Environmental and Social Impact Assessment Project Report for the Construction of Tala Township Roads in Machakos County of Nairobi Metropolitan Region

REPUBLIC OF KENYA

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT PROJECT REPORT FOR THE CONSTRUCTION OF TALA TOWNSHIP ROADS IN MACHAKOS COUNTY OF NAIROBI METROPOLITAN REGION

GPS Coordinates: Latitude: -1.26489   Longitude: 37.32058

April 16, 2019

PROPONENT
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Ministry of Transport, Infrastructure, Housing and Urban Development, State Department of Housing, Public Works and Urban Development,
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Certificate of Declaration and Document Authentication

This document has been prepared in accordance with the Environmental (Impact Assessment and Audit) Regulations, 2003 of the Kenya Gazette Supplement No.56 of 13th June 2003, Legal Notice No. 101.

This report is prepared for and on behalf of:

**The Proponent**
The Senior Principal Superintending Engineer (Transport),
Ministry of Transport, Infrastructure, Housing and Urban Development,
State Department of Housing and Urban Development,
P.O. Box 30130-00100,

**Nairobi - Kenya.**

Designation  ________________________________

Name  ________________________________

Signature  ________________________________

Date  ________________________________

**Lead Expert**

Eng. Stephen Mwaura is a registered Lead Expert on Environmental Impact Assessment/Audit (EIA/A) by the National Environment Management Authority –NEMA (Reg. No. 7284), confirms that the contents of this report are a true representation of the Environmental & Social Impact Assessment of the proposed Construction of Tala Township Roads in Machakos County. This report is issued without prejudice.

Lead Expert – Eng. Stephen Mwaura

Signature: ________________________________

Date: ________________________________
### ACRONYMS

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<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>DOHSS</td>
<td>Directorate of Occupational Health &amp; Safety Services</td>
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<tr>
<td>DONMED</td>
<td>Directorate of Nairobi Metropolitan Development</td>
</tr>
<tr>
<td>EA</td>
<td>Environmental Audit</td>
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<td>ESIA</td>
<td>Environmental &amp; Social Impact Assessment</td>
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<td>EHS</td>
<td>Environment, Occupational Health and Safety</td>
</tr>
<tr>
<td>EMCA</td>
<td>Environmental Management &amp; Coordination Act, 1999</td>
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<td>ESMMP</td>
<td>Environmental and Social Management &amp; Monitoring Plan</td>
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<tr>
<td>EMS</td>
<td>Environmental Management System</td>
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<td>ISO</td>
<td>International Standards Organizations</td>
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<td>MoTIH&amp;UD</td>
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<td>NaMSIP</td>
<td>Nairobi Metropolitan Services Improvement Project</td>
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<td>NEMA</td>
<td>National Environment Management Authority</td>
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<td>NMT</td>
<td>Non-Motorized Transport</td>
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EXECUTIVE SUMMARY

1. Introduction

This Environmental & Social Impact Assessment (ESIA) report was prepared as per the provisions of the Environmental Management and Coordination Act No. 8 of 2015, and the Environmental Impact Assessment Regulations 2003. It is also in line with the World Bank Safeguards Policies, OP4.01 (Environmental Assessment). These safeguard policies are a set of instruments to ensure that the Bank supported lending operations minimize any adverse impacts on local people, their livelihoods, culture and the environment and are a mandatory mechanism for evaluating Bank financed projects during design, implementation and completion, mainly through environmental and social impact assessments. This Project Report gives the findings of the Environmental and Social Impact Assessment Study undertaken as an integral part of the design and construction process. The project highlights salient social, economic and environmental issues associated with the design, construction and operational aspects of the proposed Tala Township Roads in Machakos County of the Nairobi Metropolitan Region.

2. Scope of the Project Report

This Environmental & Social Impact Assessment (ESIA) project report was prepared as per the provisions of the Environmental Management and Coordination Act No. 8, 2015 and more specifically to Environmental Impact Assessment Regulations 2003. It is also in line with the World Bank Safeguard Policies and specifically OP4.01 (Environmental Assessment). These Safeguard policies are a set of instruments to ensure that the Bank supported lending operations minimize any adverse impacts on local people, their livelihoods, culture and the environment and are a mandatory mechanism for evaluating Bank financed projects during design, implementation and completion, mainly through environmental and social impact assessments. The study process leading to this project report was further designed to address client expectations as stipulated in the Terms of Reference.

3. Objectives of the Project Report Study

The main objective of the study is to identify environmental and social impacts associated with the proposed construction of Tala Township roads and to recommend an appropriate environmental and social management strategy for the project. Thus, a core outcome of the study is an Environmental and Social Management and Monitoring Plan (ESMMP) for the project.
4. Study Approach and Methodology

Our investigation examined the potential impact of the project on the immediate surroundings with due regard to all the phases from construction through to completion and operational phase. It encompassed all aspects pertaining to the physical, ecological, socio-cultural, health and safety conditions at the site and its environs during and after construction. The study was based on laid down scientific qualitative procedures with the most recent methodologies and analysis required in ESIA and, strictly adheres to the relevant legislative framework governing the construction of roads. Where possible, the ESIA team will provide annexes such as location map and sign-in sheets and questionnaires for public participation and consultation to support the findings or show the depth of the investigations. This report also provides photos of the proposed site. The systematic investigative and reporting methodology specified for conduct of project report studies (Legal Notice 101 of EMCA) was adopted in this study. Baseline data on project design was generated through discussion with the client and review of project documentation. Opinions formed were revalidated through field work entailing site investigations and interviews with potentially affected people and secondary stakeholders. To identify, predict, analyze and evaluate potential impacts that may emanate from the project, diverse study methods and tools including use of checklists, matrices, expert opinions and observations were employed. An Environmental and Social Management and Monitoring Plan (ESMMP) comprising of an impact mitigation plan and modalities for monitoring and evaluation were then developed to guide environmental and social management during all phases of project development. Once approved by the World Bank and NEMA, the Project Report will be disclosed as required.

5. Policy, Legal and Regulatory Framework

This Project Report has been developed to ensure that the proposed construction of the bus park is in conformity with national policy aspirations towards securing sustainable development. Specifically, this report has been developed to ensure compliance with requirements of the Environmental Management and Coordination Act (EMCA) 2015-Kenya’s supreme environmental law and the National Constitution. Section 58 of EMCA requires that all proposed development in Kenya to be subjected to environmental impact assessment and to be conducted in line with the Second Schedule (of EMCA) and the Legal Notice 101 (Regulations for Environmental Assessment and Audit) of June 2003. The entire study process has been designed
to conform to the regulatory framework stipulated by the National Environment Management Authority (NEMA)-the body that will review this report and make decisions on grant of an environmental license to the development.

6. Project Description
The proponent aims to construct selected roads in Tala Township of Machakos County. The design for the works will include upgrading to bitumen standards selected roads within the township coupled with other ancillary works – improvement of drainage, street-lighting, provision of non-motorized transport facilities and construction of road junctions abutting to these roads. The proponents are required to present this report in order to comply with the Environment Management Co-ordination Act 1999 and in particular part II of the Environmental (Impact Assessment and Audit) Regulations, 2003. The report has provided a summary statement of the likely environmental and social effects of the proposed project. The works are located in Tala town in Machakos County. The project has roads of a total length of 1.01Km and covers the following sections as shown on the layout plan drawing in the annex of this report.

<table>
<thead>
<tr>
<th>S/No</th>
<th>Road</th>
<th>Length (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Alignment 1 – Southern link street</td>
<td>515</td>
</tr>
<tr>
<td>2</td>
<td>Alignment 2 – Eastern link street</td>
<td>272</td>
</tr>
<tr>
<td>3</td>
<td>Alignment 3 – Northern link street</td>
<td>227</td>
</tr>
<tr>
<td></td>
<td>Total length</td>
<td>1014</td>
</tr>
</tbody>
</table>

7. Project Justification
The main objective of the project is to upgrade the selected roads to bitumen standards to improve mobility within Tala town and connection to Nairobi-Kangundo road and to improve drainage and provide footpaths/walkways.
8. **Scope of Works**

The works shall include but not limited to:

i. Site clearance and earthworks as necessary

ii. Excavation to remove unsuitable materials

iii. Filling with approved materials as specified and directed.

iv. Provision and placing of gravel sub-grade and sub-base layers

v. Hand packing with approved stone base as specified

vi. Construct road drainage by concrete lining and or using IBD drain sections

vii. Construction to footpaths and shoulders as directed

viii. Laying of Asphaltic concrete layer(s) surfacing to a consolidated thickness as directed

ix. Laying and/or replacement of kerbs and channel as specified and directed

x. Construction of road junctions abutting to these roads

xi. Maintenance of the works during the construction and maintenance periods specified

xii. Traffic Management through the works and from the works

xiii. Relocation and/or protection of other services including but not limited to water pipes, Power poles

xiv. Provision of service ducts

xv. Installation of Streetlights

xvi. Any other works as instructed by the Engineer and/or as specified in this document

9. **Scope of environmental and social assessment**

This Environmental and Social Impact Assessment (ESIA) Report considers the following aspects and others that may prove of significance during the study.

1. Assess the project’s impacts on ecology. This will in essence cover:
   
   i. Impacts due to excavations
   
   ii. Surface run-off water, containment and flood control.

2. Assess social implications of the development within the locality, region and nationally to include: -

   i. Economic implications of the development.
   
   ii. Security-threats, risk and enhancement.
iii. Employment.
iv. Livelihoods.
v. Public health implications.
vi. Demand and development of infrastructure and social amenities.
vii. Labour and working conditions.
viii. Protection of children.
ix. Worksite health and safety
x. Management of construction sites
xi. Quarries and borrow pits, if applied.

3. Assess the impacts of development on landscape and land use such as: -
   (a) Determine the impact on change on civic shape, scenery, aesthetic modifications.
   (b) Examine the compatibility and complementarity of the development with the surrounding land uses.

4. Develop an Environmental and Social Monitoring and Management Plan (ESMMP) that would mitigate the possible impacts on the environment.

10. Consultations and Public Participation

Public participation and consultative forums were held at the site that included primary stakeholders; mainly traders and other business persons along the proposed road. The aim of the consultative meetings was to obtain data related to the project for environmental and social analysis, both present and that are significant to the future environmental and social status of the area for management of the project both during and after implementation. The primary stakeholders responded positively to the development as long as mitigation and mending up measures are developed and implemented simultaneously with the project. The other stakeholders included the County Government of Machakos that was represented by its officials in CPP meetings. The record of the consultations is presented in this report in the form of questionnaires, attendance sheets and minutes of meetings held that had been administered to the stakeholders seeking their views on the project and especially as regards environmental management during project implementation.
11. Findings from the Study

(i) Potential positive impacts anticipated:
The core observation of this study is that the proposed road construction project is aimed at opening up Tala Township and improving accessibility to Tala Township from the main highways. As such, the project in itself is already an activity in mitigation of an existing concern of poor accessibility and this is the prime justification of the proposed investment. Other positive implications of the project will accrue from its potential to create short-term business and employment opportunities to both professional staff and workers during the design phase while, at construction phase, traders will benefit from opportunities to supply construction material while locals will be employed in works. Upon commissioning, the project will improve the transportation condition and order in the township leading to improved transport services. It will also shorten the time if a motorist wants to divert from one highway to another without having to go the current long route around the township. Other positive impacts include storm-water drainage improvement as the project encompasses drainage works as well as improvement of footpath as non-motorized transport facilities, mainly for pedestrians.

(ii) Potential adverse impacts:
Construction activities will introduce nuisances such as dust, noise, vibrations and fumes which however can be effectively managed through shortening the construction period. Storm water management and soil erosion may be exacerbated by the project. Social vices associated with influx of job seekers can disturb the social order and even lay the ground for escalation of HIV/AIDS cases whose impacts are likely to be prolonged in prevalence. The notable potential negative environmental impacts that were identified include among others:

i. Air pollution, mainly owing to dust
ii. Traffic congestion during construction;
iii. Material sourcing and supply for the construction and maintenance works;
iv. Ecological damage from site clearance and earthworks as necessary and excavation to remove unsuitable materials. This may also be occasioned by clearance of areas for site location and storage of materials (construction materials, fuel, lubricants and machinery);
v. Social disturbance caused by the construction and future maintenance, and
vi. Any effects from uncontrolled storm-water run-off and/or soil erosion

These have to be mitigated sufficiently for the project to progress. Mitigation measures include dust abatement, traffic management, and material sourcing from licensed quarries and borrow
pits and abatement of soil erosion during project implementation in the likelihood of rains. The mitigation measures to manage these impacts are as identified in the Environmental and Social Management and Monitoring Plan (ESMMP) in the report.

(iii) Residual and cumulative impacts:
The project has no residual or cumulative impacts as all can be effectively mitigated.

12. The ESMMP
An ESMMP has been developed whose pursuit can greatly improve the overall net effect of the project. This report observes that the bulk of adverse impacts will manifest at the construction stage in which case, the core effort in mitigation will be concentrated in the contract for construction. This report therefore requires that the ESMMP be integrated into the design report with appropriate allocation of funds in the Bills of Quantities. The contract for construction should bear clauses binding the contractor to implement impact mitigation as part of the civil works. The NaMSIP’s PCT will mount own internal monitoring to ascertain environmental and social sensitivity at all stages of project development. During project development, a grievance redress mechanism will also be in place to handle all complaints and there will be creation of awareness and sensitization on HIV-AIDS. The ESMMP budget is estimated at about Kshs. 1,475,000. Moreover, this project’s potential benefits and positive impacts far outweigh the negative impacts.

12. Total Cost of the Project
Total cost of the project is approximated to be Kshs. 98,300,791/05 – see BoQ in the Annexes

13. Conclusions and Recommendations of this Project Report
Our conclusion is that the project is important for economic development of Tala Township in Machakos County and has balanced environmental considerations and benefits. The ESIA team has given adequate measures to mitigate the negative impacts and a management plan proposed which the proponent should adhere to. In the view of this study, the project as currently proposed is environmentally sound. An ESMMP has been outlined to guide resolution of potential adverse impacts while enhancing the positive ones. Further, all negative impacts need to be mitigated and it is recommended that this project is granted NEMA licensing and other clearances to pave way for implementation. More so, the ESIA is a way of promoting benign environmental management for sustainable development.
CHAPTER ONE: INTRODUCTION

1.1. Project Location
The works are located in Tala town in Machakos County. The project has roads of a total length of 1.01Km and covers the following sections as shown on the layout plan that is part of this report.

<table>
<thead>
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</tr>
<tr>
<td></td>
<td>Total length</td>
<td>1014</td>
</tr>
</tbody>
</table>

The general GPS coordinates of the location of the site are as follows;

Latitude:     Decimal: -1.26489
Longitude:    Decimal: 37.32058
Altitude:     1522 meters above sea level

Location Plan
1.2 Need for the project
The broad aim of the project is to enhance mobility, accessibility and transport within the old Tala market and ensuring quick access to Tala Township. It also provides link to the Tala – Machakos Road. The project has also laid emphasis on the provision of Non-Motorized Transport facilities so as to encourage people living within the area to either walk or cycle around and within the township. Adequate storm water drainage system has been incorporated in the works. Due to the high rate of unemployment in the area the project will provide job opportunities for youth and women in the project. Many people are going to be employed during the planning stage of the project, the construction stage and when the project will be operational. The need therefore exists for providing flexible, modern and cost effective transport facilities within Tala Township.

1.3 Scope and content of project
The works shall include but not limited to:

i. Site clearance and earthworks as necessary
ii. Excavation to remove unsuitable materials
iii. Filling with approved materials as specified and directed.
iv. Provision and placing of gravel sub-grade and sub-base layers
v. Hand packing with approved stone base as specified
vi. Construct road drainage by concrete lining and or using IBD drain sections
vii. Construction to footpaths and shoulders as directed
viii. Laying of Asphaltic concrete layer(s) surfacing to a consolidated thickness as directed
ix. Laying and/or replacement of kerbs and channel as specified and directed
x. Construction of road junctions abutting to these roads
xi. Maintenance of the works during the construction and maintenance periods specified
xii. Traffic Management through the works and from the works
xiii. Relocation and/or protection of other services including but not limited to water pipes, Power poles
xiv. Provision of service ducts
xv. Installation of Streetlights
xvi. Any other works as instructed by the Engineer and/or as specified in this document
The design of the works includes drainage improvement works and has appropriate landscape measures to prevent soil erosion. The main works will encompass upgrading the earth-road to bituminous standards and provision of drainage and landscaping with proper side channeling to manage storm-water runoff.

The project assessment investigates and analyses the anticipated environmental and social impacts of the proposed development in line with the Environmental (Impact Assessment and Audit) 2003 regulations. Consequently, the report provides the following;

- The location of the project including the physical environment that may be affected by the project’s activities.
- The activities that shall be undertaken during the project construction, operation and design of the project.
- The materials to be used, products and by-products including waste to be generated by the project and the methods of disposal.
- The potential environmental and social impacts of the project and mitigation measures to be taken during and after the implementation of the project.
- An action plan for prevention and management of possible accidents during the project cycle.
- A plan to ensure the health and safety of the workers and the neighboring communities.
- The economic and social cultural impacts to local community.
- The project budget.
- Any other information that the proponent may be requested to provide by NEMA.

This report also seeks to ensure that all the potential environmental and social impacts are identified and that workable mitigation measures are adopted. The report also seeks to ensure compliance with the provisions of the EMCA 1999, and Environmental (Impact Assessment and Audit) Regulations 2003 as well as other regulations.

The report emphasizes the duties of the proponent and contractor during the construction phase as well as the operational phase of this project.

**1.4 Duties of the Proponent**

It will be the duty of the proponent to ensure that all legal requirements as pertaining to the development are met as specified by the law, including World Bank Safeguards and specifically OP4.01 (Environmental Assessment).
The proponent shall hand over the site to the Contractor for implementation of the project.
The proponent is also the one to fund the project.
The proponent will ensure that the ESIA is submitted to NEMA and a license is obtained.
The proponent is also the one who has initiated the project and will also ensure its satisfactory implementation.

1.5 Duties of the Contractor

- Implementation of the ESMP and regularly reporting back to the Project proponent.
- Maintaining the required level of stakeholder engagement and communication, including providing project schedule information to the public, accepting and resolving public grievances, advertising and hiring local workers.
- Maintain a working grievance redress mechanism.
- Ensure that the project has children protection champions.
- Prepare and maintain an approved Time and Progress chart, showing clearly the period allowed for each section of the work.
- The contractor is to comply with all regulations and by-laws of the local Authority including serving of notices and paying of the fees.
- During the night, public holidays and any other time when no work is being carried out onsite, the contractor shall accommodate only security personnel and never should a labor camp be allowed on-site.
- The contractor shall make good at his own expense any damage he may cause to public and private roads, drainages and pavements in the course of carrying out his work.
- The proponent shall define the area of the site, which may be occupied by the contractor for use as storage, on the site.
- The contractor shall include all recommendations from ESIA into the contract.
- The contractor shall provide at his own risk, and cost all water required for use in connection with the works including the work of subcontractors, and shall provide temporary storage tanks, if required.
- The contractor shall make his own arrangements for sanitary conveniences for his workmen. Any arrangements so made shall be in conformity with the public health...
requirements for such facilities and the contractor shall be solely liable for any infringement of the requirements.

- The contractor shall be responsible for all the actions of any subcontractors in the first instance.
- The contractor shall take all possible precautions to prevent nuisance, inconvenience or injury to the neighboring properties and to the public generally, and shall use proper precaution to ensure the safety of wheeled traffic and pedestrian.
- All work operations which may generate noise, dust, vibrations, or any other discomfort to the workers and/or guest of the client and the neighbors must be undertaken with care, with all necessary safety precautions taken.
- The contractor shall take all effort to muffle the noises from his tools, equipment and workmen to not more than 70dBA
- The contractor shall upon completion of working, remove and clear away all plant, rubbish and unused materials and shall leave the whole site in a clean and tidy state to the satisfaction of the Proponent. He shall also remove from the site all rubbish and dirt as it is produced to maintain the tidiness of the premises and its immediate environs.
- No shrubs, trees, bushes or underground thicket shall be removed except with the express approval of the Proponent.
- No blasting shall be permitted without the prior approval of the Proponent and the local authorities.
- Borrow pits will only be allowed to be opened up on receipt of permission from the Proponent
- The standard of workmanship shall not be inferior to the Kenya Bureau of Standards where existing. No materials for use in the permanent incorporation into the works shall be used for any temporary works or purpose other than that for which it is provided. Similarly, no material for temporary support may be used for permanent incorporation into the works.
- Disposing of the waste generated during construction activities according to the agreement with the local government.

All the materials and workmanship used in the execution of the work shall be of the best quality and description. Any materials condemned by the Proponent (or their representatives) shall be immediately removed from the site at the contractor’s cost.
The materials for construction of this project include the following:

- Filler material
- Aggregates for sub-base
- Bituminous (Asphaltic) mixes of bitumen and aggregate
- Bitumen (Asphalt)

These materials are purchased from respective dealers where filler materials and aggregates are purchased from quarries and borrow pits in the vicinity that are owned by private dealers or individuals. Bitumen is also purchased from bitumen dealers and purchased in drums.

The premises should also be planned to be landscaped and with adequate drainage facilities as it is sloping in some sections. Environmental concerns need to be part of the planning and development process and not an afterthought, it is therefore advisable to avoid land use conflicts with the surrounding area. To avoid unnecessary conflicts that retard development in the project area, the proponent undertook this ESIA and incorporated environmental concerns as advised by the Authority. Finally, a comprehensive Environmental and Social Management and Monitoring Plan (ESMMP) is mandatory for a project of this magnitude and nature because large quantities of solid wastes are likely to be generated with temporary interference to the general public and services during project execution.

1.6 Description of the Project’s Construction Activities

1.6.1 Pre-construction investigations

The implementation of the project’s design and construction phase will start with thorough investigation of the site biological and physical resources in order to minimize any unforeseen adverse impacts during the project cycle.

1.6.2 Demolition works

Any wastes or debris arising from any demolitions will be transported to licensed site for disposal.

1.6.3 Sourcing and transportation of construction materials

Construction materials will be transported to the project site from their extraction, manufacture, or storage sites using transport trucks. The materials to be used in construction of the project will be sourced from neighboring areas of Machakos County. Greater emphasis will be laid on procurement of construction materials from within the local area, which will make both
economic and environmental sense as it will reduce negative impacts of transportation of the materials to the project site through reduced distance of travel by the materials transport vehicles, and also increase the income of local dealers of such materials.

1.6.4 Storage of materials
Construction materials will be stored on site, if need be. Bulky materials such as rough stones, ballast, sand etc will be brought to site only when needed owing to space constraints. To avoid piling large quantities of materials on site, the contractor should order bulky materials such as sand, gravel and stones in batches.

1.6.5 Excavation and foundation works
Excavation will be carried out to prepare the site for construction of sub-base, pavements and drainage systems. This will involve the use of heavy earthmoving machinery, human effort and appropriate equipment.

1.6.6 Construction of road
This involves putting different layers – sub-base, base and final finish – in aggregates as specified and a final finish in bituminous mixes and bitumen. It also involves compaction as required at different levels. The project will result in construction of the road, its drainage and related works.

1.6.7 Landscaping
To improve the aesthetic value or visual quality of the site once construction ceases, the contractor will carry out landscaping.

1.6.8 Transport trucks
The heavy transport trucks that will be turning around the project site while delivering construction materials may cause traffic file-up. In addition to contribution of noise and emission of exhaust fumes around the premises, such trucks may slow down traffic flow. The contractor will put in place measures to address such concerns by ensuring that delivery trucks are well driven and managed. In addition, the mitigation measures outlined in the EMMP will be fully implemented to address environmental issues relating to construction trucks.

1.6.9 Aesthetics
The proponent should ensure high hygiene standards within the premises and surrounding areas during construction and during the operation stages of the project. More so via the prescribed
EMMP, the proponent shall put in place several measures aimed at ensuring high standards of hygiene and housekeeping within the premises and surrounding areas.

1.7 Description of the Project’s Operational Activities

1.7.1 General repairs and maintenance
The road will be repaired and maintained by Machakos County during its operational phases and will involve a number of activities, such as general road maintenance (including maintenance of the road safety signage), drainage maintenance and solid waste/debris removal and ensuring pedestrian safety during road operation.

1.8 Description of the Project’s decommissioning activities

1.8.1 Demolition works
Upon decommissioning (which is unlikely), the project components including pavements and drainage systems will be demolished. This will produce a lot of solid waste, which will be reused for other construction works or if not reusable, disposed of appropriately by a licensed waste disposal company.

1.8.2 Site restoration
Once all the waste resulting from demolition and dismantling works is removed from the site, the site will be restored through replenishment of the topsoil.

1.8.3 Noise and Vibration
The sources of noise pollution will include transport vehicles, construction machinery and metal grinding and cutting equipment. The maximum level of noise during construction should be kept at 55dB within residential areas and 70dB commercial areas. However, the proponent will take appropriate steps to minimize noise impacts including provision of appropriate protective equipment to construction workers, planning and minimizing the frequency of materials transport, and ensuring that all equipment are well maintained. The construction works will also be carried out exclusively during the day according to NEMA regulated working hours.

1.8.4 Dust generation
There is possibility of generation of large amounts of dust within the project site and surrounding areas as a result of transportation of removed materials, especially if the decommissioning is done in dry weather. The proponent will ensure that dust levels at the site
are minimized through sprinkling water in areas being demolished and along the tracks used by the transport trucks within the site. Additional mitigation measures presented in the ESMMP will be fully implemented to minimize the impacts of dust generation.

### 1.9 Presentation of the Report

The ESIA study report as indicated above culminated with the production of this Project Report designed to ensure that the proposed development project complies with Environmental Management and Coordination Act (EMCA, 2015). The report is arranged in 10 chapters as outlined below:

- **Chapter 1**: Introduction of the project which include project Background, Scope of the ESIA Study, Study Methodology and Presentation of the report.
- **Chapter 2**: Gives the Policy, Legal and Regulatory Framework Policy, Legal, Institutional and Administrative Framework.
- **Chapter 3**: Project Description.
- **Chapter 4**: Baseline Information of the Study Area.
- **Chapter 5**: Outcome of the Public Participation and Consultation process.
- **Chapter 6**: Alternatives to the Project.
- **Chapter 7**: Identification of Potential Impacts and mitigation measures of the project.
- **Chapter 8**: Mitigation Measures of Potential Impacts of the Project.
- **Chapter 9**: Environmental and Social Management and Monitoring Plan (ESMMP)
- **Chapter 10**: Concludes the Project and recoups the core recommendations.

Section 10(2) of Part II of Legal Notice 101 allows for approval of proposed projects at the Project Report Stage and has been effectively used by NEMA to grant Environmental Licenses to small projects without requiring a full EIA. This is the process and stage at which the ESIA process for construction of Tala Township roads project is expected to end.
CHAPTER TWO: LEGAL AND INSTITUTIONAL FRAMEWORKS

2.1 National, Legal and Institutional Framework

Kenya has approximately 77 statutes that guides on environmental management and conservation. Most of these statutes are sector specific, covering issues such as public health, soil conservation, protected areas conservation and management, endangered species, public participation, water rights, water quality, air quality, excessive noise control, vibration control, land use among other issues.

The National Environment Management Authority (NEMA) in conjunction with the various lead agencies studies proposed projects to ensure all aspects of the proposed project adheres to all Institutional Frameworks requirements. The institutional framework directly governing road development projects are: Environmental Management and coordination Act (EMCA) of 1999 and its subsequent supplements the Environmental (Impact Assessment and Audit) Regulation, 2003; EMCA (Waste Management) Regulations, 2006 and EMCA (Water Quality) Regulations, 2006; EMCA (Controlled Substance) Regulations, 2007; EMCA (Noise and Vibration Control) Regulations, 2009; EMCA (Emissions Control) Regulations, 2006; EMCA
(Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009; EMC
(Conservation of Biological Diversity and Resources, Access To Genetic Resources and
Benefit Sharing) Regulations, 2006, Land Acquisition Act (Cap.295), Land Act Way Leaves
Act (Cap. 292), Public Roads and Roads Access Act (Cap. 399), Forest Act, Physical Planning
Act (CAP 286), Local Government Act (CAP 265), Traffic Act Chapter 295, Water Act 2002,
Public Health Ac (Cap. 242), Lakes and River Act Chapter 409, Wildlife Conservation and
Management Act, Cap 376 and the Penal Code (CAP 63) 514

2.2 Environmental Management and Coordination Act of 2015 (Amended)
This project report has been undertaken in accordance with the Environment (Impact
Assessment and Audit) regulation 2003, which operationalize the environment management
and coordination act 1999. The report is prepared in conformity with the requirements
stipulated in the environmental management and coordination act no 8 of 1999 (EMCA) and
the Environmental Impact Assessment and audit regulations 2003 regulation7 (1) and the
second schedule. Part II of the said act states that every person is entitled to a clean and healthy
environment and has the duty to safeguard the same. In order to achieve the goal of a clean
environment for all, new projects listed under the second schedule of Section 58 of EMCA No
8 0f 1999 shall undergo an Environmental Impact Assessment. This includes development
activities such as this new project. In additional to the legal compliance above, the following
legal aspects have also have been taken into consideration or will be taken into consideration
before commencement of construction:

2.3 Occupational Health and Safety, 2007
The said Act requires that before any premises are occupied or used a certificate of registration
should be obtained from the chief inspector. The occupier must keep a general register with
provision for health, safety and welfare of workers on site. For safety, fencing of the premise
and dangerous parts must be done for this project. There should also be provision for clean and
sanitary working conditions. More so, the project must ensure provision of quality and quantity
wholesome drinking water.

2.4 Public Health Act Cap 242
Part IX section 115 of the Act states that no person or institution shall cause nuisance or
condition liable to be injurious or dangerous to human health. Section 116 requires that local
authorities shall take all lawful necessary and reasonable practicable measures to maintain their
jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable to injuries
or dangerous to human health. This will have to be provided for this project.
2.5 Physical Planning Act, 1999
The said Act section 29 empowers the local authorities to reserve and maintain all land planned for open spaces, parks, urban forests and green belts. The same section allows for prohibition or control of the use and development of an area. Section 30 states that any person who carries out development without development permission will be required to restore the land to its original condition. It also states that no other licensing authority shall grant license for commercial or industrial use or occupation of any building without a development permission granted by the respective local Authority. This project has integrated with the planning of Tala Township by Machakos County.

2.6 Land Planning Act Cap 303
Section 9 of the subsidiary legislation (the development and use of land Regulations 1961) under which it requires that before the local authority submits any plans to the minister for approval, steps should be taken as may be necessary to acquire the owners of any land affected by such plans. Particulars of comments and objections made by the landowners should be submitted, which intends to reduce conflict of interest with other socio economic activities. There will be no land acquisition for this project.

2.7 Building Code 2000
Section 194 requires that where sewer exists, the occupants of the nearby premises shall apply to the Local Authority for permit to connect to the sewer line and all the wastewater must be discharged in to sewers. The code also prohibits construction of structures or building on sewer lines. There is no sewer along the road corridor.

2.8 Other Relevant Laws
2.8.1 EMCA (Waste Management) Regulations, 2006
These Regulations guides on the appropriate waste handling procedures and practices. It is anticipated that, the proposed project will generate large quantity of solid waste (mostly excavated top soil) during construction which will need to be managed through reuse, appropriate disposal. Others include solid waste from the generated from construction materials such as cement bags, bitumen, empty drums, among others. This regulation requires that:-

i. The contractor should not dispose any waste on the highway, street road, recreational area and public places;

ii. Waste should be segregated and grouped according to their similarity for example plastics, toxic, organic etc;
iii. All waste should be deposited in a designated dumping area approved by the local authority;

iv. All waste handlers engaged by the proponent should be licensed by NEMA and possess all relevant waste handling documents such as waste transport license, tracking documents, license to operate a waste yard, insurance cover, vehicle inspection documents among others;

v. Contractor should implement cleaner production principles of waste management strategy namely reduce, reuse and recycle;

vi. All hazardous wastes are labeled as specified in section 24 (1-3) of the regulation.

vii. The fourth schedule lists wastes considered as hazardous and solvents, emulsifiers/emulsion, waste oil/water and hydrocarbon/water mixtures. Road and bus parks projects involve use of inputs which are likely to generate the mentioned wastes and thus will need to be handled as required by the regulations.

This law requires that all wastes generated by this project in all its phases are managed in an environmentally friendly manner.

**2.8.2 EMCA (Noise and Vibrations Control) Regulations, 2009**

These Regulations provide guidelines for acceptable levels of noise and vibration for different environments during the construction and operation phase. Section 5 of the regulation warns on operating beyond the permissible noise levels while section 6 gives guidelines on the control measures for managing excessive noises and copy of the first schedule indicating the permissible noise levels for different noise sources and zones. The project team should observe the noise regimes for the different zones especially when working in areas termed as silent zones which are areas with institutions and worship places. These areas are permitted exposure to sound level limits of not exceeding 40 dB (A) during the day and 35 dB (A) at night. The regulation states that a day starts from 6.01 a.m. to 8.00 p.m. while night starts from 8.01 p.m. – 6.00 a.m. Construction sites near the silent zones are allowed maximum noise level of 60 dB (A) during the day and night levels are maintained at 35 dB (A). The time frame for construction sites is adjusted and the day is considered to start at 6.01 a.m. and ends at 6.00 p.m. while night duration from 6.01 p.m. to 6.00 a.m. Part III of the regulation gives guidelines on noise and vibration management from different sources. Sections 11, 12 and 13 of the stated part give guidelines on noise and vibration management from machines, motor vehicles and
night time construction respectively. Section 15 requires owners of activities likely to generate excessive noise to conduct an ESIA to be reviewed and approved by NEMA. It is anticipated that the proposed project will generate excessive noise and/or vibration due to demolition of the existing road. This noise will originate from the construction equipments, vehicles and the workers since the road neighbors homesteads and institutions in some sections. The project proponent has developed mitigation measures to reduce noise propagation in the project area.

2.8.3 EMCA (Air Regulations), 2014
This Act is meant to ensure that all activities at least maintain ambient quality standards of air and any pollution to air (in particulate matter, dust or obnoxious and poisonous gases) needs to be sufficiently mitigated. The project proponent has proposed regular watering of the construction site to minimize dust during the construction period.

2.8.4 Way Leave Act Cap 292
Section 3 of the Act states that the Government may carry any works through, over or under any land whatsoever, provided it shall not interfere with any existing building or structure of an ongoing activity. Notice, however, should be given one month before carrying out any such works (section 4) with full description of the intended works and targeted place for inspection. Any damages caused by the works would then be compensated to the owner as per Section 8 of the Act that states that any person whom without consent causes any building to be newly erected on a way leave, or cause hindrance along the way leave shall be guilty of an offence and any alterations will be done at his/her costs. The project will comply with this provision by ensuring that there will be minimal disruption of utilities in the area.

2.8.5 Public Roads and Roads of Access Act (Cap 399)
Sections 8 and 9 of the Act provides for the dedication, conservation or alignment of public travel lines including construction of access roads adjacent to lands from the nearest part of a public road. Sections 10 and 11 allows for notices to be served on the adjacent land owners seeking permission to construct the respective roads. This road project is being built to fulfill, in addition to other benefits, the provisions of this Act.
2.8.6 Traffic Act Chapter 403
This Act consolidates the law relating to traffic on all public roads. The Act also prohibits
encroachment on and damage of roads including land reserved for roads. This Tala Township
Roads project is under the provisions of this Act.

2.8.7 County Governments Act, 2012
This Act delineates the roles and responsibilities of county governments with their
administrations as well as the role of county citizens in public participation and consultations
regarding projects at the county level. CPP is part of this road project involving the county
government and other stakeholders.

2.8.8 HIV Aids Prevention and Control (Cap 246A)
This Act is to promote public awareness about the causes, modes of transmission,
consequences, means of prevention and control of HIV and AIDS. It also seeks to positively
address and seek to address conditions that aggravate the spread of HIV infection. In the Tala
Township Roads project, there will be awareness creation and sensitization on the workers and
other persons on the risks of infections to foster prevention and control.

2.9 National Policy Framework
Several policies have been developed over the years to guide the development and management
of proposed projects to ensure both economic and social sustainability these policies are
discussed below.

2.9.1 The National Poverty Eradication Plan (NPEP)
The objective of the NPEP is to reduce the incidences of poverty in both rural and urban areas
by 50 percent by the year 2015, as well as to strengthen the capabilities of the poor and
vulnerable groups to earn income. It also aims to narrow gender and geographical disparities
and create a healthy, better-educated and more productive population. This plan has been
prepared in line with the goals and commitments of the World Summit for Social Development
(WSSD) of 1995.
The plan focuses on the four WSSD themes of poverty eradication; reduction of
unemployment; social integration of the disadvantage people and creation of an enabling
economic, political, and cultural environment which can be achieved through developing the
transport and communication sector. The plan will be implemented by the Poverty Eradication
Commission (PEC) formed in collaboration with Government ministries, Community Based
Organization (CBO), private sector, Non-Governmental Organization (NGO), bilateral and multilateral donors.

2.9.2 **The Poverty Reduction Strategy Paper (PRSP)**

The PRSP has the twin objectives of poverty reduction and enhancing economic growth. The paper articulates Kenya’s commitment and approach to fighting poverty; with the basic rationale that the war against poverty cannot be won without the participation of the poor themselves. The proposed project through improving transport in the area will, contribute towards economic growth, as well as relieve the daily pressure of poverty for sustainable number of people by enabling them reach the markets and suppliers on time.

2.9.3 **National Environmental Action Plan (NEAP)**

The NEAP for Kenya was prepared in mid 1990s. It was a deliberate policy whose main effort is to integrate environmental considerations into the country’s economic and social development.

The integration process was to be achieved through multi-sectoral approach to develop a comprehensive framework to ensure that environmental management and the conservation of natural resources forms an integral part of societal decision-making.

The application of this plan is widening as the government through NEMA does not approve a development project unless the impacts of the proposed project are evaluated and mitigation measures proposed for incorporation in the project’s development plan which is in line with the requirements of the NEAP.

2.9.4 **Environmental and Development Policy (Session Paper No.6 1999)**

As a follow-up to the foregoing, the goal of this policy is to harmonize environmental and developmental goals so as to ensure sustainability. The paper provides comprehensive guidelines and strategies for government action regarding environment and development. It is recommended that the requirements of this policy are observed, as much by:

i. Taking measures to enhance the water catchment by replanting trees, using clean energy to reduce deforestation;

ii. Undertaking environment friendly practices during project implementation;

iii. Take measures to reduce pollutants leading to eutrophication of water bodies both above- and underground water bodies; and

iv. Rehabilitate project affected areas and public infrastructure among other
2.9.5 International Policy Framework
Kenya is a signatory as well as a party to various international conventions, treaties and protocols relating to the environment which aims at achieving sustainable development. According to the Registrar of International Treaties and other Agreements in Environment (UNEP 1999), there are 216 treaties, 29 of which are of interest to Kenya. The country is a signatory to 16 such agreements, which range from use of oil, protection of natural resources and protection of the atmosphere. The agreements are both regional and international and became legally binding on Kenya upon ratification thereof by the rightfully designated Kenyan Authority. The agreements of interest to Kenya can be categorized as those for protecting natural resources, atmosphere and social wellbeing of man.

2.9.6 The National Environment Management Authority
The responsibility of the National Environmental Management Authority (NEMA) is to exercise general supervision and, co-ordination of all matters relating to the environment and to be the principal instrument of government in the implementation of all policies relating to the environment. The Authority shall review the project report for the proposed project, visit the project site to verify information provided in the report and issue an ESIA license if it considers that all the issues relevant to the project have been identified and mitigation measures to manage them proposed.

2.10 World Bank Environmental and Social Safeguard Policies
Like in any project financed by, or with financial participation of, the World Bank, the environmental and social safeguards as defined in the Bank's Operational Procedures (OPs) will be respected for the purposes of this project implementation. WB classifies its projects into four Environmental Assessment categories according to the likely impacts on the environment they will have. This classification is as follows (only main conditions mentioned):

(i) Category A: A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts.

(ii) Category B: A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas—including wetlands, forests, grasslands, and other natural habitats—are less adverse than those of Category A projects. These impacts are site-specific; few if any of them
are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A projects. **This particular NaMSIP subproject has been categorized as B.**

(iii) Category C: A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.

(iv) Category FI: A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental impacts; this case, in any way, is not applicable to the NaMSIP project.

The table below shows the applicability of World Bank Operational Safeguards as it applies to this construction of Tala Township Roads in Machakos County of Nairobi Metropolitan Region.

**Table 1: Applicability of WB OPs**
<table>
<thead>
<tr>
<th>OP</th>
<th>Title</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.01</td>
<td>Environmental Assessment</td>
<td>Applicable. As a result of environmental and social screening, the project was identified as a Category B project due to its road rehabilitation and other activities, as described</td>
</tr>
<tr>
<td>4.04</td>
<td>Natural Habitats</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>4.09</td>
<td>Pest Management</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>4.10</td>
<td>Indigenous Peoples</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>4.11</td>
<td>Physical Cultural Resources</td>
<td>Not applicable. Site visits and inventories have not indicated the presence of any cultural (historical, archaeological) sites in the sample settlements. However, to manage “chance finds” an appropriate procedure is included in this ESIA in the Annex. Such procedures to be followed by contractors during the construction phase.</td>
</tr>
<tr>
<td>4.12</td>
<td>Involuntary Resettlement</td>
<td>Not applicable</td>
</tr>
<tr>
<td>4.36</td>
<td>Forests</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>4.37</td>
<td>Safety of Dams</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>7.50</td>
<td>Projects on International Waterways</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>7.60</td>
<td>Projects in Disputed Areas</td>
<td>Not applicable.</td>
</tr>
</tbody>
</table>
CHAPTER THREE: CONSULTATIVE AND PUBLIC PARTICIPATION (CPP)

3.1 Approach to Public Consultations

Legal Notice No. 101 of EMCA 1999 (The Environmental Regulations, 2003) requires that all environmental assessment processes in Kenya incorporate public consultations and participation. The aim is to ensure that all stakeholder interests are identified and incorporated in project development, implementation and operation. Of necessity, stakeholder consultations should take place alongside project design and implementation to ensure that the project puts in place measures to cater for stakeholder concerns in all project phases. In case of the proposed road project, public consultations followed several steps as follows.

3.2 Identification of Stakeholders

Like in all civil works projects, the core stakeholders comprise people to be directly served by the road projects and then comprise residents along the road corridor, motorists, businessmen and service providers who rely on the road, etc. This is the group that is likely to benefit or be affected by the proposed development. This study also identified a second category of stakeholders comprised of GoK officers in charge of diverse sectors, which are likely to be impacted by the road project. This category was also consulted as key informants on sectoral policy and to advise this EIA study on mitigation measures to be put in place so as to minimize adverse impacts in respective sectors. Each category of stakeholders called for a different approach to consultation.

3.3 CPP Methodology

Interviews were carried out in the project area by the use of questionnaires, to find out all the views from the neighbors’ and other stakeholders on the proposed project. The main objective was to find out if the stakeholders support the project and have no objection to it. The questionnaire was to initially give introduction and make the residents aware of the proposed project. Afterwards, the ESIA team enquired on the acceptance of the project and whether the project would cause any negative impacts on the following:

a) Local residents and their businesses; b) Ecology of the area; c) Human environment;
d) Recreational and leisure facilities; e) Public health and safety; f) Effect on water resources and quality; g) Effect on the soils; h) Effect on road transport and; i) Waste disposal. The said parameters were directly mentioned to foresee which had intense negative impacts. The meeting of the key stakeholders (NaMSIP, County Government) assessed the need for the
Environmental and Social Impact Assessment Project Report for the Construction of Tala Township Roads in Machakos County in the Nairobi Metropolitan Region

project and its attendant benefits. During such meetings, it was emphasized that high environmental, occupational health and safety standards would be adhered to during project implementation.

3.4 Stakeholder Analysis

However, from previous projects of similar magnitude and similar setting, some impacts even without concern of the residents, are expected and their effects are discussed later in this report. A public meeting (baraza) was organized with the residents of the surrounding areas of the project and the township on September 20, 2018 in Tala Township at the Matungulu Sub-County offices where the project was discussed and further views sought. During the initial reconnaissance conducted on August 16, 2018 as well as consultations and public participation meeting at Matungulu Sub-County Offices, the residents (mainly those operating shops near the selected roads to be constructed) and the general public including those operating in the bus stage, all support the project and are waiting eagerly for its commencement and full implementation. A sample of the questionnaires from those that attended the meeting including the attendance sheets will be part of the final report. Those that attended the meetings included:

- Machakos County Staff
- Staff of Matungulu Sub-County where the project is situated in Tala Township
- Traders along the roads to be upgraded – green grocerers, salon attendants, second-hand clothes dealers
- Drivers of vehicles along the roads to be upgraded
- Businessmen and women – for businesses along road to be constructed including butchery, furniture, welding, masonry etc
- Area opinion leaders and elders
- Boda boda cyclists representatives
- NaMSIP Staff – safeguards, communication and technical staff

The ESIA consultations included disclosure of the design and project status that was done by the Design Engineer Samuel Mugo. The issues that were raised by each group of stakeholders included;

- **Traders along the proposed road**
A confirmation that there would be dust management during implementation and this was affirmed.

- **Business men and women and county staff**
Whether drainage improvements would be done and this was affirmed that it was part of
the project scope as far as the drainage along the roads to be improved was concerned

- **Members of the county government**
  Timelines of the project and this was given by the Assistant Resident Engineer of the
  project Eng. Paul Kimeu.

- **Boda boda Representative**
  Whether the contractor would engage local staff for casual work and this was assured

Several minutes, questionnaires and photographs of the public participation and consultation
meeting are attached to this report.

![Public Participation Photograph – Meeting No. 1](image1)

*(Held on August 16, 2018 in Tala Township at the Matungulu Sub-County Offices of
Machakos County)*

![Public Participation Photograph – Meeting No. 2](image2)

*(Held on September 20, 2018 in Tala Township at the Matungulu Sub-County Offices
Compound of Machakos County)*
CHAPTER FOUR: BASELINE INFORMATION OF THE PROJECT AREA

4.1 The Biophysical profile

4.1.1 Location and administrative set-up
The proposed road is entirely within Tala Township where it traverses the township connecting two main tarmac roads Tala is a town in Kenya’s Machakos County in the lower eastern region of Kenya, about 56 kilometers to the east of the Kenyan capital, Nairobi. It is usually classified as being one town with Tala, due to their close proximity. The general coordinates of the town are 1.35° S and 37.37° E at a general elevation of about 1609 meters above sea level. Machakos County is within the greater Nairobi which consists of 4 out of 47 counties (five including Nairobi City County) and the area generates about 60% of the nation’s wealth. The other counties are Kiambu, Kajiado, Nairobi City County and Murang’a. The project site is located in an urban area, where no risks to flora and fauna were identified.

Google Map Showing Project Location and Alignments being upgraded in red

Source: Google Earth Pro, 2018
4.1.2 Relief and Physiography

Altitude within the road traverse ranges between 1500m to 1550m above sea level.

Additionally, there are no sensitive receptors along this corridor as the surrounding area is predominantly agricultural land as well as shops in some sections.

4.2 Socio-Economic Baseline Profiling

4.2.1 The Township Perspective

Officially, Tala’s population is the 9th largest of any urban centre in Kenya. Tala is part of Tala Town Council. The population of Tala according to the 2009 census was 218,557. The main language spoken is mainly Kikamba although the people who live there understand both Swahili and English. The population annual Growth Rate is 1.7 % with a current estimate of 5,190 households. During the public participation and consultation, those that attended comprised mainly of small-scale farmers, traders undertaking various businesses along the proposed road, village elders, retired medical doctor and unemployed youth. The age disaggregation of the township can be represented as below;
4.2.2 Economic activities

Many of the residents are Kambas who practice subsistence farming on rural farms. The land holding size is relatively small and population density is high. Open-air markets are located within the township with several shops selling basic items like hardware, clothes and food items. Farmers are also in the town selling their wares which include paw paws, bananas, arrow roots, cow peas (a vegetable delicacy in the area), maize and beans. Livestock trading is also a major enterprise. Crops grown are mainly maize, beans, sorghum, millet, sweet potatoes, onions, bananas and other that can cope with the tropical climate of the area. Apart from the mentioned crops, farmers also grow coffee as a cash crop. Initially, the returns were good but farmers kept on complaining of low prices which led to the neglect of the crop. However, farmers who mill their own coffee sell directly and make good profits. There is a high increase in labour force which has led to increase in unemployment and this could lead to escalation of crimes as a result of non-absorption of this active population in services of gainful employment. This scenario coupled with the fact that the 51% of the Machakos County citizen are considered as economically inactive implies that the County is in need of investments to spur growth and reverse the situation.

4.3 General Profiling

4.3.1 Infrastructure

Tala is well served with good communication and transport network between it and towns in its environs. Construction of selected roads will improve this farther and especially ensuring good access to the bus stage and market to improve movement into, within and out of Tala Township.
4.3.2 Climate
There are two rainy seasons during the year from November – January and again from March – April. February and May are the main harvesting periods and June – August the coldest months.

4.3.3 Waste Management
Solid waste must be disposed of in accordance with Tala Town Council by-laws and good environmental practice. The anticipated waste management related activities of the project area include solid waste deposition into receptacles in the area and later collected by registered solid waste handlers (registered with NEMA) whilst wastewater is channeled in isolated septic tanks.

4.3.4 Gender
Gender disparities are minimal in primary and secondary education where enrolments are 50 per cent for both boys and girls. Women have been discriminated against when it comes to access to ownership of property and finances. 80 per cent of women constitute the agricultural workforce but only a small percentage of them hold title deeds to land. This imposes a great constraint on their ability to make major land-related investment decisions including obtaining credit using title deeds as collateral.

4.3.5 Poverty
The county has high poverty levels which according to the 2005/2006 Kenya Integrated Household Budget Survey, about 39 per cent of the population live below the poverty line. The poor are not able to easily access the basic necessities of life such as food, shelter and education.

4.3.6 HIV and Aids
HIV and AIDS pandemic poses a serious threat to the development of the area as the prevalence rate stands at 3.9 per cent for Machakos County compared to 4.6% for the country as whole. The scourge is on the increase virtually in all the constituencies of the county. AIDS related deaths are common and those mainly affected are those within the productive age group of 15-49 years of age. Also, the number of HIV/AIDS orphans is on the increase. HIV/AIDS in the county is also linked to peer pressure and ignorance of the youth based on age and sex distribution and commercial sex due to economic hardships.
4.3.7 Sensitive Receptors

The road to be constructed passes through a busy town with some commercial businesses in some areas adjacent to the road corridor. The key environmental receptors include the motorists, pedestrians, businesses and some residential houses located near the project corridor. The roads to be upgraded are as indicated in the location and google maps of this report that show the roads as passing between buildings with adequate crossings, walkways and culverts provided to enable access to these buildings. The public use areas will not be interfered with.
5.1 Introduction
This chapter outlines the potential negative and positive impacts that will be associated with the project. The impacts will be related to activities to be carried out during construction of the project and the operation stage of the project. The operational phase impacts of the project will be associated with the activities carried out within the premises. In addition, closure and decommissioning phase impacts of the project are also highlighted.

The impacts of the project during each of its life cycle stages (construction, operation and decommissioning) can be categorized into: impacts on the biophysical environment; health and safety impacts and socio-economic impacts.

5.2 Negative environmental and social impacts of construction activities

5.2.1 Extraction and use of construction materials
Construction materials such as rough stone, ballast and bitumen required for construction of the roads project will be obtained from quarries and bitumen dealers. Since substantial quantities of these materials will be required for construction of the roads, the availability and sustainability of such resources at the extraction sites will be negatively affected, as they are not renewable in the short term. In addition, the sites from which the materials will be extracted may be significantly affected in several ways including landscape changes, displacement of animals and vegetation, poor visual quality and opening of depressions on the surface leading to several human and animal health impacts. At this point, the quarry has not been identified yet and will be once the site is handed over to the Contractor and the Contractor seeks out his material source. It is most likely the Contractor will purchase materials vendors within Machakos County for logistical and financial reasons. If the Contractor will rent land that will be used as a borrow pit or quarry, it shall be ensured that a separate ESMP and associated NEMA license is obtained beforehand for such quarry extraction and the quarry is sufficiently rehabilitated after use and decommissioned with NEMA written approval. Such ESMP and NEMA license will be presented to the NaMSIP team by the contractor and will be supervised as part of the overall ESMP (presented in this report).

5.2.2 Dust emissions
During construction, the project will generate substantial quantities of dust at the construction site and its surrounding. The sources of dust emissions will include excavation and leveling
works, and to a small extent, transport vehicles delivering building materials. Emission of large quantities of dust may lead to significant impacts on construction workers and the local residents, which will be accentuated during dry weather conditions.

5.2.3 Exhaust emissions
The trucks used to transport various building materials from their sources to the project site will contribute to increases in emissions of CO₂, NO₂ and fine particulate along the way as a result of diesel combustion. Such emissions can lead to several environmental impacts including global warming and health impacts. The impacts of such emissions can be greater in areas where the materials are sourced and at the construction site as a result of frequent running of vehicle engines, frequent vehicle turning and slow vehicle movement in the loading and offloading areas.

5.2.4 Noise and vibration
The construction works, delivery of construction materials by heavy trucks and the use of machinery/equipment including bulldozers, generators, tippers and concrete mixers will contribute high levels of noise and vibration within the construction site and the surrounding area. Elevated noise levels within the site can affect project workers and the residents, passers-by and other persons within the vicinity of the project site in Tala Township.

5.2.5 Risks of accidents and injuries to workers
Because of the engineering and construction activities including minor excavations, concrete work, sub-base stone laying among others, construction workers will be exposed to risks of accidents and injuries. Such injuries can result from the hand tools and construction equipment and risk of vehicular accidents to local residents.

5.2.6 Increased soil erosion
Excavation works associated with this project may lead to increased soil erosion at the project site and release of sediments into the drainage systems, especially if construction is done during the rainy seasons. Uncontrolled soil erosion can have adverse effects on any local water bodies.

5.2.7 Solid waste generation
Large quantities of solid waste will be generated as a result of clearances, excavations and the final construction of the selected roads. Such waste will consist of surplus materials, surplus soil and excavated materials among others. Such solid waste materials can cause negative impacts to the environment through blockage of drainage systems, choking of water bodies and negative impacts on human and animal health. This may be accentuated by the fact that some
of the waste materials contain hazardous substances such as paints, cement, adhesives and bitumen, while some of the waste materials including plastic containers are not biodegradable and can have long-term and cumulative effects on the environment.

5.2.8 Energy consumption
The project will consume fossil fuels (mainly diesel) to run transport vehicles and construction machinery. Fossil energy is non-renewable and its excessive use may have serious environmental implications on its availability, price and sustainability. The project may also use electricity supplied by Kenya Power & Lighting Company (KPLC) Ltd. Electricity in Kenya is generated mainly through natural resources, namely, water and geothermal resources. In this regard, there will be need to use electricity sparingly since high consumption of electricity negatively impacts on these natural resources and their sustainability.

5.2.9 Water use
The construction activities will require large quantities of water that will be supplied from the town council. Water will mainly be used for concrete mixing, dust suppression and sanitary and washing purposes. Excessive water use may negatively impact on the water source and its sustainability. There is adequate water for the project from the town council, and if need be, there are nearby streams located about 5 km which can be used as a source after obtaining approvals and licenses from WARMA. The source from the town council is adequate and it is not envisaged there will be need to seek water from other sources and therefore there has been no need to apply for a WARMA license.

5.2.10 Social disturbance
The construction works may cause disturbance to the local population with interactions of non-local workers with residential communities. There might be anticipated interruption of services (e.g. sales for local vendors), closure of road crossings and general disturbance from movement of transportation personnel and equipment.

5.2.11 Increased Traffic
The road may lead to increased traffic wanting to use the road and this may even lead to traffic jams. This will mainly be due to increased traffic from the construction vehicles and equipment. Flow of traffic along or near the proposed area will be affected and diversions will need to be
done to manage traffic. There will also be safety barriers and warning signs erected for safety, especially for the motorists using the route and pedestrians.

5.2.12 HIV-AIDS
This project may lead to an influx of commercial sex workers into the township or lead to contractor workers and other personnel engage in risky sexual behavior that may lead to infections in HIV-AIDS or other sexually transmitted diseases.

5.2.13 Operation of quarries and borrow pits
The contractor will mainly source this from private quarries but all in all this degrades the environment. The sourcing of materials by the project will only be conducted from the quarries with an active NEMA license.

5.2.14 Traffic management
Flow of traffic along or near the proposed road will be affected and diversions may need to be done to manage traffic. There will also be safety barriers and warning signs erected for safety, especially for the motorists using the route and pedestrians.

5.2.15 Road safety
This may be exacerbated because of road works.

5.3 Positive environmental impacts of construction activities

5.3.1 Creation of temporary employment opportunities
Several employment opportunities will be created for construction workers during the construction phase of the project. This will be a significant impact since unemployment is currently generally high in Kenya and in most urban and surrounding areas.

5.3.2 Provision of market for supply of construction materials
The project will require supply of large quantities of construction materials most of which will be sourced from neighboring or surrounding areas around Tala Town and others within Machakos County. This provides ready market for construction material suppliers such as quarrying companies, hardware shops and individuals with such materials.

5.3.3 Increased business opportunities
The large number of project staff required will provide ready market for various goods and services, leading to several business opportunities for small-scale traders such as food vendors around the construction site.
5.4 Negative environmental impacts of operational activities

5.4.1 Increased traffic and road safety
It is expected there will be more traffic using this road and this may lead to more accidents. It will also lead to heightened noise levels.

5.4.2 Increased storm-water and drainage maintenance
The pavements will lead to increased volume and velocity of storm water or run-off flowing across the area covered by the roads. This will lead to increased amounts of storm water entering the drainage systems, resulting in overflow and damage to such systems in addition to increased erosion or water logging in the neighboring areas if not adequately mitigated.

5.5 Positive environmental impacts of operational activities

5.5.1 Revenue to national and local governments
Through payment of relevant taxes, rates and fees to the government and the local authority, the roads project will contribute towards the national and local revenue earnings from those using the improved facilities like the traders who will set up businesses along the road.

5.5.2 Reduction of Dust Emissions
This may emanate from the fact that there will now be tarmacked road as opposed to an earth road.

5.5.3 Reduction of Traffic Jams
The use of the road will likely lead to better traffic management in Tala Township and reduce traffic jams along the main highways.

5.5.4 Emergency preparedness and response access
The presence of a tarmacked road especially leading to the two highways will lead to better driving conditions and ameliorating emergency response and disaster preparedness.

5.5.5 Other positive impacts of operational activities
The operational activities after this project is commissioned will have several positive long-term social impacts that include the following;

(a) Improved access to the bus stage and market
(b) Improved pathways (NMT) for cycling and walking for pedestrians
(c) Easier accessibility for all to different parts of Tala Township
(d) Improved drainage will reduce the flood damage and improve accessibility especially for pedestrian traffic and residents
Improved accessibility will spur physical development in the area leading to increased jobs for the urban poor.

Improved lighting will increase trading hours for the businesses.

Cleaner and orderly environment.

Improved safety and security for all.

In addition, street lights will be installed along the road. This will lead to improved security in the area as well as increased time for doing business and hence increased income to inhabitants of the area.

5.6 Negative environmental impacts of decommissioning activities

5.6.1 Solid waste

Demolition of the camp site, roads and related infrastructure will result in large quantities of solid waste. The waste will contain the materials used in construction including concrete, kerbs, bitumen, stones and ballast. Although demolition waste is generally considered as less harmful to the environment since they are composed of inert materials, there is growing evidence that large quantities of such waste may lead to release of certain hazardous chemicals into the environment. In addition, even the generally non-toxic chemicals such as chloride, sodium, sulphate and ammonia, which may be released as a result of leaching of demolition waste, are known to lead to degradation of groundwater quality.

5.6.2 Dust Emissions

Large quantities of dust will be generated during demolition works. This will affect demolition staff as well as the neighboring residents.

5.6.3 Noise and vibrations

The demolition works will lead to significant deterioration of the acoustic environment within the project site and the surrounding areas.

5.7 Positive environmental impacts of decommissioning activities

5.7.1 Rehabilitation

Upon decommissioning the project, rehabilitation of the project site will be carried out to restore the site to its original status. This will include replacement of topsoil that will lead to improved visual quality of the area.
CHAPTER SIX: ANALYSIS OF PROJECT ALTERNATIVES

This section analyses the project alternatives in terms of site, technology and waste management options.

6.1 Relocation Option
Relocation option to a different site is not an option available for the project implementation as this project is to improve accessibility to an already established urban township, Tala Township. Several alternatives were considered to improve other roads in the area, but this one was selected because it is more beneficial to the needs of the accessibility of the Tala Township after the development.

6.2 Zero or No Project Alternative
The No Project option in respect to the proposed project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. This option will however, involve several losses both to Tala Township and the community as a whole. The township will continue to have earth roads and this will not help maximize usage and utilization of this township and its facilities. The No Project Option is the least preferred from the socio-economic and partly environmental perspective due to the following factors:

- The economic status of Kenyans and the local people would remain unchanged.
- The bus station and market would remain largely under-utilized as it is currently.
- No employment opportunities will be created for thousands of Kenyans who will work in the project area.
- Increased urban poverty and crime in Kenya.
- Discouragement for investors and loaners
- Development of infrastructural facilities (roads and associated infrastructure) will not be undertaken.

From the analysis above, it becomes apparent that the No Project alternative is no alternative to the local people and the Government of Kenya.

6.3 Analysis of Alternative Construction Materials and Technology
The proposed project will be constructed using modern, locally and internationally accepted materials to achieve public health, safety, security and environmental aesthetic requirements.
The road-works will be made using locally sourced materials that meet the Kenya Bureau of Standards requirements.

The alternative technologies available include the conventional concrete roads, prefabricated concrete panels, or even temporary structures. These may not be desirable from a cost and durability perspective. The technology to be adopted will be the most economical and one sensitive to the environment.

6.4 Solid waste management alternatives

A lot of solid wastes will be generated from the proposed project. An integrated solid waste management system is recommendable. First, the proponent will give priority to reduction at source of the materials. This option will demand a solid waste management awareness program in the management and the staff. Recycling and reuse options of the waste will be the second alternative in priority. This will call for a source separation program to be put in place. The third priority in the hierarchy of options is combustion of the waste that is not recyclable. Finally, the proponent will need to establish agreement with Tala Town Council to ensure regular waste removal and disposal in an environmentally-friendly manner. In this regard, a NEMA registered solid waste handler would have to be engaged. This is the most practical and feasible option for solid waste management considering the delineated options.
CHAPTER SEVEN: IMPACTS MITIGATION AND MONITORING

7.1 Introduction

This chapter highlights the necessary mitigation measures that will be adopted to prevent or minimize significant negative environmental, health and safety impacts associated with the project during its construction, operation and decommissioning phases. Allocation of responsibilities, time frame and estimated costs for implementation of these measures are presented in the Environmental Management and Monitoring Plan (EMMP).

7.2 Mitigation of construction phase impacts

7.2.1 Efficient sourcing and use of raw materials

The contractor will source construction materials such as sand, ballast and hard core from registered quarry and sand mining firms, whose projects have undergone satisfactory environmental impact assessment/audit and received NEMA approval. Since such firms are expected to apply acceptable environmental performance standards, the negative impacts of their activities at the extraction sites are considerably well mitigated. To reduce the negative impacts on availability and sustainability of the materials, the contractor will only order for what will be required through accurate budgeting and estimation of actual construction requirements. This will ensure that materials are not extracted or purchased in excessive quantities. Moreover, the proponent will ensure that wastage, damage or loss (through run-off, wind, etc) of materials at the construction site is kept minimal, as these would lead to additional demand for and extraction or purchase materials.

In addition to the above measures, the contractor shall consider reuse of construction materials and use of recycled materials. This will lead to reduction in the amount of raw materials extracted from natural resources as well as reducing impacts at the extraction sites.

7.2.2 Loss of Biodiversity

Ecological loss or damage from site clearance and earthworks as necessary and excavation to remove unsuitable materials will lead to loss of biodiversity. This may also be occasioned by clearance of areas for site location and storage of materials (construction materials, fuel, lubricants and machinery).
7.2.3 Minimization of run-off and soil erosion

The project design has incorporated construction drainage to avoid instances of standing water and manage run-off. The contractor will put in place some measures aimed at minimizing soil erosion and associated sediment release from the project site during construction. These measures will include silt traps, barriers, vegetation planting, terracing and leveling the project site to reduce run-off velocity and increase infiltration of rainwater into the soil. In addition, construction vehicles will be restricted to designated areas to avoid soil compaction within the project site, while any compacted areas will be ripped to reduce run-off. This is especially relevant to the area close to the bus station, which is located in a low lying area likely to have standing water during the rainy season.

7.2.4 Minimization of construction waste

It is recommended that demolition and construction waste is properly collected, stored, recycled or reused to ensure that materials that would otherwise be disposed off as waste are diverted for productive uses. In this regard, the proponent is committed to ensuring that construction materials left over at the end of construction will be used in other projects rather than being disposed off. The proponent shall put in place measures to ensure that construction materials requirements are carefully budgeted and to ensure that the amount of construction materials left on site after construction is kept minimal. Additional recommendations for minimization of solid waste during construction of the project include:-

- Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time.
- Provision of facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to weather elements
- Purchase of perishable construction materials such as paints incrementally to ensure reduced spoilage of unused materials
- Use of building materials that have minimal packaging to avoid the generation of excessive packaging waste
- Use of construction materials containing recycled content when possible and in accordance with accepted standards.

The existing earth roads will have to be excavated to make for new roads and associated facilities and the removed materials will be taken to licensed sites or reused.
7.2.5 Reduction of dust generation and emission

Dust emission during construction will be minimized through strict enforcement of on-site speed controls as well as limiting unnecessary traffic within the project site. Traffic routes on site have to be sprinkled with water regularly to reduce amount of dust generated by the construction trucks.

7.2.6 Minimization of exhaust emissions

This will be achieved through proper planning of transportation of materials to ensure that vehicle fills are increased in order to reduce the number of trips done or the number of vehicles on the road. In addition truck drivers will be sensitized to avoid unnecessary racing of vehicle engines at loading/offloading areas, and to switch off vehicle engines at these points.

7.2.7 Minimization of noise and vibration

Noise and vibration will be minimized in the project site and surrounding areas with strict adherence to NEMA designated working hours; and through sensitization of construction truck drivers to switch off vehicle engines while offloading materials. In addition, they will be instructed to avoid running of vehicle engines or hooting especially when passing through sensitive areas such as residential areas and schools. In addition, construction machinery shall be kept in good condition to reduce noise generation. It is recommended that all generators and heavy duty equipment be insulated or placed in enclosures to minimize ambient noise levels.

7.2.8 Reduction of risks of accidents and injuries to workers

The contractor will have to be committed to adherence to the occupational health and safety rules and regulations stipulated in Occupational Health and Safety Act, OSHA 2007. The WBG EHS\(^1\) guidelines will have to be adhered to as a minimum standard to manage, especially, occupational health and safety. In this regard, the contractor is committed to provision of appropriate personal protective equipment, as well as ensuring a safe and healthy environment for construction workers and local residents as outlined in the ESMMP and these WBG EHS Guidelines.

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\(^1\) WBG OHS Guidelines: https://www.ifc.org/wps/wcm/connect/9aef2880488559a983acd36a6515bb18/2%2BOccupational%2BHealth%2Band%2BSafety.pdf?MOD=AJPERES
7.2.9 Reduction of energy consumption

The proponent shall ensure responsible electricity use at the construction site through sensitization of staff to conserve electricity by switching off electrical equipment or appliances when they are not being used. In addition, proper planning of transportation of materials will ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts. Complementary to these measures, the proponent shall monitor energy use during construction and set targets for reduction of energy use.

7.2.10 Minimization of water use

The contractor shall ensure that water is used efficiently at the site by sensitizing construction staff to avoid irresponsible water usage to minimize pressure on the local water resource. Water will be sourced externally, including using the nearby rivers and streams after obtaining licenses from WARMA that will be applied for if needed.

7.3 Mitigation of operation phase impacts

7.3.1 Management of storm-water runoff

The contractor will ensure that proper drainage is provided and regularly maintained for storm-water runoff management.

7.3.2 Residual and cumulative impacts:

These include operations and maintenance impacts – solid waste management, maintenance of lighting and drainage – and these will be managed by the county government after project completion and commissioning and during operations.

7.3.3 Traffic Management and Road Safety

The Machakos County Government in consortium with the Matungulu Sub-County staff shall ensure there is community sensitization, use of flag persons for school children crossing the constructed roads, use of adequate signs, zebra crossings and bumps for traffic management and road safety. The County Government should also ensure they educate and sensitize the school children on safe use of the constructed road.

7.4 Mitigation of decommissioning phase impacts

7.4.1 Efficient solid waste management

Solid waste resulting from demolition or dismantling works will be managed as described above.
7.4.2 Reduction of dust concentration
High levels of dust concentration resulting from demolition or dismantling works will be minimized as described earlier.

7.4.3 Minimization of noise and vibration
Significant impacts on the acoustic environment will be mitigated as described.

7.5 Grievance redress system
A grievance redress mechanism as attached in the appendix will be used to handle any complaints mainly during project implementation.

7.6 Gender mainstreaming
There will be a system to prevent sexual and gender based violence and adequate mechanisms in place to protect local vulnerable population especially women and minors from risks associated with influx of workers (harassment, underage sex). There will also be a code of conduct established for Contractor employees and contract workers acknowledging a zero tolerance policy towards child labor and child sexual exploitation. The contractor will also be required to engage women at work and this will be checked during safeguards compliance audits that will be conducted from time to time as works progresses to check the percentage of women employed. To prevent large influx of workers that may encourage sex work, it is recommended that the contractor employs local labour and considering employment of women which is consistent with the Good Practice Note\(^2\).

7.7 HIV/AID awareness and prevention
To prevent spread and HIV-AIDS infection owing to the project, there shall be a behavior changes communication and awareness and sensitization on sexually transmitted diseases.

7.8 Social Protection
There will be adequate mechanisms in place to protect local vulnerable population especially women and minors from risks associated with influx of workers (harassment, underage sex). This system will ensure having security on site provided by the contractor as well as sensitization and enforcement by the contractor. There will also be a code of conduct established for Contractor employees and contract workers acknowledging a zero tolerance policy towards child labor and child sexual exploitation. Additionally, the contractor will

employ their skilled staff and apply unskilled construction labour from the local population as far as possible to minimize on influx of foreigners into the community. This will ensure project support during the construction process. This being a relatively small localized project, it is unlikely to have any significant labour influx. However, the project will have strengthened GRMs and other monitoring mechanisms to provide safe and ethical reporting systems for people wishing to report cases of GBV, and their linkage with adequate response for Promoting interventions to reduce the level of tolerance to GBV by contributing to community mobilization around project sites, including the use of partnerships with NGOs, national and local authorities and other leaders in accordance to the requirements of the Good Practice Note Addressing Gender Based Violence in Investment Project Financing involving Major Civil Works\(^3\).

CHAPTER EIGHT: ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMMP)

8.1 Significance of an ESMMP

An Environmental and Social Management and Monitoring Plan (ESMMP) for developing projects is used to provide a logical framework within which identified negative environmental impacts can be avoided, mitigated and monitored. In addition, the ESMMP assigns responsibilities of actions to various actors and provides a timeframe within which mitigation measures and monitoring can be done. The EMMP is a vital output of an Environmental and Social Impact Assessment as it provides a checklist for project monitoring and evaluation. The EMMP outlined below will address the identified potential negative impacts and mitigation measures of the project based on the chapters on Environmental Impacts and Mitigation of the Negative Impacts.

8.1.1 Pre-Construction & Construction Phases ESMMP

The necessary objectives, activities, mitigation measures, and allocation of costs and responsibilities pertaining to prevention, minimization and monitoring of significant negative impacts and maximization of positive impacts associated with the construction phase of the project are as outlined below:
Table 3: The ESMMP for the Construction of Tala Township Roads in Machakos County

<table>
<thead>
<tr>
<th>Impact</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party*</th>
<th>Monitoring Mechanism</th>
<th>Approximate Cost (Kshs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Increased exploitation of raw materials</td>
<td>▪ Maximize sourcing of construction materials from suppliers who use environmentally friendly processes in their operations.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Commitment to only using construction materials from NEMA licensed facilities</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Ensure accurate budgeting and estimation of actual construction material requirements to ensure that the least amount of material necessary is ordered</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Ensure that damage or loss of materials at the construction site are kept minimal through proper storage</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td>2) Run off and soil erosion</td>
<td>▪ Apply soil erosion control measures such as leveling of the project site to reduce run-off velocity and increase infiltration of storm water into the soil, e.g. silt traps, barriers, tree planting.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Ensure that construction vehicles are restricted to existing graded roads to avoid soil compaction within the project site.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Debris removal and collection and disposal</td>
<td>Contractor &amp; Machakos County Government</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Ensure that any compacted areas are ripped to reduce run-off.</td>
<td>Contractor</td>
<td>6 months</td>
<td>-</td>
</tr>
<tr>
<td>Impact</td>
<td>Recommended Mitigation Measures</td>
<td>Responsible Party*</td>
<td>Monitoring Mechanism</td>
<td>Approximate Cost (Kshs)</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>§ Through accurate estimation of the sizes and quantities of materials required, order materials in the sizes and quantities they will be needed, rather than cutting them to size, or having large quantities of residual materials.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>3) Solid waste generation</td>
<td>§ Ensure that construction materials left over at the end of construction will be used in other projects rather than being disposed of.</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td>§ Ensure that damaged or wasted construction materials will be recovered for refurbishing and use in other projects</td>
<td>Contractor</td>
<td>One-off</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>§ Utilize opportunities for donating recyclable/reusable or residual materials to local community groups, institutions and individual local residents or home owners.</td>
<td>Contractor</td>
<td>One-off</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>§ Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>§ Provide facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements</td>
<td>Contractor</td>
<td>One-off</td>
<td></td>
<td>70,000</td>
</tr>
<tr>
<td>Impact</td>
<td>Recommended Mitigation Measures</td>
<td>Responsible Party*</td>
<td>Monitoring Mechanism</td>
<td>Approximate Cost (Kshs)</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------</td>
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<td>------------------------</td>
</tr>
<tr>
<td></td>
<td>Purchase of perishable construction materials such as paints should be done incrementally to ensure reduced spoilage of unused materials</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Use construction materials that have minimal or no packaging to avoid the generation of excessive packaging waste</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Reuse packaging materials such as cartons, cement bags, empty metal and plastic containers to reduce waste at the site</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Dispose waste more responsibly by dumping at designated dumping sites or engaging the use of a registered waste disposal company or Machakos County Government</td>
<td>Contractor &amp; Machakos County</td>
<td>Throughout construction period</td>
<td>70,000/month</td>
</tr>
<tr>
<td>4) Air pollution (Dust / vehicle emissions)</td>
<td>Sprinkle water on graded access routes each day to reduce dust generation by construction vehicles</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>50,000/month</td>
</tr>
<tr>
<td></td>
<td>Sensitize truck drivers to avoid unnecessary racing of vehicle engines at loading/offloading points and parking areas. Switch off or keep vehicle engines at these points</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Ensure proper planning of transportation of materials to ensure that vehicle fills are increased in order to reduce the number of trips done per vehicle or the number of vehicles on the road</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td>Impact</td>
<td>Recommended Mitigation Measures</td>
<td>Responsible Party*</td>
<td>Monitoring Mechanism</td>
<td>Approximate Cost (Kshs)</td>
</tr>
<tr>
<td>------------------------</td>
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<td>------------------------</td>
</tr>
<tr>
<td>5) Loss of Biodiversity</td>
<td>▪ Sensitize construction vehicle drivers and machinery operators to switch off engines of vehicles or machinery not being used.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Limit clearance of vegetation to only where it is absolutely necessary</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Ensure landscaping post-construction</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td>6) Noise Pollution</td>
<td>▪ Sensitize construction drivers to avoid gunning of vehicle engines or hooting especially when passing through sensitive areas such as residential areas and schools</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Ensure that construction machinery are kept in good condition to reduce noise generation and maintenance is carried out regularly as per manufacturers’ specifications</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Ensure working within day light hours as specified by NEMA i.e. 6.01am to 6pm</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Ensure that all generators and heavy duty equipment are insulated or placed in enclosures to minimize ambient noise levels.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td>7) Depletion of energy resources</td>
<td>▪ Ensure planning of transportation of materials to ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Monitor energy use during construction and set targets for reduction of energy use.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td>8) Exploitation of water resources</td>
<td>▪ Promote recycling and reuse of water as much as possible.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Organize collection of rainwater on site.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
</tbody>
</table>
Road Safety

- Prevention of traffic accidents and minimizing injuries suffered by project personnel and the public. Measures should include: Emphasizing safety aspects among drivers; Improving driving skills and requiring licensing of drivers; Adopting limits for trip duration; Avoiding dangerous routes and times of day to reduce the risk of accidents; Use of speed control devices on trucks, and remote monitoring of driver actions.
- Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.
- Minimizing pedestrian interaction with construction vehicles.
- Collaboration with local communities and responsible authorities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations where children may be present.
- Collaborating with local communities on education about traffic and pedestrian safety (e.g. school education campaigns).
- Coordination with emergency responders to ensure that appropriate first aid is provided in the event of accidents.
- Using locally sourced materials, whenever possible, to minimize transport distances. Locating associated facilities such as worker camps close to project sites and arranging worker bus transport to minimizing external traffic.
- Employing safe traffic control measures, including road signs and flag persons to warn of dangerous conditions.

<p>| Contractor | Throughout construction period | - |</p>
<table>
<thead>
<tr>
<th>Impact</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party*</th>
<th>Monitoring Mechanism</th>
<th>Approximate Cost (Kshs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10) Accidents</td>
<td>▪ Ensure that provisions for reporting incidents, accidents and dangerous occurrences during construction using prescribed forms obtainable from the local Occupational Health and Safety Office (OHSO) logs are in place.</td>
<td>Contractor</td>
<td>Continuous</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Ensure that the premises are insured as per statutory requirements (third party and workman’s compensation)</td>
<td>Proponent</td>
<td>Annually</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Develop, document and display prominently an appropriate SHE policy for construction works</td>
<td>Contractor</td>
<td>by commencement of construction</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Contractor to document and report all accidents and incidents to NaMSIP and / or the World Bank within 24 hours for all accidents or incidents occurring on project site or outside of the project site (but caused by the project equipment or staff/contractor)</td>
<td>Contractor</td>
<td>Continuous</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Provisions must be put in place for the formation of a Health and Safety Committee, in which the employer and the workers are represented</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td>11) Hygiene</td>
<td>▪ Suitable, efficient, clean, well-lit and adequate gender specific sanitary conveniences should be provided for construction workers</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td>12) Medical Examinations</td>
<td>▪ Arrangements must be in place for the medical examination of all construction employees before, during and after termination of employment.</td>
<td>Contractor</td>
<td>Continuous</td>
<td>-</td>
</tr>
</tbody>
</table>
### Impact

<table>
<thead>
<tr>
<th>Impact</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party*</th>
<th>Monitoring Mechanism</th>
<th>Approximate Cost (Kshs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13) Machinery Safety</td>
<td>▪ Ensure that machinery, equipment, personal protective equipment, appliances and hand tools used in construction do comply with the prescribed safety and health standards and be appropriately installed maintained and safeguarded</td>
<td>Contractor</td>
<td>One-off</td>
<td></td>
</tr>
<tr>
<td>14) Injuries caused by machineries and equipments.</td>
<td>▪ Ensure that equipment and work tasks are adapted to fit workers and their ability including protection against mental strain</td>
<td>Contractor</td>
<td>Continuous</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ All machines and other moving parts of equipment must be enclosed or guarded to protect all workers from injury</td>
<td>Contractor</td>
<td>One-off</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Arrangements must be in place to train and supervise inexperienced workers regarding construction machinery use and other procedures/operations</td>
<td>Contractor</td>
<td>Continuous</td>
<td>20,000 per training</td>
</tr>
<tr>
<td></td>
<td>▪ Equipment such as fire extinguishers must be examined by a government authorized person. The equipment may only be used if a certificate of examination has been issued</td>
<td>Contractor</td>
<td>Continuous</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Reports of such examinations must be presented in prescribed forms, signed by the examiner and attached to the general register</td>
<td>Contractor</td>
<td>Continuous</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Ensure that materials (cement bags, aggregates, bitumen drums) are stored or stacked in such manner as to ensure their stability and prevent any fall or collapse</td>
<td>Contractor</td>
<td>Continuous</td>
<td></td>
</tr>
<tr>
<td>Impact</td>
<td>Recommended Mitigation Measures</td>
<td>Responsible Party*</td>
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</tr>
<tr>
<td></td>
<td>▪ Conduct sensitization campaign for the public on risks related to construction sites.</td>
<td>Contractor</td>
<td>Twice (before construction begins) and a repeated after 1 month.</td>
<td>-</td>
</tr>
<tr>
<td>15) Poor storage of materials</td>
<td>▪ Ensure that items are not stored/stacked against weak walls and partitions</td>
<td>Contractor</td>
<td>Continuous</td>
<td>_</td>
</tr>
<tr>
<td></td>
<td>▪ Ensure proper storage of liquid materials in leak-proof containers</td>
<td>Contractor</td>
<td>Continuous</td>
<td>_</td>
</tr>
<tr>
<td></td>
<td>▪ All floors, steps, stairs and passages of the premises must be of sound construction and properly maintained</td>
<td>Contractor</td>
<td>Continuous</td>
<td>_</td>
</tr>
<tr>
<td>16) Emergencies.</td>
<td>▪ Design suitable documented emergency preparedness and evacuation procedures to be used during any emergency. Such procedures must be tested at regular intervals</td>
<td>Contractor</td>
<td>Initially by commencement of construction, then every 3 months</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Ensure that adequate provisions are in place to immediately stop any operations where there is an imminent and serious danger to health and safety and to evacuate workers</td>
<td>Contractor</td>
<td>by commencement of construction</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Ensure that the most current emergency telephone numbers posters are prominently and strategically displayed within the construction site</td>
<td>Contractor</td>
<td>by commencement of construction</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Provide measures to deal with emergencies and accidents including adequate first aid arrangements</td>
<td>Contractor</td>
<td>Continuous</td>
<td>-</td>
</tr>
<tr>
<td>Impact</td>
<td>Recommended Mitigation Measures</td>
<td>Responsible Party*</td>
<td>Monitoring Mechanism</td>
<td>Approximate Cost (Kshs)</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
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<td>----------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Sensitize the public on potential emergency situations</td>
<td>Contractor</td>
<td>Twice (before construction begins) and a repeated after 1 month.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provision must be made for persons to be trained in first aid, with a certificate issued by a recognized body.</td>
<td>Contractor</td>
<td>by commencement of construction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire-fighting equipment such as fire extinguishers should be provided at strategic locations such as stores and construction areas.</td>
<td>Contractor</td>
<td>One-off</td>
<td>50,000</td>
<td></td>
</tr>
<tr>
<td>Regular inspection and servicing of the equipment must be undertaken by a reputable service provider and records of such inspections maintained</td>
<td>Contractor</td>
<td>Every 3 months</td>
<td>25,000</td>
<td></td>
</tr>
<tr>
<td>Signs such as “NO SMOKING” must be prominently displayed within the premises, especially in parts where inflammable materials are stored</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Enough space must be provided within the premises to allow for adequate natural ventilation through circulation of fresh air</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Well stocked first aid box which is easily available and accessible should be provided within the premises</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
### Impact

<table>
<thead>
<tr>
<th>Impact</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party*</th>
<th>Monitoring Mechanism</th>
<th>Approximate Cost (Kshs)</th>
</tr>
</thead>
</table>
| 17) Food and toxins. | ▪ Ensure that all chemicals used in construction are appropriately labeled or marked and that material safety data sheets containing essential information regarding their identity, suppliers classification of hazards, safety precautions and emergency procedures are provided and are made available to employees and their representatives  
▪ Keep a record of all hazardous chemicals used at the premises, cross-referenced to the appropriate chemical safety data sheets  
▪ There should be no eating or drinking in areas where chemicals are stored or used  
▪ Ensure that workers at the excavation sites and other dusty sites are adequately protected from inhalation of substantial quantities of dust through provision of suitable protective gear (e.g. nose masks) | Contractor          | One-off             | _                      |
| 18) Provisions of PPE to Workers. | ▪ Provide workers in areas with elevated noise and vibration levels, with suitable ear protection equipment such as ear muffs  
▪ Suitable overalls, safety footwear, dust masks, gas masks, respirators, gloves, ear protection equipment etc should be made available and construction personnel must be trained to use the equipment | Contractor          | One-off             | _                      |
|                        |                                                                                                   | Contractor          | Once off             | _                      |
### Environmental and Social Impact Assessment Project Report for the Construction of Tala Township Roads in Machakos County in the Nairobi Metropolitan Region

<table>
<thead>
<tr>
<th>Impact</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party*</th>
<th>Monitoring Mechanism</th>
<th>Approximate Cost (Kshs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>▪ Ensure that construction workers are provided with an adequate supply of wholesome drinking water which should be maintained at suitable and accessible points.</td>
<td>Contractor</td>
<td>One-off</td>
<td>15,000/month</td>
</tr>
<tr>
<td></td>
<td>▪ Provide and maintain adequate and suitable accommodation for clothing not worn during working hours for construction employees</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Provide and maintain, for the use of all workers whose work is done standing, suitable facilities for sitting sufficient to enable them to take advantage of any opportunities for resting which may occur in the course of their employment</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Ensure that conveniently accessible, clean, orderly, adequate and suitable washing facilities are provided and maintained in within the site</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td>19) Sanitary</td>
<td>▪ All work places must be kept in a clean state, and free from effluvia arising from any drain, sanitary convenience or nuisance</td>
<td>Contractor</td>
<td>Continuous</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Accumulations of dirt and refuse should be cleaned daily from the floors, benches, staircases and passages</td>
<td>Contractor</td>
<td>Daily</td>
<td>-</td>
</tr>
<tr>
<td>19) Insecurity</td>
<td>▪ Require each contractor to sign the Code of Conduct and review the content of the Code periodically</td>
<td>Contractor</td>
<td>Continuous</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the Construction site.</td>
<td>Contractor</td>
<td>Continuous</td>
<td>-</td>
</tr>
<tr>
<td>Impact</td>
<td>Recommended Mitigation Measures</td>
<td>Responsible Party*</td>
<td>Monitoring Mechanism</td>
<td>Approximate Cost (Kshs)</td>
</tr>
<tr>
<td>--------------------------------</td>
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<td>--------------------</td>
<td>----------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Conduct sensitization campaign</td>
<td>Conduct sensitization campaign for the public on risks related to construction sites.</td>
<td>Contractor</td>
<td>Twice (before</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>construction begins)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>and a repeated after</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 month.</td>
<td></td>
</tr>
<tr>
<td>20) HIV-AIDS Management</td>
<td>Awareness creation and sensitization to workers and other persons engaged in the project to reduce or eliminate chances of infections of HIV-AIDS and other sexually transmitted diseases</td>
<td>Contractor</td>
<td>Continuous</td>
<td>Kshs. 500,000</td>
</tr>
<tr>
<td>21) Management of complaints</td>
<td>Employ a robust grievance redress mechanism incorporating a negotiation and/or mediation team or party</td>
<td>Grievance Chairman / Committee (Stewarded by Resident Engineer)</td>
<td>Continuous</td>
<td>-</td>
</tr>
<tr>
<td>and/or grievances</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL ESMMP BUDGET</td>
<td></td>
<td></td>
<td></td>
<td>Kshs. 1,475,000</td>
</tr>
</tbody>
</table>

NB:
1. NaMSIP* - The key responsibilities regarding compliance to the above ESMMP mainly rests on the Contractor. However, NaMSIP Safeguards Team will ensure adequate monitoring and evaluation for the Contractor for no non-conformances.
2. For items with no budget assigned, the budget is coming from the construction budget and has been allowed for in the Bill of Quantities.
3. The Contractor will also, based on this ESMMP, compile and expected to comply with a Contractor Environmental and Social Management Plan that also includes an Environmental and Social Health and Safety Plan, ESHS, and a Code of Conduct.
8.1.2 Operational Phase ESMMP
The necessary objectives, activities, mitigation measures, and allocation of costs and responsibilities pertaining to prevention, minimization and monitoring of significant negative impacts and maximization of positive impacts associated with the operational phase the project are outlined below.

<table>
<thead>
<tr>
<th>Objective/Plan</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Monitoring Mechanism</th>
<th>Cost (Kshs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Storm Water Run-off Management</td>
<td>Provide proper storm water drainage from the paved roads.</td>
<td>Contractor</td>
<td>One-off</td>
<td>Part of project costs</td>
</tr>
<tr>
<td></td>
<td>Provide regular inspection and maintenance of the drains.</td>
<td>County</td>
<td>Continuous</td>
<td>-</td>
</tr>
<tr>
<td>2) Health and Safety Risks.</td>
<td>Implement all necessary measures to ensure health and safety of workers and the general public during operation of the project as stipulated in OSHA 2007</td>
<td>County</td>
<td>Continuous</td>
<td>-</td>
</tr>
<tr>
<td>3) Solid waste management</td>
<td>Implement measures to ensure adequate solid waste management in the park including putting wastes receptacles and disposal</td>
<td>County</td>
<td>Continuous</td>
<td>-</td>
</tr>
<tr>
<td>4) Road management</td>
<td>Implement a sustainable road management plan after hand-over with clear structure of management</td>
<td>County</td>
<td>Continuous</td>
<td>-</td>
</tr>
<tr>
<td>5) HIV-AIDS Management</td>
<td>Awareness creation and sensitization to workers and other persons post-project to reduce or eliminate chances of infections of HIV-AIDS and other sexually transmitted diseases</td>
<td>County</td>
<td>Continuous</td>
<td>-</td>
</tr>
</tbody>
</table>

8.1.3 Decommissioning Phase
In addition to the mitigation measures provided above, it is necessary to outline some basic mitigation measures that will be required to be undertaken once all operational activities of the project have ceased. The necessary objectives, mitigation measures, allocation of responsibilities,
time frames and costs pertaining to prevention, minimization and monitoring of all potential impacts associated with the decommissioning and closure phase of the project are outlined below.

Table 5: ESMMP for the Decommissioning Phase
If any decommissioning is required, the total budget for the decommissioning ESMMP will be included in it as part of the decommissioning costs since the full scope of decommissioning will have to be established and ascertained.

<table>
<thead>
<tr>
<th>Environmental Impact</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Time Frame</th>
<th>Cost (Kshs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sold Waste Generation.</td>
<td>▪ All removed materials that will not be used for other purposes must be removed and recycled/reused as far as possible</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Where recycling/reuse of the removed materials and other demolition waste is not possible, the materials should be taken to a licensed waste disposal site or arrangements made with Machakos County</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Donate reusable demolition waste to charitable organizations, individuals and institutions</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td>Degeneration of vegetation at the construction site</td>
<td>▪ Implement an appropriate re-vegetation program to restore the site to better status</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Consider use of indigenous plant species in re-vegetation</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Trees should be planted at suitable locations so as to interrupt slight lines (screen planting), between the adjacent residential area and the development.</td>
<td>Contractor</td>
<td>Once-off</td>
<td>-</td>
</tr>
</tbody>
</table>
CHAPTER NINE: AUXILLIARY INFORMATION

9.1 Budget
The summary of the certified Bills of Quantities (BoQ) that form the budget of the project will be attached in the Annexes. The total project cost is Kshs. 98,300,791/05. The implementation of the ESMMP is included into the BoQ whose cost is estimated by the ESIA report as Kshs. 1,475,000.

9.2 Monitoring Guidelines
Continuous observations and assessment is essential so that if unforeseen safety dangers are noticed, alternatives must be sought for. Risk assessment of accidents, and other adverse impacts should not be ignored in the construction plan. Waste management in the construction should be strictly followed. Mitigation measures of storm water management are essential. Safety standards should constantly be maintained, with indicators like condition of equipment, contractor compliance with the set regulations, and tracking of accidents on-site logged regularly as required by the Directorate of Occupational Health & Safety Services, DOHSS under the Kenyan Ministry of Labor & Social Services. To monitor noise levels, the Noise and Excessive Vibrations Pollution Control Regulations, 2009 should be adhered to as represented in the following table of the maximum permissible noise levels for construction sites (measurement taken within the facility).

<table>
<thead>
<tr>
<th>Facility</th>
<th>Maximum Noise level permitted (leq) in dB (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Health facilities, educational institutions, homes for disabled and residential areas</td>
<td>60 (Day 6.01am-6.00pm)</td>
</tr>
<tr>
<td>(ii) Residential</td>
<td>60</td>
</tr>
<tr>
<td>(iii) Areas other than those prescribed in (i) and (ii)</td>
<td>75</td>
</tr>
</tbody>
</table>

9.3 Reporting
Monthly reporting by the site contractor to the proponent is necessary to ensure the project is executed as per the plans and drawings. The safety officer should always remain on site to report any safety concerns for urgent mitigation. The officer should also at all times enforce safety requirements as per the relevant legislation as covered in this report. The contractor must consult the proponent to maintain a clear understanding of all the aspects of the project. Tala
Town Council should be involved where necessary in early stages of the project to increase acceptance and ensure necessary partnership is in place (e.g. waste removal requirements).
CHAPTER TEN: CONCLUSION AND RECOMMENDATIONS

During the preparation of this report for the development of the proposed development, it is observed and established that most of the negative impacts on the environment can be mitigated and have potentially short term low significant effects. The positive impacts are highly rated and will benefit all stakeholders and the Tala Township residents at large. The project proponents have proposed to adhere to prudent implementation of the environmental management and monitoring plan. The contractor should be committed to obtaining all necessary permits and licenses from the relevant authorities and have qualified and adequate personnel to do the project as proposed. The proponent has proposed adequate safety and health mitigation measures as part of the relevant statutory requirements.

It is the duty of NEMA to consider licensing the project subject to annual environmental audits once it has been commissioned. This will be in compliance with the Environmental Management and Coordination Act, EMCA of 1999 and the Environmental Impact Assessment and Audit Regulations, Legal Notice No. 101 of 2003.
REFERENCES


Kenya gazette supplement Acts Building Code 2000 by government printer, Nairobi

Kenya gazette supplement Acts Land Planning Act (Cap. 303) government printer, Nairobi

Kenya gazette supplement Acts Local Authority Act (Cap. 265) government printer, Nairobi

Kenya gazette supplement Acts Physical Planning Act, 1999 government printer, Nairobi

Kenya gazette supplement Acts Public Health Act (Cap. 242) government printer, Nairobi


The Environmental Management & Coordination Act 1999 (EMCA 1999).

World Bank Safeguards – OP4.01 & OP4.12
Annexure

A. Sample Chance Find Procedures
B. Plate of Sample Photographs
C. Consultations and Public Participation - CPP
   i. Attendance Sheets – Volume 2 attachment
   ii. Minutes of Stakeholders Meeting – Meeting No. 1
   iii. Minutes of Stakeholders Meeting – Meeting No. 2.
   iv. Questionnaires – see Volume 2 attachment
D. Grievance Redress Mechanisms
E. Design Drawings
F. Summarized Bill of Quantities
Annex A. Sample Chance Find Procedures

Chance find procedures are an integral part of the project EMMP and civil works contracts. The following is proposed in this regard:

If the Contractor discovers archaeological sites, historical sites, remains and objects, including graveyards and/or individual graves during excavation or construction, the Contractor shall:

- Stop the construction activities in the area of the chance find;
- Delineate the discovered site or area;
- Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities or the Ministry of State for National Heritage and Culture take over;
- Notify the supervisor, Project Environmental Officer and Project Engineer who in turn will notify the responsible local authorities and the Ministry of State for National Heritage and Culture immediately (within 24 hours or less);

Responsible local authorities and the Ministry of State for National Heritage and Culture would then be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by the archaeologists of the National Museums of Kenya. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage, namely the aesthetic, historic, scientific or research, social and economic values.

Decisions on how to handle the find shall be taken by the responsible authorities and the Ministry of State for National Heritage and Culture. This could include changes in the layout (such as when finding irremovable remains of cultural or archeological importance) conservation, preservation, restoration and salvage.

Implementation for the authority decision concerning the management of the finding shall be communicated in writing by relevant local authorities.

Construction work may resume only after permission is given from the responsible local authorities or the Ministry of State for National Heritage and Culture concerning safeguard of the heritage.
Annex B. Plate of Selected Photographs

Section of earth road abutting to main road in Tala to be upgraded to bitumen standards

CPP Meeting No. 1 involving key leaders and county staff

Another section of road to be constructed to bitumen standards
Annex C: CPP DOCUMENTS

Attendance sheets and Questionnaires to be attached separately – this will be done and added in the PDF soft and hard copies. This is in the mean time in PDF and sent separately as Volume 2
MINUTES OF THE PUBLIC PARTICIPATION AND CONSULTATION MEETING FOR THE PROPOSED TALA ROADS IMPROVEMENT HELD ON THURSDAY, 16TH AUGUST 2018 IN TALA TOWN.

AGENDA
1. Introduction
2. Scope of works for the project
3. Remarks from the environmental expert.
4. Issues and questions from the public.
5. Way forward

<table>
<thead>
<tr>
<th>MINUTE</th>
<th>ITEM</th>
<th>ACTION BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min 1 16/08/2018</td>
<td>1. Introduction</td>
<td>All to note</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min 2 16/08/2018</td>
<td>2. Scope of works for the project.</td>
<td>All to note</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Introduction

The meeting began at 11.00 AM at Matungulu Sub-County offices with a word of prayer from Francis Muema. The chairperson Kimeu called the meeting into order and welcomed the members. He then requested the members to introduce themselves.

The chairperson informed the members that the meeting was meant to bring the different stakeholders together and engage them in information sharing and discussion of the issues relating to the project. The meeting was to create awareness of proposal to upgrade the Tala Township Roads to bitumen standards together with other ancillary works and to enable the public to participate in decision-making by commenting on the proposed development project during the meeting.

The chairperson explained that the meeting will offer several recommendations that, if implemented, could address and mitigate the challenges highlighted in the ESIA Report.

2. Scope of works for the project.

Eng. Samuel Mugo briefed the stakeholders on the Tala Roads Improvement as follows;

i. The project was necessitated by the increased dust and drainage challenges within Tala town. The roads improvement within town will be able to ease the movement within Tala Township and also address the drainage challenges which are experienced within the town.

ii. He explained that the project is supported and financed by World Bank and the Government of Kenya being implemented under NaMSIP program.

iii. He also explained that the project design has been completed and documentation for tendering was ready. He assured the
public that the contractor will take six months to implement
the project.

iv. In the project works scope, he told the members that the road
improvement is composed of 3 different sections which had a
total of 1.06 kilometers. He highlighted that the works on
those sections includes;
   a) Excavation and backfilling of road section
   b) Drainage works consisting of both open and close
drains
   c) Upgrading the road sections to bitumen level

v. Eng. Samuel Mugo then took the public through the design
and the roads which are covered under this project. He
explained that the roads will have a carriage way of 6 meters
and bitumen of two layers.

vi. He also explained that footpaths will be also be constructed
during the works as well as street lighting.

vii. An ESIA report is to be prepared to give the impact of the
project and the mitigation measures for the same.

3. Remarks from the environmental expert.

The NaMSIP Environmental Expert, Eng. Stephen Mwaura briefed
the members as follows;

i. The Ministry of Transport, Infrastructure, Housing and Urban
   Development through World Bank funded project, NaMSIP
   intends to improve the roads in Tala as part of the NaMSIP’s
   objective to strengthen urban services and infrastructure in the
   Nairobi Metropolitan Region.

ii. Before the commencement of any World Bank funded Project
   it’s a requirement that an ESIA report is given for their
   approval and also NEMA’s approval. Once approval is given
   by the World Bank and NEMA a license is issued to commence
   the works.

iii. For the approvals to be given, there has to have been public
   participation and consultation meeting. The public
   participation meeting is essential since it creates a platform
where the public can present their views pertaining the proposed project.

iv. The ESIA indicates the effects of the project on the environment and the mitigation measures.

v. Attendance list, minutes, questionnaires and pictures must be included in the ESIA report to prove that the public participation meeting took place.

He gave the members questionnaires and took them through every question. He emphasized that the feedback from the questionnaires will help improve the design and mitigation of adverse environmental and social factors within the project.

<table>
<thead>
<tr>
<th>Min 4 16/08/2018</th>
<th>4. Issues and questions from the public.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The residents who are likely to be affected by the project directly or indirectly raised the following issues;</td>
</tr>
</tbody>
</table>
|                | i. Thomas Kivindyo – Asked the plans which are available to address the issue of the floods which is caused by poor drainage.  
   A. Renovation of culverts and construction of line drains will be carried out to address the drainage problem. |
|                | ii. Francis Muema: needed to know how the dust issues will be addressed.  
   A: The dust management, the public was assured that environmental dust control through watering will be carried out to minimize the effect of the dust. |
|                | iii. Paul Mwele: The resident wanted to know how the drainage on Limuru road, which is an issue affecting his property.  
   A: the resident was assured that the drainage on this section of the project will be directed to the main road. In addition, on the upper side, the resident was assured that the drainage will be diverted from this road to reduce the flow amount. Additionally, the drainage will be provided on both sections of the road. |
|                | iv. Rebbeca Mutua: She noted that Limuru road finish level was too high and was draining to the residents near.  
   A: She was assured that the Engineer was aware of the situation and that sufficient drains will be provided on both sections of the road sections. |
|                | v. Felix Manthi: The resident was worried about the duplication of the project by NaMSIP and the new World Bank Municipality projects in counties.  
   A: He was assured that there is enough communication to ensure that project duplication is not achieved. He was told that the county was involved in the implementation of the |
vi. Elijah Ndiku: The resident raised the issue of the road which was not included in the project scope. He also noted that area in that section has some areas which experience drainage due to drainage issues.

A: He was told that the road had been included on the 1st draft and was left due to budget constraints.

vii. Joseph Wambua: He raised concern asking when the project will take off.

A: He was assured that this time the implementation will be carried out once the contractor is procured and the necessary approvals received.

viii. Aron Muasya: The resident raised the issue on the drainage on Ngonda road that it needed to be diverted.

A: He was told that the management of the drainage will be important to ensure blockage of the drain does not happen. He was assured the sufficient drains on this road will be provided to accommodate all the storm water.

ix. Lazarus Kitunguu: The resident wanted to know about the outfall of the drain system which he blamed for the floods in the town.

A: He was assured that enough research to ensure that the outfall of the drainage system does not have adverse effect to the community.

x. Francis Muema: He wanted to know how the issues relating to cracks development due to compaction of the road works will be addressed.

Ans: He was assured that a Baseline survey will be carried out before the construction commences. He was told that the construction method will be favorable to ensure that cracks do not develop.

xi. Bonface Mutie: He wanted to ensure that the boda boda operators are well as regards of alternative routes.

Ans: He was assured that an alternative routes will be provided for the boda boda operators to ensure they operate without hitches during the implementation stage.

xii. Francis Muema: He asked about the involvement of the community members in the construction phase especially in employment and supplies sections

Ans: He was assured that employment opportunities will be provided to the qualified community members.

xiii. Bonface Mutie: He wanted to know the areas where they can report in case the contractor is not doing the works according to the standards.

Ans: He was told that there will be a site office where the grievances desk will be available. He was told that this office
will be independent to listen to the grievances and address them.
There being no other business the meeting was adjourned at 1.30 PM with a word of prayer.

Environmental Expert
Signature _______________ Date ____________

Social Expert
Signature _______________ Date ____________

Engineer
Signature _______________ Date ____________
Public Participation on the Tala Township Roads held on 20th September 2018 in the Compound of Matungulu Sub-County Offices

Agenda

Prayers
Introductions
Public Participant meeting
Close with a word of Prayer

Eng Samuel Mugo – Project Status and Disclosure.
This team has come for this public participation because it is crucial to complete the ESIA report. We had wanted to build a new market but since that did not work out because of the complications of getting a relocation site, we have instead decided to relocate this money to build a road for the Tala people. Tala has benefitted a lot from NaMSIP with over 4.6 billion spent on building the Tala Kangundo road. Should some extra money remain we shall add a small section of the feeder road. We intend to do a good job to assist wananchi. We shall also do the drains, street lights and footpaths as well. The length of the road will be 1.04km. The tendering process is now complete and the evaluation process should be done in 3-4 weeks and a contractor thereafter selected to begin the work. We purpose to complete this work within the next 6 months. We are aware of the challenges of drainage we have also ensured that this has been included in the works.

Eng. Stephen Mwaura – Safeguards Requirements
According to the new constitution one is required to carry out public participation, and engage the people to make them understand and to the buy in from the community. This is why we have come back for a second public participation to ensure as many people and interest groups are included and consulted. Most of you have heard about Nema. The rules and regulations from Nema stipulate we must write a report and get clearance on social and environmental issues from them. It has guidelines which must be followed and therefore we must get public views on the environmental and social issues which will be impacted by the construction of this road. We must look at environmental issues which could affect the public. This report will be taken to Nema for approval. We must follow the right procedure and listen to the people.
The road for instance will help in reducing the dust and improve drainage of the area. We would like you to now feel free and ask any questions that you may have.

**Plenary Session**

**Joseph Kimani - Businessman from Tala**

Tala has problems of drainage all water from surrounding area comes to Tala – it causes flooding. Can this project expand a little to area near the church and can some drainage be included as well?. Last time we asked questions do we need to repeat ourselves or you have factored these in ? The drainage in Tala is very bad, I am wondering if your team has taken care of these issues because this has an impact on the environment.

**Response - Eng Mugo**

We have listened to you and added 500m extra of drainage to factor in the problem of storm water flooding. If we make some savings we shall indeed expand and include these areas you are requesting. We have found an outfall that will help prevent some of these drainage issues. It will help prevent and control the storm-water flooding the town areas. Our Engineers and those of the county will discuss and draw up a feasible plan to mitigate this problem. We shall try our best to cover many areas but due to budget constraints, the most we can manage is 30%. We are aware of the environmental issues and we shall not interfere with the riparian areas. We will also take care of solid waste management during project works.

**Joseph Luusa - Businessman**

This is a good project because this road can get very busy. There is also a lot of produce that comes into town from Tala. There is also a lot of building materials such as stone and sand passing through this road. I am requesting you therefore to increase the tarmac distance a little further to Kinyui area which is very productive.

**Pastor Paul Musyoka**

When doing the road what arrangement do you have to manage the traffic and the parking – which is already a big problem in this town?

**Responses - Eng Mugo**

This road is under NaMSIP but the Kinyui road is under Kerra. When we go back we shall pass on this information to the Engineers of Kerra. We agree the traffic and parking is a big problem in this town. However, because of budget constraints it is difficult for us to construct the
parking lots. Later, the county government can organize to make this road one way and organize the best way to mark parkings. We recommend that the county government should be involving the residents in planning for the town.

Mathias Musyimi
Could you also consider doing this small road passing outside the sub county administrator’s office? It is very dusty and yet busy with so many people coming to give service.

Francis Mwitu
Give the local people priority when giving sub contracts.

Nzioki Mutua
Is it possible that those small roads connecting the market can you tarmac – so it can reduce the dust and mud in the market

Dan Musioki
It is difficult for the disabled people to cross the drains to get to the markets or shops or even the hotel. Can you put ramps to give us easier access?

Patrick Katuvi - Businessman in Tala
We must be patient and bare with the challenges of road construction for us to benefit from it. I urge us all to be patient and not grumble so much because of the dust and the noise from the construction. It is only for a short while as the road is being constructed.

Harrison Muyia
This is a good project –we shall cooperate with you.

Regina Mutheu
We are happy with this project because it will end our long suffering from the dust. Many of us suffer from allergies and coughs. Once the road is complete we can enjoy better health.

Angelica Kakutu
We are happy with this project and I urge all residents to co-operate with NaMSIP so that the construction can begin. We do not want the same fate of the indecision on the market to befall us.

Responses - Eng Mugo
The hiring of casuals and even those from this area who are qualified we shall advise the contractor to give them first priority. Thank you so much for the participation in this public meeting.
Eng. S Mwaura

We now kindly request you to fill the questionnaire for us.

The meeting ended with refreshments and word of prayer from Pastor Paul Musyoka.

Signed_________________________________   Date _____________________________
Annex D: GRIEVANCE RESOLUTION MECHANISM

1. Steps in dealing with grievances

1.1. Complaint received in writing from affected person

1.2. Recording of grievance in standard form

1.3. Reconnaissance site visit with the complainant.

1.4. Submission of detailed complaint to Resident Engineer for resolution by negotiation.

1.5. Submission of detailed complaint to the Grievance Committee for resolution by mediation.

1.6. Submission of complaint to NaMSIP for resolution.

The timelines for handling and closing complaints is as shown in the grievance resolution procedure below. The Grievance Committee shall be chaired by the Resident Engineer of the project who shall review the grievance log once every two weeks. The Resident Engineer will be the holder of the grievance log assisted by the Assistant Resident Engineer.

2. Composition of grievance committee

<table>
<thead>
<tr>
<th>Name</th>
<th>Designation</th>
<th>Organization</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Resident Engineer</td>
<td>NaMSIP</td>
<td>Committee Chairman</td>
</tr>
<tr>
<td>2</td>
<td>Assistant Resident Engineer</td>
<td></td>
<td>Committee Secretary</td>
</tr>
<tr>
<td>3</td>
<td>Site Administrator</td>
<td></td>
<td>Member</td>
</tr>
<tr>
<td>4</td>
<td>Surrounding Community representative</td>
<td></td>
<td>Member</td>
</tr>
<tr>
<td>5</td>
<td>Surrounding Community Representative</td>
<td></td>
<td>Member</td>
</tr>
<tr>
<td>6</td>
<td>Community Member</td>
<td></td>
<td>Community Representative</td>
</tr>
<tr>
<td>7</td>
<td>Business Member</td>
<td></td>
<td>Business Representative</td>
</tr>
</tbody>
</table>
GRIEVANCE RESOLUTION PROCEDURE

Receipt of Complaint from

Recording of grievance in standard forms

Reconnaissance site visit

Can the grievance be resolved by the Resident Engineer’s office? (Negotiation)

Yes – 3 days

No

Can the grievance be resolved by Grievance Committee? (Mediation)

Yes – 7 days

No

Submission of grievance to NaMSIP for resolution.

STORAGE OF ALL GRIEVANCE RELATED DOCUMENTS

Grievance resolved

Yes
Annex E: Sample of Design Drawings – showing some of the sensitive receptors
## Annex F: Summarized Bill of Quantities

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity/Labor/Hours</th>
<th>Rate</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Earthworks</strong></td>
<td></td>
<td></td>
<td>7,356,875</td>
</tr>
<tr>
<td><strong>Curbing and Drainage Works</strong></td>
<td></td>
<td></td>
<td>29,649,054</td>
</tr>
<tr>
<td><strong>Passage of Traffic</strong></td>
<td></td>
<td></td>
<td>18,616,163</td>
</tr>
<tr>
<td><strong>Natural Materials Sub Base &amp; Base</strong></td>
<td></td>
<td></td>
<td>460,060</td>
</tr>
<tr>
<td><strong>Bituminous Surface Treatments and Surface Dressing</strong></td>
<td></td>
<td></td>
<td>7,540,100</td>
</tr>
<tr>
<td><strong>Bituminous Mixes Bases, Binder Courses and Wearing Courses</strong></td>
<td></td>
<td></td>
<td>2,927,310</td>
</tr>
<tr>
<td><strong>Road Furniture</strong></td>
<td></td>
<td></td>
<td>9,323,560</td>
</tr>
<tr>
<td><strong>Ditch Works</strong></td>
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<td>1,485,000</td>
</tr>
<tr>
<td><strong>Sub-total (1)</strong></td>
<td></td>
<td></td>
<td>26,101,772</td>
</tr>
<tr>
<td><strong>Add 15% of Sub-Total 1 of Bill as Provisional sum for Contingencies to be expended as the whole or part or deleted as directed by the Engineer</strong></td>
<td></td>
<td></td>
<td>6,875,266</td>
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<tr>
<td><strong>Sub-total (2)</strong></td>
<td></td>
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<td>33,977,038</td>
</tr>
<tr>
<td><strong>Add 16% of Sub-total 2 for Value Added Tax (VAT)</strong></td>
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<td>5,436,320</td>
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<td><strong>Grand Total Carried Forward to Form of Bid</strong></td>
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<td>39,413,358</td>
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</table>

*Note: The table includes various subcategories and calculations for the summarized bill of quantities.*