REPUBLIC OF KENYA

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT PROJECT REPORT FOR THE PROPOSED CONSTRUCTION OF STORMWATER DRAINAGE SYSTEMS IN SELECTED URBAN AREAS IN NAIROBI METROPOLITAN REGION

PROPONENT
Ministry Of Transport, Infrastructure, Housing and Urban Development
Nairobi Metropolitan Development
P.O. BOX 30450 – 00100
NAIROBI.

November 8, 2017
Certificate of Declaration and Document Authentication

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

This report is prepared for and on behalf of:

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

Designation  
Name  
Signature  
Date

**Lead Expert**

Eng. Stephen Mwaura is a registered Lead Expert on Environmental Impact Assessment/Audit (EIA/A) by the National Environment Management Authority–NEMA (Reg. No.7284), confirms that the contents of this report are a true representation of the Environmental & Social Impact Assessment of the proposed Construction of storm water drainage systems in selected Urban areas in Nairobi Metropolitan Region. This report is issued without prejudice.

Lead Expert – Eng. Stephen Mwaura

Signature: ________________________

Date: ________________________
## Acronyms and Abbreviations

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>CBO</td>
<td>Community Based Organization</td>
</tr>
<tr>
<td>CBD</td>
<td>Central Business District</td>
</tr>
<tr>
<td>CRCC</td>
<td>County Resettlement and Compensation Committee</td>
</tr>
<tr>
<td>DONMED</td>
<td>Directorate of Nairobi Metropolitan Development</td>
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<tr>
<td>EIA</td>
<td>Environmental impact assessment</td>
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<tr>
<td>ESIA</td>
<td>Environmental and social impact assessment</td>
</tr>
<tr>
<td>ESMF</td>
<td>Environment and Social Management Framework</td>
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<tr>
<td>ESMMP</td>
<td>Environmental and Social Management Plan</td>
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<tr>
<td>FGD</td>
<td>Focus Group Meetings</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<tr>
<td>HIV/AIDS</td>
<td>Human Immuno-deficiency Virus</td>
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<tr>
<td>KISIP</td>
<td>Kenya Informal Settlement Improvement Project</td>
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<tr>
<td>KMP</td>
<td>Kenya Municipal Program</td>
</tr>
<tr>
<td>LA</td>
<td>Land Act</td>
</tr>
<tr>
<td>MOF</td>
<td>Ministry of Finance/The National Treasury</td>
</tr>
<tr>
<td>NaMSIP</td>
<td>Nairobi Metropolitan Services Improvement Project</td>
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<tr>
<td>NGO's</td>
<td>Non-Governmental Organizations</td>
</tr>
<tr>
<td>NLC</td>
<td>National Land Commission</td>
</tr>
<tr>
<td>NUTRIP</td>
<td>National Urban Transport Improvement Project</td>
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<td>OP</td>
<td>Operational Procedures</td>
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<tr>
<td>PIU</td>
<td>Project Implementation Unit</td>
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<tr>
<td>PRA</td>
<td>Participatory Rural Appraisal</td>
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<tr>
<td>RAP</td>
<td>Resettlement Action Plan</td>
</tr>
<tr>
<td>RPF</td>
<td>Resettlement Policy Framework</td>
</tr>
<tr>
<td>SCRCC</td>
<td>Sub County Resettlement Compensation Committee</td>
</tr>
<tr>
<td>SEBR</td>
<td>Socio-Economic Baseline Report</td>
</tr>
<tr>
<td>SMP</td>
<td>Social Management Plan</td>
</tr>
<tr>
<td>STDs</td>
<td>Sexually Transmitted Diseases</td>
</tr>
<tr>
<td>SUP</td>
<td>Socially Uplifting Project</td>
</tr>
<tr>
<td>SWDP</td>
<td>Storm Water Drainage Project</td>
</tr>
<tr>
<td>VRCC</td>
<td>Village Resettlement and Compensation Committee</td>
</tr>
</tbody>
</table>
## FACT SHEET

<table>
<thead>
<tr>
<th>Programme Name</th>
<th>Nairobi Metropolitan Service Improvement Project (NAMSIP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Name</td>
<td>Proposed Construction of storm water drainage systems in selected Urban areas</td>
</tr>
<tr>
<td>Lead Implementing Agency</td>
<td>Ministry of Transport, Infrastructure, Housing and Urban Development (MOTIH&amp;UD) - State Department for Housing and Urban Development (SDFH&amp;UD)</td>
</tr>
<tr>
<td>Funding Agencies</td>
<td>World Bank and Government of Kenya</td>
</tr>
</tbody>
</table>
| Project Components | Proposed Construction of storm water drainage systems in selected Urban areas will include:  
  a) Expanding the diameter of existing drains and lining them with concrete (so they can carry more storm water away from the urban areas);  
  b) Constructing new open channel drains throughout the urban area;  
  c) Rehabilitating existing open channel drains; and  
  d) Routing storm water into the rivers and dams by means of outfalls drains i.e. pipelines that discharge storm water into the river. |
| Project Location | Nairobi City, Kiambu, Kajiado and Machakos Counties |
| Lead Expert | Eng. Stephen Mwaura  
NEMA Registration No. 7284 |
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Executive Summary

E-1 Project
The Project is proposed construction of storm water drainage in selected urban areas in Nairobi Metropolitan Region.
The Project is planned to be financed under the Nairobi Metropolitan Services Improvement Project (NaMSIP) which is a Project funded jointly by the World Bank and Government of Kenya. The Project was approved by the Bank in May 2012 for a period of five years, and further extended for an additional 18 months until 2019. The Project lead implementing agency is the State Department of Housing and Urban Development under the Ministry of Ministry of Transport, Infrastructure, Housing & Urban Development (MTIH&UD).The Project is financing investments in infrastructure and service delivery in the Nairobi Metropolitan Region, the main Project Development Objective (PDO) is to strengthen urban services and infrastructure in the Nairobi metropolitan area.

E-2 Project Location / Ownership
The proposed project is located within four counties; Nairobi City County, Kajiado, Machakos and Kiambu Counties as shown in the figures below;
ESIA for storm water drainage within selected urban areas in the Nairobi Metropolitan Region

Figure 2: Nairobi City County and the selected project urban areas
E-3 Policy and Legal Regulatory Instruments

The ESIA Report preparation was guided by provision of relevant policies, legislation and institutional frameworks that guide preparation of EIA in Kenya and the World Bank Safeguards Policies. These instruments are presented in Box E-1 below:

Box E-1: National Policy and Legal Instruments

<table>
<thead>
<tr>
<th>Policy Provision</th>
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</thead>
<tbody>
<tr>
<td>• National Environmental Action Plan (NEAP)</td>
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<td>• National Water resources Management policy</td>
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<tr>
<td>• Constitution of Kenya 2010</td>
</tr>
<tr>
<td>• National Environment Policy (NEP)</td>
</tr>
<tr>
<td>• National Land Policy</td>
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<tr>
<td>• HIV and AIDS Policy 2009</td>
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<td>• Gender Policy 2011</td>
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<table>
<thead>
<tr>
<th>Acts of Parliament</th>
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<tbody>
<tr>
<td>• Environmental Management and Coordination Act (EMCA) 1999 amended in 2015</td>
</tr>
<tr>
<td>• Water Act 2002 amended in 2016</td>
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<tr>
<td>• County Government Act no 17 of 2012</td>
</tr>
<tr>
<td>• Physical Planning Act 1996 (286)</td>
</tr>
<tr>
<td>• Occupational Health and Safety Act (OSHA 2007), Public Health Act (Cap.242)</td>
</tr>
<tr>
<td>• Works Injuries and Benefits Acts (2007)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>International Safeguard Policies and Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>• World Bank OP 4.01 on Environment Assessment</td>
</tr>
<tr>
<td>• International Finance Cooperation (IFC) Performance Standard (PS) 2: Labour and Working Conditions</td>
</tr>
<tr>
<td>• World Bank Group Environment, Health and Safety Guidelines</td>
</tr>
</tbody>
</table>

E-4 Project description

The proposed construction of Storm water drainage for selected urban areas within Kiambu, Kajiado, Machakos, and Nairobi City County (Embakasi, Dagoretti, Lang’ata, & Central Business District) will involve construction and maintenance (during the defects liability period) of approximately 8Km of storm water lines of various sizes and other auxiliary works. The works shall include procurement of all materials and labour, construction, testing, commissioning and maintenance during the defect liability period.
E-5 Scope of works

The scope of works for the proposed project will include but not limited to

- Excavation, backfilling and reinstatement
- Concrete works and structures
- Storm drainage works
- Building and miscellaneous works
- Road, drainage and site works
- Any other works as instructed by the Engineer and/or as specified in this document

E-6 Project cost

The total project cost for the proposed construction of storm water drainage system in selected urban areas in NMR is Kshs. 512 million. The implementation of the ESMMP is included into the BoQ and the total ESMMP costs are Kshs. 12,050,000.

E-7 Consultation

The World Bank Group (WBG) Environmental Assessment Policy (OP 4.01) and the EMCA 1999 amended in 2015 through the Legal Notice No. 101: the Environmental (Impact, Audit and Strategic Assessment) Regulations, 2003 requires that project-affected groups and local non-governmental organizations (NGOs) be consulted during the impact assessments process about the project’s potential environmental and social impacts.

A summary of outcomes of stakeholder consultations undertaken during preparation of this ESIA is as presented below:

- Interference with services such as transport during excavations of trenches crossing roads.
- Blockage of access roads during construction
- Need to engage local residents for available employment opportunities within the project
- Contractors should be advised not to under pay locals who will be engaged in the project
Need for communication of issues that may arise during project implementation to avoid conflicts

The ESIA chapters 6 and 7 provide a detailed approach and methodology of inclusion of the stakeholder comments into the Project implementation and operation operations.

E-8 Project impacts
The Project impacts during the assessment were generated based on the analysis of the proposed project activities in relation to the Project area environment. The impacts arising during each of the phases of the proposed development namely; construction, operation and decommissioning, were categorized into:

- Impacts on biophysical environment;
- Health and safety impacts; and
- Social-economic impacts

E-8.1 Positive impacts
During the study, various positive socio-economic and bio-physical impacts that could result from the proposed project were identified. These include *inter alia*:

- Increased human socio-economic activities during the rainy season as it is known that most of the activities of the inhabitants of the selected areas comes to a standstill during the rainy seasons as the floods cut off the communities from their work places, hospitals, markets, schools among others
- Achieve economic benefit by saving some healthcare expenses, improving people’s productivity and improving water resources management.
- Employment of locals as skilled, semi-skilled and unskilled workers.
- Increased revenues for the service providers.
- Increase in property value in the area.

E-8.2 Negative impacts during the construction and proposed mitigation measure

<table>
<thead>
<tr>
<th>POTENTIAL IMPACT</th>
<th>MITIGATION MEASURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air pollution</td>
<td>Regardless of the size or type of vehicle, operators should implement the manufacturer recommended engine maintenance programs;</td>
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<tr>
<td></td>
<td>Drivers should be instructed on the benefits of driving practices that reduce both the risk of accidents and fuel consumption, including measured acceleration and driving within safe speed limits;</td>
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<td></td>
<td>Contractors should consider additional ways to reduce potential impacts including implementing a regular vehicle maintenance and repair program.</td>
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<td></td>
<td>Recruit staff from the surrounding communities to decrease the travelling distance thus reducing emissions from vehicular traffic.</td>
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<tr>
<td></td>
<td>Ensure that all vehicles involved in the transport of construction material and staff, and machinery involved in the construction is properly maintained and serviced.</td>
</tr>
<tr>
<td></td>
<td>Machines must not be left idling for unnecessary periods of time; this will save fuel and...</td>
</tr>
</tbody>
</table>
## POTENTIAL IMPACT

### MITIGATION MEASURES

- Reduce emissions.
  - Use of dust control methods, such as covers, water suppression, or increased moisture content for open materials storage piles, or controls, including air extraction and treatment through a bughouse or cyclone for material handling sources, such as conveyors and bins;
  - Ensure that all material (sand and aggregate) stockpiled on the site to be used in construction activities are regularly sprayed to reduce the effects of wind whipping.
  - Ensure that all trucks carrying aggregate and sand are covered during delivery to the site.
  - Care must be taken in the unloading construction materials (aggregate, sand and cement) to prevent spillage. If a spill occurs, this should be cleaned up as soon as possible thereafter.
  - Extra care must be taken to reduce dust in periods when wind speed is greatest and the rainfall amounts are lowest. This will involve extra wetting of the construction area to suppress dust particles.
  - Retain a buffer area of trees and other vegetation generally around the perimeter of the development site which will serve as a natural windbreaks which may reduce the level of dispersion of dust particles generated during this phases of the development.
  - All raw materials must be sourced as close as possible to the construction site thus reducing the emissions from vehicular traffic.
  - All waste must be transported off-site for processing, not burnt or stored for any longer than is absolutely necessary.

### Soil erosion and contamination

- Only remove vegetation from areas for the storm water drain
- Avoid as far as possible the traversing of bare soil by vehicles to reduce soil compaction;
- Designate a main access route for heavy machinery;
- Avoid site Preparation in period when wind velocities are highest.
- Areas storing hazardous substances such as diesel must be properly contained in a bunded area (With capacity to contain 1 ½ times the amount of substances stored. This area must be situated away from project activities and signs indicating the storage of these substances erected. Care must be taken when handling these hazardous substances to avoid spills.
- In the event of An oil spill the contaminated soil must be removed and disposed off

### Solid wastes

- Use an integrated wastes management system observing the following hierarchy of options:
  - i. Reduction at source
  - ii. Recycling
  - iii. Reuse
  - iv. Combustion
  - v. Land filling.
- Incorporation of waste management commitments contained in the Waste Management Guidelines
- Agreement with suppliers to accept the return of unused materials.
- Agreement with and license details of companies to be used for the off-site transport of wastes
- Workforce training programs in waste minimization practices
- Where practical any excess materials will be returned to the supplier
- Waste oil will be collected for transport and off-site disposal
<table>
<thead>
<tr>
<th>POTENTIAL IMPACT</th>
<th>MITIGATION MEASURES</th>
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</thead>
</table>
| Littering, specifically of the natural areas, should be prevented. Adequate containers for litter removal should be supplied on site. These containers should be emptied on a regular basis and the contents removed to an appropriate and licensed waste disposal site. | - The Contractor shall set up a solid waste control and removal system.  
- Bins shall be emptied on a daily basis.  
- Waste and litter shall be disposed of into scavenger – and weather proof bins. The contractor shall then remove the refuse collected from the working areas, from site at least once a week. |
<p>| The Contractor shall set up a solid waste control and removal system. | |
| Bins shall be emptied on a daily basis. | |
| Waste and litter shall be disposed of into scavenger – and weather proof bins. The contractor shall then remove the refuse collected from the working areas, from site at least once a week. | |
| 4. Noise and vibration | - Best available work practices will be employed on-site to minimize occupational noise levels. |
| All construction equipment will be regularly inspected and maintained in good working condition. | - Combine noisy operations so that they occur at the same time. The total noise level will not be significantly louder than the level produced if the operations were to be undertaken separately. |
| Noisy operations will be carried out strictly during the day time. | - Switch off engines when not in use. |
| Switch off engines when not in use. | - Access roads should be cut that are exclusively used for the transportation of workers, goods and materials. These roads should be sited in such a way that the noise from this movement affects as few of the existing residents as possible. |
| Where possible silenced machinery and instruments should be employed to reduce the impact of noise on the existing residents and workers. | - Where possible silenced machinery and instruments should be employed to reduce the impact of noise on the existing residents; |
| Machinery, vehicles and instruments that emit high levels of noise should be used on a phased basis to reduce the overall impact. These pieces of equipment such as drills, graders and cement mixers should also be used when the least number of residents can be expected to be affected, for example during periods where most residents are at work or school. | - Ensure that construction activities for the development of the project are staggered to decrease the levels of noise and vibration in the area; |
| Temporary barriers such as earth berms, zinc fencing and sound dampening fencing such as acoustic screens should be employed to reduce the impact of noise to the existing residents; | - Construction hours should be limited to the hours of 8:00 a.m. and 6:00 p.m. daily. |
| The delivery of raw materials must be limited to 8:00 a.m. and 6:00 p.m daily. | |
| 5. Flora and fauna (biodiversity loss) | - Only clear vegetation that is absolutely necessary for the construction activities; |
| Retain all mature trees (&gt; 25 cm diameter at breast height (DBH)) during this phase of the development if possible; | - Avoid the use of Invasive Alien Species in the landscaping activities |
| Determine access roads which are to be used by machinery used in the construction and site clearance phase of the development to avoid the unnecessary trampling of vegetation that will be maintained within the development area. | |
| 6. Disturbance of traffic and difficulty of | - Provide diversion routes where possible. |
| Give a construction itinerary in advance so that the potentially affected population can use alternative routes and start early to get to their destinations on time. | |</p>
<table>
<thead>
<tr>
<th>POTENTIAL IMPACT</th>
<th>MITIGATION MEASURES</th>
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<tbody>
<tr>
<td>access (Service delivery impacts)</td>
<td>▪ Erect warning signs of ongoing works.</td>
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<td></td>
<td>▪ Expedite construction works so as to reduce the times where roads are blocked.</td>
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<td></td>
<td>▪ Traffic department should approve crossing plan prior to construction, and should</td>
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<td></td>
<td>approve obstruction times during construction.</td>
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<td></td>
<td>▪ Access of residents should be facilitated by installing appropriate temporary</td>
</tr>
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<td></td>
<td>bridges over the trenches.</td>
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<td></td>
<td>▪ Suitable warning signs should be placed at near locations and should be visible</td>
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<td></td>
<td>at night.</td>
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<td></td>
<td>▪ Alternatives access ways should be communicated to the community.</td>
</tr>
<tr>
<td>7. Damage of underground</td>
<td>▪ Get maps of the underground infrastructure from the relevant institutions.</td>
</tr>
<tr>
<td>infrastructure</td>
<td>▪ Sensitise workers carrying out excavations so that they exercise caution to</td>
</tr>
<tr>
<td></td>
<td>minimize chances of underground infrastructure damage.</td>
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<tr>
<td></td>
<td>▪ Work closely with the responsible institutions such as Kenya Power, Orange and</td>
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<td></td>
<td>Telkom so that in case of damage, the services are restored within the shortest</td>
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<td></td>
<td>time.</td>
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<tr>
<td></td>
<td>▪ Reroute sensitive infrastructure where possible.</td>
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<tr>
<td>8. Structural stability</td>
<td>▪ The geotechnical report should include suitable measures for confining vibrations</td>
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<tr>
<td></td>
<td>within project sites. These measures should be tailored according to the</td>
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<tr>
<td></td>
<td>proximity of buildings to the project sites and earthwork program.</td>
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<td></td>
<td>▪ These recommendations identified in the geotechnical report (such as secant piling</td>
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<tr>
<td></td>
<td>or sheet piling or establish cut-off walls) should be implemented by the</td>
</tr>
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<td></td>
<td>contractor and supervised by EHS Advisor.</td>
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<tr>
<td>9. Occupational accidents</td>
<td>▪ Ensuring that the drivers and machine operators hired to work on the site are</td>
</tr>
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<td></td>
<td>qualified.</td>
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<td></td>
<td>▪ Workers on site must be provided with appropriate PPE.</td>
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<td></td>
<td>▪ Appropriate signs must be erected on the site to warn workers and visitors.</td>
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<td></td>
<td>▪ There should be safety policy clearly displayed on the site.</td>
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<td></td>
<td>▪ Machines should be properly maintained.</td>
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<td></td>
<td>▪ A first aid kit should be provided and a trained first aider should always be on</td>
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<tr>
<td></td>
<td>site.</td>
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<td></td>
<td>▪ Fire extinguishers should be provided.</td>
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<td>▪ Proper scheduling of activities to avoid workers being overworked.</td>
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<td></td>
<td>▪ Machines/equipment for the intended purpose.</td>
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<td></td>
<td>▪ No worker should be allowed on site while under the influence of alcohol or other</td>
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<td></td>
<td>inebriating substances.</td>
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<tr>
<td></td>
<td>▪ Inspection of workers to ensure they are using the PPE at all times when</td>
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<tr>
<td></td>
<td>necessary.</td>
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<td></td>
<td>▪ Provide a fully stocked First Aid box on the site</td>
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<td></td>
<td>▪ Display at prominent places occupational health and safety rules.</td>
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<td></td>
<td>▪ Test and approve equipment such as ladders before use.</td>
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<td></td>
<td>▪ Training workers on how to use various PPE and proper use of machinery.</td>
</tr>
<tr>
<td></td>
<td>▪ Have a trained First Aider on the site.</td>
</tr>
<tr>
<td></td>
<td>▪ Registration of the premises as required by Law.</td>
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<td></td>
<td>▪ Appropriate insurance should be acquired as required by law</td>
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<tr>
<td></td>
<td>▪ Medical examination of all workers before engagement and after the project is</td>
</tr>
<tr>
<td></td>
<td>over.</td>
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<td></td>
<td>▪ Display an emergency evacuation procedure.</td>
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<tr>
<td></td>
<td>▪ Moving parts of machines should be guarded to protect workers from injuries.</td>
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<tr>
<td></td>
<td>▪ Should an accident occur:</td>
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<tr>
<td></td>
<td>▪ The injured worker should be given first aid and immediately taken to the hospital.</td>
</tr>
<tr>
<td>POTENTIAL IMPACT</td>
<td>MITIGATION MEASURES</td>
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<tr>
<td></td>
<td>▪ An investigation should be initiated immediately to ascertain the cause of the accident and preliminary findings released within 12 hours.</td>
</tr>
</tbody>
</table>
| 10. Sanitation at contractor’s camp | ▪ Provision shall be made for employee facilities including shelter, toilets and washing facilities.  
▪ Toilet facilities supplied by the contractor for the workers shall occur at a minimum ratio of 1 toilet per 30 workers (preferred 1:15).  
▪ The exact location of the toilets shall be approved by the Public Health Department prior to establishment.  
▪ Sanitation facilities shall be located within 100m from any point of work, but not closer than 50 m to any water body.  
▪ All temporary/portable toilets shall be secured to the ground to prevent them toppling due to wind or any other cause.  
▪ The contractor shall ensure that the entrances to toilets are adequately screened from public view.  
▪ Only approved portable toilets should be used.  
▪ These facilities shall be maintained in a hygienic state and serviced regularly. Toilet paper shall be provided.  
▪ The contractor shall ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are removed from site to an approved disposal site.  
▪ Discharge of waste from toilets into the environment and burying of waste is strictly prohibited.  
▪ Wash areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas, which include groundwater, are not polluted. |
| 11. Social conflicts | ▪ Immediate action undertaken as soon as possible to any complaints and in adherence to the Grievance Redress Mechanism that is part of this report  
▪ Investigations completed within seven days of receipt of complaint.  
▪ All corrective actions implemented by due date  
▪ All incidents or complaints about either environmental or social issues will be managed in accordance to the existing procedure in line with the legal framework.  
▪ All incidents and complaints will be recorded in the contractors incident reporting system  
▪ Additional environmental awareness training of the workforce with respect to procedures to be followed for environmental incidents or complaints  
▪ Sensitize workforce on cultural sensitivities |
| 12. Spread of HIV and AIDS | ▪ Sensitize the migrant workers on dangers of risky sexual behaviour.  
▪ Have VCT services on site and encourage workers to undergo the same.  
▪ Uptake of VCT by project workers and the host community.  
▪ Provision of ARVs for the affected workers. |

**E-9.3 Negative impacts and mitigation measures of the operational phase**

<table>
<thead>
<tr>
<th>POTENTIAL IMPACT</th>
<th>MITIGATION MEASURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil erosion</td>
<td>Install energy dissipaters at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with</td>
</tr>
<tr>
<td>Water pollution</td>
<td>Apply for discharge license and conduct water quality monitoring quarterly as required by law</td>
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<tr>
<td>Public health &amp; communicable</td>
<td>Ensure that the storm water drains are well maintained to avoid blockage and subsequent pooling and flooding</td>
</tr>
<tr>
<td>POTENTIAL IMPACT</td>
<td>MITIGATION MEASURES</td>
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<td>diseases</td>
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<tr>
<td>Disposal of solid</td>
<td>Ensure no solid waste find its way into the river at</td>
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<tr>
<td>and liquid wastes</td>
<td>the outfall</td>
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</table>

**E-9 Findings and Recommendations**

**E-9-1 Assessment findings**

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

- The project design has ensured that the project is constructed within existing public land and no private land will be acquired.
- The world Bank Operation Policy OP 4.12 is not triggered due to the fact that the proposed site is clear land free from encroachment.
- The Environmental and Social Screening undertaken for the project revealed that the investment will result in low impact on both social and biological environment; therefore, this project is categorized as a category B project. The level of ESIA assessment required is at Project Report Stage which should be approved at the Nairobi NEMA office.
- The overall objective of project is to reduce the number of death and destruction of property associated with storm water in Nairobi City County, Kajiado, Kiambu and Machakos counties of NMR.

**E-9-2 Assessment Recommendation**

The project is recommended for implementation provided the mitigation measures identified in the study for the potential negative impacts are implemented, the recommendations will also form part of Environment Licence that will be issued for the Project.

**E-10 Report Structure**

This Report has been prepared under the following chapters:

- Chapter 1: Background Information: This Chapter gives description of the Project background, location, purpose, objectives, study methodology, previous studies
- Chapter 2: Project Description: This Chapter gives a description of the status of the Project in the Project cycle, specifically during construction, operation and decommissioning.
• Chapter 3: Baseline Information: This Chapter gives description of the environmental setting of proposed Project and surrounding areas, e.g., climate, soils, geology, vegetation, fauna, land use, human populations and socio-economics of the Project area.

• Chapter 4: Project Alternatives: This chapter gives a description of the Project details of the proposed Project, alternative options, designs and implementation strategies.

• Chapter 5: Policy, Legal and Institutional Framework: This chapter outlines the overview of legislative framework, regulatory, international guidelines and conventions relevant to this project.

• Chapter 6: Stakeholder Consultation: This Chapter gives description of the objectives, methods used and summary of results of the public consultation activities.

• Chapter 7: Environmental and Social impacts Assessment and mitigation measures: This chapter presents the analysis of beneficial and adverse impacts of the Project on the biophysical and human (social, cultural and economic) environments. The analysis covers anticipated impacts during the construction, operation phases and decommissioning phases and also describes the enhancement and mitigation measures proposed to enhance benefits or prevent, minimize, mitigate or compensate for adverse impacts as well as the estimated cost of mitigation.

• Chapter 8: Environmental and Social Management and Monitoring Plan: This Chapter presents the Environmental and Social Management and Monitoring Plan prepared for the project.

• Chapter 9: Conclusion and Recommendations: This Chapter briefly presents the environmental and social acceptability of the project, taking into account the impacts, measures and recommendations identified during the assessment process.
CHAPTER ONE: INTRODUCTION AND BACKGROUND INFORMATION

1.1 Project background
The Nairobi Metropolitan Region (NMR) is susceptible to numerous disasters such as fire outbreaks, floods, pandemics, epidemics as well as road, rail and air accidents. There have been numerous deaths caused by floods reported in the NMR. Proper management of storm water through improvement of drainage systems can significantly reduce the extent of damage that is caused by floods. In addition the stored water can be used for domestic, livestock use and to fight fires.

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

The proposed project will involve;

a) Expanding the diameter of existing drains and lining them with concrete (so they can carry more storm water away from the urban areas);
b) Constructing new open channel drains throughout the urban area;
c) Rehabilitating existing open channel drains; and
d) Routing storm water into the rivers and dams by means of outfalls drains i.e. pipelines that discharge storm water into the river.

The proposed project will manage flood related disasters such as death and water borne diseases. Further, this will directly be translated into amounts of money saved by investors in terms of property and lives and the economy at large. The Proposed projects fall under the category of ‘Urban Development’ and further under the general provisions of second schedule of the EMCA 1999 enacted in 2015. The act requires that an ESIA is undertaken for proposed activities that are likely to have a significant adverse impact on the environment.

1.2 Project justification and benefits
The main aim of construction of storm water drainage systems in selected Urban areas in Nairobi Metropolitan Region Is to enhance preparedness for flood disaster in the NMR. In
addition the drainage systems will contribute to the goals of the government’s Nairobi Metro 2030 which is;

(a) To achieve its vision of creating a world class African metropolis by 2030 by addressing several key challenges facing the metro area. These challenges include loss of live and property destruction normally caused by flood infernos.

Kenya National Policy for Disaster Management 2009, the policy overall goal is to build a safe, resilient, and sustainable society. This goal is to be achieved by a number of objectives. Relevant Policy objective to this Project are:

(b) To ensure that institutions and activities for disaster risk management are coordinated, focused to foster participatory partnerships between the Government (including mainstreamed and emergency disaster-related activities by sectoral Ministries) and other stakeholders, at all levels, including international, regional, sub regional Eastern African, national and sub-national bodies.

(c) To promote linkages between disaster risk management and sustainable development for reduction of vulnerability to hazards and disasters

1.3 Objectives of the ESIA

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

- To identify all potential significant environmental and social impacts of the proposed project and recommend measures for mitigation.
- To assess and predict the potential impacts during site preparation, construction and operational phases of the project.
- To verify compliance with environmental regulations.
- To generate baseline data for monitoring and evaluation of how well the mitigation measures will be implemented during the project cycle.
- To allow for public participation.
- To give an Environmental Management Plan to mitigate the identified impacts so as to ensure sustainability of the proposed project.
- To recommend cost effective measures to be implemented to mitigate against the expected impacts.
1.4 ESIA approach methodology

The systematic investigative and reporting methodology specified for conduct of Project Report Studies (Legal Notice 101 of EMCA) was adopted in this Study. Baseline data on project design was generated through discussion with the client and review of project documentation. Opinions formed were revalidated through field work entailing site investigations and interviews with potentially affected people and secondary stakeholders.

To identify, predict, analyze and evaluate potential impacts that may emanate from the project, diverse study methods and tools including use of checklists, matrices, expert opinions and observations were employed. An Environmental Management and Monitoring Plan comprising of an impact mitigation plan and modalities for monitoring and evaluation were then developed to guide environmental management during all phases of project development.

Once approved by the Ministry of Transport, Infrastructure, Housing and Urban Development, NEMA and the World Bank, the Project Report will be disclosed as required.

- Consequently, this report provides the following; The location of the project including the physical environment that may be affected by the project’s activities.
- The activities that shall be undertaken during the project design, construction, operation and of the project
- The materials to be used, products and by-products including waste to be generated by the project and the methods of disposal.
- The potential environmental and social impacts of the project and mitigation measures to be taken during and after the implementation of the road construction project.
- An action plan for prevention and management of possible accidents during the project cycle
- A plan to ensure the health and safety of the workers and the neighbouring communities
- The project cost is – **Kshs. 512 million.**
- Any other information that the proponent may be requested to provide by NEMA

This report also seeks to ensure that all the potential environmental and social impacts are identified and that workable mitigation measures are adopted. The report also seeks to ensure compliance with the provisions of the EMCA 2015, Environmental (Impact Assessment and Audit) Regulations 2003 as well as other regulations and World Bank safeguards policies. Finally, a comprehensive Environmental Management and Monitoring
ESIA for storm water drainage within selected urban areas in the Nairobi Metropolitan Region

Plan (ESMMP) is mandatory for a project of this nature to ensure monitoring and mitigation of negative environmental and social impacts during the different phases of the project

1.5 Scope of works
The scope of works for the proposed project will include but not limited to

i. Excavation, backfilling and reinstatement
ii. Concrete works and structures
iii. Storm drainage works
iv. Building and miscellaneous works
v. Road, drainage and site works
vi. Any other works as instructed by the Engineer and/or as specified in this document

1.6 Project description
The proposed construction of Storm water drainage for selected Urban areas within Kiambu, Kajiado, Machakos, and Nairobi City County (Embakasi, Dagoretti, Lang’ata, & Central Business District) will involve construction and maintenance (during the defects liability period) of approximately 8Km of storm water lines of various sizes and other auxiliary works. The works shall include procurement of all materials and labour, construction, testing, commissioning and maintenance during the defect liability period.

1.7 Project Cost
The total project cost for the proposed construction of storm water drainage system in selected urban areas in NMR is Kshs. \textbf{512 million}. The implementation of the ESMMP is included into the BoQ and the total ESMMP cost is estimated to about Kshs. 12,050,000.

1.8 Proposed project location
The proposed project is located within the four counties; Nairobi City County, Kajiado, Machakos and Kiambu Counties as shown in figure 1 figure below;
ESIA for storm water drainage within selected urban areas in the Nairobi Metropolitan Region

THE PROJECT AREA

Legend:
- Nairobi City County
- Kajiado County
- Machakos County
- Kiambu County
- Nairobi C.B.D
- Embakasi
- Thika C.B.D
- Athi River (Mavoko)

Major Lakes

LEGEND:
- Nairobi City County
- Kajiado County
- Machakos County
- Kiambu County
- Nairobi C.B.D
- Embakasi
- Thika C.B.D
- Athi River (Mavoko)

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Figure 1: General location of the project area in Kenya
CHAPTER TWO: PROJECT DESCRIPTION

2.1 Nairobi City County

The Nairobi City County consists of areas such as the:

- **Nairobi Central Business District (CBD)** – whereby the CBD has been drained according to three systems:
  
i. The combined system in which surface water and sewerage from premises is collected by one combined system and delivered to sewerage treatment works.
  
ii. Separate System in which surface water from the roads and roofs is delivered by surface water drains to the Nairobi and Ngong’ Rivers and sewerage delivered to the Trunk sewers and to the treatment works.
  
iii. Partially Separate System in which the surface water e.g. from the Roads and front portions of roofs and premises is taken by the surface water drains while sewerage and rain water from the back portions of roofs and backyards are taken by the sewers according to the type of developments and the terrain.

2.1.1. Proposed interventions

I. Nairobi CBD area

a. **Cleaning /unblocking**

Cleaning / unblocking by use of barrel type shot blasting cleaner will be done in the following areas

- Haile selassie/Parliament road junction
- Kobil petro station-Ngara health center drainage along Haile Selassie avenue
- Kenya polytechnic to race course/ Haile Selassie round about
- Junction of Haile Selassie/ Race course road to Wakulima market

b. **Demolition and reconstruction of sub-surface drain & gullies**

Sub surface drain and gullies in Monrovia Lane-Muindi Mbingu Street will be demolished and reconstructed to allow for increased capacity of storm water flow.

c. **General cleaning /un blocking**

This will be done for the whole sub-surface system within the CBD. *ESIA field assessment identified that the way leave is free from encroachment and therefore no Resettlement issues will be triggered as described in the World Bank Policy on Involuntary Resettlement (OP) 4.12.*
II. **Dagoretti Sub County**

There are two proposed systems in this area: Kawangare 46 – Dagoretti Muslim Primary School Road and Macharia Road Storm Drain

Kawangare 46-Dagoretti Muslim Primary Road Storm Water Drain

The drain partially runs along Muthiora Road, crosses the road and goes down to Nairobi River. The drain is approximately 0.46km long. This system will be reconstructed using concrete Inverted block drains with covers.

No land requirement, no physical relocation of PAPs anticipated and no resettlement impact.

Macharia Road Storm Water Drain

The drain starts at Nairobi River (outfall), follows the route of the existing drain, crosses Muthiora Rd, Macharia Road and terminates at a distance of 1.423km just after crossing Kiariemucha Road off Muthiora Road. This system will be lined with concrete and IBD. Reconstruction will be done where there is extensive damage

No land requirement, no physical relocation of PAPs anticipated and no resettlement impacts.

III. **Embakasi Sub County**

There are four proposed sites storm water drainage system in this area; Kayole Spine Road Drainage System, Cathrine Ndereba Road Drainage System, Sections along Moi Drive and Manyaja Roads Storm drains and All outfall drains along Moi drive

The proposed intervention will entail;

a) Kayole Spine Road Drainage System- reconstruction of a bigger capacity storm drain from Kangundo Road Junction to Junction of Manyaja road which will have concrete lined with associated access culverts.

b) Cathrine Ndereba Road Drainage System - Construction of concrete lined IBDs from junction with Eastern bypass to Mukuru Slums.

c) Sections along Moi Drive and Manyaja Roads Storm drains – here the capacity will remain as it is though the drain will have concrete lining.

d) Rehabilitation of All outfall drains along Moi drive

IV. **Lang’ata Sub County**

There are 8 proposed sections in this area as described in the proposed intervention below;

a) Lang’ata South Drain which will need concrete lining of the existing storm drain
b) Bogani / Bogani East and Lang’ata Road Junction which will entail unblocking and reconstruction of storm drain at Bogani and Lang’ata road, Concrete lining 50m on either direction of Bogani and Lang’ata roads and Reconstruction of Lang’ata road cross culvert.

c) Jonathan Ng’eno Estate Drainage which will need to be cleared and reconstruction of outfall at Nairobi Dam, demolition of existing perimeter wall and concrete lining of existing storm drain 50m upstream from Nairobi dam.

d) Mai Mahiu Road will constitute of unblocking of storm water drain at junction of school of the blind access road / Mai Mahiu road, Improvement of sub surface drainage along school of the blind access road and concrete lining of existing surface drainage along school of the blind access road.

e) Thogoto Road / Mai Mahiu Road Junction which will be unblocked and lining of the outfall drain

f) Muhoho Avenue which will entail compete reconstruction of the existing storm drain and to be concrete lined IBD.

g) Access to the Five Star Estate Road the works on this area will entail unblocking and reconstruction of existing outfall drain, secondary main drain along Muhoho road to be reconstructed using IBD, IBD reconstruction of entrance to Nakumatt South C – Muhoho Avenue storm drain and reconstruction of damaged drain was recommended.

h) Joseph Kang’ethe Outfall will lead to upper sections of the drain (within Jamhuri Estate) being lined, no works have been proposed for this section and drain inside Kibera to be lined with concrete and covered

2.2 Kiambu County

In Thika District the proposal for drainage improvement is within the CBD which mostly needs reconstruction and construction of a new drainage system to drain Kenyatta Road and the greater Thika CBD through Mount Kenya University to General Kago Road/ School Road junction and along school road to cross Kenyatta Road at the Kenyatta / School Road T-junction. The storm drain will cut across St. Andrews ACK Church and Joy town Secondary School along existing storm water drainage way leave to drain into Thika River.
The system will be a combination of inverted block drains and surface drains (Inside Mt. Kenya University and along school road. Rehabilitation of the existing storm water drainage systems within the CBD will go hand in hand with the new works.

2.3 Kajiado County
The main area of operation is Ongata Rongai which comprises of Nkaimurinya Drainage system which is unlined natural drainage system inadequate and heavily polluted. The drainage improvement will include concrete lined IBD storm water drainage system which will outfall at Mbagathi River. Kware stage drain which is densely encroached by temporal traders will be substituted by another drain within the same settlement that is free from encroachment.

2.4 Machakos County
The main focus will be on Athi River town. In this region the EPZ have developed a drainage system from their facility through Athi River town which drains to Athi River. The system was designed in the year 1990 by Mangat I.B Patel and was meant to act as the main drainage system for EPZ, as well as Athi River Township.

The sewer system for Athi River consists of a gravity sewer network which discharges to a sewerage pumping station north of the railway station. A 225mm diameter concrete trunk main discharges into the pump sump from where it is pumped 2km via a 150mm diameter rising main to the treatment works just north of Mombasa Road. The system is separate to that of storm water.

The area proposed for improvement is Slaughter to EPZ storm drain which will consist of a covered inverted block drain. There are no social impacts or encroachments observed along this drain.
CHAPTER THREE: BASELINE INFORMATION

3.1 Introduction
Baseline conditions entail the presentation of all biophysical and geo-physical condition of the project area. Gathering of baseline data is necessary to meet the following objectives:

- To understand key social, cultural, economic, and political conditions in areas potentially affected by the proposed project;
- To provide data to predict, explain and substantiate possible impacts;
- To understand the expectations and concerns of a range of stakeholders on the proposed development;
- To inform the development of mitigation measures; and
- To benchmark future socio-economic changes/impacts and assess the effectiveness of mitigation measures.

Most importantly, project activities interaction with the baseline conditions is what produces environmental impacts and therefore the need to understand it more concisely.

3.2 Geographical characteristics of project areas

3.2.1 Nairobi City County

**Climate**: The city lies on the southern part of the country, and has an elevation of 1,795 metres (5,889 ft) above level. Under the Köppen climate classification, Nairobi has a subtropical highland climate (Cfb/Cwb). At 1,795 metres (5,889 ft) above sea level, evenings may be cool, especially in the June/July season, when the temperature can drop to 10 °C (50 °F). The sunniest and warmest part of the year is from December to March, when temperatures average the mid-twenties during the day. The mean maximum temperature for this period is 24 °C (75 °F).

There are two rainy seasons, but rainfall can be moderate. The cloudiest part of the year is just after the first rainy season, when, until September, conditions are usually overcast with drizzle. As Nairobi is situated close to the equator, the differences between the seasons are minimal. The seasons are referred to as the wet season and dry season. The timing of sunrise and sunset varies little throughout the year for the same reason.

**Rainfall projections** (2030-2050) indicate that there is expectation of precipitation increase (DFID, 2009)

**Topography**: The city is characterized by undulating hilly topography with elevation in a range of 1,460 m to 1,920 m. Lowest elevation occurs at the Athi River at the eastern
boundary of the city and highest at the western rim of the city. It is a unique characteristic that the city has Nairobi National Park with the area of 117 km² within its administrative area, extending along the western boundary and attracting a large number of international and domestic tourists annually.

Projects sites

Nairobi CBD

Location: Nairobi Central Business District (CBD) is located almost in the center of the city and developed with a radius of approximately 5 km with its center at a junction of Mombasa Road, (Route A-109), Naivasha Road (Route A-104) and Thika Road (Route A-2). The city is provided with Jomo Kenyatta International airport on its southern side.

Drainage: The city is drained mainly by the Nairobi River and the Mokoyeti River, both of which are the tributaries of the Athi River. The former have four (4) main tributaries such as the Rui Ruaka, Mathare Nairobi City County, and Ngong rivers and the latter mainly drains the area of Nairobi National Park.

Population: Nairobi has experienced one of the highest growth rates of any city in Africa since its foundation in 1899. With a population of about 3.36 million estimated in 2011; Nairobi is the second-largest city by population in the African Great Lakes region after Dar es Salaam, Tanzania. The growth rate of Nairobi is currently 4.1%. It is estimated that Nairobi’s population will reach 5 million in 2025.

Floods: The major reasons associated with floods occurrence in Nairobi CBD area includes; indiscriminate disposal of solid waste into sewerage systems causing blockage, Informal settlements on low lying areas and flood plains and poorly constructed and undersized storm water drainage infrastructure.

Solid waste management: The most common means is through garbage collection where private and municipal council form companies to collect solid waste products and dumb it in Dandora dump site. Public sensitization and education of the large mass of people living in the town is also another method that has been used to ensure proper management and disposal of solid waste. The public has been harmonized on the dangers of improper disposal of solid waste and thus there has been a significant improvement in solid waste disposal and management.
Measure to minimize Resettlement in Nairobi CBD

The project design team made deliberate measures to avoid and minimize impacts of the project activities to people’s assets and sources of livelihoods; this was done at the design stage during the project development. In order to minimize impacts on the project to people’s assets and livelihood, the design team ensured that all the civil works have been designed within the existing storm water drains free from encroachment as summarized below.

I. Road gulley at the junction of Parliament Road and Haile Selassie Avenue
II. Sub-surface storm water drain along Haile Selassie avenue section Between City Square to Uhuru Highway
III. Sub-surface storm water drain along Moi avenue section between Kenyatta Avenue and Mama Ngina Street (Hilton)
IV. Sub-surface storm water drain at Sunken parking draining towards Aga-Khan walk (45m long) – Replace system with 300mm diameter pipes
V. Sub-surface storm water drain along Haile Selassie Avenue between City square to Race Course Road/ Haile Selassie round about
VI. Sub-surface storm water drain along Kimathi Street section between Nation Centre and CFC Stanbic Bank – Replace with 300mm diameter pipes
VII. Replace broken or missing gulley pots

The photos below indicate parts of the Nairobi CBD in which work is to be carried out. Works for these drains is to be carried in streets routes in CBD where there are no way leave issues as indicated in photo plate below;

Photo Plate: Drainage Channels within Nairobi CBD

Drain along Haile Sellasie Avenue  Drain within Sunken Car Park
Lang'ata

**Location:** Lang'ata lies southwest of the city's central business district, east of Karen, approximately 18 kilometres by road, from the centre of Nairobi. The coordinates of Lang'ata are: 1°21'58.0"S, 36°44'17.0"E (Latitude: -1.366111; Longitude: 36.738056)

**Road reserve:** Drains at the Bogani/ Bogani East and Lang’ata South junction outfall to the drain along the Lang’ata South Road. Proposed intervention involve construction of drain from the junction at Bogani road along the Lang’ata south road to an existing seasonal stream a distance of approximately 1.5km and other minor works at the junction.

**Drainage:** Drainage is poor. Wastewater is poured into open channels. The channels are prone to frequent blockages and stagnant pools at times with raw human waste drains into this water, added to the bad odours, and offer breeding ground for mosquitoes. Residents have constructed a few drainage channels in the settlement through local efforts.

**Solid waste management** In areas of Lang’ata, garbage collection is not organized and the settlement is in a crisis over this. Most of it is later drained into the river below by water or thrown by the residents themselves. In some areas, the waste is collected in designated areas and later transported by garbage collectors to Dandora dump site.

**Measure to minimize Resettlement in Lang’ata Estates**

The project design team made deliberate measures to avoid and minimize impacts of the project activities to people’s assets and sources of livelihoods; this was done at the design stage during the project development. In order to minimize impacts on the project to people’s assets and livelihood, the design team ensured that all the civil works have been designed within the existing storm water drains free from encroachment as summarized below.

- **Nairobi Yatch Club Drain**
  
  Involves lining the drain at the entrance to yatch club which outfalls to Nairobi dam. Lining will be done to the boundary wall where there exists an opening to the outfall.

- **Jonathan Ng’eno Estate and Joseph Kang’ethe Outfall Drains**

  Lining of the existing unlined drain for a section of approximately 150 m and construction of culvert next to entrance to the estate

- **Joseph Kang’ethe Outfall Drain**

  Involves lining of the unlined section of the drain which mainly cuts through Moi girls

- **Southland, Civil Servants, Onyonka, Akiba, Koinange, Ngei, Otiende, KRA and Rubia Estates - Involves cleaning of existing drains and culverts.**
The photos below indicate parts of the Lang’ata Estate in which work is to be carried out. No land requirement, no physical relocation of PAPs anticipated and no impacts identified to people’s assets and sources of livelihood.

**Photo Plate of Works in Lang’ata Estate**

![Clear Storm Water Drains in Lang’ata](image)

**Dagoretti**

**Location:** Dagoretti is located in Western Suburbs of Nairobi. It borders Lang’ata, Westlands, Kabete and Starehe Constituency.

**Population:** the population of Dagoretti according to 2009 census stood at 240,081 people.

**Road reserve** The drain partially runs along Muthiora Road crosses the road and goes down to Nairobi River. The drain is approximately 0.46km long.

**Solid Waste management:** sorting and recycling of solid waste is major practise done in Dagoretti. Civic education and sensitization on the dangers of solid waste disposal and ways of managing the solid waste is also done from time to time in this area. In some areas the waste is collected in designated areas and later transported by garbage collectors to Dandora dump site.

**Measure to minimize Resettlement in Dagoretti Estates**

The drain partially runs along Muthiora Road, crosses the road and goes down to Nairobi River. The drain is approximately 0.46km long. Kawangware 46 – Dagoretti Lines: No land requirement, no physical relocation of PAPs anticipated. The design team identified the drains that are free from encroachment as indicated in the photo below;
Embakasi

Location: Embakasi is a division of Nairobi, the capital of Kenya. It is located east of the central business district. It borders South C and contains South B and slightly more than one third of Nairobi's Industrial Area and Export Processing Zones.

Solid waste management: management of solid waste in Embakasi includes; Incineration, Composting of biodegradable solid wastes and, resource recovery whereby solid waste is not put to direct disposal but the recyclable or reusable materials are sought out, cleaned, or re-processed and used for the original or other purposes. In some areas, the waste is collected in designated areas and later transported by garbage collectors to Dandora dump site.

Drainage: This area is flat and as such drainage is poor. Run-off from the nearby urban settlements contributes to the drainage problem. The existing drainage ditches are not clearly defined and have not been properly maintained, and as a result they have been partially blocked by debris and covered with vegetation.

Road reserve: Sections along Kayole Spine Road between Manyanja Road Round about towards Njiru and Lateral roads and Kangundo road junction) and Manyanja round about will be used during the proposed project activities.
Measure to minimize Resettlement in Embakasi Estates

In order to minimize impacts on the project to people’s assets and livelihood, the design team ensured that all the civil works have been designed within the existing storm water drains free from encroachment as summarized below.

The drains will involve civil works within existing storm water drains of

i) Kayole Spine Road storm water drainage System- Sections along Kayole Spine Road between Manyanja Road Round about towards Njiru and Lateral roads
ii) Umoja Estate storm water drainage System-Storm water drains in Umoja and Subsequent outfalls
iii) Kayole Spine Manyanja -Section between Mama Lucy hospital (at Kangundo road junction) and Manyanja round about.

No land requirement, no physical relocation of PAPs anticipated as indicated in the photos below;

Drains along Kangundo road (Mama Lucy Hospital) and Umoja Eastate Outfall

3.2.2 Kiambu County (Thika CBD)

Thika is an industrial town in Kiambu County, Kenya, lying on the A2 road 40 kilometres north east of Nairobi, near the confluence of the Thika and Chania Rivers.

Climate: The climate is moderate tropical with sunshine most of the year round and typical average temperatures of 25°C during the day, with the hottest period in January and February leading to the long rains and the coldest in July. The "long rains" season lasts from March/April to May/June. The "short rains" season is from October to November/December.

Rainfall projections (2030-2050) indicate that there is expectation of precipitation increase (DFID, 2009)
**Location:** The town is located on a gentle plain before the ascent into the central highlands. Small valleys are on the western and northern edges following the Chania and Thika Rivers that have waterfalls and meet on the north western edge of Thika. It has an underlying rock of tuff and trachytes and soils are well-drained red soils which vary in depth.

**Population:** Thika has a population of 139,853 which is growing rapidly, as is the entire greater Nairobi area. Its elevation is approximately 1,631 metres (5,351 ft).

**Floods:** Thika is one of the major towns in the county that is mainly affected by floods. The main reason behind this is rapid erection of houses in estates with no effective drainage system whereby the county government has not properly planned for the drainage before they allow development to crop up which in turn blocks water drains. These floods have caused displacement of people and also break out of water borne diseases.

**Road reserve:** The construction of the whole of the Thika drain is possible as the way leave is clear.

**Solid waste management:** In Thika Town CBD, waste management is through various ways and means. The most common means is through garbage collection where private and municipal council form companies to collect solid waste products and dump it in designated dumpsites. Burning is also another means than has been effected in the town whereby combustible solid products are disposed off through burning. Public sensitization and education of the large mass of people living in the town is also another method that has been used to ensure proper management and disposal of solid waste. The public has been harmonized on the dangers of improper disposal of solid waste and thus there has been a significant improvement in solid waste disposal and management.

**Measure to minimize Resettlement in Thika Estates within Kiambu County**

In order to minimize impacts on the project to people’s assets and livelihood, the design team ensured that all the civil works have been designed within the existing storm water drains free from encroachment as summarized below.

The drains will involve civil works within existing storm water drains of

1. Kayole Spine Road storm water drainage System- Sections along Kayole Spine Road between Manyanja Road Round about towards Njiru and Lateral roads
2. Umoja Estate storm water drainage System-Storm water drains in Umoja and Subsequent outfalls
3. Kayole Spine Manyanja -Section between Mama Lucy hospital (at Kangundo road junction) and Manyanja round about.
No land requirement, no physical relocation of PAPs anticipated as indicated in the photos below;

![Storm water drains in Thika Town Kiambu County](image)

3.2.3 Machakos County (Athi River)

**Location:** Athi River is a town outside Nairobi, Kenya in the former Eastern Province. It is also known as Mavoko. The town hosts Mavoko Municipal Council and headquarters of Mavoko division which is part of the Machakos County.

**Climate:** The climate here is mild, and generally warm and temperate. There is more rainfall in the winter than in the summer in Athi River. The temperature here averages 19.4 °C. In a year, the average rainfall is 599 mm. Precipitation is the lowest in July, with an average of 6 mm. With an average of 137 mm, the most precipitation falls in April.

**Rainfall projections** (2030-2050) indicate that there is expectation of precipitation increase (DFID, 2009)

**Floods:** Athi River has not had many cases of floods but the very few cases on incidences of floods have been quite serious and have resulted in death of both human beings and cattle, crops have also been destroyed. The floods have also led to several occurrences of landslides in some areas. Main cause of floods in Athi River area is over flooding of rivers mostly during the rainy season leading to bursting of riverbanks.

**Solid waste management:** Athi River is known to consist of a variety of industries. This industries tend to emit solid waste which is harmful to the environment if accumulated over a long period of time. Various ways have been devised for control of solid waste; dumping in dump sites, Recycling and composting are the major methods used.

**Measure to minimize resettlement in Machakos County – Athi River (Mavoko)**
In order to minimize impacts on the project to people’s assets and livelihoods, the design team ensured that all the civil works have been designed within the existing storm water drains free from encroachment as summarized below within Mavoko in Athi River. No land requirement, no physical relocation of PAPs anticipated as indicated in the photos below;

3.2.4 Kajiado County (Ongata Rongai)

**Location:** Ongata Rongai, is a settlement in Kenya's Kajiado County located between the Kaputiei plains and the Western slopes of the Ngong hills

**Climate:** The climate in Ongata Rongai is warm and temperate. In winter, there is much less rainfall than in summer. The Köppen-Geiger climate classification is Cwb. The temperature here averages 18.3 °C. Precipitation here averages 844 mm.

**Rainfall projections** (2030-2050) indicate that there is expectation of precipitation increase (DFID, 2009)

**Road reserve:** The proposed drain starts at Magadi Road near Kware Stage and terminates at Gataka Road just before the drain crosses Gataka Road, a distance of approximately 1.28km. Drain to be considered to a distance of approximately 460m.

**Floods:** Flash floods are a common phenomenon in the county especially during heavy rainfall. Floods occur likely in parts of Isinya whereby during heavy rains majority of the rivers tend to break their banks resulting into floods. Crops are affected and destroyed as farms get flooded with water. Persons are displaced as others tend to lose their lives as they are carried by the floods. Bridges also tend to collapse due to the fast flowing water.

**Solid waste management:** In Ongata Rongai, waste management is through various ways and means. The most common means is through garbage collection where private and
municipal council form companies to collect solid waste products and dump the waste in designated dump sites. Burning is also another means than has been effected in the town.

Measure to minimize Resettlement in Kajiado County – Ongata Rongai Estate

In order to minimize impacts on the project to people’s assets and livelihoods, the design team ensured that all the civil works have been designed within the existing storm water drains free from encroachment in Ongata Rongai Estate in an effort to avoid project impacts to people’s assets and sources of livelihood.
CHAPTER 4: PROJECT ALTERNATIVES

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

4.2 Relocation Option
Relocation option to a different site is not an option available for the project implementation as storm water systems within Dagoretti, Lang’ata, Nairobi CBD, Embakasi, Thika CBD, Athi River town and Ongata Rongai Township already exists but they are faced with flooding and storm water drains by raw sewage and solid which affect the resident livelihoods negatively.

4.3 Zero or No Project Alternative
The No Project option in respect to the proposed project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. This option will however, involve several losses both to people within Dagoretti, Lang’ata, Nairobi CBD, Embakasi, Thika CBD, Athi River town and Ongata Rongai Township. These areas will continue to have frequent flooding and pollution of storm water drains by raw sewage and solid waste. The No Project Option is the least preferred from the socio-economic and partly environmental perspective due to the following factors:

- No employment opportunities will be created for thousands of Kenyans who will work in the project area.
- Discouragement for investors and loaners
- Development of infrastructural facilities (roads and associated infrastructure) will not be undertaken.

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

4.4 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, environmental and aesthetic requirements. The road-works will be made using locally sourced materials that meet the Kenya Bureau of Standards requirements.

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

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

4.6 The Proposed Project Alternative
The project alternative as proposed in this report was considered the most appropriate. Implementing the project will ensure that the project aim and development objectives are realized as summarised below. The main aim of construction of storm water drainage systems in selected urban areas in Nairobi Metropolitan Region is to enhance preparedness for flood disasters in the NMR. In addition, the drainage systems will contribute to the goals of the government’s Nairobi Metro 2030 which are;

(a) To achieve its vision of creating a world class African metropolis by 2030 by addressing several key challenges facing the metro area. These challenges include loss of lives and property destruction normally caused by floods.

(b) Kenya National Policy for Disaster Management 2009 - the policy overall goal is to build a safe, resilient, and sustainable society. This goal is to be achieved by a number of objectives. Relevant Policy objective to this Project are:

- To ensure that institutions and activities for disaster risk management are coordinated, focused to foster participatory partnerships between the Government (including mainstreamed and emergency disaster-related activities by sectoral Ministries) and other stakeholders, at all levels, including international, regional, sub-regional Eastern African, national and sub-national bodies.

- To promote linkages between disaster risk management and
sustainable development for reduction of vulnerability to hazards and disasters
CHAPTER 5: POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

5.1 Environmental Policy Framework

5.1.1 The National Environmental Action Plan (NEAP) 1994

According to this plan, it’s recognized that the development projects on the environment i.e. industrial, economic and social development programs that do not take care of environmental considerations in their operations are not sustainable. Under the NEAP process, EIA was introduced and among the key targets recognized were the industrialists, business community and local authorities.


It enhances the systematic development of water resources for all the sectors in promotion of the country’s socio-economic development. It also recognizes the by-products of these developments as wastewater and therefore calls for development of appropriate sanitation systems to protect the people’s health and water resources from institutional pollution.

It is therefore imperative that these activities be accompanied by appropriate waste management plans. The policy also recommends that all such developments should undergo comprehensive EIA that will provide measures to protect environment and people’s health in the neighbourhood of the project including the downwind communities. As its predecessor, the EMCA (1999) calls for annual Environmental Audits (EA) to ensure continuous implementation of Environmental Management Plans (EMP) proposed in the EIA and any other recommendations and issues arising. The policy requires that those whopollute water bodies must pay the full cost of remediation of the contaminated water; in tandem with the “Polluter Pays Principle.”

5.1.3 Sessional paper No. 6 (1999)

Policy guidelines on environment and development – the key policy objectives of this paper includes:

- Ensuring that all development projects at the inception stage and programs, as well as policies consider environmental considerations.
- Ensuring that an EIA report is prepared for any undertaking or development project before implementation.
- Coming up with effluent treatment standards that will conform with acceptable health guidelines.
It’s important to note that issues of waste water management and human settlements are given prominence and therefore, the policy recommends re-use and recycling of residues i.e. waste water, use of low waste generation technologies and increasing public awareness on benefits of a clean environment. It also recognizes the role of stakeholders in all these initiatives within their localities.

The paper encourages better planning in rural and urban areas in provision of needs i.e. water, drainage system, waste disposal facilities et al.

5.2 Overview of relevant legislation

The ESIA for this project is conducted in accordance with the requirements of the Environmental Management and Co-ordination Act, No. 8 of 1999 with 2015 amendments and the Environmental (Impact Assessment and Audit Regulations, 2003) and enacted in 2009 Legal Notice No.101. In addition, the study takes into account other legislation related to the project. These include: the Water Act 2002, the Public Health Act Cap 242, the Physical Planning Act, the local Government Act Cap 265, the Forest Act (2005), the Agriculture Act, the Irrigation Act, and the World Bank guidelines on EIA procedures.

For a long time, legal provisions touching various aspects of environmental protection and management were scattered in 77 different statutes. This set up did not offer adequate protection of the environment mainly due to weak legal and institutional framework and conflicts between the various Statutes and sectors. In (1999), a Bill to provide for the establishment of a comprehensive legal and institutional framework for the management and protection of the environment was enacted into law as the Environmental Management and Co-ordination Act, 1999 and received Presidential assent on 6th January, 2000. This Act has addressed the shortcomings of the previous legislation in that it has instituted controls and set up effective institutions.

5.2.1 The Environmental Management and Co-ordination Act, 1999 and enacted in 2015

The main objective of EMCA (1999) with 2015 amendments and the related Regulations is to provide for the establishment of an appropriate legal and institutional framework including procedures for the management of the environment in Kenya. 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. This is in line with national objectives and sustainable development goals enunciated in Agenda 21 of the Earth Summit. As such, in terms of environmental management, EMCA (1999) provides a
comprehensive and an appropriately harmonized legal and institutional framework for the handling of all environmental issues in Kenya and supersedes all sectoral laws.

Part VI of EMCA (1999) with 2015 amendments makes provision for the carrying out of EIA. It is mandatory for any person being a proponent of a project, to submit a project report to the NEMA in a prescribed format. After perusing the proponent report, and the NEMA is satisfied that the proposed project is likely to have significant negative impacts in the environment, it will direct the proponent of the project to undertake at his or her own expense an environmental impact assessment study and prepare a report. The NEMA shall publish such a report and invite comments thereon from the public before deciding to issue an environmental impact license. The NEMA, at any time after issuing the environmental impact assessment license, may direct the proponent to submit a fresh environmental impact study where there is substantial change in the project or where environmental threats, not earlier foreseen, have emerged.

Some key Sections of the Act relevant to the proposed project are:

- **Section 3 – Entitlement to Clean and Healthy Environment.**

  The Storm Water Project shall be entitled to maintain a clean and healthy environment and has a duty to safeguard and enhance environmental management in accordance with subsections 1, 2, 3, 4, and 5.

- **Section 50 – Biological Diversity**

  The proposed Storm water project shall ensure that at the operation phases, conservation of biological diversity shall be observed as prescribed in (a) to (g) of this section

- **Section 51 & 52 – Biological resources**

  The project shall enforce all measures to ensure conservation of biological resources both *in situ* and *ex situ* to ensure species threatened with extinction are protected.

- **General Maintenance**

  Maintenance programme, including preventive maintenance where appropriate, shall be established at the proposed Storm water project to maintain facilities in a condition that does not impair the safety, regularity or efficiency of workers or vehicles at the proposed project.

- **Section 78 – Air quality**
The proponent shall enforce air quality standards and be maintained as per NEMA’s Standard and Enforcement Review Committee requirements.

• **Section 87 – Handling and Disposal of Wastes**

The proponent shall adhere to the disposal of wastes requirement in such a manner as not to cause pollution to the environment or ill health.

• **Section 102 – Excess Noise**

Noise during operation of the project especially from the water pumps is prohibited and shall be maintained to the desirable levels as is also pointed out in Cap 394.

5.2.2 **The Environmental Impact Assessment and Audit Regulations 2003 with 2009 amendments**

(Legal Notice No. 101)

• **Regulation 24 – EIA licence:** Environmental Impact License shall be issued after the authority approves the study report under regulations 23, and shall be issued in form and accompanied by the prescribed fee of 0.1% of the total cost of the project.

• **Regulation 28 – false or incorrect information:** Substantial change or modification and when project poses an environmental threat or revelation that information or data given by the license were false, incorrect or intended to mislead.

• **Regulation 24 – Annual Environmental Audit:** Annual environmental auditing after presentation of an EIA study report shall be undertaken by the licensee to ensure the implementation of environmental management plan is audited on regular basis, an audit report submitted to NEMA annually and ensuring that the criteria to audit is based on environmental management plan developed during the EIA process or after the initial audit.

• **Regulation 40 - Monitoring changes after project implementation**

Monitoring by NEMA and Lead Agencies shall be done to establish any possible changes in the environment and their possible impacts, immediate and long term effects of its operations, identify and determine parameters and measurable indicators and conduct changes that occurred after implementation.

5.2.3 **Water Act, 2002**

The Government of Kenya formulated the National Policy on water Resources management in 1999. This was on realizing that the arrangement then on water supply was inappropriate. The national Water Policy has four broad objectives viz:
a. To preserve, conserve and protect available water resources and allocate them in a sustainable, rational and economic way;
b. To supply water of good quality and in sufficient quantities to the various water needs, while ensuring safe disposal of waste water and environmental protection;
c. To establish an efficient and effective institutional framework to achieve a systematic development and management of the water sector promoting and supporting participation of users;
d. To develop a sound and sustainable financing mechanism for effective water supply and sanitation development.

The National Policy on Water eventually gave birth to the Water Act 2002 whose main focus is:

a. Provisions for involvement of the private sector in water services
b. Setting up a Water Regulator and Water Boards to ensure that water will be adequately distributed to all parts of the country;
c. Provision to allow communities to run water projects.

Water Act 2002, is to provide for the management, conservation use and control of water resources and for the acquisition and regulation of rights to use water; provide for the regulation and management of water supply and sewerage services; to repeal the Water Act (Cap 372) and certain provisions of the Local Government Act; and for related purposes.

In Kenya water is regarded as a national resource and therefore owned by the state for and on behalf of the people (Section 3). Thus the Minister in charge of water is empowered under the Act to control, plan and regulate the use of water. Further the Minister is vested with the duty to promote investigations, conservation and proper use of water.

The Act has set up subsidiary bodies with power to operate and regulate functions assigned to them by the Act such bodies include National water conservation and pipeline corporation and water resources management authority. The Act further gives conditions relating to construction of works in its Second Schedule. As such, the Client shall observe these conditions which are in line with the spirit of EIA.

5.2.4 The Public Health Act (Cap 242)

The Public Health Act is the principle instrument for ensuring the health and safety of the people. Its core function is the prevention of disease, treatment and care of the sick (curative services) and control of nuisance. The Act therefore makes regulations and lays standards
for a healthy living environment. Part XI Section 129 of the Act places the responsibility of protecting water supplies on the local authorities.

The Ministry of Health is in charge of administration of the Act with the Director of medical services as the Principal Officer. However, where a municipality is capable of discharging responsibilities under the Act, such a municipality is designated as a local health authority in such a situation the relevant powers under the Act are delegated to the municipality but the Director of Medical Services may take over if the Authority is in default.

During the execution of the proposed project, this Act is relevant in various ways:

- **Section 115**
  
  During construction, a nuisance is prohibited especially for all conditions liable to be injurious or dangerous to health.

- **Section 118**
  
  Outlines nuisance liable to be dealt with like accumulation or deposit of refuse, offal, manure or any other which is offensive or injurious or dangerous to health and an accumulation of stone, timber or other materials likely to harbour rats or rodents.

- **Section 126 rule 62 – Drainage & latrine rules.**
  
  It is a statutory requirement that drainage, latrines, septic and conservancy tanks and any other pre-treatment methods of sewerage effluents seek written permission or/and approval from the local authority and be built in conformity to provisions of sub-rules (a) to (e) of this section.

- **Section 127 - Buildings for foodstuffs.**
  
  In case a proposed project indicates the premises shall have a staff canteen, the proponent must consider using materials recommended by a medical officer of health and complemented by sub-sections (1) to (3) in these areas.

- **Sections 136 – 143 Breeding places of mosquitoes**
  
  The civil and building contractors will ensure that during construction, breeding places of mosquitoes and nuisance yards are kept free from bottles, whole or broken. The project area shall not be overgrown by grass, the wells etc to be covered together with the less pits. The gutters may be perforated; larva destroyed to eradicate mosquitoes completely as mere presence of mosquito larvae is an offence.
• **Section 163 – Powers of entry and inspection**

It should be noted that a medical officer, health inspector or a police officer above the role of an inspector shall enforce compliance and offences are punishable by law.

5.2.5 **Forest Act, 2005**

The Forest Act, 2005 was enacted in November 2005 to repeal the Forest Act, Cap 385 and awaits the Minister to gazette the commencement date. The Act provides for the establishment, development and sustainable management, including conservation and rational utilization of forest resources for the social-economic development of the country, recognizing that forests play a vital role in the stabilization of soils, ground water, protecting water catchments, moderating climate by absorbing greenhouse gases, provide the main locus of Kenya’s biological diversity and a major habitat for wildlife. Its provisions apply to all forests and woodlands on state, local authority and private land of the country declared as provisional forest by the Minister. The administration of forests is headed by the established Kenya Forest Service managed by a board, regional forest conservation committees work under and community participation is integrated through forest community associations and forest user associations. The Act also establishes the forest management and conservation fund headed by a finance committee.

The Act requires formulation of forest management plans for use in management of state, local and provisional forests, joint management of forests is allowed but governed by management agreement with the forest service. Indigenous forests and woodlands shall be managed on a sustainable basis and presidential decree for protection of trees can be issued. Variation of forest boundaries or revocation of state or local authority forests and state forest concession are subject to an independent EIA and public consultation. Mining and quarrying operations in the forest require board consent and has a re-vegetation condition on completion of activity. Director of KFS is required to maintain register of all licenses issued under the Act. Provisions of part VI and part XII of EMCA’99 shall apply mutatis mutandis to and in respect of a license under this Act and any EIA as well as reference to the National Environment Tribunal required under this Act. The provisions of EMCA’99 regarding reference to the Tribunal established under that Act shall apply to the settlement of disputes arising under Forest Act, 2005. Offences under the Act are punishable under the law and citizens can petition High court for a declaration of contravention of the Act provisions. Thus the Act directs, regulates and harmonizes development and use of forests in the country. In addition, the Act provides a vital link with the Environment Management and Co-ordination Act.
5.2.6 **The Physical Planning Act, 1996**

The Physical Planning Act, 1996 commenced operation in 1998 after its revision. The Act provides for the preparation and implementation of physical development plans and other related purposes. Its provisions apply to all parts of the country except those areas as the Minister may specify. Thus the Act directs, regulates and harmonizes development and use of land over the country. In addition, the Act provides a vital link with the Environment Management and Co-ordination Act. For example, Section 36 of the Act states that “In connection with a development application a local authority is of the opinion that proposals for industrial location, dumping sites, sewerage treatment, quarries or any other development activity will have injurious impact on the environment, the applicant will be required to submit together with the application an environmental impact assessment report”. This reinforces EIA requirements under EMCA (1999).

The Act creates the office of the Director of Physical Planning who is an appointee of the Public Service Commission. The Director is the chief advisor to the government on all matters relating to the physical planning and in addition performs such functions as are conferred upon him by or under the Act. However the Director at his discretion may delegate in writing any of his functions without diverting himself of such functions.

Under the act the director is assigned the responsibility of preparation of development plans. However, the control of development is vested in the respective local authorities. In the preparation of development plans, the act provides for the participation of the communities affected by such plans.

The Act establishes Physical Planning Liaison Committee at four levels namely; National, City of Nairobi City County, District and Municipality. The National Physical Planning Committee has the role of determining appeals lodged by aggrieved parties resolving matters referred to it and generally advising the Minister. The other committees deal with complaints against the Directors, arbitration on claims, development applications and appeals by aggrieved parties against the Director or local authorities. The property owners therefore are accorded the right of appeal against adverse decisions of planning authorities.

5.2.7 **The Malaria Prevention Act Cap 246**

- **Section 5 – Drainage System**

No operations shall obstruct flow of water into or out of any drainage. The management shall be required to maintain the drainage system within the area of the project for removal of water from any land around the project to prevent larvae breeding.
5.2.8 **Occupational Health and Safety Act**

This legislation provides for protection of workers during construction and operation phases. It is tailored at implementation of the EHS plan in compliance with the relevant sections of this Act.

- **Subsection 17 - Drainage of floors.**

Where any process is carried on which renders the floor liable to be wet to such an extent that the wet is capable of being removed by drainage, effective means shall be provided and maintained for draining off the wet.

- **Subsection 18 - Sanitary conveniences.**

Sufficient and suitable sanitary conveniences for persons employed in the factory/ work places shall be provided, maintained and kept clean, and effective provision shall be made for lighting the conveniences and where persons of both sexes are, such conveniences shall afford proper separate accommodation for persons of each sex.

- **Subsection 21 – Prime movers**

Every flywheel directly connected to any prime mover and every moving part of any prime mover, shall be securely fenced, whether the flywheel or prime mover is to be situated in an engine –house or not.

Head and tailrace of every water wheel and of every water turbine shall be securely fenced.

Every part of electric generators, motors and rotary converters and every flywheel directly connected thereto shall be securely fenced unless it is in such a position or of such construction as to be safe to every person employed or working in the premises as it would be if securely fenced.

**Subsection 22 - Transmission Machinery**

1. Every part of transmission machinery shall be securely fenced unless it is in such a position or of such construction as to be safe to every person employed or working in the premises, as it would be if securely fenced.

2. Efficient devices or appliances shall be provided and maintained in every room or place where work is carried on by which the power can promptly be cut-off from transmission machinery in that room or place.

3. Every machine intended to be driven by mechanical power shall be provided with an efficient starting and stopping appliance, the control of which shall be
in such a position as to be readily and conveniently operated by the person operating the machine.

Subsection 25 - Construction and maintenance of fencing

All fencing or other safeguards provided in pursuance of the a foregoing provisions shall be of substantial construction, constantly maintained, and kept in position while the parts required to be fenced or safe guarded are in motion or in use except when any such parts are necessarily exposed for examination and for any lubrication or adjustments shown by such examination to be immediately necessary.

Subsection 13 – Cleanliness

Every factory/work place shall be kept in a clean state and free from effluent arising from any drain, sanitary convenience or nuisance.

Subsection 14 – Overcrowding

A factory/ work place shall not while work is carried on be so overcrowded as to cause risk of injury to the health of the persons employed therein. Standard cubic space allowed for every person in a workroom should not be less than three hundred and fifty cubic feet.

- Section 51 Air pollution

Preventive measures shall be put in place during operation of the project to prevent fumes and exhaust gases from entering into the atmosphere.

5.2.9 The Chiefs’ Authority Act Cap 128

Section 10 parts (f), (g), (h), (i) and (o) of The Chiefs’ Act Cap 128 states that; any Chief may from time to time issue orders to be obeyed by the persons residing or being within the local limits of his jurisdiction for any of the following purposes

a) Preventing the pollution of the water in any stream, watercourse or water-hole, and preventing the obstruction of any stream or watercourse;
b) Regulating the cutting of timber and prohibiting the wasteful destruction of trees;
c) Preventing the spread of disease, whether of human beings or animals; and
d) Regulating the use of artificial water supplies constructed from public funds.

5.2.10 Way-leaves Act (Cap 292):

Under Section 3 of this Act, the Government may carry any sewer, drain or pipeline into, through, over or under any lands whatsoever but may not in so doing interfere with any existing building. Under Section 4.(1), the Government shall, at least one month before
carrying any sewer, drain or pipeline into, through, over or under any private land without the consent of the owner of the land, give notice of the intended work, either by notice in the Gazette or in such other manner as the Minister may in any case direct. The notice shall describe the nature of the intended work and shall name a place where the plan of the intended work is open for inspection at all reasonable hours. A copy of the notice shall either be served on every person resident in Kenya whose place of residence is known and who is known or believed to be the owner of any private land through, over or under which it is intended that any sewer, drain or pipeline shall be carried, or shall 'be posted in a conspicuous position on that land.

Section 6.(1) of this Act requires the Government to make good all damage done, and shall pay compensation to the owner of any tree or crops destroyed or damaged, in the execution of any power conferred by this Act. In the event of disagreement as to the amount of the compensation to be paid or as to the person entitled to receive compensation, any person interested may apply to the District Commissioner, who shall award to the person entitled to receive compensation such compensation as he thinks reasonable; and that award, subject to appeal to the Provincial Commissioner, shall be final.

5.2.11 Land Act, 2012
The Land Act 29 (“LA”) is the Kenya’s framework legislation regulating compulsory acquisition of land (i.e. land, houses, easements etc.). The LA was adopted on 2nd May 2012 and provides for sustainable administration and management of land and land based resources including compulsory acquisition. The land Acquisition Process as spelt out in the Land Act involves the following steps:

a. Compulsory possession is for public good
It is very explicit in the Land Act, 2012,Section 107,that whenever the national or county government is satisfied that it may be necessary to acquire some particular land under section 110 of Land Act2012, the possession of the land must be necessary for public purpose or public interest, such as, in the interests of public defence, public safety, public order, public morality, public health, urban and planning, or the development or utilization of any property in such manner as to promote the public benefit. Irrigation and drainage are explicitly identified as qualifying for land acquisition as public utility and the necessity therefore is such as to afford reasonable justification for the causing of any hardship that may result to any person having right over the property, and so certifies in writing, possession of such land maybe taken.

b. Respective Government agency or cabinet must seek approval of NLC
The respective Cabinet Secretary or Government agency or the County Executive
Committee Member must submit a request for acquisition of private land to the NLC to acquire the land on its behalf. The Commission will prescribe a criteria and guidelines to be adhered to by the acquiring authorities in the acquisition of land. It is important to note that if the NLC is constituted prior to conclusion of land acquisition, it could prescribe criteria and guidelines necessitating variations or revisions to the current RAP. Similar, the Commission has powers to reject a request of an acquiring authority, to undertake an acquisition if it establishes that the request does not meet the requirements prescribed.

c.  **Inspection of Land to be acquired**
NLC may physically ascertain or satisfy itself whether the intended land is suitable for the public purpose, which the applying authority intends to use as specified. If it certifies that indeed the land is required for public purpose, it shall express the satisfaction in writing and serve necessary notices to land owners and or approve the request made by acquiring authority intending to acquire land.

d.  **Publication of notice of intention to acquire**
Upon approval, NLC shall publish a notice of intention to acquire the land in the Kenya Gazette and County Gazette. It will then serve a copy of the notice to every person interested in the land and deposit the same copy to the Registrar. The courts have strictly interpreted this provision, requiring that the notice include the description of the land, indicate the public purpose for which the land is being acquired and state the name of the acquiring public body. NLC shall ensure that the provisions are included in her notice.

The Land Registrar shall then make entry in the master register on the intention to acquire as the office responsible for survey, at both national and county level, geo-references the land intended for acquisition.

e.  **Serve the notice of inquiry**
Thirty days after the publication of the Notice of Intention to Acquire, NLC will schedule a hearing for public inquiry. NLC must publish notice of this meeting in the Kenya Gazette and County gazette 15 days before the inquiry meeting and serve the notice one very person interested in the land to be acquired. Such notice must instruct owner of land to deliver to the NLC, no later than the date of the inquiry, a written claim for compensation.

f.  **Holding of a public hearing**
NLC then convenes a public hearing not earlier than 30 days after publication of the Notice of Intention to Acquire. On the date of the hearing, NLC must conduct a full inquiry to determine the number of individuals who have legitimate claims on the land, the land value and the amount of compensation payable to each legitimate claimant. Besides, at the
hearing, the Commission shall—make full inquiry into and determine who are the persons interested in the land; and receive written claims of compensation from those interested in the land. For the purposes of an inquiry, the Commission shall have all the powers of the Court to summon and examine witnesses, including the persons interested in the land, to administer oaths and affirmations and to compel the production and delivery to the Commission (NLC) of documents of title to the land.

The public body for whose purposes the land is being acquired, and every person interested in the land, is entitled to be heard, to produce evidence and to call and to question witnesses at an inquiry. It will also provide opportunity to land owners to hear the justification of the public authority in laying claims to acquire the land.

g. Valuation of the land

Part III of the Land Act 2012, section 113 (2a) states that “the Commission shall determine the value of land with conclusive evidence of (i) the size of land to be acquired; (ii) the value, in the opinion of the Commission, of the land; (iii) the amount of compensation payable, whether the owners of land have or have not appeared at the inquiry.” This can be interpreted that NLC must determine the value of the land accordingly and pay appropriate just compensation in accordance with the principles and formulae that it will develop. Nonetheless, just compensation could also be interpreted as market rate. The final award on the value of the land shall be determined by NLC and shall not be invalidated by reason of discrepancy, which may be found in the existing area.

h. Matters to be considered in determining compensation:
The market value of the property, which is determined at the date of the publication of the acquisition notice, must be considered. Determination of the value has to take into consideration the conditions of the title and the regulations that classify the land use e.g. agricultural, residential, commercial or industrial.

5.2.1.2 County Government Act No. 17 of 2012

Part II of the Act empowers the county government to be in charge of function described in Article 186 of the constitution, (county roads, water and Sanitation, Health), Part XI of the Act vest the responsibility of planning and development facilitation to the county government with collaboration with national government, this arrangement has been adopted for interventions in order not to conflict with provisions of the Kenyan Constitution.

5.2.1.3 Work Injury Benefits Act, (WIBA 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.

5.3 Institutional Structure

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

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

The MTIHUD is the project proponent and is implementing the construction of storm water drainage system in NMR through Nairobi Metropolitan Services Improvement Project (NaMSIP).

5.3.3 The Directorate of Nairobi Metropolitan Development

In the capacity of Employer, the Ministry of Land, Housing and Urban Development, Nairobi Metropolitan Development through the NaMSIP Project Coordinating Team (PCT) has administrative jurisdiction over the ESIA process.

5.3.4 Nairobi City County, Kajiado, Machakos and Kiambu County Governments

The mandate of floods Preparedness and Management in Nairobi City County, Kajiado, Machakos and Kiambu is the responsibility of Nairobi City County Kajiado, Machakos and Kiambu County Governments.

5.4 NEMA Compliance

The government established the National Environmental Management Authority (NEMA) as the supreme regulatory and advisory bodies on environmental management in Kenya under EMCA 1999 with 2015 amendments. NEMA is charged with the responsibility of coordinating and supervising the various environmental management activities being
undertaken by other statutory organs. NEMA also ensures that environmental management is integrated into development policies, programmes, plans and projects.

5.5 **Sectoral Integration**

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

5.6 **World Bank Safeguard Policies**

The project will only trigger Environmental Assessment OP 4.01 as discussed below. Other Operational Safeguard Policies of the World Bank as illustrated by Table 1 below are not triggered.

<table>
<thead>
<tr>
<th>World Bank Operation Policy</th>
<th>Applicability to the Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Assessment OP 4.01</td>
<td>Applicable. As a result of environmental and social screening, the project was identified as a Category B</td>
</tr>
<tr>
<td>Natural Habitats OP 4.04</td>
<td>Not applicable - there are no natural habitats at the project site</td>
</tr>
<tr>
<td>Pest Management OP 4.09</td>
<td>Not applicable- the project will not involve any pest management</td>
</tr>
<tr>
<td>Indigenous Peoples OP 4.10</td>
<td>Not applicable- there are no indigenous people at the site or project area</td>
</tr>
<tr>
<td>Physical Cultural Resources OP 4.11</td>
<td>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</td>
</tr>
</tbody>
</table>
5.6.1 Environmental Assessment OP 4.01

The project is planned to be implemented in Nairobi City, Kajiado, Machakos and Kiambu counties selected storm water systems. The areas with the selected systems and due to anthropogenic activities have exerted pressure on both natural and social environment. The Project will have less significant impact on physical, biological and social settings within the immediate surroundings. However OP 4.01 will be triggered.

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

Operational Policy 4.01 further requires that the EA report must be disclosed as a separate and stand-alone document by the Government of Kenya and the World Bank. The disclosure should be both in Kenya where it can be accessed by the general public and

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involuntary Resettlement OP 4.12</td>
<td>Not applicable. The proposed projects will not involve displacement of persons or relocation of assets or any structures. The design of the storm water drainage line has been realigned in many places in order to avoid affecting assets or persons, as per provisions set in OP 4.12.</td>
</tr>
<tr>
<td>Forests OP 4.36</td>
<td>Not applicable- there is no forest at the site</td>
</tr>
<tr>
<td>Safety of Dams  OP 4.37</td>
<td>Not applicable because the project will not involve construction of dams.</td>
</tr>
<tr>
<td>Projects on International Waters (OP 7.50)</td>
<td>Not applicable- the site does not sit on international waters</td>
</tr>
<tr>
<td>Projects in Disputed Areas (7.60)</td>
<td>The site is not classified as disputed in the project area.</td>
</tr>
</tbody>
</table>
local communities and at the WB Website of the World Bank and the date for disclosure must precede the date for appraisal of the Project.

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

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

### 5.6.2 Harmonization of both WB and GOK requirements for social and environmental sustainability

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

- Both require Environmental Assessment before project implementation leading to development of comprehensive Environmental and social Management plans to guide resolution of social and environmental impacts as anticipated.
- Both require public disclosure of Project Report and stakeholder consultations 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 2015 is adequate to
address all World Bank requirements for environmental and social assessment. This is a major guiding principle in this study.

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

6.1 Legal and Policy Provisions for Stakeholder Consultations


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

- Posting posters in strategic public places in the vicinity of the site of the proposed project informing the affected parties and communities of the proposed project;
- Publishing a notice on the proposed project for two successive weeks in a newspaper that has a nation-wide circulation;
- Making an announcement of the notice in both official and local languages in a radio with a nation-wide coverage for at least once a week for two consecutive weeks.
- Hold at least three public meetings with the affected parties and communities to explain the project and its effects, and to receive their oral or written comments; ensure that appropriate notices are sent out at least one week prior to the meetings and that the venue and times of the meetings are convenient for the affected communities and the other concerned parties; and
- Ensure, in consultation with the Authority that a suitably qualified co-coordinator is appointed to receive and record both oral and written comments and any translations thereof received during all public meetings for onward transmission to the Authority.
6.1.2 World Bank Group (WBG) Environmental Assessment Policy (OP 4.01)

The World Bank Group’s Environmental Assessment Policy (OP 4.01, January 1999) requires that project-affected groups and local non-governmental organizations (NGOs) be consulted during the impact assessments process about the project’s potential environmental and social impacts.

The purpose of this consultation is to take local views into account in designing the environmental and social management plans as well as in project design. For complex projects where the environmental impacts and risks are high, the policy requires public consultation at least twice: first, shortly after Environmental Screening and before the terms of reference for the ESIA are finalized and secondly, once a draft ESIA Report is prepared. Consultation during project execution is also required. Section 6.2 summarizes the consultation outcome for the ESIAs, and confirms that the project meets and indeed exceeds these requirements.

6.1.3 Stakeholders consulted

Various stakeholder groups were consulted during the study (Appendix 2-9), which mainly included residents of the selected areas where the project is located as well as any institutions.

6.1.4 Consultation methodology

The study utilized several methods to conduct public consultations:

- Questionnaires.
- Consultative forums with key informants.
- Barazas/public meetings

The main key informants targeted in the consultations and interviews were both Government and private Institutions operating within the project area as well as general residents. Meetings were convened in public areas to enable maximum attendance and were organised in collaboration with respective Area Chiefs and Assistant Chiefs.
6.2 Summary of Consultation Outcome

The people consulted gave a candid view of the proposal. The views reflect different interests and positions in the community. They expressed appreciation to the proponent for the proposal.

The following is the summary of issues that emerged during public consultations for this ESIA assessment:

6.2.1 Public concerns

Employment-This is a key benefit of any project that host communities can gain from a proposed project. They thus expressed the need for the proponent to observe the following with regard to employment. Those responsible for project implementation ensure that youth from the area are given priority in recruiting labour force. The PAPs were emphatic especially on the recruitment of manual labour. While recruiting employees during the operation phase there is need to consider local population skilled in various issues.

Reduced pollution.-The residents living along the drains felt that rehabilitation and maintenance will help curb the problem of pollution. The major source of pollution for the drainage systems was identified to be solid waste disposal. This has led to release of bad odour in the surroundings and loss of aesthetic value of the environment. The proposed project if implemented and operated as envisaged will arrest this pollution.
**Participation in the life of the community**-The proponent has become part and parcel of the local community. There is thus need to fully participate in the life of the local community in improving the lot of the people.

**Implementation** - Given the immense benefits that the proposed project will produce, the community members urged the proponent to hasten so that the community can start benefitting from it. Those living in towns are especially very keen on the sanitation aspect.

**Manual labour** - As much as is practically possible, machinery should not be used where manual labour can be used to increase employment opportunities for the community.

**Remuneration** -- Contractors should be advised not to underpay local people who will be employed on casual basis.

**Open communication**-To avert unnecessary conflicts, there is need for prompt communication to all stakeholders. This could be through the use of the local administration and any information or clarification about stakeholders’ position on project need to be promptly availed to any interested party. Any complaints need to be handled through the structured grievance redress mechanism as presented in this report.

**Project acceptance and support**-There was a near unanimous support for the proposed project. This was as a result of clear explanation of what is proposed and the way forward in the implementation process. The community understood that the project is feasible in all aspects. In addition, the project will spur growth in the area. The local administration indicated that it and the entire community would support the project as long as it promoted development in the area. The community has no objections for the project since there are similar projects in other parts of the country that have benefited the residents.

**6.2.2 Stakeholders’ concerns**
The following is a summary of concerns that were raised by the consulted stakeholders regarding implementation of the proposed project;

- Interference with services such as transport during excavations of trenches crossing roads.
- The construction period impacts such as noise and air pollution (dust generation), construction waste, etc.
- Blockage of access roads during construction

**6.3 Public Disclosure of ESIA and Annual Monitoring Reports**
In accordance with NEMA and World Bank guidelines on environmental and social
safeguards, the project proponent in this case State Department for Housing & Urban Development (SDH&UD) will ensure that the results of public consultations including ESIA are published on the Ministry’s website for wider circulation and review.

The reports will also be made available at the projects sites. This disclosure will be done early before commencement of project works, approximately 60 days before Contractor’s mobilization on site. In addition, (SDH&UD) will ensure that the ESIA Report is available throughout the project construction phase.

The ESIA report and information will be disclosed at the ESIA stage by NEMA and during project Implementation stage by (SDH&UD). NEMA will require (SDH&UD) to undertake a closeout audit after completion of the project and also undertake an initial Environment Audit (EA) immediately after commissioning of the project in the 1st year. These audits are essential in determining the performance of the project in addressing issues related to environment and social safeguards, gaps identified are corrected through implementation of recommendation of the Environment and Social Audit Action Plan (ESAAP).

6.4 Construction, Operation and Decommissioning Phase Consultations

Stakeholder groups that may be affected by and/or interested in the implementation of the Project, as well as proposed communication methods and media for each group, have been identified and are presented in the table below.

<table>
<thead>
<tr>
<th>Stakeholder/s</th>
<th>Type of communication</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>External Stakeholders</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community Members</td>
<td>Public meetings and monthly project progress updates</td>
<td>Contractor &amp; SDH&amp;UD</td>
<td>Throughout project implementation phase</td>
</tr>
<tr>
<td>Local administration representatives Chiefs and Ward</td>
<td>Public meetings and monthly project progress updates</td>
<td>Contractor &amp; SDH&amp;UD</td>
<td>Throughout project implementation phase</td>
</tr>
<tr>
<td>Interested NGOs and other civil societies</td>
<td>Local media ESIA, published on SDH&amp;UD) website.</td>
<td>Contractor &amp; SDH&amp;UD</td>
<td>Throughout the implementation of the Project</td>
</tr>
<tr>
<td>Relevant National Government and County Government Authorities for example: KURA, Kenya Power</td>
<td>Official correspondence and meetings, progress reports</td>
<td>Contractor &amp; SDH&amp;UD</td>
<td>During project design, construction and implementation</td>
</tr>
</tbody>
</table>
6.4.1 Community Relations in Construction Phase

This section sets out the proposed objectives, mechanisms, and responsibilities for liaison with settlements affected by the project during the construction phase. It identifies the approach to, and frequency of, consultation with affected settlements.

The primary responsibility for liaison will be borne by the construction contractor SDH&UD, which will therefore require the contractor to develop its own plan and more detailed proposals for community liaison. This will build on the approach outlined in this section. All potential contractors will be required to draw up this plan as part of the tender process.

The objectives of the Community Relations Programme will be to:

- Provide local residents affected by the project with regular information on the progress of work and implications for these settlements.
- Inform the project/contractor of any community-related issues that may impact construction.
- Monitor implementation of mitigation measures and the impact of construction via direct monitoring and feedback from settlements.
- Identify any significant new issues that may arise during the construction period; and
- Manage any complaints against the project/contractors and local residents (i.e., provide a grievance mechanism).

6.4.2 Construction Contractor’s Role in Community Liaison

The Construction Contractor will be required to adhere to the requirements of the Environmental and Social Management and Monitoring Plan (ESMMP) that sets out how the contractor will meet and monitor the mitigation measures recommended by the Plan. The role and responsibilities of the Contractor include:
• Provide primary interface between project and affected or interested persons;
• Coordinate and implement required pre-construction activities, namely;
• produce management plans for community relations, construction camps and transport; train staff with community relations responsibilities; and
• Implement induction training workshops for all construction staff;
• Assist in local recruitment process; and
• Ensure on-going communication with interested persons

6.4.3 Community Relations in Operational Phase
The objective of the Community Relations Programme in this Phase will be to:

- Maintain constructive relationships between local residents
- Maintain awareness of safety issues among local residents in the project areas;
- Ensure compliance with land use constraints among land owners in the project areas;
- Monitor community attitudes to the storm water drainage systems

6.4.4 Decommissioning
In the unlikely event of decommissioning of the project, liaison will continue to take place between SDH&UD and Nairobi City, Kiambu, Machakos and Kajiado County Governments and with project interested persons prior to de-commissioning. This role will complement work carried out by the operating company and social investment team to reduce the negative impact of the project decommissioning.
CHAPTER 7: ENVIRONMENTAL AND SOCIAL IMPACTS ASSESSMENT & MITIGATION MEASURES

7.1 Introduction

A study of potential environmental impacts as a result of the proposed project was carried out. From observations made in the field and discussions held with various people, a number of aspects affecting the natural, physical, economic and social environment were noted. These observations are also intended as useful pointers during the design stage of this project.

Once potential impacts of the proposed project were identified, the team went further to predict the nature of the impacts. Predictions are normally based on explicit assumptions about environmental processes, professional judgment and different value judgments expressed by various stakeholders during consultations. Determination of the significance of the potential impacts was based on the three broad categories of determining impact significance. These are:

- Legal: The importance of environmental conservation is acknowledged in existing policies, laws and plans.
- Public: segment of the public recognize the importance of environmental conservation. This recognition takes place in the form of support and sometimes conflict and opposition.
- Technical: the importance of an environmental resource is based on the scientific knowledge of the critical resource characteristics.

7.2 Potential Environmental Impacts

7.2.1 Potential positive impacts

There are a number of positive benefits associated with the proposed project. They include the following:

- Improvement in Public Health Conditions by reduction in waterborne diseases and vector transmitted diseases by eliminating sewage in open drains.
- Provision of employment opportunities during both construction and operation phases of the project
- Environmental conservation and management due to elimination of storm water drains pollution from solid waste disposal
- Improved environmental aesthetics
Cleaner air due to reduced odour from the polluted drains

7.2.2 Potential negative impacts associated with Construction Activities

Air Quality
Bush clearing, materials delivery, trench excavation and construction traffic will generate a lot of dust especially during the construction of the new storm water drains and to a lesser extent during the rehabilitation of the existing system. Vehicular traffic emissions will bring about air pollution. Cleared vegetation burnt onsite would generate smoke, possibly impacting negatively on ambient air quality and human health. All these impacts are temporary and limited to construction area.

Mitigation:

- As much as possible apply water in the working area to reduce the amount of dust.
- Use protective clothing like helmets and dust masks by the construction crew.
- Contractors should consider additional ways to reduce potential impacts including implementing a regular vehicle maintenance and repair program.
- Recruit staff from the surrounding communities to decrease the travelling distance thus reducing emissions from vehicular traffic.
- Ensure that all vehicles involved in the transport of construction material and staff, and machinery involved in the construction is properly maintained and serviced.
- Machines must not be left idling for unnecessary periods of time; this will save fuel and reduce emissions.

Soil related Impacts
All construction activities have some minor impacts on the soil. However, these are localised and restricted locally to the trenches for the storm water drains. It is expected that these impacts are short term and are to be experienced during construction; mitigation measures are recommended. The key impacts will revolve around soil erosion particularly during the rains; contamination; disturbance of the natural soil structure; mixing of layers and compaction thus reducing the ecological function of the soil. The soil may get contaminated by oil spill from construction machineries and from and disruption of pit latrines. The potential of soil erosion will be greater where the gradient is steep and at outfall locations.

During rehabilitation of the existing storm water drains, soil contamination may arise from clearing the drains and not disposing properly the silt and refuse from these drains.
Mitigation

- Install energy dissipaters at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion.
- The valuable top soil containing organic material, nutrients as well as seeds and the soil fauna would be excavated separately and piled in an adequate manner for re-use.
- After completion of the construction works, immediate restoration by spreading piled top soil and by sowing adequate grass cover and planting of bushes will be followed, therefore the impact is temporary and reversible
- Plan emergency response measures in case of accidental oil spills.
- Avoid as far as possible the traversing of bare soil by vehicles to reduce soil compaction;
- Designate a main access route for heavy machinery

Land Related Impacts (Solid wastes)

Improper handling of solid wastes produced in construction camps, during bush clearing, electromechanical and civil works such as; spoil from excavations, wooden scaffolding and forms, plastic bags scrap metal, resin, wasted concrete, paper, masonry chips and left over food stuff, presents a public nuisance due to littering or smells from rotting. Vegetation and solid waste, if allowed to accumulate in water ways, may cause localized pooling and flooding. Pooling of water, in turn, would create conditions conducive to the breeding of nuisance and health-threatening pests such as mosquitoes

Mitigation

- A site waste management plan, should be prepared by the contractor prior to commencement of construction works. This should include designation of appropriate waste storage areas, collection and removal schedule and identification of approved disposal site.
- Unusable construction waste, such as damaged pipes, formwork and other construction material, must be disposed off at an approved dumpsite or sold to willing buyers at salvage value.
- Proper solid waste receptacles and storage containers should be provided, particularly for the disposal of lunch and drink boxes so as to prevent littering of the site.
- Ensure proper maintenance of Storm water drainage system.
- Ensure that the solid waste collection, segregation, and disposal system is functioning properly at all times during operation.
• Recycle and re-use wastes where possible.
• All storm drain inlets and catch basins within the project area, must be stenciled with prohibitive language (such as: “NO DUMPING”) and/or graphical icons to discourage illegal dumping. Signs and prohibitive language and/or graphical icons, which prohibit illegal dumping, must be posted at public access points along channels within the project area.
• Legibility of stencils and signs must be maintained.

Noise and vibration
Activities such as materials delivery, trench excavation and construction traffic will generate a lot of noise and vibration.

Mitigation
- Best available work practices will be employed on-site to minimize occupational noise levels.
- All construction equipment will be regularly inspected and maintained in good working condition.
- Combine noisy operations so that they occur at the same time. The total noise level will not be significantly louder than the level produced if the operations were to be undertaken separately.
- Noisy operations will be carried out strictly during the day time.
- Switch off engines when not in use.
- Access roads should be cut that are exclusively used for the transportation of workers, goods and materials. These roads should be sited in such a way that the noise from this movement affects as few of the existing residents as possible.
- Where possible silenced machinery and instruments should be employed to reduce the impact of noise on the existing residents and workers.
- Machinery, vehicles and instruments that emit high levels of noise should be used on a phased basis to reduce the overall impact. These pieces of equipment such as drills, graders and cement mixers should also be used when the least number of residents can be expected to be affected, for example during periods where most residents are at work or school.

Risk of Accidents at Work Sites
Accidents during construction activities may occur due to failure to use Personal Protective Equipment (PPE) by workers on site and members of the public illegally accessing the work sites. Accidents may result in injuries or even death of workers or members of the public. This impact applies to all settlements under this assessment.
Mitigation Measures

- Construction Workers and the Supervising Team to be provided with Personal Protective Equipment including gloves, gum boots, overalls and helmets. Use of PPE to be enforced by the Supervising Engineer.
- Fully stocked First Aid Kits to be provided within the Sites, Camps and in all Project Vehicles
- Adequate Ablution Facilities to be provided at the Camps and Work Sites and cleanliness maintained
- Isolate the site for access by the local communities during the construction for their safety and health
- Contractor to provide a Healthy and Safety Plan prior to the commencement of works to be approved by the Supervising Engineer.
- Camps and Work Sites to be fenced off and Security Guards provided to restrict access to members of the public.

Vegetation removal

Removal of vegetation as well as trees will lead to loss of plants and animal habitat. The biodiversity affected include: insects such as butterflies and worms, small mammals, reptiles and birds. Water contamination with cement will cause it to be highly alkaline and toxic to fish, plants and animals living in water courses. Cement particles entering a water course may clog fish gills and also destroy their spawning grounds.

Mitigation

- Re-plant the indigenous vegetation as much as practical once work is completed.
- Spare the vegetation that must not necessarily be removed such as trees.
- The landscaping plan should seek to avoid the use of non-native and potentially invasive species.
- Cement mixing should be done in a designated area, away at a safe distance from storm water drains;
- Spilled cement or concrete should be collected and disposed away from natural water ways or storm water drainage;
- Sensitise workers and enable them to properly handle concrete spillages or waste cement.

Service delivery impacts

The construction activities will cause disruption of services such as water supply, electricity, sanitation and transportation within the construction area. Excavation of trenches for the storm water drains may cut the water pipes and the sewer line. Excavation of trenches will
necessitate digging up of roads, pavements and structures that may have encroached upon the road reserve. This will cause disruption of transport and other services.

**Mitigation**
- Put up signs to warn motorists and other road users of the construction activities.
- Put up signs to show diversion routes where the roads need to be closed.
- The contractor should communicate any intended disruption of services especially water, electricity and transport in advance.
- Traffic department should approve crossing plan prior to construction, and should approve obstruction times during construction.
- Access of residents should be facilitated by installing appropriate temporary bridges over the trenches

**Impacts on Land Use**
Impacts on land use will be limited to those areas, where crossing of farm land is unavoidable.
The loss of harvest is temporary and reversible, and furthermore will be compensated at the official compensation rates. Therefore no significant impact on agricultural land use is expected.

**Mitigation**
Restoration of land after pipe laying will be done.

**Public Health, Safety and HIV & AIDs Impacts**
Vehicular traffic to the proposed sites is expected to increase especially during delivery of raw materials. This may cause an increase in the number of accidents. The construction works will expose workers to occupational risks due to handling of heavy machinery, construction noise, electromechanical works etc. Construction activities of bush clearing, materials delivery, trench excavation and concrete mixing and construction traffic, will generate a lot of dust especially during the dry seasons and this may affect workers’ respiratory systems. Construction camp may be a source of both liquid and solid wastes. If these wastes are not well disposed, these sites may become breeding grounds for disease causing pests such as mosquitoes and rodents. At the concrete mixing plant the exposure of human skin to cement may lead to damage of the skin. In migration of people from different regions may lead to behavioral influences, which may increase the spread of diseases such as HIV/AIDS. Improper handling of solid wastes produced during electromechanical and civil works, such as spoil from excavations, scrap metal, resin, mortar, wood, paper, masonry chips and left over food stuff present a public nuisance due to littering or smell due to rotting.

**Mitigation**
• Implement HIV/AIDS prophylaxis for men and women through appropriate health promotion, as well as wide distribution and use of condoms, employment opportunities for affected persons and provision of family accommodation for workers.

• Work to minimize or altogether eliminate mosquito breeding sites.

• Provide appropriate human and solid waste disposal facilities

• Ensure that all construction machines and equipment are in good working conditions to prevent occupational hazards.

• Establish a Health and Safety Plan (HASP) for both civil and electromechanical work.

• Appoint a trained health and safety team for the duration of the construction work.

• Provide workers with protective gear (such as dust masks, helmet, gloves and overalls).

• Provide training on safety procedures and emergency response such as fire, oil and chemical spills.

• As much as practical, apply water in the working area to reduce the amount of dust.

Gender Empowerment Impacts
There is need to promote gender equality in all aspects of economic development and more so in construction. Women roles in construction works are mainly confined to vending of foodstuffs to the construction workers

Mitigation
Ensure equitable distribution of employment opportunities between men and women

7.2.3 Potential negative impacts associated with operation activities

Water pollution
During periods of heavy rainfall some wastewater systems may overflow and discharge excess untreated sewage directly to nearby streams, rivers or other water bodies. These discharges are known as combined sewer overflows.

Mitigation measure
- Apply for discharge license and conduct water quality monitoring quarterly as required by law

Waste management
Storm water may wash away solid or liquid waste and discharge it to nearby streams, rivers or other water bodies.
Mitigation measure

- Storm water run-on shall be prevented from contacting stored solid waste through the use of berms, dikes, or other temporary diversion structures or through the use of measures to elevate waste from site surfaces
- Waste should be disposed in designated sites as approved by NEMA

Labor arrangement for maintenance activities

Routine maintenance (grass cutting, general cleaning and unblocking) will be undertaken on regular basis. Seasonal maintenance such as flood repairs, emergency maintenance to reinstate drainage systems after major failures, and the regular upkeep of safety features will be undertaken as necessary. Major maintenance that includes reconstruction and repairs are typically scheduled over periods of several years.

Mitigation measure

- The project provides for the Contractor to train teams of local people for routine maintenance activities. The County governments of Kajiado, Nairobi City, Kiambu and Machakos will ensure that there is sufficient funding available to carry out routine and periodic maintenance of the drainage systems in their area. This will be addressed by a Technical Assistance activity to be done under the project.

7.2.4 Decommissioning

Decommissioning refers to the final disposal of the project and associated materials, at the expiry of the project design life. De-commissioning is not anticipated in the case of this storm water drainage project; instead expansion of the project will be done at the end of the design life.
CHAPTER EIGHT: ENVIRONMENTAL AND SOCIAL MANAGEMENT & MONITORING PLAN (ESMMP)

8.1 Purpose and Objectives of ESMMP

The specific objectives of the ESMMP are to:

- Serve as a commitment and reference for the contractor to implement the ESMMP including conditions of approval from NEMA.
- Serve as a guiding document for the environmental and social monitoring activities for the supervising consultant, contractor and the client management including requisite progress reports.
- Provide detailed specifications for the management and mitigation of activities that have the potential to impact negatively on the environment.
- Provide instructions to relevant Project personnel regarding procedures for protecting the environment and minimizing environmental effects, thereby supporting the Project goal of minimal or zero incidents.
- Document environmental concerns and appropriate protection measures; while ensuring that corrective actions are completed in a timely manner.

8.2 Auditing of ESMMP

The contractor shall conduct regular audits to the ESMMP to ensure that the system for implementation of the ESMMP is operating effectively. The audit shall check that a procedure is in place to ensure that:

- The ESMMP being used is the up to date version;
- Variations to the ESMMP and non-compliance and corrective action are documented;
- Appropriate environmental training of personnel is undertaken;
- Emergency procedures are in place and effectively communicated to personnel;
- A register of major incidents (spills, injuries, complaints) is in place and other documentation related to the ESMMP; and
- Ensure that appropriate corrective and preventive action is taken by the Contractor once instructions have been issued

8.3 Management Responsibility of ESMMP

In order to ensure the sound development and effective implementation of the ESMMP, it will be necessary to identify and define the responsibilities and authority of the various persons and Organizations which will be involved in the project. The following entities should be involved in the implementation of this ESMMP:
• NEMA;
• Contractor;
• Consultant ;
• County Governments of Nairobi City, Kajiado, Machakos and Kiambu.

8.3.1 National Environment Management Authority (NEMA)
The responsibility of NEMA is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government of Kenya in the implementation of all policies relating to the environment.

8.3.2 The Contractor
The persons/firms contracted to put up the proposed fire station infrastructure will be required to comply with the requirements of the ESMMP within this report. To ensure strict compliance environmental specifications of this ESMMP should form part of the contract documents.

8.3.3 Consultant
The sourced consultant will have to ensure that the proposed ESMMP is up to date and is being used by the contractor. Periodic audits of the ESMMP will have to be done to ensure that its performance is as expected.

8.3.4 County Government of Nairobi City County, Kajiado, Machakos and Kiambu
The relevant departmental officers in the above County governments will be called upon where necessary during Project implementation to provide the necessary permits and advisory services to the Project implementers. The Project once commissioned will be operated by the County Government of Nairobi under the Fire Bridget department.

Tables 3, 4 and 5 present the ESMMP for the proposed construction of storm water drainage systems in NMR during the construction, operation and decommissioning phases respectively.

8.4 Construction Phase Environmental and Social, Management Plan
The table 3 below summarizes the environmental management plan for the proposed project. They describe parameters that can be monitored, and suggest how monitoring should be done, how frequently, and who should be responsible for implementation and monitoring. The estimated costs for the various mitigation measures have been provided where possible. It will be noted that most of these measures will be part of the project’s operational costs.
### Table 3: Construction Phase ESMMP

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<thead>
<tr>
<th>POTENTIAL IMPACT</th>
<th>MITIGATION MEASURES</th>
<th>RESPONSIBILITY</th>
<th>TIME FRAME</th>
<th>COST ESTIMATE KSHS</th>
</tr>
</thead>
</table>
| Air pollution    | ▪ Regardless of the size or type of vehicle, operators should implement the manufacturer recommended engine maintenance programs;  
▪ Drivers should be instructed on the benefits of driving practices that reduce both the risk of accidents and fuel consumption, including measured acceleration and driving within safe speed limits;  
▪ Contractors should consider additional ways to reduce potential impacts including implementing a regular vehicle maintenance and repair program.  
▪ Recruit staff from the surrounding communities to decrease the travelling distance thus reducing emissions from vehicular traffic.  
▪ Ensure that all vehicles involved in the transport of construction material and staff, and machinery involved in the construction is properly maintained and serviced.  
▪ Machines must not be left idling for unnecessary periods of time; this will save fuel and reduce emissions.  
▪ Use of dust control methods, such as covers, water suppression, or increased moisture content for open materials storage piles, or controls, including air extraction and treatment through a bughouse or cyclone for material handling sources, such as conveyors and bins;  
▪ Ensure that all material (sand        | Contractor  
▪ Resident Engineer | Throughout the construction period | 1,200,000 |
<table>
<thead>
<tr>
<th>POTENTIAL IMPACT</th>
<th>MITIGATION MEASURES</th>
<th>RESPONSIBILITY</th>
<th>TIME FRAME</th>
<th>COST ESTIMATE</th>
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</thead>
</table>
| Soil erosion and contamination | - Only remove vegetation from areas for the storm water drain  
- Avoid as far as possible the traversing of bare soil by Civil Engineer and Contractor  
Throughout the construction period | 1,000,000 |

and aggregate) stockpiled on the site to be used in construction activities are regularly sprayed to reduce the effects of wind whipping.  
- Ensure that all trucks carrying aggregate and sand are covered during delivery to the site.  
- Care must be taken in the unloading construction materials (aggregate, sand and cement) to prevent spillage. If a spill occurs, this should be cleaned up as soon as possible thereafter.  
- Extra care must be taken to reduce dust in periods when wind speed is greatest and the rainfall amounts are lowest. This will involve extra wetting of the construction area to suppress dust particles.  
- Retain a buffer area of trees and other vegetation generally around the perimeter of the development site which will serve as a natural windbreaks which may reduce the level of dispersion of dust particles generated during this phases of the development.  
- All raw materials must be sourced as close as possible to the construction site thus reducing the emissions from vehicular traffic.  
- All waste must be transported off-site for processing, not burnt or stored for any longer than is absolutely necessary.
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<tr>
<th>POTENTIAL IMPACT</th>
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<th>COST ESTIMATE KSHS</th>
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<tr>
<td></td>
<td>- Vehicles to reduce soil compaction;                                                                ---------------------------------------------------------------------------------------------------------------</td>
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<td>§ Designate a main access route for heavy machinery;</td>
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<td>§ Avoid site Preparation in period when wind velocities are highest.</td>
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<td>§ Areas storing hazardous substances such as diesel must be properly contained in a bunded area (With capacity to contain 1 ½ times the amount of substances stored. This area must be situated away from project activities and signs indicating the storage of these substances erected. Care must be taken when handling these hazardous substances to avoid spills.</td>
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<td>§ In the event of an oil spill the contaminated soil must be removed and disposed off</td>
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<td>Solid wastes</td>
<td>§ Use an integrated wastes management system observing the following hierarchy of options:    vi. Reduction at source vii. Recycling viii. Reuse ix. Combustion x. Land filling.</td>
<td>Contractor</td>
<td>Throughout the construction period</td>
<td>600,000</td>
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<td>§ Incorporation of waste management commitments contained in the Waste Management Guidelines</td>
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<td>§ Agreement with suppliers to accept the return of unused materials.</td>
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<td>§ Agreement with and license details of companies to be used for the off-site transport of wastes</td>
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<td>§ Workforce training programs in waste minimization practices</td>
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<tr>
<td>Where practical any excess materials will be returned to the supplier</td>
<td>Waste oil will be collected for transport and off-site disposal</td>
<td>The Contractor shall set up a solid waste control and removal system.</td>
<td>Contractor</td>
<td>Throughout construction phase</td>
</tr>
<tr>
<td>Littering, specifically of the natural areas, should be prevented. Adequate containers for litter removal should be supplied on site. These containers should be emptied on a regular basis and the contents removed to an appropriate and licensed waste disposal site.</td>
<td>Bins shall be emptied on a daily basis.</td>
<td>Waste and litter shall be disposed of into scavenger – and weather proof bins. The contractor shall then remove the refuse collected from the working areas, from site at least once a week.</td>
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<td>Noise and vibration</td>
<td>Best available work practices will be employed on-site to minimize occupational noise levels. All construction equipment will be regularly inspected and maintained in good working condition. Combine noisy operations so that they occur at the same time. The total noise level will not be significantly louder than the level produced if the operations were to be undertaken separately. Noisy operations will be carried out strictly during the day time.</td>
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<td>▪ Switch off engines when not in use.</td>
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<td>▪ Access roads should be cut that are exclusively used for the transportation of workers, goods and materials. These roads should be sited in such a way that the noise from this movement affects as few of the existing residents as possible.</td>
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<td>▪ Where possible silenced machinery and instruments should be employed to reduce the impact of noise on the existing residents and workers.</td>
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<td>▪ Machinery, vehicles and instruments that emit high levels of noise should be used on a phased basis to reduce the overall impact. These pieces of equipment such as drills, graders and cement mixers should also be used when the least number of residents can be expected to be affected, for example during periods where most residents are at work or school.</td>
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<td></td>
<td>▪ Temporary barriers such as earth berms, zinc fencing and sound dampening fencing such as acoustic screens should be employed to reduce the impact of noise to the existing residents;</td>
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<td>▪ Ensure that construction activities for the development of the project are staggered to decrease the levels of noise and vibration in the area;</td>
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<td>▪ Construction hours should be limited to the hours of 8:00 a.m. and 6:00 p.m. daily.</td>
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<tr>
<td>The delivery of raw materials must be limited to 8:00 a.m. and 6:00 P.M daily.</td>
<td>▪ Only clear vegetation that is absolutely necessary for the construction activities; ▪ Retain all mature trees (&gt; 25 cm diameter at breast height (DBH)) during this phase of the development if possible; ▪ Avoid the use of Invasive Alien Species in the landscaping activities ▪ Determine access roads which are to be used by machinery used in the construction and site clearance phase of the development to avoid the unnecessary trampling of vegetation that will be maintained within the development area.</td>
<td>Contractor</td>
<td>Throughout construction phase</td>
<td>200,000</td>
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<td>Flora and fauna (biodiversity loss)</td>
<td>▪ Provide diversion routes where possible. ▪ Give a construction itinerary in advance so that the potentially affected population can use alternative routes and start early to get to their destinations on time. ▪ Erect warning signs of ongoing works. ▪ Expedite construction works so as to reduce the times where roads are blocked. ▪ Traffic department should approve crossing plan prior to construction, and should approve obstruction times during construction. ▪ Access of residents should be facilitated by installing appropriate temporary bridges over the trenches.</td>
<td>Contractor</td>
<td>Throughout the construction phase</td>
<td>450,000</td>
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<td>POTENTIAL IMPACT</td>
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| Damage of underground infrastructure   | ▪ Suitable warning signs should be placed at near locations and should be visible at night.  
▪ Alternatives access ways should be communicated to the community.  
▪ Get maps of the underground infrastructure from the relevant institutions.  
▪ Sensitise workers carrying out excavations so that they exercise caution to minimize chances of underground infrastructure damage.  
▪ Work closely with the responsible institutions such as Kenya Power, Orange and Telkom so that in case of damage, the services are restored within the shortest time.  
▪ Reroute sensitive infrastructure where possible.  | Contractor      | Throughout the construction phase | 750,000       |
| Structural stability                   | ▪ The geotechnical report should include suitable measures for confining vibrations within project sites. These measures should be tailored according to the proximity of buildings to the project sites and earthwork program.  
▪ These recommendations identified in the geotechnical report.  | Contractor      | Throughout the construction phase | 2,000,000     |
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<tr>
<td>report (such as secant piling or sheet piling or establish cut-off walls) should be implemented by the contractor and supervised by EHS Advisor.</td>
<td>Contractor</td>
<td>Throughout construction phase</td>
<td>1,500,000</td>
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</table>
| Occupational accidents | - Ensuring that the drivers and machine operators hired to work on the site are qualified.  
- Workers on site must be provided with appropriate PPE.  
- Appropriate signs must be erected on the site to warn workers and visitors.  
- There should be safety policy clearly displayed on the site.  
- Machines should be properly maintained.  
- A first aid kit should be provided and a trained first aider should always be on site.  
- Fire extinguishers should be provided.  
- Proper scheduling of activities to avoid workers being overworked.  
- Machines/equipment for the intended purpose.  
- No worker should be allowed on site while under the influence of alcohol or other inebriating substances.  
- Inspection of workers to ensure they are using the PPE at all times when necessary.  
- Provide a fully stocked First Aid box on the site |
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<th>TIME FRAME</th>
<th>COST ESTIMATE KSHS</th>
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<td>Display at prominent places occupational health and safety rules.</td>
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<td>Test and approve equipment such as ladders before use.</td>
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<td></td>
<td>Training workers on how to use various PPE and proper use of machinery.</td>
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<td>Have a trained First Aider on the site.</td>
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<td>Registration of the premises as required by Law.</td>
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<td>Appropriate insurance should be acquired as required by law</td>
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<td>Medical examination of all workers before engagement and after the project is over.</td>
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<td>Display an emergency evacuation procedure.</td>
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<td>Moving parts of machines should be guarded to protect workers from injuries.</td>
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<td>Should an accident occur:</td>
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<td>The injured worker should be given first aid and immediately taken to the hospital.</td>
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<td>An investigation should be initiated immediately to ascertain the cause of the accident and preliminary findings released within 12 hours.</td>
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<tr>
<td>Sanitation at contractor’s camp</td>
<td>Provision shall be made for employee facilities including shelter, toilets and washing facilities.</td>
<td>Contractor</td>
<td>Throughout construction phase</td>
<td>2,400,000</td>
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<td>Toilet facilities supplied by the contractor for the workers shall occur at a minimum ratio</td>
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</table>
| Social conflicts | - Immediate action undertaken as soon as possible and within 24 hours of receipt of a complaint  
- Investigations completed within seven days of receipt of complaint.                                                                                                                                                                                                                                           | Contractor     | Throughout construction phase | 200,000        |
|                 | of 1 toilet per 30 workers (preferred 1:15).  
- The exact location of the toilets shall be approved by the Public Health Department prior to establishment.  
- Sanitation facilities shall be located within 100m from any point of work, but not closer than 50 m to any water body.  
- All temporary/portable toilets shall be secured to the ground to prevent them toppling due to wind or any other cause.  
- The contractor shall ensure that the entrances to toilets are adequately screened from public view.  
- Only approved portable toilets should be used.  
- These facilities shall be maintained in a hygienic state and serviced regularly. Toilet paper shall be provided.  
- The contractor shall ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are removed from site to an approved disposal site.  
- Discharge of waste from toilets into the environment and burying of waste is strictly prohibited.  
- Wash areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas, which include groundwater, are not polluted. |                |            |               |               |
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<th>TIME FRAME</th>
<th>COST ESTIMATE KSHS</th>
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<tbody>
<tr>
<td>All corrective actions implemented by due date</td>
<td>All incidents or complaints about either environmental or social issues will be managed in accordance to the existing procedure in line with the legal framework.</td>
<td>Contractor</td>
<td>Throughout construction phase</td>
<td>1,500,000</td>
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</tbody>
</table>
| Spread of HIV and AIDS | - Maximize hiring of local staff for the skilled and unskilled jobs  
- Sensitize the migrant workers on dangers of risky sexual behaviour.  
- Have VCT services on site and encourage workers to undergo the same.  
- Uptake of VCT by project workers and the host community.  
- Provision of ARVs for the affected workers. | Contractor     | Throughout construction phase                                            | 1,500,000           |

**TOTAL ESMMP COST**  
KSHS. 12,050,000
Table 4: Operation phase ESMMP

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<tr>
<th>POTENTIAL IMPACT</th>
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<th>RESPONSIBILITY</th>
<th>TIME FRAME</th>
<th>COST ESTIMATE</th>
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<tbody>
<tr>
<td>Water pollution</td>
<td>Apply for discharge license and conduct water quality monitoring quarterly as required by law</td>
<td>County Governments of Nairobi City County, Kajiado, Machakos and Kiambu</td>
<td>Throughout operation phase</td>
<td>O&amp;M Budget</td>
</tr>
<tr>
<td>Labor arrangement for Maintenance activities</td>
<td>The project provides for the Contractor to train teams of local people for routine maintenance activities, pooling and flooding</td>
<td>County Governments of Nairobi City County, Kajiado, Machakos and Kiambu</td>
<td>Throughout operation phase</td>
<td>O&amp;M Budget</td>
</tr>
<tr>
<td>Disposal of solid and liquid wastes</td>
<td>Ensure no solid waste find its way into the river at the outfall</td>
<td>County Governments of Nairobi City County, Kajiado, Machakos and Kiambu</td>
<td>Throughout operation phase</td>
<td>O&amp;M Budget</td>
</tr>
<tr>
<td>Waste management</td>
<td>Storm water run-on shall be prevented from contacting stored solid waste Waste should be disposed in designated sites as approved by NEMA</td>
<td>County Governments of Nairobi City County, Kajiado, Machakos and Kiambu</td>
<td>Throughout operation phase</td>
<td>O&amp;M Budget</td>
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</tbody>
</table>

8.5 Environmental Performance Monitoring

This is a critical element in the ESIA process. Its main purpose is to provide a basis for ensuring the proposed mitigation measures for the significant environmental impacts are implemented. Monitoring plays an important role in the development, implementation and execution of environmental policy. The overall objective of environmental monitoring is to ensure that activities carried out during construction and operations are environmentally and socially acceptable, and therefore sustainable.

Monitoring creates possibilities to call to attention changes and problems in environmental quality. Monitoring can also be used for policy evaluation. It is a long-term process, which
should ideally begin at the commissioning stage and continue throughout the operational phase. It helps to establish benchmarks so that the nature and magnitude of anticipated environmental and social impacts can be continually assessed.

Monitoring involves the continuous or periodic review of operation and maintenance activities to determine the effectiveness of recommended mitigation measures. Consequently, trends in environmental degradation or improvement can be established, and previously unforeseen impacts can be identified or pre-empted. Environmental monitoring allows measures to be implemented in order to prevent or avert negative impacts.

Ideally the Proponent should establish and maintain documented procedures to monitor and measure, on a regular basis, the key characteristics of its operations and activities that can have a significant impact on the environment. This includes the recording of information to track performance, relevant operational controls and conformance with the organization’s environmental objectives and targets. Performance Indicators must be selected that are simple to monitor, and which will not necessitate the use of highly technical equipment or require highly specialized training. The monitoring plan in the table below lists indicators that should be monitored.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Target Areas &amp; Responsibilities</th>
<th>Monitoring Indicator</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeking approvals from NEMA for ESIA and Approval of plans</td>
<td>All the Project components</td>
<td>• Number of approvals / permits issued</td>
<td>Before commencing the project</td>
</tr>
<tr>
<td>plans from County and National Government</td>
<td>Responsibility MTH&amp;UD&amp; Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental and Social Training and Awareness</td>
<td>All Workers</td>
<td>• Number of Trainings Held</td>
<td>Throughout</td>
</tr>
<tr>
<td></td>
<td>Responsibility Contractor(s)</td>
<td>• Availability of Training reports</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Attendance list of participants during the trainings sessions</td>
<td></td>
</tr>
<tr>
<td>HIV/AIDS awareness and prevention campaign</td>
<td>All Workers</td>
<td>• Number of Trainings Held</td>
<td>Throughout</td>
</tr>
<tr>
<td></td>
<td>Responsibility Contractor(s)</td>
<td>• Availability of Training reports</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Attendance list of participants during the training sessions</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Local health clinic statistics</td>
<td></td>
</tr>
<tr>
<td>Local Labour / Employment</td>
<td>All the Project Lots</td>
<td>• Number of workforce employed from the local community</td>
<td>Throughout</td>
</tr>
<tr>
<td></td>
<td>Responsibility Contractor</td>
<td>• Number of female employed</td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Target Areas &amp; Responsibilities</td>
<td>Monitoring Indicator</td>
<td>Timeframe</td>
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</tr>
<tr>
<td>Materials sourcing, from burrow pits and quarries delivery and storage</td>
<td>Burrow Pits and Quarry Site&lt;br&gt;Responsibility&lt;br&gt;Contractor(s) Supervision&lt;br&gt;• Environmental Status of reinstated burrow pits&lt;br&gt;• Complaints from the community on burrow pits and material transportation</td>
<td>Throughout</td>
<td></td>
</tr>
<tr>
<td>Wastes generation and disposal</td>
<td>Construction areas&lt;br&gt;Responsibility&lt;br&gt;Contractor(s) Supervision&lt;br&gt;• Number of complaints from community not happy with waste management of the contractor</td>
<td>Throughout</td>
<td></td>
</tr>
<tr>
<td>Spoil Storage site</td>
<td>Construction areas&lt;br&gt;Responsibility&lt;br&gt;Contractor(s) Supervision&lt;br&gt;• Number of complaints from community not happy with waste management of spoil material</td>
<td>Throughout</td>
<td></td>
</tr>
<tr>
<td>Occupational Health and Safety</td>
<td>All work areas&lt;br&gt;Responsibility&lt;br&gt;Contractor(s) Supervision&lt;br&gt;Accidents occurrence incidences</td>
<td>Throughout</td>
<td></td>
</tr>
<tr>
<td>Storage of fuel oils, lubricants, chemicals and flammable materials</td>
<td>All work areas&lt;br&gt;Responsibility&lt;br&gt;Contractor(s) Supervision&lt;br&gt;Incidence of reported cases of fuel leaks and fire incidences</td>
<td>Throughout</td>
<td></td>
</tr>
<tr>
<td>Sanitation issues resulting from both solid and liquid wastes on site.</td>
<td>All work areas&lt;br&gt;Responsibility&lt;br&gt;Contractor(s) Supervision&lt;br&gt;Incidence of reported cases of water related diseases among the workforce and neighbour community</td>
<td>Throughout</td>
<td></td>
</tr>
<tr>
<td>Noise and Vibration control from plant and equipment</td>
<td>civil works areas and access roads&lt;br&gt;Responsibility&lt;br&gt;Contractor(s) Supervision engineer&lt;br&gt;Reported complaints from neighbour community and institutions</td>
<td>Throughout</td>
<td></td>
</tr>
<tr>
<td>Traffic management on site</td>
<td>civil works areas and access roads&lt;br&gt;Responsibility&lt;br&gt;Contractor(s) Supervision engineer&lt;br&gt;Accidents occurrence incidences</td>
<td>Throughout</td>
<td></td>
</tr>
<tr>
<td>Air Quality Control</td>
<td>All work areas&lt;br&gt;Responsibility&lt;br&gt;Cases of respiratory complication at nearby health centre</td>
<td>Throughout</td>
<td></td>
</tr>
</tbody>
</table>
## Activity

<table>
<thead>
<tr>
<th>Activity</th>
<th>Target Areas &amp; Responsibilities</th>
<th>Monitoring Indicator</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractor de-mobilization and site reinstatement</td>
<td>Contractor(s) Supervision</td>
<td>Closeout audit report findings</td>
<td>Throughout</td>
</tr>
<tr>
<td></td>
<td>All work areas Responsibility Contractor(s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supervision</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER NINE: CONCLUSIONS AND RECOMMENDATIONS

9.1 CONCLUSIONS
On the basis of the above discussions it is concluded that the proposed project is environmentally, legally, socially and culturally acceptable. With implementation adherence to the proposed ESMMP, the potential significant negative impacts will be reduced and/or eliminated. On that basis, it is recommended that the project be issued with the necessary clearance for the Proponent to commence implementation.

The importance of the proposed project to national development and the local community cannot be overemphasized. It is a socially uplifting project that guarantees right to proper sanitation. In addition to following the laid down guidelines, project design has also factored in state of art technology in line with sound environmental management practices.

Having considered the information collected, collated and analysed during the study, it is the Expert’s considered opinion that:

i. The project is vital for the improvement of health in the project area. Access to proper sanitation is a right for all citizens.

ii. The project DOES NOT pose any serious environmental concern, other than those that accompany similar development activities.

iii. The proposed ESMMP is adequate to mitigate the potential negative environmental impacts.

iv. The positive environmental impacts far outweigh the negative ones, which can be contained by following the proposed ESMMP.

v. The proposed project will not compromise the well-being of the neighbouring community, ecology or any other conditions.

vi. The project should be allowed to commence and activities be managed within the provided ESMMP.

vii. The proposed project is a viable venture that should be given due support. Considering the fact that there will be minimal negative impacts to the environment and its potential to contribute to the rise in economic status of the area residents who will benefit from it.

viii. The proponent has taken all due care in relation to laws and procedures of the country in setting up of the project.

9.2 Recommendations
- The proponent should be given all the available support to implement this noble project.
- The licensing authorities should issue the necessary licenses so that the work can commence.
Similar projects should be encouraged elsewhere to promote environmental and public health while spurring growth and development.
ANNEXES
CONSULTATIONS & PUBLIC PARTICIPATION
MINUTES OF START-UP MEETING FOR CONSULTANCY SERVICES FOR PREPARATION OF FEASIBILITY STUDIES, FINAL DESIGNS AND BIDDING DOCUMENTS FOR STORMWATER DRAINAGE IN SELECTED URBAN AREAS IN THE NAIROBI METROPOLITAN REGION HELD ON 12th MAY 2014 AT KIAMBU COUNTY GOVERNMENT OFFICE FROM 10AM.

GENERAL

Client: Ministry of Transport, Infrastructure, Housing and Urban Development

Consultant: FRAME Consultants Ltd

PRESENT

Eng Njeri Mburu : CEC Member (Roads, Transport & Public Works)

Eng. R.G Ngigi : Chief Engineer, Kiambu County

Mark Nderitu : Works Officer & Project Contact person

Mr John Njane : Planning Officer

Jeremy Thuku : FRAME Consultants Ltd

Duncan Kamau : FRAME Consultants Ltd

AGENDA

1. Introduction
2. Project Brief
3. Comments
4. AOB

Introduction

The meeting was opened at 10am and brief introductions were done by all members present.

Brief Overview of Consultants Scope of Works

The Consultant was invited to present in brief the scope of works.
The Consultant went ahead to expound the terms of reference. He outlined his intended approach to be as follows:

- Analyze the existing storm-water drainage system within Thika CBD.
- Identify the most problematic area(s).
- Look at possible alternatives for storm-water drainage focusing on low impact development options.
- Evaluate possibility of storage/harvesting the storm-water.
- Generate a list of priority investments and recommend the most economic and technical viable Storm-water drainage system.

The Consultant pointed out the overall scope of works would cover Kajiado, Machakos, Kiambu and Nairobi Counties. Available funding for eventual project implementation was limited and as such he’ll focus his study and outputs to what is envisaged in there terms of reference.

The Consultant requested the County to assist in provision of all relevant documentation, in particular previous studies and reports on Storm-water drainage.

**Comments**

The CEC Member for Roads, Transport & Public works appreciated and welcomed the project, pointing out the need and importance of the project to the County. She mentioned the following;

- Most of the existing Storm-water system is blocked.
- Current storm-water system is undersized and in urgent need of expansion.
- There are existing rehabilitation works currently on-going and the consultant will be expected to familiarize himself with these works.
- The Consultant to if possible look at areas outside the CBD.

The Chief Engineer pointed out drainage outfalls had been clogged by waste making them inefficient and prone to damage. Rehabilitation of the existing system should therefore be prioritized before any new system is designed.

**A.O.B**

The County government will assist the consultant in making available all documentation necessary for his work. Any other assistance will be provided to the consultant where possible.

There being no other business the meeting was closed at 11:30am
Signed:-

1. ____________________________ Date: ________________________ (For Kiambu County Government)

2. ____________________________ Date: ________________________

(For Consultant)
MINUTES OF START-UP MEETING FOR CONSULTANCY SERVICES FOR PREPARATION OF FEASIBILITY STUDIES, FINAL DESIGNS AND BIDDING DOCUMENTS FOR STORMWATER DRAINAGE IN SELECTED URBAN AREAS IN THE NAIROBI METROPOLITAN REGION HELD ON 13th MAY 2014 AT KAJIADO COUNTY GOVERNOR’S OFFICE FROM 11:30AM.

GENERAL

Client : Ministry of Lands, Housing and Urban Development

Consultant : FRAME Consultants Ltd

PRESENT

Dr. David K. Nkedianye : Governor, Kajiado County

Eng. Malika Badiribu : Chief County Engineer

Jeremy Thuku : FRAME Consultants Ltd

Duncan Kamau : FRAME Consultants Ltd

AGENDA

1. Introduction
2. Project Brief
3. Comments
4. AOB

Introduction

The meeting was opened by brief introductions from all members present

Brief Overview of Consultants Scope of Works

The Governor welcomed everyone to the meeting and invited the consultant to present in brief the objective of the assignment and scope of works.

The Consultant went ahead to expound the terms of reference. He outlined his intended approach to the works as follows:

- Analyze the existing storm-water drainage system at Ongata Rongai Township.
• Identify the most problematic area(s).
• Look at possible alternatives for storm-water drainage focusing on low impact development options.
• Evaluate possibility of storage/harvesting the storm-water.
• Generate a list of priority investments and recommend the most economic and technical viable Storm-water drainage system.

The Consultant pointed out the overall scope of works would cover Kajiado, Machakos, Kiambu and Nairobi Counties. Available funding for eventual project implementation was limited and as such he’ll focus his study and outputs to what is envisaged in the terms of reference, namely Ongata Rongai area.

The Consultant requested the County to assist in provision of all relevant documentation, in particular previous studies and reports on Storm-water drainage. He also requested the Chief Engineer to formally introduce his team to the Works officer at Ongata Rongai.

**Comments.**

The Governor appreciated the Consultants presentation and pointed out the following:-

• World Bank funded projects usually take long to implement and were hopeful this would not be the case.
• Expects the 8 month timeline for the consultancy to be strictly adhered to.
• The County Government will assist in all ways possible to meet the objectives of the assignment.

The Chief Engineer reiterated the County Governments commitment towards the project and her office will be willing and ready to act on any requests from the Consultants. The Sub-county office at Ongata Rongai will be briefed on the project and relevant instructions issued immediately. All documentation available will also be availed to the Consultant.

The consultant affirmed his commitment to completing the works within the timelines given and would keep the county government well briefed on the progress.

**A.O.B.**

There being no other business the meeting was closed at 12:00pm.
Signed:-

____________________________________  Date: __________________________
(For Kajiado County Government)

____________________________________  Date: __________________________
(For Consultant)
MINUTES OF START-UP MEETING FOR CONSULTANCY SERVICES FOR PREPARATION OF FEASIBILITY STUDIES, FINAL DESIGNS AND BIDDING DOCUMENTS FOR STORMWATER DRAINAGE IN SELECTED URBAN AREAS IN THE NAIROBI METROPOLITAN REGION HELD ON 14TH MAY 2014 AT MACHAKOS COUNTY OFFICE FOR TRANSPORT, ROAD, PUBLIC WORKS & HOUSING FROM 2PM.

GENERAL

Client : Ministry of Transport, Infrastructure, Housing and Urban Development

Consultant : FRAME Consultants Ltd

PRESENT

Joseph Mbatha : Director of Administration, Dep’t of Transport

Eng. Julius Mungai : Design Engineer, Dep’t of Transport.

Jeremy Thuku : FRAME Consultants Ltd

Duncan Kamau : FRAME Consultants Ltd

AGENDA

1. Introduction
2. Project Brief
3. Comments
4. AOB

Introduction.

The meeting was opened by brief introductions from all members present.

Brief Overview of Consultants Scope of Works.

The Consultant was invited to present in brief the scope of works for the project.
The Consultant went ahead to expound the terms of reference. He outlined his intended approach to the works as follows:

- Analyze the existing storm-water drainage system at Athi River town, Mavoko sub-county.
- Identify the most problematic area(s).
- Look at possible alternatives for storm-water drainage focusing on low impact development options.
- Evaluate possibility of storage/harvesting the storm-water.
- Generate a list of priority investments and recommend the most economic and technical viable Storm-water drainage system.

The Consultant pointed out the overall scope of works would cover Kajiado, Machakos, Kiambu and Nairobi Counties. Available funding for eventual project implementation was limited and as such he’ll focus his study and outputs to what is envisaged in the terms of reference, namely Athi River town.

The Consultant requested the County to assist in provision of all relevant documentation, in particular previous studies and reports on Storm-water drainage. He also requested the Engineer to formally introduce his team to the Works officer/Planner at Mavoko Sub-county.

**Comments.**

The Director of Administration appreciated the intervention being undertaken towards solving Athi River town’s drainage problem. He requested that apart from Athi River, Tala area which is on the way towards Kangundo be considered as well. It is an area prone to flooding during the rainy season and lacks any storm water drainage system. He further pointed out the following;

- No land is available at Athi River for storm water storage and would prefer draining the storm water into Athi River.
- EPZ drains a lot of water and the existing drainage is not adequate. The Consultant should look into this.

The Engineer undertook to assist the Consultant with any documentation he may require. He made available contacts of relevant personnel at Mavoko.

Sub-county and assured of their availability for any assistance required.
The Consultant thanked the County for their commitment to assist in every way possible. He affirmed his commitment to completing the works within the timelines given and would keep the County Government briefed on progress.

A.O.B

There being no other business the meeting was closed at 2:30pm.

Signed:-

__________________________________  Date: ________________________
(For Machakos County Government)

__________________________________  Date: ________________________
(For Consultant)
MINUTES OF START-UP MEETING FOR CONSULTANCY SERVICES FOR PREPARATION OF FEASIBILITY STUDIES, FINAL DESIGNS AND BIDDING DOCUMENTS FOR STORMWATER DRAINAGE IN SELECTED URBAN AREAS IN THE NAIROBI METROPOLITAN REGION HELD ON 15th MAY 2014 AT NAIROBI CITY COUNTY AT 2:30PM.

GENERAL

Client : Ministry of Transport, Infrastructure, Housing and Urban Development

Consultant : FRAME Consultants Ltd

PRESENT

Eng K. Wamugunda : Ass. City Engineer, NCC.

Eng. Mutua : Estates & Development Control, NCC

Eng. Kamau : Operations Department, NCC

Eng. Nderitu : Roads Department, NCC

Jeremy Thuku : FRAME Consultants Ltd

Duncan Kamau : FRAME Consultants Ltd

AGENDA

1. Introduction
2. Project Brief
3. Comments
4. AOB

Introduction.

The meeting was opened at 2:30pm by Eng Wamugunda as Chair.

Brief Overview of Consultants Scope of Works.

The Consultant was invited to introduce himself and present in brief the scope of works.
The Consultant went ahead to expound the terms of reference after briefly introducing himself and his team. He outlined his intended approach to be as follows:

- Analyze the existing storm-water drainage system within Nairobi CBD.
- Identify the most problematic area(s).
- Look at possible alternatives for storm-water drainage focusing on low impact development options.
- Evaluate possibility of storage/harvesting the storm-water.
- Generate a list of priority investments and recommend the most economic and technical viable Storm-water drainage system.

The Consultant pointed out the overall scope of works would cover Nairobi City (Dagoretti, Lang’ata, CBD and Embakasi) Thika (CBD and west of CBD), Mavoko and Ongata Rongai Township. He requested the county to assist in provision of documentation on stormwater drainage, namely feasibility studies, design reports, maps and any other relevant information for Nairobi City County.

The Consultant clarified the intention of the assignment was to basically zero in on the most problematic locations within the target areas and come up with the most feasible solution to solving the storm water drainage problems. More innovative alternatives for storm water drainage including an analysis of Low impact development options will be studied and where possible the consultant would recommend the most appropriate technology to harness and utilize stormwater. The consultant to this end requested the County to define priority areas within Dagoretti, Embakasi, Lang’ata and CBD to enable him commence reconnaissance surveys with the goal of generating priority investments on storm-water drainage within the confines of the available budget for these areas.

**Comments.**

The Chairman thanked the Consultant for his presentation and went ahead to introduce his team as follows;

Eng Kamau – from the Operations department

Eng Nderitu – standing in for Eng Muthama from the Roads department.

Eng Mutua – from the Estates & Development Control Department.
The Chair assured the Consultant all assistance will be provided by his office. Documentation if available would be provided but pointed out most of it was lost during the 2004 City Hall fire.

The Chair highlighted issues the Consultant should take note of when carrying out the assignment:

- Acquisition of drainage way-leaves will be required in some areas
- The task at hand is enormous and adequate resource mobilization will be required.

The Chair acknowledged there had been poor planning for infrastructure in Nairobi and as such most of the challenges in regard to storm water were self inflicted. He however pointed out measures are being put in place to ensure plans for infrastructure development would in future precede actual construction as was the case initially.

The Chair reiterated disadvantages of the current combined drainage system in the CBD. Apart from Kirinyaga, Latema and Accra Road storm water drainage systems, all the other areas within the CBD have a combined drainage system. As a result, the system is working beyond design capacity hence the frequent flood problems during the rainy season. Any future storm water drainage systems within the CBD Should therefore be distinct and separate from the existing combined system.

The Chair went further and mentioned the following:

- Minimum diameter for storm water pipes should be 450mm and not 300mm. Larger diameter pipes were easier to maintain and as such any hydraulic calculations should be aligned to reflect this fact.
- Waterways could be canalized. i.e. tunnelling for storm water between various drainage basins. Although costly, its effect in the long run would be beneficial.
- Anti-malarial drains should be considered in settled low lying swampy areas.
- Kamulu/Ruai area in Embakasi is prone to flush floods and the consultant is best advised to consider that area during the feasibility process.
- No public Land is available for storage of storm water. There is however an on-going project for Nairobi Dam (Nairobi Dam restoration project) which could be beneficial for Lang’ata area.

The Consultant should consider incorporation of GIS technology during the assignment.
Eng Kamau pointed out sub-surface drains are not preferable as they are prone to clogging and encroachment by commercial development. He gave examples of areas in Kasarani and Dagoretti where sub-surface drains have completely been swallowed up by commercial development. It would be prudent for the consultant to therefore recommend closed drainage systems utilizing the best pipe material for the target areas.

The Consultant pointed out that the ToR was specific on the consultants’ scope of works and the budget available. He’ll however approach the assignment holistically vis a vis studying existing working drainage systems in other areas, to be able to come up with the most technically viable and economic solution for the target areas.

A.O.B

Contact person

Eng Mutua will be the contact person at County level for the duration of the assignment.

Zoning Schedules

The Chair promised to provide zoning schedules (specify the target areas) for Dagoretti, Embakasi, Lang’ata and the CBD as soon as possible.

Documentation

The following documents were handed over to the consultants;

- Nairobi Master plan for Sewer, Sanitation and Drainage, Text -1974
- Nairobi Master plan for Sewer, Sanitation and Drainage, Text and Appendices-1998
- Surface Water Drainage Manual by J. Keenan.

Collaboration/Facilitation

The County committed to acquiring more documents from other organizations. Collaboration and probably some facilitation from the consultant will therefore be required to ensure this is done expeditiously.
Closing Remarks

The Consultant thanked the County for the documents provided and affirmed his commitment to completing the works within the timelines given.

There being no other business the meeting was closed at 4:15pm.

Signed:-

__________________________________  Date:  ________________________  
(For Nairobi City County)

__________________________________  Date:  ________________________  
(For Consultant)
MEETINGS RECORD SHEET

This is a record of discussion/minutes held on 13th January 2015 at the Highways Department, Nairobi City County at 3pm

PRESENT:

Eng Mutua : Contact person, Nairobi City County
Jeremy Thuku : FRAME Consultants Ltd
Duncan Kamau : FRAME Consultants Ltd

ABSENT:

Eng Mwangi : Head of Operations, Nairobi City County

Agenda & Way forward

Intention was to discuss with NCC problems faced when dealing with O&M within Nairobi CBD with the intention of proposing machinery & equipment to be procured under the project. The head of operations was to come with a list and submit to the Consultants for consideration. The meeting was to discuss as well stormwater drainage problems encountered along Macharia road in Dagoretti constituency. Unfortunately Eng Mwangi was unavailable.

It was agreed however through a telephone conversation with Eng Mwangi that a site visit be organized to Dagoretti. The consultant will be assisted by one of his inspectors Mr Mungai. The consultant was advised to schedule for a site visit ASAP in light of the magnitude of the problem at the location.

Eng Mutua is to follow up with Eng Mwangi regarding a list of equipment and machinery for O&M. There being no other business the meeting was closed at 3:40pm

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<th>Client:</th>
<th>Ministry of Lands Housing &amp; Urban Development</th>
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<tbody>
<tr>
<td>Project:</td>
<td>Consultancy Services for a Feasibility Study and Detailed Design for Stormwater Drainage in Selected Urban Areas</td>
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<tr>
<td>Title:</td>
<td>Final Feasibility Study Report</td>
</tr>
<tr>
<td>Project No:</td>
<td>FC/CE80</td>
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<tr>
<td>Meeting Location</td>
<td>Nairobi</td>
</tr>
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<td></td>
<td>Nairobi City County, Highways Department 13/01/2015 2:30pm</td>
</tr>
</tbody>
</table>
ENVIRONMENTAL IMPACT ASSESSMENT HOUSEHOLD SURVEY

I have considered you as a key neighbour to the area where the proposed line will pass and I hereby seek your input towards the development of the complete and authentic Environmental Impact Assessment report. Kindly take some of your precious time and go with me through this questionnaire.

BACKGROUND INFORMATION

Name: Ngiri Muiruri
Age: 37
Marital status: Married
No of dependants:
Any vulnerable member:
Highest level of Education:
Average Income per month:

1. When did you move into this estate?

2. Why did you move into the estate?

3. What is the form of land ownership around this area
   
   - Lease
   - Freehold

4. Do you have any form of land ownership document

5. What happens when it rains in this area
   
   - Floods in the playing ground and walkways in the compound

6. Does this area have a proper structured storm water drainage system

7. What are the major sources of pollution for the storm water drains

FRAME Consultants Ltd
EIA HOUSEHOLD SURVEY
8. What are the impacts of this form of pollution

- Bad odour.

9. What do you think can be done to mitigate these impacts

10. Have you heard about the proposed project to rehabilitate the storm water drain systems in this area? No.

11. Do you think the project will be of benefit to you and the community? Yes.

12. Which are the possible negative effects will it have on the lives of the surrounding community?

- Trees may be damaged.

13. Which are the possible positive effects will it have on the lives of the surrounding community?

- Clean environment.

14. What can be done to reduce the negative impacts?

END. THANK YOU

FRAME Consultants Ltd 2 EIA HOUSEHOLD SURVEY
ENVIRONMENTAL IMPACT ASSESSMENT HOUSEHOLD SURVEY

I have considered you as a key neighbour to the area where the proposed line will pass and I hereby seek your input towards the development of the complete and authentic Environmental Impact Assessment report. Kindly take some of your precious time and go with me through this questionnaire.

BACKGROUND INFORMATION
Name: 
Age: 42
Marital status: Single
No of dependants: 
Any vulnerable member: 
Highest level of Education: Secondary
Average Income per month: 20,000

1. When did you move into this estate?

2. Why did you move into the estate?

3. What is the form of land ownership around this area
   - Lease
   - Freehold

4. Do you have any form of land ownership document

5. What happens when it rains in this area
   - Flooding with delay due to inadequate drainage

6. Does this area have a proper structured storm water drainage system

7. What are the major sources of pollution for the storm water drains

FRAME Consultants Ltd
ELA HOUSEHOLD SURVEY
8. What are the impacts of this form of pollution
   - Bad odour

9. What do you think can be done to mitigate these impacts
   - Landfills should connect to existing sewer lines
   - Proper disposal of solid waste

10. Have you heard about the proposed project to rehabilitate the storm water drain systems in this area? No

11. Do you think the project will be of benefit to you and the community? Yes

12. Which are the possible negative effects it will have on the lives of the surrounding community?
   - Blockage of roads during rain

13. Which are the possible positive effects it will have on the lives of the surrounding community?
   - Improved environment
   - Proper drainage

14. What can be done to reduce the negative impacts?

END .THANK YOU

FRAME Consultants Ltd. 2 EIA HOUSEHOLD SURVEY
ENVIRONMENTAL IMPACT ASSESSMENT HOUSEHOLD SURVEY

I have considered you as a key neighbour to the area where the proposed line will pass and hereby seek your input towards the development of the complete and authentic Environmental Impact Assessment report. Kindly take some of your precious time and go with me through this questionnaire.

BACKGROUND INFORMATION
Name: Eunice Wanjiku
Age: 28
Marital status: Married
No of dependants: 0
Any vulnerable member: No
Highest level of Education: Tertiary
Average Income per month: Above 20,000

1. When did you move into this estate?
   1 year Ago

2. Why did you move into the estate?
   Business

3. What is the form of land ownership around this area
   - Lease
   - Freehold

4. Do you have any form of land ownership document

5. What happens when it rains in this area
   Flooding

6. Does this area have a proper structured storm water drainage system
   Existing but not concrete

7. What are the major sources of pollution for the storm water drains
   - Oil from garage

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EIA HOUSEHOLD SURVEY

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8. What are the impacts of this form of pollution
   - Flooded areas
   - Spoilage

9. What do you think can be done to mitigate these impacts
   - Constructing a drainage system

10. Have you heard about the proposed project to rehabilitate the storm water drain systems in this area
    - Not yet

11. Do you think the project will be of benefit to you and the community
    - Yes

12. Which are the possible negative effects will it have on the lives of the surrounding community
    - Demolition of buildings

13. Which are the possible positive effects will it have on the lives of the surrounding community?
    - Better drinking water
    - Better business

14. What can be done to reduce the negative impacts?
    - Some form of compensation

END. THANK YOU
ENVIRONMENTAL IMPACT ASSESSMENT HOUSEHOLD SURVEY

I have considered you as a key neighbour to the area where the proposed line will pass and I hereby seek your input towards the development of the complete and authentic Environmental Impact Assessment report. Kindly take some of your precious time and go with me through this questionnaire:

BACKGROUND INFORMATION

Name: [Name]
Age: [Age]
Marital status:
No of dependants: [Number]
Any vulnerable member:
Highest level of Education:
Average income per month:

1. When did you move into this estate?

2. Why did you move into the estate?

3. What is the form of land ownership around this area
   - Tenure
   - Freehold

4. Do you have any form of land ownership document?

5. What happens when it rains in this area
   - Flood
   - 100% water absorbed

6. Does this area have a proper structured storm water drainage system?

7. What are the major sources of pollution for the storm water drains?

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EIA HOUSEHOLD SURVEY
8. What are the impacts of this form of pollution?
   - It pollutes the water bodies
   - It affects the flora and fauna

9. What do you think can be done to mitigate these impacts?
   - Use of less chemical
   - Use of natural products

10. Have you heard about the proposed project to rehabilitate the storm water drain systems in this area?

11. Do you think the project will be of benefit to you and the community?

12. Which are the possible negative effects will it have on the lives of the surrounding community?

13. Which are the possible positive effects will it have on the lives of the surrounding community?

14. What can be done to reduce the negative impacts?

END. THANK YOU
ENVIRONMENTAL IMPACT ASSESSMENT HOUSEHOLD SURVEY

I have considered you as a key neighbour to the area where the proposed line will pass and I hereby seek your input towards the development of the complete and authentic Environmental Impact Assessment report. Kindly take some of your precious time and go with me through this questionnaire.

BACKGROUND INFORMATION
Name: Laminu Waribia (Mumua Road)
Age: 74 years
Marital status: Married
No of dependants: 10
Any vulnerable member: None
Highest level of education:
Average Income per month:

1. When did you move into this estate? Since I was born.

2. Why did you move into the estate?

3. What is the form of land ownership around this area
   - Lease
   - Freehold

4. Do you have any form of land ownership document
   Yes

5. What happens when it rains in this area?
   - Closure of drains
   - Odour
   - Attracting children

6. Does this area have a proper structured storm water drainage system
   No

7. What are the major sources of pollution for the storm water drains

---

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EIA HOUSEHOLD SURVEY
8. What are the impacts of this form of pollution
   - [ ] sand waste
   - [ ] sewage

9. What do you think can be done to mitigate these impacts
   - [ ] rehabilitation of the storm water drains
   - [ ] connection to a sewerage

10. Have you heard about the proposed project to rehabilitate the storm water drain systems
    in this area?
    - [ ] Yes
    - [ ] No

11. Do you think the project will be of benefit to you and the community?
    - [ ] Yes
    - [ ] No

12. Which are the possible negative effects will it have on the lives of the surrounding
    community?
    - [ ] No negative effects

13. Which are the possible positive effects will it have on the lives of the surrounding
    community?
    - [ ] Improved business activities
    - [ ] Reduced pollution

14. What can be done to reduce the negative impacts?

END . THANK YOU

FRAME Consultants Ltd 2
ELA HOUSEHOLD SURVEY
ENVIRONMENTAL IMPACT ASSESSMENT HOUSEHOLD SURVEY

I have considered you as a key neighbour to the area where the proposed line will pass and I hereby seek your input towards the development of the complete and authentic Environmental Impact Assessment report. Kindly take some of your precious time and go with me through this questionnaire.

BACKGROUND INFORMATION
Name: Michael Njoroge 
Age: 36
Marital status: Married 
No of dependants: 2 
Any vulnerable member: None 
Highest level of Education: Primary Level 
Average Income per month:

1. When did you move into this estate? - 2010

2. Why did you move into the estate?

3. What is the form of land ownership around this area
   - Lease (incorrect)
   - Freehold

4. Do you have any form of land ownership document
   - None

5. What happens when it rains in this area
   - Flooding. Water gets into the houses

6. Does this area have a proper structured storm water drainage system
   - Yes

7. What are the major sources of pollution for the storm water drains
   - Sewage
8. What are the impacts of this form of pollution
   ➔ breeding or mosquitoes can be a threat.

9. What do you think can be done to mitigate these impacts

10. Have you heard about the proposed project to rehabilitate the storm water drain systems
   in this area
   ➔ No

11. Do you think the project will be of benefit to you and the community
   ➔ Yes

12. Which are the possible negative effects will it have on the lives of the surrounding
   community

13. Which are the possible positive effects will it have on the lives of the surrounding
   community?
   ➔ Cleaner environment

14. What can be done to reduce the negative impacts?

END, THANK YOU

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EIA HOUSEHOLD SURVEY
ENVIRONMENTAL IMPACT ASSESSMENT HOUSEHOLD SURVEY

I have considered you as a key neighbour to the area where the proposed line will pass and I hereby seek your input towards the development of the complete and authentic Environmental Impact Assessment report. Kindly take some of your precious time and go with me through this questionnaire.

BACKGROUND INFORMATION
Name: Douglas Kibwana
Age: 46
Marital status: Married
No of dependants: 3
Any vulnerable member:
Highest level of Education: College
Average Income per month:

1. When did you move into this estate? 2010

2. Why did you move into the estate?

3. What is the form of land ownership around this area
   - Tenure
   - Lease
   - Freehold

4. Do you have any form of land ownership document

5. What happens when it rains in this area
   - Floods

6. Does this area have a proper structured storm water drainage system
   - Yes

7. What are the major sources of pollution for the storm water drains

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EIA HOUSEHOLD SURVEY
8. What are the impacts of this form of pollution?
- Bacterial & Viral diseases
- Contamination of ground water

9. What do you think can be done to mitigate these impacts?
- Employment in water treatment & recycling
- Reduction in amount of waste

10. Have you heard about the proposed project to rehabilitate the storm water drain systems in this area?
- Yes

11. Do you think the project will be of benefit to you and the community?
- Yes

12. Which are the possible negative effects will it have on the lives of the surrounding community?
- None

13. Which are the possible positive effects will it have on the lives of the surrounding community?
- Reduced air pollution
- Improved water recycling

14. What can be done to reduce the negative impacts?

END. THANK YOU

FRAME Consultants Ltd
EIA HOUSEHOLD SURVEY
ENVIRONMENTAL IMPACT ASSESSMENT HOUSEHOLD SURVEY

I have considered you as a key neighbour to the area where the proposed line will pass and I hereby seek your input towards the development of the complete and authentic Environmental Impact Assessment report. Kindly take some of your precious time and go with me through this questionnaire.

BACKGROUND INFORMATION
Name: Jane Mwangi
Age: 30
Marital status: Married
No of dependants: 3
Any vulnerable member: None
Highest level of Education: College
Average Income per month: Above 150,000

1. When did you move into this estate?
   Muthaiga - Over 30 years

2. Why did you move into this estate?
   Business

3. What is the form of land ownership around this area
   • Lease
   • Freehold

4. Do you have any form of land ownership document
   No

5. What happens when it rains in this area
   Floods

6. Does this area have a proper structured storm water drainage system
   None

7. What are the major sources of pollution for the storm water drain?
8. What are the impacts of this form of pollution
   "..."

9. What do you think can be done to mitigate these impacts
   Construction of a proper drainage system.

10. Have you heard about the proposed project to rehabilitate the storm water drain systems in this area
    Yes

11. Do you think the project will be of benefit to you and the community
    Yes

12. Which are the possible negative effects will it have on the lives of the surrounding community
    No negative effects expected.

13. Which are the possible positive effects will it have on the lives of the surrounding community?
    Better hygiene.
    Jobs during construction.

14. What can be done to reduce the negative impacts?
   "..."

END. THANK YOU

FRAME Consultants Ltd
EIA HOUSEHOLD SURVEY
ENVIRONMENTAL IMPACT ASSESSMENT HOUSEHOLD SURVEY

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BACKGROUND INFORMATION
Name: [Name]
Age: 32
Marital status: Married
No. of dependants: None
Any vulnerable member:
Highest level of education: College
Average income per month:

1. When did you move into this estate? Kangemi Estate - 2 months
2. Why did you move into the estate? For business
3. What is the form of land ownership around this area
   - Lease
   - Freehold
4. Do you have any form of land ownership document? No
5. What happens when it rains in this area? Floods
6. Does this area have a proper structured storm water drainage system? No
7. What are the major sources of pollution for the storm water drains? Selected waste
8. What are the impacts of this form of pollution
- Closed drains
- Health hazard.

9. What do you think can be done to mitigate these impacts
- Construction of a proper drainage system.
- Closed.

10. Have you heard about the proposed project to rehabilitate the storm water drain systems in this area?
- No, just been informed.

11. Do you think the project will be of benefit to you and the community?
   Yes.

12. Which are the possible negative effects will it have on the lives of the surrounding community?
   None.

13. Which are the possible positive effects will it have on the lives of the surrounding community?
   Proper hygiene, improved business.

14. What can be done to reduce the negative impacts?
   Construction of a functional drainage system.

END. THANK YOU
ENVIRONMENTAL IMPACT ASSESSMENT HOUSEHOLD SURVEY

I have considered you as a key neighbour to the area where the proposed line will pass and I hereby seek your input towards the development of the complete and authentic Environmental Impact Assessment report. Kindly take some of your precious time and go with me through this questionnaire.

BACKGROUND INFORMATION
Name: 
Age: 
Marital status: 
No of dependants:
Any vulnerable member: 
Highest level of Education: 
Average Income per month: 

1. When did you move into this estate?
2. Why did you move into the estate?
3. What is the form of land ownership around this area
   • Lease
   • Freehold
4. Do you have any form of land ownership document
5. What happens when it rains in this area
6. Does this area have a proper structured storm water drainage system
7. What are the major sources of pollution for the storm water drains
8. What are the impacts of this form of pollution
   - Bad smell
   - Increase outbreak.

9. What do you think can be done to mitigate these impacts
   - Rehabilitation of drainage systems
   - Unblocking the drains

10. Have you heard about the proposed project to rehabilitate the storm water drain systems in this area
    - No

11. Do you think the project will be of benefit to you and the community?
    - Yes

12. Which are the possible negative effects will it have on the lives of the surrounding community?
    - Poor environment
    - Improved health

13. Which are the possible positive effects will it have on the lives of the surrounding community?
    - Clean environment

14. What can be done to reduce the negative impacts?

END. THANK YOU

FRAME Consultants Ltd 2
EIA HOUSEHOLD SURVEY
ENVIRONMENTAL IMPACT ASSESSMENT HOUSEHOLD SURVEY

I have considered you as a key neighbour to the area where the proposed line will pass and I hereby seek your input towards the development of the complete and authentic Environmental Impact Assessment report. Kindly take some of your precious time and go with me through this questionnaire.

BACKGROUND INFORMATION

Name: 
Age: 
Marital status: Single
No of dependants:
Any vulnerable member:
Highest level of Education: 
Average Income per month:

1. When did you move into this estate?

2. Why did you move into the estate?

3. What is the form of land ownership around this area
   - Lease
   - Freehold

4. Do you have any form of land ownership document

5. What happens when it rains in this area

6. Does this area have a proper structured storm water drainage system

7. What are the major sources of pollution for the storm water drains

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EIA HOUSEHOLD SURVEY
8. What are the impacts of this form of pollution
   - Sewage from households & businesses.

9. What do you think can be done to mitigate these impacts
   - Remedial work to drains.

10. Have you heard about the proposed project to rehabilitate the storm water drain systems in this area?
    - No.

11. Do you think the project will be of benefit to you and the community?
    - Yes.

12. Which are the possible negative effects will it have on the lives of the surrounding community?
    - Congestion of businesses.

13. Which are the possible positive effects will it have on the lives of the surrounding community?
    - Reduced pollution.

14. What can be done to reduce the negative impacts?

END. THANK YOU

FRAME Consultants Ltd 2
ELA HOUSEHOLD SURVEY
ENVIRONMENTAL IMPACT ASSESSMENT HOUSEHOLD SURVEY

I have considered you as a key neighbour to the area where the proposed line will pass and I hereby seek your input towards the development of the complete and authentic Environmental Impact Assessment report. Kindly take some of your precious time and go with me through this questionnaire.

BACKGROUND INFORMATION

Name: [Redacted]
Age: 46
Marital status: Single
No of dependants: [Redacted]
Any vulnerable member: [Redacted]
Highest level of Education: [Redacted]
Average Income per month: [Redacted]

1. When did you move into this estate?

2. Why did you move into the estate?

3. What is the form of land ownership around this area
   - Freehold
   - Lease
   - Tenancy

4. Do you have any form of land ownership document

5. What happens when it rains in this area
   - [Redacted]
   - [Redacted]

6. Does this area have a proper structured storm water drainage system

7. What are the major sources of pollution for the storm water drains
8. What are the impacts of this form of pollution
   - Disease outbreaks especially in children

9. What do you think can be done to mitigate these impacts
   - House & sewers to be directed away

10. Have you heard about the proposed project to rehabilitate the storm water drain systems in this area?

11. Do you think the project will be of benefit to you and the community?
   - Yes

12. Which are the possible negative effects will it have on the lives of the surrounding community?
   - Emanation of people living near the drains

13. Which are the possible positive effects will it have on the lives of the surrounding community?
   - Improved health

14. What can be done to reduce the negative impacts?

END. THANK YOU

FRAME Consultants Ltd.
EIA HOUSEHOLD SURVEY
PLATE OF PHOTOGRAPHS
ESIA for storm water drainage within selected urban areas in the Nairobi Metropolitan Region

Solid waste disposal on the water storm drain in Kawangware

Flooded household area and blocked storm water drain which forms a health hazard to the residents in Rongai along Nkaimurinya River
SAMPLE ‘CHANCE’ FINDS PROCEDURES
Chance find procedures are an integral part of the project EMMP and civil works contracts. The following is proposed in this regard:

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

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

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

Decisions on how to handle the find shall be taken by the responsible authorities and the Ministry of State for National Heritage and Culture. This could include changes in the layout (such as when finding irremovable remains of cultural or archaeological 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.
GRIEVANCE REDRESS MECHANISMS
Grievance Resolution Mechanism

Steps in dealing with grievances

i. Complaint received in writing from affected person

ii. Recording of grievance in standard form

iii. Reconnaissance site visit with the complainant.

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

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

vi. Submission of complaint to NaMSIP for resolution.

Composition of grievance committee

<table>
<thead>
<tr>
<th>Name</th>
<th>Designation</th>
<th>Organization</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Resident Engineer</td>
<td>NaMSIP</td>
<td>Committee Secretary</td>
</tr>
<tr>
<td>2</td>
<td>Assistant Resident Engineer</td>
<td></td>
<td>Committee Assistant Secretary</td>
</tr>
<tr>
<td>3</td>
<td>Site Administrator</td>
<td>Contractor</td>
<td>Member</td>
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<tr>
<td>4</td>
<td>Chief</td>
<td></td>
<td>Community Representative</td>
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<td>5</td>
<td>Assistant Chief</td>
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<td>6</td>
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<td>Community Representative</td>
</tr>
<tr>
<td>7</td>
<td>Business Member</td>
<td>Business members</td>
<td>Business Representative</td>
</tr>
</tbody>
</table>
Grievance Resolution Mechanism

Recording of grievance in standard forms

Reconnaissance site visit

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

Yes – 3 days

No

Can the grievance be resolved by Grievance Committee?

Yes – 5 days

No

Submission of grievance to NaMSIP for resolution.

Grievance resolved

STORAGE OF ALL GRIEVANCE RELATED

Yes