Environmental and Social Impact Assessment Report for the Construction of Access Road to Thika Railway Station in Kiambu County of Nairobi Metropolitan Region

REPUBLIC OF KENYA

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT PROJECT REPORT FOR THE CONSTRUCTION OF ACCESS ROAD TO THIKA RAILWAY STATION IN KIAMBU COUNTY OF THE NAIROBI METROPOLITAN REGION

4th August 2017

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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
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Nairobi - Kenya.

Designation ________________________________________

Name ____________________________________________

Signature _________________________________________

Date ______________________________________________

Lead Expert
Eng. Stephen Mwaura is a registered Lead Expert on Environmental Impact Assessment/Audit (EIA/EA) 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 Access Road to Thika Railway Station in Kiambu County of the Nairobi Metropolitan Region. This report is issued without prejudice.

Lead Expert – Eng. Stephen Mwaura

Signature: ______________________

Date: __________________________
# ACRONYMS

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<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>DOHSS</td>
<td>Directorate of Occupational Health &amp; Safety Services</td>
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<td>DONMED</td>
<td>Directorate of Nairobi Metropolitan Development</td>
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<td>EA</td>
<td>Environmental Audit</td>
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<td>ESIA</td>
<td>Environmental &amp; Social Impact Assessment</td>
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<td>EHS</td>
<td>Environment, Occupational Health and Safety</td>
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<td>EMCA</td>
<td>Environmental Management &amp; Coordination Act, 2015</td>
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<td>ESMMP</td>
<td>Environmental and Social Management &amp; Monitoring Plan</td>
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<td>EMS</td>
<td>Environmental Management System</td>
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<td>ISO</td>
<td>International Standards Organizations</td>
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<td>MoTIH&amp;UD</td>
<td>Ministry of Transport, Infrastructure, Housing &amp; Urban Development</td>
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<tr>
<td>NaMSIP</td>
<td>Nairobi Metropolitan Services Improvement Project</td>
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<td>NEMA</td>
<td>National Environment Management Authority</td>
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<tr>
<td>NMT</td>
<td>Non-Motorized Transport</td>
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<tr>
<td>OHS</td>
<td>Occupational Health &amp; Safety</td>
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<td>OSHA</td>
<td>Occupational Safety &amp; Health Act</td>
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<td>PPC</td>
<td>Public Participation &amp; Consultation</td>
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<td>PSP</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 1999 and amended in 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 report highlights salient social, economic and environmental issues associated with the design, construction and operational aspects of the proposed Access Road to the Thika Railway Station of Kiambu County in the Nairobi Metropolitan Region.

2. Objectives of environmental and social assessment

The main objective of the Study was to identify environmental and social impacts associated with the proposed access road project and to recommend an appropriate environmental 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.

This Environmental & 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, if any
   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.
Environmental and Social Impact Assessment Report for the Construction of Access Road to Thika Railway Station in Kiambu County of Nairobi Metropolitan Region

iii. Employment.
iv. Impact on livelihoods.
v. Public health implications.
vi. Demand and development of infrastructure and social amenities.

3. Assess the impacts of development on landscape and land use such as:
   i. Determine the impact on change on civic shape, scenery, aesthetic modifications.
   ii. Examine the compatibility of the development with the surrounding land uses and how it complements them.
   iii. Examine the impacts of dumping of spoil from the road works

4. Assess the impacts of the development on power demands, water demands, and access road congestion as well as possible impacts on surface run-off and ground water qualities and quantities, if any.

5. Impacts of safety during construction - this is mainly because of increased traffic during construction requiring better traffic management plan during construction for the safety of workers, safety of motorists and other road users during construction.

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

3. Study Approach and Methodology
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 comprising of an impact mitigation plan and modalities for monitoring and evaluation were then developed to guide environmental management during all phases of project development.
Once approved by the Ministry of Transport, Infrastructure, Housing and Urban Development and NEMA, the Project Report will be disclosed as required from where accruing comments will be used to finalize the report.

4. Policy, Legal and Regulatory Framework

The ESIA Report preparation was guided by provision of relevant policies, legislation and institutional frameworks that guide preparation of EIA in Kenya and the World Bank Safeguards Policies. These instruments are presented below

**Policy Provision**

- Constitution of Kenya 2010
- Sustainable development goals
- Nairobi Metro 2030
- Kenya vision 2030
- HIV and AIDS Policy 2009
- Gender Policy 2011

**Acts of Parliament**

- Environmental Management and Coordination Act (EMCA) 1999 amended in 2015
- County Government Act no 17 of 2012
- Physical Planning Act 1996 (286)
- Occupational Health and Safety Act (OSHA 2007), Public Health Act (Cap.242)
- Way leave act
- Public roads of access act
- Traffic act
- HIV AIDS prevention control

**International Safeguard Policies and Standards**

- World Bank OP 4.01 on Environment Assessment
• International Finance Cooperation (IFC) Performance Standard (PS) 2: Labour and Working Conditions
• World Bank Group Environment, Health and Safety Guidelines

5. Project Description
The proposed construction of access Road to Thika Railway Station in Thika Township Kiambu County of NMR will cover a total of 1.636km of roads in alignment A, B and C. The table below shows the current status of the roads and the proposed project activities in the alignments.

<table>
<thead>
<tr>
<th>ROAD</th>
<th>STATUS OF THE ROAD</th>
<th>RECOMMENDATION</th>
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</table>
| Alignment A (700m) | o Gravel earth road with earth drains and some cross and access culverts, No walkway and No street lighting | o Construction of the road to provide for the 6.0m carriageway.  
  o Lined open drain on one side with access and cross culverts  
  o Provide for street lighting.  
  o Provide 2.5m walkways on one side of the carriageway  
  o Installation of traffic signs and road marking  
  o Provide service ducts |
| Alignment B (238m) | o Gravel earth road with earth drains and some access culverts, No walkway and No street lighting | o Construction of the road to provide for the 6.0m carriageway.  
  o Lined open drain on one side with access and cross culverts  
  o Provide for street lighting.  
  o Provide 2.5m walkways on one side of the carriageway  
  o Installation of traffic signs and road marking  
  o Provide service ducts |
| Alignment C (698m) | o Undeveloped earth road with No drainage, No walkway and No street lighting | o Construction of the road to provide for the 6.0m carriageway.  
  o Lined open drain on one side with access and cross culverts  
  o Provide for street lighting.  
  o Provide 2.5m walkways on one side of the carriageway  
  o Installation of traffic signs and road marking  
  o Provide service ducts |

6. Project location
The proposed project is located in Thika Township in Kiambu County as shown in the location map below.
7. Project Justification
The broad aim of the project is to enhance mobility, accessibility and connectivity of Thika Township to the existing Railway Station. The project has laid emphasis on the provision of Non-Motorized Transport facilities to encourage people living in the area and students and staff from Mt. Kenya University and Thika School of Medical and Health Sciences to walk to and from their residences to the railway station. The project also aims at providing transportation services between the existing industries such as Bidco Oil Refineries to the railway station.

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) Base repairs as specified and directed
(f) Repairs to existing drainage structures as specified and directed
(g) Improvement/construction to the drainage facilities as directed
(h) Sectional improvement/construction of sections of roads as directed
(i) Repairs and/or improvement/construction to footpaths and shoulders as directed
(j) Laying of Asphalitic concrete layer(s) to a consolidated thickness directed
(k) Laying and/or replacement of kerbs and channel as specified and directed
(l) Grading and/or improvement/construction of unpaved roads as directed
(m) Construction of road junctions abutting to these roads
(n) Provision of public transport facilities
(o) Operations ancillary to the main works
(p) Maintenance of the works during the construction and maintenance periods specified
(q) Traffic Management through the works and from the works
(r) Relocation and/or protection of other services including but not limited to water pipes, sewer pipes, street-lighting, power and telephone
(s) Provision of service ducts
(t) Installation of Streetlights

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

9. Consultation

Public participation and consultative forums were held at the site that included business community along the access road and boda-boda operators mainly as the primary stakeholders and the county government as key secondary stakeholder. The aim of the consultative meetings was to obtain data related to the past and present operations of the project road that are significant to the future environmental status of the area, the management of the project both during and after implementation. The stakeholders responded positively to the development as long as mitigation measures especially dust abatement, waste management and noise management were incorporated in the implementation phase of the project. The record of the consultations is presented in this report in the form of questionnaires, attendance sheets and minutes of meetings held that
10. Project impacts

(i) Potential positive impacts anticipated:
The core observation of this study is that the proposed access road project is aimed at improving commuter services and the broad transport sector to the railway station. As such, the project in itself is already an activity in mitigation of an existing concern 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 accessibility to the railway station.

(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. 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 due to noise, vibration and dust;
ii. Traffic inconvenience during construction;
iii. Material sourcing and supply for the construction and maintenance works; and
iv. Any effects from uncontrolled storm-water run-off

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. 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:
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.

11. Total Cost of the Project

Total cost of the project is approximated to be **Kshs. 168,655,619.**

12. **Findings and Recommendations**

Assessment findings

The assessment described in the report identified the below listed main findings:

- The project design has ensured that the project is constructed within existing public land and no private land will be acquired.
- The world Bank Operation Policy OP 4.12 is not triggered due to the fact that the proposed site is clear land free from encroachment.
- The Environmental and Social Screening undertaken for the project revealed that the investment will result in low impact on both social and biological environment; therefore, this project is categorized as a category **B** project. The level of ESIA assessment required is at Project Report Stage which should be approved at the Nairobi NEMA office.
- The contract for the 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.
- This project’s potential benefits and positive impacts far outweigh the negative impacts.
- Provisional Budget of **KES 3.138 Million** is required for implementation of mitigation measures of potential negative environmental impacts identified in the report.
- The overall objective of project is enhance mobility, accessibility and connectivity of Thika Township to the existing Railway.
Assessment Recommendation
The project is recommended for implementation provided the mitigation measures identified in the study for the potential negative impacts are implemented, the recommendations will also form part of Environment License that will be issued for the Project.
CHAPTER ONE: INTRODUCTION

1.1. Project background
The Ministry of Lands, Housing and Urban Planning is charged with the responsibility of providing policy direction and coordinating all matters related to lands, housing and urban development in the country. The ministry partly through NaMSIP is systematically strengthening and expanding its capacity and undertaking major infrastructure projects to address challenges as a way of attaining its mandate. To this end, the ministry is partnering with various development partners, which are providing funding and technical assistance for various projects. The ministry secured World Bank funding for the proposed Metropolitan Region Services Improvement project through which it proposes to construct an access road to Thika Railway station in Thika Township.

The proposed project will enhance mobility, accessibility and connectivity of Thika Township to the existing Railway Station. The project has laid emphasis on the provision of Non-Motorized Transport facilities to encourage people living in the area and students and staff from Mt. Kenya University and Thika School of Medical and Health Sciences to walk to and from their residences to the railway station. The project also aims at providing transportation services between the existing industries such as Bidco Oil Refineries to the railway station.

1.2. Project justification and benefit
The broad aim of the project is to enhance mobility, accessibility and connectivity of Industrial and Thika areas to the existing Railway Station. The project has laid emphasis on the provision of Non-Motorized Transport facilities to encourage people working in the industries to walk to and from the railway station. The project also aims at providing transportation services for goods produced from the existing industries to the market within and outside Nairobi.

1.3. Objectives of the ESIA
This ESIA assessment has been conducted in compliance with the Environmental Impact Assessment Regulation as outlined under the Gazette Notice No. 56 of 2003 established under the Environmental Management and Coordination Act (EMCA), 2015 of Kenya. The Environmental & Social Impact Assessment (ESIA) is expected to achieve the following objectives:

i. To identify all potential significant environmental and social impacts of the proposed Project and recommend measures for mitigation.
ii. To assess and predict the potential impacts during site preparation, construction and operational phases of the project.

iii. To verify compliance with environmental regulations.

iv. To generate baseline data for monitoring and evaluation of how well the mitigation measures will be implemented during the project cycle.

v. To allow for public participation.

vi. To give an Environmental Management Plan to mitigate the identified impacts so as to ensure sustainability of the proposed Project.

vii. To recommend cost effective measures to be implemented to mitigate against the expected impacts.

1.4. **Study approach and methodology**

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 – Kshs. 168,655,619
- 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 2015, 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.

1.5. Location

The works are located in Thika Township in Kiambu County. The project has a total length of 1.636km and covers the following roads as shown in figure 1 below:

![Figure 1: Location map for the proposed project sites](image)

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

- **Latitude:** Degrees: S1° 21’ 27”  Decimal: -1.35767
- **Longitude:** Degrees: E37° 5’ 29”  Decimal: 37.09163442
- **Altitude:** 1471 meters above sea level (masl)
1.6 Scope of project

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) Base repairs as specified and directed
(f) Scarifying of the existing bituminous layer
(g) Repairs to existing drainage structures as specified and directed
(h) Improvement/construction to the drainage facilities as directed
(i) Sectional improvement/construction of sections of roads as directed
(j) Repairs and/or improvement/construction to footpaths and shoulders as directed
(k) Laying of Asphaltic concrete layer(s) to a consolidated thickness directed
(l) Laying and/or replacement of kerbs and channel as specified and directed
(m) Grading and/or improvement/construction of unpaved roads as directed
(n) Construction of road junctions abutting to these roads
(o) Provision of public transport facilities
(p) Operations ancillary to the main works
(q) Maintenance of the works during the construction and maintenance periods specified
(r) Traffic Management through the works and from the works
(s) Relocation and/or protection of other services including but not limited to water pipes, sewer pipes, street-lighting, power and telephone
(t) Provision of service ducts
(u) Installation of streetlights
(v) Any other works as instructed by the Engineer and/or as specified in this document

1.7 Total Cost of the Project

Total cost of the project is approximated to be **Kshs. 168,655,619.**
1.8 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 is also the one who has initiated the project and will also ensure its satisfactory implementation
- The proponent will ensure that the ESIA is submitted to NEMA and a license is obtained.

1.9 Duties of the Contractor

- Implementation of the ESMMP 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 access road 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 Management and Monitoring Plan (EMMP) 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.
CHAPTER TWO: PROJECT DESCRIPTION

2.1 Road status and proposed project activities

The proposed construction of access Road to Thika Railway Station in Thika Township Kiambu County of NMR will cover a total of 1.636km of roads in alignment A, B and C. The table below shows the current status of the roads and the proposed project activities in the alignments.

Table 1: Road status and proposed project activities

<table>
<thead>
<tr>
<th>ROAD</th>
<th>STATUS OF THE ROAD</th>
<th>RECOMMENDATION</th>
</tr>
</thead>
</table>
| Alignment A (700m) | o Gravel earth road with earth drains and some cross and access culverts, No walkway and No street lighting | o Construction of the road to provide for the 6.0m carriageway.  
|                  |                                                                                   | o Lined open drain on one side with access and cross culverts.  
|                  |                                                                                   | o Provide for street lighting.  
|                  |                                                                                   | o Provide 2.5m walkways on one side of the carriageway.  
|                  |                                                                                   | o Installation of traffic signs and road marking.  
|                  |                                                                                   | o Provide service ducts.  |
| Alignment B (238m) | o Gravel earth road with earth drains and some access culverts, No walkway and No street lighting | o Construction of the road to provide for the 6.0m carriageway.  
|                  |                                                                                   | o Lined open drain on one side with access and cross culverts.  
|                  |                                                                                   | o Provide for street lighting.  
|                  |                                                                                   | o Provide 2.5m walkways on one side of the carriageway.  
|                  |                                                                                   | o Installation of traffic signs and road marking.  
|                  |                                                                                   | o Provide service ducts.  |
| Alignment C (698m) | o Undeveloped earth road with No drainage, No walkway and No street lighting      | o Construction of the road to provide for the 6.0m carriageway.  
|                  |                                                                                   | o Lined open drain on one side with access and cross culverts.  
|                  |                                                                                   | o Provide for street lighting.  
|                  |                                                                                   | o Provide 2.5m walkways on one side of the carriageway.  
|                  |                                                                                   | o Installation of traffic signs and road marking.  
|                  |                                                                                   | o Provide service ducts.  |

2.2 Description of the Project’s Construction Activities

2.2.1 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.

2.2.2 Demolition works

Any wastes or debris arising from any demolitions will be transported to licensed sites for disposal.
2.2.3 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 the licensed quarries in the neighboring areas. 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.

2.2.4 Storage of materials
Construction materials will be stored on site. Bulky materials such as rough stones, ballast and sand will be carefully stored on site. To avoid piling large quantities of materials on site, the contractor should order bulky materials such as sand, gravel and stones in batches.

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

2.2.6 Construction of the Road
This is the main activity and will incorporate the laying of the various layers of road up to the finish in asphalt.

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

2.3 Description of the Project’s Operational Activities

2.3.1 General repairs and maintenance
The access road will be repaired and maintained by Kiambu County Government during their operational phases.

2.4 Description of the Project’s decommissioning activities

2.4.1 Demolition works
Upon decommissioning, the project components including pavements, drainage systems, parking areas and perimeter fence 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.
2.4.2 Site restoration
Once all the wastes resulting from demolition and dismantling works is removed from the site, the site will be restored through replenishment of the topsoil.

2.4.3 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.

2.4.4 Road junctions
The road junctions where the access roads join Thika Industrial area will be improved to ensure continuity as required in order to effectively manage traffic in the junctions.

2.4.5 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 building materials, especially if the construction is done in dry weather. The proponent will ensure that dust levels at the site are minimized through sprinkling water in areas being excavated and along the tracks used by the transport trucks within the site. Additional mitigation measures presented in the ESMMP will be fully implemented to minimize the impacts of dust generation.

2.4.6 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 ESMMP will be fully implemented to address environmental issues relating to construction trucks.
2.4.7 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 ESMMP, the proponent shall put in place several measures aimed at ensuring high standards of hygiene and housekeeping within the premises and surrounding areas.

Plate of Site Photographs

| Figure 2 | Entrance of the Road to Be Upgraded |
| Figure 3 | Approach to Railway Station |
| Figure 4 | Part of the road to be upgraded |
| Figure 5 | Resident houses near the proposed access road |
CHAPTER THREE: LEGAL, INSTITUTIONAL AND LEGISLATIVE FRAMEWORK

3.1 Policy frameworks

3.1.1 Constitution of Kenya

Article 24, Part 1, Article 14, Part 2, Fourth Schedule provides that “Disaster management” is included as a function of both the national and county governments.

Article 42 of Bill of Rights of the Kenyan Constitution provides that every Kenyan has a right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of present and future generations through legislation and other measures.

Part II of Chapter 5 of the Constitution (Environment and Natural Resources), (I) the State clearly undertakes to carry out the following:

- Ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits;
- Work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya;
- Protect and enhance intellectual property in, and indigenous knowledge of, biodiversity and the genetic resources of the communities;
- Encourage public participation in the management, protection and conservation of the environment; Protect genetic resources and biological diversity;
- Establish systems of environmental impact assessment, environmental audit and monitoring of the environment;
- Eliminate processes and activities that are likely to endanger the environment; and

Part (II) “Every person has a duty to cooperate with State organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources.

Chapter 5 on Land and Environment Emphasizes on the following:

- Land use and management shall by law benefit local communities
- Community land is protected from encroachment by State.
- Law shall protect Rivers, forests and water bodies.
- Equitable access to land.
- All lawful land rights are secured; only someone who has stolen land needs to worry.
County governments will manage land in trust of the people in accordance with the constitution.

Relevance

The constitution of Kenya provides for sound management and sustainable development of all of Kenya’s projects, both public and private investments. It also calls for the duty given to the Project proponent to cooperate with State organs and other persons to protect and conserve the environment as mentioned in Part II.

3.1.2 Kenya Vision 2030

Kenya Vision 2030 is the current national development blueprint for period 2008 to 2030 and was developed following on the successful implementation of the Economic Recovery Strategy of Wealth and Employment Creation which saw the country’s economy back on the path to rapid growth since 2002. Gross Domestic Product (GDP) growth rose from 0.6% to 7% in 2007, but dropped between 1.7% and 1.8% in 2008 and 2009 respectively.

The objective of the vision 2030 is to “transform Kenya into a middle income country with a consistent annual growth of 10% by the year 2030”. One of this aims is to make Kenya to be a nation that has a clean, secure and sustainable environment by 2030. This will be achieved through promoting environmental conservation to better support the economic pillar.

Kenya’s transformation into a middle income country will be achieved by bringing and improving basic infrastructure and services namely: roads, street lights, storm water drains, footpaths, and water and sanitation facilities among others. This Project aims at enhancing mobility, accessibility and connectivity of Thika Township to the existing Railway Station through construction of access road to Railway station

3.1.3 Nairobi metro 2030

Nairobi Metro 2030 was developed in the year 2008 to provide a guide for the (Nairobi Metropolitan Region (NMR) play its role in the National growth strategies under the Kenya Vision 2030. It is a transitional document that brings into focus challenges faced under urban growth and development. The document provides forum to achieve sustained rates of economic growth necessary for successful economic and social development. The Metro 2030 provides links with the Central Government through Kenya Vision 2030 and other development plans as well as seeking to strengthen the Local Authorities as part of the devolution of power and recognizing need for ensuring efficient and effective management of resources at the grassroots. Nairobi Metro 2030 carries the vision for Nairobi Metropolitan Region to be a World Class
African Metropolis supportive to the overall national agenda under the Kenya Vision 2030. The agenda to achieve this vision is the need to enhance mechanisms for economic growth, employment creation, improved lifestyles and improved infrastructure. Therefore, the proposed project contributes to the Nairobi Metro 2030 by providing development that will contribute to the economic and employment growth within the metropolitan.

3.1.4 The Sustainable Development Goals (SDGs)

The 2030 Agenda comprises 17 new Sustainable Development Goals (SDGs), or Global Goals, which will guide policy and funding for the next 15 years, beginning with a historic pledge to end poverty.

The concept of the SDGs was born at the United Nations Conference on Sustainable Development, Rio+20, in 2012. The objective was to produce a set of universally applicable goals that balances the three dimensions of sustainable development: environmental, social, and economic.

The Global Goals replace the Millennium Development Goals (MDGs), which in September 2000 assembled the world around a common 15-year agenda to tackle the indignity of poverty.

The MDGs established measurable, universally-agreed objectives for eradicating extreme poverty and hunger, preventing deadly but treatable disease, and expanding educational opportunities to all children, among other development imperatives. The MDGs drove progress in several important areas:

- Income
- Poverty
- Access to improved sources of water
- Primary school enrolment
- Child mortality

With the job unfinished for millions of people, we need to go the last mile on ending hunger, achieving full gender equality, improving health services and getting every child into school.

Now we must shift the world onto a sustainable path. The Global Goals aim to do just that, with 2030 as the target date. This new development agenda applies to all countries, promotes peaceful and inclusive societies, creates better jobs and tackles the environmental challenges of our time particularly climate change.

Nationally, the GOK has taken bold steps to domesticate the SDGs as illustrated by:
i) Investment in the Poverty Reduction Strategy Paper (PRSP) process through which participatory mapping of poverty incidence at both District and National Level was undertaken,

ii) Implementation of the Economic Recovery Strategy for Wealth and Employment Creation, and

iii) Implementation of projects that directly confront specific aspects of the SDGs. By anchoring the Economic Pillar of Vision 2030 which seeks to generate resources needed to address SDGs, implementation development of the proposed project is attuned to the national and indeed global agenda for economic and social development.

The proposed project contributes to the policy by creating direct and indirect employment opportunities for many people that will be engaged in various task during construction and operation phases of the project.

3.1.5 HIV and AIDS Policy 2009

The proposed project is to be implemented in Nairobi County which have high freelance cases of HIV and Aids. This policy shall provide a framework to both the project proponent and contractor to address issues related to HIV and Aids. In Summary the policy provides a mechanism for:

- Setting Minimum Internal Requirements (MIR) for managing HIV and AIDS
- Establishing and promoting programmes to ensure non-discrimination and non-stigmatization of the infected;
- Contributing to national efforts to minimize the spread and mitigate against the impact of HIV and AIDS;
- Ensuring adequate allocation of resources to HIV and AIDS interventions;
- Guiding human resource managers and employees on their rights and obligations regarding HIV and AIDS.

3.1.6 Gender Policy 2011

The overall goal of this Policy Framework is to mainstream gender concerns in the national development process in order to improve the social, legal/civic, economic and cultural conditions of women, men, girls and boys in Kenya.

The policy provides direction for setting priorities. An important priority is to ensure that all
ministerial strategies and their performance frameworks integrate gender equality objectives and indicators and identify actions for tackling inequality. In addition, each program will develop integrated gender equality strategies at the initiative level in priority areas. Within selected interventions, the policy will also scale-up specific initiatives to advance gender equality. This policy will be referred to during project implementation especially during hiring of staff to be involved in the project, procuring of suppliers and sub consultants and sub contractors to the project.

3.2 Kenyan Legislations

3.2.1 Environmental Management and Coordination Act of 2015

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

3.2.2 Occupational Health & Safety, 2007 (OSHA 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. There should be provision for clean and sanitary working conditions. More so there must be also provision of quality and quantity wholesome drinking water.

3.2.3 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 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.

3.2.4 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.

3.2.5 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. This project follows a designated public road corridor and has no issues of encroachment or need to acquire private land.

3.2.6 EMCA (Waste Management) Regulations, 2006
These regulations guide on the appropriate waste handling procedures and practices. It is anticipated that, the proposed project may generate large quantities of solid waste during construction which will need to be managed through reuse, recycling or appropriate disposal. It is therefore anticipated that, the amount of materials to be discarded as waste during the project implementation will be minimum. It is recommended that the proponent should 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. It is further recommended that the proponent should consider the use of recycled or refurbished construction materials including those excavated from existing road. Purchasing and using recovered construction materials will lead to financial savings and reduction of the amount of construction debris disposed of as solid waste. To comply with the requirements of the regulations, the proponent should undertake the following in addition to the above-mentioned recommendations;

i. Should not dispose any waste on Thika Road area or near any recreational area or public places;
ii. Segregate waste and group them according to their similarity for example plastics, toxic, organic etc;

iii. Ensure all waste is deposited in a designated dumping area approved by the local authority in Kiambu County Government and/or NEMA;

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. Implement cleaner production principles of waste management strategy namely reduce, reuse and recycle;

vi. Label all hazardous wastes 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 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.

3.2.7 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 phases. 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 are 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 and it is therefore recommended that the construction team develops mitigations to reduce noise propagation in the project area.

3.2.8 **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. This act will not apply to this project.

3.2.9 **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.

3.2.10 **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 Thika Access Road project is under the provisions of this Act.

3.2.11 **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.

3.2.12 **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.
3.2.13 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.


This is an Act of Parliament to provide for compensation to employees for work related injuries and diseases contracted in the course of their employment and for connected purposes. An employee is a person who has been employed for wages or a salary under a contract and includes apprentice or indentured learner.

The proposed project will adhere to the provisions of this act throughout the construction period of the project.

3.3 Institutional Structure

3.3.1 Ministry of Environment and Natural Resource

Kenya’s Ministry of Environment and Natural Resource is mandated to monitor, protect, conserve and manage environment and natural resources of the country. The Ministry is to achieve this monumental task through sustainable exploitation of natural resources for socio-economic development geared towards eradication of poverty, improving living standards and maintaining a clean environment for present and future generations.

The Ministry of Transport, Infrastructure, Housing and Urban Development (MTIHUD)

The MTIHUD is the project proponent and is implementing the construction of Access Road to Thika Railway Station in Kiambu County through Nairobi Metropolitan Services Improvement Project (NaMSIP).

3.3.2 The Directorate of Nairobi Metropolitan Development

In the capacity of employer, the Ministry of Land, Housing and Urban Development, Nairobi Metropolitan Development through the NaMSIP Project Coordinating Team (PCT) has administrative jurisdiction over the ESIA process.
3.4 NEMA Compliance
The government established the National Environmental Management Authority (NEMA) as the supreme regulatory and advisory bodies on environmental management in Kenya under EMCA 1999. NEMA is charged with the responsibility of coordinating and supervising the various environmental management activities being undertaken by other statutory organs. NEMA also ensures that environmental management is integrated into development policies, programmes, plans and projects.

3.5 Sectoral Integration
This integration encourages provision of sustainable development and a healthy environment to all Kenyans. The key functions of NEMA through the NEC include policy direction, setting national goals and objectives and determining policies and priorities for the protection of the environment, promotion of cooperation among public departments, local authorities, private sector, non-governmental organizations and such other organizations engaged in environmental protection programmes and performing such other functions as contained in the act.

3.6 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):

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

(b) 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.
(c) 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.

(d) 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.

Most of the proposed specific projects are in the areas of water supply, storm water drainage and sewerage, with road upgrading and floodlighting in some of the settlements and improvement of roads in key urban areas of the metropolitan region. All of them will have significant positive effects on the environment and on the living conditions of the residents in these areas. Adverse effects, if any, will be limited (some minor and temporally limited noise and dust during construction). Only where drainage and sewage is concerned, measures will have to be taken to prevent indirect adverse effects; such effects could be outside of the project sites, i.e. the selected settlements, in the downstream area, to which drainage water and sewage will flow. Such effects can clearly be identified during the screening process and mitigated as described in ESMMP.

The table below shows the applicability of World Bank Operational Safeguards as it applies to this construction of Thika Access Roads in Kiambu County Government of the Nairobi Metropolitan Region.

Table 2: 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. Several site visits conducted have not indicated the presence of any cultural (historical, archaeological) sites in the construction area. However, to manage “chance finds” an appropriate procedure is included in this ESIA (Annex A). Such procedure 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</td>
<td>Not applicable.</td>
</tr>
</tbody>
</table>
3.6.1 Environmental Assessment OP 4.01

The Project is planned to be implemented in Nairobi CBD area, industrial area and Umoja area through Nairobi Metropolitan Services Improvement Project (NaMSIP). The area overtime and due to anthropogenic activities have exerted pressure on both natural and social environment therefore, the Project will have less significant impact on physical, biological and social setting within the immediate surroundings. However OP 4.01 will be triggered.

This policy requires Environmental Assessment (EA) of Projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making. The EA is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of the proposed investment. The EA process takes into account the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples, and cultural property) and Trans-boundary and global environmental aspects.

Operational Policy 4.01 further requires that the EA report must be disclosed as a separate and stand-alone document by the Government of Kenya and the World Bank. The disclosure should be both in Kenya where it can be accessed by the general public and local communities and at the WB Website of the World Bank and the date for disclosure must precede the date for appraisal of the Project.

In addition, the project and contractor shall adhere to World Bank Environmental, Occupational Health and Safety (WB EHS) guidelines in the works especially during project implementation. Such requirements include observing safety guidelines, provision of protective clothing, clean water, and insurance cover are observed so as to protect all from work related injuries or other health hazards.

The proposed project has been classified as environmental category B and hence requirement for this ESIA Report.

3.6.2 Harmonization of both WB and GOK requirements for social and environmental sustainability

The World Bank (WB) and Government of Kenya (GoK) require that Projects of such nature are subjected to environmental and social impact assessment as stipulated under EMCA 2015 and its tools; the same process simultaneously fully resolves requirements of OP 4.01. Generally, both
requirements are aligned in principle and objective in that:

- Both require Environmental Assessment before project implementation leading to development of comprehensive Environmental and social Management plans to guide resolution of social and environmental impacts as anticipated.
- Both require public disclosure of Project Report and stakeholder consultation during preparation,
- While OP 4.01 of World Bank stipulates different scales of Project Report for different category of projects, EMCA requires Project Report for all sizes of projects, which are required to be scoped as relevant.
- Where EMCA requires consultation of Lead Agencies comprising of relevant sectors with legal mandate under GoK laws, the WB has equivalent safeguards for specific interests.
- The Bank requires that stakeholder consultations be undertaken during planning, implementation and operation phases of the project which is equivalent to the statutory annual environmental audits at the operation phase of projects in Kenya.
- The understanding of this Project Report is that, pursuit of an in-depth Project Report process as stipulated by EMCA 2015 is adequate to address all World Bank requirements for environmental and social assessment. This is a major guiding principle in this study.

Therefore, in keeping with this trend, public consultation has been done to the stakeholders, and their comments have been incorporated in the final Environmental Assessment and final design of the project. In addition, the Environmental Assessment report will be made publicly available to all stakeholders through disclosure at the project’s proponent website, NEMA, and WB website, as well as copy of the report available at the project site.

3.7 International Finance Cooperation (IFC) Performance Standard 2: Labour and Working Conditions

Construction of Access Road to Thika Railway Station in Kiambu County will result to employment personnel who will work either on temporal basis or permanent basis. These personnel will be subjected to the requirements of Kenya’s Work Place Injuries and Benefits Act
Performance Standard 2 recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers. The requirements set out in this Performance Standard have been in part guided by a number of international conventions and instruments, including those of the International Labour Organization (ILO) and the United Nations (UN). The objective of the standard is:

- To promote the fair treatment, non discrimination, and equal opportunity of workers.
- To establish, maintain, and improve the worker-management relationship.
- To promote compliance with national employment and labor laws.
- To protect workers, including vulnerable categories of workers such as children.

The relevant International Labour Organization (ILO) Conventions that will be applicable to the Project are listed below:

1) ILO Convention 87 on Freedom of Association and Protection of the Right to Organize
2) ILO Convention 98 on the Right to Organize and Collective Bargaining
3) ILO Convention 29 on Forced Labor
4) ILO Convention 105 on the Abolition of Forced Labor
5) ILO Convention 138 on Minimum Age (of employment)
6) ILO Convention 182 on the Worst Forms of Child Labor
7) ILO Convention 100 on Equal Remuneration
8) ILO Convention 111 on Discrimination (Employment and Occupation)
9) UN Convention on the Rights of the Child, Article 32.1
10) UN Convention on the Protection of the Rights of all Migrant Workers and Members of their Families

The Project Contractor shall observe the Standard as presented in the ESMMP of the project to be enforced under the Works Contract.
CHAPTER FOUR: CONSULTATIVE AND PUBLIC PARTICIPATION

4.1 Approach to Public Consultations

Legal Notice of 101 of EMCA 1999 and amended in 2015 (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.

4.1.1 Legal and Policy Provisions for Stakeholder Consultations


The regulation requires that during the process of conducting Scoping, Environmental Impact Assessment the Proponent shall in consultation with the Authority here in referred to National Environment Management Authority (NEMA); seek the views of persons who may be affected by the Project. In seeking the views of the public, after the approval of the scoping report, of the proposed project by the Authority, the proponent shall publicize the project and its anticipated effects and benefits by;

- Posting posters in strategic public places in the vicinity of the site of the proposed project informing the affected parties and communities of the proposed project;
- Publishing a notice on the proposed project for two successive weeks in a newspaper that has a nation-wide circulation;
- Making an announcement of the notice in both official and local languages in a radio with a nation-wide coverage for at least once a week for two consecutive weeks.
- Hold at least three public meetings with the affected parties and communities to explain the project and its effects, and to receive their oral or written comments; ensure that appropriate notices are sent out at least one week prior to the meetings.
and that the venue and times of the meetings are convenient for the affected communities and the other concerned parties; and

- Ensure, in consultation with the Authority that a suitably qualified co-coordinator is appointed to receive and record both oral and written comments and any translations thereof received during all public meetings for onward transmission to the Authority.

4.2 World Bank Group (WBG) Environmental Assessment Policy (OP 4.01)

The World Bank Group’s Environmental Assessment Policy (OP 4.01, January 1999) requires that project-affected groups and local non-governmental organizations (NGOs) be consulted during the impact assessments process about the project’s potential environmental and social impacts. The purpose of this consultation is to take local views into account in designing the environmental and social management plans as well as in project design. For complex projects where the environmental impacts and risks are high, the policy requires public consultation at least twice: first, shortly after Environmental Screening and before the terms of reference for the ESIA are finalized and secondly, once a draft ESIA Report is prepared. Consultation during project execution is also required. Section 5 summarizes the consultation programme for the ESIA, and confirms that the project meets and indeed exceeds these requirements.

4.3 Approach to Public Participation and Consultations

In case of the proposed road project, public consultations followed several steps as follows.

4.3.1 Identification of Stakeholders

Like in all civil works projects, the core stakeholders comprise people to be directly served by the access road project and comprise companies (business community), traders and motorists along the road corridor. 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 access road project. This category was also consulted as key informants on sectoral policy and to advise this ESIA 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.
4.4 Consultation and public participation (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:

- Local residents and their businesses;
- Ecology of the area;
- Human environment;
- Recreational and leisure facilities;
- Public health and safety;
- Effect on water resources and quality;
- Effect on the soils;
- Effect on road transport;
- 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.

4.5 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 traders and surrounding factories where the project was discussed and further views sought. During the initial reconnaissance conducted, the residents (mainly those operating kiosks near the access roads to be constructed) and the surrounding factories 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 are as attached in the appendix. Those that attended the meeting included:

- Kiosks/eateries owners and operators
- Boda-boda (Motor cyclists) operators
- Representative from nearby hardware shops
- Representative from nearby nursery school
- Officers from Kiambu County Government
- Drivers/motorists of vehicles along the road
The ESIA consultations included disclosure of the design and project status that was done by the appointed Resident Engineer (RE), Eng. Allan Nyagah. The issues that were raised by each group of stakeholders included:

- **Kiosks (eateries) owners along the access road but outside road corridor**
  A confirmation that there would be dust management during implementation and this was affirmed.

- **Boda-boda operators plying the route**
  How long the project would take once it starts – response 6 months

- **Representatives from nearby hardware shops**
  Needed assurance that all wastes removed will be disposed off – the contractor will manage all wastes according to NEMA guidelines

- **Representative from near-by nursery school**
  Whether the contractor would ensure management of vehicles speeds, both contractor and other motorists to ensure safety of nursery children using the road – erection of bumps as necessary and road signs. Use of road traffic controllers and flagmen will be ensured to control traffic and contractor vehicles.

Attendance sheets, minutes and questionnaires of the public participation and consultation meetings are as attached to this report.

**Public Participation Photographs**
CHAPTER FIVE: BASELINE INFORMATION OF THE PROJECT AREA

5.1 Environmental Baseline Conditions

5.1.1 Soils and drainage
Thika town is most comprised of soils which developed on Tertiary basic igneous rocks (olivine basalts, nepheline phonolites, and older basic tuffs included). The soils are imperfectly drained, deep, dark grey, black, firm to very firm bouldery and stony, cracking clay; in other places with calcareous, slightly deeper subsoil. In other places of the town the soils are moderately well drained, yellowish red to dark yellowish brown, friable, gravely over petroplinthite or rock. The dark yellowish brown or the lateritic and variable red loamy soils occur as discontinuous patches within the generally red, loamy soil of the slopes and higher part of the volcanic ridge. These soils generally form on semi-plane lands, where drainage is better than the bottom-lands, and cover clayey weathered tuffs.

5.1.2 Water supply and Sanitation
The proposed project will use water supply from the Thika Water and Sewerage Company (THIWASCO) for construction activities.

5.1.3 Infrastructure
Due to such rapid urban growth, provision of basic infrastructure for all has become an important concern of development planners in Thika. Basic infrastructural services that have deteriorated due to
such rapid increase in population include: Solid Waste Management (SWM) system; water and sewage systems; drainage and flood protection; roads; mass transportation; electric installations; and telecommunications. Greater environmental pollution, congestion and other problems have been the result of under-provision of such basic services. The town is well served, with good communication and transport network. It is significantly located to serve the Mt. Kenya region.

5.1.4 Climate

The climate in the area is pleasant for most of the year and similar to that of the Nairobi district. Thika town is marked by a fairly warm, semi-humid to semi-arid climate (Zone IV-3 in: Sombroek et al, 1982). The mean annual temperature at Thika is approximately 20°C, while the average maximum and minimum are 24-26°C and 12.5-14.5°C, respectively. The rainfall pattern is only moderately favourable, and the volume gradually decreases with the falling elevation from west to east. As in most parts of Central in Kenya, the distribution is bi-modal, with two distinct dry periods, and two intermittent rainy seasons. The rainy seasons are from March to May and from October to December. These six months account for approximately 82% of the annual rainfall.

Representative meteorological data from the Thika Horticultural Research Station, located to the Northwest of Thika Town, is given in the table below:-

<table>
<thead>
<tr>
<th>Month Parameter</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Average Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max.Temp.</td>
<td>26.1</td>
<td>27.2</td>
<td>27</td>
<td>25.5</td>
<td>24.4</td>
<td>23.5</td>
<td>22.5</td>
<td>22.8</td>
<td>25.2</td>
<td>26.4</td>
<td>24.5</td>
<td>25.4</td>
<td>25.1</td>
</tr>
<tr>
<td>Min. Temp</td>
<td>12.8</td>
<td>13.2</td>
<td>14.6</td>
<td>15.3</td>
<td>14.9</td>
<td>13</td>
<td>12.3</td>
<td>12.2</td>
<td>12.4</td>
<td>14.3</td>
<td>15.3</td>
<td>13.8</td>
<td>13.7</td>
</tr>
<tr>
<td>Daily range</td>
<td>13.3</td>
<td>14.0</td>
<td>12.4</td>
<td>10</td>
<td>9.5</td>
<td>10.3</td>
<td>10.2</td>
<td>10.6</td>
<td>12.8</td>
<td>12.1</td>
<td>9.2</td>
<td>11.6</td>
<td>11.4</td>
</tr>
<tr>
<td>Pot. ET (mm)</td>
<td>196</td>
<td>191</td>
<td>193</td>
<td>147</td>
<td>146</td>
<td>110</td>
<td>96</td>
<td>105</td>
<td>147</td>
<td>173</td>
<td>143</td>
<td>175</td>
<td>1,822</td>
</tr>
<tr>
<td>Rainfall (mm)</td>
<td>53</td>
<td>48</td>
<td>134</td>
<td>197</td>
<td>186</td>
<td>26</td>
<td>18</td>
<td>29</td>
<td>10</td>
<td>78</td>
<td>174</td>
<td>67</td>
<td>1,020</td>
</tr>
<tr>
<td>Rainfall Deficit</td>
<td>-143</td>
<td>-143</td>
<td>-59</td>
<td>+50</td>
<td>+40</td>
<td>-84</td>
<td>-78</td>
<td>-76</td>
<td>-137</td>
<td>-95</td>
<td>+31</td>
<td>-108</td>
<td>-802</td>
</tr>
</tbody>
</table>

*Monthly Meteorological Data at Thika Horticultural Research Station (Kenya Meteorological Departments)*

The annual potential evaporation is expected to approach 1880 mm, and the rainfall/evaporation ratio (Rf/Eo) is thus about 50%.
5.1.5 Flora and Fauna
The main fauna expected in the area include rodents, snakes, insects, birds and other crawling animals. However, landscaping will be done whose plants will be as determined on site by the Resident Engineer and the Contractor.

5.2 Social Baseline Conditions

5.2.1 Population
According to the 2009 population and housing census, Thika had a total of 136,917. Population of the administrative areas of the project location is presented in the following table:

Population of the Project Administrative Area

<table>
<thead>
<tr>
<th>Administrative Area</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
</tr>
<tr>
<td>Thika town constituency</td>
<td>68,408</td>
</tr>
</tbody>
</table>

Source: GOK, National bureau of statistics

Population of the project location is dynamic, during the day it decreases as residents move out to work in offices mainly in the Nairobi CBD of industries located in the industrial area and then return in the evening increasing the population thereof throughout the night. These population dynamics cause a lot of vehicle and human congestion in the morning and evenings. There is also rural-urban and inter-urban immigration from other areas in search of employment opportunities, better education opportunities and better infrastructure. Rapid population growth has led to overstretching of infrastructures and social facilities whose expansion is not commensurate with the increase in population. Rapid migration into the project area has also led to mushrooming of slums. Most of the people in search of job opportunities end up in slums where houses are cheap and lack basic facilities.

5.2.2 Land Tenure and Use
Agricultural activities go on in the area around Thika Town. Vegetables, beans and maize and bananas are grown on a small scale. Del Monte Kenya Limited who mainly exports canned pineapples and juices to other countries also grows pineapples on a large scale. The town has many commercial businesses among which are the following:

- Shops selling basic household commodities
- Other petrol stations
- Hotels and butcheries
- Garages and franchise dealer shops
- Hardware shops
ESIA field assessment identified that the road reserve is free from encroachment and therefore no Resettlement issues will be triggered as described in the World Bank Policy on Involuntary Resettlement (OP) 4.12.

5.2.3 HIV/AIDS
HIV/AIDS are a major health problem with the prevalence averaging 34%. With regard to bed occupancy, about 60% of the hospital beds are occupied by patients with HIV/AIDS related diseases. The age group 20-49 years is the most affected, majority of who are females. This has resulted in high increase in number of HIV/AIDS orphans in the district and loss of families’ incomes which is directed towards addressing the pandemic in the household. The main causes of the spread of HIV/AIDS in the district include unsafe sexual behaviour, drug abuse especially drinking of illicit brews, high levels of peer pressure and ignorance of facts, family breakdowns etc. The socio-economic impact of HIV/AIDS in the district include the drop-out rates in high schools, female and children headed families, loss of manpower and high mortality and morbidity rates, orphans and street children etc.

5.2.4 Sensitive Receptors
The road to be constructed passes through residential area with some small-scale industries. The key environmental receptors include motorists, pedestrians, residential houses, a church and a government office.
CHAPTER SIX: ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

6.1 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.

6.2 Negative environmental impacts of construction activities

6.2.1 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.

6.2.2 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.

6.2.3 Exhaust emissions

The trucks used to transport various building materials from their sources to the project site will contribute to increases in emissions of CO$_2$, NO$_2$ 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. Because large quantities of building materials are required, some of which are sourced outside the access road area, such emissions can be enormous and may affect a wider geographical area. 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.

6.2.4 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.

6.2.5 Risks of accidents and injuries to workers

Because of the intensive engineering and construction activities including 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.

6.2.6 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. Uncontrolled soil erosion can have adverse effects on any local water bodies.

6.2.7 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 be injurious 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.
6.2.8 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.

6.2.9 Water use
The construction activities will require large quantities of water that will be sourced from the THIWASCO. 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.

6.2.10 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.

6.2.11 Traffic management
Flow of traffic along or near the proposed road will be affected and diversions may need to be done to manage traffic

6.3 Positive environmental impacts of construction activities

6.3.1 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.

6.3.2 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 locally in the larger Thika area and the surrounding areas. This provides ready market for
construction material suppliers such as quarrying companies, hardware shops and individuals with such materials.

**6.3.3 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.

**6.4 Negative environmental impacts of operational activities**

**6.4.1 Increased storm water flow**

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.

**6.4.2 Worksite health and safety**

The health and safety of surrounding community may be affected from dust, a matter that was raised during the CPP.

**6.4.3 Operation of quarries and borrow pits**

The contractor will mainly source this from private quarries but all in all this degrades the environment.

**6.4.4 Road safety**

This may be impeded because of road works

**6.4.5 Labor Camps**

These may need to be set up and it is important that labour laws or activities that abuse workers and children are avoided.

**6.4.6 HIV/AIDS**

The project may raise and expose workers and other persons to sexual immorality leading to infections of sexually transmitted diseases including HIV-AIDS.
6.5 Positive environmental impacts of operational activities

6.5.1 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.

6.5.2 Positive social 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 railway station
(b) Improved pathways (NMT) for cycling and walking for pedestrians
(c) Easier accessibility for all to different parts of Thika in the locality
(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 a nutshell, all roads being improved or rehabilitated will be installed with street lights. 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.

6.6 Negative environmental impacts of decommissioning activities

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

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

6.7 Positive environmental impacts of decommissioning activities

6.7.1 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.

6.7.2 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 SEVEN: ANALYSIS OF PROJECT ALTERNATIVES
This section analyses the project alternatives in terms of site, technology and waste management options.

7.1 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 railway station.

7.2 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 Thika and the community as a whole. The area will continue to have earth roads and this will not help maximize usage and utilization of this area 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 railway station 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.

7.3 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.

7.4 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 Kiambu County Government 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 EIGHT: IMPACTS MITIGATION AND MONITORING

8.1 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).

8.2 Mitigation of construction phase impacts

8.2.1 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.

8.2.2 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.

8.2.3 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 railway station, which is located in a low lying area likely to have standing water during the rainy season.

8.2.4 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.

8.2.5 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.
8.2.6 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.

8.2.7 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.

8.2.8 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. 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 as outlined in the EMMP.

8.2.9 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.

8.2.10 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. Water will be sourced externally, including using the nearby rivers and streams after obtaining licenses from WRMA.
8.2.1.1 Labor influx

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 project, it is unlikely to have any significant labour influx.

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

8.2.1.2 HIV/AID awareness and prevention

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

8.2.1.3 Community Health and Safety

This shall be ensured by the contractor through;

- Barricade / fence construction site
- Use of warning signs
- Sensitize public on hazards of the works
- Enforce vehicle low speed limits
- Use flagmen to control traffic and construction vehicles
- Optimize on number of trips to reduce accidents and better materials inventory management
- Designate routes with minimum community persons

8.3 Mitigation of operation phase impacts

8.3.1 Management of storm-water runoff

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

8.3.2 Mitigation of decommissioning phase impacts
8.3.3 Efficient solid waste management
Solid waste resulting from demolition or dismantling works will be managed as described above.

8.3.4 Reduction of dust concentration
High levels of dust concentration resulting from demolition or dismantling works will be minimized as described earlier.

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

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

8.3.7 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.

8.3.8 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.
CHAPTER NINE: ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

9.1 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.

9.1.1 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:
Environmental and Social Impact Assessment Report for the Construction of Access Road to Thika Railway Station in Kiambu County of Nairobi Metropolitan Region

Table 3: The ESMMP for the Construction of Access Road to Thika Railway Station in Kiambu 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 | ▪ Ensure accurate budgeting and estimation of actual construction material requirements to ensure that the least amount of material necessary is ordered  
▪ Maximize sourcing of construction materials from suppliers who use environmentally friendly processes in their operations.  
▪ 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 as much as possible to avoid soil compaction within the project site.  
▪ Ensure that any compacted areas are ripped to reduce run-off.  
▪ 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.  
▪ Before the finalization of construction, replace trees and shrubs and provide landscaping along the road to contribute to minimization of runoff and soil erosion | Contractor         | Throughout construction period    | 15,000                 |
| 3) Solid waste generation         | ▪ Ensure that construction materials left over at the end of construction will be used in other projects rather than being disposed of.  
▪ Ensure that damaged or wasted construction materials will be recovered for refurbishing and use in other projects  
▪ Utilize opportunities for donating recyclable/reusable or residual materials to local community groups, institutions and individual local residents or home owners. | Contractor         | One-off                           |                        |
<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>1) Water</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>10,000</td>
</tr>
<tr>
<td></td>
<td>▪ Reuse packaging materials such as cartons, cement bags and plastic containers to reduce waste at the site</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>▪ Use construction materials that have minimal or no packaging to avoid the generation of excessive packaging waste</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>▪ Purchase of perishable construction materials such as paints should be done incrementally to ensure reduced spoilage of unused materials</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>▪ Dispose waste more responsibly by dumping at designated dumping sites or engaging the use of a registered waste disposal company or Kiambu Town Government</td>
<td>Contractor &amp; Kiambu Town Government</td>
<td>Throughout construction period</td>
<td>4,000/month</td>
</tr>
<tr>
<td>2) Noise</td>
<td>▪ Sprinkle water on graded access routes each day to reduce dust generation by construction vehicles</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>8,000/month</td>
</tr>
<tr>
<td></td>
<td>▪ Sensitize truck drivers to avoid unnecessary racing of vehicle engines at loading/offloading points and parking areas. Switch off or keep vehicle engines at these points</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>▪ Ensure proper planning of transportation of materials to ensure that vehicle fills are increased in order to reduce the number of trips done per vehicle or the number of vehicles on the road</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Sensitize construction vehicle drivers and machinery operators to switch off engines of vehicles or machinery not being used.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>–</td>
</tr>
<tr>
<td>4) Air/ Dust pollution</td>
<td>▪ Sensitize truck drivers to avoid unnecessary racing of vehicle engines at loading/offloading points and parking areas. Switch off or keep vehicle engines at these points</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>▪ Ensure proper planning of transportation of materials to ensure that vehicle fills are increased in order to reduce the number of trips done per vehicle or the number of vehicles on the road</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Sensitize construction vehicle drivers and machinery operators to switch off engines of vehicles or machinery not being used.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>–</td>
</tr>
</tbody>
</table>
### Objective/Plan

<table>
<thead>
<tr>
<th>Objective/Plan</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Monitoring Mechanism</th>
<th>Approximate Cost (Ksh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5) Noise Pollution</td>
<td>• Sensitize construction drivers to avoid gunning of vehicle engines or hooting especially when passing through sensitive areas such as residential areas and schools</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>• Ensure that construction machinery are kept in good condition to reduce noise generation</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>• Ensure that all generators and heavy duty equipment are insulated or placed in enclosures to minimize ambient noise levels.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td>6) Depletion of energy resources</td>
<td>• Ensure planning of transportation of materials to ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>• Monitor energy use during construction and set targets for reduction of energy use.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td>7) Exploitation of water resources</td>
<td>• Promote recycling and reuse of water as much as possible.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>• Organize collection of rainwater on site.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8) Accidents</td>
<td>• Ensure that provisions for reporting incidents, accidents and dangerous occurrences during construction using prescribed forms obtainable from the local Directorate of Occupational Health and Safety Office (DOHSS) are in place.</td>
<td>Contractor</td>
<td>Continuous</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>• Ensure that the premises/works are insured as per statutory requirements (third party and workman’s compensation)</td>
<td>Proponent</td>
<td>Annually</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>• Develop, document and display prominently an appropriate SHE policy for construction works.</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>• Provisions must be put in place for the formation of a Health and Safety Committee, in which the employer and the workers are represented</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td>9) Hygiene</td>
<td>• Suitable, efficient, clean, well-lit and adequate gender specific sanitary conveniences should be provided for construction workers</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td>10) Medical Examinations</td>
<td>• Arrangements must be in place for the medical examination of all construction employees before, during and after termination of employment.</td>
<td>Contractor</td>
<td>Continuous</td>
<td>-</td>
</tr>
<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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</tr>
<tr>
<td>11) Machinery Safety</td>
<td>▪ Ensure that machinery, equipment, personal protective equipment, appliances and hand tools used in construction do comply with the prescribed safety and health standards and be appropriately installed, maintained and safeguarded</td>
<td>Contractor</td>
<td>One-off</td>
<td>–</td>
</tr>
<tr>
<td>12) Injuries caused by machineries and equipments.</td>
<td>▪ Ensure that equipment and work tasks are adapted to fit workers and their ability including protection against mental strain</td>
<td>Contractor</td>
<td>Continuous</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>▪ All machines and other moving parts of equipment must be enclosed or guarded to protect all workers from injury</td>
<td>Contractor</td>
<td>One-off</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>▪ Arrangements must be in place to train and supervise inexperienced workers regarding construction machinery use and other procedures/operations</td>
<td>Contractor</td>
<td>Continuous</td>
<td>5,000 per training</td>
</tr>
<tr>
<td></td>
<td>▪ Equipment such as fire extinguishers must be examined by a government authorized person. The equipment may only be used if a certificate of examination has been issued</td>
<td>Contractor</td>
<td>Continuous</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>▪ Reports of such examinations must be presented in prescribed forms, signed by the examiner and attached to the general register</td>
<td>Contractor</td>
<td>Continuous</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>▪ Ensure that materials (cement bags, aggregates, bitumen drums) are stored or stacked in such manner as to ensure their stability and prevent any fall or collapse</td>
<td>Contractor</td>
<td>Continuous</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>▪ Conduct sensitization campaign for the public on risks related to construction sites.</td>
<td>Contractor</td>
<td>Once before construction begins and a repeat after 1 month if necessary.</td>
<td>–</td>
</tr>
<tr>
<td>13) Poor storage of materials</td>
<td>▪ Ensure that items are not stored/stacked against weak walls and partitions</td>
<td>Contractor</td>
<td>Continuous</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>▪ All floors, steps, stairs and passages of the premises must be of sound construction and properly maintained</td>
<td>Contractor</td>
<td>Continuous</td>
<td>–</td>
</tr>
<tr>
<td>14) Emergencies.</td>
<td>▪ Design suitable documented emergency preparedness and evacuation procedures to be used during any emergency. Such procedures must be tested at regular intervals</td>
<td>Contractor</td>
<td>Every 3 months</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>▪ Ensure that adequate provisions are in place to immediately stop any operations where there is an imminent and serious danger to health and safety and to evacuate workers</td>
<td>Contractor</td>
<td>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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</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>Once before construction begins and a repeat after 1 month if necessary.</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>30,000</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>5,000</td>
<td></td>
</tr>
<tr>
<td>▪ Signs such as “NO SMOKING” must be prominently displayed within the premises, especially in parts where inflammable materials are stored</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>▪ Enough space must be provided within the premises to allow for adequate natural ventilation through circulation of fresh air</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>▪ Well stocked first aid box which is easily available and accessible should be provided within the premises</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
<td></td>
</tr>
<tr>
<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>
<td></td>
</tr>
<tr>
<td>▪ Keep a record of all hazardous chemicals used at the premises, cross-referenced to the appropriate chemical safety data sheets (MSDBs/MSDSs)</td>
<td>Contractor</td>
<td>Continuous</td>
<td>-</td>
<td></td>
</tr>
<tr>
<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>
<td></td>
</tr>
</tbody>
</table>

15) Food and toxins.
Environmental and Social Impact Assessment Report for the Construction of Access Road to Thika Railway Station in Kiambu County of Nairobi Metropolitan Region

<table>
<thead>
<tr>
<th>Objective/Plan</th>
<th>Recommended Mitigation Measures</th>
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<th>Monitoring Mechanism</th>
<th>Approximate Cost (Kshs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16) Provisions of PPE to Workers.</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></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></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>One-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>5,000/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>17) Sanitary</td>
<td>• All work places must be kept in a clean state, and free from effluvia arising from any drain, sanitary conveniences or nuisance</td>
<td>Contractor</td>
<td>Continuous</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>• Accumulations of dirt and refuse should be cleaned daily from the floors, benches, staircases and passages</td>
<td>Contractor</td>
<td>Daily</td>
<td>-</td>
</tr>
<tr>
<td>18) Insecurity</td>
<td>• Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the Construction site.</td>
<td>Contractor</td>
<td>Continuous</td>
<td>-</td>
</tr>
</tbody>
</table>
### Environmental and Social Impact Assessment Report for the Construction of Access Road to Thika Railway Station in Kiambu County of Nairobi Metropolitan Region

<table>
<thead>
<tr>
<th>19) HIV-AIDS Management</th>
<th><strong>Conduct sensitization campaign for the public on risks related to construction sites.</strong></th>
<th>Contractor</th>
<th>Twice (before construction begins) and repeated after 1 month.</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>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</strong></td>
<td>Contractor</td>
<td>Continuous</td>
<td>Kshs. 2,500,000</td>
</tr>
<tr>
<td>20) Management of complaints and/or grievances</td>
<td><strong>Employ a grievance redress mechanism incorporating a negotiation and/or mediation team or party</strong></td>
<td>Grievance Chairman / Committee (Stewarded by Resident Engineer)</td>
<td>Continuous</td>
<td>-</td>
</tr>
</tbody>
</table>
| 21) Community Health and Safety | **Barricade / fence construction site**  
**Use of warning signs**  
**Sensitize public on hazards of the works**  
**Enforce vehicle low speed limits**  
**Use flagmen to control traffic and construction vehicles**  
**Optimize on number of trips to reduce accidents and better materials inventory management**  
**Designate routes with minimum community persons** | Contractor | Number of complaints/accidents/incidents | Kshs. 400,000 |

**TOTAL ESMMP BUDGET** | Kshs. 3,138,000 |

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.

### 9.1.2 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 of the project are outlined below.
Table 4: ESMMP for the Operational Phase of the Construction of Thika Access Road to Railway Station

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

9.1.3 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 in below.
Table 5: ESMMP for the Decommissioning Phase

<table>
<thead>
<tr>
<th>Environmental Impact</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Time Frame</th>
<th>Cost (Kshs)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sold Waste Generation.</strong></td>
<td>• All removed materials that will not be used for other purposes must be removed and recycled/reused as far as possible</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>• Where recycling/reuse of the removed materials and other demolition waste is not possible, the materials should be taken to a licensed waste disposal site or arrangements made with Kiambu County Government</td>
<td>Contractor</td>
<td>One-off</td>
<td>5,000</td>
</tr>
<tr>
<td></td>
<td>• Donate reusable demolition waste to charitable organizations, individuals and institutions</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td><strong>Degeneration of vegetation at the construction site</strong></td>
<td>• Implement an appropriate re-vegetation program to restore the site to better status</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>• Consider use of indigenous plant species in re-vegetation</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>• Trees should be planted at suitable locations so as to interrupt slight lines (screen planting), between the adjacent residential area and the development.</td>
<td>Contractor</td>
<td>Once-off</td>
<td>-</td>
</tr>
</tbody>
</table>
CHAPTER TEN: AUXILLIARY INFORMATION

10.1 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. 168 655 619. The implementation of the ESMMP is included into the BoQ.

10.2 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.

10.3 Reporting
Monthly reporting by the site contractor to the proponent is necessary to ensure the project is executed as per the plans and drawings. The safety officer should always remain on site to report any safety concerns for urgent mitigation. The officer should also at all times enforce safety requirements as per the relevant legislation. The contractor must consult the proponent to maintain a clear understanding of all the aspects of the project. Kiambu County Government should be involved in early stages of the project to increase acceptance and ensure necessary partnership is in place (e.g. waste removal requirements).
CHAPTER ELEVEN: 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 Kiambu County Government 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 amended in 2015 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*

Kenya gazette supplement number 56. Environmental Impact Assessment & Audit Regulations 2003.*Government Printer, Nairobi*

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

- Sample Chance Find Procedures
- Plate of Selected Photographs
- Public Participation & Consultation Documents
  - Attendance Sheets
  - Questionnaires
  - Minutes of Meetings
- Grievance Redress Mechanisms
- Location Map
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

Part of Alignment A to be constructed

Confluence of Alignment A and Alignment B

Alignment A showing the residential houses

Public participation and consultation on site
ANNEX C: PUBLIC PARTICIPATION DOCUMENTS

MINUTES OF THE STAKEHOLDERS MEETING HELD AT THIKA ACCESS ROAD FOR CONSTRUCTION OF THIKA ACCESS ROADS PROJECT ON 5TH 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 Mwaura called the meeting to order and welcomed the members to the meeting after a word of prayer from one of the residents of the area.

Project description
Eng Mwaura briefed the members on the project scope, location and its impact on the area 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 Mwaura led the members through the questionnaires where they gave their views by writing on the questionnaire.

The questionnaires are as attached. Members of the eateries requested for more time to fill in the questionnaires until the following day.

Residential issues.
1. The 1st participant asked the Engineer the contractual period for the works.
2. The 2nd resident asked the County surveyor to give or show where the roads reserve lies for future planning of the activities in his factory.
3. The 3rd resident wanted to know the requirement for employment of casuals.
4. The kiosks owners were concerned about the dust experienced on the surrounding area due to the contractor’s activities.
5. The 6th resident asked the Engineer whether there would be way to involve the members in the tree planting exercise.
6. 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 dowsers 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.
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 Resident Engineer Eng. Allan Nyagah.
Annex D: GRIEVANCE RESOLUTION MECHANISM

1. Steps in dealing with grievances

1.1. Complaint received in writing from affected person

1.2. Recording of grievance in standard form

1.3. Reconnaissance site visit with the complainant.

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

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

1.6. Submission of complaint to NaMSIP for resolution.

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. Allan Nyagah</td>
<td>Resident Engineer</td>
<td>Nairobi City County</td>
<td>Committee Secretary</td>
</tr>
<tr>
<td>2</td>
<td>Assistant Resident Engineer</td>
<td></td>
<td>Committee Assistant Secretary</td>
</tr>
<tr>
<td>3 Martin Sauka</td>
<td>Site Administrator</td>
<td>Contractor - Njuca</td>
<td>Member</td>
</tr>
<tr>
<td>4</td>
<td>Kiosks Representative</td>
<td></td>
<td>Member</td>
</tr>
<tr>
<td>5</td>
<td>Factories Representative</td>
<td></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</td>
<td>Business Member</td>
<td>Business members</td>
<td>Business Representative</td>
</tr>
</tbody>
</table>
GRIEVANCE RESOLUTION PROCEDURE

Recording of grievance in standard forms

Reconnaissance site visit

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

Yes – 3 days

No

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

Yes – 5 days

No

Submission of grievance to NaMSIP for resolution and putting of grievance on the site notice board to notify members of the public

STORAGE OF ALL GRIEVANCE RELATED DOCUMENTS

Yes

Grievance resolved
Proposed roads for upgrading