

# REPUBLIC OF KENYA



## Environmental and Social Impact Assessment of The Proposed Kikuyu Railway Station Tunnel in Kikuyu Town of Kiambu County in the Nairobi Metropolitan Region



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<b>TABLE OF CONTENTS</b>	<b>PAGE</b>
LIST OF TABLES	VI
LIST OF PLATES	VI
LIST OF FIGURES	VI
CERTIFICATE OF DECLARATION AND DOCUMENT AUTHENTICATION	VII
LIST OF ACRONYMS	VIII
EXECUTIVE SUMMARY	VIII
1 INTRODUCTION	1
1.1 Proposed Project Location	1
1.2 Proposed Access Road Tunnel Profile	2
1.3 Environmental Considerations	3
1.3.1 Toilets	3
1.3.2 Solid Waste Management	3
1.4 Project Cost	4
1.5 Presentation of the Report	5
1.6 ESIA Study Team	5
2 ESIA OBJECTIVES, SCOPE AND METHODOLOGY	6
2.1 Terms of Reference (TOR) for the ESIA Process	6
2.2 Scope and Objectives of the ESIA	6
2.3 Scope of the ESIA	6
2.4 ESIA Approach and Methodology	7
2.4.1 Environmental Screening	8
2.4.2 Environmental Scoping	8
2.4.3 Documentary Review	8
2.4.4 Site Assessment	8
2.4.5 Public Consultation and Participation	9
2.4.6 Impact Assessment and Mitigation Measures	10
2.5 Environmental and social Management and Monitoring Plan (ESMMP)	10
3 POLICY, LEGAL AND ADMINISTRATIVE POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK	11
3.1 Government of Kenya Policy Framework	11
3.1.1 The Constitution of Kenya 2010	11
3.1.2 The Kenya Vision 2030	13
3.1.3 Nairobi metro 2030	14
3.1.4 The Sustainable Development Goals	15
3.2 World Bank Environmental and Social Safeguard Policies	16
3.2.1 Environmental Assessment (OP 4.01)	18
3.2.2 Harmonization of both WB and GOK requirements for Social and Environmental Sustainability	18
3.3 Legal and Regulatory Framework for Environment	19
3.3.1 The Environment Management and Coordination Act No 8, 1999 and the relative Amendment Act No 5, 2015	19
3.3.2 Environmental Impact Assessment and Audit Regulations, 2003	21
3.3.3 Environmental Management and Coordination Act (Waste Management) Regulations, 2006	22

## ***NaMSIP***

3.3.4	Environmental Management and Coordination Act (Water Quality) Regulation 2006	23
3.3.5	Air Quality Regulation, 2014	26
3.3.6	Environmental Management and Coordination Act (Noise and Excessive Vibrations Pollution Control) Regulations, 2009	27
3.3.7	The Urban Areas and Cities Act 2011	28
3.3.8	The County Government Act 2012	29
3.3.9	The National Land Commission Act (2012)	30
3.3.10	National Sand Harvesting Guidelines, 2007	30
3.3.11	Traffic Act Chapter 403	30
3.3.12	The Water Act, 2002	31
3.3.13	The Water Resources Management Rules (2007)	31
3.3.14	HIV/AIDS Prevention and Control Act (Act No. 14 of 2006)	31
3.3.15	Occupational Safety and Health Act OSHA, 2007	32
3.3.16	Work Injury Benefits Act, 2007	32
3.3.17	The Public Health Act (Cap. 242)	32
3.3.18	The Physical Planning Act (Cap. 286)	33
3.3.19	Way Leave Act Cap 292	34
3.3.20	The Building Code 2009	34
3.3.21	Public Roads and Roads of Access Act (Cap 399)	34
3.3.22	National Gender and Equality Commission Act, 2011	35
3.3.23	The Sexual Offences Act (No. 3 of 2006)	35
3.4	The Institutional Framework	35
3.4.1	Ministry of Environment and Natural Resources	35
3.4.2	The Ministry of Transport, Infrastructure, Housing and Urban Development (MoTIHUD)	35
3.4.3	National Environment Management Authority (NEMA)	36
3.4.3.1	The National Environmental Council	36
3.4.3.2	The National Environmental Management Authority	36
3.4.3.3	County Environmental Committees	36
3.4.3.4	Public Complaints Committee	36
3.4.4	The Directorate of Nairobi Metropolitan Development	37
3.4.5	The Tunnel Committees, Local CBOs and other Civil Society	37
4	PROJECT ENVIRONMENTAL AND SOCIAL BASELINE	38
4.1	Project Background	38
4.2	Physical Environment	38
4.2.1	Drainage and Hydrology	38
4.2.2	Climatic Condition	38
4.2.3	Topography	39
4.2.4	Geology and Soils	40
4.2.5	Biological Environment	41
4.3	Socioeconomic Environment	41
4.3.1	Demographics	41
4.3.2	Energy	41
4.3.3	HIV/AIDS	41
4.3.4	Infrastructure	42
4.3.5	Administrative Units	42
4.3.6	Political Units	43
5	PUBLIC CONSULTATION AND PARTICIPATION	44
5.1	Stakeholder Mapping and Consultations	44
5.2	Public Consultation Methodology	44
5.2.1	Initial Interviews	44
5.2.2	Socio-Economic Survey	44

**NaMSIP**

5.2.3	Public Consultation and Participation Meetings	45
6	ANALYSIS OF ALTERNATIVES	47
6.1	Introduction	47
6.2	Zero or No Project Alternative	47
6.3	Analysis of Alternative Construction Materials and Technology	47
6.4	Solid Waste Management Alternatives	48
7	ENVIRONMENTAL AND SOCIAL IMPACTS ASSESSMENT AND MITIGATION MEASURES	49
7.1	Introduction	49
7.2	Approach	49
7.3	Anticipated Positive Project Impacts	49
7.3.1	Employment Creation	49
7.3.2	Reduced Congestion	49
7.3.3	Economic Growth	50
7.3.4	Connectivity	50
7.4	Anticipated Negative Project Impacts and Mitigation Measure	50
7.4.1	Loss of Vegetation	50
7.4.2	Soils and Geology Disturbance	50
7.4.3	Depletion of Water Resources during Construction phase	51
7.4.4	Soils and Groundwater Contamination	51
7.4.5	Air pollution (Dust generation)	51
7.4.6	Air Pollution (Generation of exhaust emission)	52
7.4.7	Noise Pollution and Excessive Vibration Generation	52
7.4.8	Construction Solid/liquid Wastes Generation	53
7.4.9	Health and Safety Impacts	53
7.4.10	Disruption of Water Supply	54
7.4.11	Increased Surface Runoff	54
7.4.12	Landscape and Visual Destruction	55
7.4.13	Traffic Accidents	55
7.4.14	Housekeeping	56
7.4.15	Crime Management, Child Protection, Gender Equity, Labour Influx and Sexual Harassment	57
7.4.16	Complaints and Grievances/Social Conflict	58
7.4.17	Increased HIV/AIDs Prevalence and other Diseases	59
7.5	Operation Phase Impacts	59
7.5.1	Increased Energy Consumption and Demand	59
7.5.2	Blockage of Drainage Systems	59
7.5.3	Water Pollution	60
7.5.4	Accidents and Incidence Occurrence	60
7.5.5	HIV/AIDS prevalence	60
7.5.6	Security and Crime Risks in the Tunnel	61
7.6	Decommissioning Phase Impacts	61
7.6.1	Solid wastes (Scraps and other Debris Onsite)	61
7.6.2	Air, Water and Soil Pollution	61
7.6.3	Occupational Health and Safety Concerns	62
7.7	Cumulative Impacts	62
7.7.1	Assessment of the Impacts	63
7.7.1.1	Cumulative Impacts on Socio Economics	64
7.7.2	Conclusion	64
8	ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMMP)	65

<i>NaMSIP</i>		
8.1	Significance of ESMMP	65
8.2	Environmental and Social, Management and Monitoring Plan	66
8.3	Grievance redress Mechanisms (GRM)	80
9	CONCLUSIONS AND RECOMMENDATIONS	81
9.1	Environment and Social Assessment Conclusions	81
9.2	Environment and Social Assessment Recommendation	81
10	REFERENCE	83
	ANNEXES	84

## LIST OF TABLES

Table 3.1: Analysis of potential triggers to World Bank Safeguards Policies.....	17
Table 3-2: Analysis of the Project triggers to the EMCA and its tools. ....	21
Table 3.3: Standards for Discharge of Waste Water into Public Sewers.....	24
Table 3.4: Standards for Discharge of Waste water into Environment (Water body).25	
Table 5.1: Stakeholder Mapping Checklist.....	44
Table 5.2: Summary of Meetings held with Stakeholders.....	46
Table 8.1: Environmental and Social Management and Monitoring Plan.....	67

## LIST OF PLATES

Plate 1: The current situation at the site of the proposed tunnel with vehicles and people actively using the illegal railway crossing. On the left is NaMSIP Kikuyu Railway Station currently under construction .....	2
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## LIST OF FIGURES

Figure 1.1: General Layout of the Proposed Access Road Tunnel Site and Neighboring Facilities.....	3
Figure 4.1: Topography of Kikuyu .....	40
Figure 4-2: Constituencies in Kiambu County .....	43

## 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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Signature \_\_\_\_\_

Date \_\_\_\_\_

Lead Expert

Eng. Stephen Mwaura is a registered Lead Expert on Environmental Impact Assessment/Audit (EIA/A) by the National Environment Management Authority –NEMA (Reg. No. 7284 and copy of NEMA certificate is in this report), confirms that the contents of this report are a true representation of the Environmental & Social Impact Assessment of the proposed Construction of Kikuyu Railway Station Tunnel in Kikuyu Town of Kiambu County in the Nairobi Metropolitan Region. This report is issued without prejudice.

Lead Expert – Eng. Stephen Mwaura - (NEMA License No. 7284 Copy in this report)

Signature \_\_\_\_\_

Date \_\_\_\_\_

## LIST OF ACRONYMS

<b>Acronym</b>	<b>Meaning</b>
CBD	Central Business District
CBOs	Community Based Organization
CCTV	Close Circuit Television
DVR	Digital Video Recorder
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EMCA	Environmental management and Coordination Act
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental/Social Management and Monitoring Plan
FAO	Food Agricultural Organization
GIS	Geographic Information System
GoK	Government of Kenya
HIV/AIDS	Human Immuno-Virus/ Acquired Immune-Deficiency Syndrome
IDA	International Development Association
IBRD	International Bank for Reconstruction and Development
ICT	Information Communication Technology
IFC	International Finance Corporation
ILUT	Interdisciplinary Land-Use and Transportation Metropolitan Analysis
KCG	Kiambu County Government
LED	Light-Emitting Diode
LPG	Liquefied Petroleum Gas
MCA	Member of the County Assembly
MDGs	Millennium Development Goals
MoTIHUD	Ministry of Transport, Infrastructure, Housing and Urban Development
MoT	Ministry of Transport
MRTS	Mass Rapid Transit System/ Mass Rapid Transit Study
MP	Measurement point
MRTS	Mass Rapid Transit System/ Mass Rapid Transit Study
MSP	Measurement Sampling Point
NaMSIP	Nairobi Metropolitan Services Improvement Project
NASA	National Aeronautics and Space Administration
NEMA	National Environment and Management Authority
NIUPLAN	Nairobi Integrated Urban Development Master Plan for the City of Nairobi
NMR	Nairobi Metropolitan Region
NMT	Non-Motorized Transport
OHS	Occupational Health and Safety
OP	Operation procedures
PAPs	Project Affected Persons
RE	Resident Engineer
SDGs	Sustainable Development Goals
SPC	Spatial Planning Concept Development Plan
STDs	Sexually Transmitted Diseases
STIs	Sexually Transmitted Infections
TOD	Transit Oriented Development
ToR	Terms of Reference
WB	World Bank
WHO	World Health Organisation
WRMA	Water Resources Management Authority

## EXECUTIVE SUMMARY

### *NaMSIP*

The Ministry of Transport, Infrastructure, Housing and Urban Development (MoTIHUD) through the Nairobi Metropolitan Services Improvement Project (NaMSIP) intends to construct an tunnel at the area where the Railway Station Access Road crosses the Railway line that connects Kikuyu Railways Station and Nairobi City, The tunnel will be located at the railway crossing next to the Kikuyu Railway Station. The Railways Station is currently at the final stage of completion. This ESIA Project Report gives the findings of the Environmental Impact Assessment Study undertaken as an integral part of the design process of the tunnel. The Project highlights salient social and environmental issues associated with the design, construction and operational aspects of the Kikuyu Railway Station Access Road Tunnel

The proposed tunnel with two access approach roads is located adjacent to the Kikuyu Railway Station in Kikuyu town, Kiambu County on GPS location (-1.243974, 36.664254). When constructed, the tunnel will connect Kikuyu town to residential estates and farmlands to the south of the town through Kikuyu-Ondiri road that also connects to the Nairobi Southern Bypass. Generally, the immediate neighborhood is a medium density with a mixture of low and middle-income population comprising of relatively modern and well-designed commercial and residential developments. The tunnel will ensure safe crossing of both vehicular and human traffic across the railway crossing. This will make a seamless and safe access by people and vehicles from Kikuyu-Ondiri road on the southern side of the railway station to the Kikuyu tunnel, schools, shops, banks and public transport facilities such as the bus stop and railway station



*Google Map of Area: Source Goggle Earth, 2018*

### **ESIA Study and Objective**

The main objective of the ESIA study was to identify environmental and social impacts associated with the construction of the Proposed Railway Station Access Road Tunnel and

### *NaMSIP*

to recommend an appropriate environmental and social management strategy for the project. The core outcome of the Study is an Environmental and Social Management and Monitoring Plan (ESMMP), which will be used to enhance and mitigate any positive and negative impacts of the project respectively. Specific tasks included;

- Evaluation of the existing situation at the proposed project site,
- Appreciation of the project concepts through studying design documents, construction and intervention layout, feasibility of the project report and other documents,
- Identification of potential impacts associated with the proposed project
- Identification of suitable mitigation and preventive measures appropriate for impacts
- Development of a comprehensive environment and social management and monitoring plan for integration into the project implementation.

### **ESIA Justification**

In accordance with the EMCA, (Amendment) 2015, all new projects must undergo environmental impact assessment study to comply with the EIA Regulation, 2003. The proposed construction of the Kikuyu Railway Station Road Tunnel is expected to have an overall positive impact to the people and the environment. However, project construction phase and other associated civil works are anticipated to have environmental and social impacts that would require mitigation.

Construction related projects including access roads and tunnels are listed in the second schedule of EMCA, (Amendment) 2015 as among projects that should undergo EIA processes. The magnitude of the projects further justifies the EIA study to provide an Environmental and Social Management and Monitoring Plan (ESMMP) for integration into implementation and operation processes.

In addition, the National Policy on building and construction as well as the building Act calls for Environmental Impact Assessment on construction related projects for long-term sustainability and acceptability by the beneficiaries.

### **Approach and Methodology**

The ultimate goal of this approach was to identify positive and negative impacts resulting from the construction of the proposed project. The systematic investigative and reporting methodology specified in the conduct of Project Report Studies (Legal Notice 101 of EMCA) was adopted in this Study. Baseline data on project was generated through discussion with the client and review of project documents. Opinions formed were revalidated through fieldwork entailing site investigations and interviews with key primary stakeholders (e.g. drivers, pedestrians and traders) and holding public consultation meetings with secondary stakeholders (e.g. project area residents, traders and business persons operating in the neighborhood of the Railway Station Access Road Tunnel, the railway station and immediate neighbours).

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This helped in identifying, predicting, analyzing and evaluating potential impacts that may emanate from the project. Diverse study methods and tools including scoping the project area, use of questionnaires, direct stakeholder consultations, holding public consultation meeting 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.

### **Policy, Legal, and Regulatory Framework**

This Project Report has been developed to ensure that the construction of the proposed Railway Station Access Road Tunnel is in conformity with national policy aspirations towards securing sustainable development. Specifically, this report has been developed to ensure compliance with requirements of the Environmental Management and Coordination Act (EMCA) 2015 which is Kenya's supreme environmental law, the Constitution and World Bank's safeguard policies. Section 58 of EMCA requires that all proposed development in Kenya to be subjected to environmental impact assessment and to be conducted in line with the Second Schedule (of EMCA) and the Legal Notice 101 (Regulations for Environmental Assessment and Audit) of June 2003.

### **Anticipated Environment and Social Impacts**

This ESIA study process used a systematic, evidence-based approach to evaluate and interpret the potential impacts of the Proposed Access Road Tunnel on sensitive physical, biological and human receptors during construction, operation and decommissioning phases. The Legal Notice No. 101 (Environmental Impact Assessment and Environmental Audit) Regulations 2003 requires that a developer should provide a "description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development." The potential environment and social impacts anticipated during the construction, operation and decommissioning phase include the following:

### **Anticipated Positive Project Impacts**

#### ***Employment creation***

This project is anticipated to create employment opportunities for people within the County. Direct job creation will begin from the construction phase of the project whereby the locals will be employed to undertake both informal and formal jobs at the construction site.

#### ***Economic growth due to easier connectivity to Kikuyu town***

Construction of the access road tunnel will to spur economic growth in the project area such as development of other business activities such as banking, insurance, warehousing, transportation and development of residential and commercial buildings among others.

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This will result due to easy connectivity to Kikuyu town by the huge population residing to the south of the railway station

### ***Reduced Motor Accidents and incidences at the railway crossing***

The Construction of the Kikuyu Railway station access road tunnel will reduce the accidents and incidences previously reported at the railway line crossing.

### **Anticipated Negative Impacts**

The main negative impacts are as follows. These have been identified in this report and mitigation measures on managing them have been suggested.

#### ***Loss of vegetation***

There may be minor loss of vegetation owing to this project and it is required that replanting of vegetation through landscaping is done after project completion.

#### ***Soil and geology disturbance***

There will be excavation works to make the tunnel and this will disturb the soil and geology of the site area. First, it is proposed excavations will be done on the basis of a geological survey and study. During excavation works, adequate warning signs will be erected as well as barricading to safeguard the site.

#### ***Air pollution (Dust generation and exhausts emissions)***

The project is anticipated to impact on ambient air quality through generation of dust and combustion gases (SO<sub>2</sub>, NO<sub>x</sub>, CO, and particulates). Dust will be generated from construction activities especially removal of existing structures, grading and excavation. Fugitive dust will be greater during drier period in areas of fine textured soils. The combustion emissions will be generated by diesel powered construction equipment: excavators, wheel loaders, trucks, motor graders and compactors.

Considering the Project dust controls (watering; stabilizing disturbed areas) and the fact that the fugitive dust and combustion emissions will be short-term and localized, air quality impacts from the construction activities are expected to be of low significance (low severity; low likelihood) at the site and negligible at the closest settlements.

#### ***Soil erosion Impacts***

It is anticipated that the project will cause soil erosion during construction and decommissioning phases. Construction phase and demolition phase activities especially excavation and demolition of structures, respectively are likely to cause soil erosion at the construction site and surrounding areas. However, the impacts are expected to be short term and of low significance.

#### ***Impact on water resources***

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During construction phase, potential water contamination could arise from disturbance of soil, spillage of oils, fuels, lubricants and other toxic materials at the construction site, discharge of silt-laden run off from site and disposal of waste and wastewater from sanitary convenient provided to construction workers.

During operation phase, solid waste dropped at the tunnel by pedestrians and motorists if not collected and managed appropriately could be washed down by storm water.

During the decommissioning phase, the potential negative impacts to water resources are likely to be very similar to those considered during the construction phase of the Project, and the appropriate mitigation measures should be employed to reduce impact on receptors.

The potential risk of water pollution from proposed project can be reduced by: adopting protective measures to prevent spills; putting in place suitable spill response plans; managing wastes appropriately; and controlling soil erosion. With these good practices the risk of water pollution from the project should be low.

### *Noise pollution and excessive vibrations generation*

The ambient noise quality of the project site is characteristic of an urban setting. During construction phase, noise sources will include: manual removal and clearance of existing structures/ debris and vegetation, machine and equipment movement and rolling, pouring and piling of materials, concreting and equipment installation. During operation phase, the primary noise sources at the site will include vehicles using the access road tunnel. During decommissioning phase, sources of noise will include; hammering to remove structures and vehicles carting away salvage materials.

### *Landscape and Visual Impacts*

During the construction phase, sources of landscape and visual effects include: -

- Site access and haulage routes.
- Materials stockpiles and construction compounds.
- Construction equipment and plant.
- Utilities, including lighting and;
- Installation of site compound and security posts

Taking into consideration the character of the neighborhood, the inherent low sensitivity of the receiving landscape, absence of any landscape and visual designations it is considered that the construction impacts are most likely to be of *low medium negative* significance with regard to visual impacts in the absence of mitigation measures. The proposed access road tunnel is not anticipated to alter the existing visual landscape of the area once it is developed. Instead, it will blend in with the surroundings roads.

Decommissioning will reduce the visual intrusion of the tunnel infrastructure because much of the infrastructure will be demolished. However, there will be short term landscape and

#### *NaMSIP*

visual impacts from activities on the site including: stockpiling of wastes/rubbles generated from demolition activities.

#### ***Disruption and damage of public utilities***

There is potential for a few disruptions of public utilities, especially the electric power and some water and sewer lines, especially the ones that might be located near or located at the site. During transportation of materials to construction site, the use of already existing tarmacked roads and paved surfaces leading to the site may be damaged if axle load weight limit is not observed, resulting to poor roads, and spending more money repairing the affected roads. Mitigation measures include generation of a Utility Management Plan to minimize damage and interruption of public utilities.

#### ***Increased demand of construction materials, energy and water***

Increased demand of construction materials, energy and water is bound to happen during construction activities. An elaborate waste material reduction is important to save on high demand for construction materials from the environment. Water storage and conservation measures should be adhered to save on water volume used during the construction phase. During operation phase, electrical energy will be required for lighting up the tunnel and the access road at night. Demand for water is not anticipated during operation and decommissioning phases as no water supply infrastructure will be installed at the access road tunnel.

#### ***Inconvenience and danger to proximate residents through increased road traffic***

The project is not anticipated to impact on traffic on the Post Office road to the north nor and the Kikuyu-Ondiri road to the South. However, traffic around the site will increase during the construction phase as trucks collect and transport demolition debris/waste and excavated soil from the site and as they deliver construction materials to the site. The impacts will be for short duration (the construction and decommissioning periods) and are low significance.

#### **Public Consultation, Participation and Disclosure**

Public and stakeholder consultation sessions (qualitative) were held with the affected persons and other local community stakeholders to share the information about the project and record their concerns/ feedback associated with this project. The consultation was in two stages namely scoping and public and stakeholders' consultation. Consultative sessions discussed the topics related to the access road tunnel design, road safety, traffic management, employment and livelihoods of the local communities, gender and women issues, Contractor's camp and access to existing routes and related environmental issues.

The section on public and stakeholder consultations provides details of outcomes of consultations and covers issues and concerns raised by the members of the public and

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stakeholders/Commuters regarding the new tunnel design stall allocation, employment and livelihoods of the local communities, gender and women issues. To address the issues and concerns raised, mitigation measures have been developed and incorporated in the ESIA report. Overall, members of the public and the stakeholders supported the project and anticipated numerous benefits as a result of the proposed project.

### **Environmental and Social Management Plan**

Social and environmental safeguards and protection are very important in any development. Therefore, a detailed Environmental and Social Management and Monitoring Plan (ESMMP) has been proposed to be followed during the implementation of the project. The ESMMP details the important steps available to mitigate the impacts that may arise during all phases of the project. The Proponent and the Contractor are the responsible parties in the implementation of the ESMMP.

### **Project and ESMMP Costs**

The proposed project construction period will be 4 months and defect liability of 6 months respectively. The project is estimated to cost approximately: Kshs. 81,534,214.85. The cost of implementation of ESMP is approximated to be Kshs 1,710,000.

### **Conclusion**

The objective of the proposed project is to develop a construction of the proposed Railway Station Access Road Tunnel is to enhance road network connectivity and road safety and connecting the newly improved railway station to the catchment to the southern side. This will bring transport, safety and economic benefits to the project beneficiaries and the country as well. The environmental and social assessment of the Project ascertains that the Project is likely to cause some few and not significant adverse environmental and social impacts. However, the impacts identified have readily addressed by embedded control measures in the engineering design of the Project as well as additional mitigation measures as suggested in the Environmental and Social Management Plan. The Project received favourable support from the motorists, pedestrians and the local communities and other stakeholders during consultations and they anticipated numerous benefits as a result of the proposed project.

The proposed project will not be located near any protected areas or sensitive receptors. No archaeological or protected monuments are located in the proposed project vicinity.

The Project will have both positive and negative impacts on the physical and social environment. The positive impacts include employment creation, economic growth due to easier connectivity to and from Kikuyu town and reduced motor/ train accidents/incidents at the Kikuyu railway crossing.

During the construction phase of the Project, the key potential negative impacts includes; noise and dust generation, disruption of public utilities and traffic, blocking of neighbouring storm water drains by soil eroded from the construction site and deposited in the drains.

### *NaMSIP*

There is also a risk of soil erosion as result of removal of soil cover, excavation and movement of heavy construction vehicles and equipment. Contamination of soil, groundwater could occur also result from accidental spills and leaks of hazardous materials (e.g. oil and fuel) during handling, transportation and storage at the site. All identified negative impacts will be mitigated against as outlined in the ESMP

During, the operation, potential negative impacts will include motor vehicle/ pedestrians related accidents at the access road and tunnel due to the regular and close interaction between the two. This has been mitigated by provision of a separated pedestrian walkway along the access road including at the tunnel. Pedestrian crossing will be provided on both sides of the tunnel to ensure that the pedestrians can safely cross from one side of the Railway station to the other.

The adverse impacts identified are generally manageable through good housekeeping and a diligent implementation of the ESMMP by the Contractor and its supervision by the Proponent. The nearest air quality, noise and water sensitive receptors will be a focus for monitoring of any impact arising due to the construction, operation and decommissioning activities.

Other negative impacts include increased demand for water resources and energy in the area during construction and operation phases of the project respectively, potential occupational health and safety of the workers, and increase in HIV and AIDS prevalence. However, these impacts will be mitigated with appropriate mitigation measures built in as part of the Project planning process.

It was established that the Project activities will trigger World Bank Operation Policy (OP 4.01) on Environmental Assessment due to environmental and social impacts arising from the Project as presented in this report.

However, none of the other Operational Policies will be triggered by the project. Based on the analysis conducted in this ESIA, it is concluded that overall the Project will result in positive socio-economic benefits and the negative environmental impacts that have been identified are not significant, and will be minimized adequately through good design, appropriate application of mitigation measures and continuous supervision by the project Proponent.

### **Recommendation**

Environmental monitoring is essential to track and sustain the effectiveness of the mitigation measures proposed in this report. An environmental monitoring plan has been prepared as part of the ESMMP. The focus areas of monitoring cover air, noise, traffic management, water and energy resources, occupational health and safety, as well as local employment and economic impact of the project during construction and operation phases. The burden of mitigation measures largely lies with the Project Contractor under supervision by the Proponent. Key observations are that most adverse impacts are short-

*NaMSIP*

term and will disappear once civil works ends. The Contract for the proposed project should bear relevant clauses binding the Contractor to institute environmental mitigation as recommended in this study. The core monitoring strategy for this project will be through site meetings, in which case, it is recommended that the County Environmental Officers be invited to such meetings. Other stakeholders such as the County Labour Officer should also attend such meetings to ascertain that measures towards securing the health and safety of workers have been put in place.

It is the duty of the Kiambu County Government to carry out annual environmental audits once the tunnel has been commissioned. This will be in compliance with the Environmental Management and Coordination Act, EMCA of 1999 and the Environmental Impact Assessment and Audit Regulations, Legal Notice No. 101 of 2003.

The following are recommended for effective implementation of the mitigation measures for the project;

- All mitigation measures need to be specified in tender and contract documents, and must be included in the Engineering Drawings, Specifications and Bills of Quantities.
- Diligence on the part of the Contractor and proper supervision by the Project Engineer during construction and the initial operation phase is crucial for mitigating negative impacts.
- Periodic environmental and social monitoring is required by the project Proponent to ensure that mitigation measures have been implemented in order to prevent or avert any negative impacts of the project.
- The implementing agency should set up proper and applicable Grievance Redress Mechanism (GRM) for the project to deal with grievances and issues on the project.
- Reporting of the implementation of safeguard measures should be incorporated in the monthly reporting of the project

The Contractor will prepare a Contractor Environmental and Social Management Plan, CESMP, and a Code of Conduct that shall be approved by the proponent before beginning of works.

# 1 INTRODUCTION

The Government of Kenya is improving its economy and decentralizing development to County Governments by utilizing funds received from international organizations like World Bank and other foreign institutions to undertake major development projects at the County levels. Nairobi Metro 2030 is part of the overall national development agenda for Kenya which is encapsulated in Kenya Vision 2030. Following this effort, the Nairobi Metropolitan Region (NMR) through the National Government and respective County Governments intends to upgrade its dilapidated infrastructure, inclusive of roads and railways, to achieve an economically, socially and environmentally sustainable modern urban centres.

Nairobi Metropolitan Services Improvement Project (NaMSIP) is a World Bank funded Project under the State Department of Nairobi Metropolitan Region in the Ministry of Transport, Infrastructure, Housing and Urban Development. NaMSIP's mandate is to strengthen service delivery in the Nairobi Metropolitan Region (NMR) on various selected projects by investing in local infrastructure (tunnel, roads, street lighting, bicycle and pedestrian pathways, drainage, among others) and in providing large-scale metropolitan infrastructure in the areas of trade, solid waste management, transport, sewerage services, among others. NaMSIP has the following four major components;

- Institutional Reform and Planning;
- Local Government Infrastructure and Services;
- Metropolitan Infrastructure and Services;
- Project Management, Monitoring and Evaluation

Among the projects earmarked for improvement are railways stations and associated access roads within NMR which fall under Component 3 (Local Government Infrastructure and Services) of the NaMSIP Project.

## 1.1 Proposed Project Location

The proposed Railway Station Access Road Tunnel site is located in Kikuyu town, Kikuyu Sub-County, Kiambu County adjacent to the Railway Station, on GPS location (-1.243974, 36.664254). It connects to the Post Office road to the north and the Kikuyu-Ondiri road to the South that also connects to the Nairobi Southern Bypass. Generally, the immediate neighborhood is a medium density with a mixture of low and middle-income population comprising of relatively modern and well-designed commercial and residential developments. The tunnel will ensure safe crossing of both vehicular and human traffic across the railway crossing. This will make a seamless and safe access by people and vehicles from Kikuyu-Ondiri road on the southern side of the railway station to the Kikuyu tunnel, schools, shops, banks and public transport facilities such as the bus stop and railway station

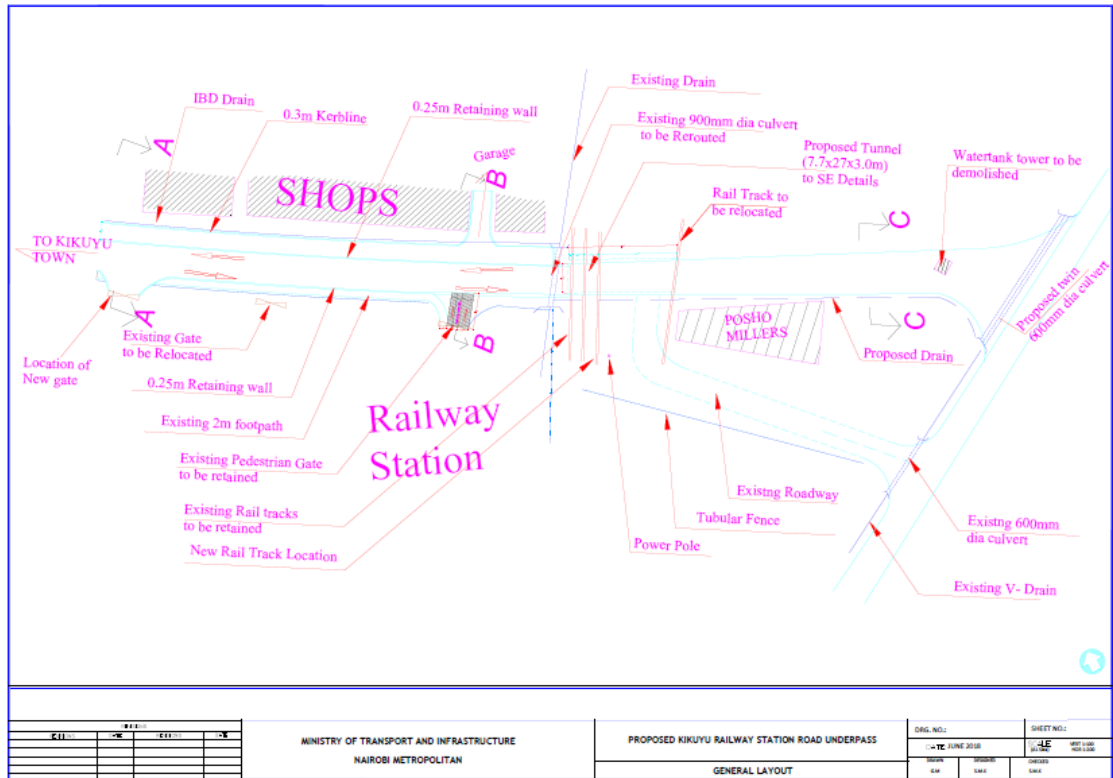
## 1.2 Proposed Access Road Tunnel Profile

The proposed access road tunnel length is 27m while the ramp to the tunnel is proposed as 200mm concrete slab class 25 which will give stabilizing effect to the retaining walls. This is more durable under wet conditions which are synonymous with tunnels. The tunnel is designed to class 30 reinforced concrete with water proofing admixture while the retaining walls and ramp are class 25 reinforced concrete. The pedestrian ramp to station gate is not feasible since with a distance of 9m and height of 3m it will give a gradient of 33.33% which is not desirable unless the distance is extended inside the station.

There is a 200mm concrete slab class 30 with water proofing admixture and A142 BRC mesh bottom and top which will be casted on top of the tunnel rings to give rigidity and seal the joints. In addition, there will be square hollow sections guardrails along the walkway to the station gate for the safety of pedestrians.



**Plate 1: The current situation at the site of the proposed tunnel with vehicles and people actively using the illegal railway crossing. On the left is NaMSIP Kikuyu Railway Station currently under construction**



**Figure 1.1: General Layout of the Proposed Access Road Tunnel Site and Neighboring Facilities**

**1.3 Environmental Considerations**

**1.3.1 Toilets**

Modern toilets that will adequately serve the expected number of commuters have been constructed at the new Kikuyu Railway Station. Kikuyu Town does not have a centralized sewerage system hence the business and residential buildings within the town are served by pit latrines, soakage pits and septic tanks. However, an African Development Bank funded extension of sewerage infrastructure to Kikuyu town from the existing Nairobi Rivers Trunk at Waithaka shopping center is currently underway. The toilets are connected to a septic tank constructed at the site for quality and perfect management of sewer. The toilets are also connected with tap water from the storage tanks and sinks installed at the railway station. This will ensure high level of cleanliness and reduce chances of communicable diseases such as amoeba and cholera.

**1.3.2 Solid Waste Management**

Litterbins will be provided at the tunnel and along the access road. Commuters will also ensure safe and sanitary disposal of the wastes in litterbins.

#### 1.4 Project Cost

The project is estimated to cost Kenya Shillings, Eighty One Million, Five Hundred and Thirty Four Thousand, Two Hundred and Fourteen, Cents Eighty Five Only (Kshs. 81,534,214.85) to construct while the cost of implementing ESMP is estimated at Kenya Shillings, One Million Seven Hundred and Ten Thousands (Kshs 1,710,000). The following Table 1.1 shows the summary cost estimate of the project.

**Table 1.1: BoQ Cost Summary Page**

<b>PROPOSED KIKUYU RAILWAY STATION ROAD TUNNEL</b>		
<b>SUMMARY BILLS OF QUANTITIES</b>		
<b>BILL No.</b>	<b>DESCRIPTION</b>	<b>AMOUNT Kshs</b>
1	Preliminaries & General	10,552,500.00
2	Site Clearance and top Soil Stripping	285,979.00
3	Earthworks	6,275,448.00
4	Culverts and Drainage works	4,839,827.50
5	Passage of Traffic	200,000.00
6	Natural material base and sub base	1,177,875.00
7	Graded Crushed stones	1,323,000.00
8	Cement for stabilization	232,848.00
9	Bituminous Surface Treatment	844,052.00
10	Bituminous Mixes	6,253,500.00
11	Concrete Works	26,533,110.00
12	Road Furniture	1,662,200.00
13	Miscellaneous Works	2,921,948.00
14	Day Works	796,000.00
I	<b>Sub-Total 1</b>	<b>63,898,287.50</b>
III	Add 10% of Sub-Total 1 of Bills as Provisional sum for Contingencies to be expended in whole or in part or deleted as directed by the Engineer	6,389,828.75
VI	<b>Sub-Total 2</b>	<b>70,288,116.25</b>
VII	Add 16% of Sub-Total 2 for Value Added Tax	11,246,098.60
	<b>TOTAL ESTIMATE</b>	<b>81,534,214.85</b>

## **1.5 Presentation of the Report**

The report is presented as outlined below:

Chapter 1: Introduction of the project which include Background, Scope of the proposed project. It also gives the format of the presentation of the report

Chapter 2: Gives the Objectives, Scope, and Methodology of the ESIA Study.

Chapter 3: Gives the Policy, Legal, Institutional and Administrative Framework.

Chapter 4: Project Baseline Information of the Study Area.

Chapter 5: Outcome of the Public Consultation and Participation process.

Chapter 6: Analysis of Alternatives to the Project.

Chapter 7: Identification of Potential Impacts and mitigation measures of the project.

Chapter 8: Environmental and Social Management Plan (ESMP)

Chapter 9: Conclusion and recommendation

References

Annexes

## **1.6 ESIA Study Team**

The study team composed of members from different professional disciplines. The team members included:

- Environmental Team Leader
- Sociologist
- Environmental support staff

## **2 ESIA OBJECTIVES, SCOPE AND METHODOLOGY**

This environmental and social impact assessment has been undertaken to fulfill the legislative requirements of the Environmental Management and Coordination Act (Amendment), 2015 and the subsequent Kenya Gazette Supplement on Environmental Impact Assessment and Environmental Audit Regulations 2003 and World Bank Safeguard polices.

The ESIA identifies potential positive and negative environmental, social, and economic impacts of the proposed project and propose mitigation measures to the anticipated negative impacts.

### **2.1 Terms of Reference (TOR) for the ESIA Process**

The following terms of reference for the Proposed Access Road Tunnel Development Project were used by the ESIA expert team.

- Provision of baseline and background information;
- Project and site description;
- Identification of environmental impacts of the proposed development in the various phases and their level of significance;
- Impact of the project on existing infrastructure;
- Evaluation of project alternatives;
- Stakeholder participation viz social survey of views from neighbors;
- Identification of possible conflicts;
- Suggest mitigation measures for identified negative impacts; and
- Prepare a comprehensive environmental management plan.

### **2.2 Scope and Objectives of the ESIA**

In accordance with the EMCA, 1999, all new projects must undergo environmental impact assessment study such as to comply with the EIA Regulation, 2003 and to ensure provisions for environmental protection. Therefore, the main objective of environmental and social impact assessment associated with development of the proposed project is to comply with the current requirements of the EIA regulations of 2003 as established under the EMCA, 2015, in addition to the requirements of World Bank Safeguard polices and in particular OP 4.01 requirements.

### **2.3 Scope of the ESIA**

The scope of ESIA study, therefore, covered the following key areas;

- Provide a description of the environmental and socioeconomic issues associated with the proposed new tunnel project;

- To generate baseline data for monitoring and evaluation of how well the mitigation measures will be implemented during the project cycle;
- Undertaking public and stakeholder consultations through interviews and holding meetings with members of the public, neighbouring communities, stakeholders and affected Commuters ;
- Identification of anticipated environmental and social impacts with focus on physical and social environment, socioeconomic factors and natural resources aspects,
- Development of mitigation measures and an environmental and social management and monitoring plan for identified negative environmental and social impacts.
- To prepare an Environmental and Social Impact Assessment Project Report compliant with the World Bank safeguard policies and the Environmental Management and Coordination Act (1999) including the subsequent NEMA Regulations and detailing findings and recommendations
- Obtain appropriate EIA License from NEMA and approval by the World Bank

## **2.4 ESIA Approach and Methodology**

In accordance to the ESIA guidelines, the study included the following:

- A clear description of the proposed project including its objectives, design concepts, proposed interventions and anticipated environmental and social impacts,
- Description of the baseline conditions in the project area to cover the physical location, environmental setting, social and economic issues,
- A description of the legal, policy and institutional framework within which the Proposed Access Road Tunnel development project will be implemented,
- Description of the project alternatives and selection criteria,
- Details of the anticipated impacts to the environment, social and economic aspects of the project area.
- Appropriate mitigation and/or corrective measures,
- Development of an environmental and social management plan (ESMP) presenting the project activities, potential negative impacts, mitigation measures and responsibilities, associated costs and monitoring indicators

According to the Environmental Management and Coordination Act (EMCA), 2015, section 58 requires that all projects falling under the second schedule of the Act must undergo comprehensive environmental and social impact assessment studies. ESIA study should also comply with the EIA Regulations of 2003 on the minimum and other convectional environmental guidelines. ESIA studies are adopted as integrated approach where desk documentary reviews, field investigations, consultations as well as interviews and discussions with stakeholders and affected communities are considered. The overall study was undertaken following these stages;

#### **2.4.1 Environmental Screening**

Screening process was undertaken to decide whether the Proposed Access Road Tunnel project needed to be subjected to an ESIA study or not. Based on literature review, the proposed project falls under category 2 of projects to be subjected to EISA study as provided for by the second schedule of the Environmental Management and Coordination Act of 2015 and Category B under the World Bank Environmental and Social Safeguards Policies as defined in the Bank's Operational Procedures (OPs).

#### **2.4.2 Environmental Scoping**

The aim of this stage was to ensure that the ESIA study adequately addresses all the crucial issues of environmental and social concern to the decision-makers. This was done by narrowing down on the Proposed Access Road Tunnel Development project issues and also to those requiring detailed analysis. The process involved dialogue with all project stakeholders to ensure that this aim was fulfilled. It also involved the collection of primary and secondary data. From an evaluation of this data, a rapid assessment of the project site and its surrounding areas was made.

The key benefits of scoping include:

- Identification and engagement of key stakeholders
- Identification the existing gaps
- Ensures that the assessment focuses on the key likely environmental and social impacts

#### **2.4.3 Documentary Review**

Several relevant documents were reviewed for a clear understanding of the terms of reference, environmental status of the project area, data on demographic trends (for the project area, the beneficiary areas and the adjoining towns and counties), land use practices in the affected areas, development strategies and plans (Local, National and International) as well as the policy, legal and institutional documents. The documents reviewed were:

- Relevant Legal, Policy and Regulatory documents;
- EMCA (Amendment), 2015
- Kenya National Bureau of Statistics, 2009
- Nairobi Metro 2030, First edition 2008

#### **2.4.4 Site Assessment**

A physical inspection of the ground (proposed site and their surrounding environment) was conducted. This process was meant to appreciate the project's scope of land requirements, and establish actual baseline as well as verification of facts stated for project designs. This was done with an aim of establishing the anticipated positive and

negative impacts on the physical and biological environment (hydrology, climatic patterns and geology), social and economic trends (population trends, settlement trends, economic patterns, cultural setting and linkages, land ownership issues, etc.) and the project affected persons (PAPs) and beneficiaries.

Specific objectives of the field assessment included:

- Obtaining available and relevant information and data from the local public offices including environment, water, lands and agriculture;
- Evaluating the environmental setting around the proposed site - observations were focused on the topography, land tenure, surface and ground water sources, public amenities, land cover, climate, flora and fauna, soils, etc.
- Undertaking comprehensive consultative public participation exercises to reach a large section of the affected persons as well as other stakeholders. Public consultations were also organized with the stakeholders to evaluate the environmental setting around the proposed site.
- Evaluate social, economic and cultural settings in the entire project site.

#### **2.4.5 Public Consultation and Participation**

It is a Kenyan Government policy that beneficiaries and members of the public living near new or improvement project sites (both public and private) are consulted to seek their views and opinions regarding the proposed projects before they are implemented. Interaction with the stakeholders, commuters and communities living around the project area was undertaken through public and stakeholder consultation and participation meetings. Refer to **Annex 2** to **Annex 6** for the Minutes and Attendance Registers of the meetings and Completed Stakeholder Questionnaires. Through this process, the stakeholders and the PAPs had an opportunity to contribute to the overall project design by making recommendations and raising any environmental and social concerns of the project. In addition, the process aimed at creating a sense of responsibility, commitment and local ownership for smooth implementation and operation of the proposed project.

#### **2.4.6 Impact Assessment and Mitigation Measures**

The primary function of an environmental impact assessment study was to predict and quantify potential impacts, assess and evaluate their magnitude and importance and develop an Environmental and Social Management Plan to mitigate the impacts. Environmental impacts could be positive or negative, direct or indirect, local or regional and also reversible or irreversible. Assessment of impacts depends on the nature and magnitude of the activity being undertaken and also on the type of mitigation measures that are envisaged as part of the project concept.

For the proposed project, the anticipated impacts are divided into three components of the project: impacts based on Project Location, impacts during Construction phase, and impacts during De-commissioning and Operational phases. The identified potential positive and negative impacts of the project are presented in Chapter 7 of this report.

#### **2.5 Environmental and social Management and Monitoring Plan (ESMMP)**

The Consultants have developed an Environmental and Social Management and Monitoring Plan (ESMMP) to guide the project team in eliminating or reducing the project negative impacts to acceptable minimum/ standards. The ESMMP is based on good environmental practices of project implementation and safety of the operations. The proposed ESMMP can be improved through continuous monitoring and audits during project implementation. The plan is provided in a matrix form in Chapter 8 of this report and it identifies the anticipated impact; proposed measures to be undertaken; monitoring indicators; the party responsible for implementing the measures, and the estimated cost likely to be incurred to undertake the measures.

### **3 POLICY, LEGAL AND ADMINISTRATIVE POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK**

This chapter outlines the policy, legal, regulatory and institutional framework in Kenya particularly for environmental management, protection and assessment applicable to the proposed Project. The Project will be subject to laws, regulations, guidelines and standards of the Government of Kenya and international institutions (IFC/World Bank). Note that wherever any of the laws/ polices contradict each other, World Bank Policies prevails.

#### **3.1 Government of Kenya Policy Framework**

Applications of national statutes and regulations on environmental conservation suggest that the owner of any project has a legal duty and responsibility to discharge wastes of acceptable quality to the receiving environment without compromising public health and safety. This position enhances the importance of an EIA for the proposed extension project to provide a benchmark for its sustainable operation when it is finally commissioned. The Access Road Tunnel project complies with government policy framework by the act of the proponent conducting ESIA study before initiating any civil works on the project.

##### **3.1.1 The Constitution of Kenya 2010**

The Constitution of Kenya, promulgated into law on 27 September 2010, is the supreme law of the Republic: It provides the broad framework regulating present and future development aspects of Kenya and along which all national and sectoral legislative documents are drawn.

With regard to environment, Section 42 inside the Bill of Rights of the Constitution, states that: every person has the 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 legislative and other measures; particularly those contemplated in Article 69; and to have obligations relating to the environment fulfilled under Article 70.

Chapter 5 of the new constitution provides the main pillars on which the 77 environmental statutes are hinged and covers "Land and Environment" and includes the aforementioned articles 69 and 70. Part 1 of the Chapter dwells on land, outlining the principles informing land policy, land classification as well as land use and property. Part 2 of the Chapter directs focus on the environment and natural resources. It provides for a clear outline of the state's obligation with respect to the environment. The Chapter seeks to eliminate processes & activities likely to endanger the environment.

Article 69 states that the State shall:

- 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 percent 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 on environmental impact assessment, environmental audit and monitoring of the environment;
- Eliminate processes and activities that are likely to endanger the environment; and,
- Utilize the environment and natural resources for the benefit of the people of Kenya.

There are further provisions on enforcement of environmental rights as well as establishment of legislation relating to the environment in accordance to the guidelines provided in this Chapter.

In conformity with the Constitution of Kenya 2010, every activity or project undertaken within the Republic of Kenya must be in tandem with the state's vision for the national environment as well as adherence to the right of every individual to a clean and healthy environment.

Section 70 provides for enforcement of environmental rights thus: -:

- If a person alleges that a right to a clean and healthy environment recognized and protected under Article 42 has been, is being or is likely to be, denied, violated, infringed or threatened, the person may apply to a court for redress in addition to any other legal remedies that are available in respect to the same matter.
- On application under clause (1), the court may make any order, or give any directions, it considers appropriate —
- to prevent, stop or discontinue any act or omission that is harmful to the environment;
- (b) to compel any public officer to take measures to prevent or discontinue any act or omission that is harmful to the environment; or
- To provide compensation for any victim of a violation of the right to a clean and healthy environment.
- For the purposes of this Article, an applicant does not have to demonstrate that any person has incurred loss or suffered injury.

Essentially, the New Constitution has embraced and provided further anchorage to the spirit and letter of the Environmental Management and Co-ordination Act (EMCA), 1999, whose requirements for environmental protection and management have largely

informed Sections 69 through to 71 of the Document. In Section 72 however, the new constitution allows for enactment of laws towards enforcement of any new provisions of the Supreme Law. The proposed project complies with the Constitution by proposing a framework in its ESIA on Social, Health, safety and environmental protection

### **3.1.2 The Kenya Vision 2030**

Kenya Vision 2030 is the country's development programme from 2008 to 2030. It was launched on 10 June 2008 by President Mwai Kibaki with the aim to help transform Kenya into a newly industrializing, middle-income country with a consistent annual growth of 10 % by 2030. Developed through an all-inclusive and participatory stakeholder consultative process, involving Kenyans from all parts of the country, the Vision is based on three "pillars": Economic, Social, and Political. The 2030 goal for urban areas, to reach “a well-housed population living in an environmentally-secure urban environment in particular, will be achieved by bringing basic infrastructure and services namely roads, street lights, water and sanitation facilities, storm water drains, footpaths, and others. It is likewise important the promotion of: environmental conservation and pollution and waste management, through the application of the right economic incentives in development initiatives.

**Under the first Medium-Term Plan (MTP-1) (2008-12) of Kenya’s Vision 2030 strategy, significant efforts were made to promote growth and preserve sound economic policies under challenging circumstances.** While reforms were being implemented across the board during 2008-12, the biggest achievements under MTP-1, as noted in the MTP-2, were in improving infrastructure as well as some social indicators, such as school enrolment rates.

Through short of the targets set in MTP-1, average annual GDP growth reached 3.8 percent despite the impact of repeated droughts, high international commodity prices, the global financial and economic crisis, and political uncertainty in the run up to the 2013 general elections. Furthermore 2.7 million jobs were created between 2008 and 2012 compared with an objective of 3.3 million.

**Kenya’s second Medium Term Plan (MTP-2) covers the 2013-2017 period.** It seeks to build on the successes of the MTP 1, including macroeconomic stability, the enactment of the 2010 Constitution, infrastructure development, the growth of the services sector, and improved access to education. At the same time, it recognizes remaining challenges, including a low and declining share of manufacturing, low agricultural productivity, high energy costs, a still limited transport infrastructure, a narrow export base, and major economic and social disparities across the country. The MTP-2 aims to continue the positive trend in areas where substantial progress was achieved, as well as to increase attention on areas where progress was slower while keeping the same priority sectors.

**The overall objectives of the MTP-2 are to accelerate growth to reach double-digit levels, to create jobs for the Kenyan youth, and to further reduce the still high poverty levels.** The key thematic areas that seek to describe how these objectives will be achieved are: (i) the foundations for national transformation, which cover a broad range of areas including infrastructure, information technology, employment policies, land reform, ending drought emergencies, public sector reform, and national security; (ii) the economic pillar, which identifies the seven sectors that are expected to spur faster growth; (iii) the social pillar; and (iv) the political pillar.

By promoting investment in the priority sectors identified under the Economic Pillar2, Vision 2030 seeks to achieve and sustain annual GDP growth rate at 10% up to 2030 and thereby generating resources required to address other SDGs. This creates the urgent need of investing in both Flagship Projects and requisite infrastructure.

The realization of the proposed project is a step towards realizing the Vision 2030 as provision of trading infrastructure that will create employment for the Kenyan population and spur economic growth for the country.

### **3.1.3 Nairobi metro 2030**

Nairobi Metro 2030 was developed in the year 2008 to provide a guide for the 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 devolvement 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**

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 rallied 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:

- Investment in the Poverty Reduction Strategy Paper (PRSP) process through which participatory mapping of poverty incidence at both District and National Level was undertaken,

- Implementation of the Economic Recovery Strategy for Wealth and Employment Creation, and
- 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.

Access Road Tunnel project contributes to the policy by creating direct and indirect employment opportunities for many people that be served by the operation of the tunnel.

### 3.2 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 it's 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.
- c) These impacts are site-specific; few if any of them are irreversible; and in most cases mitigation measures can be designed more readily than for Category A projects. *This particular NaMSIP subproject has been categorized as B.*
- d) 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 environmental assessment action is required for a Category C project.
- e) 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.

By virtue of source of funding, the proposed development of the tunnel by the Ministry of Land, Housing and Urban Development, and Nairobi Metropolitan Development under the NaMSIP is also subject to World Bank requirements for impact assessment. As such, this Project Report study has been formulated to address and cater for both Kenyan and World Bank requirements for impact assessment. World Bank projects and activities are governed by Operational Policies, which are clearly spelt out in the Bank's

Operational Manual ("Bank Procedures" and "Good Practices"). The World Bank's safeguard policies are designed to ensure that projects proposed for Bank financing are environmentally and socially sustainable, and thus improve decision-making. These operational policies include:

- OP 4.01 Environmental Assessment;
- OP 4.04 Natural Habitats;
- OP 4.09 Pest Management;
- OP 4.11 Cultural Heritage;
- OP 4.12 Involuntary Resettlement;
- OP 4.10 Indigenous People;
- OP 4.36 Forests;
- OP 4.37 Safety of Dams;
- OP 7.50 Projects on International Waterways;
- OP 7.60 Projects in Disputed Areas.

The Table 3.1 below shows the applicability of World Bank Operational Policies to the proposed project.

**Table 3.1: Analysis of potential triggers to World Bank Safeguards Policies**

OP	Title	Comments/Impact
4.01	Environmental Assessment	<b>Applicable. As a result of environmental and social screening, the project was identified as a Category B</b>
4.04	Natural Habitats	Not applicable - there no natural habitats at the project site
4.09	Pest Management	Not applicable- the project will not involve any pest management
4.10	Indigenous Peoples	Not applicable- there are no indigenous people at the site or project area
4.11	Physical Cultural Resources	Not applicable. Site inspections and literature searches 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. Such procedure to be followed by contractors during the construction phase.
4.12	Involuntary Resettlement	Not applicable as the site is vacant and devoid of any human activities.
4.36	Forests	Not applicable- there is no forest at the site
4.37	Safety of Dams	Not applicable because the project will not involve construction of dams.
7.50	Projects on International Waters (OP 7.50)	Not applicable- the site does not sit on international waters
7.60	Projects in Disputed Areas	The site is not classified as disputed in the project area.

### 3.2.1 Environmental Assessment (OP 4.01)

OP 4.01 requires Environmental Assessment (EA) for projects proposed for Bank financing to ensure that they are environmentally sound and sustainable, and as a basis for decision making. Under OP 4.01 projects are screened and assigned either of four categories each of which requires different levels of environmental assessment as follows:

- **Category A:** A proposed project is classified in this category if it is likely to have significant adverse environmental impacts that are sensitive, diverse or unprecedented. Moreover, the EA for this category includes examining the project's potential negative and positive impacts in comparison with those of feasible alternatives and recommends any measures required to prevent, minimize, mitigate or compensate for adverse impacts and improve environmental performance. These impacts may affect an area broader than the sites or facilities subject to physical works.
- **Category B:** A proposed project is classified in this Category 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 of them are irreversible and in most cases the mitigation measures can be designed more readily than Category A projects.
- **Category C:** A proposed project is classified in this Category if it's likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for Category C project.
- **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.

The proposed improvement of the proposed project has been classified as environmental category B and hence requirement for this Project Report study.

### 3.2.2 Harmonization of both WB and GOK requirements for Social and Environmental Sustainability

With regard to the project under review, our experience informs that when proposed projects 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 study is that, pursuit of an in-depth Project Report process as stipulated by EMCA 1999 is adequate to address all World Bank requirements for environmental and social assessment. This is a major guiding principle in this study.

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 infoshop, as well as copy of the report available at the project site.

### **3.3 Legal and Regulatory Framework for Environment**

#### **3.3.1 The Environment Management and Coordination Act No 8, 1999 and the relative Amendment Act No 5, 2015**

The Environment Management and Co-ordination (Amendment) Act 2015 No 5 of 2015 was effective on the 17th June 2015 to amend the Environmental Management and Co-ordination Act 1999. The Act has aligned EMCA Act 1999 with the Constitution of Kenya (2010) to include new structures that the Constitution of Kenya 2012 created particularly entrenchment of county government in environment and natural resource management.

The EMCA is an act of Parliament that provides for the establishment of an appropriate legal and institutional framework for the management of the environment and for matters connected therewith and incidental thereto.

The Act further aims to improve the legal and administrative co-ordination of the diverse sectoral initiatives in the field of environment so as to enhance the national capacity for its effective management. In addition Act seeks to harmonize all the 77 sector specific

legislation touching on the environment in a manner designed to ensure protection of the environment.

As the principal environmental legislation in Kenya, EMCA sets the legal framework for environmental management basically as follows:-

Part II of the Act states that every person in Kenya is entitled to a clean and healthy environment and has the duty to safeguard and enhance the environment.

In order to ensure the achievement, part VI of the same Act directs that any proponent of a new project, activity or operation should undertake an Environmental Impact Assessment (EIA) and a report prepared for submission to the National Environmental Management Authority (NEMA), who in turn may issue a license as appropriate; while projects already in place will undertake annual Environmental Audits (EA).

Section 58 of the Environmental Law requires that notwithstanding any approval, permit or license under this Act or any other law in force in Kenya, any person being a proponent of a project, shall before financing, commencing proceeding with carrying out, executing or conducting or causing to be financed, commenced, proceed carried out, executed or conducted by another person for any undertaking specified in the second schedule to this Act, submit a project report to the Authority in the prescribed form, giving the prescribed information and shall be accompanied by the prescribed fee.

Section 68 and 69 of EMCA requires all on-going projects to conduct an EA with a view to finding out if the processes and activities have any negative impacts on the environment and to propose any mitigation measures to counter such impacts .EA are further expounded in Regulation 35 (1) and (2) of Legal Notice 101 of June 2003.

Under EMCA 2015, NEMA has gazetted legal tools that govern how EIAs are conducted and general environmental protection. These guidelines are captured in the Contracts for Construction to ensure that contractors are legally bound to undertake mitigation alongside general construction work.

Under EMCA, NEMA has gazetted legal tools that govern conduct of EIAs and general environmental protection. The Proposed project by the NaMSIP falls under the requirement of this Act, and has been screened against these tools with results that six of the tools will be triggered as shown on Table 3-2 below.

**Table 3-2: Analysis of the Project triggers to the EMCA and its tools.**

Legal Tool	Status	Trigger mechanism
EIA and Audit regulations	Triggered	EIA Study has to conform to these rules
Waste Management Rules	Triggered	Construction likely to generate solid waste
Water Quality rules	Triggered	Water for construction will be drawn from rivers or other sources and have to adhere to ensuring water quality is observed
Conservation of Biodiversity regulations	Not triggered	These regulations focus more on benefit sharing in biodiversity conservation.
National Sand Harvesting Rules	Triggered	Construction works will require concrete mixture which shall include sand
Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 Legal Notice No. 61:	Triggered	Both construction activities and construction equipment likely to generate noise
Air Quality Regulation (2014)	Triggered	Both construction activities and construction equipment likely to generate air pollution

In particular, specifications of these guidelines would require to be captured in the Contracts for Construction to ensure that contractors are legally bound to undertake mitigation alongside general construction work. The EMCA Tools likely to be triggered by the proposed construction of the proposed project are briefly reviewed below.

### 3.3.2 Environmental Impact Assessment and Audit Regulations, 2003

Environmental impact Assessment (EIA) is a tool for environmental conservation and has been identified as a key component in new project implementation. At the national level, Kenya has put into place necessary legislation that requires EIA be carried out on every new project, activity or programme (EMCA), and a report submitted to the National Environmental Management Authority (NEMA) for approval and issuance of relevant certificates. These Regulations provide procedures for conducting an EIA study and detail the parameters to be evaluated during the study. It also provides guidelines on the payment of the EIA license fees, conducting environmental audits and development of project monitoring plans.

In particular, specifications of these guidelines indicate that no proponent should implement a project which can have a negative environmental impact.

This ESIA report has been undertaken in accordance with the Environment (Impact Assessment and Audit) regulation 2003, which operationalizes the Environment

Management & Coordination Act (EMCA) 1999 and its subsequent amendment, the Environmental Management and Coordination Act (Amendment), 2015.

The report is prepared in conformity with the requirements stipulated in the Act and its amendment and the Environmental Impact Assessment and Audit regulations 2003 regulation 7 (1) and the second schedule.

### **3.3.3 Environmental Management and Coordination Act (Waste Management) Regulations, 2006**

The regulations provide details on management (handling, storage, transportation, treatment and disposal) of various waste streams including:

- Domestic waste
- Industrial waste,
- Hazardous and toxic waste
- Pesticides and toxic substances
- Biomedical wastes
- Radioactive waste

Regulation No.4 (1) makes it an offence for any person to dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated waste receptacle.

Regulation 5 (1) provides categories of cleaner production methods that should be adopted by waste generators in order to minimize the amount of waste generated and they include:

- Improvement of production process through:
- Conserving raw materials and energy
- Eliminating the use of toxic raw materials and waste
- Reducing toxic emissions and wastes
- Monitoring the product cycle from beginning to end by:
- Identifying and eliminating potential negative impacts of the product
- Enabling the recovery and re-use of the product where possible
- Reclamation and recycling

Incorporating environmental concerns in the design and disposal of a product.

The Proponent shall ensure that the main contractor adopts and implements all possible cleaner production methods during the construction phase of the project.

Regulation 6 requires waste generators to segregate waste by separating hazardous waste from non-hazardous waste for appropriate disposal.

Regulation 14 (1) requires every trade or industrial undertaking to install at its premises anti-pollution equipment for the treatment of waste emanating from such trade or industrial undertaking.

Regulation 15 prohibits any industry from discharging or disposing of any untreated waste in any state into the environment.

Regulation 17 (1) makes it an offence for any person to engage in any activity likely to generate any hazardous waste without a valid Environmental Impact Assessment license issued by NEMA.

Regulation 18 requires all generators of hazardous waste to ensure that every container or package for storing such waste is fixed with a label containing the following information:

- The identity of the hazardous waste
- The name and address of the generator of waste
- The net contents
- The normal storage stability and methods of storage
- The name and percentage of weight of active ingredients and names and percentages of weights of other ingredients or half-life of radioactive material
- Warning or caution statements which may include any of the following as appropriate.
  - the words "WARNING" or "CAUTION";
  - the word "POISON" (marked indelibly in red on a contrasting background;
  - The words "DANGER! KEEP AWAY / NO ENTRY FOR UNAUTHORIZED PERSONS";
- A pictogram of a skull and crossbones.

Regulation 19 (1) requires every person who generates toxic or hazardous waste to treat or cause to be treated such hazardous waste.

*During the construction phase of the project, the Proponent shall ensure that the main contractor implements the above mentioned measures as necessary to enhance sound environmental management of waste.*

### **3.3.4 Environmental Management and Coordination Act (Water Quality) Regulation 2006**

The Regulations provides for sustainable management of water resources including prevention of water pollution and protection of water sources (lakes, rivers, streams, springs, wells and other water sources).

It is an offence under Regulation No.4 (2), for any person to throw or cause to flow into or near a water resource any liquid, solid or gaseous substance or deposit any such substance in or near it, as to cause pollution.

Regulation No. 11 further makes it an offence for any person to discharge or apply any poison, toxic, noxious or obstructing matter, radioactive waste or other pollutants or permit the dumping or discharge of such matter into the aquatic environment unless such discharge, poison, toxic, noxious or obstructing matter, radioactive waste or pollutant complies with the standards for effluent discharge into the environment

Regulation No. 14 (1) requires every licensed person generating and discharging effluent into the environment to carry out daily effluent discharge quality and quantity monitoring and to submit quarterly records of such monitoring to the Authority or its designated representatives.

*The proponent will have to ensure that appropriate measures to prevent pollution of underground and surface water sources are implemented throughout the project cycle.*

### **Wastewater guidelines**

Part of the study involves a review of the environmental standards that provides a basis for monitoring and future audits. The table 3-3 below presents recommended guidelines on wastewater quality for discharge into the public sewers and open water bodies.

**Table 3.3: Standards for Discharge of Waste Water into Public Sewers**

<b>Parameter</b>	<b>Maximum levels permissible</b>
Suspended solids (mg/L)	250
Total dissolved solids (mg/L)	2000
Temperature 0C	20 - 35
pH	6-9
Oil and Grease (mg/L) -where conventional treatment shall be used	10
Oil and Grease (mg/L)- where ponds is a final treatment method	5
Ammonia Nitrogen (mg/L)	20
Substances with an obnoxious smell	Shall not be discharged into the sewers
Biological Oxygen Demand BOD5 days at 20 oC (mg/L)	500
Chemical Oxygen Demand COD (mg/L)	1000
Arsenic (mg/L)	0.02
Mercury (mg/L)	0.05
Lead (mg/L)	1.0
Cadmium (mg/L)	0.5
Chromium VI (mg/L)	0.05
Chromium (Total) (mg/L)	2.0
Copper (mg/L)	1.0
Zinc (mg/L)	5.0
Selenium (mg/L)	0.2
Nickel (mg/L)	3.0
Nitrates (mg/L)	20
Phosphates (mg/L)	30
Cyanide Total (mg/L)	2
Sulphide (mg/L)	2
Phenols (mg/L)	10
Detergents (mg/L)	15

Parameter	Maximum levels permissible
Colour	Less than 40 Hazen units
Alkyl Mercury	Not Detectable (nd)
Free and saline Ammonia as N (mg/L)	4.0
Calcium Carbide	Nil
Chloroform	Nil
Inflammable solvents	Nil
Radioactive residues	Nil
Degreasing solvents of mono-di-trichloroethylene type	Nil

Sources: EMCA (Water Quality) Regulations, 2006.

**Table 3-4: Standards for Discharge of Waste water into Environment (Water body)**

Parameter	Max. Allowable(Limits)
1,1,1-trichloroethane (mg/l)	3
1,1,2-trichloroethane (mg/l)	0.06
1,1-dichloroethylene	0.2
1,2-dichloroethane	0.04
1,3-dichloropropene (mg/l)	0.02
Alkyl Mercury compounds	Nd
Ammonia, ammonium compounds, NO <sub>3</sub> compounds and NO <sub>2</sub> compounds (Sum total of ammonia-N times 4 plus nitrate-N and Nitrite-N) (mg/l)	100
Arsenic (mg/l)	0.02
Arsenic and its compounds (mg/l)	0.1
Benzene (mg/l)	0.1
Biochemical Oxygen Demand (BOD 5days at 20 oC) (mg/l)	30
Boron (mg/l)	1.0
Boron and its compounds – non marine (mg/l)	10
Boron and its compounds –marine (mg/l)	30
Cadmium (mg/l)	0.01
Cadmium and its compounds (mg/l)	0.1
Carbon tetrachloride	0.02
Chemical Oxygen Demand (COD) (mg/l)	50
Chromium VI (mg/l)	0.05
Chloride (mg/l)	250
Chlorine free residue	0.10
Chromium total	2
cis -1,2- dichloro ethylene	0.4
Copper (mg/l)	1.0
Dichloromethane (mg/l)	0.2
Dissolved iron (mg/l)	10
Dissolved Manganese(mg/l)	10
E.coli (Counts / 100 ml)	Nil
Fluoride (mg/l)	1.5
Fluoride and its compounds (marine and non-marine) (mg/l)	8
Lead (mg/l)	0.01
Lead and its compounds (mg/l)	0.1
n-Hexane extracts (animal and vegetable fats) (mg/l)	30
n-Hexane extracts (mineral oil) (mg/l)	5
Oil and grease	Nil
Organo-Phosphorus compounds (parathion,methyl parathion,methyl demeton and Ethyl parantrophyenyl phenylphosphorothroate, EPN only) (mg/l)	1.0
Polychlorinated biphenyls, PCBs (mg/l)	0.003

Parameter	Max. Allowable(Limits)
pH ( Hydrogen ion activity----marine)	5.0-9.0
pH ( Hydrogen ion activity--non marine)	6.5-8.5
Phenols (mg/l)	0.00 1
Selenium (mg/l)	0.01
Selenium and its compounds (mg/l)	0.1
Hexavalent Chromium VI compounds (mg/l)	0.5
Sulphide (mg/l)	0.1
Simazine (mg/l)	0.03
Total Suspended Solids, (mg/l)	30
Tetrachloroethylene (mg/l)	0.1
Thiobencarb (mg/l)	0.1
Temperature (in degrees celious) based on ambient temperature	± 3
Thiram (mg/l)	0.06
Total coliforms ( counts /100 ml)	30
Total Cyanogen (mg/l)	Nd
Total Nickel (mg/l)	0.3
Total Dissolved solids (mg/l)	1200
Colour in Hazen Units (H.U)	15
Detergents (mg/l)	Nil
Total mercury (mg/l)	0.005
Trichloroethylene (mg/l)	0.3
Zinc (mg/l)	0.5
Whole effluent toxicity	
Total Phosphorus (mg/l)	2 Guideline value
Total Nitrogen	2 Guideline value

Sources: EMCA (Water Quality) Regulations, 2006.

### 3.3.5 Air Quality Regulation, 2014

This regulation is referred to as “The Environmental Management and Coordination (Air Quality) Regulations, 2014”. The objective is to provide for prevention, control and abatement of air pollution to ensure clean and healthy ambient air.

It provides for the establishment of emission standards for various sources, including as mobile sources (e.g. motor vehicles) and stationary sources (e.g. industries) as outlined in the Environmental Management and Coordination Act, 1999. It also covers any other air pollution source as may be determined by the Minister in consultation with the Authority. Emission limits for various areas and facilities have been set.

The Regulations prohibits the Proponent from:

- Acting in a way that directly or indirectly cause or may cause air pollution to exceed levels set out in the second Schedule to the Regulations
- Allowing particulates emissions into the atmosphere from any source not listed in the six schedule of the Regulations
- Causing ambient air quality in controlled areas (listed in Schedule Thirteen) to exceed those stipulated under second Schedule.
- Allowing (during construction and demolition) emission of particulate matter above the limits stipulated in second Schedule

- Causing or allowing stockpiling or storage of material in a manner likely to cause air pollution
- Causing or allowing emissions of oxides of nitrogen in excess of those stipulated in the eleventh Schedule of the Regulation

*The Proponent shall observe policy and regulatory requirements and implement the mitigation measures proposed in this document in an effort to comply with the provisions of these Regulations on abatement of air pollution.*

### **3.3.6 Environmental Management and Coordination Act (Noise and Excessive Vibrations Pollution Control) Regulations, 2009**

The regulations define noise as any undesirable sound that is intrinsically objectionable or that may cause adverse effects on human health or the environment. The regulations prohibit any person from making or causing to be made any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment.

Article 13 2(d) of the regulations allows for construction work at night for public utility construction, construction of public works, projects exclusively relating to roads, bridges, airports, public schools and sidewalks, provided noise generated is not caused within a residential building or across a residential real property boundary where such noise interferes with the comfort, repose, or safety of the members of the public. The second Schedule of the Regulations provides for the maximum permissible level of noise at construction sites.

Under section 15, the Regulations require the Proponent during EIA studies to:

- Identify natural resources, land uses or activities which may be affected by noise or excessive vibrations from construction or demolition;
- Determine the measures which are needed in the plans and specifications to minimize or eliminate adverse construction or demolition noise or vibration impacts
- Incorporate the needed abatement measures in the plans and specifications.

It is anticipated that the proposed project will generate noise and/or vibration during the construction phase that will originate from the construction equipment, vehicles and the workers since the project neighbours homesteads and businesses in some sections. It is therefore recommended that the construction team develops mitigations to reduce noise propagation in the project area.

The provisions of this Act will be applied by the Proponent in the management of the project where the contractor will be required to adhere to the provisions of this regulation.

#### **Noise guidelines**

The following guidelines will be used to monitor noise levels, especially during the construction stage of the project.

**Table 3-5 Comparison between WHO and NEMA Noise Guidelines**

Specific Environment	Critical Health Effects	LAeq dB(A) WHO	Time base (hours)	LAeq dB(A) NEMA	Time base (hours)
Outdoor living area	Serious annoyance	55	16	45	14
	Moderate annoyance	50	16	35	14
Indoor dwelling Inside bedroom	Speech interference	35	16	-	-
	Sleep disturbance	30	8	-	-
Outdoor bedroom	Sleep disturbance	45	8	35	-
School classroom Indoor	Speech and communication	35	During class time	Day 60 Night 35	14 14
School playground outdoor			During play	45	Day
Hospital, treatment room indoor	night time	30	8	-	-
	daytime	30	16	-	-
Industrial, Commercial and traffic areas	Hearing impairment	70	24	60	12
Ceremonies, festivals entertainment events	Hearing impairment	100	4	-	-

The provisions of this Act will be applied by the Proponent in the management of the project where the contractor will be required to adhere to the guidelines to reduce the possibility of adverse noise and vibration impacts to human health. The regulation stipulates that the acceptable standard day and night noise levels should not exceed 65dBA and 45 dBA respectively.

**3.3.7 The Urban Areas and Cities Act 2011**

This law passed in 2011 provides legal basis for classification of urban areas (City when the population exceeds 500,000; a municipality when it exceeds 250,000; and a town when it exceeds 10,000) and requires the city and municipality to formulate County Integrated Development Plan (Article 36 of the Act). Under Article 36, the integrated development plan so developed is required to be the central pillar in public administration of the city or municipality this forming the basis for:

- the preparation of environmental management; preparation of valuation rolls for property taxation plans;
- provision of physical and social infrastructure and transportation;
- preparation of annual strategic plans for a city or municipality;

- disaster preparedness and response;
- overall delivery of service including provision of water, electricity, health, telecommunications and solid waste management; and
- The preparation of a geographic information system for a city or municipality.

The strategy plan as stated above denotes an annual plan to be adopted in the county assembly following the integrated development plan, and the Act requires the board of town committee to formulate the strategy plan soon after the adoption of the integrated development plan (Article 39).

The integrated development plan as stipulated in the Act has to reflect:

- Vision for the long term development of the city or urban area;
- An assessment of the existing level of development;
- Any affirmative action measures to be applied; development priorities and objectives;
- Development strategies which shall be aligned with any national or county sectoral plans and planning requirements;
- A spatial development framework;
- Operational strategies; and
- Applicable disaster management plans;
- A regulated city and municipal agricultural plan;
- A financial plan and;
- The key performance indicators and performance targets (Article 40).

The integrated development plan thus formulated has to be submitted to the county executive committee, and the committee has to submit the plan to the county assembly with an opinion within 30 days (Article 41).

*Access Road Tunnel project complies with the urban area and other cities act its integrated in the County integrated Development plan, and will comply with all the regulations set in the Act.*

### **3.3.8 The County Government Act 2012**

The County Government Act of 2012, which has been adapted to the Constitution's State and County structure in relation to devolution, declares the County Integrated Plan to be central to the County's administration and prohibits any public spending outside of the plan. The Act clarifies that the County Integrated Plan to be broken down into the economic plan, physical plan, social environmental plan and spatial plan. Also, the Act states that the County Plan commands,

- County integrated development plan

- County Sectoral plans
- County spatial plan
- Cities and urban areas plans as stipulated by Urban Areas and Cities Act

The act also stipulates that the County Government will be –responsible for functions stipulated in article 186 and assigned in the Fourth Schedule of the Constitution which includes control of air pollution, noise pollution, other public nuisances and outdoor advertising.

The Proponent will ensure the project will be compliant with County Government Act 2012 by controlling all forms of pollution. Additionally, an Environmental and Social Management/monitoring plan has been provided in this report with measures for mitigating potential environmental pollution anticipated from the development of the project.

### **3.3.9 The National Land Commission Act (2012)**

Section 5 of the Act, the Commission’s functions are to manage public land, recommend national land policy, advise the GoK on a land registration program, conduct research on land use and natural resources, and monitor and oversee land use planning throughout the country. The same section goes on to stipulate that the NLC ensure that state owned land is managed sustainably for future generations. *The project will be subjected to this act by ensuring the land used for the project is a public land and has no encumbrances to be used for development of a tunnel.*

### **3.3.10 National Sand Harvesting Guidelines, 2007**

These Guidelines apply to all sand harvesting activities in Kenya to ensure sustainable utilization of the sand resource and proper management of the environment. Among key features, the guidelines empower respective DEC’s to regulate sand harvesting within areas of jurisdiction implying that, sand should only be sourced from approved sites and by approved dealers.

*The project will commit to the fulfillment of the guidelines.*

### **3.3.11 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. The proposed project is under the provisions of the Act, in that it will utilize the roads near the project.

### **3.3.12 The Water Act, 2002**

The Act vests the water in the State and gives the provisions for the water management, including irrigation water, pollution, drainage, flood control and abstraction. It is the main legislation governing the use of water.

The proposed project shall require some quantities of water during the construction phase and generation of equally large volumes of surface run-off during operations. The water supplied by the local water provider and local rivers might be the sources of water for construction. The river near the project will be receiving bodies for the surfaces run-off, as all the drainage systems shall be designed to discharge into them.

*The contractor shall ensure that there will be no pollution to the nearby rivers and streams, and will seek the necessary permits to abstract the water from the rivers, or any other sources, and shall abide by the conditions attached to the permit(s).*

### **3.3.13 The Water Resources Management Rules (2007)**

These Rules are described in Legal Notice Number 171 of the Kenya Gazette Supplementary Number 52 of 2007. They apply to all water resources and water bodies in Kenya, including all lakes, water courses, streams and rivers, whether perennial or seasonal, aquifers, and shall include coastal channels leading to territorial waters.

The Water Resources Management Rules empower Water Resources Management Authority (WRMA) to impose management controls on land use falling under riparian land. It also enables any person with a complaint related to any matter covered by these rules to the appropriate office in WRMA as per the Tenth Schedule which provides a format for report on complaints. WRMA is to reply to the complainant with “copies to all other relevant parties within twenty one days of receiving the complaint, starting with what action is being taken, the position of the Authority on the matter and any recommendation to the complainant.”

*The contractor shall seek the necessary permits to abstract the water from the rivers, or any other sources, and shall abide by the conditions attached to the permit(s).*

*The contractor/proponent will adhere to the provision of this regulation by obtaining relevant water permit from WRMA or consult with Kiambu Water and Sewerage Company for its water sources.*

### **3.3.14 HIV/AIDS Prevention and Control Act (Act No. 14 of 2006)**

Part 11, Section 7 of the Act requires that HIV and AIDs education be carried out at the work-place. The government is expected to ensure the provision of basic information and instruction on HIV and Aids prevention and control to: -

- Employees of all government ministries, departments, authorities, and other agencies as well as employees of private and informal sectors.

- The information on HIV/AIDS is expected to be treated with confidentiality at the work place and positive attitude towards infected employees.

*In allocating contractors to the proposed project, the proponent should ensure that the contractor offers such training to the worker as provided by law.*

### **3.3.15 Occupational Safety and Health Act OSHA, 2007**

The Occupational Safety and Health Act, 2007, is an Act of Parliament to provide for the safety, health and welfare of all workers and all persons lawfully present at workplaces, to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes. The Act applies to all workplaces and workers associated with it; whether temporary or permanent. The main aim of the Act is to safeguard the safety, health and welfare of workers and non-workers. Part 9 states that the occupier or employer shall establish a health and safety committee where twenty or more people are employed and such an employee shall prepare a written statement of his general policy with respect to the safety and health at the work place. Further, the occupier shall prepare annual safety and health audits by a qualified person.

*The contractor shall adhere to all Sections of the Act as it relates to this project, such as 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.*

### **3.3.16 Work Injury Benefits Act, 2007**

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.*

### **3.3.17 The Public Health Act (Cap. 242)**

The Public Health Act provides for the protection of human health through prevention and guarding against introduction of infectious diseases into Kenya from outside, to promote public health and the prevention, limitation or suppression of infectious, communicable or preventable diseases within Kenya, to advice and direct local authorities in regard to matters affecting the public health to promote or carry out research and investigations in connection with the prevention or treatment of human diseases. This Act provides the impetus for a healthy environment and gives regulations to waste management, pollution and human health.

Part IX section 115 states that no person shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires Local Authorities to take

all lawful, necessary and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable for injurious or dangerous to human health. Such nuisance or conditions are defined under section 118 waste pipes, sewers, drains or refuse pits in such a state, situated or constructed as in the opinion of the medical officer of health to be offensive or injurious to health. Any noxious matter or waste water flowing or discharged from any premises into Public Street or into the gutter or side channel or watercourse, irrigation channel or bed not approved for discharge is also deemed as a nuisance. Other nuisances are accumulation of materials or refuse which in the opinion of the medical officer of health is likely to harbour rats or other vermin.

This provision is supplemented by Section 126A that requires local authorities to develop by-laws for controlling and regulating among others private sewers, communication between drains and sewers and between sewers as well as regulating sanitary conveniences in connection to buildings, drainage, cesspools, etc. for reception or disposal of foul matter.

Part XII (prevention and destruction of mosquitoes) Section 136 states that all collections of water, sewage, rubbish, refuse and other fluids which permits or facilitate the breeding or multiplication of pests shall be deemed nuisances and are liable to be dealt with in the manner provided by this Act.

The operations and activities of the proposed project can be detrimental to human and environmental health and safety in the absence of appropriate measures. For example waste, dust, noise and air emission generated from activities and process of the proposed project can directly or indirectly have adverse impacts on human and environment.

The Act prohibits the Proponent from engaging in activities that cause environmental nuisance or those that cause danger, discomfort or annoyance to inhabitants or is hazardous to human and environmental health and safety.

*The proponent will therefore observe the public Health act to mitigate on the negative environmental health and safety to the public.*

### **3.3.18 The Physical Planning Act (Cap. 286)**

Section 24 of the Physical Planning Act gives provision for the development of local physical development plan for guiding and coordinating development of infrastructure facilities and services within the area of authority of County, municipal and town council and for specific control of the use and development of land. The plan shows the manner in which the land in the area may be used. Section 29 of the physical Planning Act gives the county councils power to prohibit and control the use of land, building, and

subdivision of land, in the interest of proper and orderly development of its area. The same section also allows them to approve all development applications and grant development permissions as well as to ensure the proper execution and implications of approved physical development plans. On zoning, the act empowers them to formulate by-laws in respect of use and density of development.

*The proposed project adheres to this act by ensuring that the proposed project is being developed as per the plans approved by the Ministry of Lands and Physical Planning in accordance to the law.*

### **3.3.19 Way Leave Act Cap 292**

Section 3 of the Act states that the Government may carry any sewer, drain or pipeline through, over or under any land whatsoever, but may not in doing so interfere with any existing building. Notice, however, should be given one month before carrying out any such works (section 4) with full description of the intended works and targeted place for inspection.

Any damages caused by the works would then be compensated to the owner as per Section 8 of the Act that states that any person whom without consent causes any building to be newly erected on a way leave, or cause hindrance along the way leave shall be guilty of an offence and any alterations will be done at his/her costs.

*The proponent shall observe this Way leave Act when developing or improving the sewer and drainage system for the project.*

### **3.3.20 The Building Code 2009**

This code was formulated to provide rules and guideline to be observed during construction it requires the proponent to adhere to the set rules and guidelines in the code. The code requires building plans to be approved by county government. It also prohibits;

- Erection, or causing or permitting erection of temporary buildings (e.g. a site office, store, builder's shed etc.) to which the Regulations apply without a permit granted under Regulations and
- Knowingly occupying a temporary building which is erected in contravention to the regulations

*The proponent is committed to developing the proposed project in accordance to the building codes, the national standards and other international building standards and guidelines.*

### **3.3.21 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.

*The proponent shall issue notices to land owners adjacent to the project area before construction works begins. In addition, the proponent will inform the relevant authorities on the intended modifications of the roads near the proposed project.*

### **3.3.22 National Gender and Equality Commission Act, 2011**

The Commission was established through an Act of parliament and is mandated but not limited to perform the following functions:

(a) promote gender equality and freedom from discrimination in accordance with Article 27 of the Constitution; (b) monitor, facilitate and advise on the integration of the principles of equality and freedom from discrimination in all national and county policies, laws, and administrative regulations in all public and private institutions; (c) co-ordinate and facilitate mainstreaming of issues of gender, persons with disability into the overall national development framework.

*The provisions of this Act shall be invoked in the implementation of the project, especially in ensuring gender equity, by offering opportunities to women in employment and allocation of stalls.*

### **3.3.23 The Sexual Offences Act (No. 3 of 2006)**

Relevant Sections in this Act include:-

- 24- Sexual offences relating to position of authority and persons in position of trust.
- 25- Sexual relationship which pre-date position of authority or trust.
- 26- Deliberate transmission of HIV or any other life threatening sexually transmitted disease.

*The proposed project will ensure that this Act is adhered to, by ensuring that there will be NO sexual offences committed, especially during the construction period.*

## **3.4 The Institutional Framework**

### **3.4.1 Ministry of Environment and Natural Resources**

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.

### **3.4.2 The Ministry of Transport, Infrastructure, Housing and Urban Development (MoTIHUD)**

The MoTIHUD is the project proponent and is implementing the development of Access Road Tunnel through Nairobi Metropolitan Services Improvement Project (NaMSIP).

### **3.4.3 National Environment Management Authority (NEMA)**

The Government established the administrative structures to implement EMCA as follows: -

#### **3.4.3.1 The National Environmental Council**

The National Environment Council (the Council) is responsible for policy formulation and directions for the purposes of the EMCA Act. The Council also sets national goals and objectives, and determines policies and priorities for the protection of the environment.

#### **3.4.3.2 The National Environmental Management Authority**

EMCA allows for formation of the National Environmental Management Authority (NEMA) as the body charged with overall responsibility of exercising general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of government in the implementation of all policies relating to the environment. In the context of the EIA process NEMA is responsible for approving the ToR for the ESIA and for the approval of the ESIA. Without this latter approval, the project cannot proceed.

The Authority shall review this ESIA Report for the proposed project, visit the project site to verify information provided in this report and emanate an ESIA license whether all the relevant issues to the project have been identified and mitigated in accordance to the proposed measures.

#### **3.4.3.3 County Environmental Committees**

The County Environmental Committees also contribute to decentralized environmental management and enable the participation of local communities. These environmental committees are to be constituted by the governor and are responsible for the proper management of the environment within the county for which it is appointed.

#### **3.4.3.4 Public Complaints Committee**

Under EMCA 2015, a Public Complaints Committee has been established to provide an administrative mechanism for addressing environmental harm. The Committee whose membership include representatives from the Law Society of Kenya, NGOs and the business community has the mandate to investigate complaints relating to environmental damage and degradation.

**3.4.4 The Directorate of Nairobi Metropolitan Development**

In the capacity of Employer, the Transport, Infrastructure, Housing and Urban Development, Nairobi Metropolitan Development through the NaMSIP PCT has administrative jurisdiction over the EIA process.

**3.4.5 The Tunnel Committees, Local CBOs and other Civil Society**

Members of the tunnel committees at Kikuyu, civil society working in the area in related fields are responsible for sensitizing the people and empower them to realize maximum benefits from the project. They will be involved in the training and creating awareness of the project, and assisting in grievance handling (if any) for the proposed project.

## **4 PROJECT ENVIRONMENTAL AND SOCIAL BASELINE**

### **4.1 Project Background**

Access Road Tunnel forms part of the Nairobi Metropolitan Service Improvement Project being implemented by the Ministry of Transport, Infrastructure, Housing and Urban Development with financial support from the World Bank.

The Kikuyu Railway Station Road Tunnel will be built at a site that is approximately 200m from the current tunnel. The new site is near other facilities that support the tunnel activities such as the bus stage/ terminus and the proposed parking lot/ car park making it more favorable. The new site has a different ground orientation, access routes and the available parcel of land is bigger than the site of the current tunnel. The piece of land where the Kikuyu Railway Station Road Tunnel will be located belongs to the Kiambu County Government and it measures approximately 0.6Ha.

Previously, the proposed new tunnel site had several structures, which were being used as government facilities and whose previous users were relocated to other office buildings within Kikuyu town. The old and condemned structures are vacant, will be demolished to pave way for the construction of the new tunnel building, and associated facilities.

### **4.2 Physical Environment**

Baseline information for Access Road Tunnel assumes the larger Kiambu County's baseline environmental and social conditions. Discussed below is the physical and social environment for the project area.

#### **4.2.1 Drainage and Hydrology**

The significant hydrologic water features around Kikuyu town include Kikuyu Springs and Ondiri Swamp. Kikuyu Springs is located approximately 500 metres on the south Eastern part of the project site while Ondiri Swamp is located approximately 800 metres on the south Western side of the project site. The general drainage slope inclines towards the South Eastern side of Kikuyu town. Kikuyu spring and streams (Nyongara River) that originate from Ondiri wetland are part of catchment for Nairobi River. Ondiri Wetland is also a source of Athi River when it passes underground through Thogoto forest and resurfacing at Karinde near Karen Estate

#### **4.2.2 Climatic Condition**

The region is characteristic by equatorial climatic conditions and rainfall is highly influenced by altitude and proximity to the Aberdare forest. Rainfall in the area comes in two seasons, long rains come between March to May then followed by a cold season

and short rains come between October and December. The cold season is characterized by drizzles and frost which occur in the months of June to August.

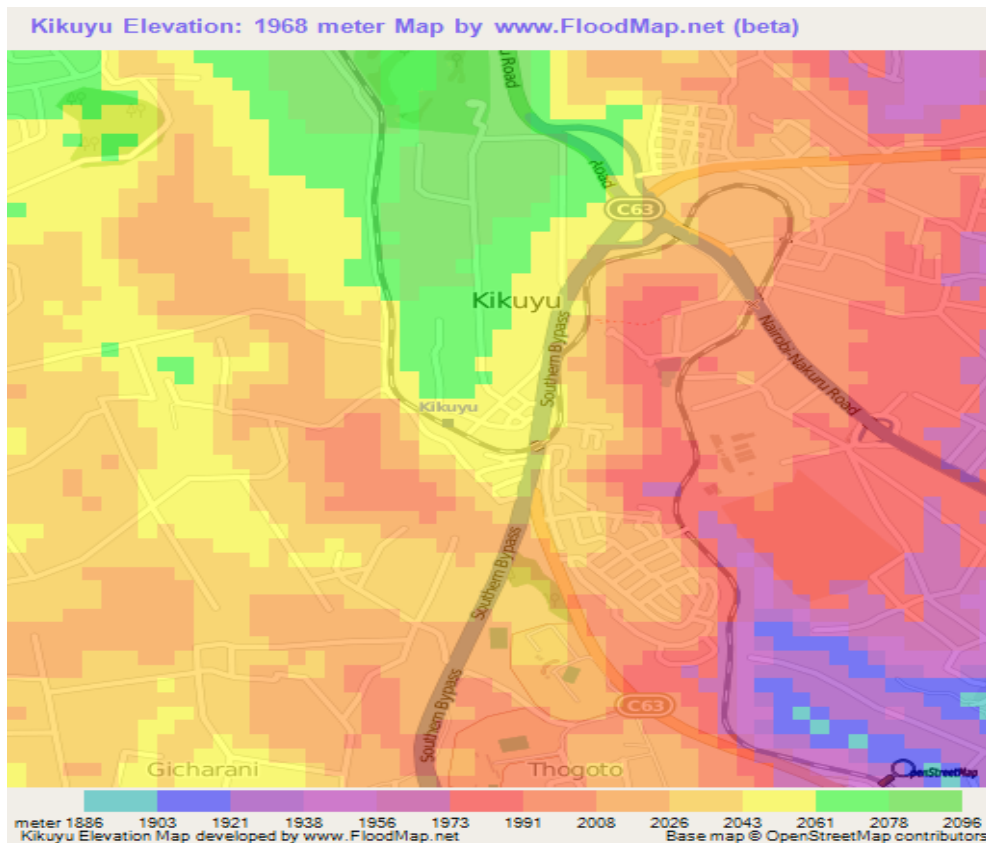
The annual mean rainfall varies from 1070mm to 1750mm per annum. The nearest meteorological station registered in the Kenyan Meteorological Department is the Thika meteorological station.

The mean temperature in the project area is approximately 26<sup>0</sup>C with temperature ranging from 17.1<sup>0</sup>C in the upper highlands to 34<sup>0</sup>C in the lower midlands. July and August are the months during which the lowest temperatures are experienced, whereas January to March is the hottest months.

The main wind – direction is easterly, evaporation ranging from 100 to 150mm per month while the humidity varies from 50% to 90%.

#### **4.2.3 Topography**

The project area is characterized by steep slopes and deep valleys and in most places has springs or streams at the lower point of the valleys. Aberdare ranges influence the physiographic of the project area with the topography varying from steep slopes in west and east to undulating rolling landforms (volcanic foothill ridges) in much of the northern part of the Lari division. Consequently, mild to steep ridges and valleys with a general slope towards the east and southeast are notable through most of the project area. The project area lying at about 1968 meters above sea level is located in the Upper Highland Zone, which is an extension of the Aberdare ranges.



**Figure 4.1: Topography of Kikuyu**

Source: Nairobi, Kenya Elevation Map at [www.floodmap.net](http://www.floodmap.net)

#### 4.2.4 Geology and Soils

The county is covered by three broad categories of soils which are: high level upland soils, plateau soils and volcanic footbridges soils. These soils are of varying fertility levels with soils from high-level uplands, which are from volcanic rocks, being very fertile. Their fertility is conducive for livestock keeping and growth of various cash crops and food crops such as tea, coffee, horticultural products, pyrethrum, vegetables, maize, beans, peas and potatoes. These soils are found in the highlands, mostly in Gatundu South, Gatundu North, Githunguri, Kiambu, Kiambaa, Lari, Kikuyu, Kabete and Limuru Constituencies. Low fertility soils are mainly found in the middle zone and the eastern part of the county which form part of the semi-arid areas. The soils are sandy or clay and can support drought resistant crops such as soya beans and sunflower as well as ranching. These soils are mostly found in parts of Juja, Thika Town, Ruiru, Kabete, Limuru, Gatundu North and Gatundu South Constituencies.

Most parts of the county are covered by soils from volcanic footbridges. These are well drained with moderate fertility. They are red to dark brown friable clays, which are suited

for cash crops like coffee, tea and pyrethrum. However, parts of Thika Town, Ruiru, Juja and Lari constituencies are covered by shallow soils, which are poorly drained, and these areas are characterized by low rainfall, which severely limits agricultural development. However, these areas are suitable for ranching and growth of drought resistant crops.

The soils around at site have been disturbed by human activities over a long period of time because it is an existing town. The soil at the tunnel consists of sandy clay soils type of origin.

#### **4.2.5 Biological Environment**

Information in Kiambu indicates that the County has few wildlife resources since many gazetted forests were allocated illegally to individuals. An example is Kinare forest in Lari Constituency, whose ecosystem constitutes of a dense forest with elephants, hyenas, bush baby, baboons, colobus monkeys, dik-dik, bush pigs, tree and ground squirrels, porcupines and many species of birds such as weaver, guinea fowls, sparrow among others. The Proposed Access Road Tunnel area is within a built environment. The site has approximately 25 trees and several shrubs and, grass while fauna include: butterflies, rats birds of different species and crawling animals such as lizards.

### **4.3 Socioeconomic Environment**

#### **4.3.1 Demographics**

Kenya Population and Housing Census 2009 indicate Kiambu County population at 1,623,279 with 802,609 being male and 820,670 being female. The average population growth rate in the County is 2.81% and the sex ratio is approximately 1/1.02. According to the 2009 census, Kikuyu town had a total population of 233,231.

#### **4.3.2 Energy**

Electricity is readily available in the County with many of the centers connected to the national grid. However, some households have not connected despite availability of the Rural Electrification Programme.

The main source of energy in the area is electricity from the national grid though there are many other sources of energy such as fire wood, kerosene and biogas which people use for cooking food, lighting and other household activities.

#### **4.3.3 HIV/AIDS**

The HIV/AIDS Policy of 2009 identifies HIV/AIDS as a global crisis that constitutes one of the most formidable challenges to economic development and social progress. The pandemic heavily affects the Kenyan economy through loss of human resource due to deaths, loss of man hours due to prolonged illnesses, absenteeism, reduced performance, increased stress, stigma, discrimination and loss of institutional memories, among others.

HIV/AIDS has been considered as one of the possible impacts and adequate mitigation measures have been proposed to that effect.

The Kenya HIV County profile of 2016 indicates that HIV prevalence in Kiambu is comparable to the national prevalence at 5.6% (Kenya HIV Estimates 2015). The HIV prevalence among women in the County is higher (8.2%) than that of men (2.9%) indicating that women are more vulnerable to HIV infection than men in the County. Kiambu County contributed to 4.7% of the total number of people living with HIV in Kenya, and is ranked the sixth highest nationally. By the end of 2015, a total of 70,971 people were living with HIV in the County, with 10% being young people aged 15-24 years and 4% being children under the age of 15 years.

#### **4.3.4 Infrastructure**

The County has a good road network. It has a total of 2,034km of roads under bitumen standards, 1,480.2 km under gravel surface and 430.1 km under earth surface. There is a great need in improving the condition of the earth roads since during the rainy season, most of the roads become impassable. However, the terrain poses a great challenge for road maintenance. There has been a lot of improvement in the roads subsector with the example of Thika-Nairobi highway.

It also has 131 km of railway line and four railway stations in Ruiru, Githurai, Juja, Thika, Kikuyu and Limuru towns. The rail is not fully utilized in the County and only passenger trains operate in the morning and evenings between the City of Nairobi and the four stations.

However, there is a great potential in the sector and hence efforts need to be put in place to ensure the rail infrastructure is improved, which will encourage introduction of modern efficient trains.

The Proposed Access Road Tunnel will connect the Post Office road to the North and Kikuyu-Ondiri road to the South.

#### **4.3.5 Administrative Units**

Kiambu County is divided into ten (10) sub-counties namely: Gatundu North, Gatundu South, Ruiru, Thika East, Thika West, Githunguri, Kiambu, Limuru, Kikuyu and Lari. Lari sub-County is the largest in size while Thika East is the smallest. The Proposed Access Road Tunnel is located in Kikuyu Sub County. The sub-counties are further subdivided into 29 divisions, 95 locations and 236 sub-locations. Kiambu town is the commercial and administrative capital of Kiambu County. Due to its proximity to the City of Nairobi (16 kilometres), the town hosts key government offices for the main ministries. See the constituencies in Figure 4-2 below:



**Figure 4-2: Constituencies in Kiambu County**

*Source: UNEP (2009), Kiambu County Environment Outlook*

#### **4.3.6 Political Units**

The County has 12 parliamentary constituencies: Gatundu South, Gatundu North, Juja, Ruiru, Thika Town, Kiambu, Kabete, Githunguri, Limuru, Kikuyu, Kiambaa and Lari. Kiambu town is the County headquarters.

## 5 PUBLIC CONSULTATION AND PARTICIPATION

### 5.1 Stakeholder Mapping and Consultations

Public participation is basically concerned with involving, informing and consulting the public in planning, management and other decision-making activities. Public participation tries to ensure that due consideration is given to public values, concerns and preferences when decisions are made. It encompasses the public actively sharing in the decisions that government and other agencies make in their search for solutions to issues of public interest.

Public consultation in this project was carried out with the following aims:

- To inform the local people, leaders and other stakeholders about the proposed project and its objectives
- To seek views, concerns and opinions of people in the area concerning the project
- To establish if the local people foresee any positive or negative environmental effects from the project and if so, how they wish the perceived impacts to be addressed

### 5.2 Public Consultation Methodology

The ESIA team conducted public participation within the project area in order to give the community a platform of expressing their environmental and social concerns; the team also conducted institutional consultations with all relevant lead agencies. The table below illustrates the identified stakeholders consulted.

**Table 5-1: Stakeholder Mapping Checklist**

Primary Stakeholders		
No	Name	Category
	NaMSIP	Project Proponent
	Surrounding community	Traders, Boda-boda (motor cyclists), shop owners near project site
	Kiambu County	County Government
	Local Administration	

#### 5.2.1 Initial Interviews

Interview of the stakeholders was undertaken during the ESIA study process. The principle was to assess the initial opinions and attitude of the stakeholders to the project including all the components.

#### 5.2.2 Socio-Economic Survey

This process involved a socioeconomic survey conducted on members of the surrounding community through direct interactions with the local communities and other stakeholders

and through questionnaire administration. A quantitative survey was conducted at project site and its neighborhood using structured questionnaires, which were designed to generate the required information. Refer to **Annex 4** for the Completed Stakeholder/Affected Community Questionnaires.

The information was used to answer questions related to status of social and economic parameters within the project site including the public knowledge of the proposed project, how the proposed project is likely to affect the community, present of any cultural heritage site, and hydrogeological sites. The respondents were also given an opportunity to give their views on opportunities and challenges that the proposed project would create

### **5.2.3 Public Consultation and Participation Meetings**

Two public participation and consultations meetings have been held at the site. During these meetings, the project status was disclosed to those that attended. The first meeting involved the key leaders in the area of the project. It also included the area MCA and representatives of the boda boda community and representatives of the area MP. It was held on July 31, 2018. The second meeting was a general public meeting (baraza) that was held on August 14, 2018. The purpose of this meeting was to sensitize the surrounding community on the proposed project and was attended mainly by opinion shapers, traders, community leaders and residents of Ondiri Swamp area that will be connected from the main town by the tunnel. This meeting was organized and facilitated by NaMSIP and Chamber of Commerce Officers and the local politicians. This second meeting was a joint meeting between the NaMSIP and KCG Officers, the Tunnel Committee and the Area MCA. The purpose of the meeting was to present the revised detailed designs to the relevant persons as well as to obtain their views on the project. The county government of Kiambu had members attending both meetings.

**Table 5.2: Summary of Meetings held with Stakeholders**

#	Date	Time	Category of Participants	No. of Participants
1	July 31, 2018	3pm to 6pm	Opinion shapers, key community leaders, Kiambu County Government Staff, political leaders, NaMSIP, Ondiri Swamp representatives, Constituency Office representatives	27
2	August 14, 2018	2pm to 5pm	General public, surrounding community, traders, Chamber of Commerce representatives, NaMSIP, Boda boda leaders, Friends of Ondiri, Thogoto Development Committee, Link Road Residents Association, Ondiri Water Project officials, businessmen, Kenya National Chamber of Commerce & Industry, Kiambu County Government.	118

The stakeholders and traders provided their views and opinions on the new tunnel project which added value to the tunnel design and entire project planning. There was consensus from the participants at these meetings that it was a wise and brilliant decision to construct the new tunnel at the proposed new site. This helped in enhancing the social and economic benefits of the project and in the proposing mitigation measures against negative impacts and acceptability of the project hence avoiding possible conflicts. Refer to **Annex 2** to **Annex 6** for the Minutes and Attendance Registers of the meetings and Completed Stakeholder Questionnaires. The minutes have the questions that were asked and how they were responded to.

#### **PLATE OF PHOTOGRAPH FOR CONSULTATIONS & PUBLIC PARTICIPATION MEETING**



## 6 ANALYSIS OF ALTERNATIVES

### 6.1 Introduction

Regulation 18(1) of Legal Notice 101 specifies the basic content of an Environmental Impact Assessment Study Report subsequent to which, subsection (i) requires an analysis of alternatives including project site, design and technologies and reasons for preferring the proposed site, design and technologies.

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

### 6.2 Zero or No Project Alternative

The No Project option in respect to the proposed project implies discontinuation of the project proposal hence the status quo is maintained. The result is the site being retained in its existing form. 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 have the greatest implications on the socioeconomic environment of the area and surrounding communities. This will mean the tunnel will not be developed, and the land will remain underutilized for the specific purpose it is supposed to serve. 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 the direct and indirect users of the tunnel will remain unchanged,
- The proposed improved tunnel site will stay underutilized
- No employment opportunities will be created for local citizens who will work in the project area and after the development of the tunnel,
- Increased urban poverty and crime in Kenya will continue to rise,
- 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 not attractive to the local people, Kenyans, and the Government of Kenya.

### 6.3 Analysis of Alternative Construction Materials and Technology

The proposed project will be constructed using modern, locally and internationally accepted materials to achieve public health, safety, security and environmental aesthetic requirements. The tunnel construction works will be made using locally sourced materials that meet the Kenya Bureau of Standards requirements.

The consultant presented three options for QW construction materials, which are:

- Option 1. Traditional material. This is primarily represented by concrete structures, and concrete or clay bricks
- Option 2. Steel frame and precast concrete/granite panels

- Option 3. Steel frame and thermo-acoustic aluminum panels

The construction materials selected for the modules by the Client is Option 2 as outlined below:

- Concrete foundation
- Metallic structures for columns, beams and roof
- Thermo-acoustic panel for the roof
- Precast concrete panels
- Security windows
- Metallic doors and louvers
- Granite tiles in the floor and/or concrete finishing non-skid with hardener in the floor

These materials were selected for these advantages:

- Use of recycled materials
- Reduction in noise levels at construction sites
- Reduction in the amount of construction waste
- Reduction in transport cost
- Reduction in site disturbance
- Savings in construction time and cost

#### **6.4 Solid Waste Management Alternatives**

A lot of solid wastes will be generated from the proposed project, which could be detrimental to the environment. An integrated solid waste management system has been recommended to mitigate any impacts of solid waste generated from the project during construction and operation of the proposed project. First, the proponent will give priority to reduction at source of the materials. This option will demand a solid waste management awareness programme 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 programme 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 an 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 described options.

## **7 ENVIRONMENTAL AND SOCIAL IMPACTS ASSESSMENT AND MITIGATION MEASURES**

### **7.1 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.

### **7.2 Approach**

The process involved in assessing the potential impacts of the project used the following steps:

Prediction: What will happen to the environment as a consequence of the project?

Evaluation- will it have beneficial or adverse effects? How big is the change expected to be? How important will it be to the affected receptors?

Mitigation- if the impact is of concern, can anything be done to avoid, minimize, or offset the impact? Or to enhance potential benefits?

Assessment of Residual impact-After mitigation, is the impact still of concern?

### **7.3 Anticipated Positive Project Impacts**

#### **7.3.1 Employment Creation**

This project is anticipated to create employment opportunities for many people within Kiambu County. Direct Job creation will begin from the construction phase of the project whereby the locals will be employed to undertake both informal and formal jobs at the construction site. The socio-economic surveys carried out for this project indicated that majority of the boda boda operators are likely to make use of this tunnel. This shows that the tunnel will attract more youth to venture into trade business and hence reduce the number of the unemployed population in the society.

#### **7.3.2 Reduced Congestion**

The upcoming development will enable orderliness in movement and transportation across the railway line.

### **7.3.3 Economic Growth**

Construction of the tunnel is likely to spur economic growth in the area such as development of other business activities including; banking, transportation and residential among others because of ease of movement and connectivity.

### **7.3.4 Connectivity**

The construction of a modern tunnel will ensure convenience of movement from Kikuyu town across the railway line to the Ondiri side and vice versa. This connectivity also reduces the possibility or probability of accidents whilst crossing the railway line that is expected to get busier when the refurbished Kikuyu railway station is commissioned.

## **7.4 Anticipated Negative Project Impacts and Mitigation Measure**

### **7.4.1 Loss of Vegetation**

The project will have a direct impact to the existing biodiversity in the tunnel centre since the construction phase will involve removal of the vegetation cover and trees planted in the tunnel area on both sides of the railway line. However, this development will have minimal impact to the biodiversity because the area is a business area as categorised by Kiambu County Government and has low vegetation and biodiversity.

#### **Mitigation**

With the rating of low medium impact, the Proponent is advised to compensate the loss of biodiversity by planting additional trees, flowers and other aesthetic plants once the project is complete. The Contractor will preserve the trees especially the ones beyond the railway line and not currently on the way of the project's civil works area. Where possible, landscaping will also be done.

### **7.4.2 Soils and Geology Disturbance**

Since the construction phase will involve use of heavy plant machinery and excavations, soil disturbance is bound to happen. Therefore, the Contractor should put in place mitigation measures to aim at minimum soil disturbance and soil erosion. These measures will include clearing the project site of excavated materials or protect excavated sections from storm water, avoid excavation through flood plains or into stream banks, creating proper channels for waste water and solid waste disposal, develop emergency measures and procedures for protection of soils.

#### **Mitigation**

The impact rating is low, however the proponent through the Contractor should ensure that Excavations are undertaken safely in that shoring and good slope banking is put in place and by adhering to all safety rules. As well, it should be mandatory that a geological study of the area is done to establish the stability and strength of the soil.

#### **7.4.3 Depletion of Water Resources during Construction phase**

Construction works demand high level of water utilization. This high water demand will in turn impact to the water supply in the County. The impact will be reduced water supply to other adjacent areas that shares the same water infrastructure.

##### **Mitigation**

The Impact rating is low. The Contractor is advised to consult with Kiambu Water and Sewerage Company to get permit for their share allocation of water. This consultation and collaboration with water supplier will be encouraged so that water demand conflict will not arise. The Contractor is also advised to install water storage tanks and other water saving technology at the site to save on water usage.

#### **7.4.4 Soils and Groundwater Contamination**

The Proponent and Contractor will prepare a hazardous substance control systems and emergency response plans that will include preparations for quick and safe cleanup of accidental spills. It will prescribe hazardous-materials handling procedures to reduce the potential for a spill during construction, and will include an emergency response programme to ensure quick and safe cleanup of accidental spills.

##### **Mitigation**

The following mitigation measures should be undertaken:

- Pave and shield the waste collection area from direct sunlight and rains;
- Place all oily and contaminated wastes on paved surfaces;
- Dispose offsite oily waste appropriately;
- Obtain spill kits for use in case of accidental spillages on site;
- Obtain portable secondary spill containments for use on site

#### **7.4.5 Air pollution (Dust generation)**

The construction activities often result in increased dust and gas emission. These pollutants emanate from movement of construction machinery and trucks as well as dust generated during construction.

##### **Mitigation**

- Practice prevention measures such as dampening dust by use of water (sprinkling water on surfaces that produce dust or covering them);
- Provide PPEs such as nose masks to the workers on the construction site;
- Control over areas generating dust particles. Such areas should be regularly cleaned;

- Workers should be encouraged to go for regular health check-ups to ascertain their health standards;
- Regular air quality tests to enhance air quality monitoring;
- Wet sweeping of the surfaces that produces a lot of dust particles;
- Establishment of optimum green spaces in the compound particularly at the perimeter fence as the vegetation helps in extracting pollutants from the air.

#### **7.4.6 Air Pollution (Generation of exhaust emission)**

The following measures are recommended to mitigate impact of air pollution associated with exhaust emissions;

- Maintaining equipment appropriately;
- Keeping vehicle idling time to the very minimum.
- Use of alternative fueled construction equipment where feasible.

#### **7.4.7 Noise Pollution and Excessive Vibration Generation**

Noise refers to unwanted sound that can affect job performance, safety and health. Physical impacts may include; loss of hearing, pain, nausea and interference with communications when the exposure is severe. Psychological effects could be disruption of concentration and cause of annoyance. Construction activities tend to cause noise which affects the immediate environment and even disrupt other nearby operations. The noise will affect small animals and birds which are sensitive to noise.

##### **Mitigation**

- Construction activities should be carried only during the day when most of the neighbours are active or carrying on with their normal day chores. The appropriate time could be between 0800hrs to 1800hrs.
- Construction vehicle's drivers and machine operators should be sensitized to adopt a habit of switching off engines of their vehicles or machinery when they are not in use.
- Regular maintenance of the construction machinery is highly encouraged to reduce the noise resulting from friction.
- The Proponent should provide a well-marked billboard at the construction site gates. This is meant to notify the public of the construction activity and timings.
- Unnecessary hooting should be avoided at all costs by the construction vehicles and even during project occupation.
- Personal protective equipment and /materials such as earmuffs and earplugs should be provided to the workers when operating noisy machinery and in a noisy environment. This measure ensures physical barrier that reduces inner noise levels and guard against hearing loss.

#### **7.4.8 Construction Solid/liquid Wastes Generation**

Construction operations will generate solid wastes within the site. The wastes may include; rods of metal, pieces of iron sheets, broken glasses, pieces of wood, empty containers and broken stones.

##### **Mitigation**

- The Proponent should liaise with private waste handlers and the Kiambu County Government to have a sound waste handling and disposal.
- The wastes should be properly segregated and separated to facilitate recycling of some useful waste materials. For example; broken stones can be used for backfills. Integrated solid waste management system may also be adopted through hierarchy of options like source reduction, recycling, composting and re-use.
- The Proponent should ensure that measures are put in place to ensure that construction materials required for the project are carefully budgeted to ensure the amount of construction materials left are kept to the minimal level possible.
- All the solid wastes should be collected by NEMA licensed waste collectors and dumped in NEMA recognized dumpsite
- E portable Human waste will be discharged into toilets and disposed appropriately by the mobile toilet handler.

#### **7.4.9 Health and Safety Impacts**

Construction activities such as excavation and concreting can pose occupational hazards and risks to construction workers and the general public living and working in the neighbourhood of the construction site. They can cause respiratory infections and injuries to limbs and body due to exposure to, dust and combustion gases, operation of equipment and handling of construction materials. Accidents may occur during construction as a result of workers falling from heights or being hit by falling construction materials or tools.

Dust and combustion gases can irritate the eyes causing trachoma and respiratory problems. While the operation of construction equipment and handling of materials can result in injuries to the workers especially in the absence of appropriate protective devices. The health of the site workers may be further compromised by the food which is often supplied by mobile individuals with no licenses to handle food and some of the foodstuffs may be prepared in unhygienic manner.

##### **Mitigation**

- Depending on the occupational safety and health hazards encountered while performing assigned tasks, workers may require using properly fitting personal protective equipment (PPE) to avoid injuries and illness. They (workers) must be

provided with full protective gear. These include working/safety boots, overalls, helmets, goggles, earmuffs, masks, gloves etc.

- Adapt effective emergency response plans. A good start of learning how to respond to an emergency is through certification in Basic First Aid. Regular drills and emergency situations should be followed to impart the anticipated insight and awareness to the workers.
- A first aid kit should be provided within the site. This should be fully equipped always and should be managed by qualified persons.
- Safety awareness may be gained through regular safety training or personal interest in safety and health.
- Local individuals preparing food for the workers at the site must be controlled to ensure that food is hygienically prepared. Allow only authorized food vendors to supply food for the workers in the site
- The Contractor should have workmen's compensation cover. It should comply with Workmen's Compensation Act, as well as other Ordinances, Regulations and Union Agreements.
- Workers should always be sensitized on social issues such as drugs, alcohol, diseases etc.

#### **7.4.10 Disruption of Water Supply**

Disruption of water supply can occur during construction phase. During excavation activities, the underground water pipes supplying water to other businesses and residents may be accidentally broken.

##### **Mitigation**

Contractor should promptly contact Kiambu Water and Sewerage Company immediately any water pipe is damaged during construction to prevent prolonged water disruptions to neighboring businesses and residents.

#### **7.4.11 Increased Surface Runoff**

Increase in the runoffs emanating from paved approach road on both sides of the railway crossing. These runoffs may lead to flooding and overflow of the drainage system within the tunnel especially since it will be on lower elevation.

##### **Mitigation**

- Construct gutters along the roofs for rainwater harvesting and provide tanks for water storage;
- Construct efficient drainage systems within the tunnel.

#### **7.4.12 Landscape and Visual Destruction**

At the initial stages of construction, excavators and landscape distortion can be an eye sore to the passerby.

##### **Mitigation**

- The Contractor shall put up a perimeter fence using non-transparent material to prevent people from accessing the site.
- The Proponent shall beautify the tunnel area and the site after its completion by painting it and planting aesthetic plant round it.

#### **7.4.13 Traffic Accidents**

Activities related to construction works and operation will undoubtedly induce uncharacteristic levels of additional vehicular traffic at the site and roads leading to the tunnel construction site. Related issues of vehicle congestion and reckless driving by truck drivers delivering construction materials and supplies to the site and tunnel will be sources of potential accidents to road users and pedestrians. Disturbance of normal living conditions to the local population and business people due to the increased traffic in the area will also be expected especially during the construction period.

##### **Mitigation Measures during Construction**

The Proponent shall implement the following measures to minimise inconvenience and danger to proximate residents through increased road traffic and dust, and reduced access to worksites:

- Determine the main access and egress points for the site throughout the project duration, along with scheduled changes in these access and egress points, if applicable. These points need to be shown on the site layout (i.e., site setup) drawings.
- Proper traffic control signage should be installed. This includes road signage to be erected near all the entrances and junctions to control construction traffic
- Delivery of materials should be planned when there is minimal traffic
- Any excavated materials should be hauled at night or timed during traffic off-peak periods
- Prepare a plan for communication with residents and businesses surrounding the construction site. Effective communication with local stakeholders is essential to minimise the inconvenience to the surrounding community
- The Contractor shall prepare a traffic management plan to be approved by the RE
- The Contractor's vehicles and equipment must be in proper working condition and have registration plates, and numbering.

- The Contractor shall ensure proper driving discipline by its employees, and sanctions those in breach.
- Excavated sites, embankments, and dangerous locations are protected with proper safety barriers, tape and warning signs.
- Maintain a log detailing every violation and accident on site or associated with the project work activities, including the nature and circumstances, location, date, time, precise vehicles and persons involved, and follow-up actions with the police, insurance, families, community leaders, etc
- Initiation of a safety program and measures by creating awareness and educational campaigns for workers and local communities
- Installation of appropriate road signage, speed signs, and other warning signs at the site and access roads
- Copies of drivers' licenses and insurance policies for the Contractor's drivers and vehicles respectively should be provided to the Supervision Consultant.
- The Contractor's vehicles and equipment must be in proper working condition and have registration plates, and numbering.
- The Contractor ensures proper driving discipline by its employees, and sanctions those in breach.
- Excavated sites, embankments, and dangerous locations are protected with proper safety barriers, tape and warning signs.
- Use of traffic flagmen who will coordinate from both ends of the tunnel using the red and green warning small flags to control traffic approaching the site
- Maintain an accident log with recording, investigation and close-out with lessons learnt instigated for no recurrence

#### **Mitigation measures during Operation**

- Make the necessary arrangements for coordinating and controlling delivery vehicles
- Make arrangements with the traffic police and County personnel to manage traffic in the area to mitigate against traffic accidents and traffic jam built up at the entry and exit points of the tunnel
- Delivery of supplies should be limited to off-peak hours when the tunnel is not operational to minimize traffic jams in the area.

#### **7.4.14 Housekeeping**

During construction, organization of the construction area is important to ensure prevention of accidents and incidences within the site. Clear gangways and pathways enable faster movements even during normal working time and during response to emergencies.

### **Mitigation**

Ensure that there is a well-organized housekeeping plan in place at the construction site

#### **7.4.15 Crime Management, Child Protection, Gender Equity, Labour Influx and Sexual Harassment**

The laws of Kenya prohibit Contractors from “employing children in a manner that is economically exploitative, hazardous, and detrimental to the child’s education, harmful to the child’s health or physical, mental, spiritual, moral, or social development. It is also important to be vigilant towards potential sexual exploitation of children, especially young girls. The Contractor should adopt a ‘Child Protection Code of Conduct’; that all staff of the Contractor must sign, committing themselves towards protecting children, which clearly defines what is and is not acceptable behavior.

Crimes might occur in the project area during the construction and operation such as stealing of construction materials or individual property, fighting, petty crimes such as pick pocketing, drug abuse and alcoholism among others.

There is also potential that gender inequality might occur during project construction through unequal distribution of work, discrimination against women, and unequal pay for women, lack of provision of separate facilities for women, among others. Sexual harassment against women might also happen because of mixing of women and men at the construction site.

#### **Mitigation Measures (design)**

- Proper design incorporating lighting to enhance security at the tunnel
- Provision for fencing along the site boundary should be part of the design to control entry and exit points

#### **Mitigation Measures during Construction**

- Ensure no children are employed on site in accordance with national labor laws
- Ensure that any child sexual relations offenses among Contractors’ workers are promptly reported to the police
- The client and the Contractor shall adopt a ‘Child Protection Code of Conduct’ which sets stringent standards for personal behavior to avoid child exploitation and abuse.
- The Contractor shall require his employees, sub-Contractors, sub-Consultants, and any personnel thereof engaged in construction works to individually sign and comply with this Code of Conduct.
- Removing any employee who persists in any misconduct or lack of care, carries out duties incompetently or negligently, fails to conform to any provisions of the contract,

or persists in any conduct which is prejudicial to safety, health, or the protection of the environment.

- Taking all reasonable precautions to prevent unlawful, riotous or disorderly conduct by or amongst the Contractor's personnel, and to preserve peace and protection of persons and property on and near the site.
- Prohibiting alcohol, drugs, arms, and ammunition on the worksite among personnel.
- The Contractor and Supervision Consultant should register in a log all events of a criminal nature that occur at the worksite or are associated with the civil works activities.
- The Contractor and Supervision Consultant should report all activities of a criminal nature on the worksite or by the Contractor's employees (whether on or off the worksite) to the police and undertake the necessary follow-up.  
Crime reports should include nature of the offense, location, date, time, and all other pertinent details.
- Sensitize the construction workers, locals, and security to be on the lookout on suspicious activities near the site

The Contractor's responsibility for workers' conduct within the worksite should include but not limited to:

- Contractor to prepare and enforce a "No Sexual Harassment Policy" in accordance with national law where applicable
- Contractor and implementing agency to prepare and implement a Gender Action plan to include at minimum, in conformance with local laws and customs, equal opportunity employment, gender sensitization
- Provision of gender disaggregated bathing, changing, sanitation facilities
- Grievance redress mechanisms including non-retaliation should be set up for the workers
- Liaise with the administration units (County and sub County governments, Police, DO, chiefs, etc.) to provide regular surveillance and patrols to protect workers and shoppers during operation
- The Kiambu County government should hire a security firm to manage security within the tunnel

#### **7.4.16 Complaints and Grievances/Social Conflict**

During construction, the neighbouring community and other stakeholders may have complaints and grievances regarding the ongoing activities. There is also potential for social unrest among the local population if they are not considered for employment. This can bring negative publicity during construction including stoppage of work and can delay the projects progress.

### **Mitigation**

- Provide grievance redress mechanism for the public and other stakeholders;
- Advise the public on where to report grievances;
- Consider prioritizing the local manpower for both skilled and unskilled labour.
- Implement proposed grievance resolution mechanism

#### **7.4.17 Increased HIV/AIDS Prevalence and other Diseases**

Construction sites in developing countries are potentially primary centres of HIV-AIDS because construction sectors provide entry-level local jobs, which may be crucial to the survival of youth-headed households and extended families.

### **Mitigation**

- HIV-AIDS awareness methods used in campaign to increase understanding about the disease;
- Raising awareness about HIV/AIDS;
- Promote the benefits of abstinence / avoidance;
- Distribute protective devices like condoms to construction workers;
- Encourage workers to go for HIV voluntary counseling, testing and referral services;
- Monitoring of outcomes, in collaboration with National HIV/AIDS Authorities.

## **7.5 Operation Phase Impacts**

### **7.5.1 Increased Energy Consumption and Demand**

The tunnel will be connected to the electric line which is already available in the area for security lighting. However; increase in energy consumption will be experienced in the existing electric supply infrastructure.

### **Mitigation**

- The Proponent shall install energy-efficient system within the tunnel for instance the use of energy saving bulbs. This will promote energy conservation during the operational phase of the project.
- The above measures will be complemented by monitoring energy use during the operation of the tunnel and set targets for efficient energy use.
- Maintenance of regular checks of the electrical systems and appliances.
- Switching off security and internal lights during the day when natural lighting can be used.

### **7.5.2 Blockage of Drainage Systems**

The plumbing system and drainage might be blocked if proper use and maintenance is not exercised within the tunnel

### **Mitigation**

- The Proponent should ensure that unwanted materials such as sticks and cloths are not allowed into the drainages. Special bins for handling sanitary materials or clothes should be provided in the toilets.
- Regular maintenance of the drainage should be done to avoid blockages.

### **7.5.3 Water Pollution**

During the operation phase, water pollution may occur when tunnel users litter the drainages, channeling contaminated water to the drainage systems and disposal of liquid waste inappropriately.

### **Mitigation**

- Avoid channeling contaminated water onto the public drainage systems.
- Channel unrecyclable water into the public sewer line. There is no drainage system within the tunnel even though a sewer main line belonging to NCC exist a short distance from the tunnel. There is need for a drainage system within the tunnel to be connected to the main sewer line
- Dispose tunnel waste appropriately

### **7.5.4 Accidents and Incidence Occurrence**

Accidents and incidences may occur during operations of the project. Occurrence of such incidences may include falling, being knocked down by vehicles, damage to goods and property.

### **Mitigation**

- Ensure that provisions for reporting incidents, accidents and dangerous occurrences during operations using prescribed forms obtainable from the local Occupational Health and Safety Office (OHSO) are in place;
- Provisions must be put in place for the formation of a Health and Safety Committee, in which the County Government and the traders are represented;
- Train employees on how to respond to incident and accident occurrences.

### **7.5.5 HIV/AIDS prevalence**

HIV-AIDS prevalence is likely to increase among tunnel traders when many youths get self-employed and earn income. Without proper campaign on prevention, the spread of HIV can be rampant within traders.

### **Mitigation**

- Awareness methods used in campaign to increase understanding about the disease;

- Raising awareness about HIV/AIDS;
- Promote the benefits of abstinence / avoidance;
- Availing condoms to traders;
- Encourage traders to go for HIV voluntary counselling, testing and referral services;
- Monitoring of outcomes, in collaboration with National HIV/AIDS Authorities

#### **7.5.6 Security and Crime Risks in the Tunnel**

Tunnels can be a security risk especially at night whereby they could be used as locations for harassment (even sexually) women and children. They could also be avenues for perpetration of criminal activities especially at night. Homeless persons can use them as shelter, posing serious security threats to users, especially women and children.

##### **Mitigation**

- Provision of adequate and functional lighting in the tunnel by the county government
- Ensuring efficient maintenance of the lighting in the tunnel by the county government so that the lighting is working throughout
- County government of Kiambu to provide security for the tunnel especially at night. This could be in the form of providing security personnel at night.
- County government of Kiambu to discourage and remove any homeless persons using the tunnel for shelter

### **7.6 Decommissioning Phase Impacts**

#### **7.6.1 Solid wastes (Scraps and other Debris Onsite)**

Demolition works generates a lot of solid wastes. These wastes range from; wood, tiles, waste metals and stones amongst others.

##### **Mitigation**

- The Proponent should liaise with private waste handlers and the Kiambu County Government to have a sound waste handling and disposal.
- The wastes should be properly segregated and separated to facilitate recycling of some useful waste materials. For example; broken stones can be used for backfills. Integrated solid waste management system may also be adopted through hierarchy of options like source reduction, recycling, composting and re-use.
- All the solid wastes should be collected by NEMA licensed waste handlers and dumped in NEMA recognized dumpsite.

#### **7.6.2 Air, Water and Soil Pollution**

Demolitions also generate a lot of waste that can contaminate water, air or soil. These wastes may include liquids, dust or waste water.

##### **Mitigation**

Solid waste and liquid waste resulting from demolition or dismantling works will be managed as described in the construction phase.

### 7.6.3 Occupational Health and Safety Concerns

The decommissioning phase may cause accidents; inhalation of dust; generation of noise and occupational incidences like fall.

#### Mitigation

- Depending on the occupational safety and health hazards encountered while performing assigned tasks, workers will use properly fitting personal protective equipment (PPE) to avoid injuries and illness. Workers must be provided with full protective gear. These include working/safety boots, overalls, helmets, goggles, earmuffs, masks, gloves etc.
- A first aid kit should be provided within the site. This should be fully equipped at all times and should be managed by qualified persons.
- Local individuals preparing food for the workers at the site must be controlled to ensure that food is hygienically prepared.
- The Contractor should have workmen's compensation cover. It should comply with Workmen's Compensation Act, as well as other Ordinances, Regulations and Union Agreements.
- Workers should always be sensitized on social issues such as drugs, alcohol, diseases etc.
- Grievance redress mechanisms including non-retaliation should be set up for the workers.

### 7.7 Cumulative Impacts

Cumulative impacts are those that result from the successive, incremental, and/or combined effects of an action, project, or activity. For practical reasons, the identification and management of cumulative impacts are limited to those effects generally recognized as important based on scientific concerns and/or concerns of affected communities<sup>1</sup>. Cumulative impacts can only occur where, following the implementation of mitigation, significant residual impacts are predicted by the ESIA process.

The cumulative impacts considered in this project include the following;

- Air quality,
- Water quality,
- Waste management
- Noise impacts
- Traffic

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<sup>1</sup> IFC), 2013, Good Practice Handbook Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Tunnel

- Social economics

### 7.7.1 Assessment of the Impacts

The ESIA assessment looked at the likelihood of an impact having a residual impact that can build up or interact with other impacts from other tunnel projects after the implementation of the mitigation measures proposed in this report. The impact was then rated likely or unlikely. The distances between the tunnel ends were also taken into consideration.

#### Residual cumulative impact of air quality

No significant local air quality effects are predicted following the good construction practice, which incorporates the implementation of the identified mitigation measures in the ESMP

Phase	Significance (Pre-mitigation)	Residual Significance (Post-mitigation)
Construction	negligible	negligible
Operation	negligible	negligible

#### Residual cumulative impact of water quality

No significant impacts on the local water environment are predicted with the implementation of proposed mitigation measures. Therefore, in reference to the tunnel, interaction of the impacts to produce cumulative impact is negligible.

Phase	Significance (Pre-mitigation)	Residual Significance (Post-mitigation)
Construction	minor	negligible
Operation	minor	negligible

#### Residual cumulative impact of Waste management

In waste management, cumulative impact to the waste services could be impacted if mitigation measures are not implemented and the impact significance could be minor. Therefore, following the implementation of mitigation measures cumulative impact are localized and impossible to spread and combine to produce any significant cumulative impact

Phase	Significance (Pre-mitigation)	Residual Significance (Post-mitigation)
Construction	minor	negligible
Operation	negligible	negligible

**Residual cumulative impact of Noise quality**

For the Proposed Access Road Tunnel project, the noise generation is predicted to be localized. In addition to distance between the tunnel ends, it is impossible for the noise level to combine and produce significant cumulative impact.

Phase	Significance (Pre-mitigation)	Residual Significance (Post-mitigation)
Construction	negligible	negligible
Operation	negligible	negligible

**Residual cumulative impact of traffic congestion/interruption**

Due to the geographical location of the tunnel at the lower end of the main road and near the railway station, there is likely to be significant cumulative traffic impacts arising from the tunnel improvement project. In addition, the haulage routes and access roads for the tunnel are different and widespread; therefore, no significant impact will arise following the implementation of the localized mitigation measures

Phase	Significance (Pre-mitigation)	Residual Significance (Post-mitigation)
Construction	minor	negligible
Operation	negligible	negligible

**7.7.1.1 Cumulative Impacts on Socio Economics**

Cumulative impacts on socio economics as a result of construction of the tunnel. Some of the benefits include improved connectivity to ease movement of goods and services hence improving business.

**7.7.2 Conclusion**

The construction of the tunnel will lead to more cumulative impacts mainly on improved transport and accessibility.

## **8 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMMP)**

### **8.1 Significance of ESMMP**

The purpose of the Environmental/Social Management & Monitoring Plan is to initiate a mechanism for implementing mitigation measures for the potential negative environmental impacts and monitor the efficiency of these mitigation measures based on relevant environmental indicators. The EMMP assigns responsibilities of actions to various actors and provides a timeframe within which mitigation measures can be implemented, supervised and monitored. Further, it provides a checklist for project monitoring and evaluation. The objectives of the ESMMP are:

- To provide evidence of practical and achievable plans for the management of the proposed project.
- To provide the Proponent and the relevant Lead Agencies with a framework to confirm compliance with relevant laws and regulations.
- To provide community with evidence of the management of the project in an environmentally acceptable manner.

The ESMMP outlined below will address the identified potential negative impacts and mitigation measures on the following project stages:

- Pre-construction and Construction Phases ESMMP
- Operation Phase ESMMP and
- Decommissioning Phase ESMMP.

Once all the operational activities have ceased, it is necessary to highlight the basic mitigation measures that will be required during the decommissioning phase of the project. Thus, the crucial 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.

## **8.2 Environmental and Social, Management and Monitoring Plan**

ESMMP is a detailed summary of the impacts and the proposed mitigation measures. It further specifies who is responsible for implementation of the proposed actions and the cost involved in the action. It describes monitoring schedule and the parameter to be monitored. The following table 8-1 outlines the ESMMP for the tunnel.

**Table 8-1: Environmental and Social Management and Monitoring Plan**

Project Environmental and Social Impact	Proposed Mitigation and Aspects for Monitoring	Responsibility for intervention and monitoring during Design, Construction, Operation and Decommissioning	Parameters for Monitoring/ Indicators (c) - construction (o) - operations (d) - Decommissioning	Timing - Recommended frequency of monitoring	Estimated Mitigation & Monitoring costs to be included in the BoQ (Kshs)
Loss of vegetation	<p><b><u>CONSTRUCTION PHASE</u></b></p> <ul style="list-style-type: none"> <li>Minimize clearing of unnecessary areas at the construction site</li> <li>Replant vegetation through landscaping upon completion</li> </ul> <p><b><u>OPERATION PHASE</u></b></p> <ul style="list-style-type: none"> <li>Replenish vegetation at the open areas of the tunnel regularly</li> </ul>	Design Engineer Project Engineer Contractor KCG NaMSIP Safeguards Team	<ul style="list-style-type: none"> <li>Check and follow specifications in the drawings and plans</li> <li>(c) Minimal clearance of vegetation and soil stripping</li> <li>(c &amp; o) Net change in vegetation types at the project site;</li> <li>(c &amp; o) Net change in fauna at the project site</li> </ul>	Continuous during construction & operation phases	Included in the BoQ under excavations  Approximately Ksh 150,000
Soil and geology disturbance	<p><b><u>CONSTRUCTION PHASE</u></b></p> <ul style="list-style-type: none"> <li>Minimize excavation of unnecessary areas at the construction site</li> <li>Replant vegetation through landscaping upon completion</li> <li>Use of shoring, warning signs and barricading during excavation</li> <li>Excavation to be undertaken on the basis of a geological survey / study</li> </ul>	Design Engineer Project Engineer Contractor NaMSIP Safeguards Team	<ul style="list-style-type: none"> <li>Check and follow specifications in the drawings and plans</li> <li>(c) Minimal excavation of ground and soil stripping</li> </ul>	Continuous during construction	Included in the BoQ under excavations.  Kshs. 150,000
Depletion of Water Resources	<p><b><u>CONSTRUCTION PHASE</u></b></p> <ul style="list-style-type: none"> <li>Develop water abstraction plan to minimize conflict with residents</li> <li>Manage use of piped water and other water sources mainly used by local people</li> <li>Abstraction licenses should be obtained from WRMA</li> </ul>	Project Engineer and Contractor  WRMA	<ul style="list-style-type: none"> <li>(c) Inspection /method of waste collection</li> <li>(c) Water related complaints from the neighbouring communities or the authorities</li> <li>(c) Amount of water abstracted</li> </ul>	monthly	Costs build in the planning and administration costs of the Contractor
Soils and ground-water contamination	<p><b><u>CONSTRUCTION AND DECOMMISSIONING PHASES</u></b></p> <ul style="list-style-type: none"> <li>Pave and shield the waste collection area from direct sunlight and rains;</li> </ul>	Project Engineer Contractor	<ul style="list-style-type: none"> <li>(c, o &amp; d) Inspection</li> <li>(c, o &amp; d) Discharge into roadside storm water drain</li> <li>(c, o &amp; d) Complaints from the neighbouring</li> </ul>	daily  regularly	Costs build in the planning and administration costs of the Contractor

Project Environmental and Social Impact	Proposed Mitigation and Aspects for Monitoring	Responsibility for intervention and monitoring during Design, Construction, Operation and Decommissioning	Parameters for Monitoring/ Indicators (c) - construction (o) - operations (d) - Decommissioning	Timing - Recommended frequency of monitoring	Estimated Mitigation & Monitoring costs to be included in the BoQ (Kshs)
	<ul style="list-style-type: none"> <li>Place all oily and contaminated wastes on paved surfaces;</li> <li>Dispose offsite oily waste appropriately;</li> <li>Obtain spill kits for use in case of accidental spillages on site;</li> <li>Obtain portable secondary spill containments for use on site</li> </ul>	Sub-County Health & Environmental Officer,  NEMA,  WRMA  KCG	communities or the authorities <ul style="list-style-type: none"> <li>(c, o &amp; d) Visible solid waste and oil stains in the storm water drainage</li> </ul>		& Maintenance costs of the tunnel
<b>Air Pollution (Dust generation + exhausts emissions)</b>	<u><b>CONSTRUCTION AND DECOMMISSIONING PHASES</b></u> <ul style="list-style-type: none"> <li>Speed control of vehicles accessing the site</li> <li>Construction of bumps along the road near the tunnel</li> <li>Proper maintenance of construction equipment as per the manufacturer requirements</li> <li>Watering dusty construction and decommissioning sections of the site</li> <li>Use of appropriate PPE against dust</li> <li>Maintaining equipment appropriately;</li> <li>Keeping vehicle idling time to the very minimum.</li> <li>Use of alternative fuelled construction equipment where feasible</li> <li>Proper maintenance of construction equipment as per the manufacturer requirements</li> </ul>	Project Engineer  Contractor  NaMSIP Safeguards Team  NEMA	<ul style="list-style-type: none"> <li>(c &amp; d) inspection / observation</li> <li>(c &amp; d) Dust levels (particulate matter) - the levels should be within the limits set out in the First Schedule of EMCA (Air Quality) Regulations, 2014. At the project site boundary, the 24hour and annual time weighted average should not exceed 70 and 50 µg/m<sup>3</sup> respectively.</li> <li>(c &amp; d) Exhaust fumes from the vehicles- the emission levels should not exceed the levels prescribed under Kenya Standards (KS1515:2000 on vehicular emission) e.g. CO shall not exceed 0.5 per cent volume and hydrocarbons (HC) concentrations shall not exceed 0.12 per cent volume (1200ppm)</li> <li>(c &amp; d) Maintenance levels of plant and equipment</li> </ul>	Continuous during construction	Costs of dust mitigation of Kshs. 100,000

Project Environmental and Social Impact	Proposed Mitigation and Aspects for Monitoring	Responsibility for intervention and monitoring during Design, Construction, Operation and Decommissioning	Parameters for Monitoring/ Indicators (c) - construction (o) - operations (d) - Decommissioning	Timing - Recommended frequency of monitoring	Estimated Mitigation & Monitoring costs to be included in the BoQ (Kshs)
			<ul style="list-style-type: none"> <li>• (c &amp; d) Availability, provision and proper use of appropriate PPE against dust</li> <li>• (c &amp; d) Dust related complaints recorded from contractor workers and neighbouring communities</li> </ul>		
Noise pollution and excessive vibration generation	<p><b><u>CONSTRUCTION AND DECOMMISSIONING PHASES</u></b></p> <ul style="list-style-type: none"> <li>• Regular sensitization of workforce and residents on potential noise levels</li> <li>• Controlled operation of construction plant and equipment</li> <li>• No blasting shall be done on site</li> <li>• Construction activities should be carried only during the day when most the neighbours are active or carrying on with their normal day chores. The appropriate time could be between 0800hrs to 1800hrs.</li> <li>• Construction vehicle's drivers and machine operators should be sensitized to adopt a habit of switching off engines of their vehicles or machinery when they are not in use.</li> <li>• Regular maintenance of the construction machinery is highly encouraged to reduce the noise resulting from friction.</li> <li>• The Proponent should provide a well-marked billboard at the construction site gates. This is meant to notify the public of the construction activity and timings.</li> <li>• Unnecessary hooting should be avoided at all costs by the</li> </ul>	<p>Project Engineer</p> <p>Contractor</p> <p>NaMSIP Safeguards Team</p> <p>NEMA</p>	<ul style="list-style-type: none"> <li>• (c &amp; d) inspection / observation</li> <li>• (c &amp; d) Construction noise and vibration levels at the construction site should be within the limits prescribed in EMC (Noise and Excessive Vibration Pollution (Control) Regulations 2009. The regulatory limits are as follow:</li> <li>• (c &amp; d) Noise levels- as provided in the Second Schedule of the above regulations the levels should not exceed Leq 60 and 30 dB(A) in diurnal and nocturnal schedules respectively.</li> <li>• (c &amp; d) Vibration levels do not exceed 0.5 centimeters per second beyond any source property boundary or 30 metres from any moving source.</li> <li>• (c &amp; d) Availability, provision and proper use of appropriate PPE against noise</li> <li>• (c &amp; d) Noise related complaints recorded from constructor workers and neighbouring communities</li> </ul>	daily/ random	Costs build in the planning and administration costs of the Contractor

Project Environmental and Social Impact	Proposed Mitigation and Aspects for Monitoring	Responsibility for intervention and monitoring during Design, Construction, Operation and Decommissioning	Parameters for Monitoring/ Indicators (c) - construction (o) - operations (d) - Decommissioning	Timing - Recommended frequency of monitoring	Estimated Mitigation & Monitoring costs to be included in the BoQ (Kshs)
	<p>construction vehicles and even during project occupation.</p> <ul style="list-style-type: none"> <li>Personal protective equipment and /materials such as earmuffs and earplugs should be provided to the workers when operating noisy machinery and in a noisy environment. This measure ensures physical barrier that reduces inner noise levels and guard against hearing loss.</li> </ul>				

<p><b>Construction solid/liquid wastes generation</b></p>	<p><b><u>CONSTRUCTION AND DECOMMISSIONING PHASES</u></b></p> <ul style="list-style-type: none"> <li>• Establish a well-planned method of solid disposal of debris/ garbage at site</li> <li>• Provision of solid waste receptacles at designated areas at site</li> <li>• The Proponent should liaise with private waste handlers and the Kiambu County Government to have a sound waste handling and disposal.</li> <li>• The wastes should be properly segregated and separated to facilitate recycling of some useful waste materials. For example; excavated soils and stones can be used for backfills.</li> <li>• Integrated solid waste management system may also be adopted through hierarchy of options like source reduction, recycling, composting and re-use.</li> <li>• The Proponent should ensure that measures are put in place to ensure that construction materials required for the project are carefully budgeted to ensure the amount of construction materials left are kept to the minimal level possible.</li> <li>• All the solid wastes should be collected by NEMA licensed waste collectors and dumped in NEMA recognized dumpsite</li> <li>• Portable human waste should be discharged into toilets and disposed appropriately by the mobile toilet handler</li> </ul>	<p>Contractor Project Engineer</p>	<ul style="list-style-type: none"> <li>• (c &amp; d) Inspection</li> <li>• (c &amp; d) Availability of solid waste receptacles at site</li> <li>• (c &amp; d) Disposal methods of solid waste from the site</li> <li>• (c &amp; d) Complaints on health and safety aspects related to construction activities</li> <li>• (c &amp; d) Site cleanliness</li> <li>• (c &amp; d) Amount of waste/debris on site</li> </ul>	<p>daily</p>	<p>Costs build in the planning and administration costs of the Contractor</p>
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Project Environmental and Social Impact	Proposed Mitigation and Aspects for Monitoring	Responsibility for intervention and monitoring during Design, Construction, Operation and Decommissioning	Parameters for Monitoring/ Indicators (c) - construction (o) - operations (d) - Decommissioning	Timing - Recommended frequency of monitoring	Estimated Mitigation & Monitoring costs to be included in the BoQ (Kshs)
<b>Health and Safety Impacts</b>	<p>The Contractor to prepare a Health and Safety Plan that will include consideration of the following;</p> <p><b><u>CONSTRUCTION AND DECOMMISSIONING PHASES</u></b></p> <ul style="list-style-type: none"> <li>• Provide adequate and right safety tools, and enforce use of PPEs to all workers</li> <li>• Appoint a fulltime OHS personnel</li> <li>• Ensure provisions of first aid for staff, insurance, and access to ambulance service at all worksites, and arrangement to access local hospital/dispensary with qualified medical staff by workers</li> <li>• The site shall be fenced off and provided with security at the access gates to reduce potential accidents and injuries to the public</li> <li>• Appropriate scaffolding and/or safety harnesses must be worn by those working at a height (usually if it is more than 2 metres)</li> </ul>	<p>Project Engineer</p> <p>Sub-County Health &amp; Environmental Officer</p>	<ul style="list-style-type: none"> <li>• (c &amp; d) Inspection</li> <li>• (c &amp; d) No of PPEs provided</li> <li>• (c &amp; d) Workers OHS compliance (use and adequacy)</li> <li>• (c &amp; d) Number of construction activities related accidents</li> </ul>	<p>Monthly</p>	<p>Standard conditions of contract for Insurance. Health &amp; Safety for Workers and Equipment – Approx. Kshs 200,000</p>
<b>Water Resources Usage</b>	<p><b><u>CONSTRUCTION PHASE</u></b></p> <ul style="list-style-type: none"> <li>• Develop water abstraction plan to minimize conflict with residents</li> <li>• Manage use of piped water and other water sources mainly used by local people</li> <li>• Abstraction licenses should be obtained from WRMA</li> </ul>	<p>Project Engineer and Contractor</p> <p>Kiambu water and Sewerage Company</p> <p>WRMA</p>	<ul style="list-style-type: none"> <li>• (c) Inspection /method of waste collection</li> <li>• (c) Water related complaints from the neighbouring communities or the authorities</li> <li>• (c) Amount of water abstracted</li> </ul>	<p>monthly</p>	<p>Costs build in the planning and administration costs of the Contractor</p>

Project Environmental and Social Impact	Proposed Mitigation and Aspects for Monitoring	Responsibility for intervention and monitoring during Design, Construction, Operation and Decommissioning	Parameters for Monitoring/ Indicators (c) - construction (o) - operations (d) - Decommissioning	Timing - Recommended frequency of monitoring	Estimated Mitigation & Monitoring costs to be included in the BoQ (Kshs)
<b>Increased surface run-off</b>	<ul style="list-style-type: none"> <li>Construct gutters along the roofs for rainwater harvesting and provide tanks for water storage to minimize water going to the tunnel;</li> <li>Construct efficient drainage systems within the tunnel with pumping out if required</li> </ul>	Contractor KCG	Amount of water collected from roof catchment	Regularly especially during rainy time	Included in the BoQ under drainage costs  Kshs. 300,000
<b>Landscape and visual destruction</b>	<ul style="list-style-type: none"> <li>The Contractor shall put up a perimeter fence using non-transparent material to prevent people from accessing the site.</li> <li>The Proponent shall beautify the tunnel area and the site after its completion by painting it and planting aesthetic plant round it</li> </ul>	Contractor NaMSIP Safeguards Team  Project Engineer	<ul style="list-style-type: none"> <li>Observation of area pre and post project activities</li> </ul>	Regularly	Included in the BoQ under landscaping  Kshs. 60,000
<b>Traffic Accidents</b>	<p><b><u>CONSTRUCTION AND DECOMMISSIONING PHASES</u></b></p> <ul style="list-style-type: none"> <li>Determine the main access and egress points for the site throughout the project duration, along with scheduled changes in these access and egress points, if applicable. These points need to be shown on the site layout (i.e., site setup) drawings.</li> <li>Proper traffic control signage should be installed. This includes road signage to be erected near all the entrances and junctions to control construction traffic</li> <li>Delivery of materials should be planned when there is minimal traffic</li> </ul>	Project Engineer  Contractor  Local Police  KCG	<ul style="list-style-type: none"> <li>(c &amp; d) Inspection and accident reports</li> <li>(c &amp; d) - No of accidents</li> <li>(c &amp; d) Complaints from the neighbouring communities or the authorities</li> <li>(c &amp; d) Adherence of insurance and traffic Act requirements</li> </ul>	monthly	Costs build in the planning and administration costs of the Contractor  Contract clause No 18  Kshs. 400,000

Project Environmental and Social Impact	Proposed Mitigation and Aspects for Monitoring	Responsibility for intervention and monitoring during Design, Construction, Operation and Decommissioning	Parameters for Monitoring/ Indicators (c) - construction (o) - operations (d) - Decommissioning	Timing - Recommended frequency of monitoring	Estimated Mitigation & Monitoring costs to be included in the BoQ (Kshs)
	<ul style="list-style-type: none"> <li>• Any excavated materials should be hauled at night or timed during traffic off-peak periods</li> <li>• Prepare a plan for communication with residents and businesses surrounding the construction site. Effective communication with local stakeholders is essential to minimise the inconvenience to the surrounding community</li> <li>• The Contractor shall prepare a traffic management plan to be approved by the RE</li> <li>• The Contractor's vehicles and equipment must be in proper working condition and have registration plates, and numbering.</li> <li>• The Contractor shall ensure proper driving discipline by its employees, and sanctions those in breach.</li> <li>• Excavated sites, embankments, and dangerous locations are protected with proper safety barriers, tape and warning signs.</li> <li>• Maintain a log detailing every violation and accident on site or associated with the project work activities, including the nature and circumstances, location, date, time, precise vehicles and persons involved, and follow-up actions with the police, insurance, families, community leaders, etc</li> </ul>				

Project Environmental and Social Impact	Proposed Mitigation and Aspects for Monitoring	Responsibility for intervention and monitoring during Design, Construction, Operation and Decommissioning	Parameters for Monitoring/ Indicators (c) - construction (o) - operations (d) - Decommissioning	Timing - Recommended frequency of monitoring	Estimated Mitigation & Monitoring costs to be included in the BoQ (Kshs)
	<ul style="list-style-type: none"> <li>• Initiation of a safety program and measures by creating awareness and educational campaigns for workers and local communities</li> <li>• Installation of appropriate road signage, speed signs, and other warning signs at the site and access roads</li> <li>• Copies of drivers' licenses and insurance policies for the Contractor's drivers and vehicles respectively should be provided to the Supervision Consultant.</li> <li>• The Contractor's vehicles and equipment must be in proper working condition and have registration plates, and numbering.</li> <li>• The Contractor ensures proper driving discipline by its employees, and sanctions those in breach.</li> <li>• Excavated sites, embankments, and dangerous locations are protected with proper safety barriers, tape and warning signs.</li> <li>• Use of traffic flagmen who will coordinate from both ends of the tunnel using the red and green warning small flags to control traffic approaching the site</li> <li>• Maintain an accident log with recording, investigation and close-out with lessons learnt instigated for no recurrence</li> </ul>				

Project Environmental and Social Impact	Proposed Mitigation and Aspects for Monitoring	Responsibility for intervention and monitoring during Design, Construction, Operation and Decommissioning	Parameters for Monitoring/ Indicators (c) - construction (o) - operations (d) - Decommissioning	Timing - Recommended frequency of monitoring	Estimated Mitigation & Monitoring costs to be included in the BoQ (Kshs)
<b>Housekeeping</b>	<ul style="list-style-type: none"> <li>Ensure that there is a well-organized housekeeping plan in place at the construction site.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>Observation of standards on site</li> </ul>	Daily	No direct costs
<b>Crime management, child protection, gender equity, labour influx and sexual harassment</b>	<p><b><u>CONSTRUCTION AND DECOMMISSIONING PHASES</u></b></p> <ul style="list-style-type: none"> <li>Utilization of local skilled and unskilled workers;</li> <li>Adhere to the local labour laws of 30% women in employment and remuneration of workers above the minimum wage</li> </ul>	Contractor Project Engineer	<ul style="list-style-type: none"> <li>(c &amp; d) observation /reports</li> <li>(c &amp; d) Number/percentage of contractor workers sourced from the local communities</li> <li>(c &amp; d) Number of female employees;</li> <li>(c &amp; d) Employment records of workers in adherence to the law</li> <li>(c &amp; d) Complaints from the neighbouring communities or the authorities</li> </ul>	Monthly	No direct costs to ESMMP, costs build in the planning and administration costs of the Contractor
	<p><b><u>CONSTRUCTION, OPERATION AND DECOMMISSIONING PHASES</u></b></p> <ul style="list-style-type: none"> <li>Proper design incorporating lighting to enhance security at the site</li> <li>Sensitize the construction workers, locals and security providers to be on the lookout for any suspicious activities near the site</li> <li>Liaise with the administration units (County and sub County governments, Police, DO, chiefs, etc.) to provide regular surveillance and patrols to protect the workers</li> </ul>	Contractor Project Engineer Local police KCG	<ul style="list-style-type: none"> <li>(c, o &amp; d) Reporting</li> <li>(c, o &amp; d) Number of crimes reported (target =0)</li> </ul>	Monthly	No direct costs to ESMMP, costs build in the planning and administration costs of the Contractor & Normal operational costs during operation

Project Environmental and Social Impact	Proposed Mitigation and Aspects for Monitoring	Responsibility for intervention and monitoring during Design, Construction, Operation and Decommissioning	Parameters for Monitoring/ Indicators (c) - construction (o) - operations (d) - Decommissioning	Timing - Recommended frequency of monitoring	Estimated Mitigation & Monitoring costs to be included in the BoQ (Kshs)
	<p><b><u>CONSTRUCTION AND DECOMMISSIONING PHASES</u></b></p> <ul style="list-style-type: none"> <li>• The Contractor to have and enforce ‘Child Protection Code of Conduct’</li> <li>• Ensure no children are employed on site in accordance with national labor laws</li> <li>• Ensure that any child sexual relations offenses among Contractors’ workers are promptly reported to the police</li> </ul>	<p>Contractor Project Engineer,</p>	<ul style="list-style-type: none"> <li>• (c &amp; d) Observation /reports/random checks</li> <li>• (c &amp; d) Inspection of employees working at the site</li> <li>• (c &amp; d) Labour Records by the Contractor</li> </ul>	<p>Regularly</p>	<p>No Direct costs</p>
	<p><b><u>CONSTRUCTION, OPERATION AND DECOMMISSIONING PHASES</u></b></p> <ul style="list-style-type: none"> <li>• Contractor to prepare and enforce a No Sexual Harassment Policy in accordance with national law where applicable</li> <li>• Contractor and KCG to prepare and implement a Gender Action Plan to include at minimum, in conformance with local laws and customs, equal opportunity employment, avoid sexual exploitation of women, give equal opportunities to women in allocation of work at the tunnel and avoid harassment by male counterparts.</li> <li>• Provision of gender disaggregated bathing, changing, sanitation facilities</li> <li>• Grievance redress mechanisms</li> </ul>	<p>Contractor, Project Engineer KCG</p>	<ul style="list-style-type: none"> <li>• (c, o &amp; d) Observation /reports</li> <li>• (c, o &amp; d) Number of incidences (target =0)</li> <li>• (c, o &amp; d) Number of women employed</li> <li>• (c, o &amp; d) Labour Records by the Contractor</li> <li>• (c, o &amp; d) No. of grievances recorded at the site</li> <li>• (c, o &amp; d) Number and separation of sanitation facilities</li> </ul>	<p>monthly</p>	<p>No direct costs to EMMP, costs build in the planning and administration costs of the Contractor</p>

Project Environmental and Social Impact	Proposed Mitigation and Aspects for Monitoring	Responsibility for intervention and monitoring during Design, Construction, Operation and Decommissioning	Parameters for Monitoring/ Indicators (c) - construction (o) - operations (d) - Decommissioning	Timing - Recommended frequency of monitoring	Estimated Mitigation & Monitoring costs to be included in the BoQ (Kshs)
<b>Security and Crime Risks in the Tunnel</b>	<p><b><u>OPERATION PHASE</u></b></p> <ul style="list-style-type: none"> <li>• Provision of adequate and functional lighting in the tunnel by the county government</li> <li>• Ensuring efficient maintenance of the lighting in the tunnel by the county government so that the lighting is working throughout</li> <li>• County government of Kiambu to provide security for the tunnel especially at night. This could be in the form of providing security personnel at night.</li> <li>• County government of Kiambu to discourage and remove any homeless persons using the tunnel for shelter</li> </ul>	Kiambu County Government	<ul style="list-style-type: none"> <li>• No. of incidents reported and recorded in the tunnel</li> </ul>	Daily checks	No direct costs to ESMMP. Costs to be borne by the County Government of Kiambu
<b>Complaints and grievances/social conflict</b>	<ul style="list-style-type: none"> <li>• Provide grievance redress mechanism for the public and workers</li> <li>• Advise the public and workers on where to report grievances;</li> <li>• Consider prioritizing the local manpower for both skilled and unskilled labour.</li> <li>• Implement proposed grievance resolution mechanism</li> </ul>	Contractor Project Engineer	<ul style="list-style-type: none"> <li>• Number of grievances in the GRM log</li> <li>• Closure time</li> </ul>	regularly	Kshs. 100,000
<b>HIV/AIDS, STDs</b>	<p><b><u>CONSTRUCTION AND DECOMMISSIONING PHASES</u></b></p> <ul style="list-style-type: none"> <li>• Initiate a sensitization and awareness campaign on HIV/AIDS and STDs to be done to workers and local community;</li> </ul>	Contractor, Project Engineer  Sub-County Health & Environmental Officer,	<ul style="list-style-type: none"> <li>• (c &amp; d) Observation / reports</li> <li>• (c &amp; d) No of HIV/AIDS programs conducted by the Contractor</li> <li>• (c &amp; d) No of testing, counselling provided</li> </ul>	Monthly	HIV/AIDS awareness campaign HIV/AIDS prevention campaign

Project Environmental and Social Impact	Proposed Mitigation and Aspects for Monitoring	Responsibility for intervention and monitoring during Design, Construction, Operation and Decommissioning	Parameters for Monitoring/ Indicators (c) - construction (o) - operations (d) - Decommissioning	Timing - Recommended frequency of monitoring	Estimated Mitigation & Monitoring costs to be included in the BoQ (Kshs)
	<ul style="list-style-type: none"> <li>• Reduce risk of transfer through provision of male and female condoms for all workers</li> <li>• Provide free STI and HIV/AIDS screening, diagnosis, counselling for workers and local people near the site</li> </ul>	Local sub-County authorities	<ul style="list-style-type: none"> <li>• (c, &amp; d) Prevalence of prostitution, HIV/AIDS and STDs in the area during various project phases</li> </ul>		Kshs 250,000; provided in the BoQ Preliminaries
	<p><b><u>OPERATION PHASE</u></b></p> <ul style="list-style-type: none"> <li>• Maintain a continuous awareness program on health issues related to STDs and HIV/AIDS</li> </ul>	Kiambu County Government	<ul style="list-style-type: none"> <li>• (o) Observation / reports</li> <li>• (o) Information flow, dissemination and awareness on HIV/AIDS</li> <li>• (o) No of posters at the tunnel</li> </ul>	Continuous Response to HIV/AIDS issues	
<b>TOTAL APPROXIMATE COSTS OF ESMMP</b>					<b>Kshs 1,710,000</b>

**NOTE**

The responsibility for enforcing this ESMMP to ensure safeguards compliance will also rest on the NaMSIP staff mainly the safeguards team that will visit the works regularly to ensure safeguards compliance standards. In addition, the Contractor will be required to submit for approval Contractor Environmental & Social Management Plan (CESMP) documents that include the Environmental & Social Health and Safety (ESHS) plan and a Code of Conduct. The Contractor will also be trained on these requirements.

### **8.3 Grievance redress Mechanisms (GRM)**

Proper and strong Grievance mechanisms are very important in ensuring the stakeholders grievances and issues as they relate to the proposed project are addressed in a timely and appropriate manner, to enhance the relationship between the project Proponent, Contractor, Commuters and the stakeholders. It is therefore recommended that the project Proponent should therefore put in place a GRM for the project to ensure any issues raised by Commuters and stakeholders related to the project safeguards are addressed during the construction and operational phases of the project.

It is important to emphasize that grievance redress mechanisms are for all aspects and phases of a project, not just environmental and social safeguards. The implementing agency should prepare and disseminate grievance redress guidelines for the project, including a hierarchy of reporting levels for redress, roles, and responsibilities. Public information about grievance redress should be posted in visible locations in project area of influence. Where needed, Grievance Redress Committees (GRCs) should be established, with the necessary authority, training and resources. Entities involved in grievance redress should keep proper records and logs. Project budgets should include resources for the establishment and operation of the Grievance Redress System. The implementing agency should on regular occasions review the GRM and verify that they are working properly. A sample grievance process has been provided in **Annex 7** of this report.

## **9 CONCLUSIONS AND RECOMMENDATIONS**

### **9.1 Environment and Social Assessment Conclusions**

The EIA study revealed that the proposed project has got both socioeconomic and environmental benefits and costs. It emerged that the benefits exceed the costs. Also, all the identified environmental impacts can be mitigated to a level of minimum or no significance throughout the project cycle. Further, none of the potential impacts would result to permanent irreversible damage on the ecosystem components.

### **9.2 Environment and Social Assessment Recommendation**

Environmental monitoring is essential to track and sustain the effectiveness of the mitigation measures proposed in this report. An environmental monitoring plan has been prepared as part of the ESMP. The focus areas of monitoring cover air, noise, traffic management, water and energy resources, occupational health and safety, as well as local employment and economic impact of the project during construction and operation phases. The burden of implementing the mitigation measures largely lies with the Project Contractor under supervision by the Proponent. Key observations are that most adverse impacts are short-term and will disappear once civil works ends. The construction contract for the proposed project should bear relevant clauses binding the Contractor to institute environmental mitigation as recommended in this study. The core monitoring strategy for this project will be through site meetings, in which case, it is recommended that the County Environmental Officers be invited to such meetings. Other stakeholders such as the County Labour Officer should also attend such meetings to ascertain that measures towards securing the health and safety of workers have been put in place.

It is the duty of the Proponent to carry out annual environmental audits once it has been commissioned. This will comply with the Environmental Management and Coordination Act, EMCA of 1999 and the Environmental Impact Assessment and Audit Regulations, Legal Notice No. 101 of 2003.

The tentative budget allocated for the proposed project is **Kshs. 81,534,214.85** and an ESMP cost of Ksh. 1,710,000. It is the responsibility of the project Proponent to allocate this budget to facilitate diligent implementation of the mitigation measures and minimize potential negative impacts at construction and operational phases of the project.

The following are recommended for effective implementation of the mitigation measures for the project;

All mitigation measures need to be specified in tender and contract documents, and must be included in the Engineering Drawings, Specifications and Bills of Quantities. Diligence on the part of the Contractor and proper supervision by the Project Engineer during construction and the initial operation phase is crucial for mitigating impacts.

Periodic environmental and social monitoring is required by the project Proponent to ensure that mitigation measures have been implemented to prevent or avert any negative impacts of the project.

The Contractor will be required to prepare a Construction Environment Management Plan (CEMP) which shall be approved by the Proponent before beginning of works;

The Proponent should set up proper and applicable Grievance Redress Mechanism (GRM) for the project to deal with grievances and issues on the project.

## 10 REFERENCE

- 1 Design Drawings for the Railway Station Access road tunnel
- 2 Kenya, The Environment Management and Coordination Act No 8, 1999 and the relative Amendment Act No 5, 2015 (EMCA 2015).
- 3 Republic of Kenya (2003), Legal Notice no.101: The Environmental Management (impact Assessment and Audit) regulations, 2003.
- 4 The Constitution of Kenya 2010
- 5 Kenya Vision 2030
- 6 Nairobi Metro 2030
- 7 Kenya Gazette Supplement Number 56. Environmental Impact Assessment & Audit Regulations 2003. *Government Printer*, Nairobi.
- 8 Kenya, the Urban Areas and Cities Act 2011
- 9 Kenya, the County Government Act 2012
- 10 Kenya Republic of (1996) Sectionals paper No 1 of 1996 on Environmental Development.
- 11 Kenya Republic of (1999) Sectionals paper no. 6 of 1999 on Environmental Development.
- 12 Kenya Republic of (1994). The Penal Code (cap. 63)
- 13 Kenya Republic of (1994), The National Environmental Action Plan (NEAP), revised in
- 14 Kenya, Republic of (2006), Environmental Management and Coordination Act (Waste Management) Regulations, 2006
- 15 Kenya, Republic of (2006), Environmental Management and Coordination Act (Water quality) Regulation 2006
- 16 Kenya Republic, Air Quality Regulation, 2014
- 17 Kenya Republic, Occupational Safety and Health Act OSHA, 2007
- 18 Kenya, Republic of (2009), Environmental Management and Coordination Act (Noise and Excessive Vibrations Pollution Control) Regulations, 2009
- 19 Kenya gazette supplement Acts Building Code 2000 by government printer, Nairobi
- 20 Kenya gazette supplement Acts (1972), Public Health Act (Cap. 242) government printer, Nairobi
- 21 Kenya, Republic of (1996), The physical planning Act (cap 286)
- 22 Kenya Republic of (1968). The Building Code, revised in 2009
- 23 Kenya Republic, The Way Leave Act Cap 292
- 24 Kenya Republic, National Sand Harvesting Guidelines, 2007
- 25 Kenya Republic, The Water Act 2002
- 26 Kenya Republic, Public Procurement and Disposal Act 2005
- 27 Kenya Republic, Public Roads and Roads of Access Act (Cap 399)
- 28 Operational Policy (OP)/Bank Procedure (BP) 4.01: Environmental Assessment, Operational Policy 4.04: Natural Habitats, 2001, Operational Policy 4.36: Forests, 2002, Operational Policy 4.12: Involuntary Resettlement, 2001

## **ANNEXES**

**Annex 1: Estimated Bill of Quantities for the Works**

1	Preliminaries & General	10,552,500.00
2	Site Clearance and top Soil Stripping	285,979.00
3	Earthworks	6,275,448.00
4	Culverts and Drainage works	4,839,827.50
5	Passage of Traffic	200,000.00
6	Natural material base and sub base	1,177,875.00
7	Graded Crushed stones	1,323,000.00
8	Cement for stabilization	232,848.00
9	Bituminous Surface Treatment	844,052.00
10	Bituminous Mixes	6,253,500.00
11	Concrete Works	26,533,110.00
12	Road Furniture	1,662,200.00
13	Miscellaneous Works	2,921,948.00
14	Day Works	796,000.00
I	<b>Sub-Total 1</b>	<b>63,898,287.50</b>
III	Add 10% of Sub-Total 1 of Bills as Provisional sum for Contingencies to be expended in whole or in part or deleted as directed by the Engineer	6,389,828.75
VI	<b>Sub-Total 2</b>	<b>70,288,116.25</b>
VII	Add 16% of Sub-Total 2 for Value Added Tax	11,246,098.60
	<b>TOTAL ESTIMATE</b>	<b>81,534,214.85</b>

**Annex 2: Consultations & Public Participation Documentation**

**Scanned copies of the attendance lists of the meetings and questionnaires will be attached to the main ESIA report**

**Minutes of Meetings**

**MINUTES OF THE PUBLIC PARTICIPATION AND CONSULTATION MEETING FOR THE PROPOSED KIKUYU TUNNEL HELD ON TUESDAY, 31<sup>ST</sup> JULY 2018 IN KIKUYU TOWN.**

Members present are as per the attached list – a scanned copy of the attendance will be attached to this report separately.

AGENDA

1. Introduction
2. Scope of works for the project
3. Remarks from the government officials.
4. Issues from the stakeholders.
5. A.O.B

MINUTE	ITEM	ACTION BY
Min 1 2/08/2018	<p><b><u>1.Introduction</u></b></p> <p>The meeting began at 3.00 PM at Kikuyu railway station site office after a word of prayer from Emmanuel Gatua. The chairman, Dr. Edward Ontita called the meeting to order, welcomed members to the meeting and requested them to introduce themselves.</p> <p>He also informed the members that the public participation meeting was meant to bring diverse groups of stakeholders together and engage them in information sharing and discussion. The meeting was to create awareness of proposal to construct the tunnel and enable the public to participate in decision-making by commenting on the proposed development project during the meeting. An ESIA Report is to be prepared presenting a thorough study of the impact of the investment project on the environment and the social fabric of the local communities. It also offers several recommendations that, if implemented, could address and mitigate the challenges highlighted in the ESIA Report.</p>	All to note
Min 2 2/08/2018	<p><b><u>2.Scope of works for the project.</u></b></p> <p>George Kamau briefed the stakeholders on the proposed Kikuyu tunnel as follows;</p> <ol style="list-style-type: none"> <li>i. The project was necessitated by the construction of the railway station and kikuyu township roads by NaMSIP whereby there was need for seamless connectivity between the earlier constructed roads and the railway station hence improving ridership on the commuter train</li> <li>ii. Two options were considered when deciding to construct the under pass. These include;             <ol style="list-style-type: none"> <li>a) Tunnel</li> <li>b) Over-pass</li> </ol> </li> </ol> <p>The former was selected due to its advantages on that locality as compared to the other.</p> <ol style="list-style-type: none"> <li>iii. The design of the tunnel comprised of;</li> </ol>	All to note

	<ul style="list-style-type: none"> <li>a) A ramp starting at the intersection slopping at a gradient of 5.71% hence allowing a headroom of 3 m.</li> <li>b) The road cross-section allows for 5.5m carriageway and 1.1 m walkway on both sides of the road.</li> <li>c) Storm water drainage has been specifically designed to allow proper drainage in the tunnel hence no ponding will be experienced. The water will be directed to Ondiri Dam.</li> <li>d) A service lane has been provided in the design to serve the shops.</li> <li>e) The road reserve will be completely utilized hence the need for the canopy roofs and temporary structures within the road reserve to be relocated/removed to pave way for the works.</li> <li>f) The tunnel dimensions are 20m long by 7m wide.</li> <li>g) The construction works for the tunnel will take a maximum of 4 months.</li> <li>iv. An ESIA report is to be prepared to give the impact of the project and the mitigation measures for the same.</li> </ul>	
<p><b>Min 3</b> <b>2/08/2018</b></p>	<p><b><u>3. Remarks from the government officials.</u></b></p> <p>The NaMSIP Environmental Expert, Eng. Mwaura briefed the members as follows;</p> <ul style="list-style-type: none"> <li>i. The Ministry of Transport, Infrastructure, Housing and Urban Development through World Bank funded project, NaMSIP intends to construct the tunnel as part of the NaMSIP's objective to strengthen urban services and infrastructure in the Nairobi Metropolitan Region.</li> <li>ii. Before the commencement of any World Bank funded Project it's a requirement that an ESIA report is given for their approval and also Nema's approval. Once approval is given by the World Bank and NEMA a license is issued to commence the works.</li> <li>iii. For the approvals to be given there has to have been public participation and consultation meeting. The public participation meeting is essential since it creates a platform where the public can air their views pertaining to the proposed project.</li> <li>iv. The ESIA indicates the effects of the project on the environment and the mitigation measures.</li> <li>v. Attendance list and pictures must be included in the ESIA report to prove that the public participation meeting took place.</li> <li>vi. He gave the members questionnaires and took them through every question in their local dialect. He emphasized that the feedback from the questionnaires will help improve the design of the project.</li> </ul> <p>The representative from the MPs office for Kikuyu constituency, Mr. Stephen Kamau informed the members that;</p> <ul style="list-style-type: none"> <li>i. The MP is in full support of the project.</li> <li>ii. The project will reduce the cases of accidents resulting from pedestrians using the level railway crossing.</li> </ul>	<p>All to note</p>



**PROPOSED CONSTRUCTION OF KIKUYU RAILWAY STATION TUNNEL**  
**MINUTES OF MEETING HELD ON 14<sup>th</sup> AUGUST 2018 WITH STAKEHOLDERS**  
**ON ESIA AT THE SITE AT 2:00 PM**

**In Attendance**

- |                        |                         |
|------------------------|-------------------------|
| 1. Eng. Stephen Mwaura | NaMSIP                  |
| 2. Eng. Mugo Kimani    | TA Kiambu County        |
| 3. Edward Ontita       | NaMSIP                  |
| 4. Herman Wabwoba      | NaMSIP                  |
| 5. Jennifer Mbugua     | NaMSIP                  |
| 6. Eng. George Kamau   | R.E Kikuyu Rail Station |

**Stakeholders In Attendance**

As per the attached list – this list has been scanned and will be attached separately in the final report.

**Agenda**

1. Introduction
2. Project Briefing
3. Plenary
4. A.O.B

<b>Minute No.</b>	<b>Details</b>	<b>Response/ Action</b>
1.00	<p><u>Introduction</u></p> <p>The meeting started with a word of prayer from Reverend Njuguna</p> <p>The meeting was chaired by Mr. Richard Ndung’u, the Chairman, Kikuyu Chamber of Commerce</p> <p>Mr. Ndung’u thanked all the stakeholders for turning up for the meeting.</p> <p>MCA Hon Kagiri-expressed his support for the project and promised members that it would be beneficial to all residents</p> <p>The MPs representative thanked participants for attendance and pointed out that the meeting was a follow up to allow residents to take part in the process</p> <p>He noted that NaMSIP with the support of the Bank has brought many beneficial projects to Kikuyu i.e. roads, lighting, rail station and the market</p> <p>He noted that there was need for the tunnel. He recounted the previous occasions where the public took matters into their own hands by opening up the road. He mentioned that there is</p>	

	<p>an ongoing case in court which will only be dropped once the road is made passable.</p> <p>He also noted that there will be a few people affected by the construction of the tunnel. He however beseeched those affected to accept changes brought about by development projects</p>	
<p>2.0</p> <p>2.01</p> <p>2.02</p>	<p><u>Project Briefing</u></p> <p>Eng. Mugo from NaMSIP gave a short brief on NaMSIP. He familiarized participants with projects done by NaMSIP in Kikuyu i.e. roads, lighting, the market, firefighting engines and an exhauster truck.</p> <p>He thereafter took participants through the Designs of the tunnel which would start from the gate passing under the rails. The headroom will be 3 meters allowing matatus and small tracks to go through</p> <p>The tunnel will be 7.7 meters wide with 1.2 meters allocated for NMT. The designs have also addressed drainage issues.</p> <p>Participants were briefed on the activities involved in the construction from the beginning to the end.</p> <p>Drawings were showcased. Advertising will be done in 1 to 2 weeks and construction is expected to take about 4 months</p> <p>Eng. Stephen Mwaura from NaMSIP added that, as a World Bank requirement, it is important to carry out an ESIA (Environmental and Social Infrastructure Assessment) for any project before its commencement. This is to ensure that all stakeholders that are directly and indirectly affected by the project are safe from any environmental hazards that they feel the project could bring about. He also noted that the Kenyan Constitution 2010 and the ESIA process greatly emphasizes on Public Participation. He added that each person's views will be captured and all questions pertaining the project shall be answered accordingly.</p> <p>He informed participants that he had a set of questionnaires which, through his guidance, needed to be filled by those in attendance and that the report would be submitted to National Environmental Management Authority (NEMA)</p>	

	for approval and subsequent issuance of ESIA license.	
3.0	<p><u>Plenary</u></p> <p>Mr. Chris Kinuthia appreciated the project but raised concern on the drainage of storm water being directed to Ondiri Swamp since drainage in Kikuyu is connected to septic tanks from houses</p> <p>Mr. Ngure Muigai noted that the Ondiri Swamp is currently dry as there is no source of water directed to the wetland. He urged for water to be directed to the swamp but solid waste should be managed properly. Reverend Njuguna-Raised concern on the drain outside his church (in the neighborhood) that came up with the construction of the road leading to the station noting that it was too wide and therefore dangerous. He requested for the drain to be covered noting that the drain is clogged by solid waste and liquid sewerage</p> <p>Mr. Njuguna Kamau- Since the Canopies will be removed to create the footpaths, what kind of access will there be for businesses along that path?</p> <p>Mr. George Kamau- Requested for the inclusion of a barrier to stop huge from accessing the tunnel and a parking shed for Boda Boda riders.</p> <p>Once construction starts, what measures will be put in place to address current users?</p>	<p>Eng. Mugo informed members that NaMSIP has given an exhauster truck to Kikuyu town to assist in management of liquid waste disposal. The County will be requested to manage solid waste and liquid waste dumped in the drains.</p> <p>Eng. Mugo pointed out that water going into the drains will be reduced by 90% as most of the storm water will be redirected to the Swamp. The County government will be involved in managing liquid and solid waste</p> <p>Eng. Mugo informed members that there will be 1.5 meters left for access to the businesses.</p> <p>Eng. Mugo pointed out that traffic signage had been included in the design but that the proposal would be looked into and that the request for the parking shed had been noted and would be discussed with KR which owns the land</p> <p>The project team will work together with residents and the business community to come up with solutions. The contractor will create a diversion for Boda bodas and pedestrians.</p>

	<p>Mr. Njoroge Mburugu inquired on the inclusion of go downs at the station for use by business people.</p> <p>Mr. Njoroge Mburugu also wanted to know about what would be done to preserve old Kikuyu town</p> <p>Representative, Link road residents' association inquired on the costing of the project, maintenance after exit, CSR, provision of an ablution block, consideration of disabled people, communication channels, insurance to cover injuries during construction and whether the land occupied by project had been secured</p> <p>Ms. Ann Kibugi- Will business people trading along the earmarked area be involved in the discussions and how will they be reached?</p> <p><u>Mr.</u> Kinyanjui representing the Boda Boda association requested for a shed for Boda Bodas and inclusion of a diversion during construction</p>	<p>Eng. Kamau informed participants that there is a provision of land for go down facilities. However, the land is on long lease by KR. Go downs to be constructed under the leases</p> <p>Eng. Kamau assured participants that all infrastructure of historical impact would remain intact. i.e. the station master's house was refurbished but the architecture would remain the same, signage was also left intact</p> <p>The project will be implemented in partnership with KR making land available. -Costing is estimated to cost about 80/100 million but will depend on contracts. -The Physically disabled will use the main gate to access the station however, they have been considered within the station. -An Ablution block is available within the station. -Insurance will be available for injuries that occur to workmen during construction and a safe guards training will be Conducted- There will be a Grievance Redress mechanism to address grievances. Grievance committee to be formed</p> <p>Eng. Mugo assured participants that the MCA has been involved. Tenants will be involved possibly in the coming week</p> <p>Eng. Mugo informed him that the contractor would create a diversion and the request for a shed would be forwarded to Kenya Railways</p>
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	<p>Mr. David Mwangi inquired on the length of the tunnel and emphasized the need for proper drainage and lighting</p> <p>Residents to be given quality assurance of works to be done</p> <p>A resident requested for consideration of cyclists</p> <p>MP's representative- Requested that the implementation of the project be fast-tracked. He noted that the project connects to the tarmacking of Ondiri-Makeresha road adding that the Deputy President is ready to commission tunnel and the road</p> <p>Mr. Richard Ndung'u, Chairman of the Kikuyu Chamber of Commerce pointed out that data is available of unemployed people and requested consideration of employment of local people in the construction of the tunnel</p> <p><u>A.O.B</u> There being no other business, all stakeholders were given copies of questionnaires and with assistance of Eng. Mwaura they filled and handed them back to him.</p> <p>The meeting ended at 17:20 pm</p>	<p>Eng. Mugo pointed out that the tunnel will be 20 meters long and if the last lane is included, it may be 27 meters. –Storm water will not drain into the tunnel. Lighting has been included in the designs. Provision of natural lighting to be included for day time use</p> <p>Eng. Kamau informed members that the government is keen on good quality and the same is emphasized to the contractors. The Defects Liability Period will be used to identify and rectify defaults</p> <p>Eng. Mugo noted that due to space limitation, cyclists' lanes could not be included. However, in other urban projects, cyclists' lanes are included</p>
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**Signed:**

Secretary.....

Date.....

Chairman.....

Date.....

### **Annex 3. 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 4: Grievance Resolution Mechanisms**

### **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**

	<b>Name</b>	<b>Designation</b>	<b>Proposed Organization</b>	<b>Position</b>
1		Resident Engineer	NaMSIP	Committee Secretary
2		Assistant Resident Engineer		Committee Assistant Secretary
3		Site Administrator	Contractor	Member
4		Surrounding Community representative		Member
5		Surrounding Community Representative		Member
6		Community Member	Local communities	Community Representative
7		Business Member	Business members	Business Representative

## **Grievance Resolution Procedure**

