March 28, 2017

PROPOSENT
The Senior Principal Superintending Engineer
Ministry of Transport, Infrastructure, Housing and Urban Development, State Department of Housing and Urban Development,

P.O. Box 30130 - 00100
NAIROBI

LEAD EXPERT
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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 Selected Roads in Kangundo Township in Machakos County. This report is issued without prejudice.
Lead Expert – Eng. Stephen Mwaura

Signature: ______________________

Date: ______________________
## ACRONYMS

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<tr>
<td>DOHSS</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 Kangundo 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 Kangundo 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 Kangundo 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 parking facilities and construction of road junctions abutting to these roads. The proponents are required to
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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.

7. Project Justification
The broad aim of this sub-project is to enhance mobility, accessibility and transport within Kangundo Township. This will greatly assist the utility of the bus park as well as enabling accessibility to the township’s commercial businesses adjacent to the road. The sub-project is also aimed at providing and improving access and traffic flow within the township and to the main highways near the township.

8. Scope of Works
The works shall include but not limited to:
   a) Site clearance and earthworks as necessary
   b) Excavation to remove unsuitable materials
   c) Filling with approved materials as specified and directed.
   d) Hand packing with approved stone as specified and directed
   e) Repairs to existing drainage structures as specified and directed
   f) Improvement/construction to the drainage facilities as directed
   g) Sectional improvement/construction of sections of roads as directed
   h) Repairs and widening /or improvement/construction to footpaths and shoulders as directed
   i) Laying of Asphaltic concrete layer(s) to a consolidated thickness directed.
   j) Laying and/or replacement of kerbs and channel as specified and directed
   k) Grading and/or improvement/construction of unpaved roads as directed
   l) Construction of road junctions abutting to these roads
   m) Relocation and/or protection of other services including but not limited to water pipes, sewer pipes, street lighting, power and telephone
   n) Installation of streetlights
   o) Provision of NMT facilities
   p) Provision of public parking facilities

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 loss of vegetation cover
      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.
xb. Road safety
xii. Gender equity, sexual harassment.
xiii. Community engagement and communication
xiv. Grievance redress

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 Kangundo Township and improving accessibility to the Kangundo bus park from two directions of the 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. 3,655,000. 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. 200,512,072/60**.

13. Conclusions and Recommendations of this Project Report
Our conclusion is that the project is important for economic development of Kangundo 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 proposed works are located within Kangundo Township, Machakos County within the jurisdiction of the Nairobi Metropolitan Region. The roads in this contract cover approximately a length of 1.455 Km. The various alignments are as shown in the location map at the end of this report and are as outlined in the following table.

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<th>S/No</th>
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<td>1</td>
<td>Alignment A</td>
<td>770</td>
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<tr>
<td>2</td>
<td>Alignment B</td>
<td>575</td>
</tr>
<tr>
<td>3</td>
<td>Accesses to Bus Terminus</td>
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<tr>
<td>4</td>
<td>Accesses to Properties/ Institution (5m Offset)</td>
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</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>1,455</strong></td>
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The general GPS coordinates of the location of the site are as follows;

Latitude: Degrees - S1, Minutes – 18, Seconds – 10.36086
Longitude: Degrees – E37, Minutes – 20, Seconds – 41.450116
Altitude: 1609 meters above sea level
1.2 Need for the project
The broad aim of the project is to enhance mobility, accessibility and transport within the old Kangundo market and ensuring quick access to Kangundo 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 Kangundo Township.

1.3 Scope and content of project
The works shall include but not limited to:
q) Site clearance and earthworks as necessary
r) Excavation to remove unsuitable materials
s) Filling with approved materials as specified and directed.
t) Hand packing with approved stone as specified and directed
u) Repairs to existing drainage structures as specified and directed
v) Improvement/construction to the drainage facilities as directed
w) Sectional improvement/construction of sections of roads as directed
x) Repairs and widening /or improvement/construction to footpaths and shoulders as directed
y) Laying of Asphaltic concrete layer(s) to a consolidated thickness directed.
z) Laying and/or replacement of kerbs and channel as specified and directed
aa) Grading and/or improvement/construction of unpaved roads as directed
bb) Construction of road junctions abutting to these roads
cc) Relocation and/or protection of other services including but not limited to water pipes, sewer pipes, street lighting, power and telephone
dd) Installation of streetlights
ee) Provision of NMT facilities
ff) Provision of public parking facilities

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.

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 ESMMMP 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 (ESMMMP)
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 Kangundo 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 guide 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.


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 regulation 7 (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 of 1999 shall undergo an Environmental Impact Assessment. This includes development activities such as this new project. In addition to the legal compliance above, the following legal aspects have also 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 Kangundo 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:-
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 are 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 provides 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 pm 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 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 and such as to ensure that the project works are only conducted during the day.
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 Kangundo 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 Kangundo 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 Kangundo 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

3.1 Approach to Public Consultations

Legal Notice of 101 of EMCA 1999 (The Environmental Regulations, 2003) requires that all environmental assessment process in Kenya to incorporate Public Consultation. 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 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 and the township on September 7, 2016 in Kangundo Township where the project was discussed and further views sought. During the initial reconnaissance conducted on Monday June 8, 2015, 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 sheet is as attached in the appendix. Those that attended the meeting included:

- Local Assistant chief and Senior Assistant Chief
- Traders along the road – green grocerers, salon attendants
- Drivers of vehicles along the road
- Businessmen and women – for businesses along road to be constructed including butchery, furniture, welding, masonry etc
- Members of Kilalani Farmers cooperative Society (offices along road)
- Village elders
- Farmers owning farms along road to be constructed
- Retired medical officer

The ESIA consultations included disclosure of the design and project status that was done by the appointed Assistant Resident Engineer (ARE), Eng. Hillary Muli. 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.

- **Village Elders**
  Whether landscaping would be done and this was affirmed that it was part of the project scope

- **Members of Kilalani Cooperative Farmers Society**
Timelines of the project and this was given by the ARE.

- **Young Men & Women**
  Whether the contractor would engage local staff for casual work and this was assured

- **Farmers with farms along the road**
  The extent of the road – it was reported that a surveyor would map out the road to only follow the road corridor – the road width was reported as 7m with each carriageway measuring 3.5m. A full survey is to be carried out to receive the beacons of the road corridor before work commences.

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

**Public Participation Photographs**

![Public Participation Photograph 1](image1.jpg)

![Public Participation Photograph 2](image2.jpg)
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 Kangundo Township where it traverses the township connecting two main tarmac roads Kangundo 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.

Project location:

4.1.2 Relief and Physiography
Altitude within the road traverse ranges between 1600m to 1620m 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, Kangundo-Tala’s population is the 9th largest of any urban centre in Kenya. Tala is part of Kangundo Town Council. The population of Kangundo-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
Kangundo 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 Kangundo 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 Kangundo 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 agricultural land with some residential houses in the lower section. The key environmental receptors include the motorists, pedestrians, businesses, bus park, and some residential houses located near the project corridor.
CHAPTER FIVE: ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

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.

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 Kangundo 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.

5.2.10 Social disturbance
The construction works may cause disturbance to the local population with interactions of non-local workers with residential communities. The movement of trucks and other equipment in the project area during the works implementation will cause noise and dust if the works will be in dry weather. This noise and dust may also affect the businesses in the vicinity of the construction works.
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.

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 Kangundo 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
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
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 Kangundo 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 Kangundo Township
(d) Improved drainage will reduce the flood damage and improve accessibility especially for pedestrian traffic and residents
(e) Improved accessibility will spur physical development in the area leading to increased jobs for the urban poor
(f) Improved lighting will increase trading hours for the businesses
(g) Cleaner and orderly environment
(h) 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
Environmental and Social Impact Assessment Project Report for the Construction of Selected Roads in Kangundo Township of Machakos County in the Nairobi Metropolitan Region

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.

5.7.2 Employment Opportunities
Several employment opportunities will be created for demolition staff. There therefore will be citizen and community engagement that requires a communication and community engagement plan.
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, Kangundo 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 Kangundo 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 Kangundo 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 Kangundo 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 Excavations
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.

7.2.3 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.

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 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.
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.

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.

7.4 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.
7.7 HIV/AIDS 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 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.
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 ESMMP is a vital output of an Environmental and Social Impact Assessment as it provides a checklist for project monitoring and evaluation. The ESMMP 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 Kangundo Township Roads in Machakos County

<table>
<thead>
<tr>
<th>Objective/Plan</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Monitoring Mechanism</th>
<th>Approximate Cost (Kshs)</th>
</tr>
</thead>
</table>
| **1) Increased exploitation of raw materials** | ▪ Maximize sourcing of construction materials from suppliers who use environmentally friendly processes in their operations.  
▪ Commitment to only using construction materials from licensed facilities  
▪ Ensure accurate budgeting and estimation of actual construction material requirements to ensure that the least amount of material necessary is ordered  
▪ Ensure that damage or loss of materials at the construction site are kept minimal through proper storage | Contractor | Throughout construction period | - |
| 2) Run off and soil erosion | ▪ 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.  
▪ Ensure that construction vehicles are restricted to existing graded roads to avoid soil compaction within the project site.  
▪ Ensure that any compacted areas are ripped to reduce run-off. | Contractor | Throughout construction period | - |
<table>
<thead>
<tr>
<th>Objective/Plan</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>▪ 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>
</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></td>
<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>
</tr>
<tr>
<td></td>
<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>
</tr>
<tr>
<td></td>
<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>
</tr>
<tr>
<td></td>
<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>70,000</td>
</tr>
</tbody>
</table>
### Objective/Plan

<table>
<thead>
<tr>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Monitoring Mechanism</th>
<th>Approximate Cost (Kshs)</th>
</tr>
</thead>
<tbody>
<tr>
<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>▪ 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>▪ 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>▪ Dispose waste more responsibly by dumping at designated dumping sites or engaging the use of a registered waste disposal company or Nairobi City County</td>
<td>Contractor &amp; Nairobi City Council</td>
<td>Throughout construction period</td>
<td>70,000/month</td>
</tr>
</tbody>
</table>

4) **Air/Dust pollution**

<table>
<thead>
<tr>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Monitoring Mechanism</th>
<th>Approximate Cost (Kshs)</th>
</tr>
</thead>
<tbody>
<tr>
<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>▪ 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>Objective/Plan</td>
<td>Recommended Mitigation Measures</td>
<td>Responsible Party</td>
<td>Monitoring Mechanism</td>
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<tr>
<td>5) Air pollution</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. ▪ 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>
</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. ▪ Ensure that construction machinery are kept in good condition to reduce noise generation. ▪ 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>
</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. ▪ Monitor energy use during construction and set targets for reduction of energy use.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
</tr>
<tr>
<td>8) Exploitation of water resources</td>
<td>▪ Promote recycling and reuse of water as much as possible. ▪ Organize collection of rainwater on site.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
</tr>
<tr>
<td>Objective/Plan</td>
<td>Recommended Mitigation Measures</td>
<td>Responsible Party</td>
<td>Monitoring Mechanism</td>
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</tr>
<tr>
<td>9) 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) are in place.</td>
<td>Contractor</td>
<td>Continuous</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>
</tr>
<tr>
<td></td>
<td>▪ Develop, document and display prominently an appropriate SHE policy for construction works</td>
<td>Contractor</td>
<td>One-off</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>
</tr>
<tr>
<td>10) 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>
</tr>
<tr>
<td>11) 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>
</tr>
<tr>
<td>12) 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>
</tr>
<tr>
<td>13) 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>
</tr>
</tbody>
</table>
### Objective/Plan
- **All machines and other moving parts of equipment must be enclosed or guarded to protect all workers from injury**
  - Responsible Party: Contractor
  - Monitoring Mechanism: One-off
  - Approximate Cost (Kshs): –

- **Arrangements must be in place to train and supervise inexperienced workers regarding construction machinery use and other procedures/operations**
  - Responsible Party: Contractor
  - Monitoring Mechanism: Continuous
  - Approximate Cost (Kshs): 20,000 per training

- **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**
  - Responsible Party: Contractor
  - Monitoring Mechanism: Continuous
  - Approximate Cost (Kshs): –

- **Reports of such examinations must be presented in prescribed forms, signed by the examiner and attached to the general register**
  - Responsible Party: Contractor
  - Monitoring Mechanism: Continuous
  - Approximate Cost (Kshs): –

- **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**
  - Responsible Party: Contractor
  - Monitoring Mechanism: Continuous
  - Approximate Cost (Kshs): –

- **Conduct sensitization campaign for the public on risks related to construction sites.**
  - Responsible Party: Contractor
  - Monitoring Mechanism: Twice (before construction begins) and a repeated after 1 month.
  - Approximate Cost (Kshs): –

### 14) Poor storage of materials
- **Ensure that items are not stored/stacked against weak walls and partitions**
  - Responsible Party: Contractor
  - Monitoring Mechanism: Continuous
  - Approximate Cost (Kshs): –

- **All floors, steps, stairs and passages of the premises must be of sound construction and properly maintained**
  - Responsible Party: Contractor
  - Monitoring Mechanism: Continuous
  - Approximate Cost (Kshs): –

### 15) Emergencies.
- **Design suitable documented emergency preparedness and evacuation procedures to be used during any emergency. Such procedures must be tested at regular intervals**
  - Responsible Party: Contractor
  - Monitoring Mechanism: Every 3 months
  - Approximate Cost (Kshs): –
<table>
<thead>
<tr>
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<th>Monitoring Mechanism</th>
<th>Approximate Cost (Kshs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Ensure that adequate provisions are in place to immediately stop any operations where there in an imminent and serious danger to health and safety and to evacuate workers</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>▪ Ensure that the most current emergency telephone numbers posters are prominently and strategically displayed within the construction site</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>▪ Provide measures to deal with emergencies and accidents including adequate first aid arrangements</td>
<td>Contractor</td>
<td>Continuous</td>
<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>One-off</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>Objective/Plan</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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</tr>
<tr>
<td></td>
<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>
</tr>
<tr>
<td></td>
<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>
</tr>
<tr>
<td>16) Food and toxins.</td>
<td>▪ 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</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Keep a record of all hazardous chemicals used at the premises, cross-referenced to the appropriate chemical safety data sheets</td>
<td>Contractor</td>
<td>Continuous</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ There should be no eating or drinking in areas where chemicals are stored or used</td>
<td>Contractor</td>
<td>Continuous</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ 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)</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td>17) Provisions of PPE to Workers.</td>
<td>▪ Provide workers in areas with elevated noise and vibration levels, with suitable ear protection equipment such as ear muffs</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td>Objective/Plan</td>
<td>Recommended Mitigation Measures</td>
<td>Responsible Party</td>
<td>Monitoring Mechanism</td>
<td>Approximate Cost (Kshs)</td>
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<td>------------------------</td>
</tr>
<tr>
<td></td>
<td>▪ 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</td>
<td>Contractor</td>
<td>Once off</td>
<td>-</td>
</tr>
<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>18) 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>
</tbody>
</table>
### Insecurity
- 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.
- Conduct sensitization campaign for the public on risks related to construction sites.

<table>
<thead>
<tr>
<th>Item</th>
<th>Responsibility</th>
<th>Frequency</th>
<th>Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractor</td>
<td>Continuous</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Contractor</td>
<td>Twice (before construction begins) and a repeated after 1 month.</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

**20) HIV-AIDS Management**
- 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

<table>
<thead>
<tr>
<th>Item</th>
<th>Responsibility</th>
<th>Frequency</th>
<th>Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractor</td>
<td>Continuous</td>
<td>Kshs. 2,500,000</td>
<td></td>
</tr>
</tbody>
</table>

**21) Management of complaints and/or grievances**
- Employ a grievance redress mechanism incorporating a negotiation and/or mediation team or party

<table>
<thead>
<tr>
<th>Item</th>
<th>Responsibility</th>
<th>Frequency</th>
<th>Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grievance Chairman / Committee (Stewarded by Resident Engineer)</td>
<td>Continuous</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL ESMMP BUDGET**
- Kshs. 3,655,000

---

**NB:**
For items with no budget assigned, the budget is coming from the construction budget and has been allowed for in the Bill of Quantities. The key responsibilities regarding compliance to the above ESMMP rest on the Contractor. However, it is important that the project proponent ensures adequate monitoring and evaluation for the Contractor for no non-conformances.
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 4: ESMMP for the Operational Phase of the Project

<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>
</table>
| 1) Storm Water Run-off Management | • Provide proper storm water drainage from the paved roads.  
• Provide regular inspection and maintenance of the drains. | Contractor        | One-off             | Part of project costs |
| 2) Health and Safety Risks.   | • 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 | County            | Continuous         | -           |
| 3) Solid waste management     | • Implement measures to ensure adequate solid waste management in the park including putting wastes receptacles and disposal | County            | Continuous         | -           |
| 4) Road management            | • Implement a sustainable road management plan after hand-over with clear structure of management | County            | Continuous         | -           |
Objective/Plan | Recommended Mitigation Measures | Responsible Party | Monitoring Mechanism | Cost (Kshs)
--- | --- | --- | --- | ---
5) HIV-AIDS Management | - 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 | County | Continuous | -

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

| Environmental Impact | Recommended Mitigation Measures | Responsible Party | Time Frame | Cost (Kshs) |
--- | --- | --- | --- | ---
Sold Waste Generation. | - All removed materials that will not be used for other purposes must be removed and recycled/reused as far as possible | Contractor | One-off | - |
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>Degeneration of vegetation at the construction site</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<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>
</tr>
<tr>
<td>Donate reusable demolition waste to charitable organizations, individuals and institutions</td>
<td>Contractor</td>
<td>One-off</td>
</tr>
<tr>
<td>Implement an appropriate re-vegetation program to restore the site to better status</td>
<td>Contractor</td>
<td>One-off</td>
</tr>
<tr>
<td>Consider use of indigenous plant species in re-vegetation</td>
<td>Contractor</td>
<td>One-off</td>
</tr>
<tr>
<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>
</tr>
</tbody>
</table>
CHAPTER NINE: AUXILIARY 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. 200,512,072/60. The implementation of the ESMMP is included into the BoQ.

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.

9.2 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. The contractor must consult the proponent to maintain a clear understanding of all the aspects of the project. Kangundo 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 Kangundo 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 Photographs – includes Public Participation & Consultation Meeting Photographs
C. Consultations and Public Participation - CPP
   i. Attendance Sheets
   ii. Minutes of Stakeholders Meeting – Meeting No. 1
   iii. Minutes of Stakeholders Meeting – Meeting 2.
   iv. Questionnaires
D. Grievance Redress Mechanisms
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 archeological 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 road to be constructed to bitumen standards along alignment B

Section of road to be constructed to bitumen standards along alignment A

Section of road to be constructed to bitumen standards along alignment A to benefit this shopping centre

Section of road to be constructed to bitumen standards along alignment A approaching the bus park below
Environmental and Social Impact Assessment Project Report for the Construction of Selected Roads in Kangundo Township of Machakos County in the Nairobi Metropolitan Region

Section of road to be constructed to bitumen standards on the right adjacent to bus park

Section of road to be constructed to bitumen standards along alignment A approaching now the tarmac

Section of road to be constructed to bitumen standards on the exit from alignment A back to the tarmac
MINUTES OF THE STAKEHOLDERS MEETING HELD AT KANGUNDO TOWNSHIP FOR KANGUNDO TOWNSHIP ROADS PROJECT ON 7TH SEPTEMBER 2016

Attendance list
As in the attendance sheet.

Introduction
The meeting began at 11.00am at CH 0+300 on Alignment A. The Chairman, Eng. Stephen Mwaura called the meeting to order and welcomed the members to the meeting after a word of prayer from one of the residents of Kangundo Town.

Project description
Eng. Stephen Mwaura briefed the members on the project scope, location and its impact on the Kangundo residents. The works to be executed included the following:

- Improving the existing roads to bituminous standards.
- Storm water drainage works
- Street lighting works
- Landscaping which includes tree planting and grassing.

Engineers report
Eng Mwaura informed the community how NAMSIP works in the 5 counties in improvement of roads and services within the counties, funded by World Bank through the Ministry of Transport, Infrastructure, Housing and Urban Development.

He informed the community that there is a requirement from NEMA and World Bank to give a report showing the impact of the project on the surrounding environment. That would be achieved through giving their views through the questionnaires which he gave.

Questionnaire
Eng. Stephen Mwaura led the members through the questionnaires where they gave their views by writing on the questionnaire.

The questionnaire is attached below.

Residential issues.
1. The area sub-chief thanked the members for attending the meeting in large numbers. He also requested the contractor to employ casual workers from the surrounding area.
2. The 1st resident asked the Engineer the contractual period for the works.
3. The 2nd resident asked the County surveyor to give or show where the roads reserve lies for future planning of the activities in his farm.
4. The 3rd resident wanted to know the requirement for employment of casuals.
5. The 4th resident asked the engineer whether there shall be provision of access culverts to their plots.
6. The 5th resident was concerned about the dust experienced on the surrounding area due to the contractor’s activities.
7. The 6th resident asked the Engineer whether there would be way to involve the members in the tree planting exercise.
8. The last resident requested the Engineer to ensure that bumps were installed at various locations for the safety of pedestrians around the project roads.
Contractors report
The contractor informed the members that he was ready to employ residents as the project starts and progresses. He also reported that once the work starts water bowsers would be mobilized on site and dust would be controlled.

A.O.B
1. The site engineer requested the members to support the contractor in executing the works
2. The site engineer assured them that he would liaise with the county surveyor to identify the extent of road reserve so that they can know their boundaries with the road for those who claimed not to know. He also assured them that bumps would be installed at various locations and access culverts provided for the access to their plots
3. It was reported that a grievance redress mechanism is in place and all those with complaints or grievances need to direct them to the Assistant Resident Engineer Eng. Hillary Muli.
MINUTES OF THE SITE POSSESSION MEETING HELD ON 22nd JUNE 2016 - CONSTRUCTION OF SELECTED ROADS IN KANGUNDO TOWNSHIP

Attendance List

<table>
<thead>
<tr>
<th>S/No</th>
<th>Name</th>
<th>Organization</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Eng. S. W. Gitau</td>
<td>DoNMED</td>
<td>Senior Principal Superintending Engineer (T)</td>
</tr>
<tr>
<td>2</td>
<td>Eng. B. K. Njenga</td>
<td>DoNMED</td>
<td>Principal Superintending Engineer (R)</td>
</tr>
<tr>
<td>3</td>
<td>Eng. Bob Ariemba</td>
<td>DoNMED</td>
<td>Resident Engineer</td>
</tr>
<tr>
<td>4</td>
<td>J. M. Kinyua</td>
<td>DoNMED</td>
<td>Assistant Resident Engineer</td>
</tr>
<tr>
<td>5</td>
<td>Hillary Muli</td>
<td>Machakos County Government</td>
<td>Site Engineer.</td>
</tr>
<tr>
<td>6</td>
<td>Wycliffe Mwanthi</td>
<td>DoNMED</td>
<td>Surveyor</td>
</tr>
<tr>
<td>7</td>
<td>Eng. Patrick Githinji</td>
<td>Solex Building Contractors</td>
<td>MD</td>
</tr>
<tr>
<td>8</td>
<td>James Nguyo</td>
<td>Solex Building Contractors</td>
<td>Site Agent</td>
</tr>
<tr>
<td>9</td>
<td>John Mutahi</td>
<td>Solex Building Contractors</td>
<td>Site superintendent</td>
</tr>
<tr>
<td>10</td>
<td>Mr Bethwel Mutinda Kingele</td>
<td>Ministry of Interior-National Gvt</td>
<td>Area Chief</td>
</tr>
<tr>
<td>11</td>
<td>Leonard Maingi David</td>
<td>Ministry of Interior-National Gvt</td>
<td>Local Assistant Chief</td>
</tr>
</tbody>
</table>

Agenda.

1. Introduction of site
2. Description of Works
3. Tour of site
4. Handover of site
5. Contractual issues
6. A.O.B

Minutes

<table>
<thead>
<tr>
<th>Item</th>
<th>Action By</th>
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<tbody>
<tr>
<td>Min 001 Introduction</td>
<td>All</td>
</tr>
</tbody>
</table>

The meeting started at 10.30am when all the members had gathered at Alignment A outside the Kangundo Bus Park. The chairman called the meeting to order after which members did a self introduction.
**Description of Works**

The Chairman requested the Resident Engineer to give a brief description of works. The total works are 1.545km located in Kangundo Town of Kangundo Sub-County in Machakos County. The roads covered include:

i. Alignment A (Katitu Road) = 970m and  
ii. Alignment B (Hospital Road) =575m.

The works shall include but not limited to:

- Site clearance and earthworks as necessary  
- Excavation to remove unsuitable materials  
- Filling with approved materials as specified and directed.  
- Hand packing with approved stone as specified and directed  
- Improvement/construction to the drainage facilities as directed  
- Sectional improvement/construction of sections of roads as directed  
- Construction to footpaths and shoulders as directed  
- Laying of Asphaltic concrete layer(s) to a consolidated thickness directed  
- Laying of kerbs and channel as specified and directed  
- Construction of road junctions abutting to these roads  
- Provision of public transport facilities  
- Relocation and/or protection of other services including but not limited to water pipes, sewer pipes, Street lighting, Power and Telephone  
- Installation of Streetlights  
- The roads widths vary between 6m to 7m depending on the space available.  
- The contract period is 12 months.

**Tour of Site**

The members toured through the project roads and checked on the current condition of the roads.

**Handover of the Site**

The site was handed over to the Contractor officially on 22nd June 2016 and he assured the members that he will start executing the works immediately the site instructions are issued.

**Contractual Issues.**

It was agreed that construction of Alignment A be extended to join the Main Road to Nairobi for purposes of continuity a distance of approximately 200m and the RE was tasked to undertake the design.
Min 006 | AOB
---|---
i. The contractor promised to submit the works program indicating how he intends to carry out the project as per the time he has been allocated.

ii. The R.E thanked the members present and also assured the contractor that his team will work hand in hand for the better running of the project.

iii. It was agreed that the date of the 1st site meeting will be communicated in due course but the first technical meeting will be held after two weeks.

There being no other business the meeting ended at 2.00pm.

<table>
<thead>
<tr>
<th>Assistant Resident Engineer</th>
<th>Kinyua Mwangi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signature</td>
<td>Date</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resident Engineer</th>
<th>Eng. Bob Ariemba</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signature</td>
<td>Date</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site Agent</th>
<th>James Nguyo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signature</td>
<td>Date</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chairman</th>
<th>Eng. S. W. Gitau</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signature</td>
<td>Date</td>
</tr>
</tbody>
</table>
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.

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 Eng. Bob Ariemba</td>
<td>Resident Engineer</td>
<td>Nairobi City County</td>
<td>Committee Secretary</td>
</tr>
<tr>
<td>2 Eng. Hillary Muli</td>
<td>Assistant Resident Engineer</td>
<td>Machakos County Government</td>
<td>Committee Assistant Secretary</td>
</tr>
<tr>
<td>3 John Mutahi</td>
<td>Site Administrator</td>
<td>Contractor - Solex</td>
<td>Member</td>
</tr>
<tr>
<td>4 Lenny Kilonzo</td>
<td>PAP representative</td>
<td>Senior Assistant Chief</td>
<td>Member</td>
</tr>
<tr>
<td>5 Leonard Maangi</td>
<td>PAP Representative</td>
<td>Assistant Chief</td>
<td>Member</td>
</tr>
<tr>
<td>6</td>
<td>Community Member</td>
<td>Local communities</td>
<td>Community Representative</td>
</tr>
<tr>
<td>7 Business Member</td>
<td>Business members</td>
<td></td>
<td>Business Representative</td>
</tr>
</tbody>
</table>
GRIEVANCE RESOLUTION PROCEDURE

1. **Recording of grievance in standard forms**

2. **Reconnaissance site visit**

3. **Can the grievance be resolved by the Resident Engineer’s office? (Negotiation)**
   - Yes – 3 days

4. **Can the grievance be resolved by Grievance Committee? (Mediation)**
   - Yes – 7 days

5. **Submission of grievance to NaMSIP for resolution.**

6. **Grievance resolved**
   - Yes

**Receipt of Complaint from**

**STORAGE OF ALL GRIEVANCE RELATED DOCUMENTS**