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

FINAL REPORT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT(ESIA) FOR ROADS, STORM - WATER DRAINS, LANDFILL CELLS AND STREET LIGHTS SUB- PROJECTS IN MTWARA-MIKINDANI MUNICIPALITY

Proponent: **Municipal Director,
Mtwara – Mikindani Municipal Council
P. o. Box 92
MTWARA
Tel: +255 023 233 3102;**

Consultant : **SMEC INTERNATIONAL PTY LTD in association with in association with
MAKCONSULT, P.o. Box 105866 DAR ES SALAAM, TANZANIA
Tel: (255-22) 260 1596/7; Fax: (255-22) 260 1590**



SMEC INTERNATIONAL PTY LIMITED, AUSTRALIA

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LIST OF ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
BOD	Biochemical Oxygen Demand
BOQ	Bill of Quantities
CBO	Community-Based Organization
CO2	Carbon Dioxide
COD	Chemical Oxygen Demand
DOE	Director of Environment
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMA	Environmental Management Act
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
HIV	Human Immunodeficiency Virus
ILO	International Labour Organization
MTUWASA	Mtwara Urban Water Supply and Sanitation Authority
NEMC	National Environment Management Council
NEP	National Environment Policy
NGO	Non-Governmental Organization
OSHA	Occupational Health and Safety Act
PAP	People Affected by the project
PMO-	Prime Minister's Office, Regional Administration and Local
RALGPO-	Government
RALG	President's Office-Regional Administration and Local Government
PPE	Personal Protective Equipment
RAP	Resettlement Action Plan
RoW	Right of Way
STDs	Sexually Transmitted Diseases
TAC	Technical Advisory Committee
TANESCO	Tanzania Energy Supply Company
TOR	Terms of Reference
TSCP	Tanzania Strategic Cities Project
Tshs	Tanzania Shilling
VPO	Vice President's Office
WB	World Bank

STUDY TEAM

Expert	Responsibility	Signature
Mr. Richard Minja	Team Leader and Senior Environmental Specialist	
Mr. Robert Kishiki	Senior Social Specialist	

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EXECUTIVE SUMMARY

Mtwara - Mikindani Municipal Council (MMMC) is a lower government authority under the PO-RALG and, is among the eight local authorities and the CDA implementing the Core Tanzania Strategic City Project (TSCP).

The Core TSCP dropped some of the new infrastructure subprojects in the total list because of shortage of funds and, that had a negative effect of not meeting the desired goals. As well, some of the implemented subprojects of roads, storm drains, street lights and a landfill could not be well completed and so deemed necessary to seek additional financing to properly accomplish them. Thus, the proposed additional works are desired to fill the gap..

The ESIA study is essentially aimed to contribute to the environmental and social safeguards of the proposed subprojects in MMMC which will have to be verified and approved by NEMC and the Vice President's Office (VPO) for legacy of implementation of the additional works. This ESIA has been prepared according to an Environmental and Social Management Framework (ESMF) for TSCP Additional Financing (AF). The ESMF provides guidance for environmental and social screening process and preparation of appropriate safeguards instruments for proposed investments under AF.

Project Description

The project will involve the improvements of roads and drainage systems which were in Packages 1 and 2 under Core TSCP including access structures and street lights as well as improvement of the Mang'amba landfill by constructing one additional waste cell and improvement of an evaporation pond.

Key works in the landfill involve excavation works for waste cells, application of liners to intercept leachate, leachate storage and evaporation pond and construction of leachate collection system/ pipes. In addition, installation of gas collection system/ pipes and grading of surrounding areas to maximize run-off.

Other works are excavation for road-side drains and storm water canals, roads, vegetation clearance, fixing/ concreting and erection of poles for street lights together with fixing of solar panels and bulbs for street lights.

Stakeholder Consultation and involvement in ESIA process

A communication plan was prepared to guide in the stakeholders consultation process in which meetings and discussions were held with representatives of key stakeholders and the MMMC. The meetings were aimed at collecting their concerns and opinions about implementing additional subprojects. Additionally, the meetings were important in having a common understanding about setting and key issues of additional subprojects.

The meetings were the basis for people's participation and involvement in project formulation process. The main stakeholders consulted were relevant officials from MMMC, Ward, Mitaa, CBOs, NGOs and influential people who will benefit from the subprojects.

Field visits were also made to the subproject sites to understand and document about basic conditions on topography, location, drainage, human settlement and vegetation cover. The purpose was to get an insight about possible impacts to be caused by subprojects and feature them in the ESIA report.

Results of Public Consultations

The outcomes of stakeholder consultation meetings revealed the following concerns;

- Storm water effect
- Occurrence of communicable diseases such as HIV/AIDS
- Soil erosion hazards and

- Dust pollution
- Rehabilitation of borrow pits and landscape
- Worries about local employment
- Influx of workers
- Solid waste management

Environmental and Social Impacts

The ESIA study for the additional works for the proposed additional financing subprojects show limited negative environmental implications of the sub-project, the proposed improvement works will have high socio-economic benefits to the residents of MMMC in terms availing local employment, improved sanitation and revenue collection.

The associated negative impacts will be significantly reduced or eliminated through careful engineering design and good construction practices. Specific mitigation measures have been suggested in this report to offset adverse impacts especially those linked human and social environment. These include the following; noise and dust pollution, soil erosion and landscape destabilization, interference to business and pedestrian movements, traffic accidents and management of solid waste. Others are occupational health and safety; and spread of diseases. Construction of storm water drains will safeguard road infrastructure and control flooding or water stagnation in the urban center. Water stagnation creates habitats for mosquitoes thus prevalence of malaria.

Storm drain works may lead to removal or cutting of planted trees, fruits and coconut plants along the proposed storm drain in Chikongola area. Installation of street lights poses electrocution risk associated with electricity connection. However, construction of side drains for roads and erection of electric poles by excavation of foundations will be confined within the area reserved for public utilities and will fall inside the Road Right of Way (RoW).

Predicted impacts at the landfill include pollution of surface and underground water resource by leachate, effect of dust on ambient air quality, traffic accidents near public road and noise. Additional effects include fire outbreak and smoke emission risks at landfill during operation phase, solid waste and storm water. The study also predicted the occurrence of soil erosion around the landfill especially on sloping grounds. Landfill design should ensure no interference with Right of Way for the public roads. The project may also result into spread of HIV/AIDS and odour nuisance around the landfill due to poor landfill management in operational phase.

In converse, the project will create positive impacts such as creating local employment, relieving transport snags, and subsequently contribute to improve of social welfare of the municipal community.

Mitigation Measures

Some practical mitigation measures have been proposed for all significant impacts. Implementing these measures shall safeguard the environment and make the proposed sub-projects sustainable. The implementation of planned works will not require compensation or resettlement.

The summary of recommended mitigation to minimize the potential impacts are:

- Proper design to prevent, storm water effects e.g. proper dimensions for culverts.
- Measures to safeguard employment and gender balance.
- Protection of soil erosion and landscape instability by tree planting and rehabilitation.
- Proper discharge of run-off or storm water to natural water bodies or safe ends.
- Implement measures against occupational health and safety and
- Prevent traffic accidents and interference to business and access to homes
- Control noise and dust pollution; provision of protective gear and awareness creation
- Measures against spread of social diseases like HIV/AIDS and STDs.

- Involvement and participation of communities in management of subprojects.
- Work with Utilities companies (water, TANROADS) to minimize damage.
- Prevent electrocution along street lights by warning signs and regular maintenance.
- Compensate unforeseen or accidental damages on trees/houses during works
- Maintenance of landfill fence and gate control to keep away scavengers and animals.
- Manage human health and safety during works.
- Control of leachate against pollution of ground water and soils during the operation phase
- Manage noise and dust during works
- Management of traffic accidents
- Re-vegetation and landscape restoration

Under the new management for the redesigned landfill, waste will be placed into 3 different and segregated lined cells. New infrastructures of pipes and leachate pond will be constructed for collection and safe storage of leachate. This will allow more efficient management of leachate and storm water drainage and will isolate any issues with the liner or leachate quality to the respective cell and not potentially affect the entire landfill.

ESMP

Effective implementation of the proposed mitigation measures as guided in the ESMF will significantly minimize the anticipated impacts. Therefore, implementation of mitigation measures should be adequate and timely. The ESMP has been prepared as shown in chapter 8.

The total estimated cost for the various environmental and social mitigation and monitoring measures including environmental and social follow-up, capacity building, sensitization campaigns against the spread of social diseases e.g. HIV/Aids, sexually transmitted diseases (STDs) etc. and ancillary works is TShs 13.2 Mio for proposed road and drainage subprojects and, TShs 19.0 Mio for the landfill works and trainings. Actual costs will be determined during implementation.

Environmental and Social Monitoring Plan

Recommendations for monitoring have been included in the report. The monitoring plan also assigns responsibilities for monitoring activities. MMMC will assume an important role in the monitoring of activities such as disease spread, trends of pollution and accidents, and importantly monitoring of underground water quality which risk being polluted by leachate. Test pits will be constructed at the landfill site. Environmental audit will also be conducted with the technical support from NEMC in the long-term as stipulated in the environmental regulations.

Resettlement

Findings from ESIA reveals that there are resettlement issues at the sites designated for the construction of additional roads and a cell at the Mang'amba landfill. The construction of additional roads will impact 87 PAPs, 530 assets (mostly permanent crops) that would require MMMC to compensate 31,882,160.69 Million Tshs. For the landfill a total of 910 assets will be affected owned by 11 PAPs with a total compensation of 160,472.054.43 Tshs. It should be noted that none of the PAPs will have to relocate as a result of these projects. The MMMC has prepared 2 ARAP reports for TSCP-AF. To minimize resettlement impacts works will be confined within legal boundaries of road Right of Way (RoW) or reserve, and zone designated for public utilities.

Decommissioning

At the end of contract of works and the life span of the landfill when the landfill is completely filled. In the case of landfill, decommissioning will be carried-out by competent engineers and solid management professionals.

The MMMC with the support of the supervision consultant will prepare a final closure plan, which will be approved by the Full Council before it is implemented.

The decommissioning will aim at minimizing erosion problems, restoration of landscape scenery and replacement of vegetation to its near original state.

Activities of decommissioning that may affect the environment negatively are;

- Alignment of road-side drains
- Demolition works for side drains
- Removal of concrete structures or foundations.
- Removal of pole/posts for street lights and accessories.
- Compaction, grading and resurfacing
- Stabilization of steep slopes;
- Final cover of filled-in landfill by soil and green vegetation;
- Control of drainage systems;
- Safeguard to leachate and gas management systems;
- Fire control and;
- Prevention of illegal dumping.

The contractor shall demolish structures and clean up the project sites to a condition suitable for use by the community.

Therefore, the following mitigation measures are proposed as part of decommissioning;

- Safe removal / recycle of concrete structures or foundations,
- Removal and safe disposal of concrete structures; culvers and drainage slabs,
- Filling water pockets to eliminate risk of providing breeding sites for mosquitoes hence controlling malaria spread and,
- Replanting of vegetation on the banks to minimize the erosion.

Conclusion

MMMC will implement the proposed recommendations and further carrying out environmental audit and monitoring schedules. The Council will also take charge to respond to anticipated positive impacts of creation of local employment and ensuring of balanced gender considerations.

Effective implementation of the proposed subprojects will mitigate predicted impacts of harmful or near harmful levels. Their implementation should be adequate and timely. The ESMP has been prepared as shown in chapter 6. In overall, the anticipated positive impacts will by far outweigh the negative impacts. Improved road infrastructure storm drains and landfill have significant positive impacts on the social development and welfare for the community of Mtwara-Mikindani.

Ultimately, MMMC is committed to implement all the proposed Safeguards recommendations and further carry-out environmental auditing and monitoring schedules.

1 INTRODUCTION

1.1 Project Background

The Government of Tanzania through PO-RALG received funds from the World Bank (IDA Credit) and a grant from the Government of the Kingdom of Denmark to implement the Core Tanzania Strategic Cities Project (TSCP).

PO-RALG has been implementing the Core TSCP for 5 years (since 2010) with 7 participating urban Local Government Authorities (LGAs): 4 cities of Mwanza, Tanga, Mbeya and Arusha; and 3 Municipalities of Dodoma, Kigoma-Ujiji, Mtwara-Mikindani and Capital Development Authority (CDA). Later on, Ilemela Municipal Council was added to the list of implementing LGAs following the division of the Mwanza City Council to establish a new Municipal Council.

1.2 Objective and scope of ESIA study

The objective of this ESIA study supplement the earlier ESIA under the Core TSCP and to identify potential environmental and social impacts and key issues associated with TSCP – AF subprojects implementation. The ESIA further proposes appropriate mitigation measures to minimize associated negative impacts and enhance the positive impacts.

This ESIA has been prepared according to an Environmental and Social Management Framework (ESMF) for TSCP Additional Financing (AF). The ESMF provides guidance for environmental and social screening process and preparation of appropriate safeguards instruments for proposed investments under AF.

The scope of improvement works for MMMC under the TSCP AF is as follows:

1. Additional of one landfill cell and one rainwater storage pond at the Mang'amba landfill,
2. Additional drains along Port and Zambia roads and,
3. Additional drains and street lights along Chuno road.

1.3 Brief Description and Rationale for TSCP Additional Financing

The TSCP – AF is an extension of the Core TSCP prepared in a response to further request from the government to the International Development Association (IDA) or the World Bank.

The Development Objective of the proposed AF remains the same as the current project, to improve the quality of and access to the basic urban to basic urban services in seven selected Participating Local Government Authorities (LGAs). The Project will be implemented through three components: (i) Core Urban Infrastructure and Services (ii) Institutional strengthening and (iii) Implementation Support and Preparation of Future Urban Projects. Eligible investment projects must fall in at least one of the below categories: (i) Road and drainage infrastructure (ii) Urban transport infrastructure (iii) Solid and liquid waste management.

Additional funding will further enhance socio-physical transformation of the designated urban areas and promote their economic growth and improvement in welfare of the entire nation. The urban areas are strategically important to mainland Tanzania based on their

physical locations, connectivity for regional trade, demographic weight and contribution to the national economy.

1.3.1 Current Status

Activities under Core Urban Infrastructure and Services component have involved improvement or development of selected infrastructure sub-projects at various locations within the Mtwara-Mikindani municipality. Works have involved upgrading /rehabilitation of a number of artery roads and drainage and associated structures aimed to improve movement of people, goods and services in the urban areas. Priority is given to roads to enhance connectivity (linking principal residential areas, commercial centers and service centers i.e. markets, airports, bus terminal) to the main road networks, enhancement of traffic flow /alleviation of traffic congestion.

Completed subprojects also include a range of local infrastructure such as bus stands and lorry parking areas, and; rehabilitation of solid waste collection centres; development or improvement of solid waste disposal sites specifically two additional cells to the new Mang'amba landfill. Most of the infrastructure on the list of the first batch of prioritized subprojects are complete and in use or ready for use.

1.3.2 Additional Financing

Some areas of the completed infrastructure have been identified where further improvements need to be made. In addition, a number of infrastructure facilities were prioritized during the Core TSCP design and preparation but could not be financed for implementation due to limitation of funds under the credit. Core TSCP is ending in December 2015 and, some of the additional infrastructure facilities were either not well completed under the Core project or were dropped because they were not funded.

Also, MMMC has also identified new sub-projects important for functionality of existing sub-projects. Thus, the government through PO-RALG has secured an additional credit from the World Bank that will specifically finance improvement of prioritized infrastructure investments in the municipality

The additional improvement works for MMMC especially **urban roads, storm drains and extra one cell and a storage pond at the Mang'amba landfill** are therefore desired to complement the initial works of Core TSCP.

Therefore, the proposed supplement ESIA study aims to contribute to the preparation of environmental and social safeguards parameters for the proposed subprojects.

1.4 ESIA APPROACH

The TSCP obtained EIS certificate for proposed works with conditions attached in the certificate after verification of the carried out the ESIA study between August and November 2009.

However, although the EIA regulations of 2005 GN No. 349 of 2005 allow for variation on issues certificate for any additional works where the developer is required to fill in Form No. 5 of the regulation, that will not apply to this case because the additional subprojects are part of the previously selected and designed subprojects approved by NEMC but could not be carried-out due to limitation of TSCP credit funds.

To this effect, steps adopted to prepare this ESIA study covers the following:

- Deskwork studies and analyses,



- Fieldworks and
- Stakeholders' consultations

The necessary activities involved in undertaking the study are as follows:

- To consult key stakeholders to gather their concerns about proposed improvement works and in particular how the surrounding communities will be affected by the project;
- To carry out additional information or data to supplement EIS - To establish an environmental conditions about in the proposed sites for proposed works;
- To assess the status of ecological and social receptors
- To describe the project characteristics and affected environment of the improvement works;
- To assess and evaluate the potential environmental impacts resulting from the proposed and Storm Water Drain sub-projects, especially within the zones of project influence;
- To identify mitigation measures for serious impacts and,
- To develop an Environmental and Social Management Plan (ESMP) detailing actions and responsibilities for the mitigation of impacts and for monitoring them.

1.5 Report Structure

The ESIA Report is structured as follows:

An executive summary provides an overview of significant findings and recommended actions.

- Chapter 1 is about project introduction giving overview of the projection conception and the necessity for carrying out an ESIA;
- Chapter 2 provides detailed baseline information on the proposed additional financing sub-projects, briefly describes the project area and conditions, the proposed project features with key trends and anticipated conditions that give justifications for the investment. It also includes the existing spatial, institutional and temporal boundaries;
- Chapter 3 summarises the policy, legal and administrative framework within which the ESIA was carried out, including the environmental and social impact assessment requirements;
- Chapter 4 presents stakeholders consultation and public involvement;
- Chapter 5 discusses the detailed information on the identification, prediction and analysis of actual impacts. In addition it covers alternatives considered in designing the project;
- Chapter 6 summarises measures that have been adopted to ensure that the mitigation measures are implemented and the impacts are in accordance with predictions;
- Chapter 7 provides an outline of the environmental and social management plan, cost and responsibilities during implementation; it also addresses measures for institutional capacity building, grievances and mechanisms/procedures for their resolution.
- Chapter 8 provides the proposed monitoring plan. It outlines the mechanisms for checking environmental performance during the project implementation;

- Chapter 9 is about decommissioning activities at the end of sub-project life span.
- Chapter 10 provides a conclusion.
- Appendices: Provides a reference list, including all literature and other sources of data used in preparation of the ESIA.

2 DESCRIPTION OF ADDITIONAL FINANCING SUB-PROJECTS

2.1 Overview

The improvement works of TSCP Additional Financing are infrastructural and for improvement of transportation, sanitation and social services in MMMC. These are side drains or storm water drains improvement to improve drainage along roads. In addition, installation of street lights to enhance night visibility and addition of more waste disposal cells at the new Mang'amba landfill. Some of these works were not completed in the Core project (Package 1 and 2).

The municipality has pockets of areas which are vulnerable to seasonal flooding because of its natural low-laying topography. Hence, roads passing in these areas especially the newly constructed roads require drains constructed and installation of street lights. Storm water drains and road-side drains will remove and empty run-off water into safe ends.

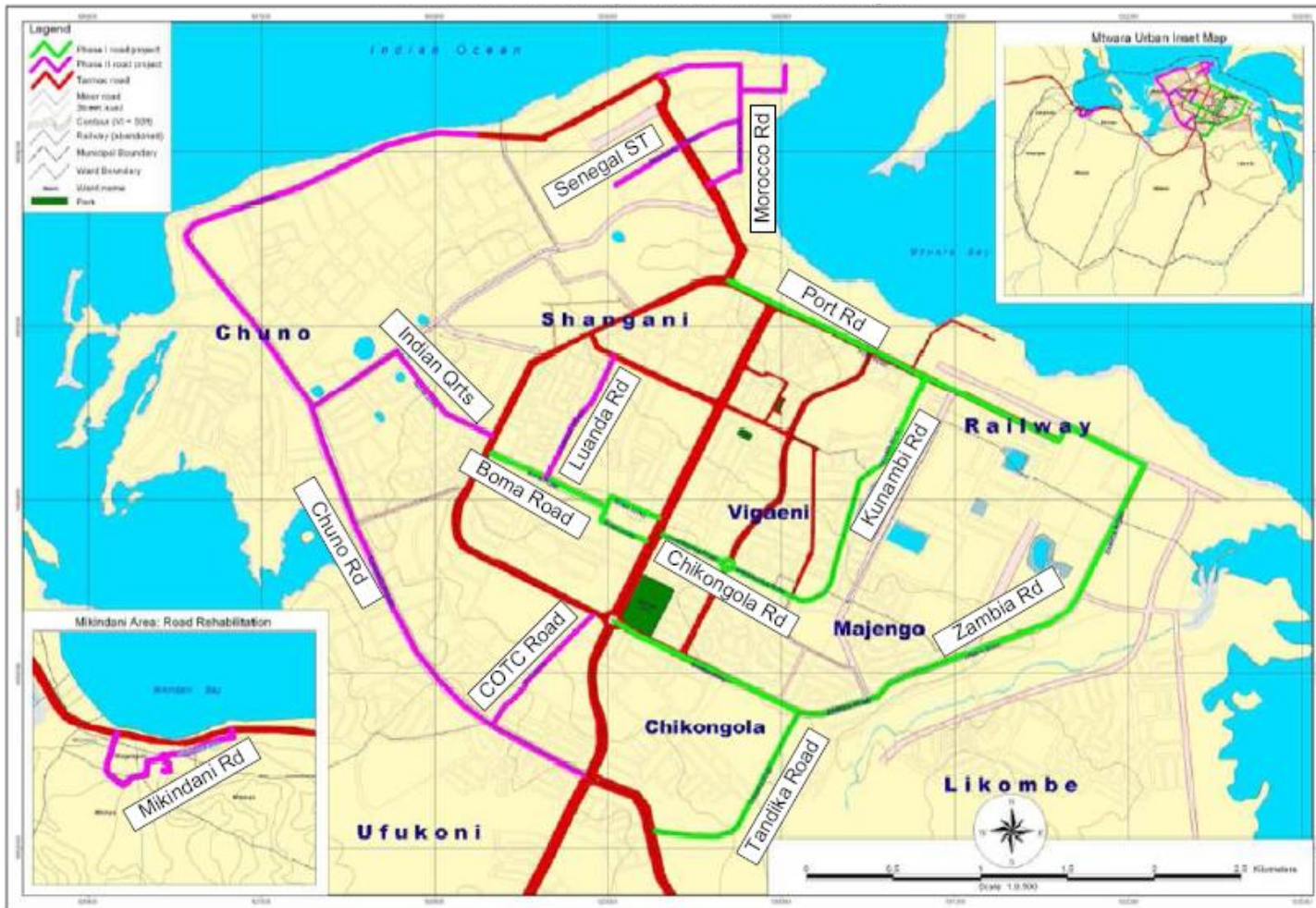
2.2 Project Location Map

The location of project area is shown in **Error! Reference source not found.** and Figure 2.

Figure 1: Location of Project area



Figure 2 - Roads Layout in Mtwara- Mikindani Municipality



2.3 Additional Drains Street Lights for Roads and Mang'amba landfill

This subproject is designed to construct components for road drains and street lights as described in section 1.2. The task will involve the following;

Road Drainage Infrastructure

- 1) Side drains:
 - Demolishing of side drains and laying of new ones
 - sand traps,
 - stone pitching,
 - gabions, concrete pipes
- 2) Storm drains for rain run-off
- 3) Pedestrian crossing slabs:
 - pedestrian walkways,
 - speed humps,
 - rumble strips,
 - Road shoulders
- 4) Culverts
- 5) Road furniture: street lights, signing
- 6) Vegetation clearance to pave way for works and,
- 7) Construction of **one cell and one rainwater storage pond** at landfill for solid waste disposal including drainage structures and a boundary chain-link fence at the Mang'amba landfill.

Table 1 below shows a list of subprojects combined for Package 1,2 and 3 which will get Additional Financing (AF) for provision of Street lights and improvement on storm water drains.

Table 1: Sub project road; Storm/ Side drains and Street lights for Mtwara-Mikindani

Priority	Description of subproject	Current status (metres)	Scope of work
1	Makonde - Nangwada swamps	1861	Widening and lining with concrete of a storm water drain from Makonde to Nangwada swamps Provision of road crossing 13 box culverts Provision of 124 House access slabs
2	Tabora road Side Water Drains (SWD)	436	Provision 4 R.C. Pipe culvert Provision of 29 House access slabs Widening and lining with concrete
3	Zambia-Kilwa Link SWD1	357	Provision of 2 R.C. Pipe culverts Widening and lining with concrete Provision of 24 House access slabs
4	Zambia-Kilwa Link SWD2	356	Provision of 1 R.C. Pipe culvert Widening and lining with concrete Provision of 24 House access slabs
5	Kilwa Road SWD	417	Widening and lining with concrete Provision of 28 House access slabs
6	Port Rd - Power Plant Crossing SWD	435	Widening and lining with concrete Provision of 6 House access slabs
7	Port Rd -	88	Provision of 1 Box culverts across Port Road.

Priority	Description of subproject	Current status (metres)	Scope of work
	Power Plant Residential Area Link SWD		Widening and lining with concrete of the approach channel Provision of 6 House access slabs
8	Port Rd- Weighbridge Yard Crossing SWD	213	Provision of 1 Box culvert Widening and lining with concrete Provision of 2 House access slabs
9	Zambia- Likonde Dispensary Link SWD1	163	Provision of 1 R.C. Pipe culvert Widening and lining with concrete Provision of 5 House access slabs
10	Zambia- Likonde Rd Link Side Water Drains (SWD)	278	Provision of 2 R.C. Pipe culverts Widening and lining with concrete
11	Zambia- Likonde Dispensary Link Side Water Drains (SWD)	209	Provision of 10 House access slabs
12	Zambia – Primary School Link	140	Provision of 1 R.C. Pipe culvert Widening and lining with concrete Provision of 5 House access slabs
13	Chuno Rd-SWD1	399	Provision of 1 pipe culvert. Widening and lining with concrete. Provision of 10 house access slabs
14	Chuno Rd-SWD2	420	Provision of 2 R.C culverts Widening and lining with concrete Provision of 10 House access slabs
15	Chuno Rd SWD 3		Widening and lining with concrete Provision of 10 house access slabs.
16	Chuno Rd SWD4	218	Widening and lining with concrete Provision of 5 house access slabs. Street lights.
17	Chuno Rd SWD5	329	Provision of pipe culverts Widening and lining with concrete Provision of 5 house access. Street light. Slabs
Total		6653	

2.4 Designing

2.4.1 Mang'amba landfill

The proposed landfill cell has been designed and partly constructed. It will be influenced by rainfall thus potential for leachate generation and, hence will need specific mitigation measures.

The management of the landfill cells will require use of soil materials that will be used for topping or mounding. The soil may be available from the site by use of overburden material or spoil generated during construction or else will have to be imported from nearby authorized sources.

The piling of waste inside the cells can heighten up to 20m from the bottom layer surpassing the ground level before it is capped by earth material.

The intension for additional works at the landfill are to:

- build a facility that is effective, functional, compliant with environmental and other regulatory requirements, and is sustainable;
- achieve a filling capacity of approximately 15 years; and
- stay within the funding set aside for the landfill related works.

2.4.2 Road subproject

Most of the access roads have been hindered to function due to existence of longitudinal ditches. Earlier roads were constructed o allow more to incorporate the size of culverts, fill vehicles to manoeuvre through the streets meeting design and safety requirements.

Walkways were provided as per existing design of 1-1.5m width on both and/or single side of the road with paving slabs laid to bring authenticity to the streets and safety and comfort to passers-by.

2.4.3 Storm Drains

This requires the new construction of drainage structures, including the construction of open drains and energy dissipation structures.

Storm water drains have been designed for consideration of holistic view of surface water movements in Mtwara municipality. The longitudinal road ditches exist in the additional roads and direct run-off to the lowest points along the roads and, from the lower points to external locations far from the roads whose levels are lower than the lowest points on the roads.

2.4.4 Structures

Designed structures include access slabs to houses for vehicles, pedestrian crossings and foot bridges crossing the storm water drains were considered as additional facilities. The major structures for the storm water drains are open trapezoidal lined ditches of varying sizes running throughout the drains considering climate change factors.

2.4.5 Street lights

Streetlights with solar power (Photovoltaic module) sources will be provided to the already built Chuno road, recommended to be installed 6.0 M height and at distant pole intervals of

50m centre to centre alternating side to side within the RoW. The 5.8KM Chuno road will have 120 street lights.

2.5 Project requirements

2.5.1 Borrow Materials and Quarries

Construction materials particularly gravel and sand will be obtained from approved borrow areas. Crushed rock aggregates may be obtained from existing quarries used during Core TSCP.

Safety measures during transportation of the materials will be adhered to and all access roads to be used for the transportation of materials shall be properly maintained.

The contractor shall prepare and subsequently implement rehabilitation plans for borrow pits and quarries during the decommissioning stage. The plans shall include demolition of temporary structure, and blending and filling of cuts to minimise risks for mosquito breeding and human or animal accidents, especially to children.

2.5.2 Construction Camps, Workshops, Offices and Camps

During the construction of TSCP-AF subprojects existing work camps may be used for workshops, offices, accommodation for staff and storage of construction materials.

2.6 Project activities/ Operations

2.6.1 Mobilisation Phase

The project works will be implemented close to household or public areas and may affect public utilities and so necessary precautions must be taken with the guidance of the supervision consultant in keeping equipment in or close to the working sites. That will help avoiding disturbances to the residents. The right manpower and other subproject associates resources should adequately assembled ready for commencement of the works.

2.6.2 Construction phase

The major works and materials for access roads, storm water drains, street lights and landfill structures during the construction will consist of;

- i) Clearing of areas in advance of construction works;
- ii) Excavations for drains and poles foundations;
- iii) Earthworks necessary to construct the road ways and drains;
- iv) Lining of drains with slabs and concrete
- v) Construction of concrete slabs and strips;
- vi) Preparation of culverts and slabs;
- vii) Removal of overburden material;
- viii) Earthworks necessary to construct the landfill cell and office building;
- ix) Construction of leachate collection pond / storage structures;
- x) Construction of leachate treatment facilities;
- xi) Construction of gas ventilation and collection system;
- xii) Construction of test pits for ground water and other pollution monitoring;

- xiii) Installation of polysynthetic lining material;
- xiv) Construction of office building, weighbridge, fence and access ways and;
- xv) Construction of drainage structures, including the construction of open drains and energy dissipation structures.

2.6.3 Waste Management

The proposed road-side and storm water drains, street lights and landfill works are not expected to generate harmful waste materials. The major wastes generated by the subprojects are spoil soils resulting from earthworks including creation of borrow pits. Topsoil shall be stock piled along near construction sites and later on used to re-instate the sites at the end of the project implementation phase. In particular, the topsoil will be used for environmental rehabilitation such as capping of waste cells, re-vegetation and stabilisation of road, drain and landfill cell embankments.

Waste may be generated in the campsites if the contractor chooses to establish new sites or use the existing sites. This will include liquid wastes, general refuse and hydrocarbons. Sanitation facility to be used in the landfill site/camp will include ventilated improved pit latrines (VIP latrines), septic tanks and soak ways.

However, the contractor will make contingency plans to handle accidental oil spillages and general waste management during the preparation of ESMP for the subprojects.

2.6.4 Power and Water Supply

The contractor will obtain power supply from own standby generators or national power grid or served by TANESCO as well as water supply from the Mtwara Urban Water Supply and Sanitation Authority. Power and water supply are essential services for office, camps and workshops and for the operation of some equipment as well as the environmental hygiene of at the compounds.

2.7 Demobilisation Phase

As soon as possible and to as great an extent as possible, after construction all areas not covered by permanent works shall be re-instated to their original conditions.

The activities during demobilisation will include the following:

- Handing over of the permanent works in a serviceable condition to the Mtwara-Mikindani Municipal Council;
- Removal of temporary works and associated installations;
- General cleanliness of the areas affected by the contractor's activities;
- The disposal of all wastes to designated disposal sites;
- Restoration of borrow pits, quarry areas, water ponds to natural and usable conditions; and
- Termination of recruited workers in accordance with their contracts and labour laws and regulations.

2.8 Operation and Maintenance Phase

During the operation phase, the major activity will be the transport of various goods and passengers to neighbouring districts, towns and regions. Maintenance of the drainage and street lights will be necessary to ensure continued ease of use and to prevent deterioration of assets. Moreover, another activity will be management of waste at the landfill site and; in general the activities under the additional works will involve the following:

(a) Landfill site:

- Piling and management of waste by compaction and soil capping inside cells.
- Clearing and cleaning/ unblocking of drainage systems and collection pipes
- Management of leachate and water evaporation pond.
- Repairs to damaged and replacement of vandalized poly material (liner);
- Re-establishment of sign boards;
- Operation, repair and servicing of weighing bridge.
- Allow vegetation growth on cell mounds or cap
- Continuation of safety awareness programme for the people close to the landfill site and,
- Environmental monitoring for dust, noise, leachate, inflammable gas, and groundwater quality.

The duration of these activities matches the life span of the project which is 15 years. Main equipment during operation phase are; roller compactor, plate compactor and motor grader.

(b) Roads, drains and street lights:

- Repairs to damaged drains and culverts
- Removal of debris from the drainage system
- Maintenance of drainage including the removal of blockages, cutting and removal of vegetation, the removal of silt from culverts and the inverts of drains, repairs to damaged sections, etc.:
- Replacement of road signs;
- Replacement of light poles knocked down by motorists
- Re-establishment of road markings;
- Proper storage and deployment of maintenance materials and equipment;
- Continuation of safety awareness programme for the people using the road; and
- Involvement of community in protection of road structures including drains and street lights.

2.8.1 Work-force and Equipment

In the same manner as was during the Core TSCP, the construction of additional works will require a team of technical personnel namely project managers, engineers, surveyors, sociologists, valuers, supervisors and technicians as well as semi-skilled and unskilled labourers. Unskilled and semi-skilled labour will be employed from local areas as need may be. The exact number of employees required by the subprojects will be known when each prepares and avails the methodology on how they will deploy the labour force..

There will be a need for heavy equipment for earthworks, construction of pavements and drainage structures, and transportation of construction materials and the labour force. These shall include bulldozers, graders, wheel loaders, excavators, water bowsers, fuel tankers, bitumen distributors, vehicles, pumps, generators, cranes, rollers and compactors.

It is anticipated that labour based methods will be used for the construction of drainage and part of landfill cell structures especially in concrete works.

2.8.2 Street lights

Solar lights will be installed in the streets. They absorb energy from the sun and turn it into light illuminating in subproject areas, hence, ensuring safety and security in the then dark streets.. Technically, a solar light has a photo-voltaic module integrated with a micro controller and a lithium battery which combines with high output LEDs and a human infrared sensor to get a multiple feature of low power consumption with high luminance. The lights are designed to deliver in a long lifespan with minimal maintenance and provides a complete solution for the off-grid or remote inner streets applications. The lights endure against harsh weather as they are kept free from corrosion and premature failure.

2.9 Organisation of Works and Construction Duration

MMMC to award works to different contractors in separate lots for each subproject (roads, and drains). The detailed schedule and methodology for works will be known at a later stage when the contractor(s) is/are engaged.

2.10 Land requirement, resettlement and compensation issues

The outcome from ESIA reveals that there are **resettlement issues at the sites designated for the construction of additional** roads and a cell at the Mang'amba landfill the construction of additional roads will impact 87 PAPs, 530 assets (mostly permanent crops) that would require MMMC to compensate 31,882,160.69 Million Tshs. For the landfill a total of 910 assets will be affected owned by 11 PAPs with a total compensation of 160,472.054.43 Tshs. It should be noted that none of the PAPs will have to relocate as a result of these projects for MMMC. The MMMC prepared 2 ARAP reports for TSCP-AF. To minimize resettlement impacts works will be confined within legal boundaries of road Right of Way (RoW) or reserve, and zone designated for public utilities.

2.11 Status of proposed sites for additional works

The proposed Makonde –Nangwada storm drain passes in poorly drained area and it is expected to drain the newly constructed roads in particular, Zambia, Kunambi and Chuno roads. The proposed drains traverse area which is already inhabited by people. Houses and land properties such as fruit, planted shade and banana and coconut trees are in found in the proposed site as shown in **Figure , ,Figure , Figure , Figure ,Figure 7, Figure , Figure and Figure 10**. There are also road culverts and religious buildings and institutions at the sites. Some of the areas traversed by the proposed drains are prone to soil erosion,. Other areas have service utilities of water, power and gas **Figure 7, Figure . Figure and Figure 10**.

The present characteristic for the subproject proposed improvement works as observed during are presented in **Error! Reference source not found.**

Table 2: Environmental characteristics of the proposed sites for Improvement works

S/No	Project	Sub projects	Baseline Features
1	Road improvement works	Improvement works for Package 1 and 2	<p>Residential area. It is a paved road Close to temporary and permanent water ponds. Planted trees outside properties.</p> <ul style="list-style-type: none"> - Connects Chuno and Jamhuri Roads. - Close to 3 swampy areas. - Serves Guest houses - Serves religious building- mosque. - Shops and hair salon along the road. - Motorcycle (Bodaboda) stand
3	Storm drain (Improvement works)	1 st Drain	<ul style="list-style-type: none"> - Line parallel to Makonde road. - Serves Chikongola, Zambia and Chuno roads. - Pass close to offices, residential and guest houses (may interfere access to properties). - Presence of 7 fruit tree (Mafenesi or jack fruit), 2 coconut trees and 5 banana plants on its proposed path. - Passes 2 culverts across Chikongola road which will be removed. - Drains to discharge water from Zambia, Makonde, Chikongola and Kunambi roads. - Houses on the side of proposed drain. -
		2 nd Drain	<ul style="list-style-type: none"> - Starts from Zambia and Kilwa junction to Nagwada Swamp which is a collection pond. - Drains also Kunambi road. - Presence of planted shade and ornamental trees. - Presence of small business /kiosks.

S/No	Project	Sub projects	Baseline Features
		3 rd Drain	<ul style="list-style-type: none"> - The drain start from Zambia road and run in Chikongola area, will remove flooding water from the road. - Presence of religious schools e.g. Chikongola Madrasa School and Zainab- Albidina Islamic School. - Soil erosion is caused by water from Zambia road.
		4 th Drain (approx 400m)	<ul style="list-style-type: none"> - The 4th drain starts from the junction of Zambia and Likonde Mji Mpya road towards the later. - Cross the main water supply pipe from Mtawanya to Likonde area (see photo). - Passes on sloping area which is prone to soil erosion. -
		Port Road Drain	<ul style="list-style-type: none"> - Will drain water from Zambia road. - Requires construction of new culvert across Zambia roads (will interfere traffic flow). - Discharge storm water to Indian Ocean through TANESCO site for gas power generation. - Will affect TANESCO fence at power generation plant - Presence of TANESCO power supply lines - Passes outside Oil deport (may affect access)
		Chuno road drains	<ul style="list-style-type: none"> - Will drain flooding points along newly improved Chuno road. - Few residential and guest house (Midland Lodge) subjected to storm water effect will be served. - 6 coconut and 2 orange trees will be removed. - Water supply pipes will be affected. - Primary school at Magowela area subjected to flooding will be served. - Passes Close to dispensary at the junction of Magomeni-Airport roads. - Business shops/kiosk at Magomeni junction. - Passes close to TANU – Magomeni – Sokosela road. - Part of drain lies in TANROAD

S/No	Project	Sub projects	Baseline Features
			RoW
3	Mang'amba Landfill development	One landfill cell and a storm water storage pond	<ul style="list-style-type: none"> a) Proposed one cell will lie close to newly constructed cells at Mang'amba landfill, b) Similarly water evaporation pond will be confined inside the same site, c) The site harbours the operational old waste dump owned by MMMC, d) Site lies on gradually sloping ground, e) Remnants of natural vegetation, f) Presence of newly constructed storm drain around the landfill. g) Entrance starts from tarmac road, on uphill. h) New landfill is fenced, i) Electric poles along adjacent public road and, j) A contractor's site camp is close-by along the road to the Mang'amba landfill.

However, most roads have utilities of water and power which requires protection. See **Error! Reference source not found..**

Figure 3: coconut trees, water pipe and Electric Poles will be affected by drain expansion, Mangowela , Chuno Road



Figure 4: Houses affected by flooding along Chuno Road



Figure 5: People damaged drainage structure to reduce flooding along Chuno Road



Figure 6: Properties along proposed improvement of Water Drain along Port Road



Figure 7: Power Utility close to proposed Drain in Chikongola Area



Figure 8: Water Supply pipe near Zambia Road at Likonde



Figure 3: Sign of Soil Erosion along the Proposed site for Water Drain at Chikongola



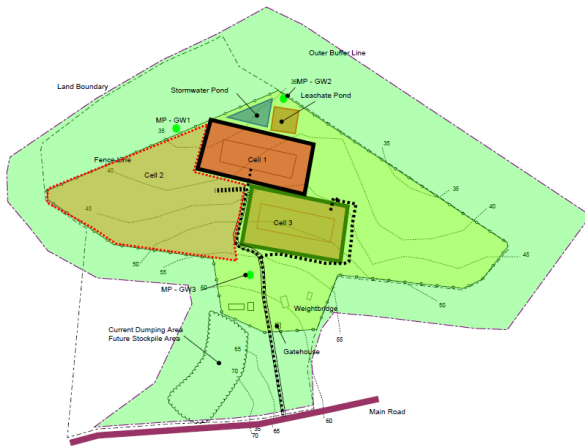


Figure 10: The layout of Mang'amba landfill

3 BASELINE CONDITIONS

3.1 PHYSICAL ENVIRONMENT

3.1.1 Location

The municipality has an area of 163Km² or 1.0% of the regional area of which 64Km² is Urban proper and 98.75Km² has characteristics of sub – urban. The present population figures provide a population density of 726/km².

Besides formal settlements in planned areas, the housing pattern also includes informal settlements located in unplanned areas with poor social services.

3.1.2 Climate

The project area is located in eastern Africa and is predominately affected by air masses and weather systems from the east and the Indian Ocean. It has typical tropical climate influenced by Monsoon winds of Indian Ocean influence the rainfall in the area.

The town has bi-season climate, a hot humid rainy Season from November to May influenced by dominant North – East winds humid dry Season from June to October influenced by South-East Winds. Average annual precipitation is about 800mm -1000mm.

The highest and lowest monthly mean air temperatures are 27°C and 23.8°C in December and July respectively. Relative humidity varies between 87% in March and 79% in October.

3.1.3 Topography

The town is located on the coastal line of Indian Ocean with predominantly flat and undulating terrain. Elevated areas can be found on the gentle hills on westerns side of Mikindani. The elevation of Mtwara-Mikindani is low ranging from 0 to 50m a.s.l. Generally, the elevation of Mtwara-Mikindani has a low landscape ranging from the Sea level up to 50 metres. The topography is slightly undulating.

Geophysical: Part of the town is below sea level a phenomenon which causes seasonal flooding especially in Mdenga area/ Zambia Road and Kwa Limo area. As result the management of road is becoming difficult because of raising waters.

The majority of watercourses within this area are seasonal and therefore are dry during the dry season. The main source of water is from bore holes. Because of the predominantly sand soils the area is well drained with little or no water logged wetland areas. The hills on the west side of Mikindani/Jangwani uplands as catchment areas for the small springs at Mikindani.

3.1.4 Landscape and Geology

Geology determines soils. The region has two geological zones and hence two geologically determined soils types. The first zone is geologically the coastal sedimentary formation extending some 125 Km from the Indian Ocean to the edge of the Makonde Plateau of Newala. This zone produces deep, well drained, sandy soils of low fertility and low moisture holding capacity. They are produced from sandstones. Some areas give rise to marine heavy clay soils or verticals. Further, coastal limestone produces red, well drained, heavy textured soils.

The second zone geologically extends west of the coastal sediments. It is a zone of pre-cambrian basement rocks consisting of gneisses and granulites. Soils from this basement are variable. They are deep, well drained, red clays to the north of Masasi town. These are the best soils in the region since they suit best the upland crops of the region. South of Masasi course grained sandy soils occur frequently.

The project area lies on sedimentary deposits from Jurassic and lower Cretaceous. There is a marled extension of rocky limestone along the coastal line.

Parts of the project (roads, recreational parks, street lighting and proposed drains) pass through areas with flat or gradual falling ground and depressions which are seasonally flooded.

There is considerable potential risk to slope stability at present associated primarily with nature of the soils (sand) and seasonal rains which may result in destabilisation of road embankments/shoulders.

The project area lies on sedimentary deposits from Jurassic and lower Cretaceous. There is a marled extension of rocky limestone along the coastal line.

3.1.5 Soils

The coastal soils are sedimentary, well drained sandy soils with low fertility and low moisture holding capacity. The soils are predominantly sand.

The cause of soil degradation can be considered under two broad categories; agriculture, fertiliser use. Evidence of some localised erosion was visible during the site visits to the project particularly around Mikindani Hills, notably associated with erosion along routes of communications (tracks and paths) and on bare sloping ground. Heavy rains during the wet season often result in the breakup of soils from the impact of the rain. This then makes them susceptible to being washed away over the surface of the ground.

3.1.6 Hydrology/ Water resource

Water catchment areas for Mtwara-Mikindani are located in the following upland areas; Mchuchu, Mtawanya, Rwelu, Mbawala chini/ Mkangala and Mbae. Others are Mkundi and Kisungule.

Groundwater forms an important source of water supply in the project area. Therefore, the municipality depends on water pumped from Mtawanya bore holes. The water is treated at MTUWASA water station before it is supplied to the population. MTUWASA is the water supply agent for the municipality.

3.1.7 Coastal environment

Patches of Mangrove forests near Mikindani Forest: *Avicennia marina*, *Xylocarpus granatum* and *Rhizophora mucronata*. These have ecological (erosion protection, breeding sites for prawns) and socio-economic (poles, charcoal) benefits to the area. Illegal felling of mangrove trees for poles and boat making is one of environmental problems in the area.

Marine communities include; Sea grass beds found in the marine ecology. Reef species; Marine turtles of fresh and salt water

Birds: Shorebirds especially herons and egrets, Whales such as Humpback are found in the nearby Indian Ocean waters. Overfishing and destructive fishing through the use of dynamite fishing is reported to take place in the area. Turtles have been hunted for meat and shells. Other marine organisms include algae, sea weed species, crabs, fish and molluscs.

3.2 BIOLOGICAL ENVIRONMENT

3.1.1 Biological environment

The project area is a designated urban development area and therefore no significant existence of forestry and wildlife resources that could be impacted by the proposed sub projects. The marine resources can be considered as the most sensitive part of the

Municipality in terms of conservation. The marine resources provide food in terms of fish, molluscs etc. Any pollution in terms of hydrocarbons pollution will put the marine resources at risk. This mean that adequate measures must be put in the project activities /area to ensure oil and chemical if applicable do not find its way to the water ways and consequently to the nearby ocean.

3.1.2 Reptiles and Amphibians

One purpose associated with the clearance of natural vegetation within the peri urban area is with regard to the removal of habitat suitable for snakes. This is particularly applicable to areas in and around settlements.

Typical snake species present within the project area include python (*Python sebae*), black mamba (*Dendroaspis polyleps*),Vine snake *Imantodes* spp, Cobra (*Hemachatus* spp). In addition, other reptile species include sand lizard (*Lacerta anglis*), eyed lizard (*lacerta lepida*),common lizard (*Lacerta vivipara*), turtles and toads (*Pleurodema* spp).No reference to existence of rare and endangered animal species in the area.

3.2 SOCIO-CULTURAL ENVIRONMENT

3.2.1 Population

The estimated population is 156,436 persons (2012 Census). The major occupation along the coastal strip is fishing with an average annual fish production of 385 metric tons. Industry, trade and commerce are the major economic activities in the CBD. A number of other trading activities are also carried out along various streets. About 33% of the population are involved in urban agriculture. The council possess a total of 9,000 hectors of arable land but only 6,757 hectors has been utilised.

3.2.2 Agriculture and livestock keeping

Most agricultural output, which occurs in the peril urban areas, is by small holder farmers hence subsistence. The main food crops include cassava, sorghum, millet and, maize and rice. Cashew nut is the most important cash crop. Sesame and groundnuts also contribute to the cash income of the peasant farmer. Coconut is important along the Coast.

Mtwara region has chronic shortage of food and most food stuff is supplied from other regions. Horticultural farming is taking place in the depressions where moisture favors the farming even in the dry seasons. Subsistence agriculture outside the core urban area includes farming of cash crops such as coconut, cashew nuts, simsim and groundnuts, and food such as cassava, banana, maize, sorghum, rice and pigeon peas. The standard of livestock keeping in Mtwara region is very low.

3.2.3 Fishing

Mtwara – Mikindani Municipal Council has coastal strep of 25 Kilometers, The average annual fish production is 320 metric tons. Fishing activities are done mainly at Shangani. Low fish earning is attributed by inadequate and insufficient years and vessels. These are total of 600 fishers and 320 vessels mostly bearing dugout canoes which carry 1-2 fishers, There are 200 basket traps, 5 ring nets, 120 gillnets, 2 long lines, 130 hand lines, 20 shank nets

3.2.4 Urban settlement

A large proportion of the project area comprises urban settlement consisting of business and residential properties. Existing roads includes sealed and unsealed roads.

Much of the data, particularly that for population numbers, is old as it is from the 2002 population census.

3.2.5 Ethnicity

The ethnicity of the project area is composed of Makonde, Yao and Makua and other smaller tribes from all over Tanzania.

3.2.6 Livelihood

Main source of livelihood as described by the respondents is farming. Main crop produced by the majority is cashew nut followed by coconut and vegetables. Food crops grown include cassava, beans, potatoes and maize. Generally 98.4% of interviewed people own farms and only 1.6% do not have farm/plots at all. For those who have farmland, 87.1% of the farms are within their own villages at distance of 0-4 km and 11.5% depend of farmlands are on adjacent parts of municipal areas in one of the neighboring villages at distance of up to six kilometers and very few walk above six kilometers.

3.2.7 Occupation of Affected people

Socio-economic study results revealed that majority of affected people are basically small scale farmers with some involved in both farming and simple animal husbandry. Household survey data shows that the main source of income for majority as in most rural communities is small scale farming (86.8%) with most of them divided into permanent and seasonal crops. Also, there are 7.7% who depend on small businesses followed by 3.1% who have formal employment and 2.5% engage in other economic activities like hunting, handcraft artisan activities, and timber activities.

Economy of these areas is characterized by subsistence sector, with low productivity and dependency on rain and soil fertility. The economy/livelihoods of people along the road line include:

- Household or subsistence crop production (agriculture)
- Livestock mainly to meet household requirements but also for selling mainly chicken.
- Harvesting and selling of wood for construction, block making are also another sources of income for the communities.
- Small commercial businesses comprising of small retails and medium wholesaler shops.

3.2.8 Land tenure

All Tanzanians land is a public owned property but it is given to people for occupation and development. There are diversified land tenure systems in the area. The 2010 study by SMEC showed 54.5% of the affected households bought the lands from previous occupiers in either surveyed or unsurveyed areas, followed by 22.2% who obtained land through government allocation. The rest 21.7% inherited the portions of land from their ancestors and an insignificant part of population (1.6%) were renting premises where they live.

3.2.9 Power supply

There is a network of power supply within the town. Power is supplied by generators which uses natural gas/ ARTUMAS PROJET. The town is connected to 132 kV transmission line.

3.2.10 Communication/Transport

The use of commuter buses is common within the municipality. Other Types of transport are ships, auto-rickshaw (Bajaj), motorcycles and boats. Buses connect the town to towns. Telephone communication is available through both TTCL and the mobile phone network. Traffic accidents; Threats are likely in all roads. Motorcycles and auto-rickshaws (bajaj) are fast emerging type of public transport in Mtwara and pose a risk of traffic accidents.

3.2.11 Housing

The majority of houses is built of cement and burnt bricks with iron sheet roofing. The remaining is mud brick construction with iron sheet roofing.

3.2.12 Noise, Air Pollution and Dust

The project area, in general, currently has a low level of noise and air pollution although during the dry season and in certain areas, higher levels of dust are caused especially along the earth roads. Locally some areas are subjected to higher levels of noise, notably along the main road network. The level of vehicle use of these is however low and the extent of noise pollution limited. The level of noise is low because of low traffic and limited industrial activities. Noise from the power generators of ARTUMAS is also low. According to the Tanzania Bureau of Statistics (TBS), the allowable noise levels are as shown in Table 3.

Table 3: National standards of maximum permissible noise levels (dB) at work places

Noise level (Leq dBA)	Duration in minutes/ hours per day	Duration in minutes/ hours per week
85	8 hrs	40 hrs
88	4 hrs	20 hrs
91	2 hrs	10 hrs
94	1 hr	5 hrs
97	30 min	2.5 hrs
100	15 min	1.25 hrs
103	7.5 min	37.5 min
106	3.75 min	18.75 min
109	1.87 min	9.37 min

3.2.13 Education

Mtwara-Mikindani has 23 primary schools with 16475 pupils of whom 8195 are boys and 8280 girls. There are 249 classrooms, 46 teacher's houses, and 424 primary School teachers. By using Primary Education Development Program (PEDP), the Council in collaboration with available communities and other development partners has constructed a total of 48 classrooms in past three years. Increased numbers of classrooms result into an increase in enrolment of standard one pupil in primary schools.

An increase in number of pupils enrolled in primary schools directly increase number of standard VII pupils who complete primary education. Inadequate number Secondary Schools available in the Municipality limit chances for standard VII pupils who pass national examination to join Secondary Education. Although there are several efforts made by local people and government resources, need for better environment especially more classrooms, better and enough teaching materials as well as staff training are still not sufficient.

Concerning to secondary education, Mtwara-Mikindani Municipality has 15 Secondary Schools whereby 10 of them are owned by government. Seven Secondary Schools are

owned by Community and three (3) are central government owned schools. Five (5) Secondary Schools are owned by private Sector (Religious and non religious). Among 12 secondary schools, only six of them offer chances to local standard seven leavers who pass STD seven examinations.

3.2.14 Health Services

Mtwara regional hospital is in Mtwara-Mikindani municipality where by various services are provided, but there are other health institutions which are run by the community, council and other stakeholders. Generally, there is well distribution of health services within the municipality. Most of the people are living within five kilometers to reach the health centre.

3.2.15 Income and gender issues

Most of the Mtwara-Mikindani municipal council's income comes from government allocations as Government disbursements for subsidizing development activities in the area. The municipality gets its income from few sources such as:-

- Hotel levy (Hotel Levy Act No.25 of 1997 R.E.2002);
- Business license (The law No. 25 of 1972);
- Liquors license(Intoxicating liquors act no.28 of 1968 and its amendments);
- Markets levy;
- Property tax;
- Bus Stand fees;
- Slaughters fees;
- Charges on refuse collection;
- Rent obtained from Council Properties;
- Fishing license and marine products;

Distribution of income among men and women in the area is uneven. Men own all major means of production like land, livestock and controls household income though main producers are women. On the other hand women are considered as a group meant to provide labour, just to be paid nothing but marriage responsibilities. Proper intervention is needed to assist women in the area to be conscious and eager to engage on income generating activities.

3.2.16 Gas and mineral deposits

Coral mining is taking place around Mikindani upland areas. The limestone is used for construction activities including roads in the town centres. A cement plant is being developed outside Mikindani which will be fed by limestone rock for cement processing.

Gas deposits and gas well at Mnazi Bay, the extraction of natural gas is today taking place under ARTUMAS Company. The gas is used for power production which is sold to TANESCO for supply to Mtwara and nearby towns.

3.2.17 Industry, Trade and Commerce

Having enough area for locating industries, enough labor power, and good source of power (electricity) etc all these have made Mtwara-Mikindani to be among the best area to invest both for foreign and indigenous investors. There are some industries such as OLAM cashew nuts industry, and other small scale producers, Some of the industries had been closed example soda, cashew nuts, and mattress because of problems like high production costs, lack of reliable markets for cashew nuts etc but we hope due to increased level of development on infrastructure sector, most of these industries will be re established.

Majority of the commercial enterprises are located at BIMA area, Maduka Makubwa, Bus stand and Mtwara Market area. Also there are trading activities in various streets. decision of GoT to make various reforms so as to simplify procedures of starting business by entrepreneurs has brought many positive changes. Many people have managed to start their business and they are developing successfully.

3.2.18 Transport and Infrastructure

A network of roads within the Municipality, both gravel and tarmac. One key main road out from the south North to Dar es Salaam (tarmac/earth). The boat or ships for transport to Lindi and to Dar es Salaam ceased to function some years ago. Daily flights are available between Mtwara airport and Dar es Salam.

3.2.19 Communication and Telecommunication

In Mtwara there are about five telephone service providers which are: Tanzania Telecommunication Company Limited (TTCL) which provides both Mobile as well as land line services, Zain, Vodacom, Zantel and TIGO. There is Poster services, 3 Radio stations, and Television service.

3.2.20 Water Supply

Mtwara Urban Water Supply Authority (MTUWSA) is the sole distributor of water in the municipality. Almost 83% of the population in this municipality gets water within the distance of 400m from their homes. The distribution of water in municipality is of three kinds:-

- Domestic water collection points
- Clean water distributed by pipes,
- Bore and shallow holes

3.2.21 Tourism

A sole tourist attraction in the council is an Indian Ocean beach. There are good resting beaches but most of available local people do not have habit of visiting their beaches.

Mikindani area on the beach front along Mtwara-Lindi is rich in history and touristic values which is dated back to Arab and Portuguese era. Notable historical sites include the old slave market, old German Boma and the house where the famous explorer Dr. David Livingstone lives. It is a historical town with old slave trade market, Old German administrative building "Boma" which is now being used as tourist hotel. There is also a house, which was used by Dr. David Livingstone, early explorer.

3.2.22 Storm water and Flooding

Mtwara town is faced with risk in terms of storm water management or disposal because of flat terrain and flooding spots along the roads which will be covered by the project. The hot spot roads are Chuno and Indian Quarters Road because of flooding vulnerability. These are areas, which will be considered as vulnerable to seasonal flooding during project development.

Management of storm water: The physiography of Mtwara-Mikindani makes management of storm water a critical issue. Some parts of the land lies below sea level a situation which is attributed to seasonal flooding. The problem is more pronounced at Kwa Limo Bwawani and Shangani area and it is affecting nearby roads. Mikindani area along the coast is affected by high tide which causes water to enter peoples' houses and the rise can reach 0.5m inside houses.

3.2.23 Water Quality

As for quality, water from Bore Hole (BH) No 20/69 has high fluoride while that from GH No. 113/71 is rated as good. There are number of potential threat to water quality in the project area is human population. Lack of sanitary facilities. Largely linked to lack of sewerage system and safe disposal of sewerage. The facilities are poor and infrastructure is not available. There are no treatment mechanisms for waste in the urban area.

There are no records of existing contaminated land along the project area. Industrial activities are limited in the Mtwara – Mikindani because of inherent poor communication with other towns and cities and even neighboring country of Mozambique. The petroleum depots outside the port harbor such as BP and Oilcom are well connected by strong pipes safeguarding it against possible leakage. In general, the proposed project does not comprise any large scale industry or potential sources of significant contamination

4 POLICY, ADMINISTRATIVE AND LEGAL POLICY

4.1 NATIONAL POLICIES

4.1.1 Overview of national policy and administrative framework

The ESIA study has been guided by the NEMC's EIA Guidelines (March 2002) and that of other relevant sectors, and the World Bank's Environmental and Social Safeguard Policies.

Regulation on environmental management in the country is mainly vested on two public institutions, the National Environment Management Council (NEMC) and the Division of Environment (DoE) in the office of the Vice President. NEMC undertakes enforcement, compliance, and review of environmental impact statements whereas the DoE provides the policy formulations and technical back-up and executes the overall mandate for environmental management in the country. The EIA certificate is issued by the Minister responsible for Environment.

National policies on environment, land, transport, wildlife, forests, water, occupational health, mining and local government relevant to this project have been considered, as also various international treaties and conventions on natural resources that Tanzania has ratified. The main legal instruments applicable to environmental management with respect to this particular road side/ storm drains and infrastructure for street lights subproject are:

4.1.2 The National Environmental Policy (NEP, 1997)

This is the major policy document which outlines environmental problems and gives guidance to environmental management and projection in Tanzania. 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. Key objectives of this policy with regards the road rehabilitation and upgrading projects are to:

- Ensure sustainability, security and equity in the use of resources;
- Prevent and control degradation of life supporting land, water, vegetation and air;
- Conserve and enhance natural and man-made heritage;

The policy promotes the use of EIA's as a planning tool that integrates environmental issues into the planning process. The policy also stipulates the use of numerous approaches in environmental management in Tanzania.

4.1.3 Transport Policy, 2002

The main Policy objective in the transport sector is to enhance transport and promote environmental protection. Environmental problems created by the transport sector are pollution and safety. Emission into the environment from vehicles is beginning to take its toll in Tanzania. The majority of fuel is leaded and a lot of the vehicles are in poor condition. Furthermore, improper disposal of oils, fuels, and other pollutants from garages and petrol stations may contaminate soils and water sources.

The implementation of this ESIA process will take aboard all these issues as appropriate.

4.1.4 National Mining Policy, 1997

The Mineral Policy covers all activities regarding extraction from the ground. This includes minerals and material such as that for construction. The policy however, promotes private sector led mineral development relegating the role of the government to regulation, promotion and facilitation.

The responsibilities of the government include monitoring of mining activities, collection and maintenance of geo-technical data for promotional purposes and administration and inspection of mining activities, and environmental management with regards to mining. The project sourcing for materials shall be guided under this policy as extraction of sand, gravel and stone are considered as mining.

4.1.5 National Water Policy, 2002

Three components from the National Water Policy have a bearing on the solid waste project. These address proper use, conservation and protection for human consumption and the environment.

(i) Socio-Economic and Water Allocation: Water is a basic need and its use is to be determined by and have consistence in the legislation, the allocation system should distinguish and separate water use permit from land titles and a sufficient supply of water and an adequate means of sanitation are prioritised.

(ii) Protection and Conservation of Water Resources: The "polluter pays principle" shall apply and water conservation for all aspects of water use are to be enforced. "Demand management" is to be used in conjunction with water supply provision.

(iii) Water and the Environment: Water related activities should aim to enhance or to cause least detrimental effect on the natural environment. Furthermore, the allocation and consumption of water for environmental purposes shall be recognized and given appropriate considerations, water for the environment shall be determined based on scientific information available considering both the temporal and spatial water requirements to maintain the health and viability of riverine and estuary eco-systems.

The implementation of this ESIA process will take into consideration the provisions of water policy especially those related to pollution of surface and underground water resources.

4.2 RELEVANT REGULATIONS AND GUIDELINES

4.2.1 Environmental Management Act of 2004

The Act provides a legal and institutional framework for the sustainable management of the environment. It outlines the principles for management, impact and risk assessments, the prevention and control of pollution, waste management, environmental quality standards, public participation, compliance and enforcement. It provides the basis for the implementation of international instruments on the environment and the National Environmental Policy. All project activities must be planned in order to comply with the provisions of Part VI (EIA) Studies, Part VIII (Pollution Prevention and Control), Part IX (Waste Management), Part X (Environmental Quality Standards) and Part XI. Specifically, section 81(1) EMA 2004 states that each developer has to carry out an Environmental Impact Assessment (EIA). The implementation of sub-project investments and this ESIA process will be in full compliance with the Act.

4.2.2 Occupational Health and Safety Act No. 5 of 2003

This Act make provisions for safety, health and welfare for persons at work in factories and other places of work; to provide for the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with activities of persons

at work. Proposed project operations will entail the employment of both skilled and unskilled labourers, and as such will comply with this Act.

Occupational health and safety are key aspects in the operations. First aid and appropriate personal protective equipment will be provided to employees and maintained by the contractor during the period of construction.

4.2.3 Local Government Act (District and Urban Authorities) of 1982

This Act provides for detailed responsibility for urban and district councils in the administration of their day-to-day activities. ESIA and waste management is pointed out as one of the activities to be managed by both district and urban authorities. Accordingly, the proposed investment sub-project activities including this ESIA process will seek to liaise closely with MMMC and other sector authorities in the region.

4.2.4 Land Act No. 4 and Village Land Act No. 5 of 1999

The Land Act seeks to control land use and clarify issues pertaining to ownership of land and land-based resources, transactions on land and land administration. This act identifies three categories of land; village, public and general, and distinguishes protected or restricted land (e.g. national parks, forest reserves, etc.), and ensures that tenure and rights of legitimate land users are considered and respected. Land sensitivity and potential environment impacts of the proposed road drains and street lights subproject shall be considered in order to ensure that the land is not polluted and to allow for natural and rapid restoration of cleared vegetation or disturbed land.

The Village Land Act provides for legal framework for the management and administration of land in villages. The Act empowers the Village institution or Council to manage all village land. It is important therefore that there should be close consultations and consideration of views of local authorities over any matter, e.g. compensation of damaged properties, as a result of the implementation of investment sub-project.

The implementation of this ESIA process is consistent with both legislations.

4.2.5 Environmental Impact Assessment and Audit Regulations (2005)

It is an offence for MMMC to commence, finance, permit or license a project without ESIA authorization. The municipal – specific ESIA process described in this ESMF (chapter 4 below) including application, screening, assessment, review and approval are in line with EIA Regulations. The EIA and Audit Regulations Part IX, Regulation 42, Sub-regulation (1); (2)(b); and (4), require that in such situations where an ESIA Certificate is still valid, and a Proponent wishes to make changes to the development, extra work should be done to supplement the existing Environmental Impact Statement. The nature of additional information required to supplement the EIS should be provided by the National Environment Management Council (NEMC).

The EIS supplement is undertaken by the Proponent. At the completion of the assessment, the supplement report is reviewed and approved by NEMC. The Proponent is issued with a Variation Certificate in accordance with Part VII, Regulation 35, Sub-regulations (1) – (3)) of the EIA and Audit Regulations, 2005. This ESMF environmental and social assessment and management process specific for TSCP additional works aims to fulfil this requirement.

4.2.6 Environmental (Registration of Environmental Experts) Regulations (2005)

Sub-project ESIA, where required, will be conducted by person or firm of experts registered and certified by the Registrar at NEMC. PO-RALG will commission Consulting firms certified to undertake ESIA. LGA will strive to assign qualified LGA staff to prepare sub-project ESMP; or support and supervise external experts where screening determines a need to follow national procedures and obtaining EIA certificate issued by Minister responsible for environment. MMMC will ensure through capacity building outlined under this ESMF (B6) that it is relevant Staff attain qualifications required under this regulations to conduct Environmental Impact Assessment and Audit or related studies and are registered / certified by Registrar (NEMC).

4.2.7 Environmental Management (Air Quality Standards) Regulations, (2007)

This regulation prohibits emissions/release of hazardous substance into the environment. The sub-project ESMP for managing wastes will adhere to permissible emission limits and quantities of emissions of SOX, CO, black smoke and suspended particulate matters, NOX,O3, hydrocarbon, dust, lead, and substances in exhaust of motor vehicles prescribed by the regulations. If need be, LGA seek air pollutant emission permit issued by NEMC.

4.2.8 Environmental Management (Water Quality Standards) Regulations (2007)

The sub-project ESMP will ensure safe distances of water supply systems from pollution sources for any infrastructure activity near water sources. The inclusion of EMOs in project teams and approval of subproject ESMP will ensure no discharge of water polluting substances will go uncontrolled.

4.2.9 Environmental Management (Soil Quality Standards) Regulations (2007)

The sub-project ESMP will ensure main polluting activity and discharge effluent are prevented from contaminating soils or subsoil.

4.2.10 Environmental Management Act (EMA), Cap 191 (Sections 114 – 118).

By developing waste management infrastructure, MMMC have fulfilled their responsibility required by EMA which empower them to devise means for minimization of solid wastes and method of collection, transportation, treatment and disposal; as well as availing appropriate equipment and routes for collection; and designate transfer station / collection centres. The subproject ESMP will ensure proper functioning of the infrastructure and facilities.

4.2.11 Public Health Act, Cap 336 (2009)

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

4.2.12 Quality Standards for Control of Noise and Vibration Pollution) Regulations (2011)

The sub-project ESMP will incorporate measures for control of noise and vibration pollution emanating from construction site, vehicles, workshop, and quarries that annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and of the environment.

4.2.13 Water Acts of 1974 and 1981

The Water Act no. 42 of 1974 and Act no. 10 of 1981, principally seek to ensure that water is utilized without sectoral conflicts and without causing pollution. They were enacted to control and protect water resources, and place a regime of water rights to govern access to water use. Pollution control norms and standards are embodied in the water rights.

Apart from incorporating pollution control and having prevention conditionality in the water rights, the Act goes a step further by putting in place a regime in consent with discharge of effluent. Under Section 15 A (1) of the Act, no person may discharge effluent from any commercial, industrial or other trade waste systems into receiving waters without a consent duly granted by a Water Officer. The Act also contains two schedules, which set standards for receiving waters and effluent. The ESIA process will see to it that all relevant adverse impacts from the proposed landfill, road, drainage and facilities for street lights additional works are properly mitigated to avoid any potential pollution problem in the subproject areas.

4.2.14 Mining Act, No. 17 of 1980, as amended

The Act sets out government policy on all forms of mining and is supported by various regulations covering claims, prospecting rights, mining rights and royalties. Mining license applicants are required to submit plans for environmental protection. Each industry is required to establish realistic resource recovery standards and to adhere to them. Mining plans are required to be presented before operations begin.

The implementation of investment sub-projects will take on board all the relevant provisions of the mining act especially as regard to borrow pits, crushers and quarry material.

4.2.15 Roads Act 2007

The Road Act 2007 serves as a guideline to the use of the road reserve. Clause 29 (2) gives provisions for the request and terms of approval for use of the road reserve by other people, utilities or institutions. The Ministry of Infrastructure Development is the authority for this regulation.

4.3 International Regulations

The most appropriate international legal frameworks are as follows:

4.3.1 United Nations Convention on Biological Diversity

This Convention, which calls for the sustainable use of biological diversity, was ratified by Tanzania in 1996. Mtwara-Mikindani Municipality, where the sub-projects will be implemented has a very low diversity of both flora and fauna. However, best practices of flora and fauna protection will be observed by contactors.

4.4.2. Convention on Protection of Workers against Occupational Hazards in the Working Environment Due to Air Pollution, Noise and Vibration:

This Convention, ratified by Tanzania in 1984, provides the framework for ensuring a safe working environment for workers. The implementation of infrastructural sub-projects will ensure that it prevents the exposure of its workers and the public from any occupational hazards by providing appropriate security and safety equipment.

4.4.3. World Bank's Safeguard Policies

The World Bank Safeguard Policies are Operational Policies (OP) and Bank Procedures (BP) approved by the Board for addressing environmental and social issues within the Banks supported development projects. The core TSCP and the Additional Financing have been rated Environmental Risk Assessment Category B and trigger three environmental and social safeguard policies, which are: Environmental Assessment (OP/BP 4.01); Involuntary Resettlement (OP/BP 4.12); and Physical Cultural Resources (OP/BP 4.11). The same policies will apply to the Sub-Project activities under the proposed Additional Financing.

The safeguard policies considered applicable to the TSCP in general and Additional Financing specifically are:

4.4.3.1 Environmental Assessment (OP/BP 4.01)

This policy requires environmental assessment (EA) of projects/programs ensure that they are environmentally sound and sustainable. The EA is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of the sub projects under the core urban infrastructure (Mtwara) component

The environmental and social impacts are anticipated to come from the implementation of sub projects activities by the contractor. The EA process will lead in the preparation of an Environmental and Social Management Plan (ESMP) for Mtwara-Mikindani. The ESMP will set out mitigation, monitoring and institutional measures to be taken during operations of these activities, to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels.

OP 4.01 further requires that the ESIA report must be disclosed by the Government of Tanzania and the World Bank Info Shop before commencement of the project activities

4.4.3.2 Physical Cultural Resources (OP/BP 4.11)

Culturally, Tanzania is an extremely rich and diverse country and is home to ancient civilizations: 300-year-old Arab settlements; 100-year-old European buildings; graveyards; sacred areas; mosques; churches; etc. To mitigate potential for adverse impacts on cultural property, training of LGA project teams and local leaders and management committees and the subproject planning checklist as well as other tools, will ensure that cultural property resources are identified during subproject planning, and appropriate measures are taken to avoid damaging them. Chance find procedures have been included into civil works contracts; Designs and buffer zones will be created to avoid damage to cultural resources, such as "sacred" forests and graveyards. According to approved designs, the proposed infrastructures are such that they do not affect cultural resources, but procedures in case of "chance finds" will be observed.

4.4.3.3 Involuntary Resettlement (OP/BP 4.12)

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

AF sub-projects in MMC involves resettlement issues at the sites designated for the construction of additional roads and a cell at the Mang'amba landfill. The construction of additional roads will impact 87 PAPs, 530 assets (mostly permanent crops) and would require MMMC to compensate 31,882,160.69 Million Tshs. For the landfill a total of 910 assets will be affected owned by 11 PAPs with a total compensation of 160,472.054.43 Tshs. It should be noted that none of the PAPs will have to relocate as a result of these projects for MMMC. The MMMC prepared 2 ARAP reports for TSCP-AF. To minimize resettlement impacts, works will be confined within legal boundaries of road Right of Way (RoW) or reserve, and zone designated for public utilities. To mitigate this impact, the MMMC will compensate the PAPs as per the entitlement impact stipulated in the TSCP-AF RPF.

5 STAKEHOLDERS CONSULTATION AND PUBLIC INVOLVEMENT

5.1 Consultation

ESIA was prepared for the first phase and EIS certificate given for the project. The public consultation process in Mtwara-Mikindani was conducted in accordance with the Tanzanian Environmental Impact Assessment and Audit Regulation of 2005. Importantly the stakeholders were given information about the improvement works and allowed to give their concerns or opinions about the planned works. This experience from phase I (package II and I) and how to improve the situation.

The objectives of public consultation were:

- Provide clear and accurate information about additional subprojects to communities living in the sub-project area, especially along the proposed road drains and street lights sub-projects in order to obtain feedback/valuable suggestions directly from impacted communities on their preferred mitigation measures;
- Promote understanding through the active engagement of individuals, groups, stakeholders, organizations who have a stake in the sub-project and its outcomes. Public consultation plays a critical role in raising awareness of impacts of the new developments;
- Share information with stakeholders on proposed improvement works, implementation schedule and expected impact on the physical, biological, and socio-economic environment of the sub-project;
- Understand stakeholder concerns regarding various aspects of the subprojects and the likely impacts in different phases of construction and operation.
- Share experience from implementation of the Core TSCP works in 2009 -2010 particularly on how the impacts were mitigated and ,
- How best to enhance people's participation and involvement.

In the public consultation process the focus was on consultations with the Municipal Council or high level executives and in particular the heads and staff of relevant departments. The affected and beneficially communities were also consulted.

5.2 Issues and Concerns as raised during stakeholder meeting for proposed works

The outcome from consultation meeting in particular the concerns is provided in **Error! Reference source not found.**

Table 4: Issues and Concerns expressed by stakeholder regarding improvement works

Stakeholders/ Ward Officials	subproject/ Impact	Issues of concern/ raised
Eng. Francis Rugemalila – Municipal Engineers	Storm Water Drains (SD)	<ul style="list-style-type: none"> - Road drains incomplete, drained water not discharged into safe ends. - Initial designs for SD had shortfalls- need for improvement. - Need for construction of drains to safeguard or sustain new roads
Mr. Mohammed Aziz– Municipal Health Officer	Dust pollution	<ul style="list-style-type: none"> - Dust pollution is an issue of concern- observed in previous works. - Use new Mtwara- Mikindani by-law to control

Stakeholders/ Ward Officials	subproject/ Impact	Issues of concern/ raised
		environmental pollution
	Drainage canals	<ul style="list-style-type: none"> - Poor drainage of storm water from new roads- Improve design. - Inadequate provision of PPEs - Damping of solid water in drainage canals.
	Rehabilitation of Borrow pits	<ul style="list-style-type: none"> - Insufficient rehabilitation of borrow pits/ landscape disturbance.
Mr. Macha – Agriculture Department	Storm Drains (SD)	<ul style="list-style-type: none"> - Storm water is directed to residential and business premises - Drainage in Mtwara municipality is insufficient;, there are houses in water ways.
Mr. Spuku – HIV/AIDS coordination	General works	<ul style="list-style-type: none"> - Works may contribute to increased prevalence. - Control HIV/AIDS spread; continue use of media; radio etc. - Use groups/ CBOs, films and cinema against disease spread. - Training or education is important against disease spread. - Distribute condoms to workers and surrounding population. - School children are at risk of contaminating HIV/AIDS. - Influx of workers will bring different culture and ideology
	Solid waste management	<ul style="list-style-type: none"> - Increase solid waste management - Poor collection of Solid water causing odour.
	Employment	<ul style="list-style-type: none"> - Improvement (roads general and drains) works provide employment and income opportunity.
Ms. Juliana Manyama	Storm drains (SD)	<ul style="list-style-type: none"> - SD passes close to people’s homes, may affect houses - SD not well aligned, lined or interconnected. - Vibration may affect houses, use manual labour. - Dust pollution. - Works may risk safety of children while playing, - Hoard or fence work sites to minimise accidents. - Works may cause dust pollution around houses. - Ensure local employment including women. - Educate people about planned works. - Relocation or severing of water AND POWER utilities (TANESCO and MTUWASA). - Share HIV/Mitigation reports with Mtwara-Mikindani Municipality.
Eng. Frank Mwela	Storm Drains	<ul style="list-style-type: none"> - Mtwara municipality is vulnerable to flooding due to storm water effect and nature of its terrain e.g. Chuno road
Mr. Lyakurwa-NEMC Zonal Office, Mtwara	Storm water	<ul style="list-style-type: none"> - Water drainage is a big challenge in Mtwara town. - Construction works (trucks) creates dust pollution

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SN	Name/stakeholders	Views/Concerns
1	Eng Mpaki TSCP-AF Coordinator	<ul style="list-style-type: none"> The project is a continuation of the TSCP that improved various infrastructures within the Municipal Council For Mtwara among others the project will improve storm water drainage to reduce floods, road furniture's to enhance safety and security as well as upgrade roads. We urge locals to accept the project as the purpose is to improve the infrastructures within the Municipal.
2	Mr Kubingwa MMMC Valuer	<ul style="list-style-type: none"> The valuation exercise will be transparent and participatory All affected persons will be compensated as per the Tanzania Law requirements as well as those of the World Bank and therefore we anticipate compensation will be fair and prompt We shall also facilitate to establish a Grievances committee
3	Ms Manyama-MMMC Community Development	<ul style="list-style-type: none"> These projects will have economic benefits to the community We urge people to form the GRC and to use this committee as a mechanism to file complains Complains should also include those associated with misconduct of the contractor
4	Chikongola Ward	<ul style="list-style-type: none"> We want to know how much we are being compensated prior to accepting the package
5	Majengo, Magomeni and Vigaeni local communities	<ul style="list-style-type: none"> We accept the project as the major challenge in the area is floods during rainy season; however some of the areas with floods have not been covered by the project, what are the plans?
6	Chikongola Ward	<ul style="list-style-type: none"> The contractor should ensure that the quality of the infrastructures constructed is at standard
7	Chikongola Ward	<ul style="list-style-type: none"> The project should ensure that the design considers safety and security of locals e.g. pedestrian cross bridges and covering parts of the drainage
8	Chikongola Ward	<ul style="list-style-type: none"> Any complains raised during project implementation should be handled on a timely manner
9	Chikongola, Mjengo, Magomeni and Vigaeni Ward	<ul style="list-style-type: none"> Compensation should be paid prior to project

		implementation stage
10	Chikongola, Magomeni ,Vigaeni and Majengo Ward	<ul style="list-style-type: none"> Locals should be given priority on employment during construction phase
11	Vigaeni Ward	<ul style="list-style-type: none"> Who will compensate utilities likely to be damaged during construction? The MMMC should ensure replacement of utilities is done on time to avoid inconveniences
12	Vigaeni Ward	<ul style="list-style-type: none"> Locals/particularly the owners of the affected trees should be allowed to harvest
13	Majengo, vigaeni, Magomeni Ward	There are still some areas which are prone to floods but have not been considered in this project.

6 ASSESSMENT OF IMPACTS AND IDENTIFICATION OF ALTERNATIVES

6.1 Introduction

The potential environmental and social impacts for the proposed improvement works are presented in this chapter.

The proposed works are expected to cause negative and specific impacts on the physical and biological environment. The impacts will be realized within and around the site where the infrastructure will be constructed.

Direct impact will be within the boundaries of the proposed subprojects. These impacts are predominately short-term and temporary in nature and are likely to affect the human and physical environment. Impacts presented in this section are a result of field observation, consultation and prediction of impacts.

Generic predictions of impacts are also presented at this stage. The neighboring community was informed about the project details through the consultation process during the main approved ESIA in 2010. Their concerns were recorded and addressed in the first Environmental Impact Statement (EIS).

This assessment is not considering an alternative to the sites provided for improvement works because the selection is based on suitable potential options for development as judged by engineering side. Thus, the developer has made decisive economic commitments. For example, the developer considered a range of factors such as land ownership by municipality, engineering feasibility or design, settlements and social aspects as well as environmental considerations.

6.2 Identification of project boundaries

Identification of boundaries within which the EIA was undertaken as an important component of the study. The identification process focuses and delineates the project within an area where impacts both positive and negative will be felt on the environment, economy and local community. The types of boundaries considered are institutional, temporal and spatial boundaries.

Spatial boundaries

Spatial boundaries refer to the area affected by the project. The area of direct impact for the proposed road side/ storm water drainage and street lights will be within the legal boundaries of Road Reserve or designated zone for service utilities where most of the activities will take place. The immediate impact area is adjacent to the road reserve where some of the impacts, such as the damage to peoples properties or interference to business; traffic accidents; spread of communicable diseases such as HIV/AIDS and STDs/ public health; and dust pollution will be felt directly.

The influential impact area is defined as the one comprising areas where decisions are made. For this project, decisions are made mainly at regional, district/ Municipality, ward and village administration levels. In addition, PO-RALG, the Ministry of Lands, Vice Presidents Office/ Environment and District Authorities may all have input regarding land ownership and construction permits and issues.

Temporal boundaries

Temporal boundaries refer to project life span and the reversibility of impacts. For example, the impact of construction works on natural vegetation may be short lived if measures to restore vegetation and the land are taken after material extraction. However, the

resettlement of the community to give way for the alignment of infrastructure for road drains and street lights if applicable may have long lasting impact, stretching far into the future in terms of loss of income, land and disruption in cultural life and livelihood of the people.

The following are the estimated temporal boundaries of the project:

Project Phase	Duration
Mobilization period:	1-2 weeks
Construction period:	2-3 months
Demobilization period:	1-2 weeks
Design life of the roads/ drains	20 years

Institutional boundaries

The institutional boundaries are comprised of institutions and sectors, which are relevant to the project development. These can be determined from the political boundaries, regulations, institutional mandates and structures. The proposed project is likely to affect directly or indirectly the interests of the surrounding institutions. Therefore, these institutions will be adequately consulted during the ESIA process.

The institutional framework for environmental management and handling ESIA requirements in the country exists at national, sector, regional, Mtwara Municipal/District Council / local government and Ward and Village. The relevant institutions for handling ESIA requirements for the construction sector include the following: National Environment Management Council (NEMC), PO-RALG, RAS – Mtwara Region and Districts/ Municipal Environment Management Committees, Ward Committees and Street Committees

6.3 Potential Project Impacts

There are a number of predicted impacts of the proposed landfill additional works on the physical, biological and human environment. Except for leachate and risk for pollution of underground water resource, most of these are predominately low to moderate level impacts on the social environment, many of which can be considered as short term or temporary impacts. The project can be characterized as generally having none or low value impact on the natural and social environment. However, it is expected that the detailed design will focus on averting impacts. The summary of impacts and occurrence phase is presented in Table below.

Table 5: Summary of potential Impacts

Construction phase	Operational Phase
1. Noise and Dust pollution	1. Pollution of water resource and soils by leachate
2. Soil erosion risk	2. Odour pollution
3. Spread of social diseases (HIV/AIDS)	3. Spread of diseases
4. Storm water management	4. Dust and smoke emission
5. Solid waste disposal	5. Solid waste pollution and sanitation management
	6. Subsurface fire
	7. Risk of traffic accidents

6.4 Impacts analysis method

These impacts are those predicted for the project as per project design and plans. Where details have not yet been determined for the project, realistic assumptions have been made and qualified. The impacts may be positive as well as negative, they may be **short or long-term, temporary and reversible** as well as **permanent**.

The impact assessment for the improvement works has considered the level of the potential impacts, this being based on both the value of the environment and the **nature** and **magnitude** of the potential impact.

It is important at this stage to qualify what level of impact this assessment will consider as resulting in a 'significant impact'. For the purposes of the assessment, those impacts identified as being major or Moderate have therefore been evaluated as 'significant impacts'. This is not to say that minor impacts will be disregarded, but that their impact, whilst detectable, is not considered significant. The overall level of predicted impacts, this being both positive and negative ones, are evaluated as shown in the table below:

Impact		Definition
None (0) or Minimum		Insignificance or No detectable change to the physical, biological and human (social) environment.
Positive & Negative	Low	Small but detectable and permanent change to the environment; or larger short-term / temporary change to the physical, biological and human environment.
	Moderate	larger, but non-fundamental permanent change to the physical, biological and human environment; or short-term / temporary large change to the environment.
	High	fundamental (permanent, detrimental) change to the environment.

Potential direct environmental and social impacts are a result of interactions between sub-projects' activities with the relevant baseline aspects (valued receptors). Principles guiding impact identification involve the following:

Impacts identification link to causes of impacts (cause-effect interactions) and identification shall extend through entire sub-project cycle. All valued receptors – physical, chemical, biological, built or human on sub-project site, immediate vicinity or off site locations needs to be considered as required during the planning, designing and implementing stages of sub-projects. The impacts were categorized as direct versus indirect and whether they are positive or negative.

Impact Evaluation:

Evaluation of impacts was based on the following criteria:

Extent - the spatial boundary where impacts will occur i.e. within the project primary corridor of impact, secondary impact area or general project area of influence.

Duration - whether the impact shall be temporary or permanent.

Magnitude - the extent in which the impact will alter the natural or social systems and baseline conditions.

6.5 Social Impact

Findings from ESIA reveals that there are **resettlement issues at the sites designated for the construction of additional** roads and a cell at the Mang'amba landfill. The construction of additional roads will impact 87 PAPs, 530 assets (mostly permanent crops) and would require MMMC to compensate 31,882,160.69 Million Tshs. For the landfill a total of 910 assets will be affected owned by 11 PAPs with a total compensation of 160,472.054.43 Tshs. It should be noted that none of the PAPs will have to relocate as a result of these projects for

MMMC. The MMC prepared 2 ARAP reports for TSCP-AF. To minimize resettlement impacts, works will be confined within legal boundaries of road Right of Way (RoW) or reserve, and zone designated for public utilities. To mitigate this impact, the MMC will compensate the PAPs as per the entitlement impact stipulated in the TSCP-AF RPF.

6.6 Positive Impacts during Construction

Storm Drains

The storm drain will improve drainage in the area and consequently reduced mosquito infestation and malaria disease. It will also easy access to residential and educational facilities in Mtwara town during rainy season.

Street lights

Solar lights absorb energy from our sun and turn it into area illumination when it is dark. Their integrated photo voltaic module, micro controller and lithium battery combine with high output LEDs and a human infrared sensor to achieve multiple features such as low power consumption with high luminance. Their design delivers a long lifespan with minimal maintenance and provides a complete solution for off- grid or remote applications. The rated components ensure endurance against harsh weather and keep solar lights free from corrosion and premature failure.

Street lights will improve night vision and security as well as increased income to people as they will have more hours to do business thus increased income. Installation of poles will be spot activities with no negative impact. Any impact related to foundations of poles will be confined within zone set for service utilities and treated to that of road auxiliaries / furniture.

Roads improvement (drains, street lights) subproject

The project is expected to have positive impacts upon the stakeholders that outweigh any negative impacts. The most significant and long lasting impacts result from the provision of roads giving year round access for presently disadvantaged urban communities or tenants. Stakeholders expect the project to bring a number of positive benefits such as; Improved access to Social Services, income and road safety. Expansion of commercial activities and trade within the project area. In addition, land and property values are expected to increase thus increased rent and income. Road works will lead to reduced vehicle operation and maintenance costs due to improved road conditions.

The work force in construction phase will be comprised of the following team members for each subproject; Site Engineers, Foremen and skilled and non-skilled labour. In addition, there will be Project Manager and Quantity Surveyors. Skilled and semiskilled people will be employed permanently during the operational phase to manage the new infrastructure.

Stakeholders accepted the proposed works will create temporary and permanent employment during construction phase respectively, a number of these are likely to be sourced within the municipality.

During operative phase, the project will employ permanent workers road maintenance; the source of these will depend on labour market competition. Therefore, all the proposed works will provide the residents of the municipality with important employment opportunities.

Employment impact

The project will create employment opportunity during the construction phase for unskilled and skilled labour. Employment impact is therefore, is Low to Moderately positive. The effect is spread between construction and operational phases. Evaluation of impact is as follows;

Impact Assessment/ Subproject	Road Drains and street lights	Storm drains
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Significance	Low Positive	Low Positive
Occurrence phase	Construction and operation	Construction
Area of influence	Direct	Direct
Permanence (No change, temporary, Permanent))	Temporary and long term	Temporary

Sanitation:

The project will promote environmental sanitation and subsequently people's welfare because of improvement in waste collection and processing. The municipal authority will also realize increased revenue collection from individual waste haulers who will bring waste to the landfill. Similarly, health hazards such as odor and flying waste papers will be controlled by improved waste management

Aesthetic:

The project will improve aesthetic or scenery at Mang'amba landfill. Burning of waste and emission of smoke in the streets will stop following improved landfill management.

- *Potential Impacts of the landfill*

There are a number of predicted impacts of the proposed landfill additional works on the physical, biological and human environment. Except for leachate and risk for pollution of underground water resource, most of these are predominately low to moderate level impacts on the social environment, many of which can be considered as short term or temporary impacts. The project can be characterized as generally having none or low value impact on the natural and social environment. However, it is expected that the detailed design will focus on averting impacts. The summary of impacts and occurrence phase is presented in the table below:

Summary of potential Impacts

Construction phase	Operational Phase
-Noise and Dust pollution	-Pollution of water resource and soils by leachate
-Soil erosion risk	-Odour pollution
-Spread of social diseases (HIV/AIDS)	-Spread of diseases
-Storm water management	-Dust and smoke emission
-Solid waste disposal	-Solid waste pollution and sanitation management
	-Subsurface fire
	-Risk of traffic accidents

6.7 Negative Impacts during construction and operation

Notably, the erection of poles is assumed to be of same pattern for all roads and will take place along road reserves and it will involve excavation and use of equipment similar to those used in road construction.

6.9.1 Climate

The planned improvement works for roads, drains, street lights and landfill have no negative impacts on climate change because it will not involve significant generation of carbon emissions. It is also not associated with the extraction of wood from forest, which is sinks for carbon. However, the landfill will be managed in manner that will not allow burning. Gaseous will be collected by pipes, stored or used in economical manner.

6.9.2 Hydrology

There are no potential impacts on hydrology associated with construction of the proposed sub project.

The site for the subproject is not located near permanent surface water-courses and water points. The landfill site is situated on elevated ground which is well drained. There are no permanent rivers or streams in the area or on its neighborhood.

6.9.3 Natural forest and wildlife

The proposed works will take place in the urban setting where the presence of natural resources such as natural forest and wildlife values are low. The site is designated for landfill or waste collection and bordering a road reserve. There is no human settlement in core area of the project site. Already there is an operation of old waste dump going on at the site. The area around the landfill is has poor vegetation due previous agricultural and deforestation activities.

Overall, the impact is on natural environment and as regards to the forest and wildlife the impact is predicted to be **insignificant** or none to be caused by the subprojects.

6.9.4 Soil erosion

Land clearing during construction phase may disturb the land but not likely to trigger significant soil erosion. Observation indicated that the site is covered by scrap vegetation. In the absence of proper mitigations, works around the site especially during hauling of spoil may disturb landscape and cause erosion during rainfall season.

Therefore, the impact as regard to soil erosion is considered Lo to Moderate Negative but confined at the site. The evaluation of impact is as follows;

Impact Assessment/ Subproject	Landfill
Significance	Moderate
Occurrence phase	Construction phase
Area of influence	Direct
Permanence (No change, temporary, Permanent)	Permanent
Reversibility	Reversible

6.9.5 Landscape and Soil erosion

Land clearing during construction phase will disturb the land but not likely to trigger significant soil erosion because of the flat topography/terrain of the sites. Observation indicated no visible evidence of vulnerability to soil erosion on the proposed sites for roads or poles for street lights.

6.9.6 Dust and Smoke emission

During clearing of vegetation and movement of vehicles and the operation of heavy machinery will increase the levels of dust. The effect will be nuisance and even cause health problems to the community around the project site.

During clearing of vegetation and demolition of concrete structures, movement of vehicles and the operation of heavy machinery will increase the levels of dust. The effect will be nuisance and even cause health problems to the community around the project site.

The construction of works for roads, storm water drains, street lights and improvement of the landfill will involve earthworks or excavations and transportation of fine / stock piles. Air pollution due to dust together with exhaust emissions from excavations, breaking up, crushing, transportation and stockpiling of overburden and spoil materials as well as emission of exhaust fumes from heavy trucks, machinery and construction equipment. Hauling of aggregates from long distances may cause dust pollution. Notably, burning and smoke emission is taking place at the site as result of ongoing dumping of waste.

Emission of smoke due to accidental or spontaneous subsurface burning in at Mang'amba landfill will create health hazard to people beyond the landfill borders. This effect may affect motorists and passengers along the nearby public road. The impact may be a long-term risk if proper management will not be undertaken.

Overall, the impact as result of dust or emission pollution will be confined to the proposed working sites and within the short period of construction. The projects are small and construction period is short. Overall, the impact is rated as low Negative for road and drain. The evaluation is made as per the following table:

Impact Assessment/ Subproject	Road drains and street lights	Storm drains
Significance	Low Negative	Low Negative
Occurrence phase	Construction	Construction
Area of influence	Direct	Direct
Permanence (No change, temporary, Permanent))	Temporary	Temporary

6.9.7 Noise pollution

Movement of vehicles and the operation of heavy machinery will increase the levels of noise in the local environment where works will be confined. The effect will be cause health problems such as respiratory diseases around the subproject sites for road drains/ street lights and road and storm drains. Equipment which will be working at borrow pit and crusher sites will generate noise nuisance. Evaluation of the impact is presented in the table below:

Impact Assessment/ Subproject	Road drains and street lights	Storm drains
Significance	Low Negative	Low Negative

Occurrence phase	Construction	Construction
Area of influence	Direct	Direct
Permanence (No change, temporary, Permanent))	Temporary	Temporary

6.9.8 Pollution of ground water by leachate

Waste Cells at Mang'amba landfill can be sources of increased toxic water or leachate if proper disposal and treatment is not organized, microbiological and organic pollution of the surrounding environment could result. This will include impact on soil and surface and underground water.

Groundwater contamination is a concern in landfill operations because of effects caused by leachate and its potential health. The effects results from landfill material which most often contains toxic substances. This can turn serious when industrial wastes are accidentally or illegally dumped at landfill. The leachate from landfills could contain complex organic compounds, chlorinated hydrocarbons and metals at concentrations that could pose potential threat to both surface and ground waters. Synthetic organic chemicals constitute a significant environmental and health hazards. Some of these chemicals are resistant to degradation.

Landfill leachates have high levels of BOD, COD, ammonia, chloride, sodium, potassium, hardness and boron. The conditions within a landfill vary over time because of chemical processes especially aerobic and anaerobic reactions. This allows different chemical reactions to take place at landfill. Leachate could produce reducing conditions at landfill base thus facilitating percolation of iron and manganese solution. The composition of leachate varies due to a number of different factors such as age, type of waste, landfill management regimes and percolation rate. Extreme levels of heavy metals especially cadmium, arsenic and chromium are known to exist in groundwater as result of landfills operations.

Therefore, the impact as result of leachate is considered High Negative and could affect beyond the site boundaries and may cause long-term effect and irreversible one. The evaluation of impact is as follows:

Impact Assessment/ Subproject	Landfill
Significance	High Negative
Occurrence phase	Operational phase
Area of influence	Direct and indirect
Permanence (No change, temporary, Permanent)	Permanent
Reversibility	Irreversible

6.9.9 Pollution by Hydrocarbons

During the implementation of improvement works for landfill equipment (heavy duty), crusher plants and trucks may contribute hydrocarbon pollution as the result of operation of the vehicles and equipment or servicing at workshops. This may also be accompanied by the soil and water pollution that might result from spillage of oil and fuel.

This impact is short lived, site specific and restricted to the construction and operational phases of the landfill. Therefore, as shown in the table below the impact is ranked as Low as hydrocarbons can be separated and contained in secured containers.

Impact Assessment/ Subproject	Landfill
Significance	Low Negative
Occurrence phase	Construction and operation
Area of influence	Direct
Permanence (No change, temporary, Permanent)	Permanent
Reversibility	Irreversible

6.9.10 Pollution by Solid Waste

Solid wastes can be in the form of plastic, cement bags or other packing materials at workshops, workers' camps and working sites. This applies to drain//storm drain and street lights sub-projects. The effect will be localized around working sites or work facilities during the construction phase. The actual amount of waste will depend on methods applied by contractor. Generation of waste will depend on material, organization of works, types of equipment and construction methods.

These impacts are mostly confined to the construction phase and to the specific project working sites (camps, workshops etc.). In general, the impact is considered Low Negative (road and drain). The Evaluation of impacts for the subproject can be presented as in the following table:

Impact Assessment/ Subproject	Road drains and street lights	Storm drains
Significance	Low Negative	Low Negative
Occurrence phase	Construction	Construction
Area of influence	Direct	Direct
Permanence (No change, temporary, Permanent)	Temporary	Temporary
Reversibility	Reversible	Reversible

6.9.11 Odour

Odor nuisance is confined within operational phase and avoidable if appropriate measures will be undertaken. Otherwise, the effect can last for the entire lifespan or operational phase of Mang'amba landfill if proper management will not be implemented. Otherwise, a comprehensive management will be put in place such as waste sorting, compaction and soil mounding. Notably today duping of waste is taking place without proper management thus generating odor. The impact under the new development will be low negative and confined inside and immediate surroundings of the landfill. Odor is not life threatening and can be reversed by proper management of waste at landfill.

6.9.12 Storm water

Some parts of Mtwara Municipality are vulnerable to flooding or water logging because of poor drainage and high water table. The storm water impact is predicted to occur during the construction and operational phases if careful design and management of storm is not applied by developer and subsequent the Municipal Authority respectably.

During the operational phase, storm water flows due to rapid overland flow of rain water, clogging or dirty canals and culverts. Clogging of culverts and obstruction inside drains along the roads or storm drain may occur due to under design of culvert diameter, dumping of solid waste, silting and blocking by debris. As result, it will cause flooding of people's houses during rainfall.

Major storm drain may spill water to individual and institutional properties or houses if not well design or not directed to discharge water to proper water ways or bodies.

The project is more concerned by the effect, which may be caused by development and to take precautionary measures against those. This impact is likely to affect area along the proposed for the proposed works for storm drains and street lights sub-projects. It will take place especially in the peaks of rainfall season.

Overall, the impact is rated as Moderate negative (road drains/ street lights) and could occur in both construction and operational phases, and especially in the flood prone pockets of the town. Storm water effect can be evaluated as shown in the table below:

Impact Assessment/ Subproject	Road drains and street lights	Storm drains
Significance	Moderate Negative	Low Negative
Occurrence phase	Construction and operation	Construction and operation
Area of influence	Direct	Direct
Permanence (No change, temporary, Permanent))	Temporary	Temporary
Reversibility	Reversible	Reversible

6.9.13 Occupational Health and safety

Occupational health and safety risks to workers due to exposure to dust emissions as well risk of accidents during operation of heavy equipment and labour intensive works. However, improvement is expected on health and hygiene conditions among the local communities of the project areas as result of improved management of air and dust pollution. This category of impact is likely to affect proposed subprojects of road/ street lights and storm water drains. The impact may affect project and non-project workers. For example unsuspecting people e.g. pedestrians who may fall into the drains/canals or children who may be hurt by project equipment and open trenches/ drains. The impact will be localized with project sites and be more significant during construction period.

Electrocution may take place as result of power connection faults to the street lights or poor handling. This may happened if poles are knocked down by motorists or become obsolete and fall down.

Overall, impact as regards to human health and safety is rated Moderate to High negative. It will be significant in the absence of proper mitigations. The impact is most likely to fall within the construction phase and to specific projects during the operational phase. They are not expected to extend far beyond the boundaries of sub-projects.

This type of impact may be long term on human health, site specific and restricted to the short period of construction (road/ street lights, storm water) phase. Erection of poles is assumed to resemble that of road works, it will take place along road reserve.

Therefore, as per the table below the impact on occupational health and safety is ranked as Low to moderate as can be managed through better practices.

Impact Assessment/ Subproject	Road drains and street lights	Storm drains
Significance	Moderate Negative	Low Negative
Occurrence phase	Construction	Construction
Area of influence	Direct	Direct
Permanence (No change, temporary, Permanent))	Permanent	Permanent
Reversibility	Reversible	Reversible

6.9.14 The spread of social diseases (HIV/AIDS)

The influx of job seekers to the project area during the construction phase will result in social interaction and consequently the risk of spreading social or communicable diseases among

workers or neighboring community, in particular HIV/AIDS and STDs in the absence of adequate control measures. The effect can result in death or other irreversible outcome.

Safety and health issues shall be addressed through various training program for workers and local communities through meetings, seminars, posters and leaflets. Consulted stakeholders showed their concerns that the project may increase the problem if proper mitigation measures are not instituted. Importantly, the advised collaboration and involvement of relevant department in Mtwara municipality.

The risk of HIV/AIDS spreading is confined in the construction phase when activities are at climax and involvement of manpower is high. The impact is direct and indirect as it can spread beyond project boundaries. Additionally, the effect can continue after the project and result in loss of life in the absence of proper preventative measures.

Overall, the impact of the spread of HIV/AIDS is considered Moderate Negative due to the size of project and short duration and unlikeness to bring large working force from outside and establishment of camps. Evaluation is summarized as follows:

Impact Assessment/ Subproject	Road drains and street lights	Storm drains
Significance	Moderate Negative	Low Negative
Occurrence phase	Construction	Construction
Area of influence	Direct and Indirect	Direct and Indirect
Permanence (No change, temporary, Permanent))	Permanent	Permanent
Reversibility	Irreversible	Irreversible

6.10 Traffic Accidents

Road works are generically associated with increase of traffic accidents during construction phase. However, the positive impacts associated with the project include reduced accidents and vehicle congestion in town center because of alternative access within the town. There may be eminent risk for increased traffic accidents along project sites or in congested areas around central market during road works as result of frequent movement and stopping of construction vehicles/equipment. The risk for traffic accidents is especially considerable for young children and elderly people.

The overall impact assessment on traffic accident shows the project will create Low to Low negative impact. The risk lies most within the short period of construction phase and localized along the proposed drain and road sites. The overall evaluation is as shown in the table below:

Impact Assessment/ Subproject	Road drains and street lights	Storm drains
Significance	Moderate Negative	Low Negative
Occurrence phase	Construction	Construction
Area of influence	Direct	Direct
Permanence (No change, temporary, Permanent))	Temporary	Temporary
Impact reversibility	Reversible	Reversible

6.11 Damage to Public Utilities

There is potential risk for disruption of public service utilities of water, communication and power (TANESCO) during improvement works for roads/ erection of poles for street lights

and drains. This impact lies with roads and storm drains. The potential for damage during road and drain works are high if careful design and sharing of information with owners will be undertaken.

The subprojects risk prediction on water and power utilities shows it will be low to moderate negative and more pronounced on drain and road works respectively. The damage risk is direct and confined in the work sites and reversible through repair. The evaluation is summarized as is in the table below:

Impact Assessment/ Subproject	Road drains and street lights	Storm drains
Significance	Moderate Negative	Low Negative
Occurrence phase	Construction	Construction
Area of influence	Direct	Direct
Permanence (No change, temporary, Permanent))	Temporary	Temporary
Reversibility	Reversible	Reversible

6.12 Disruption of businesses, pedestrian and vehicular movement

Disruption of traffic flow and increased risk of traffic accidents will occur during construction of roads and storm drains. The impact may be caused by overstay of piled material for road construction or poor organization of works. Observation shows there are foot path crossing the proposed storm drain thus access slabs are important. See **Error! Reference source not found.**

Erection of poles for street lights will take place at designated small spots as discussed in Chapter 2. Its effect in this regard is minor or none.

There are ongoing business along roads where works will be implemented and thus at risk of been interfered or disrupted during works.

Evaluation of this risk can be as follows;

Impact Assessment/ Subproject	Road drains and street lights	Storm drains
Significance	Moderate Negative	Low Negative
Occurrence phase	Construction	Construction
Area of influence	Direct	Direct
Permanence (No change, temporary, Permanent)	Temporary	Temporary
Impact reversibility	Reversible	Reversible

6.13 Impacts during Demobilization

Demobilization will occur after the end of construction activities. As much as possible after construction, all areas not covered by proposed works especially around camps or workshops shall be rehabilitated and reinstated to the original landscape. The activities under demobilization will entail the following:

- a) Removal of temporary works and associated installations,
- b) General cleanliness to the areas affected by the contractor's activities, all wastes to be disposed to designated disposal sites,
- c) Removal of physical structures such as offices, workshops, storage and foundations has the potential to generate noise, dust and possibly pollution of surface and ground water, and soils. These shall be undertaken under careful supervision and,
- d) After removing facilities and clearing all waste and debris, the contractor will rehabilitate the disturbed sites e.g. at borrow pit sites by contouring, replanting and re-vegetation.

6.14 Analysis of Alternatives

Sub-projects alternatives

In the course of developing the proposed sub-projects for road, storm drain, street light and landfill structures, alternatives were compared in terms of potential environmental and social impacts; capital and operating costs, land availability and; suitability under local conditions. It was imperative to also examine and review different sub-projects settings, designs, and construction alternatives where two options were considered: No sub-project option and, Alternative sites.

'No sub-project' option

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

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

If the 'no project' option was chosen, from the economic standpoint and social considerations, the following benefits will be foregone: i) improved transportation; ii) long life span for roads, iii) employment; iv) low incidence of accidents and v) controlled flooding inside urban centres against water stagnation. vi) good visibility and security at night and whenever natural light is dim, and vii) improved environmental sanitation in the city. Hence, for TSCP – AF sub-projects, the alternative of “no-project” would increase the risks on traffic and pedestrian accidents, flood damages to houses, vandalism of the infrastructure, untidy environment and general poor public health.

Thus, the 'no sub-project' option will not be a viable alternative under TSCP – AF sub-projects in Mtwara Mikindani Municipality.

6.15 Potential Project Impacts

There are a number of predicted impacts of the proposed landfill additional works on the physical, biological and human environment. Except for leachate and risk for pollution of underground water resource, most of these are predominately low to moderate level impacts on the social environment, many of which can be considered as short term or temporary impacts. The project can be characterized as generally having none or low value impact on the natural and social environment. However, it is expected that the detailed design will focus on averting impacts. The summary of impacts and occurrence phase is presented in Table below.

Table 6: Summary of potential Impacts

Construction phase	Operational Phase
6. Noise and Dust pollution	8. Pollution of water resource and soils by leachate
7. Soil erosion risk	9. Odour pollution
8. Spread of social diseases (HIV/AIDS)	10. Spread of diseases
9. Storm water management	11. Dust and smoke emission
10. Solid waste disposal	12. Solid waste pollution and sanitation management
	13. Subsurface fire
	14. Risk of traffic accidents

7 ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES

7.1 Introduction

The identification of appropriate mitigation measures is an important aspect of the supplement ESIA. Many of the potential impacts identified in the preceding chapter can be eliminated or reduced through the implementation of appropriate mitigation measures at a strategic planning level or when applied to specific project tasks and activities.

7.2 Identification methods

The level of predicted impacts can be reduced through appropriate mitigation measures. Such mitigation may involve design measures aimed to reduce the impact before it occurs, they may involve direct mitigation at the point of impact to reduce or remove the impact or they may be indirect measures to respond to the impact.

Mitigation measures presented are designed to reduce the impact of the project, both with regard to its construction and operation. In some cases, mitigation measures, as with the project itself, may provide beneficial effects for the local environment. In all cases, the mitigation measures seek to reduce the potential impacts to a level which is insignificant on the environment.

7.3 Enhancement measures during pre-construct phase

Enhancement mitigation measures will include the following;

- Implementation of measures to safeguard local employment including regards to gender. For example, encourage women employment.
- Proper remuneration
- Spread of diseases for employees.

7.4 General Commitments

Much of the mitigation proposed for the proposed works can be considered under a range of general commitments.

Information and Awareness Raising

An important mitigation measure across the project is consultation and the availability of information. Many of the impacts and problems predicted for the project may be associated with insufficient or inadequate information being provided to the affected communities and people. Whilst provision of information for the project has already started as part of the EIA consultation process, it is important that this continue throughout the project both from the contractor and from developer.

Should the project progress to the implementation and construction phase, information and awareness creation will be an important component from the outset. Key issues to be raised and addressed will include, but not be limited to, the following:

- Nature and details of construction works and program, control and management;
- Technical issues such as fire risks and safety issues;
- Social issues such as restrictions, information relating to working areas, progress and project timing; and
- Indirect risks from construction such as spread of social diseases (HIV/AIDS) and other STDs, traffic safety, etc.

The transparency and ready availability of information to the local communities and affected people will be an important component in the successful implementation of the project.

7.5 Management of Construction Sites

It is important that the construction site be managed appropriately, both from a health and safety perspective as well as with regard to impacts on the physical, biology and human environments.

Responsible person will be appointed for the construction site and an instruction manual or handbook for site procedures is developed. This will include, but not be limited to, the following topics.

- Control of site including workshops;
- Securing (fencing) and management of the working area;
- Working hours;
- Control of discharges;
- Storm water or runoff management including emptying into safe ends;
- Management of waste materials (plastics);
- Management and removal of wastes;
- Control of noise and dust;
- Liaison with local community / residents; and
- Landscape restoration.

Following completion of the construction works, appropriate consideration will be given to the decommissioning of the construction site. This will ensure that no significant impacts are caused in the process of withdrawal of construction workers and equipment. For example, aversion of contamination, waste or damage.

7.6 Health and Safety Measures of OSHA

As a basic, the contractor / developer will be required to prepare a Health and Safety Plan / Procedure for the construction works and to ensure and monitor its implementation.

The contractor will ensure compliance of the project with the national Health policy, construction policy and Occupational Health and Safety Act (OSHA).

Health and Safety measures will be important for not only the construction work force but also the public. Key consideration for Health and Safety include:

- Responsibility for health and safety issues placed under appointed person or contractor;
- Personal protective equipment (PPE) should be provided and used on site as appropriate;
- Appropriate warning and control signs should be used;
- First aid facilities and competence should be readily available;
- Appropriate welfare facilities should be available at construction site; and
- Measures against work place accidents.

7.7 Mitigation measures during pre-Construction phase

7.10.1 Landscape and soil erosion

The following mitigation measures are presented to minimize the predicted impacts on soils and landscape of the project area:

- Storage of soil will be undertaken in accordance with best practice. This will include stockpiling in a way to limit compaction and avoiding the mixing different qualities;
- Minimization of soil and landscape disturbance.
- Limit soil works to the design, avoid tempering with steeping ground.
- Application of geo-technical expertise to cater for tank farm excavation.

It is possible that site-specific impacts identified during the ESIA study can be mitigated through adjustments to the design, such as cuts and fill works.

7.10.2 Clearing of trees and natural vegetation

A few trees within the Right of Way may be cleared or removed at proposed side drains/ storm drains and street lights. Therefore, the developer or Municipal council is obliged to re-vegetate the area by tree planting. This will serve as landscape restoration. The developer will plant desirable species particularly, those resembling the original ones. However, emphasis will be put on use of local species. Other general mitigation measures are:

- Careful design to minimize environmental disturbance;
- During the detailed planning stages, an assessment will be made as to the exact positioning of the cells and construction works to reduce the impact on natural; and
- Need for a restoration plan with regard to vegetation following completion of works.
- Contractor and MMC to resolve unforeseen compensation by use of county regulation especially linked to implementation of works e.g. damage to trees or houses.

7.11 Mitigation measures during construction phase

7.11.1 Solid waste management

The contractor is required to comply with work place and environmental safeguards including proper disposal of solid waste such as plastics and liquid waste. Cement bags and other packed materials which generate solid waste particularly plastics should be properly disposed and destroyed.

The service and maintenance of equipment and machines should take place away from project site to avoid oil spillage to natural waterways. Additionally, measures to recover solid materials from working sites should be implemented.

The design works should ensure that the appropriate structures for safe disposal of solid and liquid waste are included in the main design for long-term operation. This will include pits and incinerators for solid waste. Also, sign boards to warn people against haphazard waste disposal should be put in place in risk areas. During operation phase, these facilities should be given regular maintenance services.

The contractor is obliged to reduce generation of solid waste during construction including construction materials, excess unsuitable spoil material, vegetation and litter.

7.11.2 Storm water management

Careful design of the works for associated with roads and its drainage structures will ensure proper collection of storm water and discharge to safe ends away from the construction sites and surrounding properties. The contractor is obliged to control storm water and ensure protection to private properties, business and households. Road structures such as side drains and culverts (diameter) should be carefully designed to allow the flow of storm water and consequently flooding and damage to private properties. Installation and foundations for street lights /pole should not impede movement of rain water or block drainage system.

The contractor is obliged to direct surface water flow to properly designated channels, existing natural water path, water bodies and safe ends. He is also required to construct sufficient water outlets and discharge points depending on the runoff water from the catchment areas or road surface. Special emphasis will be given to areas with steep slopes or vulnerable to flooding as pointed out during consultation with stakeholders. See 5.2.

The construction of runoff surfaces and storm drains for roads should observe local conditions and the slope of the site as shown in the drawings.

Collaboration is required with other utilizes such as road authority and water supply authority to avoid interference or damages.

7.11.3 Health and Safety

The contract for contractors should have an attachment of safety rules for worksite personnel as established in the Occupational Health and Safety Act No. 5 of 2003 and Standard Specifications for Road Works (2000), Section 1237. The contract should have a plan for emergency procedures in case of accidents. Measures to avoid disruption of vehicle movement along Mtwara Municipal roads during construction should be instituted. Poles for street lights should be carefully designed and positioned to ensure no obstruction to pedestrian movement.

Prevent electrocution by careful design and installation of power along posts for street lights. Warning signs should be placed on poles to prevent uninformed person from climbing up or handling bare energized wires.

7.11.4 Traffic Accidents

The contractor and developer should implement adequate measures against traffic accidents. In particular, the developer is obliged to place warning signs / posters around the site/ road access. Also, update design to cater for access points.

Traffic management plan shall be incorporated in the designs to include for example details of signs, markings, intersection layouts, access restrictions, bus stops, crossings, footpaths etc.

The designs for storm drains, side drains and street lights shall take account of safety concerns. For example, provision of crossing slabs and street lights at human habitation or bus stops to prevent accidents.

Speed bumps/ Signboards will be necessary in controlling the speed of vehicles or pedestrian movement at accident risk sites such as road curves or open storm drains. To make this measure a success, the developer will create liaison with local authority and Traffic Police.

Additionally, awareness creation about possible accidents is important to both drivers and project workers. Use of signboards, periodic checking and maintenance of project vehicles and equipment is necessary.

7.11.5 The spread of social diseases (HIV/AIDS)

Since construction works will attract job seekers and trade mongers, the contractor shall collaborate with local authorities to encourage local employment in order to reduce prevalence of communicable diseases (especially HIV/AIDS and STDs).

A safety, health and environment induction course shall be conducted to all workers, putting more emphasis on HIV/AIDS, which has become a national disaster.

In order to prevent more HIV/AIDS infection, during the implementation phase, the project 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. It is important that Mtwara and Municipal Committee for Counseling and Testing (MCTC) be involved at all levels of mitigation.

The education and awareness creation campaigns should target workers and community in the project area and those competing for work. There is a need for contractor to collaborate

with the client to formulate messages against STDs and HIV. The contractor is obliged to provide zero accommodation at site.

7.11.6 Noise and Dust pollution

Noise and air pollution impacts are predicted around the project area. They are in general short-term temporary impacts associated with the construction works. As such, mitigation measures relate primarily to construction procedures.

Consultation with affected communities is an initial mitigation measure, which is important to ensure that those likely to be affected by the works are aware of what the works will entail, the duration and likely impacts on them.

Control of construction site represents the best potential means to mitigate noise and air pollution. Measures will be detailed as part of the construction procedures which will be drafted during the design stage. Typical measures to control noise and air pollution may include:

- Sensitive location of noise sources / machinery;
- Working day in accordance with legal requirements, night working avoided where possible;
- Limiting working day for noisy activities;
- Screening of activities by iron fencing
- Liaison with local community for suitable timings of noisy activities (noisy excavation);
- Observe noise limits during procurement and installation of equipment. Use standard levels from OSHA or Tanzania Bureau of Standards (TBS);
- Covering of stockpiled soil/aggregates during the dry season;
- Spraying of loose soils and construction site with water;
- Hoarding or demarcating work to warn approaching people.

The client is committed to maintain noise emission to the level accepted in the country. The National standards of maximum permissible continuous or intermittent noise levels (dB) per given period at work places is shown in Table 7.

Table 7: Permissible noise levels in Tanzania

Noise level (Leq dBA)	Duration in minutes/ hours per day	Duration in minutes/ hours per week
85	8 hrs	40 hrs
88	4 hrs	20 hrs
91	2 hrs	10 hrs
94	1 hr	5 hrs
97	30 min	2.5 hrs
100	15 min	1.25 hrs
103	7.5 min	37.5 min
106	3.75 min	18.75 min
109	1.87 min	9.37 min

7.11.7 Protection of public Utilities

There is a need to observe the following;

- Proper design to safeguard utilities of TANESCO, optic fiber, oil and gas pipes/installations, water supply pipes and other utilities.
- Sharing of design information with local leaders and owners of utilities.
- Sharing design with road authorities/ TANROADS.

- Prompt replacement of severed services or payment of compensation.

7.11.8 Disruption of business and vehicular movement

The construction works for roads, storm drains and street lights are likely to interrupt traffic and pedestrian movement. These problems can be mitigated by:

- Adequate measures should be instituted to ensure the construction works do not disrupt traffic flow or entrances to properties along the RoW.
- Use of signs and warning posters at project sites.
- Abide to Road Management Regulation of 2009.
- Measures will include timely removal or spreading of material piles and provision of alternative routes.
- The contractor shall ensure unimpeded vehicular movement and access to properties along the road including business, religious, educational and residential buildings.
- Particular attention should also be paid to entrance to residential and institutional properties and religious houses from roads.
- Regular or daily monitoring and inspection will be instituted during the construction phase and especially during rainfall season.
- Provide
- Installation of pedestrian lanes at human settlement crossings

As for storm drains or road side canals, the MMMC shall provide access paths where the drain is constructed near house, school, religious institution etc. Also, these crossings should be provided wherever there was an access path.

7.12 Mitigation measures for operation phase

During operation phase, some impacts may occur such as accidents and flooding due to blockage of storm drains and culverts. Measures will include;

- Replacement of accident warning signs
- Regular cleaning of water drains
- Unblocking of culverts
- Community involvement in sustainable management of infrastructure.

7.13 Summary of Mitigation Measures for Negative Impacts

This section present summary of mitigation measures basing on stakeholders input, expert analysis, experience with similar and or related projects and best practice. The predicted impacts and mitigation measures are presented below.

7.14 Summary of Mitigation Measures for Negative Impacts

This section present summary of mitigation measures basing on stakeholders input, expert analysis, experience with similar and or related projects and best practice. The predicted impacts and mitigation measures are presented in Table .

Table 8: Summary of Mitigation Measures for Road drains/ Storm Drains and Street lights

Topic / Impact	Predicted Impact/ activity	Type of works (Road drains D =R, Street lights= S)	Impact phases	Mitigation Measures
Loss of trees	Some valuable plants will be destroyed along roads to give way for construction works..	D, L	Construction	Proper design to minimize impact. Compensate unforeseen damages by use of existing regulations
Noise pollution	Construction works will disturb neighbours/ public by creation of noise.	D, L	Construction	Observe ambient sound levels and attenuate equipment. Observe noise limits for equipment. Awareness creation
Air pollution by dust	Dust during transportation of sand, stockpiles and aggregates to working sites. Road works for clearing, excavation.	D, L	Construction and Operation	Watering and covering of earth materials Watering of loose soils
Spread of social diseases (HIV/AIDS)	Risk for spreading of communicable diseases such as HIV/AIDS between workers and host community	D,L.	Construction	Awareness creation Counseling and testing Involvement of Municipal HIV/AIDS committee.
Traffic Accidents	Interruption of traffic and pedestrian movement by project activities. Reckless driving	D, L	Construction & Operation	Careful design Awareness creation Use sign/warning materials. Bumps to slow down speeding vehicles.
Disruption of business, traffic and pedestrian movement	Road drains works will interfere with normal traffic flow and pedestrian movement. Overstay of stock piles along roads	D,L	Construction	Awareness creation. Prompt spreading of stock piles along roads Provide access slabs and crossings to properties.
Occupational Health and safety .	General construction works. Electrocution along energized street-light poles.	D, L	Construction & Operation	Adhere to OSHA* and contractors regulations. Practice safety and Health measures/policy. Regular maintenance of equipment. Measures against electrocution along street lights

Solid waste	Haphazard disposal of solid waste e.g. plastics	D, L	Construction Operation	Proper handling of waste by installation of facilities for solid waste facilities.
Management of Storm water	Some project sites are located in poorly drained areas. Storm water effect is expected in rainy season. Storm Drains planned to improve drainage.	D	Construction & Operational	Careful road design. Regular maintenance; cleaning and unblock culverts and drainage canals. Awareness creation. Discharge storm water into safe ends.
Damage of Road Utilities.	Improvement works may sever water pipes/DUWASA, optic fiber, oil, gas and power/TANESCO.	D, L	Construction	Careful design of Infrastructures to include layout for water, communication cables and power and other utilities. Replacement/compensation for damaged utilities. Liaison and sharing of design.
Soil erosion	Excavation works may trigger soil erosion on sloping ground around the road and storm water drains	D	Construction	Proper design. Confine works to design borders. Stabilizations of embankments and Restoration of landscape.
Employment	The project will create benefit in terms of temporary employment.	D, L	Construction	Encourage local employment and gender balance. Liaise with local leaders in recruitment of workers.

8 ENVIRONMENTAL AND SOCIAL MANAGEMENT

8.1 Personnel and Capacity Building Requirements

The environmental sustainability of the landfill, roads, storm water drains and street lights investment sub-projects is highly dependent on the capacity of institutions at all levels (i.e. staffing, training, and other necessary support services) to carry out the associated ESMP implementation work. Thus, it is vital that the MMMC allocates sufficient resources for training and capacity building. These efforts will not only benefit MMMC, but will also build local capacity to undertake other development initiatives. The institutional capacity to monitor and enforce implement and monitor subproject environment was assessed based on the technical, financial and physical capability of the community leaders, local CBOs and NGOs, MMMC. They are responsible to carry out ESMP activities. The findings indicated that these different groups have different capacity building and training needs in terms of raised awareness, sensitization to the issues, and detailed technical training. General awareness on environmental issues exists within the municipal council and Mtwara professional staff, focused training and capacity building would enhance the ESMP implementation capacity substantially on their part.

It is recommended that capacity building and training should take place at all levels i.e., wards, local NGOs and CBOs, government officials, community leaders, extension teams and the council management. The MMMC's environmental safeguards experts should be exposed to short-term and long-term training in the management of environmental issues. The training program for various role players will include an orientation program on the ESMP, Environmental Assessment Processes, Participatory Methodologies and Project Management. The training on ESMP may be integrated with social framework and other related training program for cost effectiveness.

Estimated cost for implementing this capacity building strategy is included in the overall cost for implementing the ESMP and Monitoring Plan in the following section.

8.1.1 Training Programs

Training programs will be developed and delivered project developer for the implementation of environmental safeguards of the proposed subproject.

Following training needs assessment; specific and tailored training will be developed and agreed upon developer and key stakeholders for implementation of safeguards in the course of project implementation.

- Target groups for the training: MMMC Engineers, Environmental Officers, Community Development Officers/Sociologists, Contractors and community representatives in the project area.
- Training schedule: at least 2 weeks - 1 month before construction starts.
- In service and refresher Training: The training programs proposed below will take place every six months on a yearly basis and its content updated and adapted to implementation issues. Training frequency and content will be reviewed in the course of subproject operation lifespan depending on needs or technical requirements.

Training Programs for Capacity Building

Target Group	Municipal Staff
Course Title	Environmental supervision, monitoring and reporting and rehabilitation.
Participants	Infrastructure/ road Engineers, Environmental staff and Social workers
Training Frequency	Soon after project effectiveness but at least 2 weeks - 1 month before start of subprojects work. In-service /refresher training during l operation.
Time	Short course/training twice a year, and then to be repeated on a yearly basis until year three of implementation.
Content	<ul style="list-style-type: none"> • Public health and safety of roads, drainage and landfill management • Environmental rehabilitation • Social mitigations for environmental projects • Community participation in environmental supervision monitoring. • Supervision of contractors, Subcontractors and community representatives in the implementation of environmental supervision. • Risk assessment, response and control • Awareness creation • Review By-laws to include roads/storm drains/ street lights and landfill management
Responsibilities	Project developer i.e. MMMC with support from PO-RALG with facilitation of the World Bank to implement environmental safeguards.
Target Groups	Project Managers, Environmental and Social staff, contractors, local community leaders and NGOs/ Civil Organizations
Course Title	Implementation of mitigation measures
Participators	On-site construction management staff; environmental staff of contractors; ward/group authorities.
Training frequency	After bidding, and determine based on needs
Time	3 days of training for contractors and 2 days of training for others, to be repeated twice a year on an annual basis depending on needs
Content	<p>Overview of environmental monitoring; Requirements of environmental monitoring; Role and responsibilities of contractors Scope and methods of environmental monitoring and rehabilitation; Response and risk control; Preparation and submission of reports Public participation in infrastructure management.</p>
Responsibilities	MMMC with facilitation of the World Bank
Target Groups	Local communities/ stakeholders and road/ urban infrastructure technicians/ Engineers
Course Title	Environmental sanitation and safety
Participators	Representatives of community and/or worker leaders (as appropriate)
Training frequency	Bimonthly or every 6 month

Time	One-day presentation and one-day on-the job training twice a year, to be repeated on as needed basis
Content	<ul style="list-style-type: none"> • Environmental and Social safeguards • Safety and health issues • Environmental Pollution risks and management • Management of environmental safety and sanitation on work sites; • Mitigation measures at construction sites; • Procedures to deal with emergency situations; • Other areas to be determined.
Responsibilities	Contractor and MMMC

8.1.2 Grievance Management

The development of additional landfill cells, roads and storm water drains have resulted into preparation of two ARAPs for MMMC; therefore, any resettlement grievances or disputes envisaged regarding compensation and valuation procedures for land and other individual properties will accordingly managed. **The arrangement will be devised at MMMC through to subproject Wards involving representatives from subproject areas to respond to any environmental and resettlement grievances which may arise during implementation and operation using the existing committees and Dispute Desk.**

The MMMC will resolve any arising complaint during project construction, related to work implementation such as compensation for loss or damage on individual or institutional properties. For example issue arising at borrow pit or quarry site such as crop or house damages or damage on houses and fence by construction equipment.

8.2 Environmental and Social Management Plan (ESMP)

ESMP describes in detail actions to be taken to mitigate possible impacts..Where impacts cannot be mitigated, compensation will be paid, as well as any environmental enhancement activity that will be required to offset, those impacts that cannot be mitigated. It provides a schedule for the implementation of recommended mitigation activities. The responsibility for implementing the ESMP of the additional subprojects will be of MMMC. Likewise, the responsibility for operation and maintenance of the works to be developed, will be vested on MMMC.

To a considerable degree, contractors will be responsible for implementing mitigation measures but, in any case, the ultimate responsibility for ensuring that environmental and social protection elements are being carried out properly is of MMMC. Most of the predicted impacts can be reduced or avoided through the application of sound construction management measures. Construction contracts will require all qualified bidders to include ESMPs as a part of their submitted bids. The additional costs of these plans cannot be predicted at this time, but they are considered as integral part of total project costs.

The following tables show ESMPs for proposed works for roads with side drains, storm drains, street lights and the Mang’amba landfill; as shown in Table 1 and 8.

Table 1: ESMP for roads side drains, storm water drains and street lights

Project Impact	Mitigation Measures	Standards	Timing	Responsibility	Cost (Tsh) '000
i) Pre-construction phase					
Preparation / review of ESMP	-Mitigation of environmental and social effects -Observe EIA and Audit regulation (2005)		Before construction works	MMMC and RE	2000
ii) Construction phase					
Dust pollution	-Regular watering of loose soils -Public information about dusty activities -Provision of PPEs	Dust: PM: Not to exceed 250mg/Nm ³ (24h mean value (TZ) for Dust	Throughout construction phase	RE, MMMC / Municipal Health Officer/ MC Environmental Officer	Part of contract sum
Noise	-Public information especially settlements. -Provision of PPEs	Max 85 dBA/ 8 hr day time	Throughout construction phase	RE and MMMC	Part of contract
Occupational Health and safety	-Comply to OSHA regulation/ requirement -Provision of PPEs -Training and awareness about risk activities		Weekly	RE, MMMC/ Municipal Health Officer/	Contractual sum
Disruption of business and social services	-Public information around shops, bus stand and medical services. -Avoid impeding access premises/ institutions e.g. to Oil depots and TANESCO substation along Port road. Also, Islamic School and Mosque in		weekly	MMMC/ MC Engineer	Part of contract sum

Project Impact	Mitigation Measures	Standards	Timing	Responsibility	Cost (Tsh) '000
	Chikongola; Guest houses along Chuno Rd. -Scheduling of works to minimize business disturbance e.g. Zambia / Kilwa roads				
Disruption of utilities	-Carefully design and involve utility companies. -Identify water pipes (MTUWAS, gas and TANESCO power lines. NB: main water supply pipe from Mtawanya to Likonde area and domestic pipes in Chikongola area. -Prompt replacement of severed services		Before works and in daily works	Developer, MMMC and MTUWASA	3,000
Traffic accidents and interference to bussines, motorist and pedestrian movement.	-Roads sign at working site -Comply to road traffic rules -Removal of 2 culverts in Chikongola area will temporarily hamper transportation.		Monthly	Traffic Police MMMC	2,000
Soil erosion control	-Avoid triggering soil erosion sloping ground especially Likonde area. -Stabilize disturbed slopes by re-vegetation / embankments. -Discharge storm		Entire construction phase	MMMC/ Municipal Environmental Management Officer (MEMO)	200

Project Impact	Mitigation Measures	Standards	Timing	Responsibility	Cost (Tsh) '000
	water (drain) to safe end without causing erosion effect				
Loss of planted trees	-Avoid unnecessary cutting of fruit, banana, ornamental and coconut trees along/ outside Zambia and Chuno Roads and in Chikongola area. -Stick to engineering design -Pay compensation according to law		Entire construction phase	Developer (PO-RALG) / MMMC/ Municipal Environmental Management Officer (MEMO)	6,000 (compensation for trees)
iii) Operation phase					
Lack of access to properties	-Construct slabs to all houses, institutional premises and business properties e.g. along Port , Zambia road and Chikongola area -Design and budgeting		Before handover	MMMC/ RE	Part of contract sum
Occupation Health and safety	-Electrocution risk along street lights		Continuous maintenance. Prompt repair of fallen poles/ naked wires Awareness creation about electrocution risks	MCC/ MC Engineer	Operational Budget

Project Impact	Mitigation Measures	Standards	Timing	Responsibility	Cost (Tsh) '000
Sub-Total Cost					13,200

Table 8: ESMP for Mang'amba landfill

Project Impact	Mitigation Measures	Standards	Timing	Responsibility	Cost (TAS) '000
<u>Pre-construction phase</u>					
Preparation / review of ESMP	-General mitigation of environmental hazards -Observe EIA and Audit regulation (2005)		Before construction works	Developer / CC	4000
Compensation for any affected properties	-Resolution of unforeseen disputes over land -Payment for land take and dislocation of properties.		Before construction works	Developer/ CC	2000
<u>Construction Phase</u>					
Noise pollution from equipment at landfill site.	-Careful scheduling of noise activities during works -Warning of motorists and pedestrians during activities <ul style="list-style-type: none"> o Use Flag men o Public information -Abide to explosive regulation if applicable -Provide PPEs to workers	Noise: Max 85 dBA/ 8 hr day time	Throughout construction phase	CC Resident Engineer (RE)	5000
Dust pollution	-Irrigation to reduce dust pollution -Provision of PPEs -Cover truck loads / stock piles	Dust: PM: Not to exceed 250mg/N m ³ (24h mean value (Tanzania) for dust	Throughout construction phase	CC / RE	

Project Impact	Mitigation Measures	Standards	Timing	Responsibility	Cost (TAS) '000
Soil erosion risk	<ul style="list-style-type: none"> -Limit works to design borders and specifications -Prevention of soil erosion on the sloping land at Mangamba -Stabilize disturbed sites by vegetation 		Before and during rain season	CC/ RE and Municipal Environmental Officer	1000
Traffic accidents	<ul style="list-style-type: none"> -Accident warning signs at the entrance of Mangamba landfill. -Awareness raising for drivers -Proper servicing and maintenance of vehicles -Construct speed limit bumps 		Throughout construction phase	Traffic Police / MMMC	3000
Disruption of motor traffic and pedestrian movement	<ul style="list-style-type: none"> -Warning signs about turning vehicles at Mangamba landfill 		Monthly	RE, / MMMC	Contract budget
Interference with service utilities	<ul style="list-style-type: none"> -Carefully design and involve utility companies. -Identify water (MTUWASA) supply, TANESCO power lines. -Prompt replacement of severed services 		Daily	RE, / MMMC	600
HIV/AIDS	<ul style="list-style-type: none"> -Awareness creation amongst workers and nearby community by cinema, fliers and meetings. -HIV/Counseling and training -Distribution of condoms at workplace 		Twice in construction phase	MMMC/ Municipal HIV/AIDS Testing and counselling Committee (MHTC)	3000
Storm water management	<ul style="list-style-type: none"> -Construct storm drain canal around the proposed cell and discharge it to proper site. -Stabilize storm water drain by proper lining and vegetation at Mangamba landfill. 		Every rain season	RE. and (MMMC) / Municipal Engineer	Contract sum

Project Impact	Mitigation Measures	Standards	Timing	Responsibility	Cost (TAS) '000
Solid waste management	<ul style="list-style-type: none"> -Ensure that the contractor complies to environmental requirements and roads specifications -Provision of solid waste/garbage collection facilities at all construction sites -Proper handling of wastewater at base camp, crusher/ asphalt plants, workers camp and contractors office. -Provide adequate sanitary facilities at camps/ offices including shower and toilets -Proper handling of Liquid and Solid waste as per Roads Management Regulations (2009) -Management of sewage is via the existing system Works 		Twice in construction phase	Mtwara Mikindani Municipal Council (MMMC) / Municipal Environment Management Officer (MEMO)	Part of contract sum
Landscape disturbance and soil erosion/ Sedimentation risk	<ul style="list-style-type: none"> -Rehabilitation of areas after earth works. -Control soil erosion by replanting at borrow-pit and sites. 		Yearly	MMMC and Municipal Environmental Officer	Part of operational budget.
<u>Operation phase</u>					
Pollution of water resource and soils by leachate	<ul style="list-style-type: none"> -Proper design of leachate evaporation pond -Proper lining of leachate pond by polysynthetic material -Proper management of leachate evaporation pond e.g. control of vandals -Protection of soil and groundwater aquifer through storm water control. 		Yearly	NEMC/ MMC	Part of operational budget

Project Impact	Mitigation Measures	Standards	Timing	Responsibility	Cost (TAS) '000
Odor pollution	<ul style="list-style-type: none"> -Proper management of landfill. For example by -Covering waste with soils to reduce odor, -Public education about waste sorting 		Throughout in operation phase	MMMC/ Landfill Manager/ Municipal Health Officer	Part of operational budget
Spread of diseases	<ul style="list-style-type: none"> -Fencing to control access by scavengers and stray animals -Control flies and rodents by covering waste with food material. -Reduce spreading of litter by soil mounding and fencing -Proper management of landfill e.g. compaction and soil mounding 		Routine activity	MMMC/ Municipal Health Officer/ Landfill Manager	MC operational Budget
Dust and smoke emission	<ul style="list-style-type: none"> -Proper management of landfill by compaction of waste, -Fire control by soil mounds 		Routine	MMMC/ Municipal Health Officer/ Landfill Manager	MC operational Budget
Solid waste pollution and sanitation management	<ul style="list-style-type: none"> -Pre-sorting at source to isolate plastics and other solid material -Control flying papers by fencing and compaction -Planting of vegetation around the landfill provides wind barriers to help control dust and minimize blowing litter. -Control scavengers by fencing 		Throughout operation phase	MMMC/ Municipal Health Officer/ Landfill Manager/ MC Environmental Officer	4,000 (For tree planting and tending).
Landscape disturbance and soil erosion/ Sedimentation risk	<ul style="list-style-type: none"> -Rehabilitation of areas by replanting on disturbed landscape. 		Yearly	MMMC and Municipal Environmental Officer	Part of operational budget.

Project Impact	Mitigation Measures	Standards	Timing	Responsibility	Cost (TAS) '000
Traffic management	-Proper management of traffic at landfill entrance <ul style="list-style-type: none"> ○ Waste trucks and management trucks ○ Municipal Management vehicles 			Landfill Manager/ MMC	Part of operation budget
Sub Total					22600

8.3 ESMP Cost

The total estimated cost for the various environmental and social mitigation and monitoring measures including environmental and social follow-up, capacity building, sensitization campaigns against the spread of social diseases e.g. HIV/Aids, STDs etc. and ancillary works is Tshs 13.0 Million for roads with side drains and storm drains street lights and Tshs 19.0 Million for a landfill cell and run-off storage pond. Exact costs will be arrived at upon implementation.

9 ENVIRONMENTAL AND SOCIAL MONITORING PLAN

The Environmental Impact Assessment (EIA) and Audit regulations (2005) require the developer to prepare and undertake monitoring plan and regular auditing. The monitoring plan was previously prepared embedded in ESIA report under the Core TSCP and subsequently approved by the Minister of State – Environment in the Vice President’s Office; and EIA certificates were issued to DMC and the CDA. Therefore, this is a supplement ESIA according to the aforementioned regulation. The objectives of environmental monitoring upon executing TSCP AF activities are to:

- monitor the effective implementation during the construction and operation phases of: proposed mitigation measures;
- confirm compliance with environmental, public health, and safety legislation/regulations during construction;
- control the risks and ecological/social impacts;
- ensure best practices management as a commitment for continuous improvement in environmental performance;
- provide environmental information to community/stakeholders and;
- provide early warning signals on potential environmental degradation for appropriate actions to be taken so as to prevent or minimize environmental consequences;

Recommendations for monitoring responsibilities and estimated costs have been included in section 8.5 under the implementation of the ESMP. The Monitoring Plan schedules in **Error! Reference source not found.** and Table 2 below provide the monitoring indicators, frequency and assigns responsibilities for monitoring activities.

Monitoring Parameters/Indicators

The key verifiable indicators which will be used to monitor the impacts will mainly include: pollution (noise, soil, air-dust, waste), erosion and loss of resources, skills transfer, occupational and health safety, land-take, spread of diseases and accidents as well as job creation.

Environmental Audit

Environmental audits determine the long-term effects of adopted mitigation measures and set an avenue for evaluating their effectiveness. These shall be carried out on the project as part of the on-going maintenance programme. The audits will unveil the actual performance of mitigation measures and will allow effective measures to be included in future projects based on the legislation in force. As per EIA and Audit Regulations (2005), environmental audits would be a responsibility of MMMC and the National Environment Management Council (NEMC).

Table 2 Environmental Monitoring Plan for roads, storm drains and Street Lights

Phase or Aspect	Monitoring Parameter	Monitoring Frequency	Standards	Responsible	Measurement Area	Action	Costs Estimate (TAS) '000
Pre-construction Phase							
Safety/Traffic Accidents	Establish the baseline information. No. of accidents	Use data from feasibility study and Traffic Police		Contractor, Developer	No. of accidents along roads	Keep records	1150
HIV/AIDS	Record of HIV/AIDS and other sexual related diseases in the area. Level of prevalence	Once before the project.	Data from Municipal Medical Officer	Contractor, Municipal HIV/AIDS coordinator/ Municipal HIV/AIDS Testing and counselling Committee (MHTC)	Project area	Establish database	3500
Construction Phase							
Storm water management	Distance (km) of drainage system cleaned or maintained. Number of culverts unblocked	After rainfall	Number of reported cases	Contractor, Supervisor, NGOs	RoW	Repair and compensate damages	1150
Soil erosion and landscape management	Sites affected by soil erosion/ landscape instability along roads/ drains	After rainfall	Field observation	MC Engineers/ Environmental officer	Extent of damage e.g. depth and length	Stabilize or Rehabilitate areas and report	MC Operational budget
Noise and dust/ emissions at construction sites	Sampling (use dBA units for noise) Record respiratory infections Record public complaints. Air quality: Particulate matter (PM) in the air. Assess dust effects by monitoring respiratory disease.	Every 6 months	85 dBA /8 hrs for Noise PM: Not to exceed 250mg/Nm ³ (24h mean value (TZ) for Dust SO = 125 µg/m ³ /24Hrs ((WHO) NO ₂ = 200 µg/m ³ / 1Hr (WHO)	Contractor, Supervisor, NGOs	Crusher, quarry site, roads under construction, diversions, access and haul roads	Reporting	600

Phase or Aspect	Monitoring Parameter	Monitoring Frequency	Standards	Responsible	Measurement Area	Action	Costs Estimate (TAS) '000
			CO= Max exposure of 100mg/Nm ³ >15min (Tz)				
Solid waste management	No. of dustbins, extent of haphazard disposal. Availability of disposal sites. Recorded complaints	Monthly		Contractor, Supervisor, NGOs	Project sites	Report	1200
Traffic Accidents	Monitor construction and efficacy of road humps. Speed control Awareness creation Erection of warning sign boards. Record keeping	Monthly	Reported cases of accidents (fatal, injuries, near miss)	Contractor, Supervisor, Traffic Police	Project roads	Report	1000
Monitor local employment (Ensure access to local employment)	Encourage local employment, including for youth and women Prepare monitoring sheet formats	Every 3 months	No. of local people employed by contractor	Contractor, Supervisor, local government, NGOs	Project sites	Reporting	400
HIV/AIDS	Record of increase of HIV/AIDS and other sexual related cases the area.	Every 6 months		Contractor, Municipal HIV/ AIDS coordinator, NGOs/ Municipal HIV/AIDS Testing and counselling Committee (MHTC)	Project sites	Reporting	2500
Operation Phase							
Human health and safety / Electrocutation	Cases of road accidents Cases of occupational accidents for maintenance workers.	Every 6 months		Contractor, Supervisor, Districts, Traffic Police	Project sites	Reporting	1150

Phase or Aspect	Monitoring Parameter	Monitoring Frequency	Standards	Responsible	Measurement Area	Action	Costs Estimate (TAS) '000
	Electrocution accidents along street lights. Monitor efficacy of road humps. Speed control, Monitor signboards.						
Storm water management	Annual flooding and blocking of drainage – number of cases. Number of houses and properties damaged by storm water.	After every rainy season	Identified and reported cases	Municipal Authorities/ MC Engineers and Environment Officer	Settlements	Carry out inspection before and after rainy seasons.	575
Total							13,225

Table 10: Environmental and Social Monitoring Plan for the Mang'amba Landfill

	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility for monitoring	Five Year costs estimates (Tsh) '000
Operation Phase								
Ground Water pollution	pH	Once before works	Ground water	-	pH Meter	6.5-9.2	Municipal council/ RE	1800
	Temperature	3 times a year		Centigrade	Thermometer	20-35		1720
	Electric conductivity	3 times a year		µs/cm	Electrode Meter			1660
	Ammonium Nitrogen	3 times a year		mg/l	Sampling and analysis (Spectrophotometer)			1640

	Chloride	3/ times a year		mg/l	Sampling and analysis (Spectrophotometer)	200		1800
	BOD			Mg/l	Sampling and analysis (BOD Track)	30		1000
	COD	Three times a year		mg/l	Sampling and analysis (Spectrophotometer)	60		12300
Total								21920

10 DECOMMISSIONING

10.1 Management of decommissioning activities

Decommissioning of road, drain and landfill infrastructure will take place in the future after the end of contracts. If it happens, the carriage way can be demolished together with concrete structures such as culverts and side drains.

The anticipate lifespan for road and drains, for instance, is more than 20 year and 15 year for the landfill. If applicable, decommissioning should aim at minimizing erosion problems, restoration of landscape scenery and replacement of vegetation to its near original state.

Activities of decommissioning that may negatively affect the environment include;

- Re-alignments road route
- Demolition works of bridges, road side drains and road furniture
- Removal of existing road surface
- Compaction, grading and resurfacing
- Re-alignments water drainage ways/canals and,
- Demolition works of road side drains/storm water canals and street lights

The contractor shall demolish structures and clean up the project sites to a condition suitable for use by the community.

Therefore, the following mitigation measures are proposed as part of decommissioning;

- Safe removal / recycle of asphalt concrete layer
- Removal and safe disposal of concrete structures; culvers and drainage slabs
- Filling water pockets to eliminate risk of providing breeding sites for mosquitoes hence controlling malaria spread.
- Replanting of vegetation on the banks of the borrow pits to minimize the erosion

Demobilization of the project will comply with environmental standards and legislation and competent engineers should be involved. Overall, the demobilization of the project will comply with environmental standards and legislation. MMMC is advised to seek or incorporate the service of qualified experts for roads, storm water drains and landfill management.

11. CONCLUSION

The supplement ESIA study results show some limited negative environmental implications of the project, the proposed works will have high socio-economic benefits to the residents of MMMC. The associated negative impacts will be significantly reduced or eliminated through careful engineering design and best construction practices. Specific mitigation measures have been suggested in this report to offset some of the inherent adverse impacts especially those linked human and social environment. Effects in the

construction phase include effect on ambient air quality due to dust, noise pollution, soil erosion, poor solid waste disposal and storm water. In addition; interference to business and residential access, occupational health and spread of social diseases e.g. HIV/AIDS, STDs risk may result from project activities.

Some practical mitigation measures have been proposed for all significant impacts. Implementing these measures would safeguard the environment and make the proposed sub-projects sustainable.

It is, therefore, concluded that, effective implementation of the proposed works subprojects will mitigate the predicted impacts to harmful or near harmful levels. Their implementation should be adequate and timely. The ESMP has been prepared as shown in chapter 8. Overall, the anticipated positive impacts will outweigh the negative ones by far. In particular, transport improvement, decreased flooding or ponding along the roads hence increased social development and welfare for the municipal community.

Predicted impacts shall be managed through the proposed mitigation measures and implementation regime laid down in this ESIA. MMMC is committed in implementing all the proposed recommendations and further carrying out environmental auditing and monitoring schedules as well as enhancing the anticipated positive impacts especially creation of local employment.

The summary of recommended mitigation and management measures to minimize the potential impacts are:

- Proper design to accommodate measures for, storm water effects and soil erosion and slopes destabilization.
- Measures to safeguard job opportunities and gender balance.
- Measures to encourage local employment.
- Mitigation measures against workplace health and safety
- Measures against noise and dust effects.
- Management of traffic accidents
- Measures against possible increase of social diseases HIV/AIDS prevalence.
- Monitor compliance with environmental, health and safety measures,
- Involvement of community to safeguard infrastructure and,
- Management of Storm water and discharge to safe ends

LIST OF CONSULTED PERSONS

SUPPLEMENT ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR TANZANIA STRATEGIC CITIES PROJECT (TSCP) - DODOMA, MTWARA AND DODOMA, 2014.

LGA/ City/ Institution: MTWARA

List and Signatures of persons Consulted

SN	Name	Title / Organisation	Telephone No.	Signature
1	Eng. F. K. Rugemache	Municipal Engineer	0756 594 858	
2	MZIINGWA, R. Y	Road Technicians	0652872878/062677645	
3	AZIZ MOHAMED	AFISA DRYA MATUNDA	0683227160	
4	SEVEN MACHA.	AFISA KILIMO	0787753 653	
5	SUPUK LENASIRA	GHAC-MTWARA-MIKINDANI	0714-279222	
6	M. J NYONI	MUNICIPAL COMMUNITY DEV OFFICE	0652 99 3744	
7	J. MANYAMA	COMMUNITY DEV OFFICE	0764207221	
8	Chand PC	-Lead Hill Eng. Dept. Mbwa-	0654455969	
9	ENG FRANK J. MWELA	-RAJ- OFFICE -MTWARA-	0755 391 789	
10	DIONIS LYAKURWA	ENV. OFFICER (NEMC-Mtwara)	0753 122011	
11	NYASANYI SAMUEL D.	ENV. OFFICER (Mwani-Mtwara)	0762-002784	