

THE UNITED REPUBLIC OF TANZANIA
PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT



TANZANIA STRATEGIC CITIES PROJECT -
ADDITIONAL FINANCING, 2015 – 2017
(IDA CREDIT No. 54600-TZ)

FINAL REPORT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT(ESIA) FOR ADDITIONAL LANDFILL CELLS, ROADS, STREET LIGHTS AND DRAINAGESUB-PROJECTS IN DODOMA MUNICIPALITY

Proponents:

**Municipal Director,
Dodoma Municipal Council
Mashariki Avenue
P. o. Box 1249
DODOMA
Tel: +255 026 232 4817**

**Director General
Capital Development Authority
P. o. Box913
DODOMA
Tel: +255 026 232 1569/232 4052;
Fax: +255 026 232 2650;
e-mail: info@cda.go.tz**

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

OCTOBER 2016

TABLE OF CONTENTS

LIST OF ABBREVIATIONS.....	vi
ACKNOWLEDGEMENTS	vii
EXECUTIVE SUMMARY	1
1 INTRODUCTION	6
1.1 Project Background	6
1.2 Objective and scope of ESIA study.....	6
1.3 Rationale for TSCP Additional Financing with respect to DMC and the CDA	6
1.3.1 Objectives.....	Error! Bookmark not defined.
1.3.2 Current Status	Error! Bookmark not defined.
1.3.3 Additional Financing	7
1.4 ESIA APPROACH	7
1.5 Report Structure	8
2 DESCRIPTION OF ADDITIONAL FINANCING SUB-PROJECTS	10
2.3 Overview	10
2.4 Project Location Map.....	10
2.5 Additional works for roads, drainage and landfill.....	11
2.6 Designing	11
2.6.1 Chidaya landfill	11
2.6.2 Road subproject	11
2.6.3 Storm Drains	12
2.6.4 Structures.....	12
2.6.5 Pavement	12
2.6.6 Street lighting	12
2.7 Subproject requirements.....	12
2.7.1 Borrow materials and quarries.....	12
2.7.2 Construction camps, workshops, offices and camps.....	13
2.8 Project activities/ Operations	13
2.8.1 Mobilisation	13
2.8.2 Construction	13
2.8.3 Waste Management	13
2.8.4 Power and Water Supply	14
2.9 Demobilisation.....	14
2.10 Operational and Maintenance.....	14
2.10.1 Workforce and Equipment	14
2.11 Organisation of Works and Construction Duration	15
2.12 Land requirement, resettlement and compensation issues	15
2.13 Status of proposed sites for additional works.....	15
3. POLICY, ADMINISTRATIVE AND LEGAL POLICY	19
3.1 NATIONAL POLICIES	19
3.1.1 Overview of national policy and administrative framework	19
3.1.2 The National Environmental Policy (NEP, 1997).....	19
3.1.3 Transport Policy, 2002.....	19
3.1.4 National Mining Policy, 1997.....	19
3.1.5 National Forest Policy (1988).....	Error! Bookmark not defined.
3.1.6 National Water Policy, 2002.....	20
3.2 RELEVANT REGULATIONS AND GUIDELINES	20
3.2.1 Environmental Management Act of 2004	20
3.2.2 Occupational Health and Safety Act No. 5 of 2003	20
3.2.3 Local Government Act (District and Urban Authorities) of 1982	21
3.2.4 Land Act No. 4 and Village Land Act No. 5 of 1999	21
3.2.5 Environmental Impact Assessment and Audit Regulations (2005)	21
3.2.6 Environmental (Registration of Environmental Experts) Regulations (2005)	22

3.2.7	Environmental Management (Air Quality Standards) Regulations, (2007).....	22
3.2.8	Environmental Management (Water Quality Standards) Regulations (2007)	22
3.2.9	Environmental Management (Soil Quality Standards) Regulations (2007)	22
3.2.10	Environmental Management Act (EMA), Cap 191 (Sections 114 – 118).	22
3.2.11	Public Health Act, Cap 336 (2009).....	22
3.2.12	Quality Standards for Control of Noise and Vibration Pollution) Regulations (2011)	23
3.2.13	Water Acts of 1974 and 1981	23
3.2.14	Mining Act, No. 17 of 1980, as amended	23
3.2.15	Roads Act 2007	23
3.3	International Regulations	23
3.3.1	United Nations Convention on Biological Diversity.....	23
3.3.2	Environmental Assessment (OP4.01, BP 4.01, GP 4.01).....	24
3.3.3	Involuntary Resettlement (OP/BP 4.12)	25
4.	Baseline Conditions	26
4.1	PHYSICAL, BIOLOGICAL AND SOCIAL ENVIRONMENT OF CDA AND DMC	26
4.1.1	Climate	26
4.1.2	Topography	26
4.1.3	Soils	26
4.1.4	Water resource	27
4.2	BIOLOGICAL ENVIRONMENT.....	27
4.2.1	Ecosystem.....	27
4.2.2	Land Use	28
4.2.3	Conservation Areas	28
4.2.4	Vegetation	28
4.2.5	Fauna	28
4.2.6	Wildlife values	28
4.3	SOCIO-CULTURAL ENVIRONMENT	28
4.3.1	Population and Administration	28
4.3.2	Economic Conditions	29
4.3.3	Education	29
4.3.4	Health and HIV/Aids prevalence	29
4.3.5	Economic Activities.....	29
4.3.6	Ethnicity and languages.....	29
4.3.7	Financial status /revenue	30
4.3.8	Industries.....	30
4.3.9	Transport and Transportation	30
4.3.10	Utilities and Services:	31
4.3.11	Water Supply	31
5.	Stakeholders Consultation and Public Involvement	32
5.1	Consultation	32
5.2	Issues and Concerns as raised during stakeholder meeting for proposed works	33
6.	Assessment of impacts and Identification of alternatives.....	37
6.1	Introduction.....	37
6.2	Identification of project boundaries	37
6.3	Impacts analysis method	38
6.4	Positive Impacts during Construction and operation phases	39
6.5	Negative Impacts in construction and operational phases	40
6.5.1	Climate	40
6.5.2	Hydrology	40
6.5.3	Natural forest and wildlife	40
6.5.4	Soil erosion.....	40
6.5.5	Dust and emissions	41
6.5.6	Noise pollution	41
6.5.7	Pollution of ground water by leachate	41
6.5.8	Pollution by Solid Waste	42

6.5.9	Pollution by Hydrocarbons	42
6.5.10	Storm water	43
6.5.11	Occupational Health and safety	44
6.5.12	Spontaneous subsurface and subsurface	44
6.5.13	Odour	45
6.5.14	The spread of social diseases (HIV/AIDS)	45
6.5.15	Traffic Accidents	45
6.5.16	Damage to Public Utilities	46
6.5.17	Disruption of business, pedestrian and vehicular movement.....	46
6.5.18	Dust and emissions	47
6.5.19	Noise pollution	47
6.6	Impacts during Demobilization	47
6.7	Analysis of Alternatives.....	48
6.7.1	'No sub-project' option	48
7	Environmental and social mitigation measures	49
7.1	Introduction.....	49
7.2	Identification methods.....	49
7.3	Enhancement measures during pre-construct phase	49
7.4	General Commitments.....	49
7.5	Management of Construction Site.....	50
7.6	Health and Safety Measures of OSHA.....	50
7.7	Mitigation measures during pre-Construction phase	50
7.7.1	Landscape and soil erosion	50
7.7.2	Clearing of natural vegetation	51
7.8	Mitigation measures during construction phase	51
7.8.1	Solid waste management	51
7.8.2	Hydrocarbons	51
7.8.3	Storm water management	52
7.8.4	Health and Safety	52
7.8.5	Traffic Accidents.....	52
7.8.6	The spread of social illnesses.....	53
7.8.7	Noise and Dust pollution.....	53
7.8.8	Protection of public Utilities.....	54
7.8.9	Disruption of business and vehicular movement	54
7.9	Resettlement	55
7.10	Mitigation measures for operation phase	55
7.10.1	Servicing roads and drains	55
7.10.2	Ground water pollution due to leachate	55
7.10.3	Odour management.....	56
7.10.4	Management of solid waste	56
7.10.5	Fire protection in landfill cells.....	56
7.10.6	Management of Occupational health	56
7.11	Summary of Mitigation Measures for Negative Impacts	56
7.12	Summary of Mitigation Measures for Negative Impacts	60
8	ENVIRONMENTAL AND SOCIAL MANAGEMENT.....	63
8.1	Personnel and Capacity Enhancement.....	63
8.1.1	Training Programs	63
8.1.2	Grievance Management	65
8.2	Environmental and Social Management	65
8.2.1	ESMP Costs	77
8.3	Environmental and Social Monitoring Plan.....	78
9	Decommissioning.....	82
9.1	Management of decommissioning activities.....	82
10	Conclusion	83

List of consulted persons 84

LIST OF FIGURES

FIGURE 1 - LOCATION OF PROJECT AREA	10
FIGURE 2 CONSULTATION WITH EXECUTIVE DMC STAFF	17
FIGURE 4 DRAIN FOR IMPROVEMENT OUTSIDE MAIN BUS STAND	18
FIGURE 5 BUSINESS ACTIVITIES AT MAIN MARKET,	18
FIGURE 6 BUSINESS ACTIVITIES AT MAIN MARKET,	18
FIGURE 7 THE LAYING OF NEW WATER PIPES IN DMC.....	18
FIGURE 5 RESULTS OF ANALYSIS FOR SOILS TAKEN FROM DODOMA URBAN	27
FIGURE 6 QUALITY IN DODOMA URBAN	27
FIGURE 7 CONSULTATION WITH SENIOR STAFF OF DMC	32

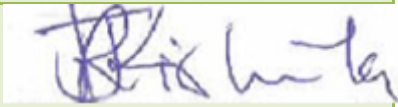
LIST OF TABLES

TABLE 1 ENVIRONMENTAL CHARACTERISTICS OF THE PROPOSED SITES FOR IMPROVEMENT WORKS	15
TABLE 2 ISSUES AND CONCERNS AS RAISED DURING STAKEHOLDER MEETING FOR PROPOSED WORK.....	33
TABLE 3 PERMISSIBLE NOISE LEVELS IN TANZANIA.....	54
TABLE 4 SUMMARY OF MITIGATION MEASURES FOR ROADS AND STORM DRAINS	61
TABLE 5 ESPM FOR ROADS AND STORM DRAINS	66
TABLE 6 ESMP FOR STORM DRAINS.....	71
TABLE 7 ENVIRONMENTAL MONITORING PLAN FOR ROADS AND STORM DRAINS..	79

LIST OF ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
BOD	Biochemical Oxygen Demand
BOQ	Bill of Quantities
CBO	Community-Based Organization
CDA	Capital Development Authority
CO ₂	Carbon Dioxide
COD	Chemical Oxygen Demand
COD	Chemical Oxygen Demand
DOE	Director of Environment
DUWASA	Dodoma Urban Water Supply and Sanitation Authority
EA	Environmental Assessment
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
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-RALG	Prime Minister's Office, Regional Administration and Local Government
	Personal Protective Equipment
PO-RALG	Presidents Office- Regional Administration and Local Government
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 Shillings
WB	World Bank

STUDY TEAM

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

ACKNOWLEDGEMENTS

M/s SMEC International Pty Ltd in association with Proper-Consult (T) Ltd, the Consultant, would like to extend sincere gratitude to the President's Office - Regional Administration and Local Government (PO-RALG), the Project Proponent. The task is to provide the consulting services of among others the Environmental and Social

Special thanks go to the management and staff of PO-RALG particularly to Eng. Jovin B. Bujulu and Dr. mukuki Hante for their technical support and guidance in the preparation of this report.

Lastly, kind acknowledgements deserve to DMC and the CDA, Dodoma Urban Water Supply and Sewerage Authority (DUWASA), Water Resources Division, Ward Executive Officers, Mtaa and the Chidaya Village leaders for providing us with valuable information, data and support, which enabled the Team assigned to this task to smoothly conduct the study.

EXECUTIVE SUMMARY

Dodoma Municipal Council (DMC) and the Capital Development Authority (CDA) are public institutions under the PO-RALG, hitherto, implementing the Core Tanzania Strategic City Project (TSCP).

As the Core TSCP ends in December 2015, some of the new infrastructure facilities were either not well completed or the desired goals were not fully met. Hence, the proposed additional works for roads, storm drains, street lighting and the Chidaya landfill are importantly needed to complement what has been achieved in the Core TSCP subprojects.

The ESIA study, in this case, is aimed to contribute to the environmental and social safeguards of the proposed additional subprojects in DMC and the CDA. Notably, the latter being subprojects developers prepared ESIA's under the Core TSCP which were verified and approved by the National Environment Management Council (NEMC) during the preparation of the project between November 2009 and March 2010. 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 additional subprojects will involve improvement of roads, storm-water drains and the Chidaya landfill by doing the following:

DMC:

1. Improvement of Package 1 and 2 works uncompleted during carrying-out of the Core TSCP, and
2. Construction of two additional waste cells and improvement of the evaporation pond at the landfill site.

CDA:

1. Improvement of Kisasa and Chang'ombe roads,
2. Improvement of Area C and Kikuyu neighbourhood roads, and
3. Constructing various storm drains linking Package 2 and 3 drainage works.

Important works in the roads and drainage include earth excavation for roads and walkways clearing as well as surfacing by asphalt concrete. In addition, there will be installation of road furniture such as road signs and passage slabs, culverts, walkways and side drains. As for storm drains, major tasks will include excavation and lining by concrete slabs.

Additional works in the Chidaya landfill will include earth excavation for waste cells, spreading of liners to intercept leachate, leachate storage and evaporation pond and construction of leachate collection piping system. It will also involve installation of a gas collection system and grading of surrounding areas to maximize run-off.

Stakeholder Consultation and involvement in ESIA process

The study team prepared a communication plan which guided in the stakeholders' consultation process. Meetings and discussions were held with representatives of key

stakeholders and project developers. These were aimed at collecting their concerns and opinions about the subprojects. These meetings were important in order to establish a common understanding about subproject settings and key issues.

Stakeholders meetings formed a basis for people's participation and involvement in subprojects formulation process. The main stakeholders consulted TSCP – AF subproject identification and approval were DMC and the CDA officials comprised of heads of Social and Environmental Sections in the authorities. Also, grass-roots participation was done in the revisit of the subprojects status over what done during Core TSCP where a wide cross-section of villagers, Mtaa, Ward and District leaders were consulted.

Field visits were conducted to the development sites to capture the information about baseline conditions such as topography, location, drainage behaviours, social inter-connections, human settlement and vegetation cover. That information provided an insight about possible impacts that will be caused by the subprojects and that has to be featured in ESIA report.

Results of Public Consultations

The outcome from stakeholders' consultation meetings revealed the following concerns;

- a) Uncertainty on the availability local employment,
- b) Storm water effect,
- c) Occurrence of communicable diseases and social illnesses,
- d) Soil erosion hazards,
- e) Dust pollution, and
- f) Management of solid waste.

Environmental and Social Impacts

The ESIA study for additional works of the proposed roads, drainage, street lights and landfill cell subprojects shows that there are limited negative environmental and social impacts anticipated to arise from the sub-projects. Instead, the proposed improvements will have high socio-economic benefits to the residents of the Dodoma Municipality.

Possible negative impacts are; noise and dust pollution, soil erosion, interference to businesses and pedestrian movements, traffic and traffic-related accidents and mis-management of solid waste. Others are soil erosion and landscape instability, non-adherence to occupational health and safety; and spread of diseases.

The project will create positive impacts such as raised employment opportunities, increased internal revenue collection and a healthier economy and community, transport and transportation improvement and subsequently a developed social welfare in the municipality

Thus, proper techniques if applied to in the construction of additional subprojects will at the end yield to a stronger municipal capacity and integrity for profitable investments

Mitigation Measures

Some practical mitigation measures were identified to encounter various possible impacts. Implementing these measures shall safeguard the environment and make the proposed sub-projects sustainable. Importantly, the implementation of planned additional works will not require compensation or resettlement.

In all the additional works, mitigation measures for minimizing identified potential impacts include the following aspects:

- i) Proper design to prevent soil erosion and landscape damage,

- ii) Safeguard of local employment, gender balance and regulation of influx of job seekers to the development sites,
- iii) Proper designing of storm water drain, collection and discharge of storm water to safe ends,
- iv) Mitigation measures against workplace and traffic accident ,
- v) Control of pollution by noise and dust,
- vi) Measures against possible increase of social illnesses such as HIV/AIDS, STDs, illicit drug addiction, etc.
- vii) Good management of occupational health and safety at work places,
- viii) Involvement of communities for sustainable management of improved infrastructure facilities,
- ix) Safeguard employment and gender balance,
- x) Measures to reduce odor and waste pollution during operational phase by proper management e.g. early sorting of refuse and covering of waste cells by soil,
- xi) Control of leachate against pollution of ground water by liner and leachate pond,
- xii) Fencing of landfill to control spread of solid waste and entrance of stray animals and scavengers during operational phase,
- xiii) Protection of subsurface fire at landfill during operation by gas piping,
- xiv) Installation or construction of Test Pits to monitor water quality during operation,
- xv) Involvement and participation of local community in landfill management,
- xvi) Storm water management by construction of storm drains and bunds around landfill and,
- xvii) Allow vegetation growth on waste cells or landfill.

Under the new management for the redesigned landfill, waste will be placed into different and segregated lined cells. New infrastructure 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.

Environmental and Social Management Plan (ESMP)

Effective implementation of the proposed mitigation measures as guided in the ESMF will significantly minimize 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 costs for the various environmental and social mitigation and monitoring measures including capacity building in environmental and social subprojects' aspects where TShs 38.0 Mio is set aside for additional roads; TShs 11.0 Mio for drainage and TShs 12.9 Mio for two landfill cells. These estimates will be further refined during the implementation stage. For example, in the determination of training needs, CDA and DMC will have to identify the type and number of beneficiaries, type of trainings needed and where these trainings will occur and their corresponding costs.

Environmental and Social Monitoring Plan

Recommendations for monitoring have been included in this report. The monitoring plan assigns responsibilities for monitoring activities. DMC and the CDA will have to assume an important role of monitoring all ongoing sub project activities such as disease spread, pollution and accidents, underground water quality which risk pollution by leachate. Monitoring of water quality will be undertaken by use of test pits or wells. Environmental audit will also take place will involve National Environment Management Council (NEMC) in the process and will be a long term activity. This is well stipulated in the environmental

regulation. Groundwater monitoring wells will be installed at landfill to monitor groundwater quality.

Resettlement

The assessment revealed that there are **no resettlement issues on all the sites designated for additional subprojects** improvements. Therefore, a Resettlement Action Plan (**RAP**) **has not been prepared for the proposed additional works**. Works will be confined within legal boundaries of the facilities Right of Way (RoW). Therefore, the design team will avoid interference with any property especially along the proposed storm drain canal.

The risk of relocating a house at Chang'ombe along the storm drain was resolved by re-alignment the drain to a new path to empty into a nearby culvert and, therefore, leaving away the house.

As such, DMC and the CDA and will collaborate with contractors to resolve any unforeseen disputes or misunderstandings based on the existing regulations.

Land for the Landfill at Chidaya under the Dodoma Municipal Council has already been acquired and a RAP prepared and implemented; however, this ESIA noted that one of the landfill cell has been located at the edge of the landfill, this will require additional land take to accommodate the buffer zone. Therefore the DMC will acquire the land as per the TSCP-AF RPF and then later update the RAP report for the landfill.

Decommissioning

The anticipate lifespan for road and drains is more than 20 year and 15 years 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 affect the environment negatively are;

- a) Re-alignments road route,
- b) Demolition works of bridges, road side drains and road furniture,
- g) Removal of existing road surface and,
- h) Compaction, grading and resurfacing.

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,
- 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,
- Removal and safe disposal of concrete structures; culvers and drainage slabs,
- Stabilization of harsh slopes,
- Final cover by soil and green vegetation,
- Control of drainage systems,
- Safeguard to leachate and gas management systems,
- Fire control, and
- Prevention of illegal dumping.

Conclusion



DMC and the CDA are committed to implement all the proposed recommendations and further carrying out environmental auditing and monitoring schedules according to the directive of the ESMF. The authorities will also ensure that the anticipated positive impacts bring up social and environmental aesthetic value of targeted subproject areas.

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 is to 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 agreed scope of improvement works for CDA and the DMC under the TSCP AF is as follows:

DMC

1. Improvements to landfill including 2 additional cells and evaporation pond at Chidaya Landfill in DMC.
2. Improvement of Package 1 works, and
3. Improvement of Package 2 works.

CDA

1. Improvements of Kisasa and Chang'ombe roads,
2. Improvement of Area C and Kikuyu roads, and
3. Improvement of various additional storm drains linking Package 2 and 3 drainage works.

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 municipality of Dodoma. 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 disposal sites specifically two additional cells to the new Chidaya 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. Some of the proposed additional infrastructure facilities were not well completed under the Core project. Also, DMC and the CDA have 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 DMC and the CDA.

The additional improvement works for DMC and the CDA particularly **urban roads, storm drains and extra two cells at the Chidaya landfill** are therefore desired to complement the initial works of the Core TSCP.

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

1.3 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 2009 and November 2010.

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.

1.4 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

2.3 Overview

The improvement works of TSCP Additional Financing are infrastructural and for improvement of transportation, sanitation and social services in the Dodoma Municipality. The works will involve roads, landfill and drainage street lights. Some of these works as mentioned earlier were not completed in the Core project (Package 1 and 2).

Apparently, the Dodoma municipality has pockets of areas which are vulnerable to seasonal flooding because of its natural flat topography. Thus, roads passing in these areas especially the newly constructed roads require proper construction of a drainage system that will remove and dispose of storm water to safe end.

2.4 Project Location Map

The location of CDA and Dodoma Municipality is shown in Figure Figure 1.

Figure 1 - Location of Project area



2.5 Additional works for roads, drainage and landfill

Additional road works are planned to construct roads and storm water drains as explained in section 1.2. The task will involve the following;

Road and drainage infrastructure

- 1) Roads and walkways
 - Upgrading of roads from gravel to asphalt concrete surface
 - gravelling, brick paving
- 2) Side drains:
 - Demolishing of side drains and laying of new ones
 - sand traps,
 - stone pitching,
 - gabions, concrete pipes
- 3) Storm drains
- 4) Pedestrian crossing slabs:
 - Pedestrian walkways,
 - Speed humps,
 - Rumble strips,
 - Road shoulders
- 5) Culverts
- 6) Road furniture: street lights, signage
- 7) Vegetation clearance to pave way for works.
- 8) Chidaya Landfill
 - Two cells,
 - One storage pond

2.6 Designing

2.6.1 Chidaya landfill

This subproject is designed to construct two (2) additional cells at the Chidaya landfill. It will also involve improvement of the evaporation pond. The three structures will be located in the remaining space of the landfill area.

The goals for the upgrades and additional designs are to:

- design 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.

2.6.2 Road subproject

The proposed improvement works for roads will be confined within the existing road reserves of 30m for Municipal roads. The upgraded road will follow the corridor of the existing roads, which is managed by Municipal Engineers.

It was found that most of the access roads have been hindered to function due to existence of longitudinal ditches. The design adopted incorporates the size of the culverts, fill and the radius of the curve enough for vehicles to manoeuvre through without touching the head wall. The existing of horizontal alignments as well as vertical have been made to meet design and safety requirements.

The walkways have been provided as per existing design of 1-1.5m width on both and/or single side of the road. These are paved with slabs to bring aesthetic foot-walking.

The project will be implemented in the designated urban setting. That means the sites are close to the people's houses or households and may affect public utilities of water and power supply. The project will also include construction of road-side structures to control drainage. The contractor may be required to restrict traffic movement during the construction phase.

2.6.3 Storm Drains

New construction of drainage structures, including the construction of open drains and energy dissipation structures is required.

Storm water drains have been designed considering holistic view of surface run-off regimes in the Dodoma municipality. The longitudinal road ditches are available and existing which direct water to the lowest points. The Consultant has designed the storm water drains to collect water from the lower points to external locations far from roads whose levels are lower than the lowest points on the roads; this has been done to those roads which were not constructed in the Core TSCP due to budget constraint.

2.6.4 Structures

Designed structures include access slabs to houses for vehicles, pedestrian crossings and foot-bridges crossing the storm water drains have been considered. The major structures designed for storm water drain is Open Trapezoidal Lined ditches running throughout the drains.

2.6.5 Pavement

The pavement design for the access roads and the access to Land fill is done for a 150mm of G15 improved; 200mm sub-base, 150mm base and 40mm of asphalt concrete (AC) surface layers.

2.6.6 Street lighting

Streetlights will be provided in RoW at the reserve portion of the road.

2.7 Subproject requirements

2.7.1 Borrow materials and quarries

Construction materials such as gravel, stones and sand will be obtained from approved borrow pits. The contractor may obtain crushed rock aggregates from existing quarries or may choose to develop small quarry sites especially for the project depending on the location and availability of aggregates from existing sources. These areas will have to be approved by Municipal Engineer of local authorities.

Safe transportation of materials to the site will be an important prerequisite. All access or private roads used for 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. Rehabilitation 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.

2.7.2 Construction camps, workshops, offices and camps

During the construction phase, some work camps may not be needed to provide workshops, offices and accommodation for staff, storage for construction materials because these premises/ facilities may be rented within the municipality.

2.8 Project activities/ Operations

2.8.1 Mobilisation

As applied to the previous phase or phase I, mobilisation will involve, mobilisation of equipment, recruitment of manpower, construction of offices and campsites (if required), including the associated waste products management systems, identification of borrow areas and quarry sites and acquisition of various permits as required by the law. If applicable, the locations for offices and campsites will be agreed between the contractor and the supervisor and subsequently approved by Municipal Engineer and Resident Engineer. The project works will be implemented close to household or public areas and may affect public utilities and water supply.

2.8.2 Construction

The major works and materials for roads and drains during the construction phase, which will last for 2-3 months, will be as follows.

a) Road and drainage canals:

The project comprises primarily civil engineering works consisting of;

- i) Clearing of areas in advance of construction works;
- ii) Filling and reshaping the road section to sub-grade level;
- iii) Earthworks necessary to construct the road ways and drains;
- iv) Excavation at proposed sites for roads
- v) Shaping of gravel from borrow pits for sub-base and base course;
- vi) Supply of bitumen and stone chippings/aggregates;
- vii) Laying a bitumen prime coat and bituminous surface treatment;
- viii) Construction of concrete slabs and strips; and

b) Storm Water drains

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

2.8.3 Waste Management

The proposed road and storm water drains are not expected to generate harmful waste material. The major wastes generated by the project are spoil soils resulting from earthworks during the road formation and the creation of borrow pits.

Topsoil shall be stock piled along near construction sites. The soil shall be used to reinstate the sites at the end of the project implementation phase. In particular, the topsoil will be used for environmental rehabilitation such as re-vegetation and stabilisation of road embankments.

Contractor will make contingency plans to handle accidental oil spillages and general waste management during the preparation of the Environmental and Social Management Plan (ESMP) for this project.

2.8.4 Power and Water Supply

The contractor will obtain power supply from own standby generators or national power grid or served by TANESCO. Power is necessary for office, camps and workshops and for the operation of some equipment.

2.9 Demobilisation

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

The activities during demobilisation will include the following:

- Handing over of the permanent works in a serviceable condition to Municipal/ city 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.

Duration for this activity is about one to two weeks.

2.10 Operational and Maintenance

During the operational phase, the major activity will be the transport of various goods and passengers to neighbouring districts, towns and regions. Maintenance of the roads and drainage will be necessary to ensure continued ease of use and to prevent deterioration of the assets. This will include the following:

- Repairs to damaged road sections, including potholes;
- Removal of debris from the road;
- 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;
- Re-establishment of road markings;
- Proper storage and deployment of maintenance materials and equipment; and
- Continuation of safety awareness programme for the people using the road.

2.10.1 Workforce and Equipment

As in the previous phase, the construction of the roads and storm water drains requires a team of technical personnel including project managers, engineers, surveyors, supervisors and technicians as well as skilled and unskilled labour. Unskilled and semi-skilled labour will be employed from local areas on a temporary basis.

The exact number of employees required by this project will be known when the contractor's methodology is submitted.

During the construction phase, 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 drains and drainage structures and for concrete works.

2.11 Organisation of Works and Construction Duration

DMC and CDA 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.

2.12 Land requirement, resettlement and compensation issues

Land for road works is available within the existing RoW for Municipal roads and original design. Details for design works have been detailed in the design and feasibility report. When engaged, the contractor will liaise with municipal and CDA engineers to propose sites for workshops, borrow pits and quarry sites. A number of existing borrow pits have been identified and are suitable for use in the project.

Compensation for any unforeseen land or properties take or damage will comply with Land Act No. 4 and 5 of 1999 as well as the World Bank OP 4.12. As the project will not cause any displacement of people and loss of land or properties **Resettlement Action Plan (RAP) will not be prepared.**

Land for the Landfill at Chidaya under the Dodoma Municipal Council has already been acquired and a RAP prepared and implemented; however, this ESIA noted that one of the landfill cell has been located at the edge of the landfill, this will require additional land take to accommodate the buffer zone. Therefore the DMC will acquire the land as per the TSCP-AF RPF and then later update the RAP report for the landfill.

2.13 Status of proposed sites for additional works

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

Table 1: Environmental characteristics of the proposed sites for Improvement works

		NAME OF SUB-PROJECT	TARGETED INTERVENTIONS	PHYSICAL, SOCIAL ENVIRONMENTAL CHARACTERISTICS
1	Dodoma Municipality			
	a) Roads	Roads: Improvement to Package 1 works	Continuation of upgrade works	<ul style="list-style-type: none"> - Residential premises - Business activities - Live and Concrete fence

		Roads: Improvement of Package 2 works	Continuation of upgrade works	<ul style="list-style-type: none"> - Residential premises - Business activities - Live and Concrete fence
		Kikuyu Roads (Package 2)	Improvement of drainage/ upgrade	<ul style="list-style-type: none"> - Poorly drained area - Close to St. John College. - Unpaved Roads - Residential properties - Business structures. - Pentecoste City Church - Concrete fence along the road - Serves Maisha Mapya Tourism Institute
	b) Main bus Stand	Main Bus Stand-improvement to "Package 2" works	Improvements to main bus stand, mini bus stand- drainage canal workshop and skip pads	<ul style="list-style-type: none"> - Travel booking offices for Dar es Salaam and country buses. - Drain crosses access road to Main Bus stand.
2	CDA			
	a) Roads	Roads: Improvement of Kisasa & Chang'ombe Roads (Package 1) – 2.9 KM	Upgrade from earth surface to tarmac level	<ul style="list-style-type: none"> - Church buildings - Residential and Business properties. - Poorly drain area - Planted trees/ fence - Close to suburb market
		Roads: improvement to Area A and Kikuyu Roads (Package 2)	Upgrade from earth surface to tarmac level	<ul style="list-style-type: none"> - Residential premises - Business activities - Live and Concrete fence

	b) Storm Drains	Drains: Various storm water drains linking Package 2 & Packages 3 works	To facilitate drainage water drainage in newly constructed Roads. To serve flood prone areas Excavation and pitching Excavation and pitching works. Kerb-stones	<ul style="list-style-type: none"> - Drain to cross access road to Main Bus stand. - Pass in poorly drained area. - Settlements or houses in the area. One house is locate inside the drain path. - No culverts in nearby Roads. - Business and residential properties
		Drains: Improvement of Kisasa drain	Improvement of drainage	<ul style="list-style-type: none"> - Residential premises - Business activities - Live and Concrete fence

Some of important features of the proposed sites for improvement works are presented in Figure 2, **Error! Reference source not found.**, Figure, Figure and Figure .

Figure 2: Consultation with executive DMC staff



Figure 3: Drain for improvement outside Main Bus Stand



Figure 4: Business activities at Main Market,



Figure 5: Business activities at Main Market,



Figure 6: The laying of new water pipes in DMC



3. POLICY, ADMINISTRATIVE AND LEGAL POLICY

3.1 NATIONAL POLICIES

3.1.1 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 and storm drains subproject are:

3.1.2 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.

3.1.3 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.

3.1.4 National Mining Policy, 1997

The Mineral Policy covers all activities regarding extraction from the ground. This includes minerals and materials suitable 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.

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

3.2 RELEVANT REGULATIONS AND GUIDELINES

3.2.1 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.

3.2.2 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 projectoperations 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.

3.2.3 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 Dodoma Municipal Council and the CDA as well as other sector authorities in the region.

3.2.4 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 and drains 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.

However, the implementation of ESMP of this ESIA is consistent with both legislations.

3.2.5 Environmental Impact Assessment and Audit Regulations (2005)

It is an offence for DMC and the CDA to commence, finance, permit or license a project without EIA 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.

3.2.6 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. DMC and the CDA will strive to assign qualified staff to prepare sub-project ESMP; or support and supervise external experts where screening determines a need to follow national procedures and obtaining ESIA certificate issued by Minister responsible for environment. DMC and the CDA will ensure through capacity building outlined under this ESMF (B6) that their 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).

3.2.7 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, DMC and the CDA seek air pollutant emission permit issued by NEMC.

3.2.8 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.

3.2.9 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.

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

By developing waste management infrastructure, DMC and the CDA 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.

3.2.11 Public Health Act, Cap 336 (2009)

By developing waste management infrastructure, DMC and the CDA also have fulfilled PHA requirement that vest duty to them 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 the municipal infrastructure and facilities operate as per these requirements.

3.2.12 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.

3.2.13 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 street lights additional works are properly mitigated to avoid any potential pollution problem in the subproject areas.

3.2.14 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.

3.2.15 Roads Act 2007

The Road Act 2007 serves as a guide 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 Works is the authority for this regulation.

3.3 International Regulations

The most appropriate international legal frameworks are

3.3.1 United Nations Convention on Biological Diversity

This Convention, which calls for the sustainable use of biological diversity, was ratified by Tanzania in 1996. Dodoma Municipality and the CDA, 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.

3.2.2. 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.

3.2.3. 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:

3.3.2 Environmental Assessment (OP/BP4.01)

This policy requires environmental assessment (EA) of projects/ 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 (Dodoma) 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 Dodoma/CDA. 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 InfoShop before commencement of the project activities.

3.3.3 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.

3.3.4 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.

Significant efforts are to be made in the design and screening stages of sub-projects to avoid impacts on people, land, property, including as far as people's access to natural and other economic resources, possible. However, the AF sub-projects in Dodoma/CDA are not expected to cause any involuntary resettlement as the infrastructure of roads is confined within the legally owned road reserve.

4. BASELINE CONDITIONS

4.1 PHYSICAL, BIOLOGICAL AND SOCIAL ENVIRONMENT OF CDA AND DMC

4.1.1 Climate

Climate is mostly semi-arid due to low and erratic rainfall. Rainfall is the most important climatic factor in with only one rainy season of heavy storms and flash floods are a common occurrence.

The minimum average temperatures vary from 10°C in July to 20°C in November. July is the coldest month whereas November is the hottest month, with mid-day temperatures exceeding 30°C.

The area has a dry savannah type of climate, which is characterized by a spell of long dry season lasting between late April to early December and a short single wet season lasting from late December to early April. Annual rain distribution ranges between 550mm – 600mm, raining between December and April each year.

The climate of the all the sub-project areas are identical to the overall climate of the Dodoma municipality. The average air temperature ranges from 160C (lowest) in June/July to 360C (highest) in November. The following table and bar chart shows the years average weather condition readings covering rain, average maximum daily temperature and average minimum temperature for Dodoma.

4.1.2 Topography

The project area stands on a broad upland plateau with an altitude ranging between 900 – 1000 above sea level. Physio-graphically and topographically, the road and drainage sub-project falls in the flat central zone of Dodoma that lies between latitude 6.000 and 6.300 South and longitude 35.300 and 36.0200 East. The sub-project stands on broad upland plateau with an altitude ranging between 900 – 1000 above sea level.

The area covered by this ESIA study encompasses approximately 30 square kilometers and extends from Imagi (Kilimani) and the linear hill chain in the south to Mlimwa and Nala and the gently undulating plains in the north. The ground slopes vary from gentle to flat and present no problems for sub-project investments.

4.1.3 Soils

The soil was observed to be of low fertility, deficient in organic matter, moderate to poor in permeability and of shallow depth. Salt content is generally high and in some areas, salt pans form under the top soil. Surface soil crusting is common.

The majority of soils would be classified as silty-sandy mixes with a trace of clay, very dense, compacted, lightly permeable and no-plastic. There are a few deposits of sandy-silty clays and in some areas pure cracking clay deposits can be found. The permeability of the soil exhibits great local variations depending mainly on the clay content.

Analysis of soils taken from Dodoma town reveals results shown in Figure 8.

Figure 7: Results of analysis for soils taken from Dodoma urban

LAB.NO.	CWL.SO.1029/09	
SOURCE OF SAMPLE	MCHESE	
LOCATION	DODOMA URBAN	
PARAMETERS REQUESTED	UNIT	VALUE
pH		6.3
Electrical Conductivity (EC)	μS/cm	293.0
Alkalinity	mg/100gm of soil	30
Chloride	mg/100gm of soil	24.5
Sulphate	mg/100gm of soil	8.5
Organic Matter	%	1.0

4.1.4 Water resource

The project area has no rivers or wetland areas. The ground water level is usually well in excess of 2 meters deep and consequently should present no problem for road construction. It should, however, be noted that the proposed investment sub-project roads which is rehabilitate and upgrade of the existing roadway does not traverse or come close to any major water sources.

The quality of water in Dodoma urban is presented in **Error! Reference source not found.9** .

Figure 8: Quality in Dodoma Urban

LAB.NO.	CWL.S.1028/09	
SOURCE OF SAMPLE	TAP	
LOCATION	DODOMA TOWN	
PARAMETERS REQUESTED	UNIT	VALUE
pH		7.8
Alkalinity	mg/l	286.0
Chloride	mg/l	71.0
Sulphate	mg/l	65.0
Electrical Conductivity (EC)	μS/cm	910.0

4.2 BIOLOGICAL ENVIRONMENT

4.2.1 Ecosystem

Dodoma municipality is an urbanized ecological system without marked aquatic or semi aquatic ecosystems. The review of primary and secondary literature and interviews have indicated that the area to be covered by these investment sub-projects have neither protected areas no endangered species. Some of the sub-project areas are surrounded by bush thickets, grasses and a few short trees 'Miti Maji' of the family *Trichilla (Trichilla emetica)*.

4.2.2 Land Use

The existing Land-use types in the project area include residential communities and neighborhoods, urban centre, urban open space and recreation, government offices and institutions. In the area away from the urbanized center, in the Bahi and Chamwino districts, the land use types are characterized by conservation and aforestation, arable lands, grazing land, institutional use and urban areas.

4.2.3 Conservation Areas

The sub-project investment areas have no forest reserves, no National Parks or any form of conservation area as defined in the National Wildlife Policy.

4.2.4 Vegetation

Vegetation in the sub-urban area is characterized by bush or thicket type. Depressions, which are seasonally inundated *mbuga* (areas with impeded drainage) support grasses to form grasslands and sometimes a mixture of grasses and woody plants. These are the wooded grasslands. Woodlands are observed as patches on many hills in Dodoma.

The sub-project area has scanty vegetation due to unreliable rainfall. The natural vegetation in the vicinity of the road sub-projects consists mainly of bush thickets mixed with annual herbs, grasses and short trees, mostly Miti Maji *Trichilla emetica*. Asked whether the project will have a negative impact on the vegetation, most respondents said there will be no impacts at all.

4.2.5 Fauna

The sub-project areas and their vicinity are poorly endowed with wildlife resources. Most of the proposed sub-projects are situated in areas which have no wildlife resources of conservation interest. At the urbanized municipal center there virtually no game species whereas there are reports that migratory leopards, hyenas and elephants are occasionally seen in the peripheral areas such as Ntyuka and Chidaya. The ecological setting of the larger part of the municipality does not allow wildlife game species to flourish.

4.2.6 Wildlife values

The habitat for wildlife has been significantly modified because of human activities of agriculture, deforestation and nearby urbanization. Therefore, there is poor presence of wildlife in the area. As such, there are no known rare or endangered species in Dodoma municipality and its vicinity (e.g. by IUCN categories).

4.3 SOCIO-CULTURAL ENVIRONMENT

4.3.1 Population and Administration

Administratively, the Dodoma urban district has 4 divisions, 30 wards, 40 villages, 70 streets and 249 hamlets. The population of Dodoma Municipal was 324,347 in 2002 census and the population is 410,956 (2012 Census) with an average rate of increase population of 4.0%. The Urban Division has 17 wards with a total area of 426 km² and total population of 183,650 inhabitants.

The Capital Development Area (CDA) covers an area of 276,910 ha and has a designated area for urbanization, designed to a population of 1,000,000. The rest of CDA area is earmarked for an

underground water catchment, agriculture and livestock grazing, afforestation and conservation areas as well as a future international airport.

4.3.2 Economic Conditions

Dodoma Municipality is situated in an economically depressed area. Although it has rich agricultural land, it is affected by harsh semi-arid climatic conditions, and rather traditional agricultural methods are still predominating.

In the urban areas the main activities of the residents are commerce, urban farming and civil service employment while in the rural areas, crop farming and livestock keeping are the prime means of existence. The Capital Development Area (CDA) covers an area of 276,910 ha and has a designated area for urbanization, designed to a population of 1,000,000.

4.3.3 Education

There are many educational facilities, government, religious, and privately owned. Such facilities include nursery schools, several primary and secondary schools, colleges and two universities in Dodoma: [St John's University of Tanzania](#), owned by the Anglican Church of Tanzania, and [University of Dodoma](#), currently with 6,000 students. It is projected to have 40,000 students in three to four years time. Both Universities were officially opened in 2007.

4.3.4 Health and HIV/Aids prevalence

Following trade liberalization, health facilities including dispensaries, health centers and hospitals, as well as government and private facilities, have increased substantially in number. Despite the increased number of the health facilities water borne/related diseases are still prevalent in Dodoma Municipality. The health facilities are government, religious and privately owned.

The threat of HIV/AIDS in the Municipality is high as in elsewhere in the urban centres in Tanzania. The prevalence of the disease in the period of 2005- 008 was as shown below (in percentages)

- 2005/06- 6.7%
- 2006/07- 5.4%
- 2007/08- 4.5%

The number of people infected by HIV/AIDS in the urban is 305 for male and 615 are females and this is for the year 2006. The most affected age group is between 30 -34 years which are 8.3%.

4.3.5 Economic Activities

Given the fact that employment in the formal sector has been drastically reduced through the retrenchment exercise many interviewees who responded to our questionnaires in the project area indicated that few people were salaried employees. The income generating activities of a bigger part of the municipal population is mainly through petty businesses and farming activities, hence, a majority of the municipal population has low income as established by the household survey.

4.3.6 Ethnicity and languages

The sub-project area is populated by the people of different ethnic groups although the original ethnicity groups are the Gogo, Rangi and Sandawe. The area has no Asians such as Arabs and Indians.

4.3.7 Financial status /revenue

Major source of Council's revenue is derived from government transfers and revenue collected from own sources.

Despite the abolition of the so called nuisance taxes, still the Council's trend of revenue collection from own sources has substantially been improved year after year.

The actual collection for the past three years reveals that there is an increase of 41% since 2007/2008 year. In 2007/2008, the Council has managed to collect Tshs. 740,339,457.00 equals to 95% of the planned target of Tshs. 778,682,500.00. In the previous financial year, the Council's target was to collect Tshs.1, 192,323,808.00 Major sources of revenue from own source for 2008/2009.

4.3.8 Industries

The industry sector in the Municipality to date is still improvising due to the fact that there is no major industrial investment that may term the council areas as industrial one.

However, in the recent years the industrial investment trend in the Municipality has fairly changed following the implementation of various strategic plans/programmes. These plans/programmes include, MKUKUTA, ASDP, DADPs DIDF, TASAF fight hunger in Dodoma etc. Following the implementation of these programmes, the severity of food shortage problem in the region has been reduced tremendously. Cash crops have been rejuvenated and its production raised especially grape farming.

New wine factory (CETAWICO) has been opened after the defunct "DOWICO" that stopped its function in late 80'S. Good number of grape farmers has emerged and it is estimated that there are 900 grape farmers with total 1104 ha. In the 2007/2008 season, 524 ha of grape were cultivated and it is estimated that 3,930 tons were produced worth 2 billion at a rate of 500/kg. It is also estimated that wine industry has provided for more than 2,000 employment opportunities. The future expansion of wine industry is promising.

There is also a modern abattoir at Kizota area that slaughter about 170 cattle per day. The main aim of constructing the abattoir was to become a leading meat industry actor in the country and possibly in Africa. The plant also has opened the sheep market after Arabian businessmen started to slaughter 500 sheep per day for oversea market.

The Municipality also has concrete and ceramic industries at Nyankali and Zuzu areas respectively. These industries are especially for material supply to construction works mainly roads and to some extent buildings.

4.3.9 Transport and Transportation

The Dar-es-Salaam to Dodoma was surfaced in the 1980s. In 2005, the Government started improving to tarmac level the remaining portion of east west trunk road, feasibility studies for construction of the north south trunk road is in advanced stage. Also, the study and design of the new airport for Dodoma is in progress. However, the transport network within Dodoma that provides internal access and circulation for all land-use elements in the capital city, such as residential communities and industrial areas is critically poor and inadequate for the growing traffic. Yet, the transport sector forms a good source of employment in and outside town.

The town commuter buses prominently known as "Daladala" are a substantial means of transport for the population of Dodoma Municipality and a source of employment to young people. Another kind of transport are the inter-regional buses and lorries to southern, northern, western, and to the lake zone parts of the country which also constitute a source of employment to many people as well as transportation of goods to and outside Dodoma.

The road infrastructure was dramatically improved during the TSCP program 2010 -2015.

4.3.10 Utilities and Services:

There is a network of water supply connections and sanitation services composed of a central sewer system and septic tank system which empties their septic tanks using Municipal Sludge emptier. Other houses are not connected to the main sewer and do not have flush toilets with septic tanks; these houses use pit latrines. During the site investigations, it was observed that most sub-project roads are passing through human developments with notable above ground and underground public utilities along the roads such as water supply pipes, telephone lines, electricity poles and transformers, etc.

Excavation operations during construction phase without consulting existing utility maps may result in accidental damage to existing utilities as it was experienced during Core TSCP implementation and, that may cause inconvenience to the public. A good coordination with different utility agencies (e.g. TANESCO, DUWASA, TTCL) should be further enhanced and maintained to get details of existing underground utilities before starting rehabilitation and upgrading activities. Provision should be made on early restoration/replacement to avoid social disturbance. For instance, the national optic fiber passes in Dodoma and in some parts close to roads something which should be noted early enough..

4.3.11 Water Supply

Dodoma Urban District (Dodoma Municipality) is endowed with underground water resources and geological data reports reveal that the water table is fairly high in most parts of the Municipality which is 6 meters below the ground level.

Makutupora artesian basin supplies water for the entire Dodoma urban residents and this water source is part of the famous Great Rift Valley basin extending eastwards and connected with lower Ruvu water Basin emptying its water into the Indian Ocean. The main water sources in the Municipality include:

- Deep wells
- Shallow wells
- Springs
- Dams

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 Dodoma 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. The experience from Core TSCP provides a platform to improve the consultation and public participation approaches for the success of TSCP AF implementation.

Public consultations were made so as to:

- Provide clear and accurate information about the Project to communities living in the sub-project area, especially along the proposed road 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 previous TSCP works particularly how impacts were mitigated and;
- How best to enhance peoples participation and involvement.

In the public consultation process the focus was on consulting the municipal council or high level executives and in particular the heads and staff of relevant departments of DMC and the CDA. The affected and beneficially communities were consulted in the initial or main ESIA process. See Figure .

Figure 9: Consultation with senior staff of DMC



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 Table 2.

Table 2: Issues and Concerns as rose during stakeholder meeting for proposed work

Stakeholders/ Ward Officials	subproject/ Impact	Issues of concern/ raised
CDA Team	Storm water	<ul style="list-style-type: none"> – Area A and Hijira are prone to floods therefore storm water management should be taken care in the improvement woks. – There is high water table in some areas such as Waste-gate.
	Dust pollution	<ul style="list-style-type: none"> – Dodoma is in the semi arid and windy zone thus dust pollution is most likely during construction works. – Control dust caused by transportation trucks from borrow pits to construction sites
	Noise	<ul style="list-style-type: none"> – Night works will disturb Dodoma residents
	Vibration effect	<ul style="list-style-type: none"> – Some houses in CDA e.g. Kisasa area are of low quality thus may be vulnerable to vibration effect or cracking during works
	Traffic accidents	<ul style="list-style-type: none"> – Traffic accidents may increase in high density areas such as Chang'ombe especially for motorcycles. – Stock piles if left on Roads for a long time may cause accidents and interfere with traffic and pedestrian movement – Control accidents by construction of bumps.
	Resettlement	<ul style="list-style-type: none"> – People in sites proposed for road/drainage works (Chang'ombe). One house may be affected.
	Interference with business	<ul style="list-style-type: none"> – Most of Roads proposed for improvement are in surveyed area with clearly demarcated road reserve or Right of Way (RoW).
	Soil erosion	<ul style="list-style-type: none"> – Some areas in CDA area are prone to soil erosion. For example Njedengwa area
	Service Utilities	<ul style="list-style-type: none"> – Construction works in Magorofani area may affect utilities (water). – Water supply pipes may be affected in Waste-gate area. – Sewerage pipe starts from Waste gate (positioned 3.m down). – Electricity poles (2) are close to the proposed road. – Optic fibre cable is in Kikuyu area – Show poles that may be affected in Bill of Quantities (BoQ)
	Construction material/ Borrow pits	<ul style="list-style-type: none"> – Sand will be outsourced from licensed individuals.
	Aggregates	<ul style="list-style-type: none"> – Outsource aggregates from licensed people at Chigongwe quarry.
	Local employment	<ul style="list-style-type: none"> – Improvement works should create local employment for men and women.
	Use of local resource e.g. water by contractor	<ul style="list-style-type: none"> – Dodoma has enough water. From DUWASA and Mkalama dam which is owned by village council.

Stakeholders/ Ward Officials	subproject/ Impact	Issues of concern/ raised
Eng. Nchilla – Municipal Engineer Eng. Kilembe- Coordination Engineer for road works	Storm water management	<ul style="list-style-type: none"> – Storm water effect was a concern in Package 1 of TSCP works. – Kerb stones for the control of storm water lacked in some road works. – Storm water affecting business and residential buildings. – Main bus stand is affected by storm water. – Storm water from improved Roads is affecting business e.g. at Bus Stand. – Storm drains were not completed in previous TSCP works. Lack lids /covers. – Some Roads lack culverts. – Flat terrains are vulnerable to storm water effect.
	Interference of people's movement	<ul style="list-style-type: none"> – Rods lack access slabs to houses thus hampering pedestrian movement.
	Roads	<ul style="list-style-type: none"> – Some Roads lack street lights
	Bus stand	<ul style="list-style-type: none"> – Toilets are insufficient at main bus stand. – Shelters are missing at Bust Stand
	Roads and accidents	<ul style="list-style-type: none"> – Roads have insufficient traffic signs especially at crossing areas for students/ school children. – Roads at Market area and Ndovu Road critically requires improvement. – Ndovu Roads serves high population, – Accidents may occur during works. – Carry out awareness raising and – Involve local leaders. – Use warning signs especially for Children
	Dust pollution	<ul style="list-style-type: none"> – Dust pollution is likely to affect population along Ndovu road.
	Business interference	<ul style="list-style-type: none"> – Cover drains to protect people's business
	Utilities	<ul style="list-style-type: none"> – Identify and protect utilities
	Awareness	<ul style="list-style-type: none"> – Provide information to people before and during works
	HIV/AIDS	<ul style="list-style-type: none"> – Continue HIV/AIDS mitigation during execution of improvement works. – Education and awareness is important. – Allocate sufficient budget for HIV/AIDS mitigation. – Involve NGOs and MC departments.
	Business	<ul style="list-style-type: none"> – Proposed works will affect business at central market.
	Environmental mitigation	<ul style="list-style-type: none"> – Assign lump sum budget for environmental mitigation

Stakeholders Consultation July 2016

Dodoma Municipal Council

SN	Name/stakeholders	Views/Concerns
1	Eng Nchila 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 Dodoma Municipal Council 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.
	Mr.MfungoManyama- Community Development Officer Rukia Nyange: Community Development Ward Official	<ul style="list-style-type: none"> The purpose of these meetings is to inform people about the project and that the implementation will take place soon. In terms of business the project will create clean environment especially reduce dust around their business Create temporary employment during the construction period The project will increase the quality of settlement We shall also facilitate to establish a Grievances committee
	Mr. Godson Rugazama Chairperson, businessmen Dodoma Municipal market	<ul style="list-style-type: none"> He advised the constructors to be careful during the construction in order to avoid any effects which can be experienced during the construction.
	Mr Abdallah Diwani Vice chairperson businessmen Dodoma Municipal market	<ul style="list-style-type: none"> This is a very good project as currently the road is a challenge due to dust and mud during rain season
	James Nassoro: Business man	<ul style="list-style-type: none"> Will there be any impact on our kiosks
	Public transporters association in the Nkuhungu (market area)	<ul style="list-style-type: none"> The proposed project will mitigate the long time challenge of the road. Prior to establishing an alternative road to be used during construction phase, the association should be involved

CDA Dodoma

SN	Position/stakeholders	Views/Concerns
1	TSCP-AF Coordinator	<ul style="list-style-type: none"> The project is a continuation of the TSCP that improved various infrastructures within the CDA area For the CDA area, the project will improve storm water drainage to reduce floods; road furniture's to enhance safety and security. We urge locals to accept the project as the purpose is to improve the infrastructures within the CDA area.

2	Public Relation Officer	<ul style="list-style-type: none"> • The purpose of these meetings is to inform people about the project and that the implementation will take place soon. • Create temporary employment during the construction period • The project will increase the quality of settlement • There is a GRM within the CDA to handle any complains arising from this project implementation therefore we argue you to choose your GRC members to facilitate the process
3	Locals in Changombe and Kisasa Ward	<ul style="list-style-type: none"> • We are aware of the proposed project and acknowledge that we have been consulted regarding the proposed project • Any complains raised during project implementation should be handled on a timely manner • Locals should be given priority on employment during construction phase

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, DMC and the CDA have made decisive economic commitments. For example, the developers 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 ESIA was undertaken is an important component of the study. The identification process focused and delineated the additional financing subprojects within an area where impacts both positive and negative will be felt on the environment, economy and the local community. The types of boundaries considered were institutional, temporal and spatial in nature.

Spatial boundaries

Spatial boundaries refer to the area affected by the project. The area of direct impact for the proposed roads and drains will be within the legal boundaries of Road Reserve 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 proposed works 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:	6 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 EIA process.

The institutional framework for environmental management and handling ESIA requirements in the country exists at national, sector, regional, Municipality/ CDA/ 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 – Dodoma Region and Districts/ Municipal Environment Management Committees, Ward Committees and Street Committees.

6.3 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 and, may be **short or long-term, temporary and reversible** or **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'. For the purpose of this assessment, the impacts identified were evaluated to have '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 involved the following:

Impacts identification linked to causes of impacts (cause-effect interactions) and identification that extend in touch with the entire sub-project cycle. However, all valued receptors – physical, chemical, biological, built or human on sub-project site, immediate vicinity or off site locations need 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.

6.3.1 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.

6.4 Positive Impacts during Construction and operation phases

Road

The project will create employment opportunity during the construction phase for unskilled and skilled labour.

Employment impact is therefore, Low to Moderate positive. The effect is spread between construction and operational phases.

Transportation: Road subproject is expected to improve transportation inside Dodoma urban thus boost business and income. This is positive social economic development.

Storm Water 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 Dodoma during rainy season.

Landfill at Chidaya

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 subproject can be characterized as generally having none or low value impact on the natural and social environment. However, it is expected the detailed design will focus on averting impacts. Also, the project will create employment opportunity during the construction phase for unskilled and skilled labour. Employment impact is therefore, Low to Moderate positive. The effect is spread between construction and operational phases.

The summary of impacts and occurrence phase is presented in the **Error! Reference source not found**.below.

Table 3: 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
-------------------------	----------------------------------------------------

However, the overall evaluation of impacts of roads, drainage and landfill is as in the following table;

Impact Assessment/ Subproject	Roads, Storm water drains and landfill
Significance	Low to Moderate Positive
Occurrence phase	Construction and Operation
Area of influence	direct
Permanence (No change, temporary, Permanent))	Long term

6.5 Negative Impacts in construction and operational phases

6.5.1 Climate

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

6.5.2 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 watercourses and water points. Therefore, the construction activities will not divert water from its natural course or source. Hence, the sub-project is anticipated to cause pollution of surface water sources or affect downstream users.

6.5.3 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 sites are categorized for urban infrastructure development or use and have been approved by Municipal authority. Landfill is being developed on sites designated for solid waste disposal with no human settlement. The area around landfill is has poor vegetation, scattered bushes and shrubs or thicket,

Overall, the impact is on natural environment as regard to forest and wildlife is predicted to be **insignificant** or none to the subproject.

6.5.4 Soil erosion

Land clearing during construction phase will disturb the land but not likely to trigger erosion because of flat terrain. Observation indicated no visible evidence of vulnerability to soil erosion on the proposed sites.

6.5.5 Dust and emissions

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 road and storm drains will involve earth works 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.

Overall, the impact as result of dust or emission pollution will be confined to the proposed working sites and within the short period of road and drain 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 follows:

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

6.5.6 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. 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	Storm drains
Significance	Low Negative	Low Negative
Occurrence phase	Construction	Construction
Area of influence	Direct	Direct
Permanence (No change, temporary, Permanent))	Temporary	Temporary

6.5.7 Pollution of ground water by leachate

Wastewater from kitchen or canteen could represent sources for pests (rats, cockroaches) and the spreading of diseases and unpleasant odour. It will be important to ensure that any wastewater generated during construction is properly disposed of. The number of people working at landfill site during the construction phase will probably be small or none thus reducing the risk of this pollution significantly. Most work force will be accommodated in town guest houses and hotels.

The additional cells at Chidaya 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 per the table below:

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

6.5.8 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 road and storm drain works. 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.). The proposed subprojects are not envisaged to set up own workshops, camps and offices. Contractors will operate from rented premises. The impact is considered Low Negative (road and drain). The Evaluation of impacts for the subproject can be presented as follows:

Impact Assessment/ Subproject	Road	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

6.5.9 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 per 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

6.5.10 Storm water

Some part of CDA and Dodoma Municipality are vulnerable to flooding or water logging. Dodoma literally means “sinking waterborg”. These are deemed as flood prone. Some roads have adequate culverts or drainage canals thus spilling water into residential and business properties for example, areas around Chang’ombe Market and Main Bus Stand.

During consultation with stakeholders it was also mentioned that drainage is a problem in some areas. Therefore, storm water and flooding 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 council respectably.

During the operational phase, storm water flows due to clogging or dirty canals and culverts. Clogging of culverts and obstruction in side drains along 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, institutional and business premises 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 end like natural water way.

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

Storm water impact is predicted to occur during the construction and operational phases of landfill cells if careful design and management of storm is not applied by developer and subsequent the Municipal council respectably.

Following vegetation removal, leveling and compaction works at landfill site, the area is likely to generate run-off after rain and if not properly managed it will result to soil erosion.

During the operational phase, storm water flows will occur and may combine with contaminated water as result of leachate presence. Clogging by debris or dirty along drainage ways/canals and culverts around the landfill may aggravate the problem. As result, it will cause flooding of people’s houses, institutional and business premises during rainfall.

The concern with the subproject is on the effect, which may be caused by the subproject development demanding to take necessary precautionary measures. This impact is likely to affect areas around the landfill site. It will take place especially during the peaks of rainfall season.

The impact in the landfill is rated as Low negative and could occur in both construction and operational phases. Storm water effect in the landfill is evaluated as in the table below:

Impact Assessment/ Subproject	Landfill
Significance	Low Negative
Occurrence phase	Operation
Area of influence	Direct
Permanence (No change, temporary, Permanent))	temporary
Reversibility	reversible

However, the impact in roads and drains is rated as Moderate negative (road) and could occur in both construction and operational phases, and especially in the flood prone pockets of the town. Storm water effect is evaluated as per the table below:

Impact Assessment/ Subproject	Road	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

6.5.11 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 all subprojects of road and storm water canals. The impact may affect project and non-project workers. For example unsuspecting people e.g. pedestrians who may be burnt by hot asphalt 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.

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 such roads and storm drains 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, drain) phase. Therefore, as per the table below the impact is ranked as Low to moderate as can be managed through better practices.

Impact Assessment/ Subproject	Road	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

6.5.12 Spontaneous subsurface and subsurface

The release of inflammable gaseous during the decomposition or chemical processes inside cells may result into eruption of fires during operation phase. Methane is produced from anaerobic conditions while waste from burning charcoal or wood may bring fire to the landfill. The burning effect will cause smoke around the landfill and may affect people using the nearby road at the same time cause air pollution. Smoke emission may obstruct motorists

and may cause respiratory problems. The impact is considered Moderate and may continue for some time if not properly mitigated.

6.5.13 Odour

The odour 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 Chidaya landfill. The impact is **low** negative and confined inside and immediate surroundings of the landfill. Odour is not life threatening and can be reversed by proper management of waste at landfill.

6.5.14 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 DMC and the CDA.

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	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

6.5.15 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 shown in the table below:

Impact Assessment/ Subproject	Road	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

6.5.16 Damage to Public Utilities

There is potential risk for disruption of public service utilities of water supply (Figure), optic fiber and power (TANESCO) during excavation of roads and drains. Generally, 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.

Its 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 shown in the following table:

Impact Assessment/ Subproject	Road	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

6.5.17 Disruption of business, pedestrian and vehicular movement

The most eminent risk for proposed improvement works is disruption of business and social services in the Central business District of the CDA or DMC in particular around the main bus stand and central market (Figure and Figure). There are business and social services along roads. For example, shops, booking offices and main bus stand, dispensary and guest houses. Access roads at central market are congested with shops and movement of shoppers. There is interference risk during implementation of works for roads and drains.

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.

Evaluation of this risk can be as follows:

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

6.5.18 Dust and emissions

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 at road and water storm structures will involve earth works 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.

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

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

6.5.19 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 and storm drains. Equipment operating at borrow pit and crusher sites will generate noise nuisance. Evaluation of the impact is presented in the table below:

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

6.6 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.

- d) After removing facilities and clearing all waste and debris, the contractor will rehabilitate the disturbed sites e.g. at landfill and borrow pit sites by contouring, replanting and re-vegetation.

Impacts caused by demolition of camps/ base offices if applicable will generally be small, short lived and localized.

6.7 Analysis of Alternatives

In the course of developing the proposed additional subprojects in the landfill at Chidaya as well as for the roads and storm drains; various alternatives were compared in terms of potential environmental and social impacts; capital and operating costs, availability of Right-of-Way and; suitability under local conditions.

In the course of developing the proposed road sub-projects in the existing routes, various alternatives were compared in terms of potential environmental and social impacts; capital and operating costs, and; suitability under local conditions. Three options were considered:

6.7.1 'No sub-project' option

This additional landfill cell sub-project in Dodoma Municipality is expected to: improve sanitation and public health in the urban setting. The municipal population is growing fast amid absence of adequate and quality road infrastructure.

Choosing the 'no project' option was, from the economic perspective as well as health and social considerations, the following benefits will be realized: i) improved transportation; ii) long life span for roads; iii) employment; iv) low incidence of pollution, diseases and accidents and v) controlled erosion and flooding inside urban areas. For this subproject, the alternative of "no-project" will increase risks on road accidents, flood damages to properties and poor public health and environmental degradation (Malaria prevalence). Hence, the 'no sub-project' option is not a viable alternative.

6.7.2 'Using the existing road and ROW throughout' option

The sub-project investment will comprise the upgrading of the existing gravel and earth surface to tarmac road complete with storm water drains and road furniture. These routes are the only road connections that exist and therefore there are no available alternative routes to be considered and the existing routes were considered to be the only viable alternative.

6.7.3 'Routing the roads through the urbanized municipality' option

This option will entail a new alignment through the built environment. The area has a large number of permanent structures and community facilities. The availability of developed permanent structures provides an unsuitable alternative for this investment sub-project. New alignment through the human settlements is considered more environmentally and socially unfriendly and very costly option. Other reasons that make this option not a viable alternative' are:

- Maximum property loss along this new ROW;
- Less flexibility and freedom in selecting and maintaining a direct (straight) road corridor; and;
- More litigation from contending property owners and tenants.

6 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 subproject 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. Forexample, 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 Site

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 runoff management;
- Management of waste materials (plastics);
- Management and removal of wastes;
- Control of noise and dust;
- Liaison with local community / residents;
- Landscape restoration; and
- Emergency procedures (such as fire and spill response).

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

7.7.1 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 EIA study can be mitigated through adjustments to the design, such as cuts and fill works.

7.7.2 Clearing of natural vegetation

Little natural vegetation may be cleared or removed at proposed sites for 2 landfill cells at Chidaya, roads and storm drains. Therefore, whereby DMC and the CDA are obliged to allow growth of vegetation in the area by tree planting. This will serve as landscape restoration. The developer will plant desirable species in particular those resembling the original ones. However, emphasis will be put on use of indigenous 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.

7.8 Mitigation measures during construction phase

7.8.1 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. However, DMC should design and ensure a fence around the additional cells to control spread of waste especially flying papers. Fence will also bar off scavengers and stray animals from spreading contaminated waste from landfill to people's homes.

7.8.2 Hydrocarbons

During the construction works, heavy duty equipment, 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.

Proposed mitigation measures are;

- Care shall be taken to prevent spillage on haul routes. Any such spillage shall be removed immediately and the area cleaned.

- Store and refuel equipment in secure facilities and containers or designated areas, away from waterways and water sources; and with impermeable concrete floors and covering roofs.
- Provide proper treatment or sell to licensed people.
- Cleaning and maintenance of equipment shall be undertaken in designated areas and in a manner, which prevents or minimizes pollution of waters courses.
- Traps and collection pits must be used to prevent escape of pollutants (oils, hydrocarbons etc.) and consequent pollution of surface and underground water.
- Use tested and approved materials for fuel tanks, well-maintained tanks and the application of good environmental practices can reduce contamination of soils.

7.8.3 Storm water management

Careful design of the works associated with landfill works, roads and storm and any pavement works 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 life, properties, business and housing premises as well as the general landscape. Structures such as road-side drains and culverts should be carefully designed to allow flow of storm water that avoids flooding and associated damages,

The contractor is obliged to direct surface water flow to properly designated channels and existing natural drainage. Sufficient water outlets and discharge points be provided depending on the runoff water from the catchment areas or road surface. Special emphasis will be given to areas with steep slopes as it is at Chidaya landfill site 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.

7.8.4 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 Municipal /CDA roads during construction should be instituted.

The manager for landfill shall develop safety and health guidelines for workers. Induction training should be implemented before commissioning of operational works. The DMC shall provide first aid kits at the Landfill offices and equipment.

To safeguard public health around the landfill, the following measures are important;

- Control pests in particular cockroaches by waste compaction and cover, eliminate water ponds by filling depressions to eliminate breeding sites.
- Control of rats and stray dogs by daily covering of waste, proper compaction and soil mounding.
- Control birds e.g. Indian crows by noise production, distress calls, and use of captive birds of prey shall be used to control birds

7.8.5 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/ roadway. 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 shall take account of safety concerns especially at human habitation crossings e.g. installation of bus stops at settlement canterers.

Speed bumps/ Signboards will be necessary in controlling the speed of vehicles especially close to site. 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.

7.8.6 Spread of social illnesses

Since construction works will attract job seekers and trade mongers, the contractor shall enforce a code of conduct in the camp to encourage respect for the recipient community.

The contractor shall employ locally available labour to reduce risk of spreading of social or 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 CDA 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.

7.8.7 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;
- Putting in place all important infrastructures and supporting materials to avoid unnecessary accidents and consequential injuries and fatalities; and
- Use of high efficiency vehicles for transportation of raw materials and products and measures against dust pollution and accidents prevention.

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 inTable .

Table 4: 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

7.8.8 Protection of public Utilities

There is a need to observe the following;

- Proper design to safeguard utilities of TANESCO, Optic Fiber, oil, water supply pipes and other utilities; and
- Sharing of design information with local leaders and owners of utilities.
- Prompt replacement of severed services or payment of compensation.

7.8.9 Disruption of business and vehicular movement

The construction works for roads and storm drains 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 about road diversion to avoid confusion.
- 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 and road side canals, the developer shall drainage crossings to 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.

7.9 Resettlement

The assessment revealed that there are **no resettlement issues on all the sites designated for additional subprojects** improvements. Therefore, a Resettlement Action Plan (**RAP**) **has not prepared for the proposed additional works**. Works will be confined within legal boundaries of the facilities Right of Way (RoW). Therefore, the design team will avoid interference with any property especially along the proposed storm drain canal.

The risk of relocating a house at Chang'ombe along the storm drain was resolved by re-alignment the drain to a new path to empty into a nearby culvert and, therefore, leaving away the house. As such, DMC and the CDA and will collaborate with contractors to resolve any unforeseen disputes or misunderstandings based on the existing regulations.

Land for the Landfill at Chidaya under the Dodoma Municipal Council has already been acquired and a RAP prepared and implemented; however, this ESIA noted that one of the landfill cell has been located at the edge of the landfill, this will require additional land take to accommodate the buffer zone. Therefore the DMC will acquire the land as per the TSCP-AF RPF and then later update the RAP report for the landfill.

7.10 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;

7.10.1 Servicing roads and drains

On a routine basis or a special occasion, road and drainage infrastructure facilities will be cared of by:

- Replacement of accident warning signs
- Regular cleaning of water drains
- Unblocking of culverts

7.10.2 Ground water pollution due to leachate

Pollution of underground water resource by leachate at landfill can be avoided by the following measures;

- Careful design of leachate evaporation pond and
- Construction of leachate collection system/ pipes
- Application of liners to intercept leachate
- Construction of storm drain to collect polluted surface runoff
- Construction of leachate pond for treatment system to treat leachate.

Under the new management for the redesigned landfill, waste will be placed into 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.

7.10.3 Odour management

Odour will affect landfill area and its surrounding. The developer shall ensure the following;

- Choose working hours and use larger vehicles to reduce odour nuisance.
- Proper management of waste at the landfill. In particular, the application of daily cover soil to prevent odour emission and airborne waste
- Application of mobile fence to reduce windblown odorous waste
- Sorting of waste at source to remove/ identify easy decomposing waste that can be turned into compost manure.
- Employment safeguard

The developer is advised to open a recruiting office for job seekers away from the site to minimize influx of job seekers.

In order to counter the worry over job restriction to local people, the developer is bound to implement measures that will safeguard local employment.

7.10.4 Management of solid waste

Measures will include separation collection of materials suitable for recycling and composting. Other non hazardous wastes have to be deposited at specific landfill sites already used for this purpose in compliance with Tanzanian regulations.

Contaminated soil and materials will be separated, contained and properly disposed of. It is important to irrigate loose waste to prevent waste going airborne especially for light paper material. Protect animals and scavengers from entering the site by fencing.

7.10.5 Fire protection in landfill cells

Landfill managers are obliged to do the following to prevent fire at landfill;

- a) Observe OSHA guidelines regarding fire protection.
- b) Install fire warning signs at landfill
- c) Monitor and extinguish fire promptly
- d) Forbid use of fire for cooking/ cigarette smoking at landfill
- e) Conduct regular fire control exercises
- f) Provision of fire extinguishers

7.10.6 Management of Occupational health

The following measures are important to safeguard workers health at work site;

- Adhere to OSHA provisions applicable for employment and work sites
- Provision of health education and training to landfill personnel.
- Provision of PPEs (boots, gloves, and helmets)
- Provide adequate fire extinguishers
- Proper servicing and maintenance of landfill equipment and tools.
- Provision of safe drinking water.
- Provision of first aid kits at working sites /inside equipment,

7.11 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.

Table 5: Summary of Mitigation Measures for landfill

Topic	Predicted Impact/ activity	Impact phases	Mitigation Measures
Noise pollution	Construction works will disturb neighbours/ public by creation of noise.	Construction	Observe ambient sound levels and attenuate equipment. Observe noise limits during procurement of equipment. Awareness creation
Air pollution by dust /emission	Air pollution by dust and smoke.	Construction and Operation	Watering and covering of earth materials Immediate treatment of waste at landfill by or covering by soil/sand. Proper management at landfill
Odor	Creation of nuisance odor from landfill	Operation phase	Sorting of waste Proper management of waste at landfill
Health and spread of diseases	Scavengers, Pests and animals at landfill will spread diseases.	Operation	Fencing of landfill Proper landfill management
Spread of social diseases(HIV/AIDS)	Risk for spreading of communicable diseases / HIV/AIDS	Construction	Awareness creation Counseling and testing Involvement of Municipal HIV/AIDS committee.
Occupational Health and safety	Work place safety and health related impacts	Construction & Operation	Adhere to OSHA* and contractors regulations. Practice safety and Health measures/policy. Regular maintenance of equipment and use of

Solid waste	Haphazard disposal of solid waste e.g. plastics Scavengers, animals and wind will spread waste at landfill to neighborhood.	Construction Operation	Proper handling of waste by installation of facilities for solid. Fencing of landfill and solid waste collection centers Fence landfill to control airborne waste, scavengers and stray animals.
Fire protection	Spontaneous fire eruption at landfill by gaseous material	Operation	Training and warning signs. Provide fire extinguishers
Hydrocarbon pollution	Poorly handling of waste oil and hydrocarbons at workshop.	Construction	Proper maintenance of equipment and plant. Proper Collection, storage and disposal of hydrocarbons
Soil erosion	Excavation works may trigger soil erosion on sloping ground around the landfill		Proper design. Confine works to design borders. Stabilizations of slopes and Restoration of landscape.
Employment	The project will create temporary and permanent employment. During operation landfill will create permanent employment for workers and managers	Construction & Operation	Encourage gender/ local employment. Liaise with local leaders in recruitment of workers.
Solid waste	Haphazard disposal of solid waste e.g. plastics Scavengers, animals and wind will spread waste at landfill to neighborhood.	Construction Operation	Proper handling of waste by installation of facilities for solid. Fencing of landfill and solid waste collection centers Fence landfill to control airborne waste, scavengers and stray animals.
Fire protection	Spontaneous fire eruption at landfill by gaseous material	Operation	Training and warning signs. Provide fire extinguishers
Hydrocarbon pollution	Poorly handling of waste oil and hydrocarbons at workshop.	Construction	Proper maintenance of equipment and plant. Proper Collection, storage and disposal of hydrocarbons
Soil erosion	Excavation works may trigger soil erosion on sloping ground around the landfill		Proper design. Confine works to design borders. Stabilizations of slopes and Restoration of landscape.
Employment	The project will create temporary and permanent employment. During operation landfill will create permanent employment for workers and managers	Construction & Operation	Encourage gender/ local employment. Liaise with local leaders in recruitment of workers.

7.12 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.

7.13 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 in Table 6:.

Table 6: Summary of Mitigation Measures for Roads and Storm Drains

Topic / Impact	Predicted Impact/ activity	Type of works (Road =R, Drains= D)	Impact phases	Mitigation Measures
Loss of trees	Some valuable plants will be destroyed along roads to give way for construction works..	R, D	Construction	Proper design to minimize impact.
Noise pollution	Construction works will disturb neighbours/ public by creation of noise.	R, D,	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.	R, D,	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	R.	Construction	Awareness creation Counselling and testing Involvement of Municipal HIV/AIDS committee.
Traffic Accidents	Interruption of traffic and pedestrian movement by project activities. Reckless driving	R,	Construction & Operation	Careful design Awareness creation Use sign/warning materials. Bumps to slow down speeding vehicles.
Disruption of business, traffic and pedestrian movement	Road and drains works will interfere with normal traffic flow and pedestrian movement. Overstay of stock piles along roads	R, D	Construction	Awareness creation. Prompt spreading of stock piles along roads Provide access slabs and crossings to properties.
Occupational Health and safety	General construction works. Possible burning accidents by hot asphalt. Accidents related to running of solid waste equipment	R, D,	Construction & Operation	Adhere to OSHA* and contractors regulations. Practice safety and Health measures/policy. Regular maintenance of equipment

Solid waste	Haphazard disposal of solid waste e.g. plastics	R	Construction Operation	Proper handling of waste by installation of facilities for solid waste facilities.
Damage to houses due to vibration	Movement and compaction of compactor and roller will house walls by causing cracking. Vibration effect will impact drivers/ users of equipment	R	Construction	Attenuate equipment. Awareness raising Stick works I the design boundaries
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.	R, D	Construction & Operational	Careful road design. Regular road maintenance to unblock culverts and drainage canals. Awareness creation.
Damage of Road Utilities.	Improvement works may sever water pipes/DUWASA, Optic fiber and power/ TANESCO.	R, D	Construction	Careful design of Infrastructures to include layout for water, communication cables and power and other utilities. Replacement/compensation for damaged utilities
Soil erosion	Excavation works may trigger soil erosion on sloping ground.	R, D		Proper design. Confine works to design borders. Stabilizations of embankments and Restoration of landscape.
Employment	The project will create temporary and permanent employment.	R, D	Construction	Encourage local employment. Liaise with local leaders in recruitment of workers.

8 ENVIRONMENTAL AND SOCIAL MANAGEMENT

8.1 Personnel and Capacity Enhancement

The environmental sustainability of the roads, landfill and storm drains additional investment sub-projects is 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 DMC and the CDA allocate sufficient resources for training and capacity building. These efforts will not only benefit the authorities, 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 NGOs, DMC and CDA. 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. The DMC and the CDA were found to have a very limited institutional capacity to implement the provisions of the ESMP, especially regarding the municipal solid waste management sub-project. Although general awareness on environmental issues exists within the municipal council and CDA 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, DMC and CDA management. The DMC's and the CDA Environmental and social experts should be exposed to short-term and long-term training in the management of environmental and social 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 enhancement strategy is included in the overall cost for implementing the ESMP and Monitoring Plan as shown in Tablesand.....

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: CDA and DMC Engineers, Environmental, Community development Officers, 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
Participants	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 I 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 management • Road management technics • 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 • Preparation of roads/storm drains management byelaws
Responsibilities	DMC andCDA 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; Response and risk control; Propagate monitoring forms and guide how to fill in the forms and risk report; Preparation and submission of reports Other areas to be determined.</p>
Responsibilities	DMC and CDA with facilitation ofthe World Bank
Target Groups	Local communities/ stakeholders, CDOs, Health Officers and road/ urban infrastructure technicians/ Engineers

Course Title	Environmental sanitation and safety
Participators	Representatives of community and/or worker leaders (as appropriate)
Training frequency	Bi-monthly 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 DMC and the CDA

8.1.2 Grievance Management

The development of additional landfill cells, roads and storm water drains will result into preparing a Resettlement Action Plan (RAP). Hence, resettlement grievances or disputes are envisaged regarding compensation and valuation procedures for land and other individual properties will be addressed according to the available rules. **However, a similar arrangement of using the existing Dispute Desk will be devised at DMC through to subproject Wards and the CDA involving representatives from subproject areas to respond to any environmental grievances which may arise during implementation and operation.**

However, the risk of relocation of a house at Chang'ombe along a storm drain was resolved by realigning the position of the proposed drain and, instead the drain was diverted to route towards a nearby culvert.

The contractor and DMC or the CDA will resolve any arising complains during project construction, related to work implementation such as compensation for loss or damage of individual or institutional properties.,

8.2 Environmental and Social Management

The purpose of the ESMP is to describe in detail, necessary actions to be taken to ensure that serious impacts will be mitigated. Where impacts cannot be mitigated, compensation will be paid, as well as any environmental enhancement activity that will be required to offset, where possible, those impacts that cannot be mitigated.

This ESMP provides a schedule for the implementation of recommended mitigation activities. The responsibility for implementing the ESMP of the supplement ESIA during construction will be of DMC and the CDA. During operation and maintenance of the urban works, the responsibility will be mainly under the Municipal Council.

To a considerable degree, construction 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 DMC and the CDA. Most of the predicted impacts can be reduced or avoided through the application of sound construction management guidelines. Construction contracts will require all qualified bidders to include environmental management plans as a part of their submitted bids. The additional costs of these plans cannot be predicted at this time, but they are considered an integral part of total project costs.

The following table shows environmental and social management plans for proposed works for road and storm drain in 7 and 8 respectively.

Table 7: ESMP for roads, storm drains and street lights

Project Impact/ Phase	Mitigation or Enhancement Measures	Measurements units/ Standards	Timing	Responsible Implementing Agency	Cost Estimate (Tsh) '000
<i>Pre-Construction Phase</i>					
Dust	-Control ambient air quality especially dust level. -Scheduling of dusty activities -Provide PPEs during mobilization phase	PM: Not to exceed 250mg/Nm ³ (24h mean value (Tanzania) for Dust. Use Specification for road works in Tanzania (2000) or roads Management Regulation (2009).	Mobilization phase	Construction Contractor (CC) / Resident (supervising) Engineer	Part of contract sum
Noise pollution	-Control noise levels during mobilization phase -Scheduling of noisy activities -Provide PPEs -Careful selection of equipment / servicing	dBA for Noise and. Use WHO and Tanzania standards. Max 85 dBA/ 8 hr day time	Mobilization phase	CC/ RE	Part of construct sum
Implementation of Environmental	-Prepare revised Environmental		Before works		3500

Project Impact/ Phase	Mitigation or Enhancement Measures	Measurements units/ Standards	Timing	Responsible Implementing Agency	Cost Estimate (Tsh) '000
Management Requirements	Management Plan and submit to supervising Engineer.				
<i>Construction phase</i>					
Solid waste disposal	<p>-Comply with environmental requirements and roads specifications/ Management Regulation</p> <p>-Provision of solid waste/ collection facilities</p> <p>-Proper handling of Solid waste as per Roads Management Regulations (2009)</p>	WHO standards for liquid waste pollution	Throughout construction phase	<p>Dodoma Municipal Council (DMC) / Municipal Environment Management Officer (MEMO)</p> <p>CDA PO-RALG</p>	Part of contract sum
Storm Water management	<p>-Proper engineering design. Flood prone area; Waste gate, Area A and Hijira area..</p> <p>-Proper control of storm water and discharge to proper or designated ends</p> <p>-Liaison with LGAs and local leaders in identifying high water table</p>	Use Specification for road works in Tanzania (2000) or roads Management Regulation (2009)./ World Bank Works	During rainy season	<p>CC/ Resident Eng.</p> <p>Dodoma Municipal Council (DMC) / Municipal Environment Management Officer (MEMO) and CDA</p>	2000

Project Impact/ Phase	Mitigation or Enhancement Measures	Measurements units/ Standards	Timing	Responsible Implementing Agency	Cost Estimate (Tsh) '000
Occupational Health and safety	<p>areas.</p> <ul style="list-style-type: none"> -Comply with OSHA requirement/ regulation. -Provision of PPEs (e.g. helmet, boots and ear plugs) 		Throughout construction phase		Contractual budget
Social diseases (HIV/ AIDS)	<ul style="list-style-type: none"> -Awareness raising by cinema. Flies and meetings -Training and counseling -Condoms distribution 		Every 2 month in construction phase	CC/ DMC/ HIV/AIDS coordinator/ Community and Social Department of MC. Municipal HIV/AIDS Testing and counselling Committee (MHTC)	8,000
Traffic Accidents	<ul style="list-style-type: none"> -Awareness creation and warning signs. Sensitive in dense populated are – Chang'ombe suburb -Speed limits (Bumps) -Prepare Traffic management Plan -Proper Design 		Throughout construction phase	Developer (Design Engineer)/ CC/ Traffic Police	3000
Damage to utilities	<ul style="list-style-type: none"> -Carefully design and involve utility companies. -Identify water, 	Use Specification for road works in Tanzania (2000) or	Throughout construction phase	Developer/ CC/ DUWASA	15,000

Project Impact/ Phase	Mitigation or Enhancement Measures	Measurements units/ Standards	Timing	Responsible Implementing Agency	Cost Estimate (Tsh) '000
	<p>optic fibre (Kikuyu area & area A), Sewerage pipes and power supply utilities.</p> <p>-Prompt replacement of severed services</p>	Roads Management Regulation (2009).			
House damage due to Vibration	<p>-Advance notice to local communities</p> <p>-Proper attenuation of equipment</p> <p>-Proper location of quarry sites</p>	Use Specification for road works in Tanzania (2000) or Roads Management Regulation (2009).	Monthly	Developer/ CC	5,000
Dust/ Air pollution	<p>-Daily watering of loose soils or stock piles</p> <p>-Awareness and information about dusty activities and risks</p> <p>-Provide dust masks</p>	<p>PM: Not to exceed 250mg/Nm³ (24h mean value (Tanzania) for Dust</p> <p>/ Use World Bank / WHO/ Tanzania standards</p>	Monthly	Developer/ CC	Part of contract sum
Noise pollution	<p>-Attenuate and repair noise equipment</p> <p>-Awareness and information about noise activities</p> <p>-Complies with noise standards</p>	Max 85 dBA/ 8 hr day time		Developer/ CC	Part of contract sum

Project Impact/ Phase	Mitigation or Enhancement Measures	Measurements units/ Standards	Timing	Responsible Implementing Agency	Cost Estimate (Tsh) '000
Disruption of business, pedestrian and vehicular movement	-Prepare traffic management plan -Provide temporary access and notifications -Early notice to users before interruption	Use Specification for road works in Tanzania (2000) or Roads Management Regulation (2009).	Monthly	Developer/ CC	1500
Employment opportunity	-Transparency on employment opportunities -Liaise with local leaders in employment		Monthly	Developer/ CC/ local Governments	500
<i>Operation phase</i>					
Traffic accidents	-Awareness raising about traffic accidents -Roads / Traffic signs -Speed limit structures such as Road Bumps/ humps		Bi annual	DMC / Traffic police	DMC operational budget
Storm water management	-Management of culverts and drainage ways by e.g. unblocking and regular cleaning		Every rain season	DMC/ MC Engineer	
Sub Total					38,500

Table 8: ESMP for Storm Drains

Project Impact	Mitigation Measures	Standards	Timing	Responsibility	Cost (Tsh) '000
Pre-construction phase					
Preparation / review of ESPM	-Mitigation of environmental and social effects -Observe EIA and Audit regulation (2005)		Before construction works	CC and RE r	2000
Compensation for any affected properties or business	-Payment for planted trees and valuable plants -Payment for disturbed business or kiosks		Before construction works	Developer / DMC	2000
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	CC/ RE DMC/ Municipal Health Officer/ MC Environmental Officer	Part of contract sum
Noise	-Public information -Provision of PPEs	Max 85 dBA/ 8 hr day time	Throughout construction phase	CC/ RE and DMC	Part of contract
Occupational Health and safety	-Comply to OSHA regulation / requirement -Provision of PPEs -Training and awareness about risk activities		Weekly	CC/ RE DMC/ Municipal Health Officer/	Contractual sum
Disruption of business and services	-Public information around Central market, main bus stand and medical services. -Scheduling of		weekly	CC. DMC/ MC Engineer	

	works to minimize business disturbance				
Disruption of utilities	<p>-Carefully design and involve utility companies.</p> <p>-Identify water pipes (DUWASA), optic fibre (Kikuyu area & area A), Sewerage pipes and power supply utilities.</p> <p>-Prompt replacement of severed services</p>		Before works and in daily works	DUWASA, MC,	3,000
Traffic accidents	<p>-Roads sign at working site</p> <p>-Comply to road traffic rules</p>		Monthly	Traffic Police DMC/ CDA	4,000
Loss of planted trees	<p>-Avoid unnecessary tree cutting</p> <p>-Stick to engineering design</p> <p>-Pay compensation according to law</p>		Before the start of construction phase	Developer (PO-RALG) / DMC/ Municipal Environmental Management Officer (MEMO)	
Operation phase					
Lack of access to properties	<p>-Construct slabs to all houses and business</p> <p>-Design and budgeting</p>		Before handover	CC/ RE	Part of contract sum
Sub-Total Cost					11,000

Table 9: ESMP for Chidaya landfill, Dodoma

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
<u>Construction Phase</u>					
Noise pollution	-Careful scheduling of noise activities -Provide PPEs	Noise: Max 85 dBA/ 8 hr day time	Throughout construction phase	CC Resident Engineer (RE)	Contractual budget
Dust pollution	-Irrigation to reduce dust pollution -Provision of PPEs -Cover truck loads / stock piles	Dust: PM: Not to exceed 250mg/Nm ³ (24h mean value (TZ) for dust	Throughout construction phase	CC/RE	
Traffic accidents	-Accident warning signs. -Awareness raising for drivers -Proper servicing and maintenance of vehicles -Construct		Throughout construction phase	Traffic Police DMC/ CDA	500

Project Impact	Mitigation Measures	Standards	Timing	Responsibility	Cost (TAS) '000
	speed limit bumps				
Social diseases (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	DMC/ MC HIV/AIDS coordinator/ Municipal HIV/AIDS Testing and counselling Committee (MHTC)	3000
Liquid and solid waste disposal	<ul style="list-style-type: none"> -Ensure that the contractor complies to environmental requirements -Provision of solid waste/ garbage collection facilities at all construction sites -Proper handling of waste water at base camp, crusher/ asphalt plants, workers camp and contractors office. -Provide adequate sanitary facilities at camps/ offices including shower and toilets 		Twice in construction phase	Dodoma Municipal Council (DMC) / Municipal Environment Management Officer (MEMO) CDA	Part of contract sum

Project Impact	Mitigation Measures	Standards	Timing	Responsibility	Cost (TAS) '000
	<ul style="list-style-type: none"> -Proper handling of Liquid and Solid waste. -Management of sewage is via the existing system Works 				
<i>Operation phase</i>					
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. 		Every 5 years	NEMC/ DMC	Part of operational budget
Odor pollution	<ul style="list-style-type: none"> -Proper management of landfill. For example by -Covering waste with soils to reduce odour, 		Throughout in operation phase	DMC	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 		Routine activity	DMC/ Municipal Health Officer/ Landfill Manager	MC operational Budget

Project Impact	Mitigation Measures	Standards	Timing	Responsibility	Cost (TAS) '000
	<p>covering waste with food material.</p> <p>-Reduce spreading of litter by soil mounding and fencing</p> <p>-Proper management of landfill e.g. compaction and soil mounding</p>				
Smoke emission as result of burning	<p>-Proper management of Chidaya landfill by compaction of waste,</p> <p>-Fire control by soil mounds</p>		Routine	DMC/ Municipal Health Officer/ Landfill Manager	MC operational Budget
Solid waste pollution	<p>-Pre-sorting at source to isolate plastics and other solid material</p> <p>-Control flying papers by fencing and compaction</p> <p>-Planting of vegetation around the landfill provides wind barriers to help control dust and minimize blowing litter.</p> <p>-Control scavengers by fencing</p>		Throughout operation phase	DMC/ Municipal Health Officer/ Landfill Manager/ MC Environmental Officer	6,000 For tree planting and tending.
Sub Total					12,900

8.2.1 ESMP Costs

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 TShs38.0 Mio for roads, TShs 11.0 Mio for storm drains and Tsh 12,9Mio for two landfill cells. This cost structure will be further refined during implementation. For example, for the determination of training needs, DMC and the CDA will have to identify the type and number of beneficiaries, type of the training needed and where this training will occur and at what cost.

8.3 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 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 the developer (DMC and the CDA) and the National Environment Management Council (NEMC).

Table 10: Environmental Monitoring Plan for Roads and Storm Drains

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	1,150
Social Diseases (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 counseling Committee (MHTC)	Project area	Establish database	4,600
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	1,150
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-EU) 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/Nm3 >15min (Tz)				
Solid waste management	No. of dustbins, extent of haphazard disposal. Availability of disposal sites. Recorded complaints	Every 3 months		Contractor, Supervisor, NGOs	Project sites	Report	2,300
Traffic Accidents	Monitor construction and efficacy of road humps. Speed control Awareness creation Erection of warning sign boards. Record keeping	Every 6 months	Reported cases of accidents (fatal, injuries, near miss)	Contractor, Supervisor, Traffic Police	Project Roads	Report	1,400
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	600
Social diseases (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 and villages	Reporting	4,150

Phase or Aspect	Monitoring Parameter	Monitoring Frequency	Standards	Responsible	Measurement Area	Action	Costs Estimate (TAS) '000
Operation Phase							
Human safety (to prevent occurrence of accidents in the project area)	Cases of road accidents Cases of occupational accidents for maintenance workers. Monitor efficacy of road humps. Speed control, Monitor signboards.	Every 3 months		Contractor, Supervisor, Districts, Traffic Police	Project sites	Reporting	1,150
Storm water management	Annual report and blocking of drainage – number of cases. Number of houses and properties damaged by storm water.	After every rainy season	Identified and reported cases	PO-RALG, Municipal Authorities	Settlements	Carry out inspection before and after rainy seasons.	500
Total							17,600

9 DECOMMISSIONING

9.1 Management of decommissioning activities

Decommissioning of road and drains 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 life span for road and drains is more than 20 year. 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 affect the environment negatively are;

- Re-alignments road route
- Demolition works of bridges, road side drains and road furniture
- Removal of existing road surface
- Compaction, grading and resurfacing

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

Overall, the 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. The developer is advised to seek or incorporate the service of qualified engineers for roads and storm water drain and environmental experts.

10 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 Dodoma Municipality. 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 community of the municipality..

Predicted impacts shall be managed through the proposed mitigation measures and implementation regime laid down in this ESIA. DMC and the CDA are 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:



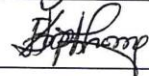

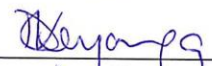


- Proper design to accommodate measures for, storm water effects and soil erosion and slopes destabilization.
- Measures to safeguard job opportunities and gender balance.
- Measures to encourage local employment.
- Mitigation measures against workplace health and safety
- Measures against noise and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

LIST OF CONSULTED PERSONS

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

LGA/ City/ Institution: DODOMA M.C.

List and Signatures of persons Consulted

SN	Name	Title / Organisation	Telephone No.	Signature
01	ENG. JOHN M. NCHILLA	MUNICIPAL ENGINEER	0767 390681	
02	Eng. LUSAKO KILEMBE	Component 1 Coordinator	0767 828107	
03.	Euphresia Anthony Byangaba	Dodoma Municipal Social Welfare officer	0782 807304	
04	MLANYA MAURICE OURE	REVENUE ACCOUNTANT	0755 994250	
05	DAISY G. KANYANGA	CHAC -DODOMA MC	0754 948423	
06	RUKIA. D. BAKARI	ACTING MUNICIPAL ECONOMIST	0717 129221	
07	JOHN S. LUGENDO	HEALTH OFFICER	0784928379	

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

LGA/ City/ Institution: CDA - DODOMA

List and Signatures of persons Consulted

SN	Name	Title / Organisation	Telephone No.	Signature
1.	Ibrahim M. Ngwada	Ag. Director of Engineering	0713 265 454	
2.	Yahaya H. Kilungu	Civil Engineer - CDA	0784 310350	
3.	JONAPHRY RWABABABO	ARCHITECT - CDA	0786-622198	
4.	EMANUEL MANJANGA	CIVIL ENGINEER	0714-275788	
5.	TOM E. KIWELE	Ag HEAD OF DESIGN DIVISION	0786151666	
6.	YUSUF M. NGUZU	ARCHITECT - CDA	0713513336	
7.	SALVATORY S. MASHAMBA	Ag. HEAD OF FOREST DIVISION	0755-280112	
8.	ANKASTAS SALLAMANI	SMGC	0784-446021	
9.	Angele Mrimba	PRO	0713 - 701953	