


01

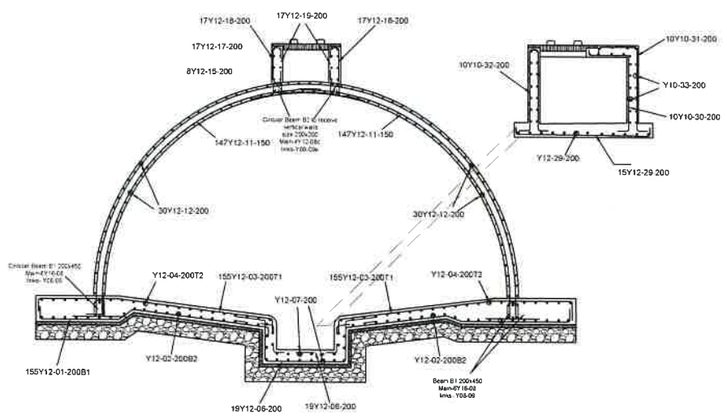
01

02

PLAN
SCALE 1:50



SECTION 01-01
SCALE 1:50



SECTION 02-02
SCALE 1:50

DOHWA ENGINEERING CO., LTD
DOHWA
REPUBLIC OF KOREA

DESIGN BY		SCALE	AS SHOWN	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - BIOGAS DIGESTER STRUCTURAL DRAWINGS - FOUNDATION & WALLS REINFORCEMENTS DETAILS	CHECKED BY		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
SHEET NO:		DRAWING NO.	FSTP-107-02-2		APPROVED BY		

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN
2. DO NOT SCALE FROM THIS DRAWING
3. THE SCALES GIVEN ON THIS DRAWING REFER TO THE A1 SIZE ORIGINAL DRAWING
4. THE SUBGRADE SHALL BE COMPACTED TO 99% MAXIMUM DRY DENSITY BEFORE THE PLACEMENT OF HARDCORE
5. CONCRETE SHALL BE CLASS C30/37 FOR STRUCTURAL MEMBERS AND CLASS C8/10 FOR BLINDING
6. THE MAXIMUM SIZE OF AGGREGATE SHALL BE 20mm UNLESS OTHERWISE SHOWN
7. REINFORCEMENT SHALL BE HIGH TENSILE DEFORMED TYPE WITH A CHARACTERISTIC YIELD STRESS OF AT LEAST 429N/mm²
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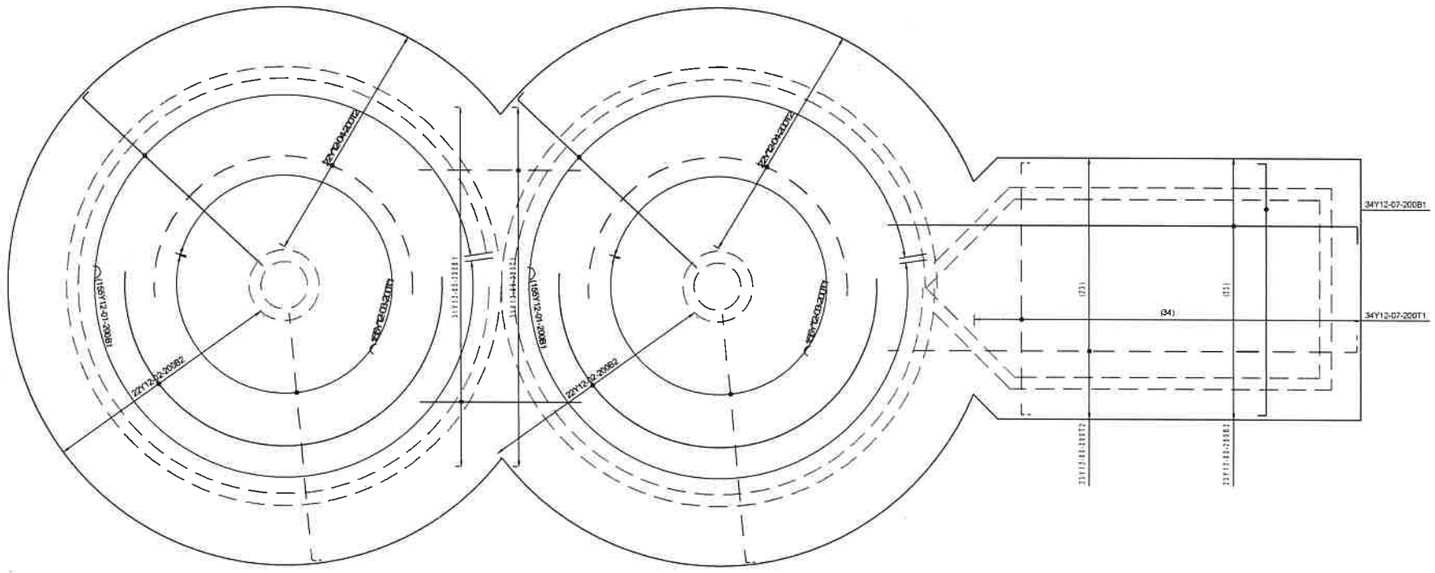
   - FOUNDATIONS 50mm
   - SLABS 25mm
   - WALLS AND BEAMS 30mm
9. LAPS TO ALL REINFORCEMENT SHALL BE 50 * BAR DIAMETER UNLESS OTHERWISE SHOWN



FOUNDATION BASE
SCALE 1:50

DESIGN BY		SCALE	AS SHOWN	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - BIOGAS DIGESTER STRUCTURAL DRAWINGS - FOUNDATION BASE REINFORCEMENTS DETAILS & BAR BENDING SCHEDULE	CHECKED BY		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
SHEET NO:		DRAWING NO.	FSTP-107-02-3		APPROVED BY		

Bar Bending schedule- Biogas Digester

member	Mark	Diameter	Total Numbers/Area	Length (mm)	Unit weight (kg/m)	Total weight (kg)	Bar bending shape
Base	01	Y12	310	4400	0.888	1,212	
	02,04	Y12	176	12000	0.888	1,876	
	03	Y12	310	4500	0.888	1,240	
	05	Y12	62	2700	0.888	149	
	07	Y12	68	4550	0.888	275	
	08	Y12	46	8100	0.888	331	
Walls	11	Y12	294	6350	0.888	1,658	
	12	Y12	120	8500	0.888	906	
	13,16	Y12	34	4750	0.888	144	
	14,17	Y12	34	3650	0.888	111	
	15	Y12	92	3300	0.888	270	
	18, 19	Y12	68	1260	0.888	76	
	20	Y12	34	2200	0.888	67	
	21	Y12	7	3950	0.888	25	
	22	Y12	7	3950	0.888	25	
	23	Y12	26	1150	0.888	27	
	24	Y10	36	7650	0.616	170	
	25	Y10	62	3550	0.616	136	
Hidden beams	08a	Y16	8	3600	1.578	46	
	08c	Y16	8	3300	1.578	42	
	09	Y08	216	1350	0.312	91	
	09a	Y08	72	950	0.312	22	
	10	Y16	24	10500	1.578	398	
						Total	9,364

NOTES:

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   - FOUNDATIONS 50mm
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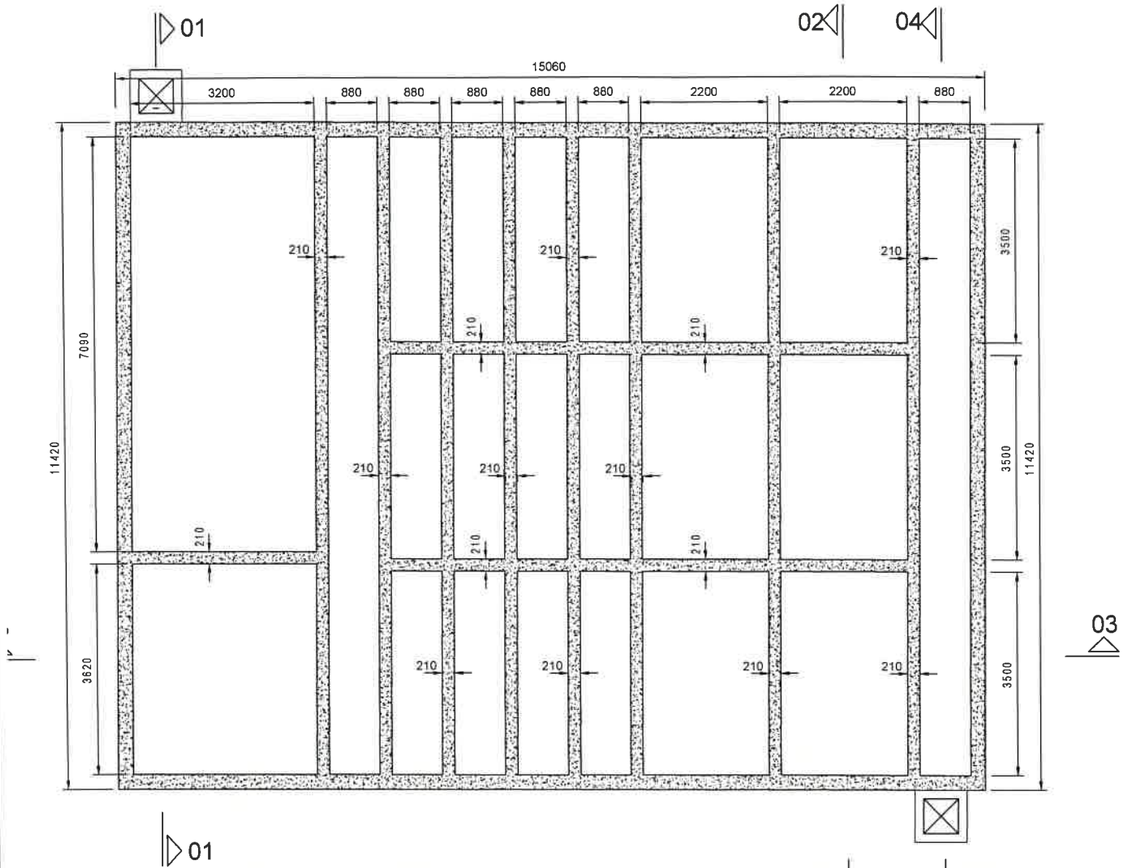
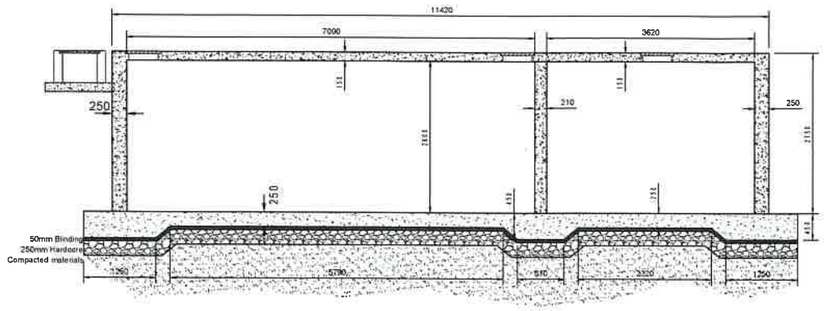
DESIGN BY		SCALE	AS SHOWN	REVISION		CLIENT
DRAWN BY				DATE		DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
CHECKED BY				NATURE OF REV.		CONSULTANT
APPROVED BY		DATE	JANUARY-2022	CHECKED BY		DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
SHEET NO:		DRAWING NO.	FSTP-107-02-4	APPROVED BY		

PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM

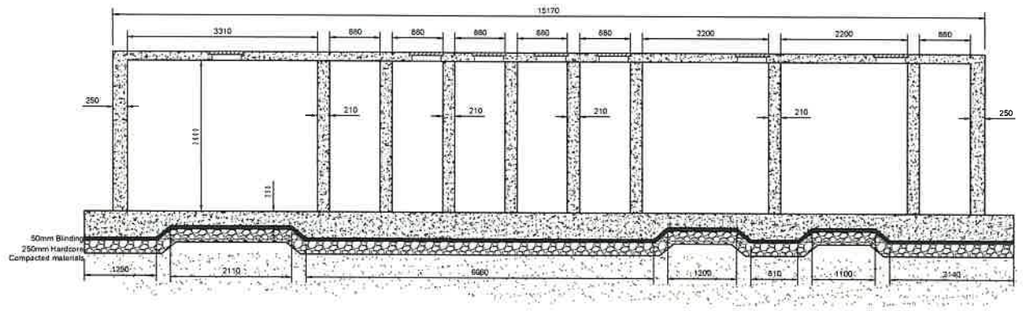
TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - BIOGAS DIGESTER STRUCTURAL DRAWINGS - BAR BENDING SCHEDULE



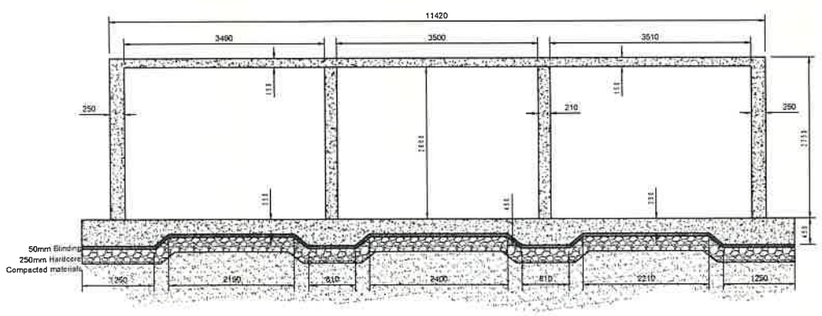
PLAN VIEW
SCALE 1:50



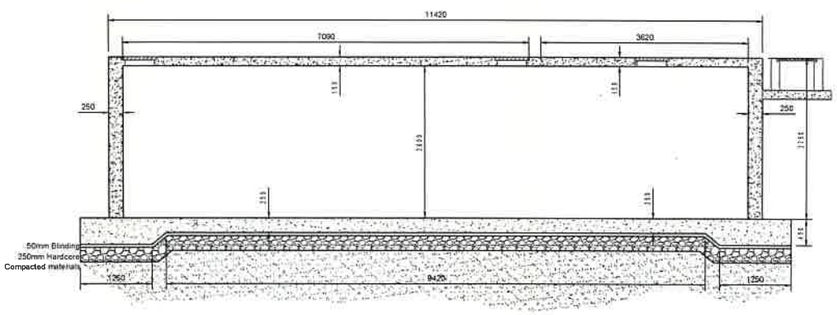
SECTION 01-01
SCALE 1:50



SECTION 03-03
SCALE 1:50



SECTION 02-02
SCALE 1:50



SECTION 04-04
SCALE 1:50

NOTES:

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   - WALLS AND BEAMS 30mm
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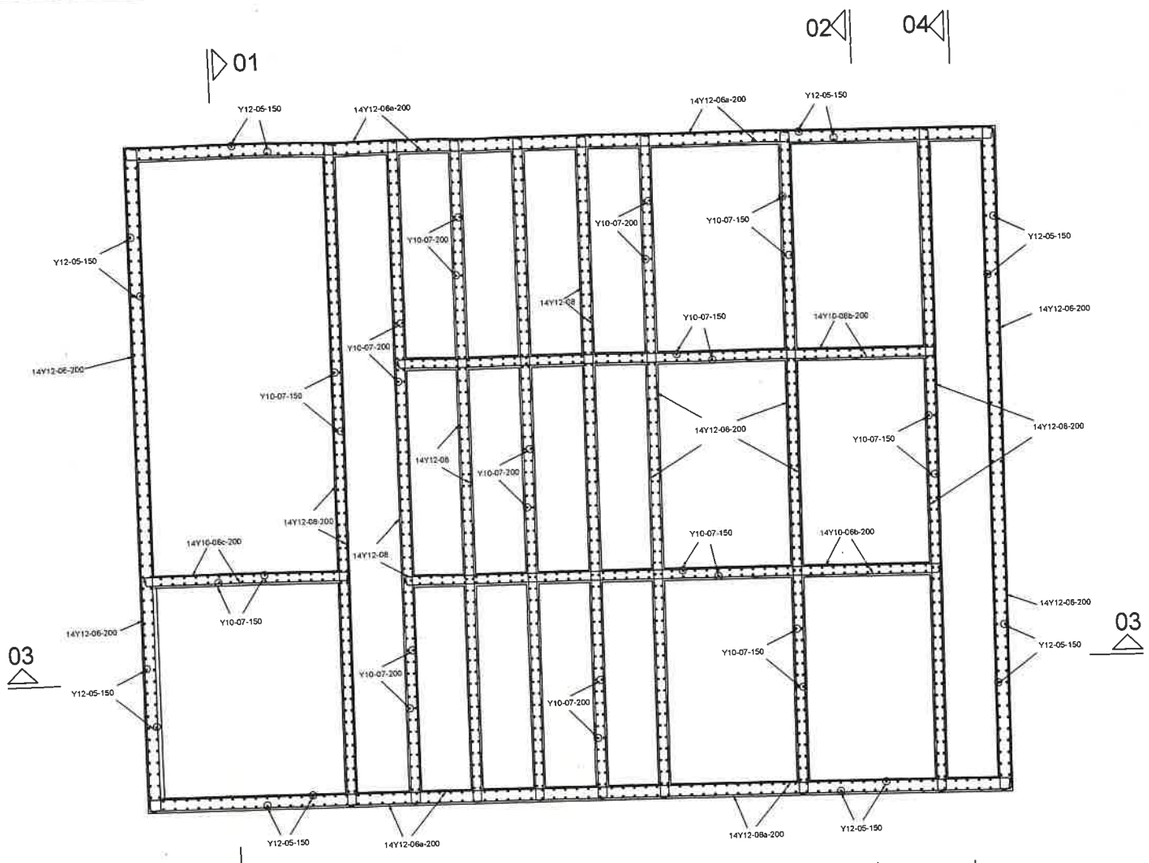
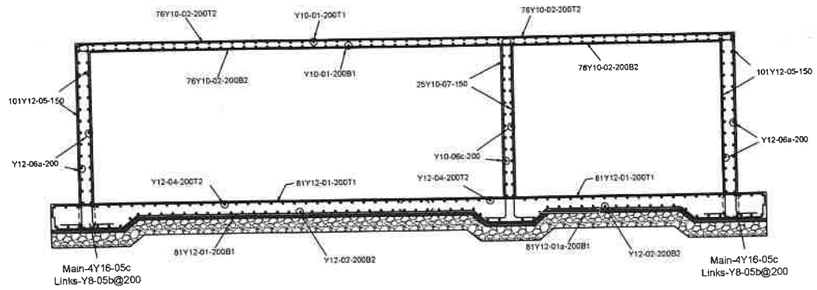
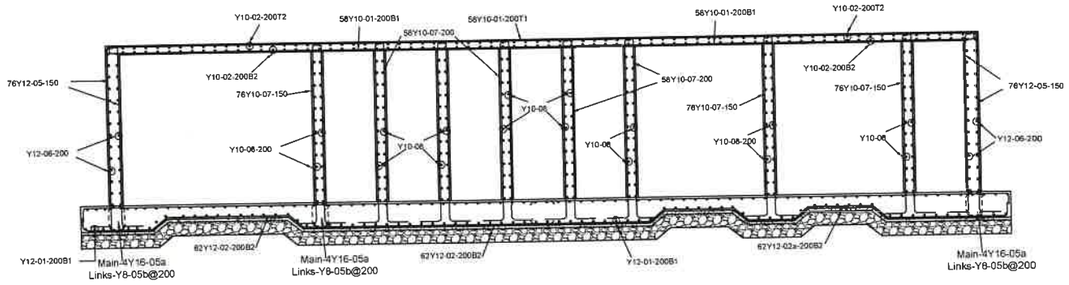
DOHWA ENGINEERING CO., LTD

DESIGN BY		SCALE	AS SHOWN	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - INTERGRATED SETTLER, ABR & ANAEROBIC FILTER STRUCTURAL DRAWINGS - PLAN & SECTION GENERAL ARRANGEMENT	CHECKED BY		
SHEET NO:		DRAWING NO.	FSTP-107-03-1		APPROVED BY		

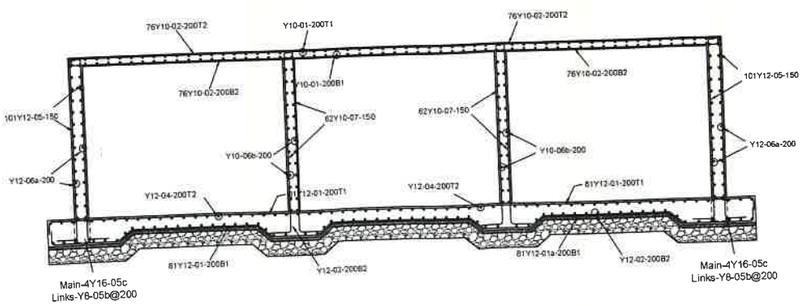




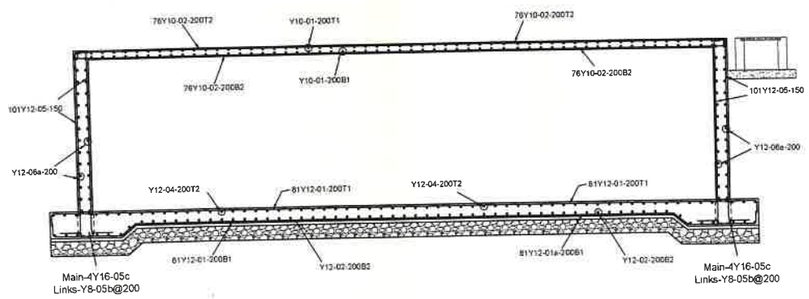
SECTION 01-01
SCALE 1:50



SECTION 03-03
SCALE 1:50



SECTION 02-02
SCALE 1:50



SECTION 04-04
SCALE 1:50

NOTES:

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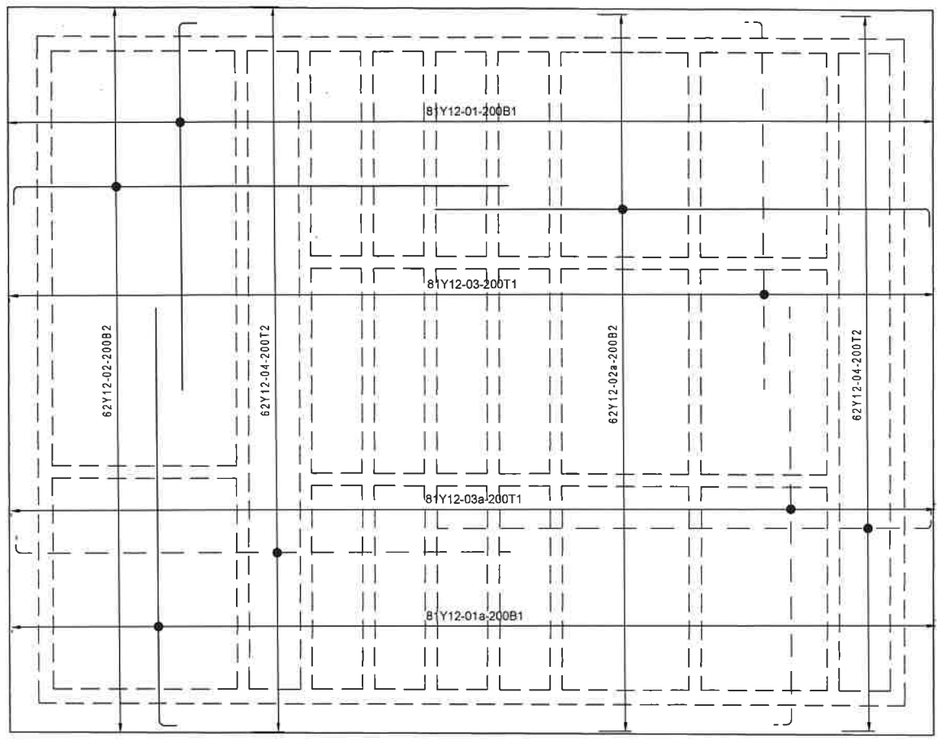
5. CONCRETE SHALL BE CLASS C30/37 FOR STRUCTURAL MEMBERS AND CLASS C8/10 FOR BLINDING
6. THE MAXIMUM SIZE OF AGGREGATE SHALL BE 20mm UNLESS OTHERWISE SHOWN
7. REINFORCEMENT SHALL BE HIGH TENSILE DEFORMED TYPE WITH A CHARACTERISTIC YIELD STRESS OF AT LEAST 429N/mm²
8. COVER TO REINFORCEMENT SHALL BE:
   - FOUNDATIONS 50mm
   - SLABS 25mm
   - WALLS AND BEAMS 30mm
9. LAPS TO ALL REINFORCEMENT SHALL BE 50 * BAR DIAMETER UNLESS OTHERWISE SHOWN

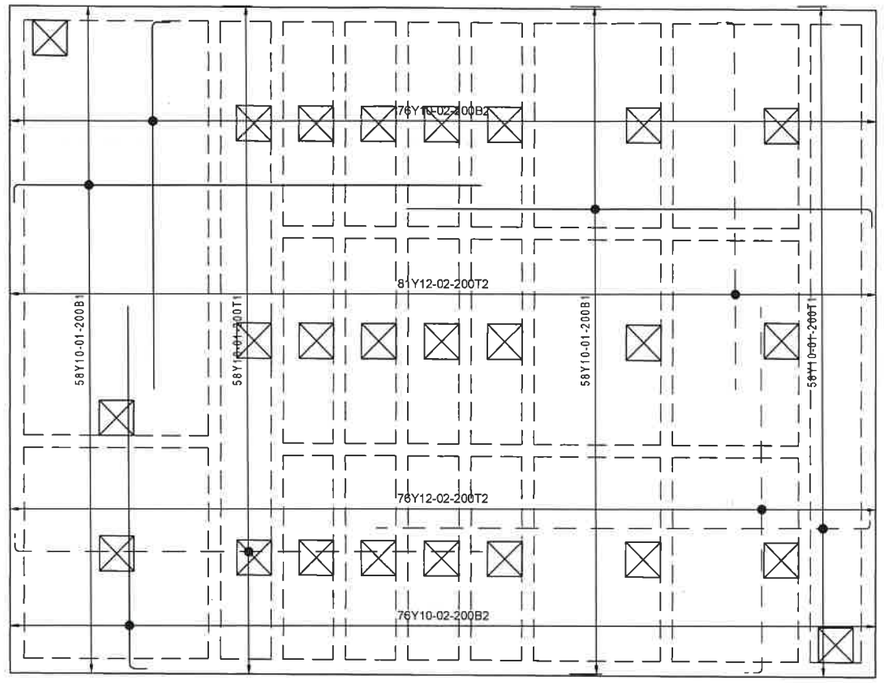
	SCALE	AS SHOWN	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION	
				DATE	
				NATURE OF REV.	
	DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - INTERGRATED SETTLER, ABR & ANAEROBIC FILTER STRUCTURAL DRAWINGS - FOUNDATION & WALLS REINFORCEMENTS DETAILS	CHECKED BY	
	DRAWING NO.	FSTP-107-03-2		APPROVED BY	

CLIENT
DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)

CONSULTANT
DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS



Foundation Base reinforcement details



Top slab reinforcement details

Top slab reinforcement details

NOTES:

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DESIGN BY		SCALE	AS SHOWN	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - INTERGRATED SETTLER, ABR & ANAEROBIC FILTER - FOUNDATION BASE & TOP SLAB REINFORCEMENT DETAILS	CHECKED BY		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
SHEET NO:		DRAWING NO.	FSTP-107-03-3		APPROVED BY		

Bar Bending schedule

Member	Mark	Diameter	Total Numbers/Area	Length (mm)	Unit weight (kg/m)	Total weight (kg)	Bar bending shape
Base	01	Y12	81	6750	0.888	468	
	01a	Y12	81	7000	0.888	504	
	02	Y12	62	10250	0.888	565	
	02a	Y12	62	10000	0.888	551	
	03,03a	Y12	162	6550	0.888	943	
	04	Y12	124	8650	0.888	952	
Walls	05	Y12	708	3500	0.888	2,200	
	06	Y12	112	6350	0.888	632	
	06a	Y12	112	8250	0.888	821	
	06b	Y10	56	9350	0.616	323	
	06c	Y10	28	3650	0.616	63	
	07	Y10	1284	3500	0.616	2,769	
	08	Y10	448	6350	0.616	1,753	
Bott beam	05a	Y16	24	6300	1.578	239	
	05b	Y08	351	1400	0.312	154	
	05c	Y16	16	8350	1.578	211	
Top Slab	01	Y10	232	6350	0.616	907	
	02	Y10	304	8250	0.616	1,545	
					Total	15,600	

NOTES:

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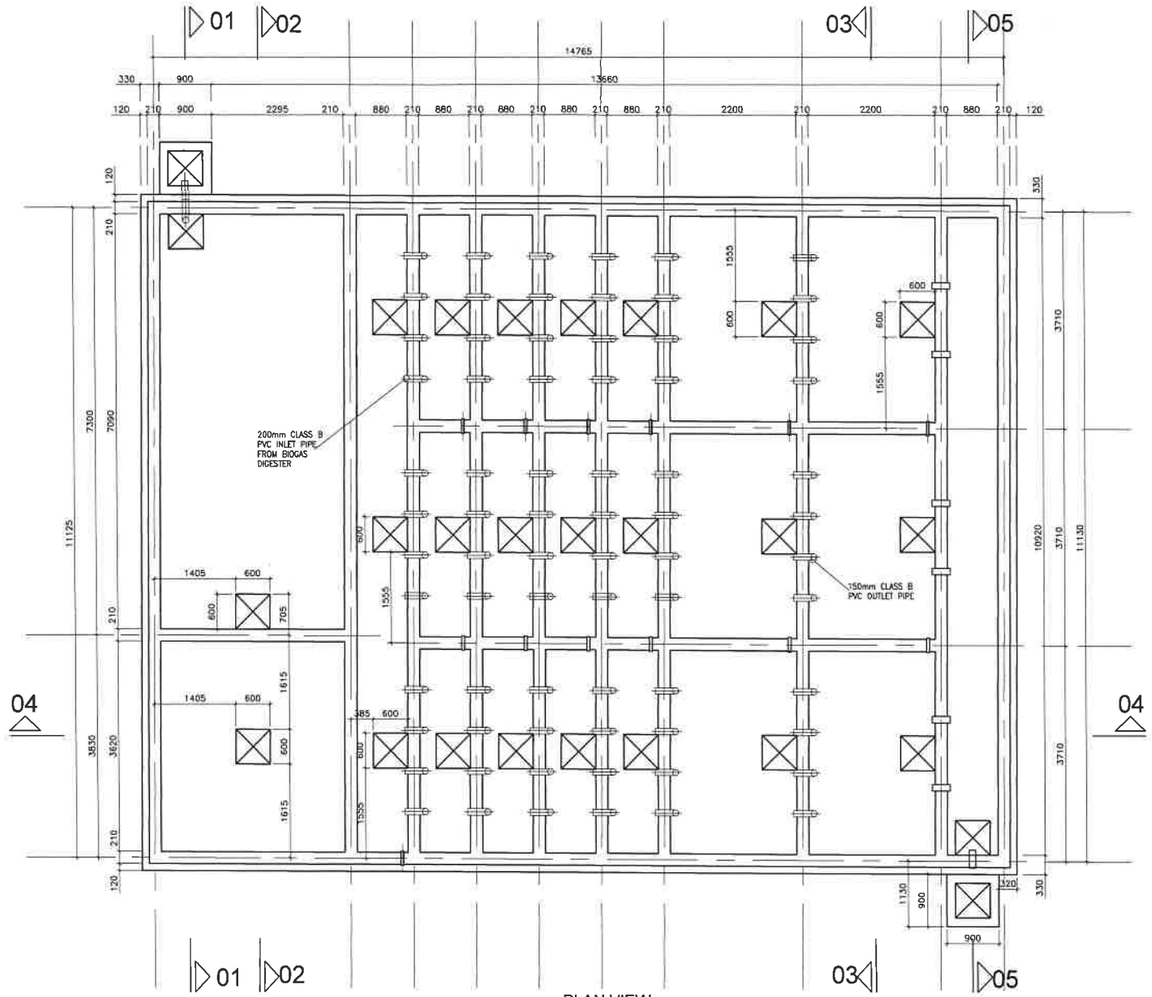
2. DO NOT SCALE FROM THIS DRAWING
3. THE SCALES GIVEN ON THIS DRAWING REFER TO THE A1 SIZE ORIGINAL DRAWING
4. THE SUBGRADE SHALL BE COMPACTED TO 99% MAXIMUM DRY DENSITY BEFORE THE PLACEMENT OF HARDCORE
5. CONCRETE SHALL BE CLASS C30/37 FOR STRUCTURAL MEMBERS AND CLASS C8/10 FOR BLINDING
6. THE MAXIMUM SIZE OF AGGREGATE SHALL BE 20mm UNLESS OTHERWISE SHOWN
7. REINFORCEMENT SHALL BE HIGH TENSILE DEFORMED TYPE WITH A CHARACTERISTIC YIELD STRESS OF AT LEAST 429N/mm²
8. COVER TO REINFORCEMENT SHALL BE:
   - FOUNDATIONS 50mm
   - SLABS 25mm
   - WALLS AND BEAMS 30mm
9. LAPS TO ALL REINFORCEMENT SHALL BE 50 * BAR DIAMETER UNLESS OTHERWISE SHOWN

DESIGN BY		SCALE	AS SHOWN	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - INTERGRATED SETTLER, ABR & ANAEROBIC FILTER - REINFORCEMENT DETAILS & BAR BENDING SCHEDULE	CHECKED BY		
SHEET NO:		DRAWING NO.	FSTP-107-03-4		APPROVED BY		



PLAN VIEW
SCALE 1:50

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN
2. DO NOT SCALE FROM THIS DRAWING
3. THE SCALES GIVEN ON THIS DRAWING REFER TO THE A1 SIZE ORIGINAL DRAWING
4. THE SUBGRADE SHALL BE COMPACTED TO 99% MAXIMUM DRY DENSITY BEFORE THE PLACEMENT OF HARDCORE
5. CONCRETE SHALL BE CLASS C30/37 FOR STRUCTURAL MEMBERS AND CLASS C8/10 FOR BLINDING
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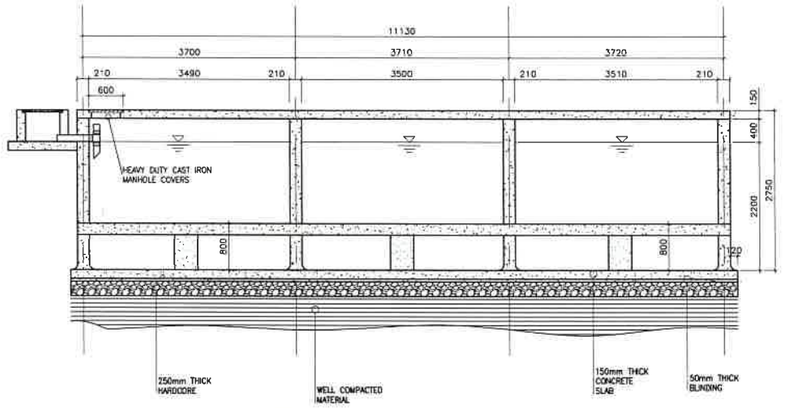
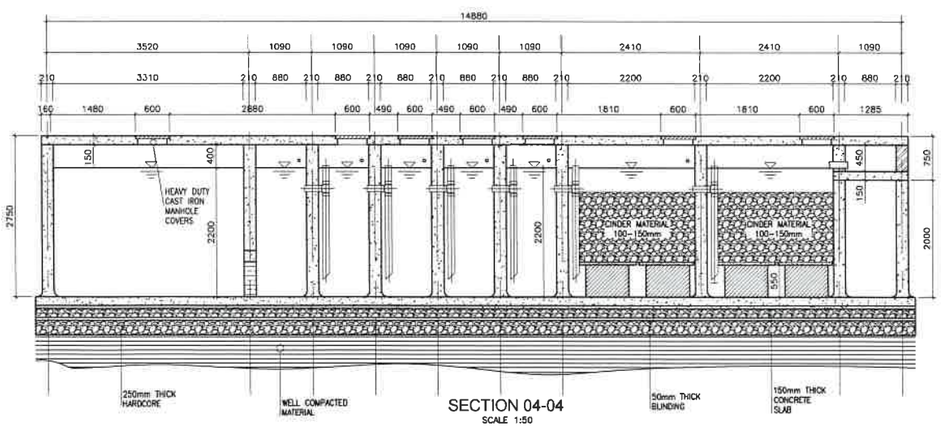
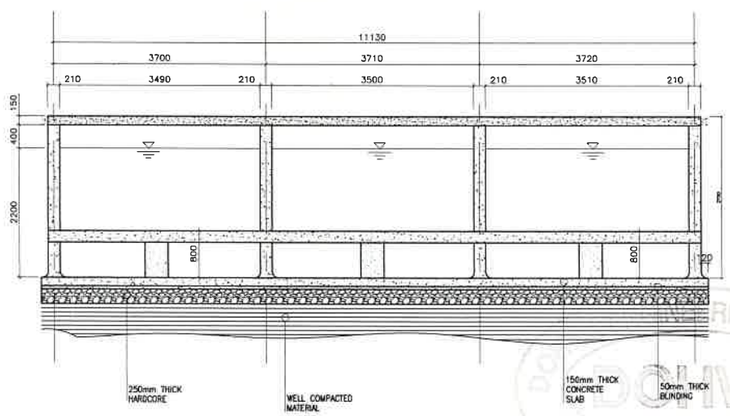
7. REINFORCEMENT SHALL BE HIGH TENSILE DEFORMED TYPE WITH A CHARACTERISTIC YIELD STRESS OF AT LEAST 429N/mm²
8. COVER TO REINFORCEMENT SHALL BE:
   - FOUNDATIONS 50mm
   - SLABS 25mm
   - WALLS AND BEAMS 30mm
9. LAPS TO ALL REINFORCEMENT SHALL BE 50 * BAR DIAMETER UNLESS OTHERWISE SHOWN



SECTION 01-01
SCALE 1:50

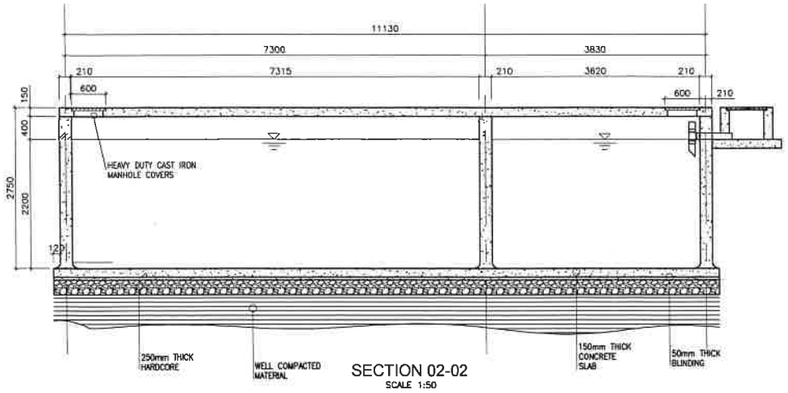


SECTION 04-04
SCALE 1:50

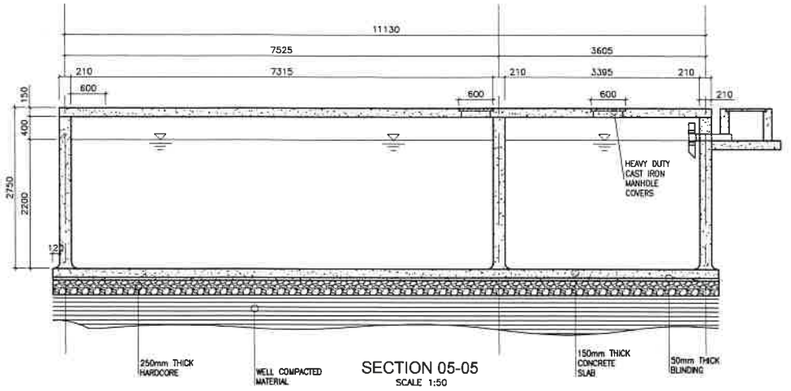


SECTION 03-03
SCALE 1:50

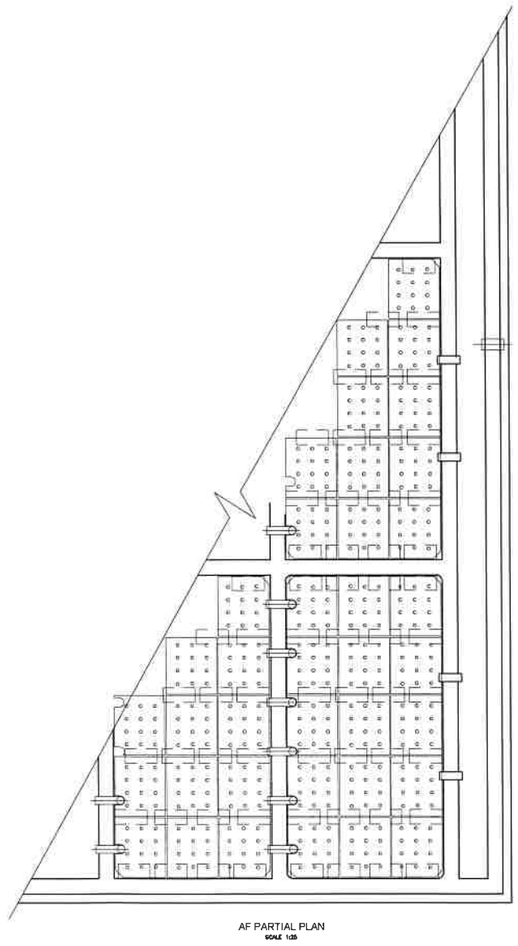
DESIGN BY		SCALE	AS SHOWN	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - INTERGRATED SETTLER, ABR & ANAEROBIC FILTER - PLAN VIEW AND SECTIONS GENERAL ARRANGEMENTS	CHECKED BY		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
SHEET NO:		DRAWING NO.	FSTP-107-03-A		APPROVED BY		



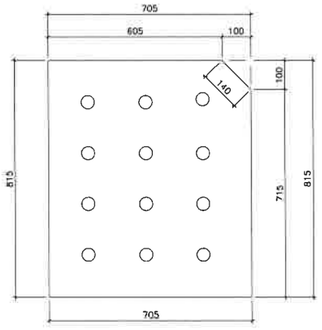
SECTION 02-02
SCALE 1:50



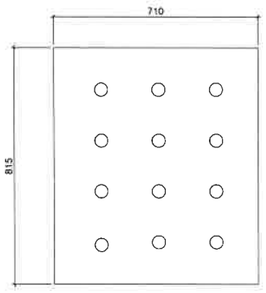
SECTION 05-05
SCALE 1:50



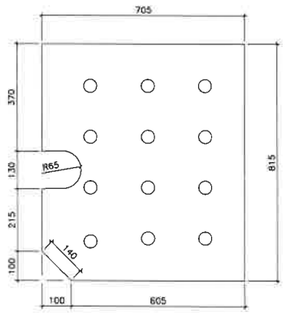
AF PARTIAL PLAN
SCALE 1:35



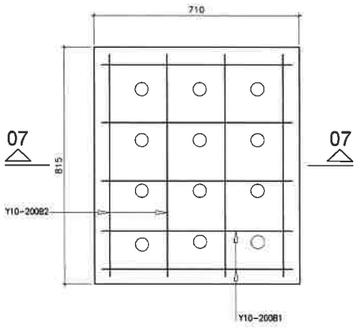
AF SLAB TYPE I
--- UNITS
SCALE 1:10



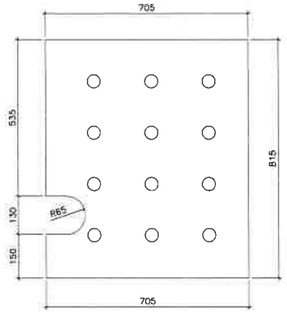
AF SLAB TYPE II
--- UNITS
SCALE 1:10



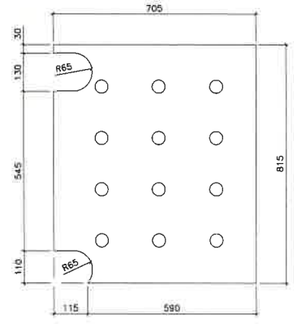
AF SLAB TYPE III
--- UNITS
SCALE 1:10



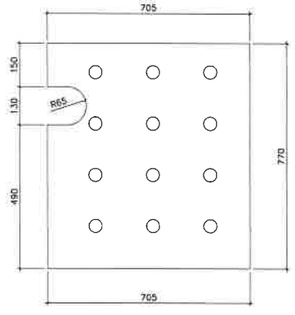
AF SLAB PLAN VIEW
SCALE 1:10



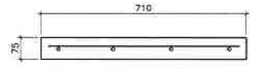
AF SLAB TYPE IV
--- UNITS
SCALE 1:10



AF SLAB TYPE V
--- UNITS
SCALE 1:10

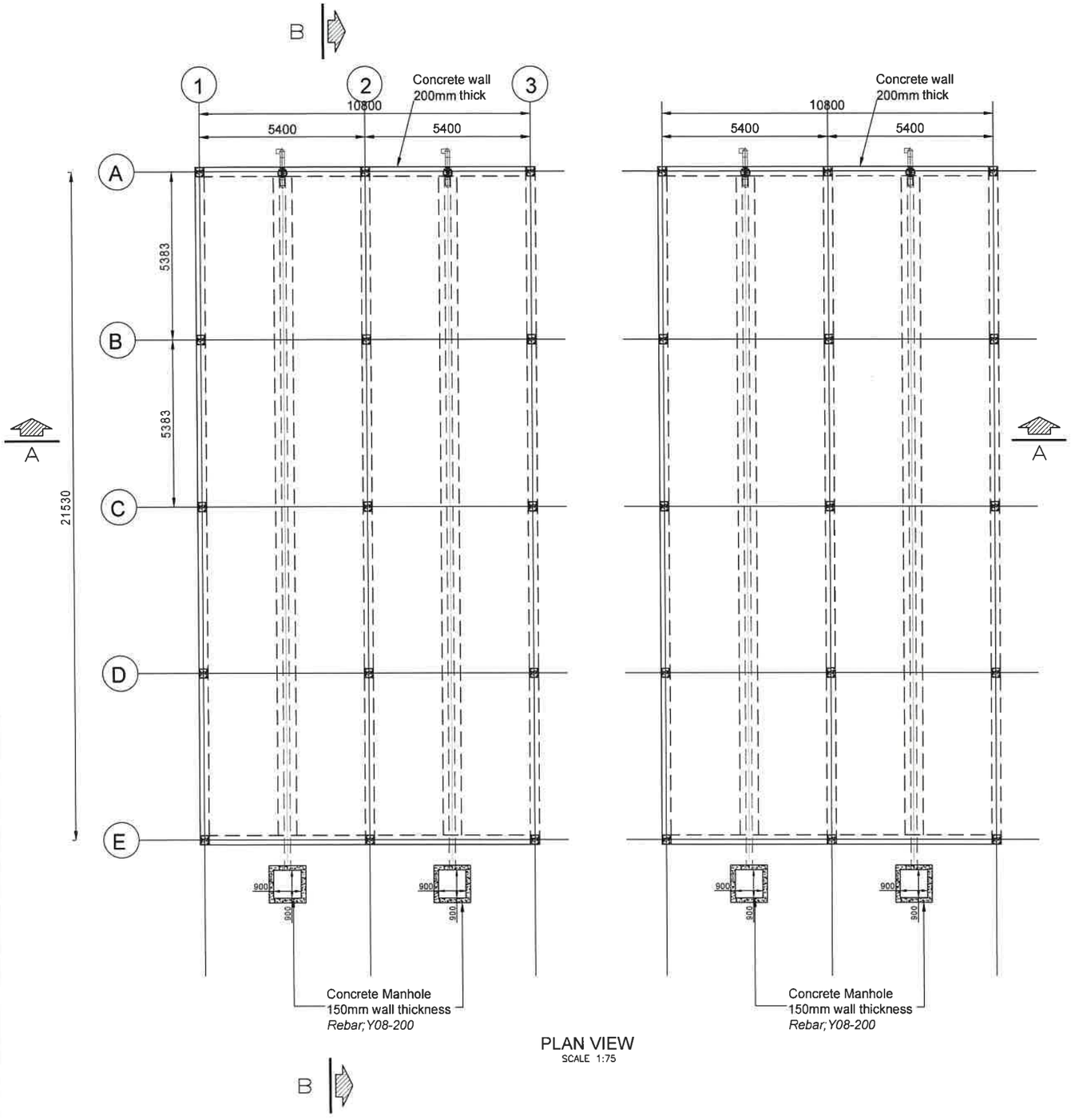


---AF SLAB TYPE VI
--- UNITS
SCALE 1:10

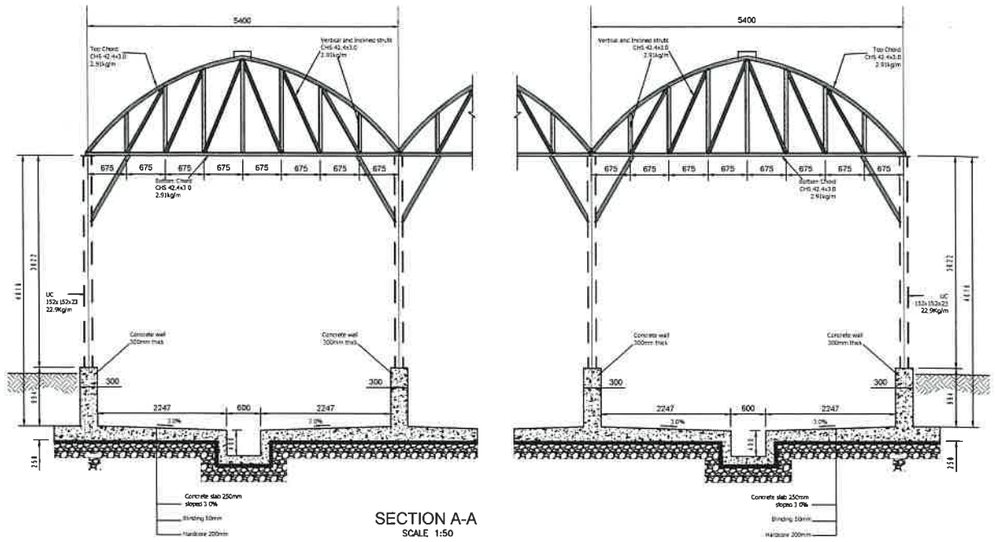


SECTION 07 - 07
SCALE 1:10

DESIGN BY		SCALE	AS SHOWN	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - INTERGRATED SETTLER, ABR & ANAEROBIC FILTER - SECTIONS & FILTERS GENERAL ARRANGEMENTS	CHECKED BY		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
SHEET NO:		DRAWING NO.	FSTP-107-03-B		APPROVED BY		



PLAN VIEW
SCALE 1:75



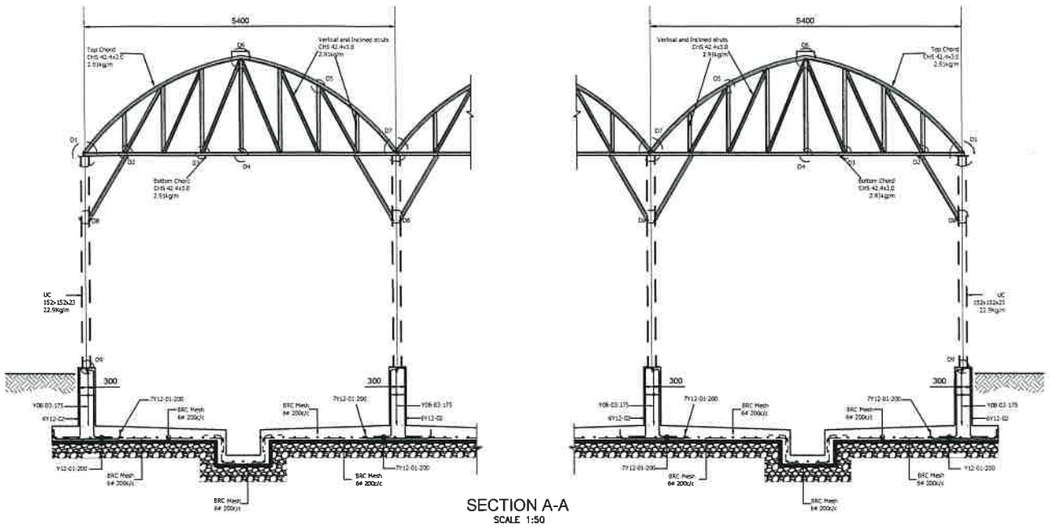
SECTION A-A
SCALE 1:50

NOTES:

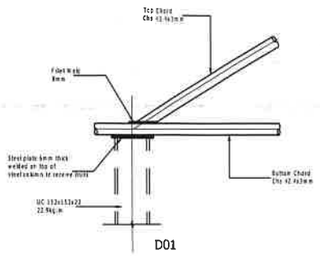
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN
2. DO NOT SCALE FROM THIS DRAWING
3. THE SCALES GIVEN ON THIS DRAWING REFER TO THE A1 SIZE ORIGINAL DRAWING
4. THE SUBGRADE SHALL BE COMPACTED TO 99% MAXIMUM DRY DENSITY BEFORE THE PLACEMENT OF HARDCORE
5. CONCRETE SHALL BE CLASS C30/37 FOR STRUCTURAL MEMBERS AND CLASS C8/10 FOR BLINDING
6. THE MAXIMUM SIZE OF AGGREGATE SHALL BE 20mm UNLESS OTHERWISE SHOWN
7. REINFORCEMENT SHALL BE HIGH TENSILE DEFORMED TYPE WITH A CHARACTERISTIC YIELD STRESS OF AT LEAST 429N/mm²
8. COVER TO REINFORCEMENT SHALL BE:
   - FOUNDATIONS 50mm
   - SLABS 25mm
   - WALLS AND BEAMS 30mm
9. LAPS TO ALL REINFORCEMENT SHALL BE 50 * BAR DIAMETER UNLESS OTHERWISE SHOWN

DOHWA ENGINEERING CO., LTD
DOHWA
REPUBLIC OF KOREA

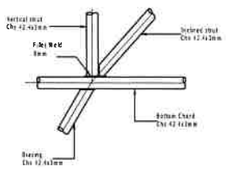
DESIGN BY		SCALE	AS SHOWN	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - UNPLANTED DRYING BEDS STRUCTURAL DRAWINGS - GENERAL ARRANGEMENTS DETAILS	CHECKED BY		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
SHEET NO:		DRAWING NO.	FSTP-107-03-2		APPROVED BY		



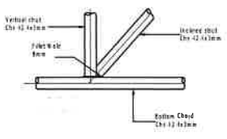
SECTION A-A
SCALE 1:50



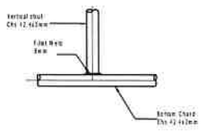
D01



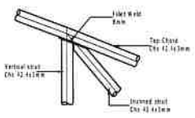
D02



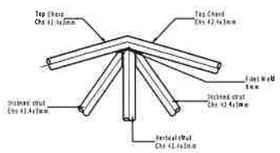
D03



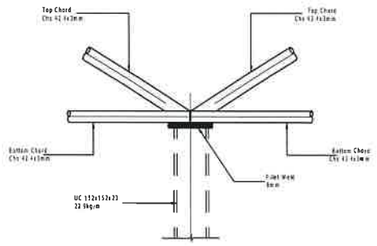
D04



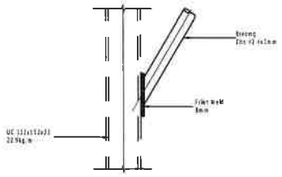
D05



D06



D07



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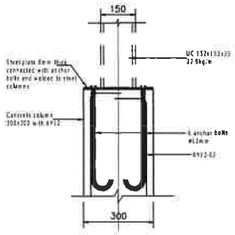
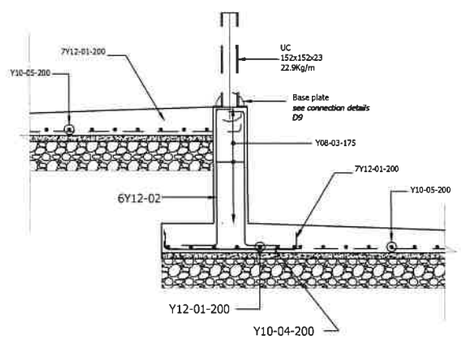


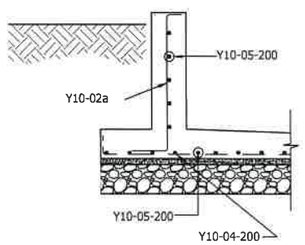
D09

BAR BENDING SCHEDULE

Mark	Diameter	Total Numbers/Area	Length (mm)	Unit weight (kg/m)	Total weight (kg)	Bar bending shape
01	Y12	168	1250	0.888	187	
02	Y12	72	1750	0.888	112	
03	Y08	84	1110	0.312	29	
BRC Mesh	R06	124sqm	–	2.22kg/m²	275	
				Total per unit	603	
				Nos of Units	4	
				Total	2,412	



TYPICAL STEP SECTION DETAILS
SCALE 1:25



DETAILS TYPICAL WALL SECTION
SCALE 1:25

CONNECTION DETAILS
SCALE 1:10

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN
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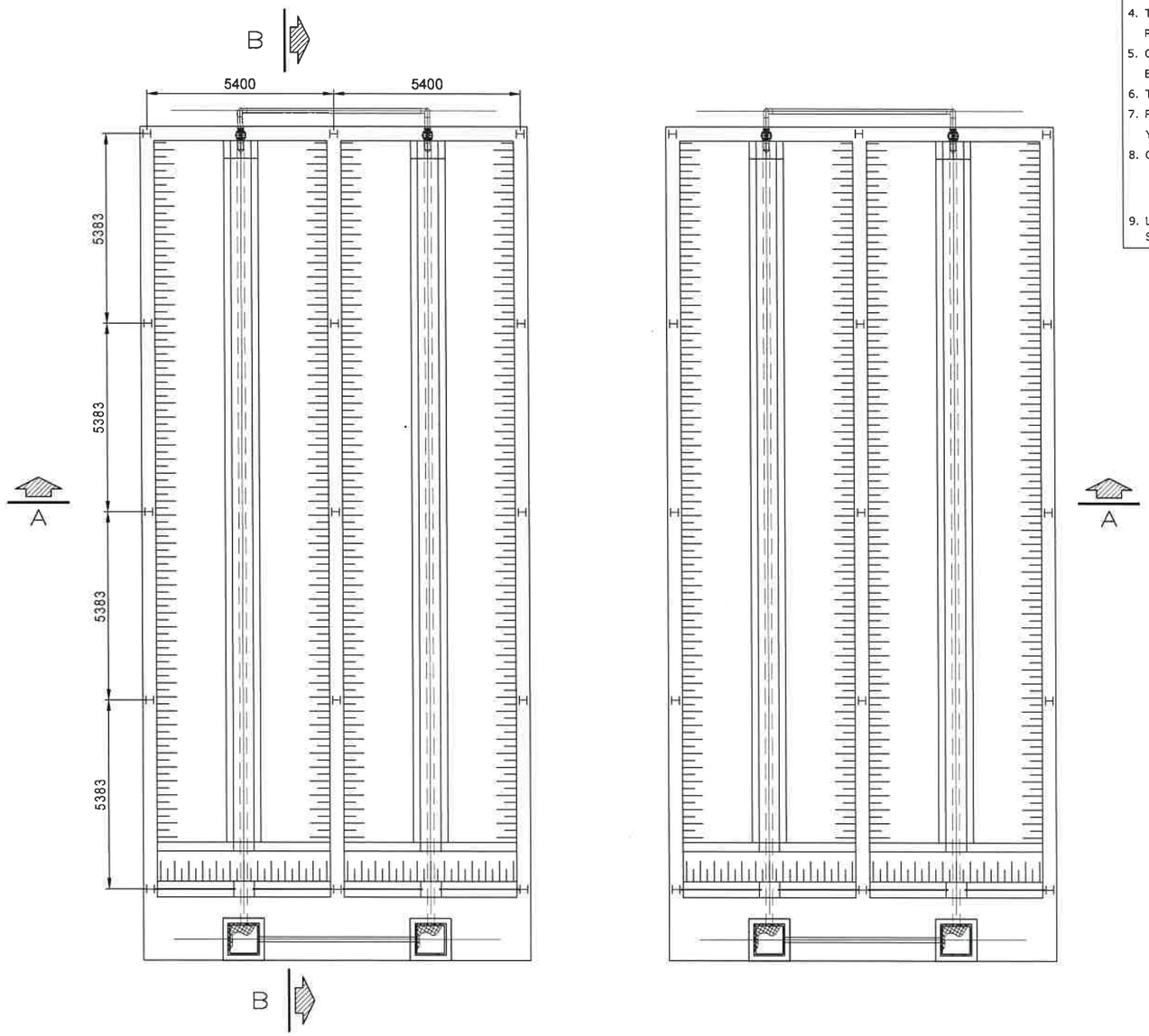
4. THE SUBGRADE SHALL BE COMPACTED TO 99% MAXIMUM DRY DENSITY BEFORE THE PLACEMENT OF HARDCORE
5. CONCRETE SHALL BE CLASS C30/37 FOR STRUCTURAL MEMBERS AND CLASS C8/10 FOR BLINDING
6. THE MAXIMUM SIZE OF AGGREGATE SHALL BE 20mm UNLESS OTHERWISE SHOWN
7. REINFORCEMENT SHALL BE HIGH TENSILE DEFORMED TYPE WITH A CHARACTERISTIC YIELD STRESS OF AT LEAST 429N/mm²
8. COVER TO REINFORCEMENT SHALL BE:
   - FOUNDATIONS 50mm
   - SLABS 25mm
   - WALLS AND BEAMS 30mm
9. LAPS TO ALL REINFORCEMENT SHALL BE 50 * BAR DIAMETER UNLESS OTHERWISE SHOWN

DESIGN BY		SCALE	AS SHOWN	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY. (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - UNPLANTED DRYING BEDS STRUCTURAL DRAWINGS - REINFORCEMENTS DETAILS, STEEL CONNECTION & FOUNDATION DETAILS	CHECKED BY		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
SHEET NO:		DRAWING NO.	FSTP-107-04-2		APPROVED BY		



NOTES:

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3. THE SCALES GIVEN ON THIS DRAWING REFER TO THE A1 SIZE ORIGINAL DRAWING
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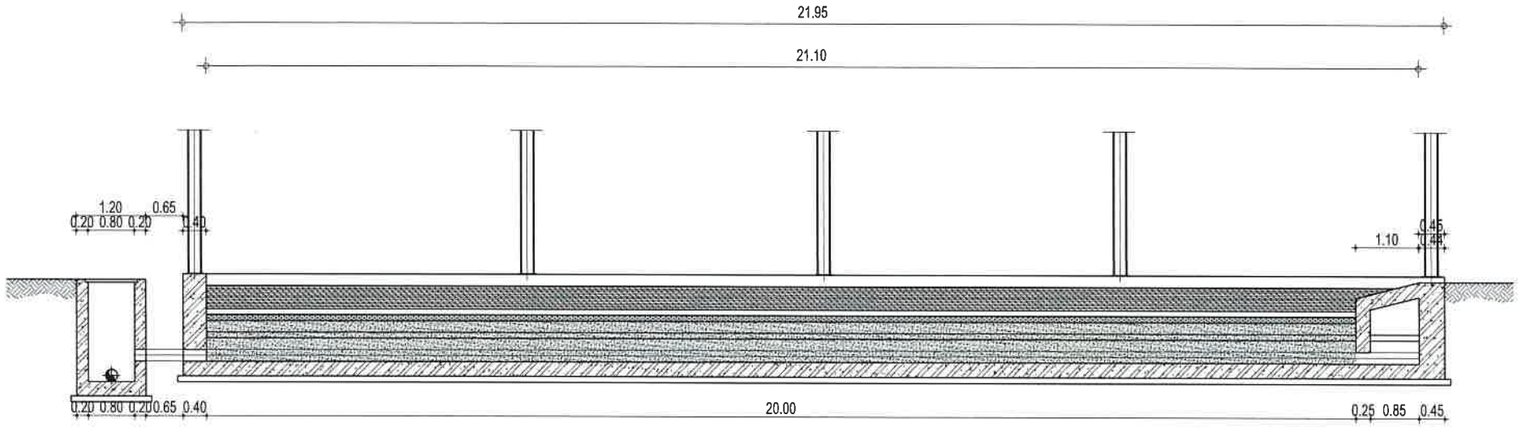
5. CONCRETE SHALL BE CLASS C30/37 FOR STRUCTURAL MEMBERS AND CLASS C8/10 FOR BLINDING
6. THE MAXIMUM SIZE OF AGGREGATE SHALL BE 20mm UNLESS OTHERWISE SHOWN
7. REINFORCEMENT SHALL BE HIGH TENSILE DEFORMED TYPE WITH A CHARACTERISTIC YIELD STRESS OF AT LEAST 429N/mm²
8. COVER TO REINFORCEMENT SHALL BE:
   - FOUNDATIONS 50mm
   - SLABS 25mm
   - WALLS AND BEAMS 30mm
9. LAPS TO ALL REINFORCEMENT SHALL BE 50 * BAR DIAMETER UNLESS OTHERWISE SHOWN

X

DESIGN BY		SCALE	1:75	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - UNPLANTED DRYING BEDS (UDB) PLAN VIEW GENERAL ARRANGEMENT	CHECKED BY		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
SHEET NO:		DRAWING NO.	FSTP-107-04-A		APPROVED BY		

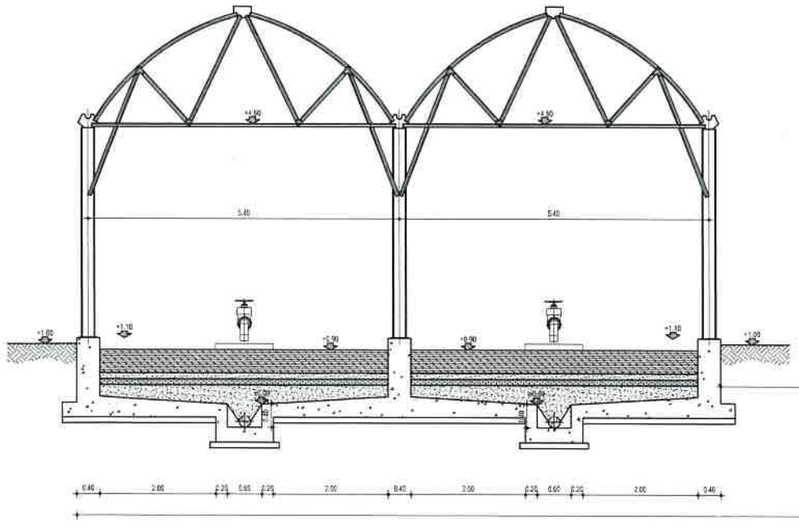
B



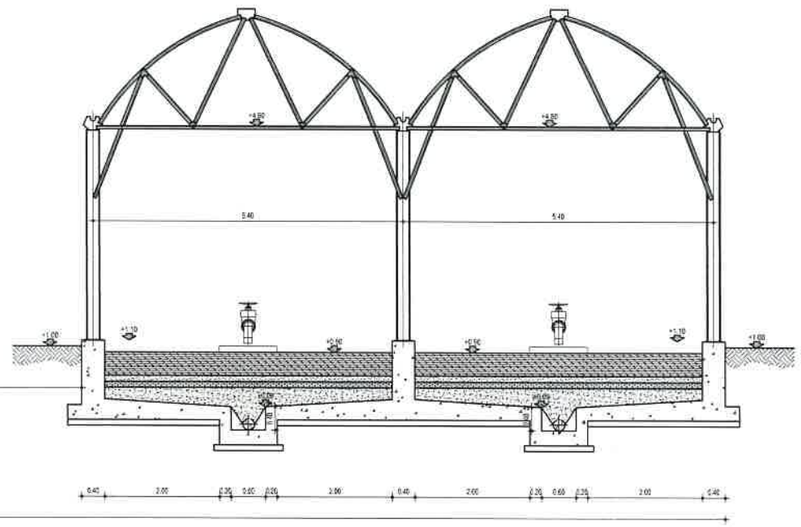
SECTION B-B

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN
2. DO NOT SCALE FROM THIS DRAWING
3. THE SCALES GIVEN ON THIS DRAWING REFER TO THE A1 SIZE ORIGINAL DRAWING
4. THE SUBGRADE SHALL BE COMPACTED TO 99% MAXIMUM DRY DENSITY BEFORE THE PLACEMENT OF HARDCORE
5. CONCRETE SHALL BE CLASS C30/37 FOR STRUCTURAL MEMBERS AND CLASS C8/10 FOR BLINDING
6. THE MAXIMUM SIZE OF AGGREGATE SHALL BE 20mm UNLESS OTHERWISE SHOWN
7. REINFORCEMENT SHALL BE HIGH TENSILE DEFORMED TYPE WITH A CHARACTERISTIC YIELD STRESS OF AT LEAST 429N/mm²
8. COVER TO REINFORCEMENT SHALL BE:
   - FOUNDATIONS 50mm
   - SLABS 25mm
   - WALLS AND BEAMS 30mm
9. LAPS TO ALL REINFORCEMENT SHALL BE 50 * BAR DIAMETER UNLESS OTHERWISE SHOWN



SECTION A-A



LEGEND:

DRYING BEDS FOR FSTP

1. SLUDGE FEEDING PIPE
2. SLUDGE FEEDING PIPE
3. SLUDGE FEEDING GATE VALVE
4. DRAIN COLLECTION PERFORATED PIPE
5. REMOVABLE PLATE
6. LIGHT METALLIC STRUCTURE AND SEMI TRANSPARENT ROOF COVER
7. COATED MILD STEEL COLUMN - I SECTION
8. GRAVEL BOTTOM LAYER - H=0.2m, GRAVEL Ø 15-30mm
9. INTERMEDIATE SAND LAYER - H=0.1m, SAND Ø 7-15mm
10. TOP SAND LAYER. H=0.1m, SAND Ø 0.2-0.6mm
11. WET SLUDGE LAYER. H=0.4m
12. LEACHATE OUTLET PIPE

DOHWA ENGINEERING CO., LTD DOHWA

DESIGN BY		SCALE	1:50
DRAWN BY			
CHECKED BY			
APPROVED BY		DATE	JANUARY-2022
SHEET NO:		DRAWING NO.	FSTP-107-04-A

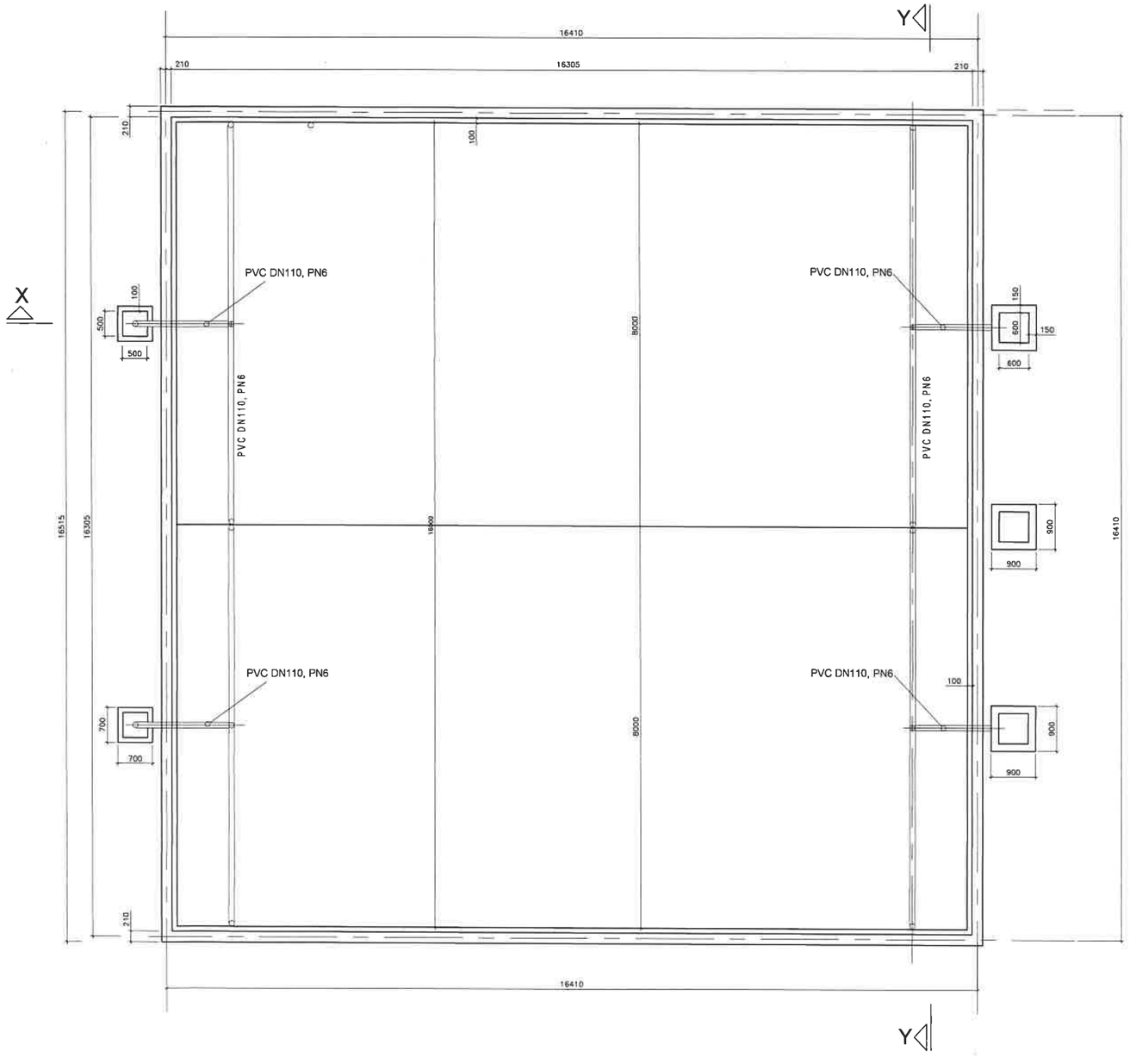
PROJECT
CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM

TITLE
FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - UNPLANTED DRYING BEDS (UDB) SECTIONS GENERAL ARRANGEMENT

REVISION	
DATE	
NATURE OF REV.	
CHECKED BY	
APPROVED BY	

CLIENT
DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)

CONSULTANT
DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS



PLAN VIEW
SCALE 1:50

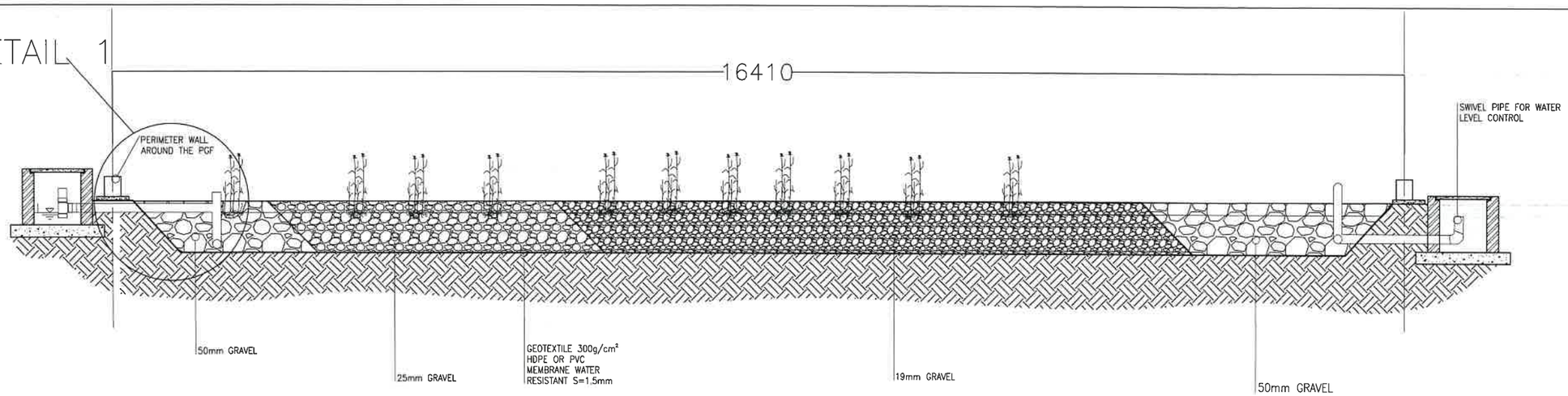
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN
2. DO NOT SCALE FROM THIS DRAWING
3. THE SCALES GIVEN ON THIS DRAWING REFER TO THE A1 SIZE ORIGINAL DRAWING
4. THE SUBGRADE SHALL BE COMPACTED TO 99% MAXIMUM DRY DENSITY BEFORE THE PLACEMENT OF HARDCORE
5. ALL PIPES ARE PVC DN110, PN6

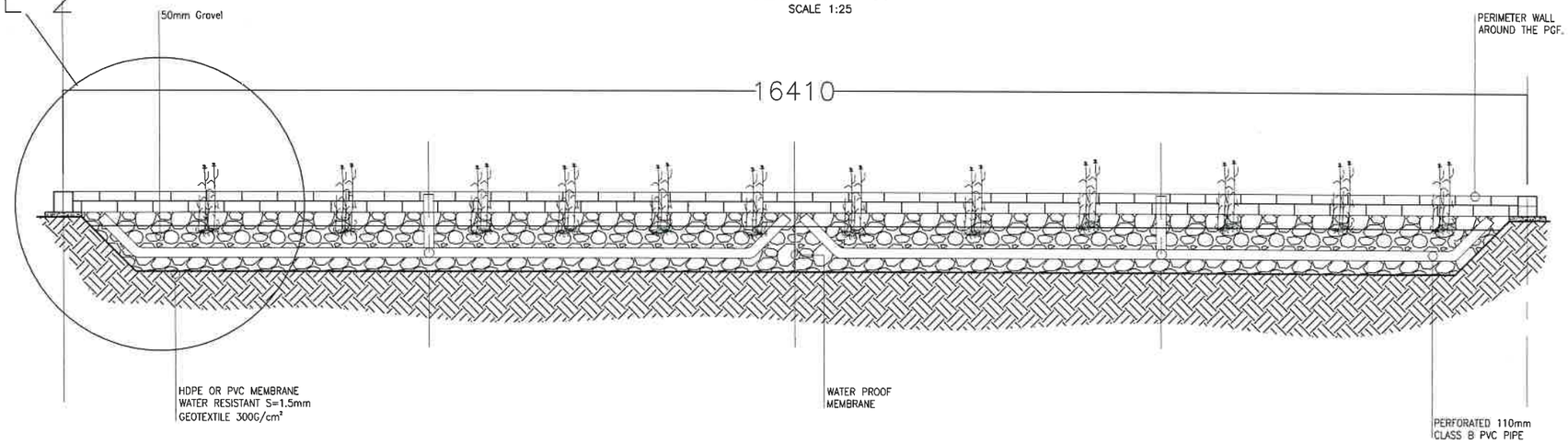
DOHWA ENGINEERING CO., LTD

DESIGN BY		SCALE	AS SHOWN	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - PLANTED GRAVEL FILTER - PLAN VIEW GENERAL ARRANGEMENT DETAILS	CHECKED BY		
SHEET NO:		DRAWING NO.	FSTP-107-05-1		APPROVED BY		

DETAIL 1

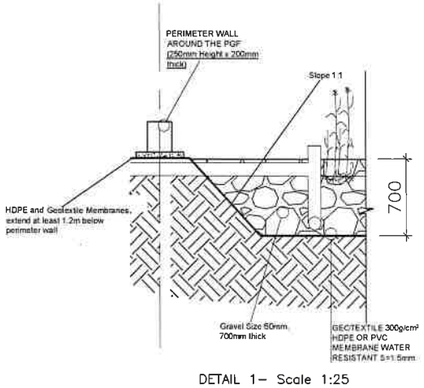


DETAIL 2

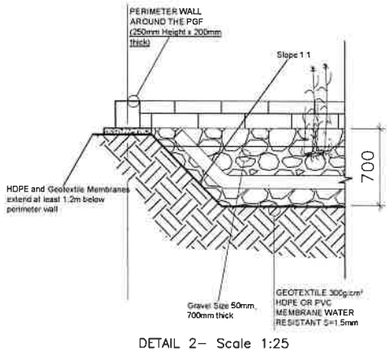


SECTION X - X
SCALE 1:25

SECTION Y - Y
SCALE 1:25



DETAIL 1– Scale 1:25



DETAIL 2– Scale 1:25

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN
2. DO NOT SCALE FROM THIS DRAWING
3. THE SCALES GIVEN ON THIS DRAWING REFER TO THE A1 SIZE ORIGINAL DRAWING
4. THE SUBGRADE SHALL BE COMPACTED TO 99% MAXIMUM DRY DENSITY BEFORE THE PLACEMENT OF HARDCORE
5. ALL PIPES ARE PVC DN110, PN6

DESIGN BY		SCALE	AS SHOWN
DRAWN BY			
CHECKED BY			
APPROVED BY		DATE	JANUARY-2022
SHEET NO:		DRAWING NO.	FSTP-107-05-2

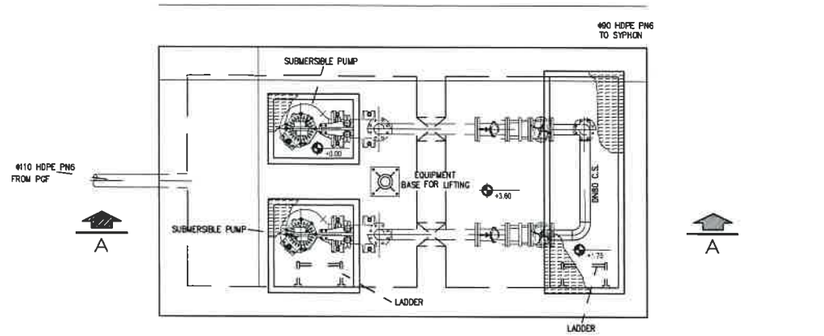
PROJECT
CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM

TITLE
FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - PLANTED GRAVEL FILTER - SECTIONS GENERAL ARRANGEMENT DETAILS

REVISION	
DATE	
NATURE OF REV.	
CHECKED BY	
APPROVED BY	

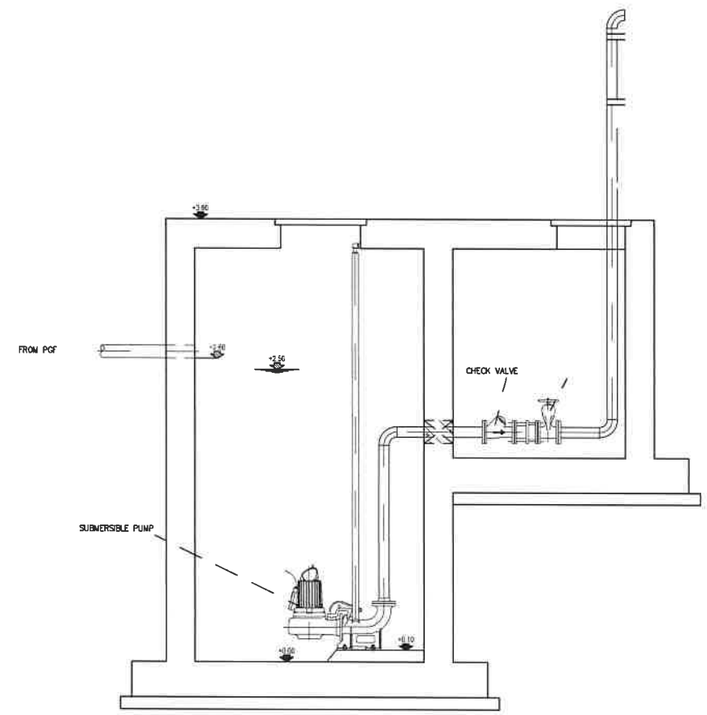
CLIENT
DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)

CONSULTANT
DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS



PLAN VIEW

LEGEND
METAL COVER - CARBON STEEL

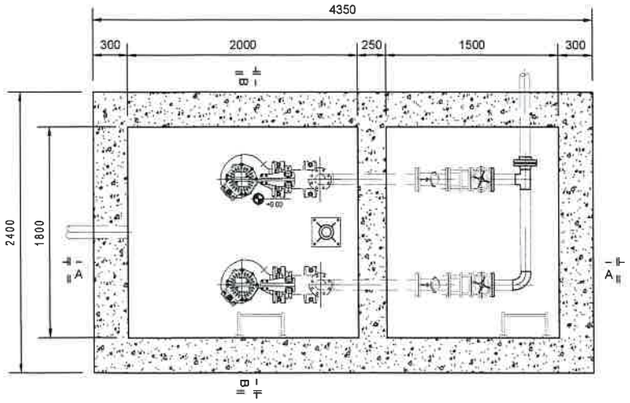


SECTION A–A

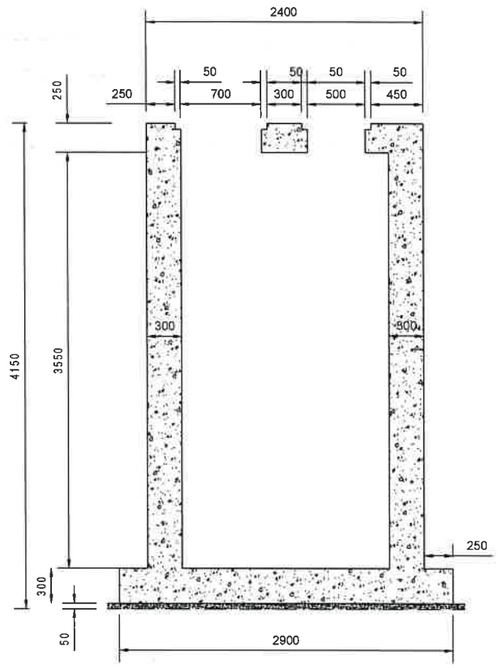
NOTES:

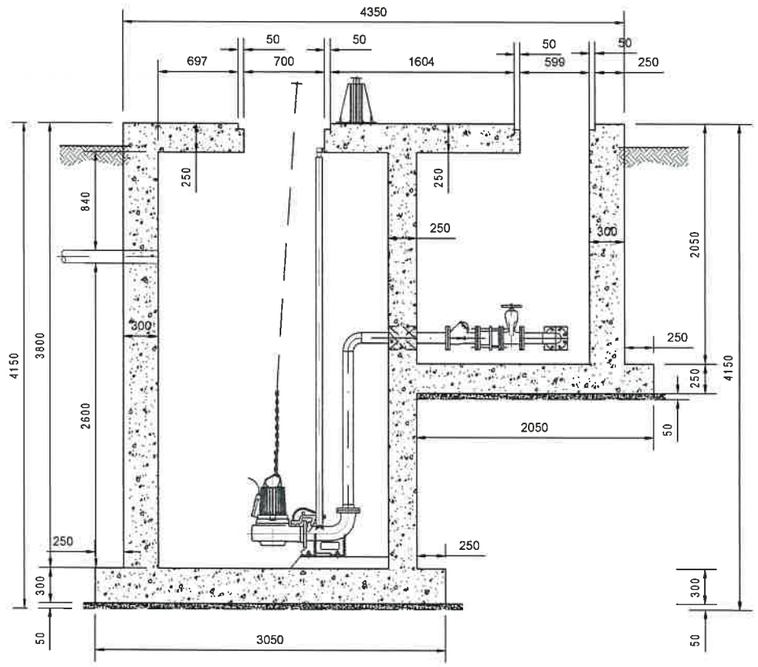
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN
2. DO NOT SCALE FROM THIS DRAWING
3. THE SCALES GIVEN ON THIS DRAWING REFER TO THE A1 SIZE ORIGINAL DRAWING
4. THE SUBGRADE SHALL BE COMPACTED TO 99% MAXIMUM DRY DENSITY BEFORE THE PLACEMENT OF HARDCORE
5. CONCRETE SHALL BE CLASS C30/37 FOR STRUCTURAL MEMBERS AND CLASS C8/10 FOR BLINDING
6. THE MAXIMUM SIZE OF AGGREGATE SHALL BE 20mm UNLESS OTHERWISE SHOWN
7. REINFORCEMENT SHALL BE HIGH TENSILE DEFORMED TYPE WITH A CHARACTERISTIC YIELD STRESS OF AT LEAST 429N/mm²
8. COVER TO REINFORCEMENT SHALL BE:
   - FOUNDATIONS 50mm
   - SLABS 25mm
   - WALLS AND BEAMS 30mm
9. LAPS TO ALL REINFORCEMENT SHALL BE 50 * BAR DIAMETER UNLESS OTHERWISE SHOWN

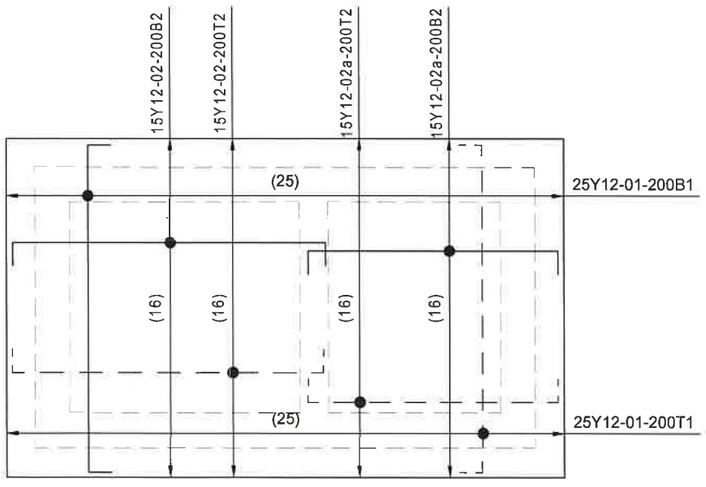
DESIGN BY		SCALE	1:25	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - PUMP STATION - PLAN & SECTION GENERAL ARRANGEMENT DETAILS	CHECKED BY		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
SHEET NO:		DRAWING NO.	FSTP-107-06		APPROVED BY		



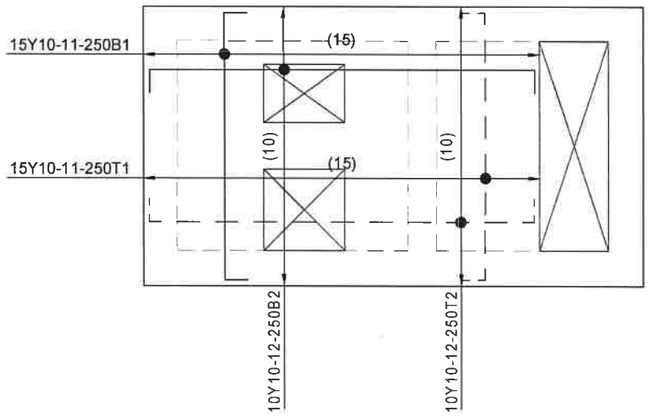
Plan







Foundation base rc details

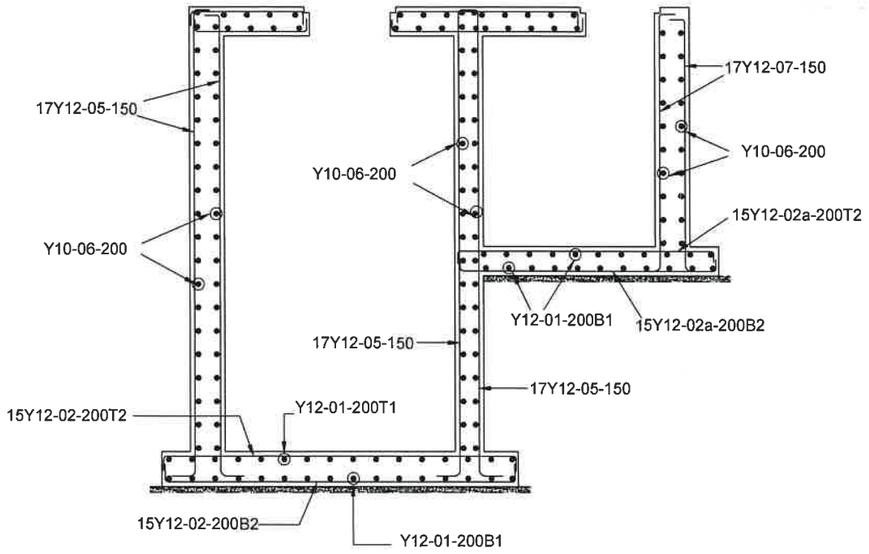


Top slab rc details

NOTES:

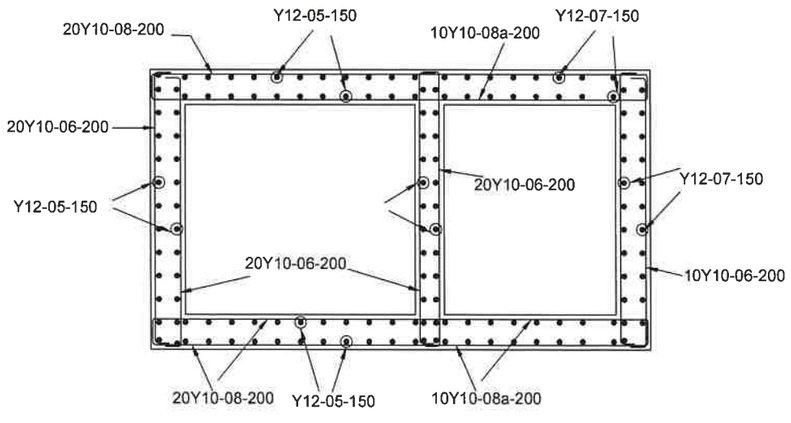
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN
2. DO NOT SCALE FROM THIS DRAWING
3. THE SCALES GIVEN ON THIS DRAWING REFER TO THE A1 SIZE ORIGINAL DRAWING
4. THE SUBGRADE SHALL BE COMPACTED TO 99% MAXIMUM DRY DENSITY BEFORE THE PLACEMENT OF HARDCORE
5. CONCRETE SHALL BE CLASS C30/37 FOR STRUCTURAL MEMBERS AND CLASS C8/10 FOR BLINDING
6. THE MAXIMUM SIZE OF AGGREGATE SHALL BE 20mm UNLESS OTHERWISE SHOWN
7. REINFORCEMENT SHALL BE HIGH TENSILE DEFORMED TYPE WITH A CHARACTERISTIC YIELD STRESS OF AT LEAST 429N/mm²
8. COVER TO REINFORCEMENT SHALL BE:
   - FOUNDATIONS 50mm
   - SLABS 25mm
   - WALLS AND BEAMS 30mm
9. LAPS TO ALL REINFORCEMENT SHALL BE 50 * BAR DIAMETER UNLESS OTHERWISE SHOWN

DESIGN BY		SCALE	1:25	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - PUMP STATION - STRUCTURAL DRAWINGS PLAN, SECTIONS GENERAL ARRANGEMENT AND REINFORCEMENTS DETAILS	CHECKED BY		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
SHEET NO:		DRAWING NO.	FSTP-107-06-1		APPROVED BY		

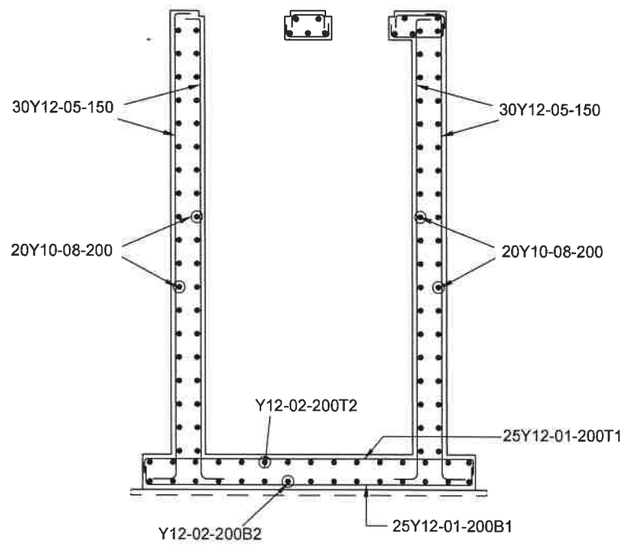


Section A-A, rc details

Mark	Diameter	Total Numbers	Length (mm)	Unit weight (kg/m)	Total weight (kg)	Bar bending shape
01	Y12	50	3100	0.888	138	
02	Y12	30	3000	0.888	80	
02a	Y12	30	2500	0.888	67	
05	Y12	82	4250	0.888	310	
06	Y10	100	2650	0.616	164	
07	Y12	50	2750	0.888	122	
08a	Y10	40	2300	0.616	57	
11	Y10	30	2550	0.616	48	
12	Y10	20	3600	0.616	44	
				Total	1030	



Plan-Reinforcements details



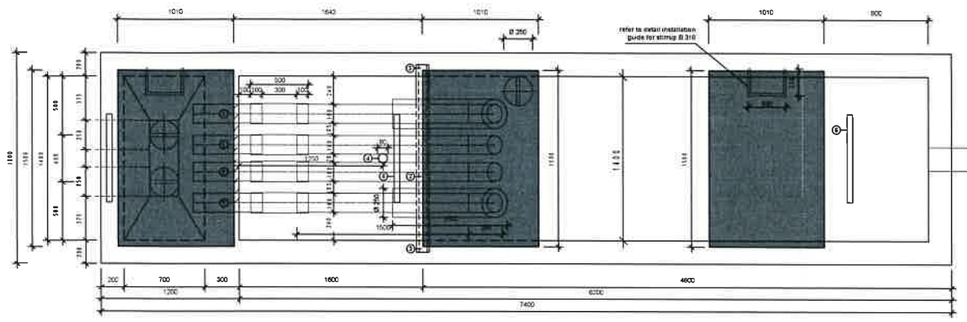
Section B-B, rc details

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN
2. DO NOT SCALE FROM THIS DRAWING
3. THE SCALES GIVEN ON THIS DRAWING REFER TO THE A1 SIZE ORIGINAL DRAWING
4. THE SUBGRADE SHALL BE COMPACTED TO 99% MAXIMUM DRY DENSITY BEFORE THE PLACEMENT OF HARDCORE
5. CONCRETE SHALL BE CLASS C30/37 FOR STRUCTURAL MEMBERS AND CLASS C8/10 FOR BLINDING
6. THE MAXIMUM SIZE OF AGGREGATE SHALL BE 20mm UNLESS OTHERWISE SHOWN
7. REINFORCEMENT SHALL BE HIGH TENSILE DEFORMED TYPE WITH A CHARACTERISTIC YIELD STRESS OF AT LEAST 429N/mm²
8. COVER TO REINFORCEMENT SHALL BE:
   - FOUNDATIONS 50mm
   - SLABS 25mm
   - WALLS AND BEAMS 30mm
9. LAPS TO ALL REINFORCEMENT SHALL BE 50 * BAR DIAMETER UNLESS OTHERWISE SHOWN

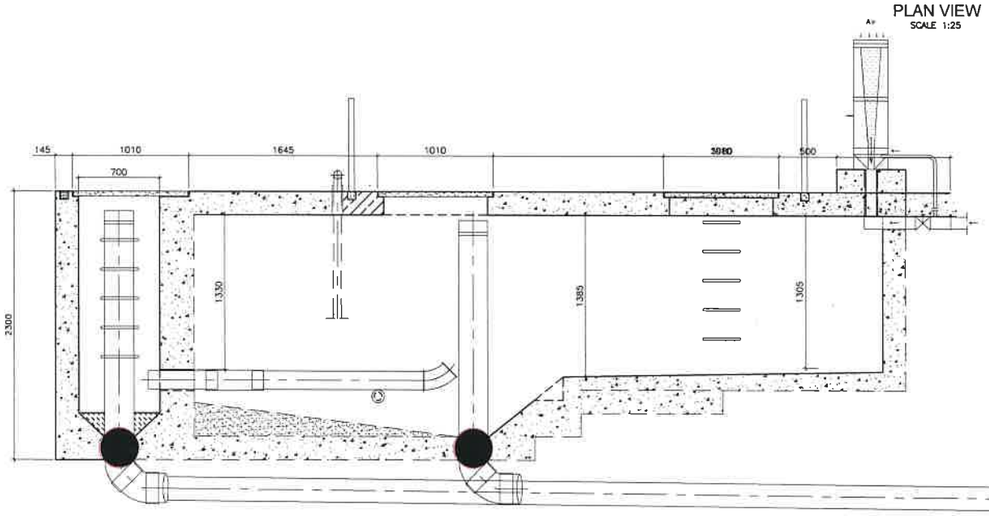
DESIGN BY		SCALE	1:25	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - PUMP STATION - STRUCTURAL DRAWINGS - REINFORCEMENTS DETAILS & BAR BENDING SCHEDULE	CHECKED BY		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
SHEET NO:		DRAWING NO.	FSTP-107-06-2		APPROVED BY		

SIPHON

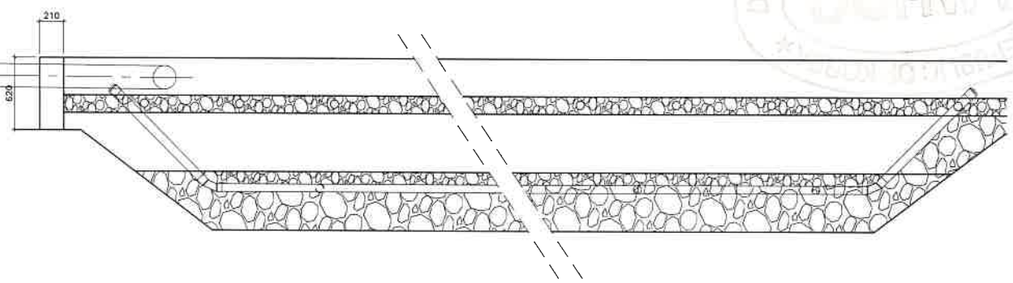


VERTICAL FLOW CONSTRUCTED WETLAND

PLAN VIEW
SCALE 1:25



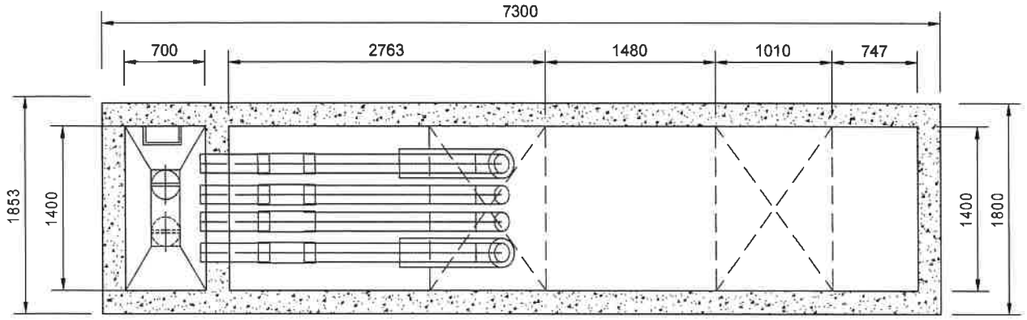
SIPHON



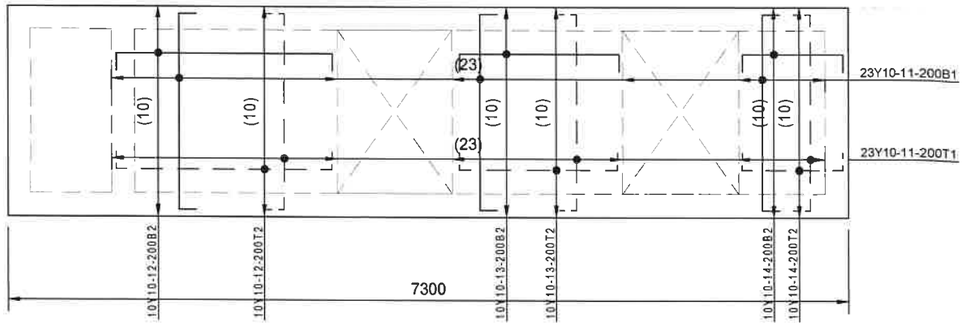
VERTICAL FLOW CONSTRUCTED WETLAND

TYPICAL SECTION
SCALE 1:25

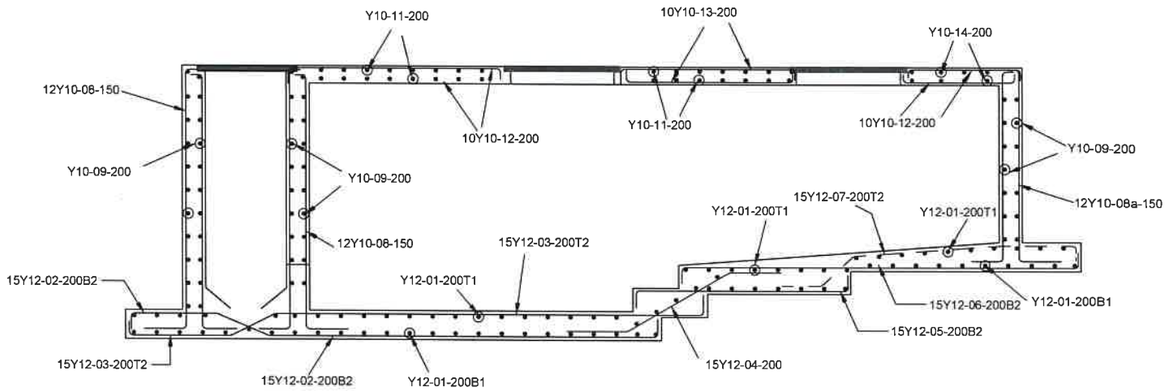
DESIGN BY		SCALE	1:25	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - HYDRO-MECHANICAL SIPHON - PLAN & SECTION GENERAL ARRANGEMENT DETAILS	CHECKED BY		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
SHEET NO:		DRAWING NO.	FSTP-107-07		APPROVED BY		



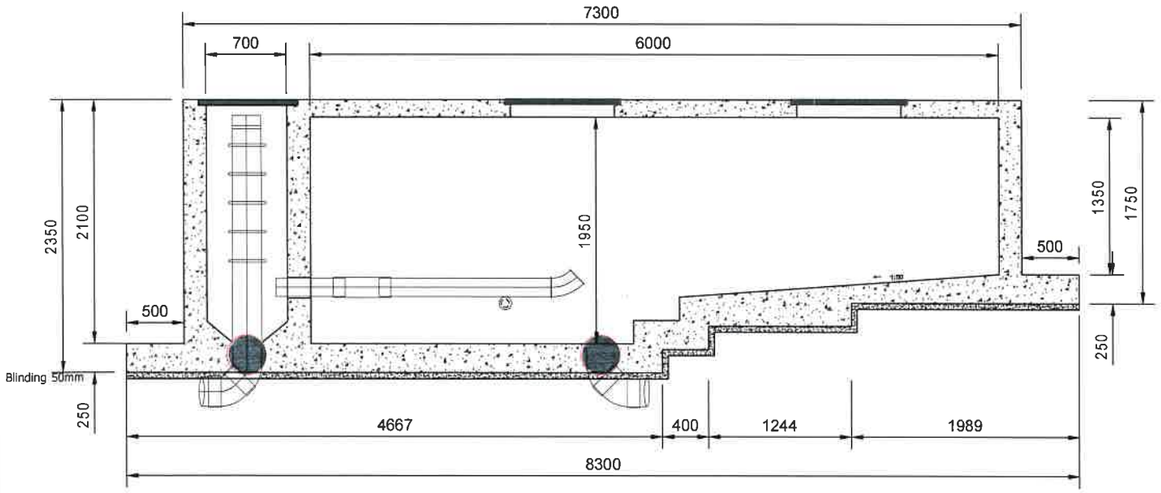
Plan



Top Slab Reinforcements



Walls & Section Reinforcements

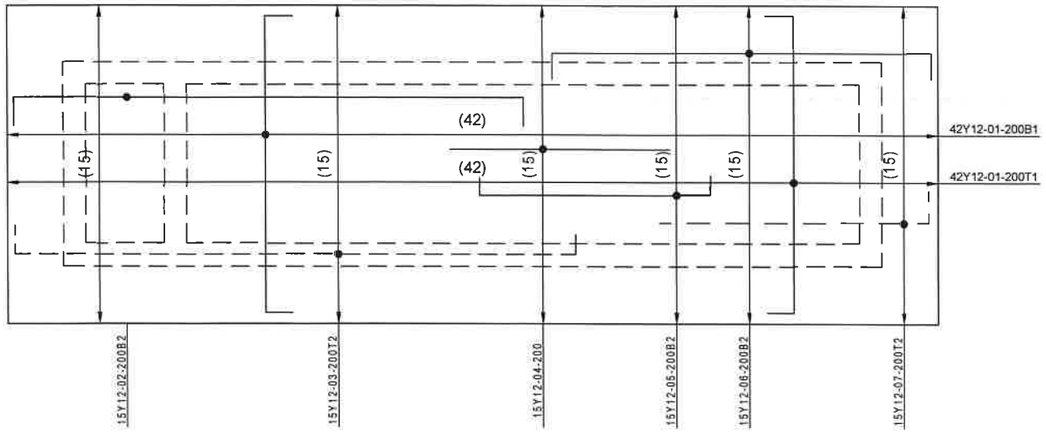


Section

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN
2. DO NOT SCALE FROM THIS DRAWING
3. THE SCALES GIVEN ON THIS DRAWING REFER TO THE A1 SIZE ORIGINAL DRAWING
4. THE SUBGRADE SHALL BE COMPACTED TO 99% MAXIMUM DRY DENSITY BEFORE THE PLACEMENT OF HARDCORE
5. CONCRETE SHALL BE CLASS C30/37 FOR STRUCTURAL MEMBERS AND CLASS C8/10 FOR BLINDING
6. THE MAXIMUM SIZE OF AGGREGATE SHALL BE 20mm UNLESS OTHERWISE SHOWN
7. REINFORCEMENT SHALL BE HIGH TENSILE DEFORMED TYPE WITH A CHARACTERISTIC YIELD STRESS OF AT LEAST 429N/mm²
8. COVER TO REINFORCEMENT SHALL BE:
   - FOUNDATIONS 50mm
   - SLABS 25mm
   - WALLS AND BEAMS 30mm
9. LAPS TO ALL REINFORCEMENT SHALL BE 50 * BAR DIAMETER UNLESS OTHERWISE SHOWN

DESIGN BY		SCALE	1:25	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - HYDRO-MECHANICAL SIPHON - STRUCTURAL PLAN, SECTIONS GENERAL ARRANGEMENT AND REINFORCEMENTS DETAILS	CHECKED BY		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
SHEET NO:		DRAWING NO.	FSTP-107-07-1		APPROVED BY		



Bottom Slab Reinforcements

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN
2. DO NOT SCALE FROM THIS DRAWING
3. THE SCALES GIVEN ON THIS DRAWING REFER TO THE A1 SIZE ORIGINAL DRAWING
4. THE SUBGRADE SHALL BE COMPACTED TO 99% MAXIMUM DRY DENSITY BEFORE THE PLACEMENT OF HARDCORE
5. CONCRETE SHALL BE CLASS C30/37 FOR STRUCTURAL MEMBERS AND CLASS C8/10 FOR BLINDING
6. THE MAXIMUM SIZE OF AGGREGATE SHALL BE 20mm UNLESS OTHERWISE SHOWN
7. REINFORCEMENT SHALL BE HIGH TENSILE DEFORMED TYPE WITH A CHARACTERISTIC YIELD STRESS OF AT LEAST 429N/mm²
8. COVER TO REINFORCEMENT SHALL BE:
   - FOUNDATIONS 50mm
   - SLABS 25mm
   - WALLS AND BEAMS 30mm
9. LAPS TO ALL REINFORCEMENT SHALL BE 50 * BAR DIAMETER UNLESS OTHERWISE SHOWN

Bar Bending schedule

Member	Mark	Diameter	Total Numbers/Area	Length (mm)	Unit weight (kg/m)	Total weight (kg)	Bar bending shape
Base	01	Y12	84	3100	0.888	232	
	02	Y12	15	4900	0.888	63	
	03	Y12	15	5300	0.888	71	
	04	Y12	15	2000	0.888	27	
	05	Y12	15	2100	0.888	28	
	06	Y12	15	3700	0.888	43	
	07	Y12	15	2850	0.888	38	
Walls	08	Y10	272	2700	0.616	453	
	09	Y10	54	2000	0.616	67	
	10	Y10	40	7500	0.616	185	
Top Slab	11	Y10	46	2000	0.616	57	
	12	Y10	20	2160	0.616	28	
	13	Y10	20	1700	0.616	21	
	14	Y10	20	1200	0.616	16	
					Total	1,329	

DESIGN BY		SCALE	1:25
DRAWN BY			
CHECKED BY			
APPROVED BY		DATE	JANUARY-2022
SHEET NO:		DRAWING NO.	FSTP-107-07-2

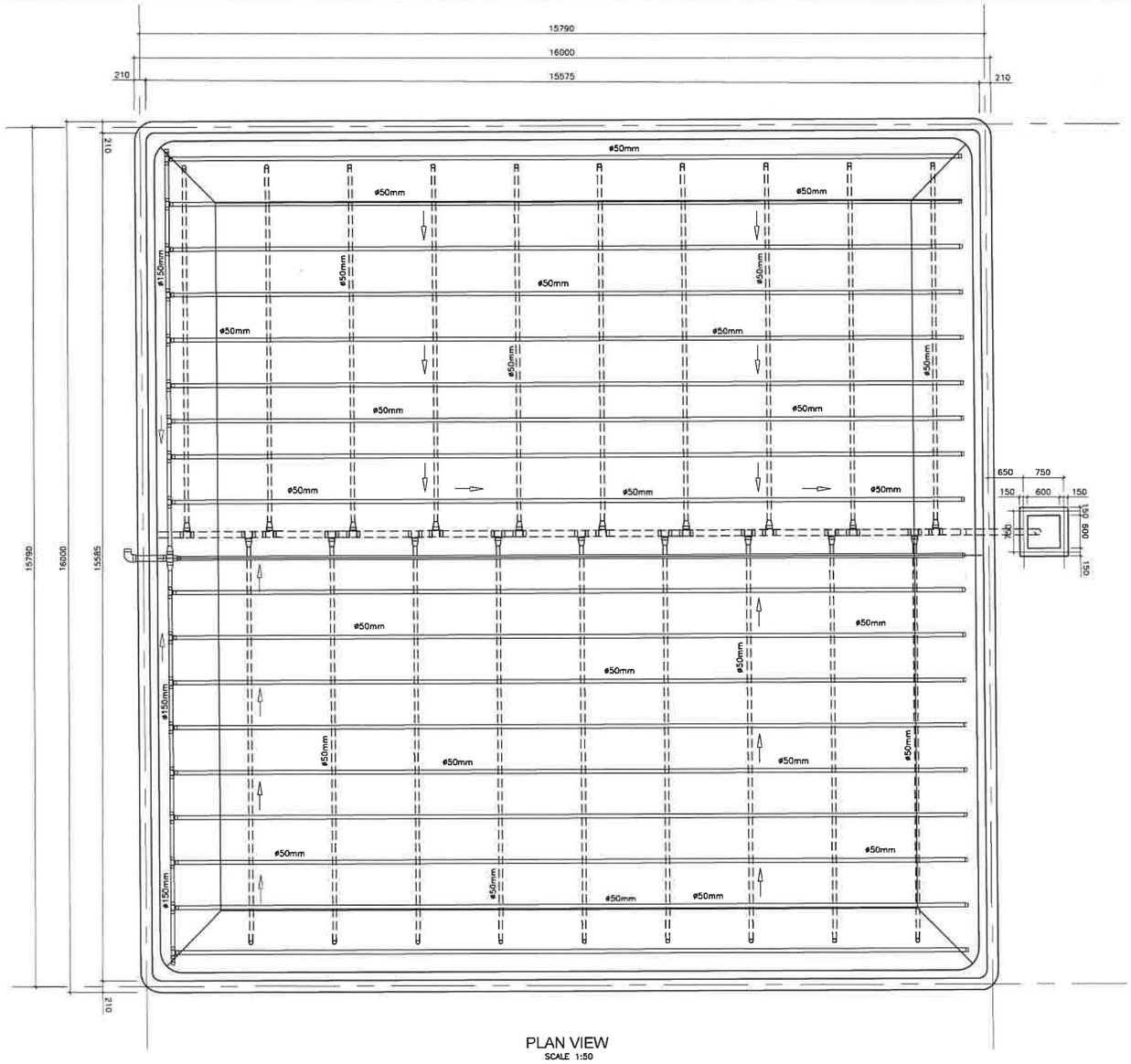
PROJECT
CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM

TITLE
FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - HYDRO-MECHANICAL SIPHON - STRUCTURAL PLAN, REINFORCEMENTS DETAILS & BAR BENDING SCHEDULE

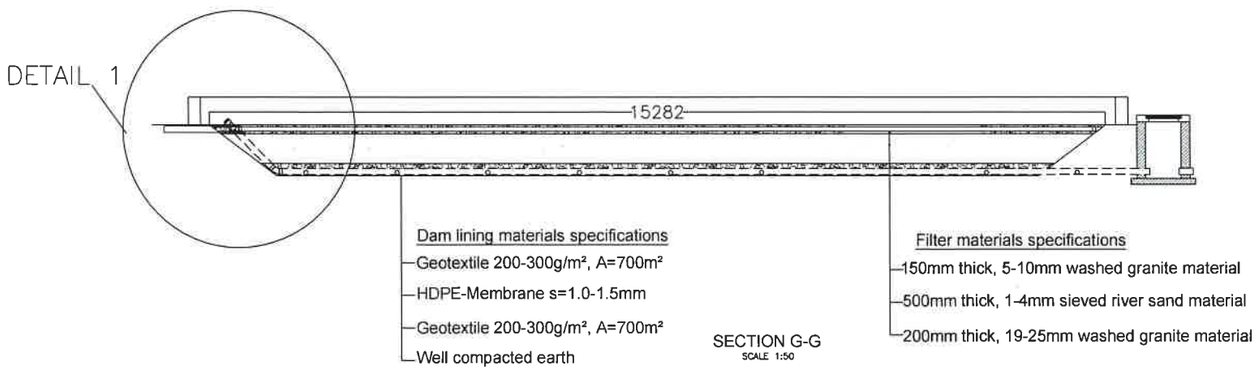
REVISION	
DATE	
NATURE OF REV.	
CHECKED BY	
APPROVED BY	

CLIENT
DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)

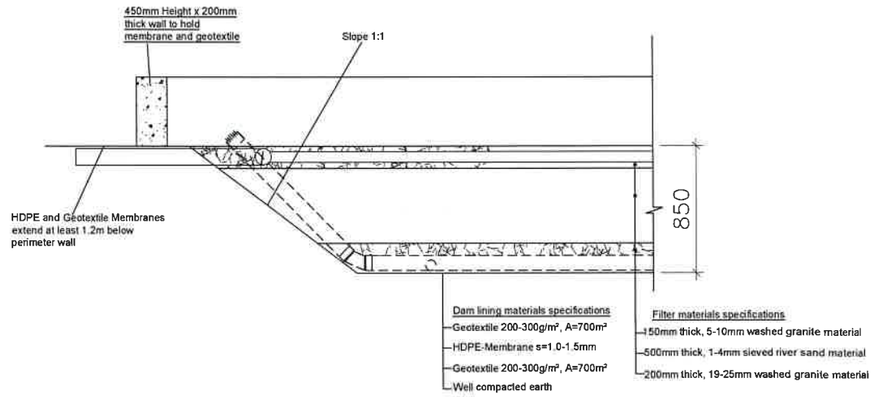
CONSULTANT
DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS



PLAN VIEW
SCALE 1:50



SECTION G-G
SCALE 1:50

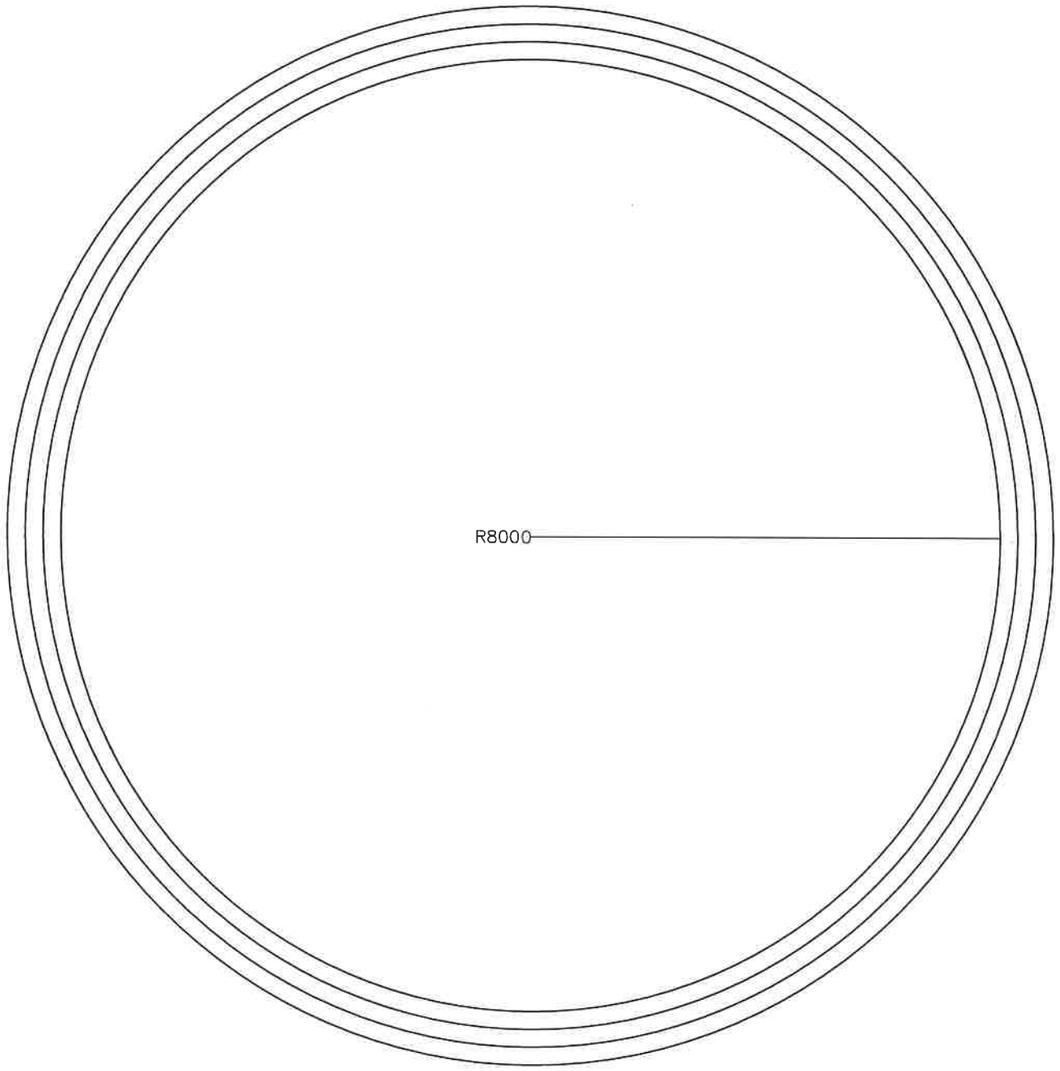


DETAIL 1– Scale 1:25

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN
2. DO NOT SCALE FROM THIS DRAWING
3. THE SCALES GIVEN ON THIS DRAWING REFER TO THE A1 SIZE ORIGINAL DRAWING
4. THE SUBGRADE SHALL BE COMPACTED TO 99% MAXIMUM DRY DENSITY BEFORE THE PLACEMENT OF HARDCORE
5. CONCRETE SHALL BE CLASS C30/37 FOR STRUCTURAL MEMBERS AND CLASS C8/10 FOR BLINDING
6. THE MAXIMUM SIZE OF AGGREGATE SHALL BE 20mm UNLESS OTHERWISE SHOWN
7. REINFORCEMENT SHALL BE HIGH TENSILE DEFORMED TYPE WITH A CHARACTERISTIC YIELD STRESS OF AT LEAST 429N/mm²
8. COVER TO REINFORCEMENT SHALL BE:
   - FOUNDATIONS 50mm
   - SLABS 25mm
   - WALLS AND BEAMS 30mm
9. LAPS TO ALL REINFORCEMENT SHALL BE 50 * BAR DIAMETER UNLESS OTHERWISE SHOWN

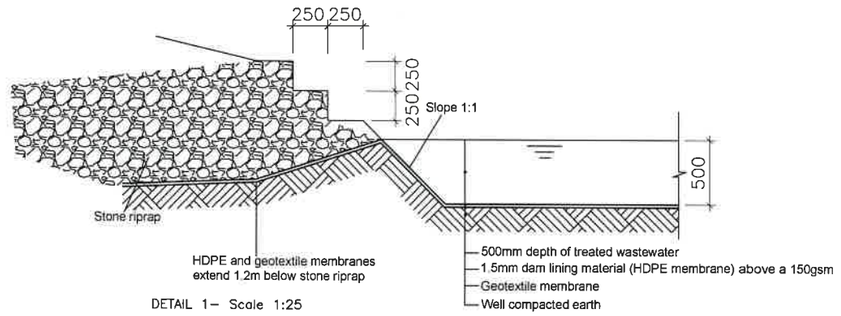
DESIGN BY		SCALE	1:50	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - VERTICAL FLOW CONSTRUCTED WETLAND - PLAN AND SECTION DETAILS	CHECKED BY		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
SHEET NO:		DRAWING NO.	FSTP-107-08		APPROVED BY		



PLAN VIEW
SCALE 1:50

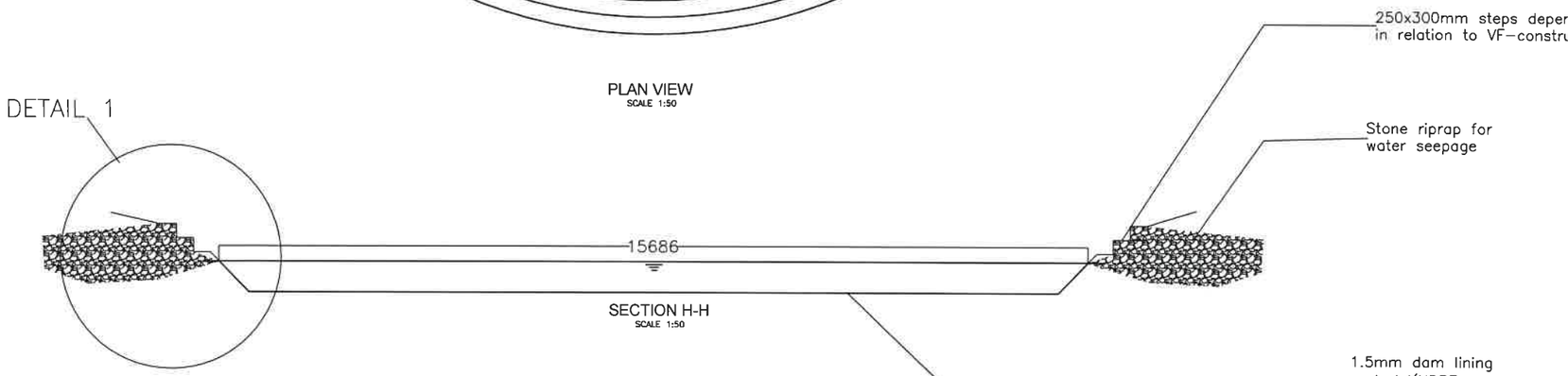
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN
2. DO NOT SCALE FROM THIS DRAWING
3. THE SCALES GIVEN ON THIS DRAWING REFER TO THE A1 SIZE ORIGINAL DRAWING
4. THE SUBGRADE SHALL BE COMPACTED TO 99% MAXIMUM DRY DENSITY BEFORE THE PLACEMENT OF HARDCORE
5. CONCRETE SHALL BE CLASS C30/37 FOR STRUCTURAL MEMBERS AND CLASS C8/10 FOR BLINDING
6. THE MAXIMUM SIZE OF AGGREGATE SHALL BE 20mm UNLESS OTHERWISE SHOWN
7. REINFORCEMENT SHALL BE HIGH TENSILE DEFORMED TYPE WITH A CHARACTERISTIC YIELD STRESS OF AT LEAST 429N/mm²
8. COVER TO REINFORCEMENT SHALL BE:
   - FOUNDATIONS 50mm
   - SLABS 25mm
   - WALLS AND BEAMS 30mm
9. LAPS TO ALL REINFORCEMENT SHALL BE 50 * BAR DIAMETER UNLESS OTHERWISE SHOWN



DETAIL 1– Scale 1:25

DETAIL 1



SECTION H-H
SCALE 1:50

DESIGN BY		SCALE	1:50	PROJECT: CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANTS (FSTP) WORKS IN DAR ES SALAAM	REVISION		CLIENT: DAR ES SALAAM WATER SUPPLY & SANITATION AUTHORITY (DAWASA)
DRAWN BY					DATE		
CHECKED BY					NATURE OF REV.		CONSULTANT: DOHWA Engineering CO., LTD IN ASSOCIATION WITH LUPTAN CONSULTS LTD AND WWS
APPROVED BY		DATE	JANUARY-2022	TITLE: FECAL SLUDGE TREATMENT PLANT - SMALL SIZE (50m³) MTONI FSTP - POLISHING POND - PLAN AND SECTION DETAILS	CHECKED BY		
SHEET NO:		DRAWING NO.	FSTP-107-09		APPROVED BY		

Appendix IV: Minutes of Meetings with stakeholders

JAMHURI YA MUUNGANO WA TANZANIA
OFISI YA RAIS, TAWALA ZA MIKOA
NA SERIKALI ZA MITAA

HALMASHAURI YA MANISPAA YA TEMEKE
KATA YA AZIMIO

OFISI YA SERIKALI YA MTAA WA MBUYUNI
S.L.P 46343, DAR ES SALAAM, Barua Pepe temekemanispaa@yahoo.com

MUHTASARI WA MKUTANO WA WANANCHI WA MTAA WA MBUYUNI.

TAREHE 19/01/2024

AGENDA NA. 1: KUFUNGUA MKUTANO

Kabla ya kufungua kikao katibu alifanya utambulisho kwa wageni waalikwa ambao walialikwa katika mkutano kwa kutaja majina na Taasisi wanazotoka.

Mwenyekiti alifungua kikao mnamo saa 10:01 jioni.

AGENDA NA. 2: KUTHIBITISHA AGENDA

1. KUFUNGUA MKUTANO
2. KUTHIBITISHA AGENDA
3. KUSOMA NA KUTHIBITISHA MUHTASARI MKUTANO ULIOPITA WA TAREHE 21/07/2023
4. ULINZI NA USALAMA
5. KUWASILISHA TAARIFA YA URASIMISHAJI WA ARDHI MTAA WA MBUYUNI
6. TAARIFA NA MAELEKEZO KUTOKA SERIKALINI
7. KUWASILISHA TAARIFA YA MRADI WA MTAMBO WA KUCHAKATA MAJI TAKA UNAOTARAJIWA KUFANYIKA KATIKA ENEO LA DAWASA LILILOPO MTAA WA MBUYUNI
8. KUFUNGUA KIKAO

AGENDA NA. 3: KUSOMA NA KUTHIBITISHA MUHTASARI KIKAO KILICHOPITA WA TAREHE 21/07/2023

Mwenyekiti alimkaribisha katibu awasomee muhtasari wa kikao kilichopita.

Aidha aliwataka wananchi wawe watulivu na wasikivu pindi katibu atakapokuwa anasoma muhtasari huo.

Katibu alisoma muhtasari wa kikao kilichopita na baada ya kumaliza Mwenyekiti aliwataka wananchi kwa pamoja kuwa wanaupokea na kuuthibitisha muhtasari huo ambao unaendana kwa walichokijadili katika kikao kilichopita.

WANANCHI

Kwa pamoja waliuthibitisha na kupitisha muhtasari wa mkutano uliopita.

Mwenyekiti baada ya wananchi kuuthibitisha na kuupitisha na sababu hakukua na yatokanayo aliendelea na agenda zengine za kikao.

OFISA MTENDAJI WA MTAA MBUYUNI

AGENDA NA. 7: KUWASILISHA TAARIFA YA MRADI WA MTAMBO WA KUCHAKATA MAJI TAKA UNAOTARAJIWA KUFANYIKA KATIKA ENEO LA DAWASA LILILOPO MTAA WA MBUYUNI

Mwenyekiti alitaka wananchi wawetulivu kipindi walipoingia agenda ya mwisho kabla ya kufunga. Kutokana na agenda hiyo kusubiriwa kwa hamu mwenyekiti alienda moja kwa moja katika hoja ya msingi na kuwataka wataalamu wa mradi kutoka DAWASA kuja kutoa elimu na kuelezea mradi huo.

Mshauri wa mradi alianza kwa kusema mradi wa mtambo wa kuchakata maji taka ni miongoni mwa miradi inayotekelezwa na DAWASA katika mkoa mzima wa Dar es salaam katika manispaa zake zote 5 na katika kila manispaa kutakuwa na miradi ya vyoo vya umma na mitambo ya kuchakata maji taka. Mrai huu ni wa serikali na unatekelezwa kupitia fedha za mkopo wa world bank na katika manispaa ya temeke vikunai na azimio ndiyo maeneo yaliochaguliwa kutekelezwa mradi huo.

Mradi huu utakuwa na faidi kwa wakazi na manispaa lakini alisema kwa ufanisi wa mradi huu hakutakuwa na madhara kwa binadamu na kuwatoa hofu wananchi juu ya utofauti wa mtambo huu na miradi iliyopita. Aidha mradi huu ulianza 2022 mwezi novemba lakini kutokana na taratibu ya ufanyikaji wa tathimini na utolewajwi wa vibali pamoja na kumpata mkandarasi mradi huu unaanza utekelezwaji wake mwaka huu na mkandarasi tayari ameshasaini mkataba wa kuanza kutengeneza mradi.

MJADALA

SWALI

Alitaka kujua kama huu mkutano ni wa mtaa au wa kata?

Aliomba kama mkutano huu ni wa mtaa basi agenda ya kuwasilisha mradi wa mtambo wa kuchakata maji taka wa **DAWASA** isizungumziwe mpaka wakazi wote wa kata ya azimio ilidhie.

JIBU

Mwenyekiti alisema huu mkutano ni wa mtaa hii ni agenda katika agenda za mkutano wa wananchi.

Kwamaoni yake akiwa kama kiongozi wa dini na mjumbe wa kamati ya Amani anaomba kikao hichi hakipaswi kuzungumzia agenda hii ya mradi na aliomba viongozi waandae mkutano wa kata nzima na kuwe na agenda hiyo tu ya mradi.

OFISA MTENDAJI WA MTAA
MBUYUNI

Aidha kutokana na muda kwenda na mpaka sasa ni saa 11:57 na uzito wa agenda hiyo aliomba kikao hicho kighairishwe na alimuomba muheshimiwa diwani wakakae na kamati ya maendeleo ya kata kisha kuja kufanya kikao cha kata ili wananchi wapate muda wa kutoa maoni yao.

Kamanda mkuu wa polisi jamii mkoa wa temeke alimtaka mwenyekiti akighailishwe kikao mpaka siku na muda mwengine kutokana na muda wa mikutano kuisha kufika

AGENDA NA. 8: KUFUNGA MKUTANO

Mwenyekiti aliwashukuru wananchi wote kwa uvumilivu na utulivu wao na kisha aliwatakia kila la kheri pindi wanaporudi katika majumba yao.

Mwenyekiti alifunga kikao saa 12:00 jioni

.....

MWALIMU MUSA RAMADHANI

KATIBU

AFISA MTENDAJI WA MTAA
MBUYUNI

.....

SELEMANI.H. MPOYO

MWENYEKITI

MWENYEKITI WA MTAA
MBUYUNI AZIMIO

HALMASHAURI YA MANISPAA YA TEMEKE

KATA YA AZIMIO

OFISI YA SERIKALI YA MTAA WA MBUYUNI

MUHTASARI WA MKUTANO WA WANANCHI

MAHUDHURIO

Na.	JINA	CHEO	NAMBA YA SIMU	SAHIHI
1	YUNUS A. MLAWA			
2	MUSSA M. MTAMBO			
3	MWANAAISHA GEA			
4	MWAJUMA MALINDA			
5	HAIPAN JENGA			
6	KHADIJA MAMBA		0785,66964	[signature]
7	HASNATH SALUMU		0655985096	[signature]
8	ZAINAB RAJABU			
9	FARIDA SULE			
10	KWEPU			
11	DEAL O MPILI			
12	SAID M SHAHA			
13	RASHID MKENDA		0626451745	[signature]
14	MANSURI NARINGA			
15	CHAMBUSO			
16	MABADI			
17	CUTHEBETH TUMBO			
18	KHALOPAN MUMINA		0654 863939	KHN
19	TAJIRI JUMBE			
20	HASHIM MTUPA		0718-20258	[signature]
21	SALMINI KOMBO			[signature]
22	HUSSEN AGAYU		0717-921220	[signature]
23	HAJI SALUM		0717291949	[signature]
24	SAID M WGOROPO		0657-883450	[signature]
25	HAMADI JUMA		0689615867	[signature]
	GODFREY PAULO		0718614646	[signature]
27	MOHAMEDI LITANDA		0664886802	[signature]
28	MAYOLWA MALIMWA		0686208976	[signature]
29	ABDUL ATHUMANI		0754 058004	[signature]
30	KWEPA		0718 793004	[signature]
31	MTAMBO			[signature]
32	OMARY B. NGAYONGA		0652-617223	[signature]
30	R. A. Kaloka			[signature]
33	GOSCAR A RONGOLKA	KAMANDA	0717-179399	[signature]
34	JOHNSON JOHN NGOTI	KAMANDA	0784985773	Mugoly
35	DARIP HASAN		0788608373	Dawan
36	ASHA HASSAN		0719316093	Ashara
37	PRISCA MBENA	MJUMBE SHINA NA. 1	0783-815434	[signature]
38	ZULFA MOHAMEDI			
39	ZAINA S. SOBO			
40	Mwajuma Fazili			
41	Mohamu Fazili			
42	Hawa Juma			

[signature]

AFISA MTENDAJI WA MTAA MBUYUNI

HALMASHAURI YA MANISPAA YA TEMEKE
KATA YA AZIMIO
OFISI YA SERIKALI YA MTAA WA MBUYUNI

MUHTASARI WA MKUTANO WA WANANCHI

MAHUDHURIO

Na.	JINA	CHEO	NAMBA YA SIMU	SAHIHI
	HAMIS MLAO	MJUMBE	0688031626	[signature]
	Abdallah A. Abdallah	MJUMBE	0654352392	[signature]
	ZAMSONI MKETO	MJUMBE	0683585354	[signature]
	SINA MASHAKA	= 〃 =	0693512728	[signature]
	David Mwamasangula	Mjumbe	0688-838892	[signature]
	KAISWALI KHALFANI	MJUMBE	0652050506	K.muhino
	ALLY SUDI		0717785160	A. SUDI
	AMIS ALI		0712423267	[signature]
	DIDAS JOSEPH		0689122041	[signature]
	NIMEKUBAR			HASMI
	NAKANIWA A. IWIGAIWIKE	〃	0717631512	[signature]
	ZIADA S. MAONYA	〃	〃	[signature]
	ABDALAH H. NGUOGANI	〃	〃	A. Hamisi
	MBAWILA H. ALLY	KAMANDA	0717849292	[signature]
	WADALA SALUM	KAMANDA	0712549141	S. SALUM
	FATUMA MOHAMED	〃	〃	[signature]
	SADIKI MASUDI	〃	0682730600	[signature]
	MAULIDI YUSUFU TESO		0787356112	[signature]
	MOHAMEDI MKALI	MJUMBE	0787221635	[signature]
	SAID S. MAVULUNGA	〃	0777754428	
	ABDI JUMA MPONDA		0653814022	[signature]
	ZAKIA SAIDI KAMBI	〃		
	AISHA TELELLO	〃		
	ASHURA MUSSA	〃		
	SEIFU HABIBU	〃		
	REHEMA NYAMANZALE	〃		

[signature]

AFISA MTENDAJI WA MTAA
MBUYUNI

HALMASHAURI YA MANISPAA YA TEMEKE
KATA YA AZIMIO
OFISI YA SERIKALI YA MTAA WA MBUYUNI
MUHTASARI WA MKUTANO WA WANANCHI

MAHUDHURIO

Na.	JINA	CHEO	NAMBA YA SIMU	SAHIHI
1	[illegible] H MPOTO	M/KITI	0655461861	
2	AMINA I [illegible]	DIWANI	0654 512 431	
3	Francisca Tewa	DAWASA	0717-152636	
4	Musa Kidwangela	DAWASA	0716-161826	
5	Cecilia Ungele	Dalitwa	0754 258512	
6	Jackline Mollel	SHANXI	0767789326	
7	Humphrey Jimmy	DAWASA	0658-349043	
8	AMON GRADEHORD	DAWASA	0752903248	
9	VAINES NBAGA	SHANXI	0757142345	
10	GRACE MAINA	DAWASA	0688728896	
11	Lyua Mgonja	CDO -Kata	0755-909790	
12	Rosha Mathias	CDO - KATA	0746782285	
13	George W. Chimile	Afisa Afya	0715 505619	
14	MUJAHIDI OMPIZILY	MKUU TAWI	0684065216	
15	MWOLINU [illegible]	MEO - KIBAONI	0674910929	
16	Muharam Mziwanda	M/Kamati Amani	0655733277	

AFISA MTENDAJI WA MTAA
MBUYUNI

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^3	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 WSSPII 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:

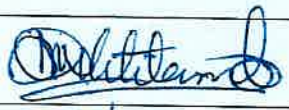
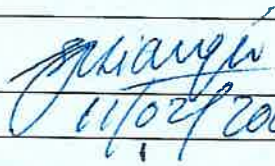
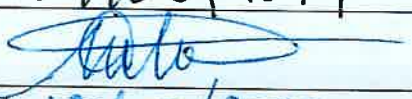
Municipal Director
Ilala Municipal Council
Address:
Tel:
E–mail:

Municipal Director
Kinondoni Municipal Council
Address:
Tel:
E–mail:

Municipal Director
Ubungo 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 1/2/2019
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 07/02/2019

Appendix VI: Non-Technical Summary

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF WATER

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

Provision of Consultancy Services for Preparation of Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) Report for Construction of Off Grid Sanitation Projects

Ref No: TZ-DAWASA-91652-CS-QCBS

Comprehensive Project Brief for the Proposed Fecal Sludge Treatment Plant to be constructed at Mtoni area, Mbuyuni ward, Temeke District, Dar es Salaam Region

NON-TECHNICAL EXECUTIVE SUMMARY
(English and Kiswahili Versions)

Submitted to:

National Environment Management Council,

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

Phone: +255 262960098, 0713608930,

Email Address: nemcdg@nemc.or.tz

Website: www.nemc.or.tz

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

December, 2024

NON-TECHNICAL EXECUTIVE SUMMARY

Comprehensive Project Brief for the Proposed Fecal Sludge Treatment Plant to be constructed at Mtoni area, Mbuyuni ward, Temeke District, Dar es Salaam Region

Proponent: DAWASA

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

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

INTRODUCTION

The Government of the United Republic of Tanzania (GoT) through the Dar es Salaam Water and Sewerage Authority (DAWASA) under the Ministry of Water intends to implement an Off-Grid Sanitation Project (OGSP) in Dar es Salaam City to serve peri-urban areas not connected to the central sewerage system. DAWASA has received financing from the International Development Association (IDA) in the form of a credit to implement the project. 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 (National Census 2022)*. 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 in divided into several subprojects which will be implemented in the five municipalities of Dar es Salaam City. One of these is the Construction of Faecal sludge treatment plant at Mtoni area in Mbuyuni ward, Temeke District.

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 Temeke District”, 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 Temeke District is being submitted to NEMC together with EIA Registration Forms for EIA Certificate decision.

PROJECT DESCRIPTION

The project site is located at Mbuyuni ward, Temeke District within Dar es Salaam Region. The project site is geographically located at 37S UTM zone with coordinates in Table 1. The site is about 12 Kilometers from City Center via Kilwa road.

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 DAWASAs Registration (Amendment) Act, 2008
- The Architects and Quantity Surveyors Act (1997)
- The 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 Temeke District and community at DAWASA Mtoni area 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 DAWASA is finalized. These equipments 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 50m^3 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 durig 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 38,000,000.00. The estimated annual costs for carrying out the proposed environmental and social motoring program amounts to TSH 28,000,000.00.

DECOMMISSIONING PLAN

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

CONCLUSION

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

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

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

MUHTASARI WA WATENDAJI USIO WA KIUFUNDI

Muhtasari wa Mradi mtambo wa kuchakata majitaka utakaojengwa katika eneo la Mtoni area, Kata ya Mbuyuni, Halmashauri ya Manispaa ya Temeke, Mkoa wa Dar es Salaam

Mmiliki: Mamlaka ya Majisafi na Usafi wa Mazingira Dar es Salaam (DAWASA)

Mawasiliano ya Mmiliki: DAWASA,

DAWASA Building, Dunga/Malaga Street, Mwananyamala Area
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Simu :. +25522276006/15; Fax: +255222762480;
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Mshauri Muelekezi: Prof. Rubhera RAM Mato (PhD), CEng. (T), Reg. EIA Expert

S.L.P 35478, Dar es Salaam, Tanzania
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UTANGULIZI

SERIKALI ya Jamhuri ya Muungano wa Tanzania (GoT) kupitia Mamlaka ya Majisafi na Majitaka Dar es Salaam (DAWASA) chini ya Wizara ya Maji inatarajia kutekeleza Mradi wa Usafi wa Mazingira Nje ya Mtandao (OGSP) katika Jiji la Dar es Salaam ili kuhudumia maeneo ya pembezoni mwa miji. maeneo ambayo hayajaunganishwa na mfumo mkuu wa maji taka. DAWASA imepata ufadhili kutoka kwa Jumuiya ya Maendeleo ya Kimataifa (IDA) ikiwa ni mkopo wa kutekeleza mradi huo. Kabla ya kutekeleza mradi huo, sheria nchini Tanzania inataka Tathmini ya Athari kwa Mazingira ifanywe na kuidhinishwa na mamlaka husika. Ili kuzingatia sheria nchini Tanzania, DAWASA inatarajia kutumia sehemu ya mapato ya mikopo kwa malipo stahiki kwa ajili ya huduma za ushauri kwa ajili ya Maandalizi ya Tathmini ya Athari kwa Mazingira na

Kijamii (ESIA) na Ripoti ya Mpango Kazi wa Makazi Mapya (RAP) kwa ajili ya ujenzi. wa miradi ya usafi wa mazingira nje ya gridi ya taifa.

Dar es Salaam ni kituo kikubwa na muhimu zaidi cha biashara na viwanda nchini Tanzania. Jiji lina idadi ya watu wanaokadiriwa kuwa milioni 5.0 na inakadiriwa kuongezeka mara mbili mwishoni mwa upeo wa mradi wa miaka 25 (Sensa ya Kitaifa 2022). Takriban 10% ya watu wanahudumiwa na mifereji ya maji machafu na wengine karibu hutegemea mifumo ya usafi wa mazingira kwenye eneo. Mtaro wa maji taka ni mdogo tu kwa eneo la katikati mwa jiji lenye urefu wa jumla ya 67.8km na mfumo unategemea mfumo tofauti na kumwaga maji machafu yao kwenye madimbwi ya vioksidishaji, na baharini kupitia maji ya bahari ya urefu wa 1.03km. Mifumo ya usafi wa mazingira kwenye eneo husababisha uchafu wa kinyesi ambao utunzaji na usimamizi wake katika mnyororo mzima wa usafi wa mazingira (kutoka kwa vyombo vya nyumbani, usafirishaji na utupaji na matibabu) kwa sasa hautoshelezi kiafya na hivyo kuhatarisha mazingira na afya ya umma. Mradi huu unakusudiwa kutatua changamoto hizi. Mradi huu umegawanywa katika miradi midogo kadhaa ambayo itatekelezwa katika manispaa tano za Jiji la Dar es Salaam. Mojawapo ni Ujenzi wa mtambo wa kusafisha kinyesi kilichopo Mtaa wa Mtoni area Kata ya Mtoni area Manispaa ya Temeke.

Utafiti wa ESIA ulifanyika kwa mujibu wa Kanuni za Usimamizi wa Mazingira (Tathmini na Ukaguzi wa Athari kwa Mazingira) (Marekebisho), 2018 pamoja na Tathmini ya Athari za Mazingira na Kanuni za Ukaguzi za mwaka 2005. Kanuni hizi zinatoa taratibu za kisheria za kutekeleza matakwa ya Sheria ya Usimamizi wa Mazingira. Sura ya 191 ya 2004. Kanuni zinatoa mamlaka kwa NEMC kusimamia mchakato wa EIA, ambao unaishia kwa kutunukiwa Cheti cha EIA na Wizara inayohusika na Mazingira.

Kwa mujibu wa Kanuni za EIA, NEMC ina mamlaka ya kuchunguza miradi na kufanya maamuzi ya kiwango cha EIA kinachohitajika pamoja na kutathmini utoshelevu wa taarifa za mazingira husika. Kwa kuzingatia asili na ukubwa wa mradi unaopendekezwa wa “Mradi wa Kinyesi katika Manispaa ya Temeke”,

mradi uko chini ya Kitengo “B2” (Si cha Lazima) kwa mujibu wa Kanuni ya 4 (1)(c) na Jedwali la Kwanza la Kanuni zilizorekebishwa za 2018. . Kanuni hizo zinawataka wasanidi programu kuandaa na kuwasilisha kwa Baraza la Kitaifa la Usimamizi (NEMC) lililojaza fomu za usajili wa EIA na "Muhtasari wa Miradi" kwa miradi yote ya B2. Maandalizi na maudhui ya “Maelezo ya Mradi” yametolewa chini ya Kanuni ya 6(1) ya Tathmini ya Athari kwa Mazingira na Kanuni za Ukaguzi, 2005. Vile vile vimefuatwa katika kuandaa “Muhtasari wa Mradi” huu. Muhtasari wa mradi ulifanyika Julai-Agosti 2020.

Muhtasari huu wa mradi wa Mapendekezo ya Ujenzi wa Mtambo wa kuchakata maji taka katika Manispaa ya Temeke unawasilishwa NEMC pamoja na Fomu za Usajili wa TAM kwa Ilikuapata Cheti cha Mazingira.

MAELEZO YA MRADI

Eneo la mradi lipo kata ya Mtoni area, Manispaa ya Temeke ndani ya Mkoa wa Dar es Salaam. Eneo la mradi liko kijiografia katika eneo la 37S UTM na viwianishi. Eneo lipo takriban Kilomita 41.31 kutoka katikati ya Jiji kupitia barabara ya Bagamoyo

Eneo la mradi linalopendekezwa lina sifa ya uoto wa asili. Kuna nyasi fupi na ndefu na vichaka karibu na eneo la mradi. Eneo la mradi lipo jirani na mto Mpiji ambao ni mpaka kati ya Dar es Salaam na Mkoa wa Pwani. Maeneo yanayopendekezwa yanaathiriwa na maji kutoka mto Mpiji wakati wa msimu wa mvua.

SERA, MFUMO WA SHERIA NA TAASISI

Tanzania imejitolea kufikia malengo ya maendeleo endelevu. Msukumo huu unazingatiwa katika Sera ya Taifa ya Mazingira na sera nyingine za kisekta zikiwemo;

- Sera ya Kitaifa ya Mazingira, 2021
- Sera ya Taifa ya Ardhi ya mwaka 1997
- Sera ya Sekta ya Ujenzi (2003)
- Sera ya Taifa ya Afya (2003)
- Sera ya Taifa ya Jinsia ya 2000

• Sera ya Taifa ya Maendeleo ya Makazi (2000)

Sheria na kanuni muhimu ambazo zina umuhimu kwa maendeleo ya barabara kuhusiana na usimamizi wa mazingira ni pamoja na;

• Sheria ya Usimamizi wa Mazingira (2004)
• Kanuni za Usimamizi wa Mazingira (Ada na Ada) za 2021
• Kanuni za Usimamizi wa Mazingira (Udhibiti wa Taka hatarishi), 2021
• Kanuni za Usimamizi wa Mazingira (Udhibiti wa Kelele na Mtetemo), 2015
• Kanuni za Usimamizi wa Mazingira (Marufuku ya Mifuko ya Kubeba Plastiki), za 2019
• Kanuni za Usimamizi wa Mazingira (Udhibiti wa Taka Ngumu), 2007
• Kanuni za Usimamizi wa Mazingira (Ubora wa Maji), 2009
• Kanuni za Usimamizi wa Mazingira (Ubora wa Hewa), 2009
• Kanuni za Usimamizi wa Mazingira (Ubora wa Udongo), 2009
• Sheria ya Afya na Usalama Kazini ya 2003
• Sheria ya Ugavi wa Maji na Usafi wa Mazingira Na. 12 ya 2009
• Sheria ya Usajili wa Wahandisi na Marekebisho yake ya 1997 na 2007
• Sheria ya Usajili wa Makandarasi (Marekebisho) ya mwaka 2008
• Sheria ya Wabunifu na Wakadiriaji Majenzi (1997)
• Sheria ya Mipango Miji (2007)
• Sheria ya Afya ya Umma (2009)
• Miongozo ya Benki ya Dunia ya Usimamizi wa Mazingira

MASUALA NA MAMBO YA WADAU

Wadau mbalimbali walishauriwa. Miongoni mwa mambo yanayojitokeza wakati wa mashauriano katika Halmashauri ya Manispaa ya Temeke na jamii katika eneo la Mtoni area ni pamoja na:

Vifaa vya kuendelezwa
• Uelewa sahihi kwa watu juu ya njia bora za kutupa pedi na taka zingine ili kuzuia kuziba kwa mfumo
• Vifaa vinavyopendekezwa vinapaswa kulindwa vyema
Ufahamu kwa jamii

• Ufahamu kwa watu juu ya uendeshaji wa mfumo, kwa kuwa ni teknolojia mpya
• Uhamasishaji kwa jamii kuepuka machafuko siku zijazo
• Kuelimisha jamii kuepuka matumizi ya dawa hatarishi kwenye mfumo ili kuepusha kushindwa kwa mfumo na mbolea iliyochafuliwa.

MAHITAJI YA MRADI NA UZALISHAJI WA TAKA

Mahitaji ya mradi

Nyenzo kuu za Kiwanda cha Kusafisha Matope ya Kinyesi ni pamoja na saruji, mikusanyiko (mawe), maji, chuma, mchanga, mbao, vitalu, mabomba ya uPVC, Mabomba ya IPS na changarawe. Nyenzo zote zinapatikana katika vyanzo vya ndani nchini Tanzania. Kiasi kinachokadiriwa cha nyenzo zitakazojumuishwa kwenye BoQ.

Uendelezaji wa mradi unaopendekezwa utaajiri vifaa na mashine mbalimbali za kawaida za ujenzi. Vifaa vinavyotarajiwa kutumika wakati wa kazi za ujenzi ni Mashine za kuchimba, malori, Mashine za kuchanganya zege, , n.k. Vifaa na mashine zote za kazi za ujenzi zinazohitajika na mradi unaopendekezwa zitajulikana wakati bili ya kiasi na uteuzi wa Mkandarasi umekamilika. Vifaa hivi vitakuwa vya muda na vitatolewa mara tu mradi utakapokamilika.

Uzalishaji wa taka

Uzalishaji mkubwa wa taka unaohusishwa na mradi ni udongo nyara unaotokana na udongo wakati wa uchimbaji wa msingi, taka ngumu na taka za kioevu. Udongo ulioharibika utarundikwa kuzunguka choo cha umma kwa matumizi zaidi katika kuweka mazingira ya eneo mwishoni mwa mradi.

Jumla ya mita za ujazo 50 kwa siku za maji taka ya kioevu inakadiriwa kupokelewa kwenye chumba cha kupokea cha kituo kilichopendekezwa wakati wa awamu ya juu ya operesheni. Kwa upande mwingine, takriban tani 0.5-1 kwa mwezi za taka za nyumbani na taka zingine ngumu inakadiriwa kuzalishwa na kunaswa kwenye skrini ya taka wakati wa awamu ya ujenzi na operesheni ya mradi mtawaliwa. Mfumo mzuri wa kukusanya taka ngumu utaanzishwa. Mfumo huo utahusisha miongoni mwa mambo mengine kutenganisha taka kwenye chanzo, kuchakata tena au kutumia tena baadhi ya taka na utupaji wa mwisho kwa dampo/jaa lililoidhinishwa.

ATHARI ZINAZOWEZA

Athari zifuatazo zilitambuliwa kuwa zinaweza kutokea wakati wa awamu ya uhamasishaji:

• Fursa za ajira
• Kuboresha kilimo mijini
• Kuongezeka kwa mwingiliano wa kijamii na kitamaduni

Athari zifuatazo zilitambuliwa kuwa zinaweza kutokea wakati wa awamu ya ujenzi;

• Kuongezeka kwa VVU/UKIMWI na magonjwa mengine yanayohusiana na ngono
• Kupotea kwa viumbe hai
• Uharibifu wa ardhi na kuongezeka kwa uchafuzi wa mazingira
• Uchafuzi wa kelele
• Uchafuzi wa hewa kutokana na uchafuzi wa vumbi
• Hatari kubwa ya Afya inayohusishwa na kazi ya ujenzi
• Uzalishaji taka katika ujenzi wa durig

Athari zifuatazo zilitambuliwa kuwa zinaweza kutokea wakati wa awamu ya uendeshaji;

• Kuboresha maisha ya kijamii na kiuchumi na heshima ndani ya jamii inayofaidika
• Ongezeko la Mapato kwa taifa kupitia kodi, za moja kwa moja na zisizo za moja kwa moja
• Kupunguza gharama za usimamizi wa maji taka
• Uwezo wa uzalishaji wa gesi asilia
• Uvunaji mdogo wa misitu
• Kuvuja kwa maji taka/kufurika
• Kuboresha kilimo mijini

HATUA ZA KUPUNGUZA NA MPANGO WA USIMAMIZI WA MAZINGIRA NA KIJAMII

Chaguzi za kupunguza au kuzuia athari mbaya za kijamii na kimazingira zilizotambuliwa pamoja na mpango wa ufuatiliaji zimependekezwa katika ripoti hii na zimo katika. Wengi wao ni msingi wa mazoea mazuri ya uhandisi na mwitikio wa wakati wa taasisi inayowajibika. Mpango huu unaelezea ratiba ya utekelezaji wa mapendekezo ya hatua za kupunguza na pia kupanga shughuli za ufuatiliaji wa muda mrefu. Inafafanua majukumu na wajibu wa watendaji mbalimbali wa mpango. Gharama za Mbinu za kimazingira na kijamii zinafikia Tshs 38,000,000.00. Makadirio ya gharama za kila mwaka za kutekeleza mpango unaopendekezwa wa magari ya kimazingira na kijamii ni TSH 28,000,000.00.

MPANGO WA KUFUNGA MRADI

Mradi hautarajiwi kufungwa katika siku zijazo zinazoonekana. Hata hivyo, kama hii itatokea, inaweza kuhusisha mabadiliko ya matumizi (mabadiliko ya kiutendaji) au uharibifu unaosababishwa na mabadiliko ya matumizi ya ardhi. Kwa kuzingatia hili, hatua mahususi za kupunguza zinazohusu athari za kimazingira za kazi za uondoaji kazi haziwezi kupendekezwa kwa sasa kwa kiwango cha uhakika.

HITIMISHO

Mradi unaopendekezwa una faida kubwa kwa jamii na nchi kwa ujumla kwani unakuza na kuboresha usafi wa mazingira mitaani. Kunapokuwa na usafi wa mazingira bora na ulioboreshwa, basi mlipuko wa magonjwa kama vile kuhara na magonjwa yanayohusiana na tumbo na yale yatokanayo na maji pia hupungua na kuzuiwa hivyo kuboreshwa kwa afya ya umma.

Athari zilizoainishwa zinaweza kuzuilika na hazina hasi kidogo kwa jamii, kwa hivyo msanidi anaweza kupewa cheti cha kibali cha mazingira ili kuanza kuhusisha mradi.

Hivyo basi, inahitimishwa kuwa utekelezaji wa mapendekezo ya ujenzi wa mtambo wa kuchakata majitaka katika eneo la Mtoni area, hautaleta madhara yoyote mradi tu kwamba hatua zilizopendekezwa za kukabiliana nazo

zimewekwa vya kutosha na kwa wakati. Athari mbaya zilizotambuliwa zitadhibitiwa kupitia hatua zilizopendekezwa za kupunguza na mfumo wa utekelezaji uliowekwa katika ripoti hii. DAWASA imejitolea kutekeleza mapendekezo yote yaliyotolewa katika ripoti na kutekeleza zaidi mpango wa ukaguzi na ufuatiliaji wa mazingira.

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:

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.

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 (ft2) 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.

CONSTRUCTION ACTIVITIES AND ENVIRONMENTAL RULES FOR DAWASAS

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 DAWASAs 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.

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.

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.

1.1.2 Safety During Construction

The DAWASA's responsibilities include the protection of every person and nearby property from construction accidents. The DAWASA 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. o 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.

1.1.3 Nuisance and dust control

To control nuisance and dust the DAWASA 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.

1.1.4 Community Relations

To enhance adequate community relations the DAWASA 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 DAWASA 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.

1.2 ENVIRONMENTAL SUPERVISION DURING CONSTRUCTION

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