SEAMLESS CONNECTIVITY

MINISTRY OF TRANSPORT AND INFRASTRUCTURE

HARAMBEE

REPUBLIC OF KENYA

EUROPEAN UNION
Delegation to The Republic Of Kenya

Cooperation between the Government of Kenya and the European Union Delegation to the Republic of Kenya

CLEAN BRT CORE LINE 3 NAIROBI

DRAFT ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE CLEAN BUS RAPID TRANSIT CORE LINE 3

IN NAIROBI, NAIROBI CITY COUNTY




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DOCUMENT CONTROL

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LIST OF ACRONYMS

AFD	Agence Française de Développement
BRT	Bus Rapid Transit
CBD	Convention on Biological Diversity
CBD	Central Business District
CBO	Community Based Organization
DOSHs	Directorate of Occupational Health and Safety Services
COVID-19	Coronavirus Disease 2019
EHS	Environmental, Health, and Safety
ENSO	El Niño–Southern Oscillation
EIB	European Investment Bank
EMCA	Environment Management & Coordination Act,
EMP	Environmental Management Plan
ESIA	Environmental & Social Impact Assessment
ESS	Environmental and Social Safeguards
ESMP	Environmental and Social Management Plan
EU	European Union
EUD	Delegation of the European Union to Kenya
FBO	Faith Based Organization
FGD	Focus Group Discussion
GBV	Gender Based Violence
GDP	Gross Domestic Product
GO	Grievance Officer
GoK	Government of Kenya
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
GDP	Gross Domestic Product
HH	Household Head
IFIs	International Financial Institutions
JICA	Japanese International Cooperation Agency

JKIA	Jomo Kenyatta International Airport
KENHA	Kenya National Highway Authority
KNH	Kenyatta National Hospital
KURA	Kenya Urban Roads Authority
M&E	Monitoring and Evaluation
MoH	Ministry of Health
MTS	Mass Transit System
NCWSC	Nairobi City Water and Sewerage Company
NaMATA	Nairobi Metropolitan Area Transport Authority
NEMA	National Environment Management Authority
NGO	Non-Governmental Organizations
NLC	National Land Commission
NMT	Non-Motorized Transport
OSH	Occupational Safety and Health
PAPs	Project Affected Persons
PLWDs	Persons Living With Disability
PPE	Personal Protective Equipment
RAP	Resettlement Action Plan
ROW	Right of Way
SPSS	Statistical Package for Social Sciences
VMGs	Vulnerable and Marginalized Groups
WHO	World Health Organization
WB	World Bank

EXECUTIVE SUMMARY

1. Background

According to a study by the Japanese International Co-operation Agency (JICA, 2006), the number of vehicle trips between 2004 and 2025 in the Nairobi Metropolitan Area had been estimated to increase by 148%. As a result, the average speed of trips is expected to decrease from 35km/hr to 11km/hr as congestion increases. The City of Nairobi is currently suffering from severe traffic congestion, and it is reasonable to assume that if nothing is done, the urban air quality and along with it the quality of life will continue to worsen. Hence, the Government of Kenya intends to improve the flow of traffic by introducing a Bus Rapid Transit (BRT) system along the key corridors. This Environmental and Social Impact Assessment (ESIA) relates to the implementation of the proposed Clean BRT Core Line 3 from Dandora to Hospitals on Ngong Road.

The EU has earmarked a EUR 45 million subsidy for BRT Core Line 3 (hereinafter 'the Project'). This subsidy is intended to leverage additional financing. Accordingly, the European Investment Bank (EIB) intends to apply as 'lead financier' for the delegation of the EU grant to support additional financing from the EIB and the Agence Française de Développement (AFD). The remaining investment needs will be covered directly by the GoK, though, as implementation details are further clarified, there is the possibility that additional financiers may join the Project.

The core objectives of undertaking the ESIA are:

- To identify and assess the potential environmental and social impacts of the proposed project;
- To assimilate baseline data and information relating to the physical, biological and social environment in and around the proposed Project RoW;
- To have a series of dialogues with the Lead Agencies, local communities/ households living in and around the proposed project site as well as other stakeholders of the project to obtain their views;
- To formulate the necessary counter measures against the potential adverse impacts so as to minimize the possible negative impacts due to project implementation;
- To propose an ESMP to guide the implementation of mitigation measures and monitoring throughout the implementation of the project and contribute to the overall process of project monitoring and auditing. This will enable the project developer to take timely action to prevent negative environmental and social impacts before they become irreversible; and
- To prepare an ESIA Report compliant with the Environmental Management and Coordination (Amendment) Act, 2015, EIB's Environmental and Social Standards, AFD's Environmental and Social Framework, WB-ESS and in compliance with the acceptable format as stipulated in the Environmental (Impact Assessment and Audit) Regulations, 2003; 2018; properly addressing all the items specified in the Terms of Reference (ToR) approved by NaMATA/NEMA and detailing findings and recommendations from the ESIA process.

2. Project Description

The Bus Rapid Transport (BRT) project is located in the North-East of Nairobi. It is the first stage of a broader network and serves a 12.4 km long corridor referred to as Core Line 3. It starts from Kenyatta Hospital progresses down Haile Selassie Road to the Central Business District (CBD), continues on Race Course Road to Ring Road Ngara to Juja Road and then onto the end at Dandora. The project comprises 10 main components. These are bus running ways, bus stations, bus depot, station access supporting infrastructure including pedestrian bridges where needed, fare collection and validation systems, bus fleet (110-articulated buses), interchange stations for feeder bus services, Park & Ride facilities, a BRT control room, and a real time passenger information system. The project concept integrates road traffic management with the needs of non-motorized transport modes (NMT) and a full integration of the BRT into the streetscape and urban living environment with all essential functions of the road corridor such as NMT facilities like pedestrian paths, cycle lanes, parking spaces, green spaces, secure crossings included in the overall project design.

The key (public) infrastructure components of the present BRT Project are:

- Dedicated BRT running ways (all following existing roads);
- Electric buses;
- 15 bus stations with facilities for pre-paid and off board fare collection; feeder interchanges,
- 1 Park and Ride at Dandora;
- 1 bus depot at Dandora;
- Complementary measures including Non-Motorized Transport (NMT) and corridor improvement items;
- Intelligent Transport Systems (ITS).

Figure 1: Project Location

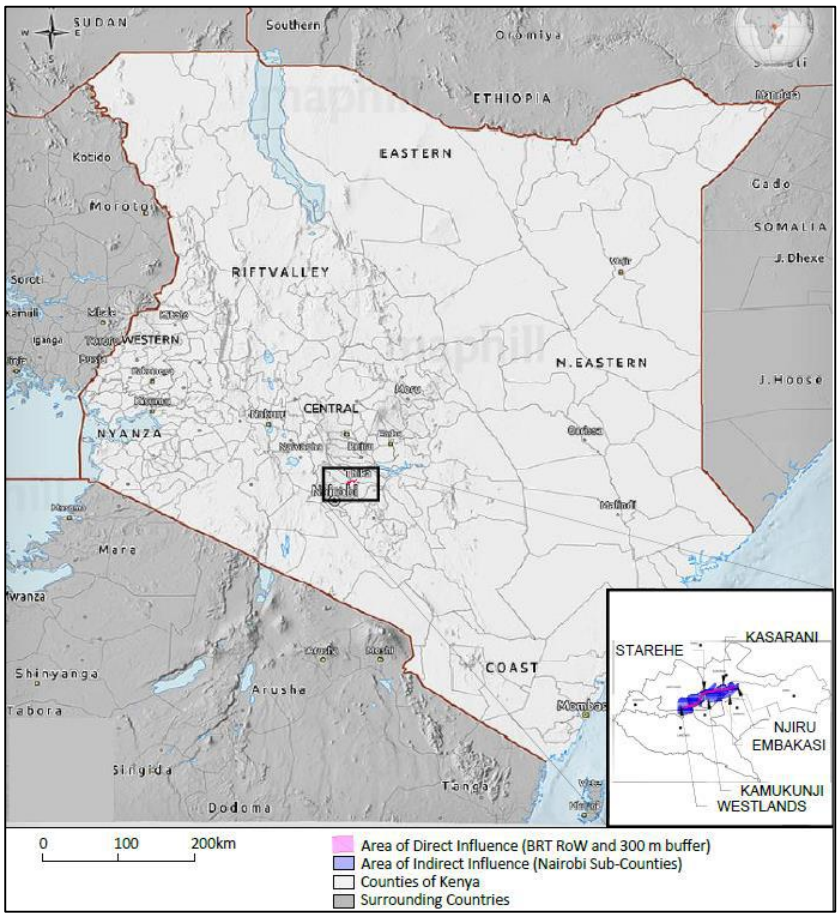
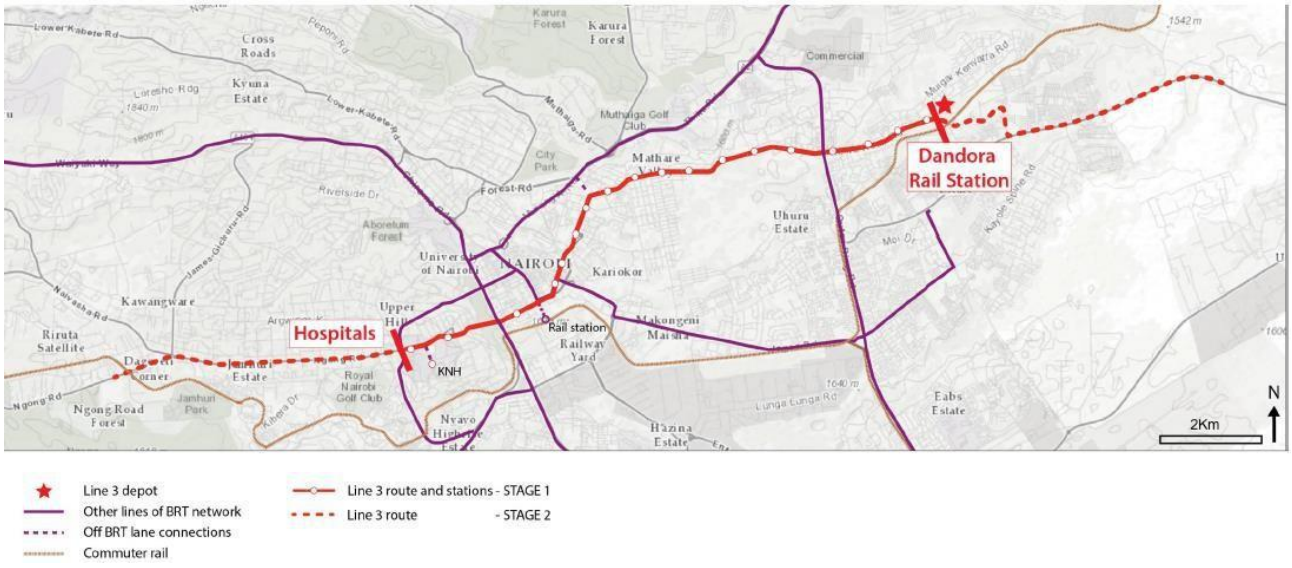


Figure 2: Proposed project route



3. Environmental and socio-economic baseline

Environmental and socio-economic aspects considered in this ESIA include;

- Physical environment: emissions and air quality, noise, soil and geological setting
- Biological environment and the landscape
- Social-economic environment

The baseline conditions were analysed based on a desk study and baseline field investigations. The results of the field and desk surveys were documented in maps, photographs and text describing the existing state of the environment prior to the proposed construction and operation of the Clean BRT Core Line 3 components.

Biophysical environment

Nairobi's elevation strongly influences the City's **climate**. In general temperatures are fairly uniform with the coolest periods ranging from June to August while the hottest temperatures typically occur from December to March.

The **topography** along the Clean BRT Core Line 3 route can be described as mainly flat. An exception to this is the easternmost part of the Project route at Upper Hill, where the proposed route descends from Hospitals towards the crossing with Uhuru Highway.

Regarding **geology and soils**, Nairobi is mainly underlain by pyroclastic volcanic rocks that were deposited during the formation of the East African Rift Valley. Some of the volcanic rocks were deposited in aqueous conditions over a long period of time and are intercalated with lacustrine sediments. River valleys and other depressions that existed during the periods of intermittent inactivity were filled with alluvium and clays.

Nairobi sits on a **drainage basin** between highlands in the northwest and plains east of the city. Its main rivers (from north to south) Mathare, Nairobi and Ngong converge into Nairobi River in the east of the city. Nairobi River itself is a tributary of Athi River which flows into the Indian Ocean.

The **ecosystem** of the project area is in harmony with that of the larger Nairobi built environment, which is represented by modified habitats (novel ecosystem) but presence of restricted pockets of natural habitats present opportunities to trace back the originally naturally occurring vegetation (Somali - Masai *Acacia – Commiphora vegetation*), particularly within the protected areas of Uhuru Park. Nairobi Arboretum, the Karura Forest and the Nairobi National Park in the south.

Socio Economic Environment

The project analysed in this ESIA is located in the Nairobi County and the area of indirect influence includes the **sub-counties** of Westlands, Starehe, Kasarani, Njiru, Embakasi, Makadara, Dagoreti and Kamukunji.

According to the population census 2019, the **population** of Kenya was reported to be 47.5 million in 2019, compared to 28.7 million in 1999, 21.4 million in 1989 and 15.3 million 1979. This is an increase by a factor of 3.1 over 40 years. Based on the projections of the latest UN data, the population of Kenya has reached 55,4 million in 2021.

Nairobi commands the largest share of the **formal sector** wage employment in Kenya. The manufacturing industry accounts for the highest wage employment followed by trade, restaurants and hotels. The construction, transport and communications industry also play a key role in the generation of wage **employment.** Other important sectors include finance, real estate and business services. The main formal employment zones in Nairobi are the Central Business District (CBD), Upper Hill, Westlands and the industrial areas along Mombasa Road, Thika Road and Dandora.

The main sources of **energy** in Nairobi County are electricity, solar, LPG, biogas paraffin, charcoal and firewood. Lack of access to clean sources of energy is a major impediment to development through health-related complications such as increased respiratory infections and air pollution. The type of cooking fuel used by households is related to the socio-economic status of households/individuals.

The **current road network** in the County is inadequate in terms of coverage to meet current and future demands as envisaged in the Vision 2030. There is heavy congestion on most of the city roads especially during the morning and evening peak hours. The total road network covers 3602 Km out of which 1735Km are tarmac roads while 1867 Km are earth roads. The current poor state of the road network is a great impediment to socio-economic growth leading to high production costs and low productivity. The completion of the Elevated Expressway from Jomo Kenyatta Airport to Westlands, the Thika Superhighway, by-passes and missing links within the County will help in reducing traffic congestion.

Analysing the mode of transport, the number of personal vehicles decrease along the eastern section of the BRT corridor and the number of buses increase. This is the result of prevailing social differences along the proposed BRT route, i.e., there is a higher percentage of middle/ upper class in the western part compared to a higher percentage of poorer sub-counties in the eastern part, including several slums served by the buses.

4. Environmental and Social Impact Assessment and Mitigation Measures

In this section prediction and analysis of possible positive and negative impacts of construction and operation of the proposed project well as mitigation measures identified impacts to address, as far as possible, any adverse impacts due to the proposed project and utilizing existing environmental attributes for optimum development are discussed. Prediction of impacts technically characterizes the causes and effects of impacts, and their secondary and synergistic consequences to the environment and the project affected communities.

Many of the potential impacts identified in the previous section can be eliminated or reduced through the implementation of appropriate mitigation measures either at the planning stage or when applied to specific project tasks and activities. The proponent (NaMATA) will ensure that any significant impacts identified are managed within its capability in collaboration with other relevant stakeholders and the Contractor.

Table 1 below presents a summary of the impacts to environmental resources and receptors assessed in the ESIA as well as the mitigation measures.

Table 1: Potential Impacts and mitigation measures

Nature of impact / impact description	Impact	Mitigation measure
Mobilization phase		
1. Creation of employment	Low, short term, certain, medium	-
2. Loss of vegetation	Construction area, short term, irreversible, certain, low	▪ A comprehensive vegetation impact survey should be conducted which should indicate all affected vegetation. ▪ Avoid cutting of short trees whose heights are lower than the power line. ▪ Equipment to be used should be decontaminated e.g., washing equipment to remove soil potentially carrying invasive plants propagules. ▪ Avoid importing soils/gravels to use for level grounds for vehicles to pass in ROW should be avoided. If brought from outside, the surface of the soil should be removed to avoid mixing of soils potentially harbouring invasive plants propagules. ▪ Site clearance shall be minimized but will permit safe and efficient movement of personnel, materials and equipment. ▪ Cleared trees should be left for the local people to collect as firewood. ▪ The Contractor shall avoid unnecessary removal of the vegetation, especially woody trees. When removal of vegetation is not avoidable, they shall be replaced by original or indigenous vegetation species soon after completion of construction works within the project area. ▪ During site clearing for the camps, topsoil shall be stockpiled so that it is used for vegetation during site reinstatement Develop and implement a ROW vegetative maintenance plan. ▪ Restoration/ Rehabilitation plan for disturbed areas. ▪ Under any circumstances, the Contractor shall not use the cleared trees for other purposes such as firewood. ▪ The Contractor will prevent vegetation trampling by restricting access to the construction areas only. ▪ As much as it is practical, existing vegetation shall be preserved to the extent possible, by confining construction activities to road alignment.

Nature of impact / impact description	Impact	Mitigation measure
3. Generation of noise	Construction area, short term, reversible, medium, medium	▪ Provision of protective devices like earmuffs/earplugs to workers, who are continuously exposed to high levels of noise during construction activities. ▪ Providing silencers or enclosures for noise generating machines such DG sets, compressors, etc. ▪ Restrict noisy construction activities to normal working hours (8am - 5pm). ▪ Use equipment that has low noise emissions as stated by the manufacturers. ▪ Use equipment that are properly fitted with noise reduction devices such as mufflers ▪ Limit pickup trucks and other small equipment to an idling time of five minutes, observe a common-sense approach to vehicle use, and encourage workers to switch off vehicle engines whenever possible. ▪ All construction equipment should be regularly inspected and serviced.
4. Deterioration of ambient air quality	Construction area, short term, reversible, medium, medium	▪ The project ROW road, material haul/ access roads and diversion roads across settlements and active construction sites shall be sprayed with water at least twice a day to suppress the generation of dust. ▪ Haulage trucks carrying dusty material shall be covered with tarpaulin to prevent escape of dust from material being transported. ▪ When equipment is not in use, they shall be switched off to minimize the concentration of exhaust fume from equipment and so protect the workers at material borrow sites. ▪ The Contractor shall properly tune engine of equipment to ensure complete combustion of fuel and so minimize exhaust fumes. ▪ The Contractor shall provide workers with dust masks and ensure that they are used properly to prevent them from inhaling polluted air. ▪ Stockpiles of fine materials (e.g., sand and concrete) should be wetted or covered with tarpaulin during windy conditions. ▪ Regular inspection and maintenance of construction equipment. ▪ Avoid burning of solid waste at the campsite.

Nature of impact / impact description	Impact	Mitigation measure
5. Risk of road traffic accidents	Construction area, short term, reversible, medium, medium	▪ The Contractor must prepare a Traffic management Plan, including deploying traffic management personal at all active construction sites. ▪ Issue notices/advisories of pending traffic inconveniences and solicit tolerance by local residents before the commencement of construction works. ▪ Appropriate traffic warning signs, informing road users of construction activities ahead and instructing them to reduce speed, should be placed along the road sections used for the BRT construction. ▪ Flag-women should be employed to control traffic and assist construction vehicles as they use the road section under the construction site. ▪ As far as possible, transport of construction materials should be scheduled for off-- peak traffic hours. This will reduce the risk of traffic congestion and of road accidents on the road sections. ▪ Proper planning of transportation of construction materials to ensure that vehicle fills are increased in order to reduce the number of trips done or the number of vehicles on the road. ▪ Erection of signs ahead of the works warning motorists of the heavy/construction units entering the road sections along the ROW.
Construction phase		
6. Creation of employment	Local area county, short term, certain, medium	---
7. Informal sector benefits	Local area county, short term, certain, medium	---
8. Development of other sectors	Local area county, short term, certain, medium	---

Nature of impact / impact description	Impact	Mitigation measure
9. Improvement of growth of the economy and trade	Local area county, short term, certain, medium	---
10. Temporary loss of land	Construction area, short term, reversible, certain, medium	▪ Conducting a **Resettlement Action Plan (RAP)** to EIB AND AFD standards to determine the persons affected and are eligible for compensation. ***The RAP must include the following:*** ▪ *Need to consider economic displacement and loss of household income.* ▪ *Consideration of both rightful and non-rightful owners, squatters and other categories of informal land users.* ▪ *The following eligibility must be recognized and applicable where the project undertakes land acquisition or impacts the livelihoods of local residents:*
11. Permanent loss of land	Project footprint, long term, irreversible, certain, high	

Nature of impact / impact description	Impact	Mitigation measure
12. Loss of properties	Project footprint, long term, irreversible, certain, high	▪ *People who occupy or derive livelihoods from a piece of land prior to the cut-off date and who will be physically and/or economically displaced due to permanent or temporary loss of land, structures and/or livelihood, whether full or partial, as a consequence of the project will be eligible for compensation:* ▪ *Such eligible PAPs include the following:* ▪ *Owners of land and/or structures, including those recognized as legally titled or legalized on the basis of claims recognizable under national law;* ▪ *Lessees (leaseholders) of state or private land, whether long-term or short-term;* ▪ *Tenants with or without formal legal registration according to national law;* ▪ *PAPs that neither have formal legal rights nor recognizable claims to lands will be entitled to be compensated for their non-land assets. The eligibility also includes both those who are temporarily/permanently or partially/fully affected by the project including squatters or encroachers;* ▪ *Business owners, whether registered under national law or informal;* ▪ *Employees of private or public businesses or enterprises, whether registered under national law or informal;* ▪ *Cultivators of plants and tree seedlings, irrespective of legal status of property relation to land;* ▪ *Vulnerable persons, including households headed by women, elderly and/or disabled persons, the households in local context with per capita incomes at or below the poverty line.* ▪ *Mobile vendors and others who may be drawing livelihoods from the project area.* ▪ *The proponent should work with Nairobi City County Governments, County Administration and other local leaders to sensitize public on the intentions of land acquisition where the wayleave width is not adequate. This must be done prior to project implementation to give people sufficient time for planning and proper assessment.*
13. Removal and disturbance of flora	Construction area, short term, reversible, high, medium	Same as #2

Nature of impact / impact description	Impact	Mitigation measure
14. Soil compaction, erosion and land degradation	Construction area, short term, reversible, high, medium	▪ *Totally avoid encroachment into private or public properties by properly demarcating the project area to be affected by the construction works and restricting construction works including movement of vehicles to the actual project area to avoid effects spilling over into neighbouring areas.* ▪ *Drainage works for storm water must adhere to the Public Works specifications.* ▪ *Supervise all construction works. All excavation and cutting to take place as instructed in the approved structural plans for the proposed project structures.* ▪ *Monitor areas of exposed soil during periods of heavy rainfall throughout the construction phase of the project to ensure that any incidents of erosion are quickly controlled.* ▪ *Safe storage areas should be identified and retaining structures put in place.* ▪ *Materials to be delivered on site in instalments to avoid stockpiling and possible wastage.* ▪ *Areas of ground surface clearance (exposed soil) will be minimized by re-vegetating with natural vegetation.* ▪ *Unnecessary disturbance of sensitive areas like steep slopes shall be avoided as much as possible.*
15. Generation of solid waste	Construction area, short term, reversible, high, medium	▪ *A waste management plan must be prepared by the Contractor for the construction and post-construction (demoblization) phases of the project.* ▪ *Special attention should be given to minimizing and reducing the quantities of solid waste produced during site preparation/ clearance, excavation and construction activities.* ▪ *Any combustible waste must not be burned on the site.* ▪ *Reusable inorganic waste (e.g., excavated sand/soils) should be stockpiled away from drainage features and used for in filling where necessary and/or possible.* ▪ *The Nairobi City County Government must dispose of unusable construction waste, such as formwork and other construction material, at an approved dumpsite.* ▪ *Skips and bins should be strategically placed within the campsite and emptied regularly. The skips and bins at the campsite should be adequately designed and covered to prevent access by vermin and minimize odour.* ▪ *Construction waste to be managed in accordance with national standards. Hazardous waste such as spent transformer oil should be collected/disposed through an authorized dealer.*

Nature of impact / impact description	Impact	Mitigation measure
16. Water quality deterioration	Construction area, short term, reversible, medium, medium	▪ *Install treatment facilities and/or oil/water separators to remove oil and grease from drainage water prior to discharge at campsite.* ▪ *Implement the construction waste and wastewater management plan.* ▪ *The construction vehicles and equipment will be regularly maintained from a recognized garage off-site or a well bounded onsite area thus minimizing the potential for leakages to the natural environment.* ▪ *Secondary containment measures in areas where fuels, oils, lubricants and construction materials such as cement are stored and loaded or unloaded, including fueling points should be installed.* ▪ *Design and install a septic tank system for human sanitary purposes at the campsite.* ▪ *Provide disposal facilities for waste at the campsite and properly allocate the dumping site.* ▪ *Undertake regular water quality testing in NEMA accredited laboratories.* ▪ *Avoiding alignments that are susceptible to erosion, such as those along or crossing steep slopes.* ▪ *Preventive measures for runoff, erosion and sediment control.*
17. Wastewater generation and disposal	Construction area, short term, reversible, medium, medium	▪ *The impact due to improper disposal of human sanitary waste shall be mitigated by construction of sanitation facility at the camp. The type of facility will be of water closet (flush type). The sanitary wastewater shall be treated and disposed of on-site by septic tank – soak away method.*
18. Increment of noise levels	Construction area, short term, reversible, medium, medium	Same as #3
19. Deterioration of ambient air quality	Construction area, short term, reversible, medium, medium	Same as #4

Nature of impact / impact description	Impact	Mitigation measure
20. Accidental spillage of hazardous materials	Local area county, short term, reversible, medium, low	*A Hazardous Substances Management Program must be prepared by the Contractor.*
21. Risk of fire outbreak	Local area county, short term, reversible, medium, low	▪ *Ensure compliance with fire safety regulations and install all necessary fire safety equipment.* ▪ *Conduct regular trainings and fire drills for employees.* ▪ *Provide adequate number of appropriate firefighting equipment and Post 'No smoking signs' where flammable materials will be stored at the campsite level.* ▪ *Organize for inspection and maintenance of fire equipment at least once in a period of three months for site.* ▪ *Declare places with flammable materials as "NO SMOKING ZONES" and display conspicuous notices of the same.* ▪ *Establish and mark a "FIRE ASSEMBLY POINT" and designate parking spaces for emergency management vehicles at strategic outdoor points at the site.* ▪ *Clearly mark "FIRE EXIT" points from the proposed campsite and ensure that they are visible.* ▪ *Develop and post at the camp site, fire emergency and evacuation procedures* ▪ *Weather-proof all lighting and power points at the site.* ▪ *At least one person trained on handling firefighting techniques should be available through-out the construction phase of the project.*
22. Increment of traffic	Construction area, short term, reversible, high, low	Same as #5

Nature of impact / impact description	Impact	Mitigation measure
23. Increment of water demand and pressure on existing supply	Construction area, short term, reversible, medium, medium	▪ *Implementing appropriate water conservation measures and sensitize construction workers on the importance of proper water management.* ▪ *Develop water abstraction plan to minimize conflict with local residents.* ▪ *The Contractor should generate a water utility management plan.* ▪ *The Contractor should minimize damage to public water utilities during construction activities;* ▪ *Ensure provision of adequate water storage facilities on the camp site to meet project needs during periods of high demand externally and refill of storage tanks during periods of low demand;* ▪ *Repair water equipment as needed to prevent unintended discharges.*
24. Extraction of construction materials	Local area, county, medium, irrelevant, certain, high	▪ *Immediately after construction, all the borrow pits shall be rehabilitated according to the plans approved* ▪ *Material for construction must be taken for testing and approval by relevant departments at the Public Works offices before they are used for construction.* ▪ *Proper planning of transportation of materials will ensure that products of fossil fuels (diesel and petrol) are not excessively consumed.* ▪ *Waste rock/spoil materials should be placed at designated areas with proper biological reclamation.* ▪ *Compaction and re-vegetation of exposed areas as soon as possible.* ▪ *Topsoil deteriorates in quality while stockpiled. To help maintain soil quality, topsoil should be kept separate from overburden and other materials; and should be protected from erosion. Also, wherever possible, stripped topsoil should be placed directly onto an area being rehabilitated.* ▪ *If the topsoil is to be stored for a long duration, it should have a vegetal cover of, preferably, leguminous species (grasses and shrubs).*

Nature of impact / impact description	Impact	Mitigation measure
25. Construction works energy demand	Local area county, short term, reversible, medium, medium	▪ *Limiting unnecessary idling of construction equipment as well as adequately tuning of engines of the construction equipment and vehicles to minimize fuel consumption).* ▪ *Encourage carpooling (sharing of vehicles) among construction workers.* ▪ *The Contractor shall not be allowed to use firewood and charcoal for boiling of bitumen. In addition, the Contractor shall not be allowed to use firewood (including trees cleared from the road side) and charcoal as sources of energy for cooking.* ▪ *Use of energy efficient night-time lighting only at the camp-site.* ▪ *Light sensor switches can be used to ensure outdoor lights are not used during daytime.* ▪ *All energy using equipment used should be switched off when not in use.* ▪ *Control of fires and explosions is important in energy-use and management to reduce damage on property, avoid injuries and accidents and protect electrical appliances and lives.*
26. Disruption of public utilities	Project footprint, short term, reversible	▪ *A Utility Management Plan must be prepared by the Contractor and implemented prior to the construction phase.* ▪ *The proponent to consult the service providers in case of any relocation exercise.* ▪ *Consumers to be informed prior of any interruption to services.*

27. Socio-economic, cultural impacts and increased social vices	Local area, county, short term, reversible, medium, medium	▪ *Employ workers from the immediate area where feasible to avoid social conflict.* ▪ *Establish a code of conduct for the project workers* ▪ *Creating awareness towards the diversity of cultures and different economic background of the people in the project staff and residents through sensitization. Additionally, sensitize foreign workers to respect and obey the local customs and social norms of the project area community.* ▪ *The Contractor should develop and implement labor influx plan during the project implementation phase.* ▪ *Non-native workers during the construction phase should be housed in the temporary workers' camp while the local workers will return to their homes in the local communities. The camp will have the necessary social service amenities like health, water and sanitation facilities for the workers.* ▪ *Employ local security personnel to protect Contractor's assets as well as the staff on the campsite.* ▪ *Restrict construction workers to the campsite and limit their mingling with the local residents who are not project workers.* ▪ *Develop a Grievance Redress Mechanism (GRM) that should outline how the Contractor will address any complaints or grievances raised by the communities or by their employees.* ▪ *Promoting social cohesion and integration among people in the area.* ▪ *Restrict unauthorized entry to the campsite by non-workers; keep records of entry and exits for people, vehicles and materials to site.* ▪ *All communications with the community should be documented.* ▪ *Display communicative posters within site on HIV/AIDS related messages at the campsite and avail literature on HIV/AIDS awareness to staff.* ▪ *Proponent to ensure the public are involved in all stages and that their recommendations and concerns are addressed to encourage ownership of the project.* ▪ *Installing proper barricades, signs, providing flags, lights and personnel to control the traffic and separate the construction area from potential receptors;* ▪ *Emergency plans/ evacuation plans to be in place in case of injuries and accidents.* ▪ *Implementing a collaborative hiring process by involving different people to be in charge of the hiring process. This will ensure diversity and inclusion of personnel with different attributes to offer.* ▪ *Building awareness on hiring bias to all the personnel that will be responsible for recruitment of those that will work on the project.* ▪ *Ensure gender mainstreaming during the hiring process.* ▪ *The community relations plan and activities should be designed to address these situations and to minimize residual discontent or resentment among communities.*

Nature of impact / impact description	Impact	Mitigation measure
		▪ *The impact due to marital and social conflicts will be a residual impact, and it can be mitigated at the project level by enforcing a code of conduct that will define the ethics in solving these conflicts.* ▪ *There shall be a HIV alleviation program.* ▪ *The Contractor should hire an organization (Sub-Contractor) experienced in the provision of HIV/AIDS awareness and prevention activities to prepare and implement HIV alleviation program on their behalf. The Sub-Contractors shall work closely with various stakeholders (including communities and their leaders, schools and health centers, civil societies to have an educational awareness campaign during mobilization, construction, and demobilization phases of the project in order to prevent the further spread of HIV/AIDS due to construction activities.*

Nature of impact / impact description	Impact	Mitigation measure
28. Impact on vulnerable groups	Local area, county, short term, reversible, medium, medium	▪ *Vulnerable households, legal/ legalizable owners, tenants or encroachers will be entitled to one vulnerable impact allowance equal to the market value of the harvest of the lost land for one year (summer and winter), in addition to the standard crop compensation.* ▪ *The aim of this payment is to assist severely displaced persons to overcome the short term adverse impacts of land and asset loss and help them to readjust to their changed circumstances while they are making replacement earning arrangements. The one-time payment should, at the absolute minimum be adequate to provide them with equivalent level of livelihood than they had previously.* ▪ *All vulnerable PAPs affected by the loss of land will be assisted with the identification and purchase or rental of a new plot and/or structure, as the case may be, as well as the administrative process of land transfer, including cadastral mapping and registration of their property titles.* ▪ *All vulnerable PAPs affected by the loss of a structure will be assisted with the construction of a new structure or the identification and purchase or rental of a new structure, as the case may be.* ▪ *Temporary occupation of land at properties owned or occupied by vulnerable persons will be avoided and, if unavoidable, preferentially mitigated.*
29. Impacts on the existing public transport operators	Local area, county, long term, irreversible, medium, high	▪ *Public transport operators must be informed of the construction scheduling;* ▪ *Contractor and proponents must assist the Matatus operator in planning the rerouting for the circulation during the construction phase.*

30. Occupational Health and Safety Hazards - workers	Local area county, long term, reversible, medium, medium	▪ *Formulation and implementation of safety policy for the proposed Project.* ▪ *The Contractors must have a health and safety officer to manage all the accidents and safety concerns on site.* ▪ *Advice workers and visitors to take precautions not to cause any effect on their own health or to the health of other persons.* ▪ *Engaging only those workers who are trained to operate specific machines and equipment.* ▪ *Proper signs on construction sites to warn workers of safety requirements as regards machines with moving parts and other equipment at site.* ▪ *Provide a First Aid Box and have a trained person to handle site emergencies and incidences.* ▪ *Display in the campsite telephone numbers of ambulances or provide a site vehicle to specifically transport the injured to hospital.* ▪ *Provide fire-fighting mechanism at the campsite. Display emergency call numbers that can be used in case of a site fire.* ▪ *Provide washing (enclosed bathroom) and toilet facilities at site with both drinking and washing water. The number of workers engaged determines the number of the toilets and bathrooms provided. These facilities should be adequate and fit for use for both genders both at the campsite and along the construction site.* ▪ *Ensure the project areas are marked and appropriate signage used to warn the public of the ongoing project.* ▪ *Enforcing adherence to safety procedures and preparing contingency plan for accident response.* ▪ *Providing all employees with suitable safety and protective gears (PPEs);* ▪ *Ensuring that all machinery used on the site are properly maintained and inspected before use;* ▪ *Place warning signs for hazardous or flammable substances and ensure chemicals are stored safely and MSDS are made available educating workers on the same.* ▪ *Excellent housekeeping standards should be maintained on site and construction stores.* ▪ *Ensure that provisions for reporting incidents, accidents and dangerous occurrences during construction using prescribed forms obtainable from the Directorate of Occupational Health and Safety Services (DOSHs) are in place.* ▪ *Proponent and Contractor to consider employing local labourers as this limits the number of labourers settling in new places leaving their families behind.*

Nature of impact / impact description	Impact	Mitigation measure
		▪ *Develop HIV/AIDS awareness programmes or initiatives to target the construction workers, institutional communities and the general members of the community, particularly the youths; with the objective of reducing the risks of exposure and the spread of HIV virus in the project area.* ▪ *Develop appropriate training and awareness materials for Information, Education and Communication on HIV/AIDS.* ▪ *Develop an intervention strategy compatible with the construction programme to address success of the HIV/AIDS prevention and provide peer educators for sustainability in collaboration with other stakeholders.* ▪ *Integrate monitoring of HIV/AIDS preventive activities as part of the construction supervision. Basic knowledge, attitude and practices are among the parameters to be monitored, and particularly on provision of condoms, status testing and use of ARVs.*

Nature of impact / impact description	Impact	Mitigation measure
31. Occupational Health and Safety Hazards - community	Local area county, long term, reversible, medium, medium	▪ *Implement precautions to ensure that objects (e.g., equipment, tool, debris, precast sections, etc.) do not fall onto or hit people, vehicles and properties in adjoining areas.* ▪ *Fencing of construction sites and regular patrols to restrict public access.* ▪ *Prior to excavation work, provide fencing on all sides of areas to be excavated.* ▪ *Provide warning signs at the periphery of the construction site.* ▪ *Strictly impose speed limits along residential areas and where other sensitive receptors are located.* ▪ *Educate drivers on safe driving practices to minimize accidents and to prevent spill of hazardous substances and other construction materials during transport.* ▪ *An Emergency Preparedness and Response Program must be prepared by the Contractor and must include an identification of areas where accidents and emergency situations may occur, communities and individuals that may be affected, response procedures, provision of equipment and resources, designation of responsibilities, communication, including that of potentially affected communities and periodic training to ensure an effective response;* ▪ *A Security Personnel Program must be prepared by the Contractor to manage and control potential security risks and impacts resulting from the recruitment and performance of the Project's security personnel.* ▪ *Waste Management Plan;* ▪ *Hazardous Substances Management Program;* ▪ *Transit Management Program;* ▪ *A Risk Management Plan with the implementation of the mitigation above defined.*

32. Impacts on worker's rights	Local area county, long term, reversible, medium, medium	▪ *Contractors and Sub-Contractors shall ensure that operative's health is well maintained and arrange a regular periodic health examination and follow up with any serious issues. Contractors and Sub-Contractors shall ensure control measures in place to protect employees from dust, noise and infections by providing adequate rest areas and toilets, and by monitoring the hygienic condition of the site and welfare facilities. Regular testing to drinking water shall be made to all drinking points on site.* ▪ *Setting health and safety requirements in tender specifications, meeting EIB's requirements.* ▪ *Ensuring all persons, including managers, are trained and able to carry out their work without risk to the safety or health of themselves or other workers.* ▪ *Ensure proper training and precise information on labour law.* ▪ *Make sure that all workers are informed of their rights including wages and benefits and on their fundamental right to associate freely under the law;* ▪ *Communicate policies to labour intermediaries as appropriate and make sure they understand;* ▪ *Make policies contractually binding under the service agreement with labour intermediaries;* ▪ *Appoint a supervisor(s) to physically observe, on a periodic basis, the payment of wages and inspect welfare facilities and OHS practices on sites;* ▪ *Implement a risk-free communication channel to receive workers' complaints – openly or anonymously – on labour rights violations including payment of wages;* ▪ *Develop policies on remuneration, working conditions.* ▪ *Ensuring all persons, including managers, are trained and able to act on such emergency happenings.* ▪ *Local authorities emergency telephone numbers to be shown at all strategic places and accessible to all personnel.* ▪ *Security 24/7 must be deployed at site.* ▪ *Site and surroundings must have adequate suitable lighting and signage.* ▪ *Ensuring all persons, including managers, are trained and able to act on such emergency happenings.* ▪ *Local authorities emergency telephone numbers to be shown at all strategic places and accessible to all personnel.*

Nature of impact / impact description	Impact	Mitigation measure
33. Archaeology & Cultural Heritage	Construction area, short term, reversible, medium, low	*To prepare an chance find Procedure including following elements:* ▪ *A review of Kenyan heritage legislation as it relates to chance finds and government agency or ministry notification requirements and procedures;* ▪ *A multi-tiered classification system for chance finds based on previously identified cultural heritage resources types and protections afforded to different types of cultural heritage resources by Kenya heritage legislation, IFC PS 8, and recognized industry standards.* ▪ *A step-by-step procedure to be followed by Company staff in the event that a chance find is discovered, including clear criteria for potential temporary work stoppages in the area of the find;* ▪ *Clearly defined roles and responsibilities and response times required from both Company staff and relevant heritage authorities;* ▪ *A framework for defining the scale and scope of potential mitigation measures (e.g., collection, rescue excavations, or relocation), including guidelines for estimating time and cost associated with these measures;* ▪ *Procedures for consulting with heritage authorities during the development of mitigation measures for significant chance finds;* ▪ *Procedures for monitoring and verifying compliance with the CFP;* ▪ *Chain of custody instructions for recovered artefacts.*
Operation phase		
34. Reduction of GHG emissions	Local area, county, long term, certain high	---
35. Community support and livelihoods opportunities	Local area county, long term, certain, medium	---

Nature of impact / impact description	Impact	Mitigation measure
36. Road maintenance negative impacts	Project footprint, long term, irreversible, high, medium	▪ *Incorporating recycling of road resurfacing waste where possible;* ▪ *All vegetation cuttings for road clearance maintenance suspected to be from invasive alien species should be burnt on site or translocated to minimize dispersal;* ▪ *Manage sediment and sludge removed from storm water;* ▪ *All removed paint materials suspected or confirmed as containing lead should be treated as a hazardous waste.*
37. Solid waste generation	Project footprint, long term, irreversible, medium, medium, medium	▪ *A waste management plan must be prepared by the Proponent for the operation phase of the project;* ▪ *Enforcement of laws and by-laws for the buses and other motorists on improper disposal of solid waste from vehicles;* ▪ *No vehicles should be serviced along the roads or at bus stops – all should be in a licensed garages or service stations;* ▪ *Road signage prohibiting disposal of waste;* ▪ *Regular cleaning, collection and disposal of solid waste by the local authorities (at bus stops), and performance-based Contractor that will be assigned on the road for maintenance (along the roads).*
38. Impacts on the existing public transport operators	Local area county, long term, irreversible, medium, low	▪ *Rerouting and monetary compensation: The operator's license and permit should be transferred to another route.* ▪ *Incorporation into the BRT operation: Impacted operators could be "rerouted" to serve on the BRT as to feed the BRT routes.*
Decommissioning phase		
39. Noise levels increment	Construction rea, short term, reversible, medium, medium	▪ *Inform local residents beforehand, via notices and advisories, of pending noisy periods and solicit their tolerance well before the commencement of demolition works.* ▪ *Workers operating equipment that generates noise shall be equipped with noise protection gear including ear muffs and plugs.* ▪ *Limit pick-up trucks and other small equipment to an idling time of five minutes, observe a common-sense approach to vehicle use, and encourage workers to shut off vehicle engines whenever possible.* ▪ *All machines and equipment should be regularly inspected and service.*

Nature of impact / impact description	Impact	Mitigation measure
40. Solid waste generation	Construction rea, short term, reversible, medium, medium	The Contractor should prepare a site waste management plan prior to commencement demolition activities. This shall include designation of appropriate waste storage areas, collection and removal schedule, identification of approved disposal site, and a system for supervision and monitoring. The mitigation measures are as applicable during the construction phase.
41. Dust emissions	Construction rea, short term, reversible, medium, low	▪ *Covering of all haulage vehicles carrying debris for dumping at approved sites.* ▪ *Stockpiles of fine materials should be wetted or covered with tarpaulin during windy conditions.* ▪ *Workers should be issued with proper Personal Protective Equipment.*
42. Occupational Health and Safety hazards	Local area county, short term, reversible, medium, medium	▪ *Workers shall be issued with appropriate PPEs and use enforced.* ▪ *All workers will be sensitized/ inducted before the decommissioning exercise begins.* ▪ *A comprehensive contingency plan will be prepared before decommissioning activities begins.* ▪ *Adherence to safety procedures will be enforced at all stages of the exercise.* ▪ *All workers, pursuant to labour laws, shall be accordingly insured against accidents.* ▪ *Decommissioning activities will be limited to daytime only to avoid worker's accidents due to poor visibility at night.*

5. Environmental and Social Management Plan (ESMP)

An Environmental and Social Management Plan was prepared to ensure that the Project's requirements are translated into practical actions which can be adequately resourced, monitored and reported against through the phases of the Project.

The ESMP is presented as a standalone document part of the ESIA and includes information on the potential impact being managed, the proposed management control, responsibility for implementation, when mitigation should be applied and how it will be documented.

In particular, the ESMP describes:

- The organisational approach to environmental and social management, including definition of roles and responsibilities;
- The environmental and social standards to be applied;
- The specific management, mitigation and monitoring measures to be implemented; Recognising the dynamic nature of the Project, the mitigation measures will be responsive to changes in circumstances, unforeseen events, and the results of monitoring and review.

6. Conclusions and Recommendations

The ESIA of the proposed BRT Core Line 3 was carried out in line with statutory requirements for environmental management in Kenya, the European Investment Bank's Environmental and Social Standards and the AFD's Environmental and Social Framework. The findings have been documented in this final ESIA report. The existing environmental baseline conditions (biophysical and socio-economic) as well as sensitive components of the study area have been established through a field data gathering exercise and complemented with information from literature research. Interactions between the biophysical and socio-economic components of the environment and the proposed BRT developmental project were used to identify, characterize and evaluate the potential and associated impacts of the proposed project. Thereafter, mitigation measures to ensure the sustainability of the project based on best industry practices, available technology and level of knowledge were developed for the significant impacts. An ESMP was developed and documented to ensure effective management of the proposed BRT Project impacts as well as the implementation of the environmental and social commitments made. Finally, a Resettlement Action Plan is being developed to provide a guide for resettlement and restoration of the Project Affected Persons (PAPs); so that their losses owing principally to the construction of the BRT system are compensated or mitigated and their standard of living improved or at least restored to the pre-project levels.

Given its presence in an urban, heavily built-up area impacts on the environment cannot be avoided and impacts on the socio-economic component cannot be neglected. However environmental and social impacts assessed in this ESIA Study can be mitigated if negative and enhanced if positive through

inclusive and universal design, through responsible implementation, and through serious operation, maintenance and follow-up through the implementation of the proposed ESMP.

The assessment concludes that the implementation of the Project will improve transport connectivity and mobility in Nairobi.

1. INTRODUCTION

1.1 PROJECT BACKGROUND

According to a study funded by the Japanese International Co-operation Agency (JICA, 2006), the number of vehicle trips between 2004 and 2025 in the Nairobi Metropolitan Area had been estimated to increase by 148%. As a result, the average speed of trips is expected to decrease from 35km/hr to 11km/hr as congestion increases. The City of Nairobi is currently suffering from severe traffic congestion, and it is reasonable to assume that if nothing is done, the urban air quality and along with it the quality of life will continue to worsen. Hence, the Government of Kenya intends to improve the flow of traffic by introducing a Bus Rapid Transit (BRT) system along the key corridors.

The European Union (EU) has earmarked a EUR 45 million subsidy for the proposed Clean BRT Core Line 3 (hereinafter 'the Project'). This subsidy is intended to leverage additional financing. Accordingly, the European Investment Bank (EIB) intends to apply as 'lead financier' for the EU grant to support additional financing from the European Investment Bank (EIB) and from the Agence Française de Développement (AFD). The remaining investment needs will be covered directly by the GoK.

This report is the Environmental and Social Impact Assessment (ESIA) report for the implementation of the proposed Clean BRT Core Line 3, from Hospitals to Dandora.

1.2 PROJECT MOTIVATION AND JUSTIFICATION

The project falls under the Nairobi Metropolitan Area Transport Authority (NaMATA) and the intention is to improve transport services in the Nairobi Metropolitan Area, which are critical for economic development, through provision of improved transport systems and the BRT system is one of them. The main aim of the Bus Rapid Transit Core Line 3 is to enhance mobility, accessibility and transport within the Nairobi Metropolitan Region, from the Hospitals in Ngong Road to Dandora while providing interconnectivity with the BRT Line 2 (currently under construction) and the Nairobi Commuter Rail system. The Project aims to enable the residents living within the corridor and other users to access a faster and more efficient mode of transport to all destinations along the Core Line 3 while contributing to a reduction of air and noise pollution.

The need to undertake an ESIA for the proposed BRT Core Line 3 emanated from the Project scope and characteristic as per the requirements of the Environmental Management and Coordination Act (EMCA), (Amendment) Act, 2015 and the Environmental (Impact Assessment and Audit) Regulations of 2003; Rev. 2018 as well as the requirements of the potential Lenders/funding agencies (European Investment Bank) and the Agence Française de Développement (AFD).

1.3 ESIA TEAM MEMBERS

This ESIA Report was prepared by a multidisciplinary team. The team involved and the role played in the development of the report are presented on Table 1 below.

Table 1: ESIA team members

Name	Position
Charles Lwanga Muyembe*	Team Leader and Lead Environmental Expert
Allan Owino	Social Expert
Julius Musili	Lead Expert Environment
Cleophas Musumba	Air Quality and Noise Measurements
Dominic Kithae	Flora and Fauna
Jason Opanda	Environmental Expert
Boniface Muvea	Field Liaison and Stakeholder Engagement
Zakary Wahome	Design Engineering

Both firm and Team Leader are certified and licensed by NEMA as Environmental Impact Assessment /Audit experts (Practicing License no. #NEMA/EIA/ERPL/14210, Appendix 1 and License no. 6417, Appendix 2)

1.4 ENVIRONMENTAL AND SOCIAL ASSESSMENT PROCESS

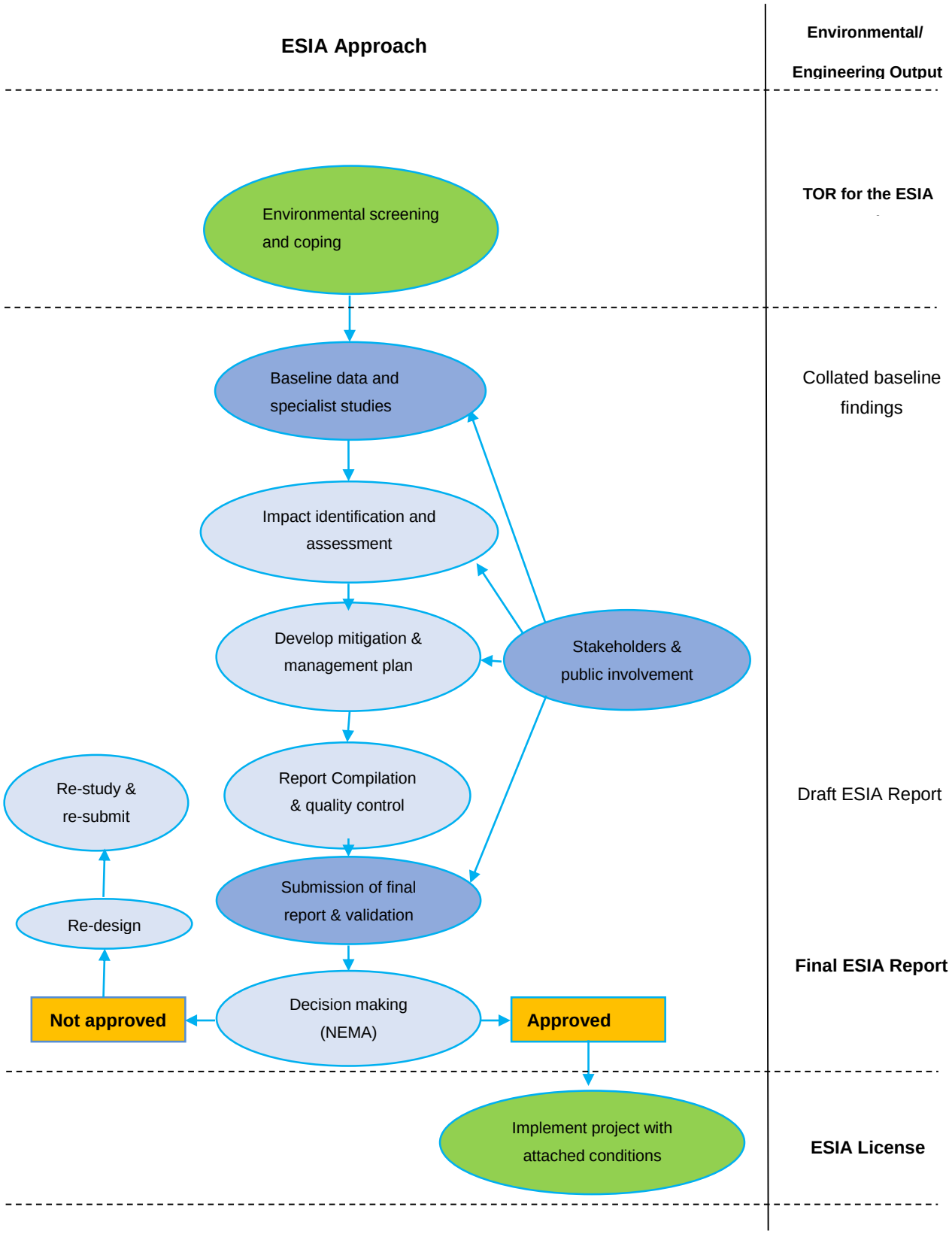
1.4.1 The need for an Environmental and Social Impact Assessment

Following the gazettement of the *Environmental (Impact Assessment and Audit) Regulations* in June 2003; Revised 2018, and the Principal Act *(EMCA), 1999*, (Amendments, 2015) all proposed projects must undertake an Environmental Impact Assessment (EIA) pursuant to facilities and utilities listed in the Second Schedule of the *Environmental Management and Co-ordination Act;* Section 58 of the Principal Act. The proposed BRT Core line 3 Project is stipulated under the Second Schedule (s.58 (1), (4)).

The Terms of Reference (ToR) were prepared and submitted to the National Environment Management Authority (NEMA) for approval before the Environmental and Social Impact Assessment for the proposed project could be undertaken. NEMA approved the ToR on October 26th 2020 (see Appendix 3).

The key activities that are required during the EIA process as per the Kenyan regulations are presented in Figure 3.

Figure 3: Summary of Key Activities



1.4.2 Administrative and Legal Framework

The Environmental Management and Co-ordination Act (EMCA) (Amended), (Amendment) Act, 2015 and the Environmental (Impact Assessment and Audit) Regulations of 2003; 2018 are the legislative framework for ESIA in Kenya. Section 58 of the Act requires all projects in the second schedule to carry out Integrated Environmental Impact Assessments. Section 18 of the regulation gives information to be captured in the ESIA Report. NEMA is the institution charged with overseeing the implementation of EMCA (Amendment) Act, 2015 and subsequent amendments and statutes thereafter. The proposed project falls within the Second Schedule of the EMCA, (Amendment) Act, 2015. Successful implementation of the project will necessitate strict compliance with all applicable international conventions, Kenyan laws and donor or lender policy requirements.

1.4.3 ESIA Objectives

The broad objective of the ESIA is to identify potential environment and social impacts of the project and formulate recommendations to ensure that the proposed development takes into consideration appropriate measures to mitigate/minimize any adverse impacts through all phases of its implementation. The specific objectives of this ESIA are to:

- Identify and assess the potential environmental, social and cumulative impacts of the proposed Project;
- Assimilate baseline data and information relating to the physical, biological and social environment in and around the proposed project RoW;
- Have a series of dialogues with the Lead Agencies, local communities/ households living in and around the proposed project site as well as other stakeholders of the project to obtain their views;
- Formulate the necessary counter measures against the potential adverse impacts so as to minimize the possible negative impacts due to project implementation;
- Propose an ESMP to guide the implementation of mitigation measures and monitoring throughout the implementation of the project and contribute to the overall process of project monitoring and auditing. This will enable the project developer to take timely action to prevent negative environmental and social impacts before they become irreversible; and
- To prepare an ESIA Report compliant with EMCA, (Amendment) Act, 2015, EIB environmental and social standards; AFD Environmental and Social Framework, WB-ESS and in compliance with the acceptable format as stipulated in the Environmental (Impact Assessment and Audit) Regulations, 2003; 2018; properly addressing all the items specified in the Terms of Reference (TOR) submitted and approved by NaMATA/ NEMA and detailing findings and recommendations from the ESIA process.

1.4.4 ESIA Approach

In order to identify the potential environmental and social impacts, and to come up with the proper mitigation measures for the proposed BRT Core Line 3 Project, both conventional and participatory approaches were used including:

- Review of national and international environmental regulations, and conventions relevant to the proposed project activities;
- Definition of the area of influence and review of preliminary designs for the proposed project to be acquainted with environmental issues in the area;
- Baseline data collection (Biophysical and Socio-Economic environment);
- Visit to the project site, and widely consulting with the local communities, local leaders and other relevant key stakeholders such as the heads of institutions adjacent to the Right of Way (RoW) and relevant Nairobi City County Government Departments;
- Consultation with the general public, National Government Departments, Nairobi City County (NCC), Community Based Organizations (CBO), PSV operators and other key stakeholders;
- Comprehensive assessment ensuring all environmental concerns and views of all parties/ persons likely to be affected by the project are taken into consideration;
- Impact identification, prediction, interpretation and evaluation;
- Development of cost effective mitigation measures;
- Development of an Environmental and Social Management Plan (ESMP) with mechanisms for monitoring and evaluating the compliance and environmental performance, which include the cost of mitigation measures and the timeframe of implementing the measures;
- Preparation of an ESIA report in line with EMCA, NEMA, World Bank (WB) and EIB Environmental and Social Standards (ESS) and AFD Environmental and Social Framework.

1.4.5 ESIA Premises

The key premises that affect ESIA process were established from the initial stages of the project and have provided the general guidance, framework, and commitment to standards acceptable nationally and internationally. The premises shall be retained and variations allowed only in certain circumstances with supporting evidence to do so. The premises identified during the screening exercise include:

- The project area is within the exclusive jurisdiction of the Nairobi City County Government and the Kenyan State Government. Therefore, both the Nairobi City County and country laws/ national laws and policies, including the environmental laws shall apply;
- The Project recognizes the laws and regulations of Nairobi City County Government and the Kenyan State Government as represented by the Ministry of Environment and Forestry, Ministry of Transport and Infrastructure NEMA, the State Department of Water, and the relevant Nairobi City County Government Departments, and insists that best options will be

adopted for the project execution through liaison with both the County and National Government Relevant Authorities;

- The project was designed and shall operate to comply with local and national laws, together with all the international protocols, agreements and conventions entered into by Kenyan Government or in tandem with financier requirements as they may be applicable particularly the EIB's Environmental and Social Standards, AFD Environmental and Social Framework and WB ESS;
- The agreements and understanding reached with Government Agencies during the course of the ESIA process will be respected and honoured throughout the project life cycle;
- An ESMP has been developed as part of the ESIA process for implementation by the proponent and the Contractor.

1.4.6 Benefits of the ESIA

The benefits of the ESIA will, among other things, include:

- Obtaining authorization; this is required by regulatory authorities before the commencement of any major development;
- Providing a forward planning tool; when environmental implications are taken into account with other design considerations at the conceptual design stage. It allows for important decisions to be built into the project while avoiding undue damage to the environment and social infrastructure;
- Providing a designing tool that will allow a systematic evaluation of potential environmental problems from the proposed development and identification of key issues which require special consideration for effective environmental management and controls;
- Involving all stakeholders through consultation so as to address common problems, impacts, and mitigating measures that might be proposed in order to obtain a social license for the project;
- Informing and assisting management with a view to establish and achieve long term management objectives in order to minimize associated financial and environmental risks; and
- Having a Monitoring Plan in place: an Environmental and Social Management & Monitoring Plan was developed for the project, where mitigation measures, design features, and impacts can be monitored to ensure environmental acceptability of the project during and after construction.

1.5 APPROACH AND METHODOLOGY FOR THE ESIA STUDY

1.5.1 Identification of the area of Influence

The BRT Core line 3 is 12.4 km in length and is proposed to run on awest to east alignment starting at Kenyatta Hospital then along Haile Selassie Avenue to the Central Business District (CBD), continues on Race Course Road to Ring Road Ngara to Juja Road and then onto the end at Dandora.

The definition of a Project´s Area of Influence (AoI) allows the establishment of geographical boundaries of areas subject to change, in a positive or negative, direct or indirect, permanent or temporary way allowing the establishment of guidelines leading to the assessment of possible environmental and social impacts. To define the areas of influence of this project, topographic, physiological, climatic and biological aspects were considered, as well as possible changes in the socio-economic context and quality of life of the population existing in the directly and indirectly affected areas, and in this case the main sub-counties include; Starehe, Kamukunji, Westlands and Njiru were considered.

In practice the AoI is a function of many factors which have changing and varying degrees of influence on the areas surrounding the project throughout the course of the project cycle. The AoI can therefore be thought of as the sum of several fluctuating factors. The geographical extent of some of these factors can be partially quantified (e.g. water contamination can be defined by a delineated plume under specified meteorological conditions), whilst the extent of others is very difficult to measure (e.g. direct and indirect economic effects).

A further consideration, especially in developed urban areas, is the presence of other organisations or developments - each with their own AoI – within the AoI of the proposed project, making it very challenging to assign an AoI to each individual development. To this end, it is often useful to consider and/or adopt existing units, such as shorelines, catchments, cadastral boundaries (national, provincial, local), linear infrastructure (notably railway lines, roads, rivers, canals, etc.) when defining the AoI.

Given the characteristics of the project, its location and the aim of clarifying the degree of impact of the project on environmental and social issues, three (3) areas of influence were defined for this project, namely:

- The Directly Affected Area (DAA)
- The Direct Area of Influence (DAI)
- The Indirect Area of Influence (IAI)

The area of influence of the project is presented in Figure 4 below.

Directly Affected Area (DAA)

The project Directly Affected Area (DAA) comprises the project footprint, i.e., the area likely to be directly affected by the project (RoW) and the construction area, corresponding to 10 m outside the RoW where construction activities will take place. This area intersects six sub-counties of Nairobi: Westlands, Kasarani, Njiru, Kamukunji, Starehe and Embakasi.

Direct Area of Influence (DAI)

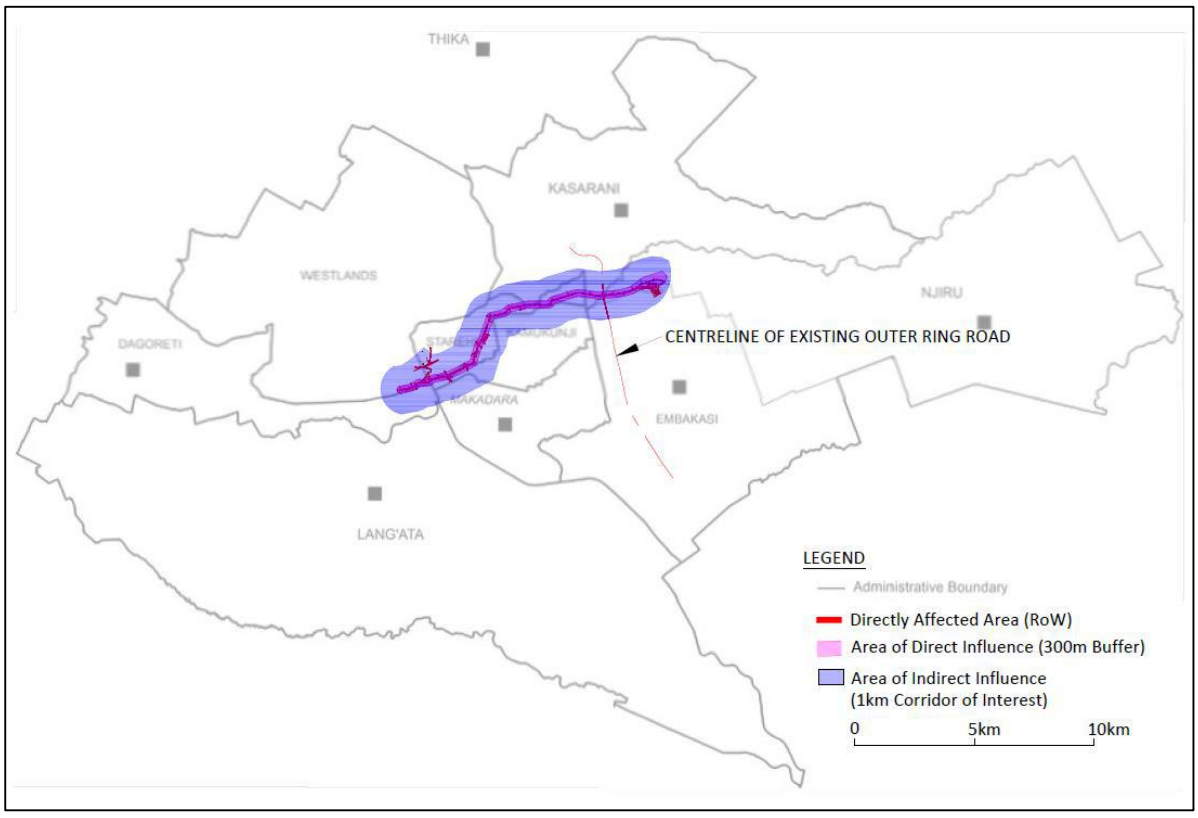
The Direct Area of Influence (DAI) represents the area where direct impacts from the construction and operational activities will be felt. The DAI will be limited to the site where the BRT will be constructed and operated, the immediate surrounding areas, and corresponds to 300 meters from the project footprint.

Indirect Area of Influence (IAI)

The project Indirect Area of Influence (IAI) is the geographic area where indirect project impacts and secondary impacts that result from direct impacts will manifest. A conservative approach will be taken, and all the impacts identified for the project, including those considered to be not significant will be considered to inform the IAI. The IAI corresponds to a 1 km corridor of interest across 8 sub-counties affected by the project implementation, people living there will indirectly be affected by the BRT.

The sub-counties intersected are Westlands, Kasarani, Njiru, Embakasi, Kamukunji, Makadara, Starehe, and Dagoretti Sub-Counties (Figure 4).

Figure 4: Areas of Influence of the project



1.5.2 Site reconnaissance survey

A site reconnaissance visit was conducted at an early stage of the Project across the proposed alignment from Hospitals to Dandora, aiming at understanding the site setting, environmental and social sensitivities and to identify the potential relevant local stakeholders.

Specific objectives of the preliminary site assessment included:

- Obtaining any available information and data from the local public offices including environment, water, lands, health and agriculture;
- Evaluating the environmental setting around the proposed site - observations were focused on the topography, land tenure, surface and ground water sources, public amenities, land cover, climate, flora and fauna, soils, etc.

1.5.3 Desktop work

Desktop studies were undertaken to acquire an environmental database required for the ESIA study. The literature search included information from previous studies around areas with similar environmental characteristics. During this process, a number of relevant documents were collected and detailed reviews of important secondary data were carried out. The documents review included the following: Socio-economic profile reports, policies related to environment and socio-economic, legislations, international conventions, and guidelines, geometric design reports and drawings, and economic evaluation of the project. During the desk review, important information was collected on project background, objectives, and design of the proposed project.

1.5.4 Field Surveys

Field surveys were undertaken in the DAI along the Right of Way in Dandora, Kariobangi North and South, Mathare, Pangani, Huruma, Kariokor, Ziwani, Ngara, along Ngong Road (Westlands) and Starehe. The purpose of the surveys was to complement/verify information gathered from desktop studies. It was also done to obtain detailed information about the project area to compliment information gathered during the interviews and meetings with stakeholders. Specific information on the ecological and socio-economic conditions of the project environment was gathered during fieldwork execution. In particular, the survey covered the following environmental components: the biophysical environment – topography, geology and soils, hydrology, noise and air quality characteristics and flora and fauna; the socio-economic and health environment - population, land-use and patterns of land ownership and tenure, community structure, employment, distribution, public health, cultural heritage, customs, aspirations and attitudes, etc.

It should be noted that sampling requirements investigated include air quality and noise.

1.5.5 Stakeholder engagement

A Stakeholder Engagement Plan (SEP) was prepared (Appendix 9) aiming at ensuring the following:

- Promote transparency of project objectives between the project implementers and the stakeholders;
- Targeting different project stakeholders at relevant periods of the project cycle;
- Provide relevant, appropriate and timely information to stakeholders;
- Manage and mitigate project risks;
- Improve efficiencies and accountabilities between the project managers and stakeholders;
- Promote inclusivity;

- Promote clarity and comprehensiveness;
- Raise awareness among the general population and, in particular the affected local communities living in the vicinity of the project area, on the importance of the Project implementation from the perspective of health system improvement and other benefits from Project's implementation to improve the social and economic conditions of the local populations.

Under the Stakeholder Engagement Plan (SEP) presented in Appendix 9 consultations were made in a participatory and consultative manner in order to gather compressive information appropriate to the study.

The following tools were employed to capture the views, comments and concerns of the public and stakeholders in the project area and specifically along the proposed project RoW. The approaches used included the following:

- Key Informant Interviews;
- Stakeholder Consultations;
- Focus Group Discussions (FGD);
- Socio-Economic Survey.

I. Key informant interview

Key informant interviews were done to obtain qualitative data regarding the proposed project. The County Government Officials, National Land Commission (NLC), learning institutions, Non-Governmental Organizations (NGOs), Community Based Organisations (CBOs), Faith Based Organizations (FBOs) and other National Government Officials were interviewed and their insight used in developing this report, organizing public meetings/barazas and other logistics. An open-ended questionnaire was also used to collect data from the Key Informants, See Appendix 10.

II. Stakeholder consultations

In conjunction with the Deputy County Commissioners, meetings were conducted in each location traversed by the proposed project.

III. Focus group discussions

Focus Group Discussions (FGDs) were used to gain insights into the workings of the project area. FGDs where held in all location traversed by the proposed project and targeted the following groups;

- Men;
- Women;
- Youth;
- Vulnerable/ People Living with Disability (PLWD) were encouraged to join the three groups;

IV. Socio-economic survey

A socio-economic survey was undertaken in all the six sub-counties along the RoW. The main tools of the survey were questionnaires and the sampling unit included household community members. The aim of conducting the socio-economic survey was to obtain the project area socio-economic

profile and find out different opinions of people regarding the proposed project and anticipated impacts it would have on the environment and the community at large. The Consultant used Cochran's formulae to determine an appropriate sample size that will be a representation of the actual population. The data collected was analysed and the findings have been presented in Section 7.

1.5.6 Environmental and social baseline

The assignment involved a series of activities carried out in the DAA and DAI, specifically in Njiru, Kasarani, Kamukunji, Starehe, Westlands and Embakasi Sub-Counties that fall under the project Right of Way (ROW); in liaison with the proponent, relevant Lead Agencies/ Government departments, local authorities, community groups and other organizations in the area with a view to sharing their experiences and information with respect to environmental resources and social aspects. Effective evaluation of the social baseline status was achieved through interviews (consultative discussions) and physical inspection of the entire project area. The baseline conditions provided the starting point for the impact predictions and benchmark for the mitigation measures.

1.5.7 Impact assessment and mitigation measures

Upon data analysis, potential environmental and social impacts (both positive and adverse) were predicted based mainly on concerns raised by stakeholder and expert observations on the ground and available tools. The magnitude, significance, and acceptability of predicted impacts were evaluated with a view to determining whether observed adverse impacts are significant enough to warrant mitigation.

As part of the ESIA process, adverse impacts are identified (which cannot be managed via design controls/incorporated mitigation) and mitigation measures are developed (including

avoiding, management and monitoring actions).

In order for the Project to manage and ensure the implementation of the proposed mitigation measures an Environmental and Social Management Plan (ESMP) was prepared. The purpose of the ESMP is to ensure that the Project's requirements are translated into practical actions which can be adequately resourced, monitored and reported against through the phases of the Project.

The ESMP is presented as a standalone part of this ESIA and includes information on the potential impact being managed, the proposed management control, responsibility for implementation, when mitigation should be applied and how it will be documented.

In particular, the ESMP describes:

- The organisational approach to environmental and social management, including definition of roles and responsibilities;
- The environmental and social standards to be applied;
- The specific management, mitigation and monitoring measures to be implemented.

1.6 ESIA ORGANIZATION AND STRUCTURE

Executive summary: This presents a summary of the study approach, significant findings and recommended actions with an emphasis on expected impacts.

Section 1: **Introduction:** This section gives a description of the project background, core objectives, project benefit and justification and the general structure.

Section 2: **Project Description:** This gives a description of the proposed Project and details of its components.

Section 3: **Policy, Legal and Institutional / Administrative Framework:** This section outlines the overview of the Kenyan and international best practice/framework on implementation of the project.

Section 4: **Analysis of Project Alternatives:** Describes the alternatives considered including location, technologies and processes available.

Section 5: **Physical Environment baseline:** This section gives a description of the physical environment of the project area.

Section 6: **Ecological Environment baseline:** This section gives a description of the ecological environment of the project area.

Section 7: **Socio-economic Environment:** This section gives a description of the socio-economic environment of the project area.

Section 8: **Stakeholder Engagement and Public Participation:** This section highlights the approach adopted and summary of results of the public consultation activities undertaken. Brief of OHS (Occupational Health and Safety) requirements is also presented.

Section 9: **Environmental and Social Impacts:** This section summarizes all the potential impacts.

Section 10: **Mitigation Measures and Monitoring Programmes**: This section describes the proposed mitigation measures and monitoring programmes throughout the Project's lifecycle.

Section 11: **Environmental and Social Management Plan (ESMP)**: This section summarizes the objectives of the ESMP which is presented as a standalone document to the ESIA.

Section 12: **Grievance Redress Mechanism**: provides a formal avenue for affected groups or stakeholders to engage with the project implementers or owners on issues of concern or unaddressed impacts.

Section 13: **Conclusions and Recommendations:** The conclusion briefly presents the environmental and social acceptability of the project,

taking into account the impacts and measures identified during the assessment process. Further specialized studies, programs, plans, institutional requirements, and capacity building needs are summarized here.

References: This section presents all the reference material used in the course of the study.

Appendices: This comprises of all the appendices relevant to the study.

2. PROJECT DESCRIPTION

2.1 Project location and Route

The Project is located in the North-East of Nairobi. It is part of a broader network and serves a 12.4 km long corridor referred to as BRT Core Line 3. It starts from Kenyatta Hospital progresses down Haile Selassie Road to the Central Business District (CBD), continues on Race Course Road, to Ring Road Ngara to Juja Road and then onto the end at Dandora.

The BRT RoW intersects six sub-counties of Nairobi: Njiru, Kasarani, Kamukunji, Starehe, Westlands and Embakasi.

Figure 5: Project location

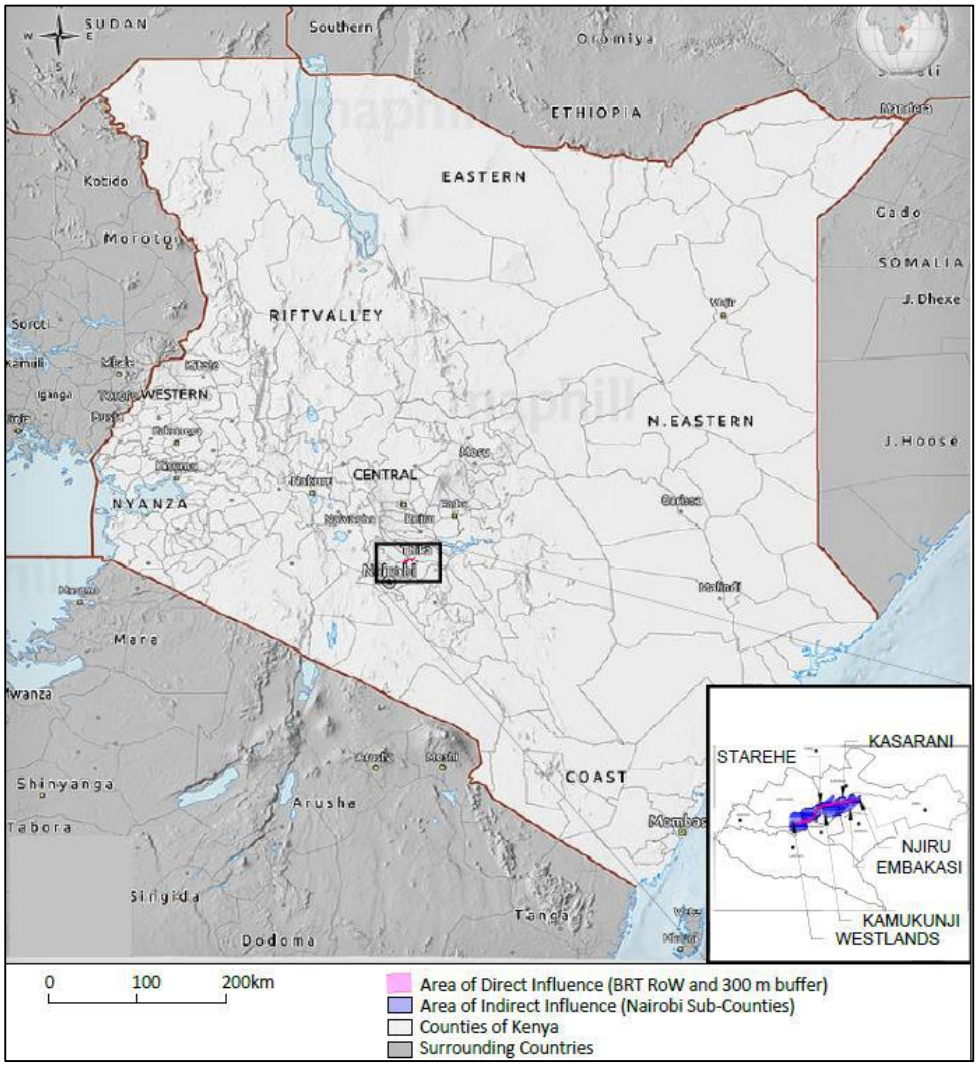
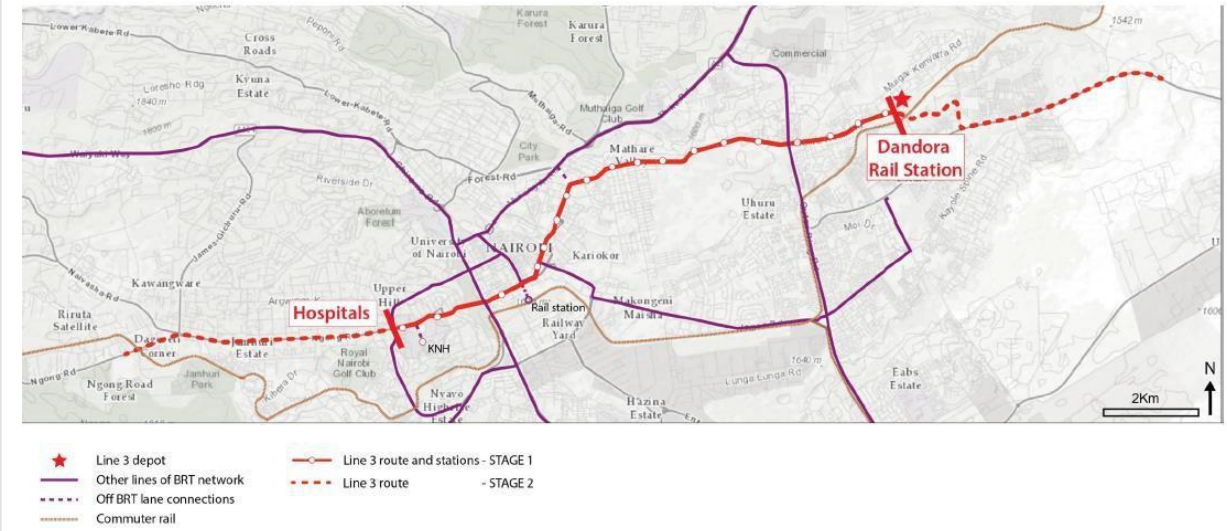


Figure 6: Project route



2.1 Project Objectives

The main objectives of introducing Bus Rapid Transit in Nairobi are to:

1. Provide fast, frequent, reliable, clean, safe and affordable transport in the Nairobi Metropolitan Area;
2. Improve mobility for low-income groups, reduce congestion and improve the accessibility of Nairobi, being essential conditions for social and economic development;
3. Reduce air pollution and greenhouse gas emissions;
4. Modernise, formalise and regulate the public transport sector;
5. Provide a business model that ensures a financially sustainable operation.

In addition, the specific objectives of the BRT Core Line 3 project are to:

1. Provide infrastructure, systems and fleet for BRT operation on BRT Core Line 3 corridor;
2. Improve NMT, traffic management and drainage on the BRT Core Line 3 corridor;
3. Provide a BRT Management Centre for managing the entire BRT network.
4. Provide the basis for further extension to the entire Line 3 Corridor and eventually towards an open BRT system

2.2 Project Design

2.2.1 Introduction to the Mass Rapid Transit System (MRTS)

A Mass Rapid Transit System (MRTS) will be introduced in the Nairobi Metropolitan Area (NMA). The MRTS, including Bus Rapid Transit (BRT) and Commuter Rail, is linked to the Kenya Vision 2030, the Integrated National Transport Policy approved by the Cabinet in 2009 and by Parliament in 2012 and the Nairobi Integrated Urban Development Master Plan (NIUPLAN) in May 2014. The BRT system is being provided to address the problem of urban congestion in the Nairobi Metropolitan Area (NMA) and its implementation will facilitate movement of people and goods in the NMA. This endeavour will enhance the quality of life by reducing air pollution and decongestion of traffic among others.

The BRT corridor has already been gazetted under Legal Notice No.16 of 2019 (See Appendix 4)**.**

In order to ensure successful implementation of the BRT system the Government of Kenya (GoK) established the Nairobi Metropolitan Area Transport Authority (NaMATA) through an Executive Order signed by the President under Legal Notice No. 18 of 17th February 2017. The principal objective of NaMATA is overseeing the establishment of a safe, integrated, efficient, effective, and sustainable public transport system within the Nairobi Metropolitan Area (NMA), bringing better conditions to the public transportation without excluding the present operators.

NaMATA is currently placed under the Ministry of Transport, Infrastructure, Housing and Urban Development (MoTIHUD with the principal objective of overseeing the establishment of a safe, integrated, efficient, effective, and sustainable public transport system within the Nairobi Metropolitan Area (NMA). NaMATA is responsible for the realisation and management of the Mass Rapid Transit System (MRTS) for the NMA, including metro, commuter rail, light rail, BRT and bus. NaMATA highest priority in the short term is the implementation of Bus Rapid Transit (BRT) and

Intelligent Transport Systems (ITS). The vision of NaMATA is "To have a modern public transport system at reasonable cost to the users and yet profitable to the operators using high-quality capacity buses which meet international standards, environmentally friendly, operating on exclusive lanes and at less travelling time".

Bus Rapid Transit (BRT) is a flexible, rubber-tired form of rapid transit that combines stations, vehicles, services, running ways and information technology elements into an integrated system with a strong identity. The development of BRT systems has been supported for the following reasons: first is the notion that the effective, efficient and cheap public transport services contribute to the wellbeing of the residents of those cities; and secondly, such improvements in accessibility and movement within those cities makes the cities more attractive and competitive as investment centres and tourist attractions. BRT Systems have been acknowledged to be the most effective and cheaper options for solving identified problems of mass transportation instead of the metro system which is very expensive and rigid.

In Nairobi road-based public transport is currently dominated by Matatu bus operations which have grown over the years to replace Kenya Bus Services (KBS), a bus company then jointly owned by private sector investors with government participation. Currently Matatu operators utilise 14, 33 and 51-seater vehicles along nearly 70 routes licensed by NTSA and carry nearly 400,000 passengers per day utilising nearly 10,000 vehicles.

2.2.2 BRT System Concept

The BRT is a bus-based mass transit system that delivers fast, comfortable, and cost-effective urban mobility. It is not only a high-quality bus transportation system: it represents a completely new approach to public space.

The BRT main characteristics are:

- Segregated and exclusive bus lanes
- Use of high-capacity buses
- High performance of boarding and alighting system
- Enclosed stations with a central platform, and on level boarding, speeding up boarding time and bringing safety and comfort to the user
- Pre-board fare collection
- Average speeds over 20 km/h
- Overtaking lanes at stations, that allow express services implementation, therefore improving service quality and speed
- Direct service to further destinations
- Services that switch from one corridor to another will be provided in the future.

The system also contemplates a bicycle system, pedestrian facilities and special features for disabled people. All these elements are integrated into the bus corridor, and are designed to segregate public, mixed and non-motorized traffic. Design for the BRT System has as its main objective to provide high quality, high capacity and a more efficient public transport service to the whole NMA, bringing better conditions to the public transportation without excluding the present operators.

The project will include the implementation of:

- Modern electric vehicles with zero emissions and in accordance with international standards;
- Closed, clean and spacious stations and terminals;
- Non-motorized transportation system, through the construction of pedestrian and bikeways along the corridor and creation of facilities for integration of bicycles and the bus system.

2.2.3 BRT Core Line 3 Project

This ESIA is related to the BRT Core Line 3 that runs from Hospitals to Dandora, via Ngong Road, Haile Selassie Avenue, Race Course Road, Ring Road Ngara, Pangani junction, Juja Road, Outer Ring junction and Koma Rock Road.

The Project Proposal was approved by the GoK's Cabinet in early 2019. In March 2019, the MoTIHUD & PW submitted a request for financing to a number of financiers including the EIB and the AFD. Following this request, the EIB, AFD and EUD held a series of meetings with the GoK in October 2019 to assess the status of the Project and agreed on a way ahead. The BRT Line 3 was proposed to extend from the Showground (south west) through the Central Business District (CBD) and on to Koma Rock Road/Kangundo Road (north east) of Nairobi. However, the financing agencies and GoK agreed that the scope of the BRT Line 3 Project needed to be reduced to fit the available budget. The Project in the context of this assignment therefore comprises of the 12.4 km long BRT Line 3 section from Hospitals to Dandora (referred as 'core'), a depot for the buses and feeder stations adjacent to BRT stations where necessary. Excluded for now is the BRT Line 3 section from Hospitals to Showground as well as the feeder lines themselves. These may be included in a later phase of the BRT system development.

The BRT Core Line 3 Project includes the following components:

1. The BRT 'Core' Line 3 corridor from Hospitals to Dandora (12.4 km).
2. BRT infrastructure:
    i. BRT lanes in the median.
    ii. 15 BRT stations (including 2 terminals). Stations are located in the median, with passing lanes, ticket validation at the entries and level boarding.
    iii. 1 Depot including parking for the BRT fleet, charging facilities for the electric buses, cleaning, fuelling, maintenance workshop and offices.
    iv. 9 elevated structures, including footbridges, flyovers and an underpass.
    v. 25 at-grade intersections provided with traffic signalling.
3. Other infrastructure:
    i. Upgrading and adjustment of general traffic lanes and NMT along the entire corridor.
    ii. Pedestrian access to and from the stations for at least 150m for each access point.
    iii. Adequate drainage of the entire BRT corridor and surrounding catchment area.
    iv. 1 Park & Ride facility at Dandora.
    v. 2 Feeder bus stations (at Hospitals and Dandora).
    vi. Utilities (water, sewer, power and telecom): relocation where necessary and provision of connections to BRT stations, feeder stations and depot.

4. Land acquisition, resettlement and mitigation measures.
5. BRT fleet consisting of 110 articulated buses.
6. Ticketing and information systems.
7. BRT Management Centre.

2.2.4 Traffic lanes

The widths of traffic lanes have been designed according to the following key factors:

- Driving speed;
- Corridor width available;
- Type of traffic lane (one or two-way traffic);
- Number of traffic lanes (single or dual carriageway);
- Templates of vehicles.

Lane widths should be considered within the overall layout of the street. Where there is limited width, available lane widths have been reduced to 3m, which is acceptable within an urban environment and in accordance with local standards. Where possible lane widths of up to 3.5m will be provided.

a. Cycle Tracks

Cyclists will be separated from the carriageway by a concrete kerb. As a result, the cycle tracks created by this separation combine the user experience of a separated path with the on-street infrastructure of a conventional bike lane. It improves perceived comfort and safety, eliminating risk and fear of collisions with over- taking vehicles. Cycle widths will be typically 2m wide and 3m where there are two-way movements.

b. Sidewalks

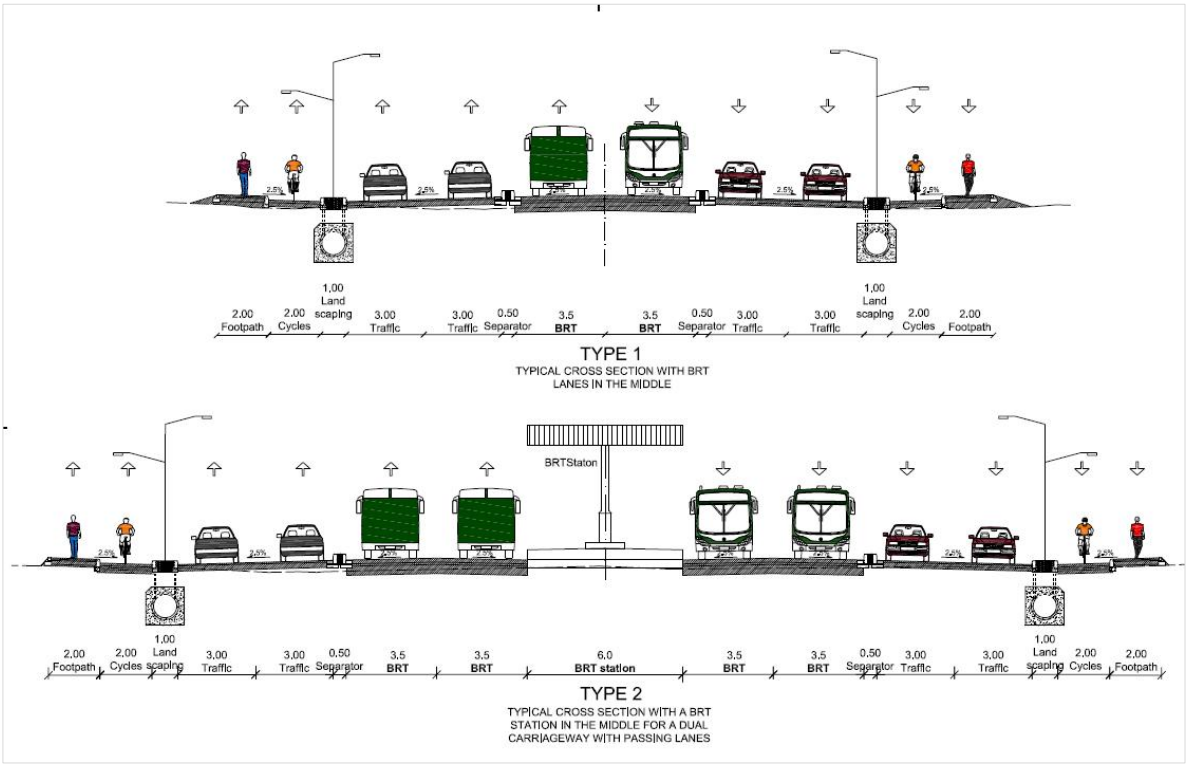
Sidewalks are an essential component of the urban environment and serve as key corridors for people, goods, and businesses.

Sidewalks will typically be 2.0m wide. However, where space permits the sidewalk width will be increased up to 4.0m in busier pedestrian areas. Pedestrians and businesses thrive where sidewalks have been designed at an appropriate scale, with sufficient lighting, shade, and street-level activity. Sidewalks are separated from the carriageway by a concrete kerb. BRT lanes are separated from other vehicular traffic by vertical separation elements and prioritize transit movements at intersections. It provides a high level of capacity and reliability for the bus service, and typically requires the most space of any transit treatment.

c. Separators

The BRT route is to be physically separated from general traffic lanes. This will ensure that no crossing is possible between general traffic lanes and BRT lanes. The separator between the traffic lanes and the BRT lanes will be 0.5 m.

Figure 7: Typical cross sections of the project



2.2.5 Parking areas

Parking areas have been provided at various locations to compensate for the loss of parking slots along the BRT Corridor.

2.3 Land requirements and restrictions

Table 2 below includes the summary all land requirements in relation to each of the project components (including associated facilities) and the Right of Way (RoW). The table identifies if land is temporarily or permanently required.

Table 2: Land requirements

Project Components	Type of occupation	Land requirements (Area m^2)
RoW	Permanent	35,972.42
Stations	Permanent	Within RoW
Depot including parking for the BRT fleet	Permanent	118,896.43
Elevated structures, including footbridges, flyovers and an underpass	Permanent	Within RoW
Pedestrian access to and from the stations	Permanent	Within RoW
Drainage of the entire BRT corridor and surrounding catchment area	Permanent	Within RoW
Park & Ride facility at Dandora	Permanent	18,485.41
2 Feeder bus stations (at Hospitals and Dandora)	Permanent	13,338.96
Utilities (water, sewer, power and telecom	Permanent	Within RoW
Worker's camp, workshops, site offices, etc.	Temporary	See attached document
Construction access roads	Permanent	Within RoW
Laydown areas	Temporary	Dandora
Quarry	Temporary	See attached document

In the RoW land restrictions will be implemented in terms of clearance, building and livelihood.

Significant restrictions will be applicable in the areas where significant traffic movement changes will be expected.

NaMATA is currently engaging with Matatus so that they form part of the feeder routes system and do not compete with BRT.

Regarding street vendors they will be given the opportunity to return and operate in the BRT corridor after construction is complete.

Private transportation will still continue operating along the route as there will be mixed traffic lanes on the BRT design.

2.4 Safety requirements for persons with reduced mobility

2.4.1 Kerbs

The height of kerbs between sidewalks and any other traffic lane will be typically 0.14m, which is currently in use in Nairobi. This is sufficient to provide protection for pedestrians when using the sidewalk. At all pedestrian crossing points, dropped kerbs are proposed to provide ramped crossing points and also tactile paving.

2.4.2 Slope

The slope of an accessible path should not exceed 4% (1:25). Pathways with a slope of more than 1:20 should be designed as ramps. The slope across a path should not exceed 2% (1:50). However, when the longitudinal slope does not foster an easy rainwater runoff, the slopes above can be raised to 2.5%.

2.4.3 Surface

The surface of an accessible pathway should be smooth, continuous, non-slip and even. Pathways which are level and even with adjacent surfaces should be given a different texture and coloured finish for differentiation. Intersecting pathways should blend at one common level.

2.4.4 Ramps

a. Slope

The BRT stations for the Core Line 3 will have low floor (320mm) platforms. This will provide safe boarding for all passengers including those using wheelchairs. The low floor will also eliminate the risk of collision of buses with the platform.

b. Landings

Ramps shall have landings at the bottom and top of each ramp, points of turning, entrance, exits and at doors resting and manoeuvring. Furthermore, the "Planning and Building Regulations (2009)" specifies that a landing should be provided after every 9.0m of travel distance. The landing will have a minimum length of 1.40 m and a minimum width equal to that of the ramp.

In NaMATA's BRT Design Framework, the maximum length of any ramp is 9.0m, which means that there will be no need for intermediate landings.

2.4.5 Pedestrian crossings

Pedestrian crossings will ease safe NMT movements and usage of the Project corridor. Where required, pedestrian crossings will be equipped with traffic control signals. Where signalling is not required, warning signs and deceleration devices will allow for safe crossings.

Kerb ramps are used wherever there is a difference in level on pedestrian paths or cross paths. Standard kerb ramps are to be used on the project: they cut back into the pavement with flared sides providing transition in three directions.

Implemented slopes tend to limit cross slope as much as possible while providing an inclusive environment for persons with a disability:

- A 2cm lip is used as a level transfer between the kerb ramp and the surface of a pathway
- Maximum slope of 8% on a maximum 2m distance.

2.4.6 Detailed Design Solutions for NMT Management

The management of Non-Motorised Traffic (NMT) constitutes an integral part of the overall BRT Project to enhance safety for pedestrians, cyclists and all other road users. As stipulated in the Nairobi City County Government NMT Policy (2015) access for disabled people will be ensured throughout the system of the BRT.

Dedicated walkways and cycle ways for bicycles are provided along the entire corridor with a clear separation from the main carriageway. This general concept was modified and adapted as appropriate according to site-specific conditions and available space. Workers, small business operators, school children, disabled and other people who are willing to walk to their respective workplaces will benefit from improved safety conditions resulting from this design approach.

To ensure safe and easy access for passengers the following elements have been incorporated into the design of the BRT corridor:

- Passenger exchanges between the station platforms and buses will be at one level to ensure minimal bus landing time as well as safety and comfort of transfer;
- To facilitate access for disabled persons and to minimize the risk of accidents at the entrance and exit of buses, the vehicles must be able to enter the stations with a horizontal gap of less than 10cm between bus doors and the deck; the vertical gap between the platform and the vehicle floor will be ≤ 2cm at all cabin doors;
- Large spaces will be provided in front of the bus doors to facilitate access for disabled people and wheelchairs;
- Inside each bus at least one location will be designated for wheelchair users and shall be marked accordingly.

Access ramps will have the least possible slope. The maximum slope of a ramp in new construction will be 1:12, the maximum rise for any run is 760 mm.

Sidewalks have a desired minimum through zone of 2.0m. However, where possible, wider walkways will be provided. Cyclists will be separated from the carriageway by a concrete kerb. As a result, the cycle tracks created by this separation combine the user experience of a separated path with the on-street infrastructure of a conventional bike lane. It improves perceived comfort and safety, eliminating risk and fear of collisions with over- taking vehicles. Cycle widths will be typically 2m wide and 3m where there are two-way movements.

2.5 Bus specifications

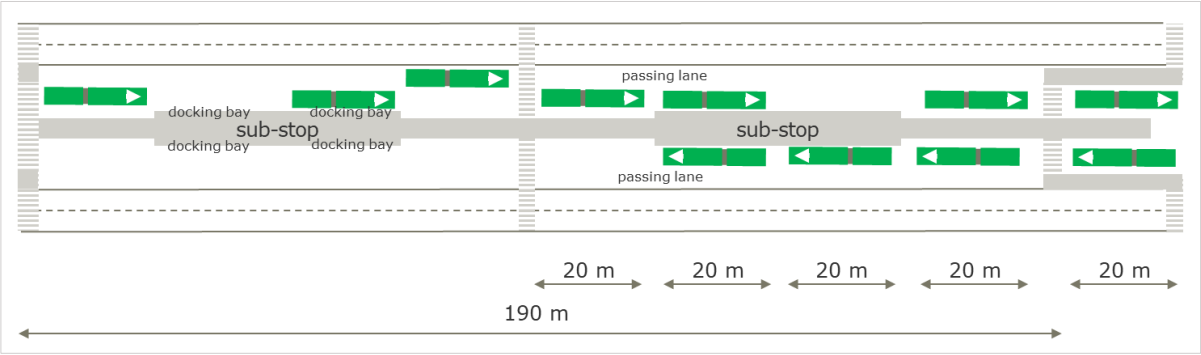
The corridor will be served by 18 m buses. The current environmentally relevant measures are:

- Average energy consumptions are 1.6 kWh/km with ventilation system (without demanding air conditioning);
- With demanding air conditioning with the former NaMATA specs the energy consumption would increase up to 3.2 kWh/km;
- The total energy consumption of buses will be 3.4 MWh per day (without demanding air conditioning – otherwise twice as much);
- Fleet size is 110 buses with 91 in operation at peak hours,
- At night buses will be slow charged with 2.6 MW of total power at the depot;
- During the day between the peak hour periods buses will be fast charged with 1.9 MW of total power at the depot;
- Including the power demand of the workshop and other facilities at the depot a power of 3.0 MW is needed;
- It is expected that when it comes to operation (2025) that solid state batteries are available that have a longer lifetime (12 years) and no need for keeping them on an ideal temperature.

2.6 BRT stations

Longer stations with passing lanes will be provided at the majority of locations. The station arrangement typically includes 2 sub-stops sited 50 m apart with additional docking positions for the buses, as illustrated in Figure 8.

Figure 8 Typical Station Arrangement



The stations allow for a pedestrian crossing in between and access control areas between the pedestrian crossing and platform. In addition, this allows for one queuing position for buses before and after the pedestrian crossing, which helps to avoid blocking of the passing lanes.

This type of station can also accommodate express services and will enable buses to skip stops if required. In the future when an 'Open System' or a 3rd Generation system is in operation the requirement for express services will become more important.

The stations will have the following facilities:

- Staff facilities, ticket office and ticket vending machines;
- Staff toilets;
- Pedestrian crossings;
- Access control for other checks (e.g. Covid-19);
- Independent docking (typically a minimum of 32 m between sub-stops for 18 m buses; but in this design 50 m are provided);
- Low platform boarding;
- Primarily sited in the median;
- Waiting zone.

In total, 15 bus stations will be provided along the corridor of the BRT Core Line 3 as shown in the Table below. Along the corridor of the BRT Core Line 3, the distance between 2 bus stations is typically about 500m

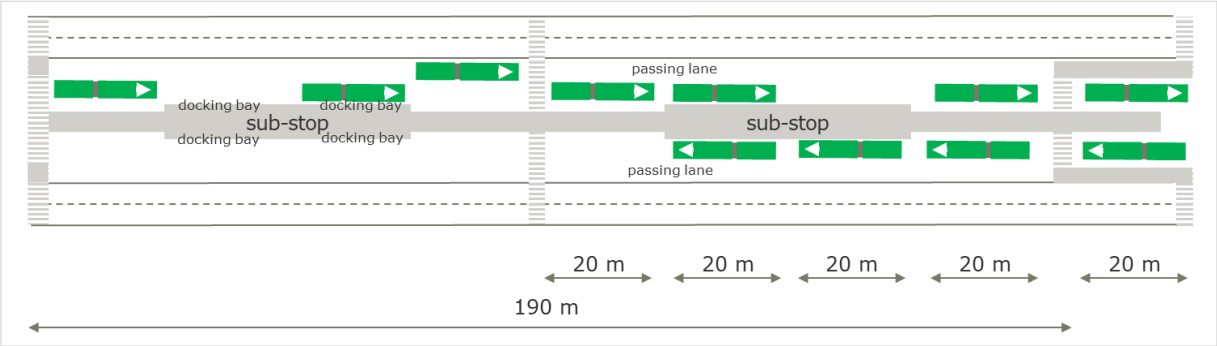
Table 3: Overview of BRT Stations

Location	No. of Docking Bays per direction	Approx. Length of Station	Passing Lanes	Shared Infrastructure
Hospitals	4	190m	Yes	No
Library	4	190m	Yes	BRT Line 2
Green Park	4	190m	Yes	BRT Line 2
City Square	5	210m	Yes	BRT Line 2
Race Course	5	210m	Yes	No
Kariokor	5	210m	Yes	No
Chai Road	4	190m	Yes	No
Muratina Street	4	190m	Yes	No
Melawa Road	4	190m	Yes	No
Moi Airbase	4	190m	Yes	No
Mathare North Road	4	190m	Yes	No
Huruma	4	190m	Yes	No
Outer Ring Road	4	190m	Yes	No
Mutarakwa Road	4	190m	Yes	No
Dandora End Station	4	190m	Yes	No

2.6.1 Detailed design of the bus stations

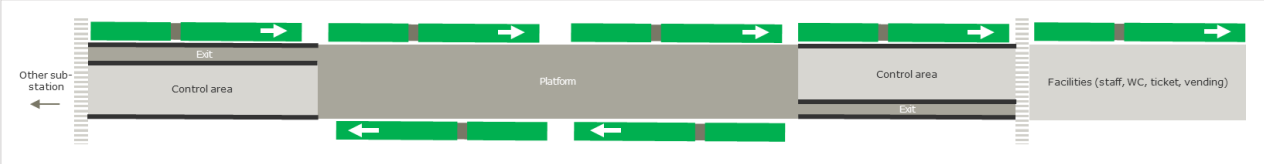
Since the infrastructure is designed for a 3rd Generation System the stations are oversized for the initial operation phase. A station typically consists of 2 sub-stops with 2 positions per direction each. This allows for using one sub-stop for the direction to the west and the other for the direction to the east. There will be plenty of space on the platform for waiting passengers. Longer stations will be provided at locations where there is a higher pedestrian demand. The number of sub-stops will typically be increased to 3 positions.

Figure 9: Typical Station Arrangement with 2 sub-stops



Between the pedestrian crossings and the platform there will be the exit path and the access control area. On the ends at the opposite site of the pedestrian crossings there will be facilities for the staff and for ticket selling.

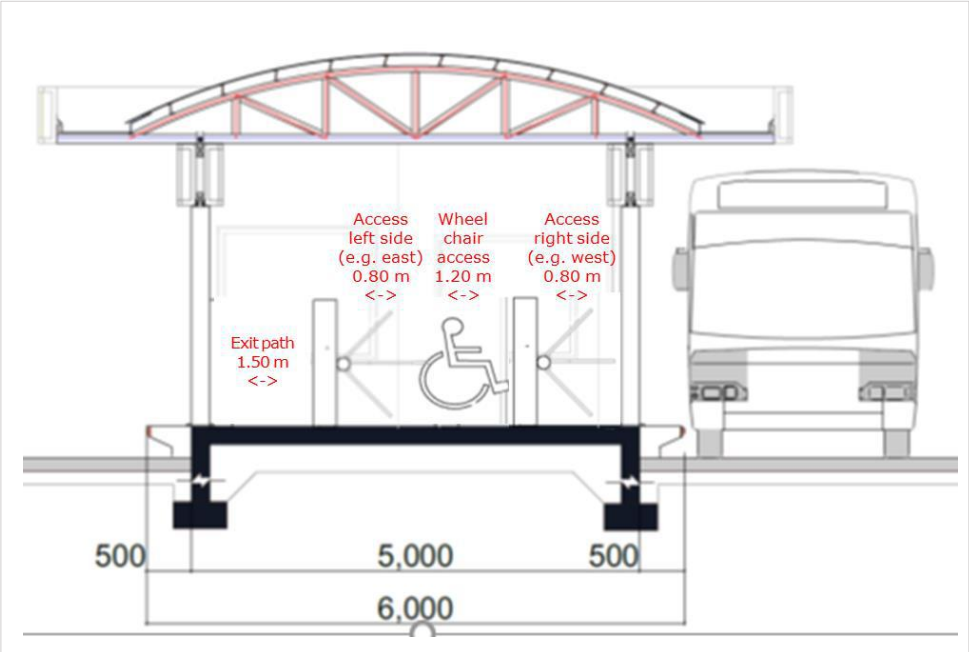
Figure 10: Sub-stop with 2 positions and access control areas



The access control area will have 3 passages:

- One for passengers going to depart from the left side,
- One for PRM (e.g. wheel chairs, strollers) in the middle for both sides
- One for passengers going to depart from the right side

Figure 11: View from the access control area onto the platform



2.6.2 Later phases of operation

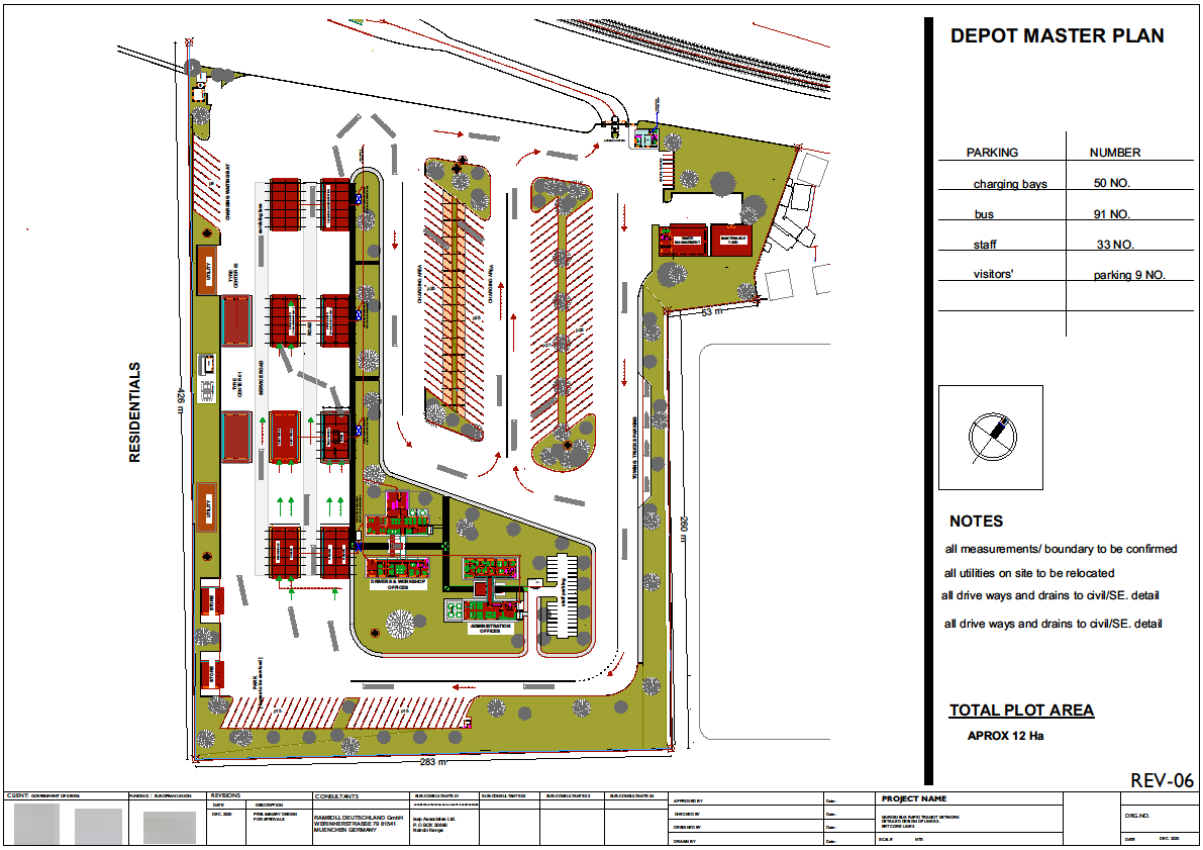
In a later phase (II and III) one sub-stop will be served by bus lines serving the BRT corridor mainly. The other sub-stop is served by less frequent bus lines that serve destinations mainly outside the BRT corridor. This ensures that buses on bus lines going off the corridor will not be crowded by passengers travelling on the BRT corridor only; i.e. space inside those buses is reserved for passengers with destinations outside the BRT corridor.

Enforced departures will take place only on the sub-stop with the lines mainly on the BRT corridor since buses circulate more frequent.

2.7 Bus Depot

The bus depot will be situation at Dandora. A master plan of the overall layout is shown in Figure 12**Error! Reference source not found.** below.

Figure 12: Master Plan for Dandora Depot



The main functions of the depot are:

- Buses storage;
- Maintenance of the buses;
- Centralized management of the BRT Line 3 operations;
- Accommodation of the staff.

To ensure these functions, the following will be installed:

- Storage space: the depot provides a wide-open space where buses can be stored for night and inter peak hours;
- Workshop to ensure maintenance of the buses. It is made of a maintenance workshop where bus maintenance is undertaken, storage for spare parts.
- Charging stations;
- Washing station;
- CMC and systems required for operation of BRT Line 3;
- Administrative building: for staff accommodation and depot supervision.

2.7.1 Security devices

To ensure the security of the depot, it will be equipped with secure Nairobi stone walling with an electric fence on top and contact alarm, gates controlled by the station guard, outdoor lighting, surveillance cameras and audio and video link between the entrance and the local guard station.

2.7.2 Emergency response facilities

Emergency response facilities (clinic and fire assembly points and fire response equipment) will be provided and located inside the administration/driver's buildings and open-air areas, in accordance with the Health/Fire Department Specifications.

2.7.3 Proposed Master Plan/Site Layout

In laying out the Depot Master Plan, the design was informed by the bus parking/circulation, which are clearly defined from the other functions of the depot for ease of circulation, safety of the different users/management of the buses for the different maintenance service requirements.

The following planning regulations by the Development Control Department of Nairobi County Government (NCG) applicable to all developments within the city have been observed:

- All development control measures in place by NCG - Building Code - to apply (plot ratios, plot coverage, setback to neighbouring developments, Health, Fire, etc.);
- All KRC regulations;
- Flight path heights to be observed if applicable;
- All NEMA regulations to apply (Treatment of wastewater from the workshops and car wash bays before connection to the public sewer system to meet NEMA standards).

The administration/social buildings and workshops are designed in an open plan concept to allow for changing workspace requirements and equipment/machines needs in future. The needs of physically challenged people are considered in the overall provision of external / internal spaces where possible (ramps, parking slots, washrooms, door sizes, railings, corridor sizes, etc).

2.7.4 Buildings

The main buildings in the proposed depot development are as follows:

- Administration building;
- Drivers/workshop staff building social spaces; changing rooms, showers/WC.

Buses monitoring centre (Central Management Centre) and drivers/workshop staff coordination:

- Mechanical workshop;
- Electrical workshop;
- Body/panel beating workshop;
- Welding workshop;

- Paint workshop;
- Car wash bays;
- Tyre centres;
- Spare parts store.

2.7.5 External Buildings

The external buildings include:

- Access control for buses, supply/collection, staff and visitors;
- Maintenance yard;
- Bus charging bays/parking;
- Parking for buses;
- Staff/visitors parking;
- Utility buildings (transformer, generator and pumps).

2.8 Drainage design

The drainage design developed for the corridor of BRT Line takes on board not only the storm water from the BRT corridor but also the storm water from the catchment areas (also designated as Extra Corridor Catchment Areas) along the corridor and flowing towards the BRT corridor.

Road-side drains have been designed for a return period of ten (10) years, whereas for main hydraulic structures, a return period of 50 years has been used. Existing undersized drainage structures will be replaced by properly dimensioned ones.

2.9 Utilities

Utilities dedicated to the Project include:

- Duct banks on each side of the Project corridor;
- Provision of water and power facilities at each station;
- Solar powered security lights;
- LED lighting;
- Intelligent battery charging infrastructure.

The electric buses will have a battery charging source consisting of a stationary battery package, which can be kept charged during the normal power supply and used to charge the buses during power outage and also in case of any shut down due to a defect or maintenance of the switchgear.

Enough water will be required to provide sanitary facilities at the Dandora Depot as well as for the washing of the buses. The quantity required is based on the recommended demand as shown below:

- Office facilities: 3.8 m^3/m^2 (higher tier*);
- Office facilities: 1.9 $m^3/m^2/d$ (lower tier);

- Bus washing and disinfection: 120 litres/bus.

The road illumination will be designed to Classification of M4 (based on EN 13201-2:2015) and the side lanes for pedestrians and cyclists to R6. Energy saving LED lighting luminaires will be installed for both internal and external spaces and areas. Solar powered security lights on 15m masts will also be installed.

2.10 Non BRT Equipment, street furniture & green spaces

Street furniture includes vertical posts at pedestrian crossings and barriers for pedestrian refuges. Other urban furniture includes benches and bins.

Public strips of green spaces will be created where sufficient space remains in the public right of way. Within the BRT corridor such green spaces will be provided between the cycle tracks and walkways.

Existing roadside trees that need to be cut down during construction or that may be accidentally damaged or uprooted will need to be fully compensated under the Project. In line with Nairobi City County Government policies, any tree losses will be replaced in a ratio of 3:1, which will contribute to an attractive cityscape and provide shaded areas for pedestrians.

An estimate of the approximate number of trees growing in the future construction corridor has been established as part of the present study. The exact numbers and species will be confirmed by the Contractor at the pre-construction stage, immediately prior to the start of clearance operations. These numbers will be updated as appropriate in case additional trees may need to be cut down during construction or are unintentionally damaged.

2.11 Source of construction materials and equipment

2.11.1 Materials required

During the feasibility study several potential sources for sand, gravel or rocks were identified. All of these are licensed, operating borrow areas or quarries in Nairobi City County. The existing quarries along the route include Aristocrat Quarry, Biz Rock Quarry, Silver Stone Quarry, National Concrete Quarry, Eastern bypass Quarry, Kwainga Gomoro Quarry, China Quarry, Gituamba Njiru Quarry and Njoro Quarry (Ruaka). These are all commercial quarries and could be used as will be appropriate on the project. It is assumed that they have all the required approvals for their operations.

In 2011 NEMA published the "Integrated National Land Use Guidelines (INLUG)" for sustained societal attributes – infrastructure, environmental resources and public safety, where at chapter 3.10 defines the Occupational, Public Safety and Health, Environmental and Socio-Economic Guidelines for quarrying in Kenya. This measure is included in the ESMP which the Contractor is obliged to comply with.

The Contractor will be responsible to select the sources for the required construction materials in appropriate quality and quantity complying with the technical specifications. The Contractor will also decide on the most appropriate transport routes, on sites for the temporary storage of materials and on areas for spoil dumps. The utilization of any such sites will require the prior approval of the

competent authorities and of the Project Implementation Consultant, usually the Engineer who will be the Construction Supervision Consultant representative at the site.

Sand required for concrete works is normally obtained from commercial suppliers in or near Nairobi. The sand from these suppliers usually comes from Machakos County. Any sand used for the purpose of construction under this Project will be tested and approved for compliance prior to utilization.

Hard stone of sufficient quality and quantity is available in the Mlolongo area east of Nairobi, where commercial production of crushed stone for aggregates and building construction is ongoing. Construction water will be needed to cater for such activities as dust management, batching, compaction during fills, sanitation, washing and other needs at the Contractors yard and worker's camp. Such water can be obtained from private sources, the public network or natural streams. Surface water from local streams and rivers such as Nairobi River crossed by the Project corridor or the nearby Mathare River cannot be used for those purposes due to quality issues. Further suitable sources for construction water would be Ruiru and Mukuyu Rivers, both in the East of the City.

Water from these sources is used by the local populace and their livestock. Should the Contractor opt to use water from these sources, samples would have to be tested for compliance and the necessary permits obtained from both the responsible Government authorities prior to any construction work.

Should there be a need for a mobile asphalt plant or a cement batching plant, the Contractor will seek and obtain any necessary permits/ licenses.

Other materials that will be used for the Project include bitumen emulsion, polyvinyl chloride pipes and other pre-fabricated items such as, guard rails; BRT road signs; road markings and bus station equipment.

2.11.2 Gravel material sites

The following 5 No. gravel material sites have been identified, for improvement of sub-base and or for use as fill/sub-grade layers

- MS1: Kwanga Gomoro Material site
- MS2: China Material site
- MS3: Opposite Tuskys Supermarket
- MS4: Gituamba Njiru Material site
- MS5: Njoro Ruaka Material site

Kwainga Gomoro Material site (MS1)

The material site MS1 is located along Eastern Bypass. It is an existing material site with a potential for extension.

China Material site (MS2)

The Material Site 2 MS2 is located behind Ruturu shopping centre.

Opposite Tuskys Supermarket (MS3)

It is an existing borrow pit with a possibility of extension.

Gituamba Njiru Material site (MS4)

This Material Site 3 MS 3 is located off the Kangundo Road Interchange.

It is an existing borrow pit with a possibility of extension.

Njoro Ruaka Material site (MS5)

This Material Site 5 (MS 5) is near Ruaka trading centre.

2.11.3 Hardstone/Aggregate Sites

As the project is located in Nairobi Metropolitan Area hardstone for use in Dense Bitumen Macadam, Asphalt Concrete, Graded Crushed Stone, chippings and for Concrete works can be sourced from the following Commercial Quarries located in Mlolongo.

- Biz-Rock
- Aristocrat
- Silverstone
- National Concrete

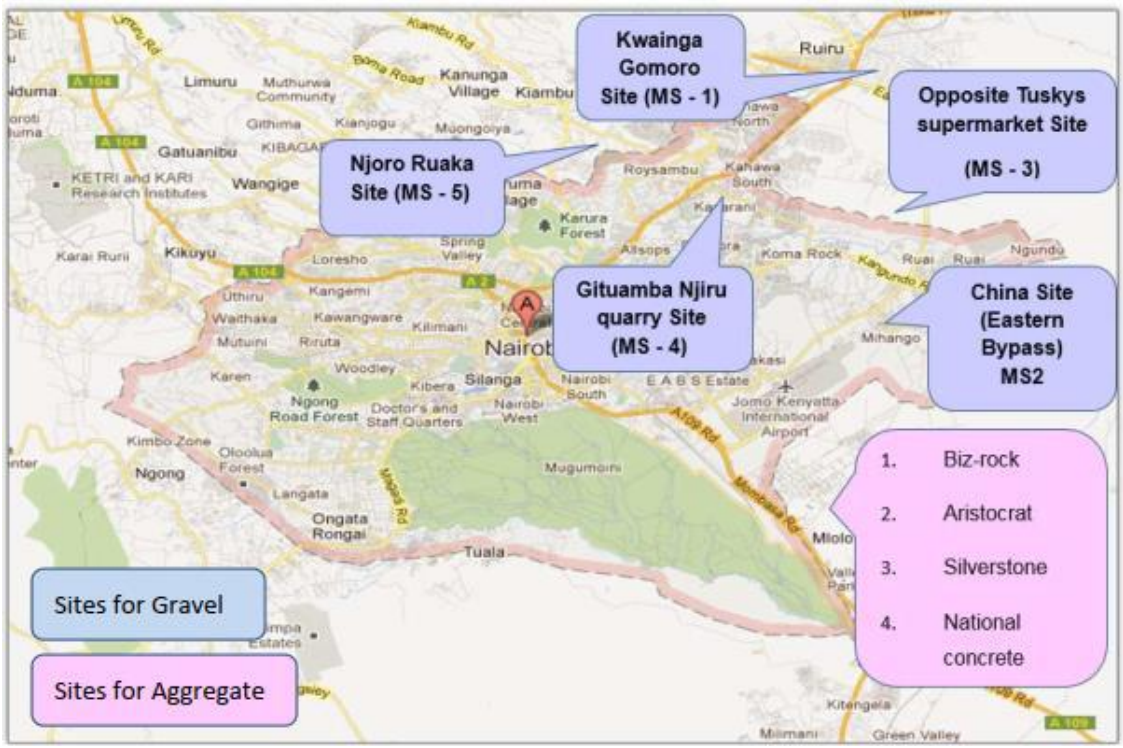
2.11.4 Sand

Sand for the project would be sourced from rivers in Machakos and Kajiado.

2.11.5 Water

Water can be sourced from the Nairobi and Ngong Rivers.

Figure 13: Location of Borrow Pits and Aggregate Quarry Sites



2.12 Waste Management Plan

NaMATA and the Contractor shall make sure that the campsite is kept tidy and under good housekeeping. The walkways shall be kept free of tripping hazards such as trailing cables, building materials and waste. This is especially important for emergency routes. All flammable waste materials (such as packaging and timber offcuts) shall be cleared away regularly to reduce fire risks. The indoor floor areas shall be kept dry, clean and tidy while outdoor footpaths shall be level and firm and should not be used for storing materials.

The Contractor shall designate storage areas for plant materials, waste, flammable substances and hazardous substances. Flammable materials shall be stored away from other materials and protected from accidental ignition. Care must be taken not to store materials where they obstruct access routes or where they could interfere with an emergency escape at the camp level.

All storage areas should be kept tidy, whether in the camp site or field level. The Contractor should plan deliveries to keep the amount of materials on site to a minimum. A decision shall be made on how the waste stream will be managed to ensure it is timely and effective. The Contractor should consider whether to be responsible for collecting his or her own waste or whether to provide someone else to do this for the site.

All project related waste should be collected at a designated waste collection point, segregated into types, appropriately stored in recycling area and periodically transported to a designated NEMA approved site. Organic/ food waste and paper should be collected from waste bins strategically distributed on the campsite awaiting collection for safe disposal in line with Environment Management and Coordination (Waste Management Regulations), 2006. All options should be

considered in avoiding, minimizing or transporting any unsuitable excavated materials from site, as this is undesirable from both an ecological and economic perspective. Where practicable, materials should be reused or recycled appropriately before being disposed of.

2.12.1 Classification of Waste

The classification of waste envisaged for the Project are as follows:

1. Construction waste/debris
2. Non-Hazardous waste:
    - Biodegradable waste: food waste
    - Combustible waste: paper, cardboard, tyres, plastics, wood and derivatives (chipboard, etc.).
    - Non-combustible waste: scrap metal, tins/cans, wire, glass, etc.
    - Domestic organic waste (sewage).
    - Hazardous Waste: battery, oil and or used lubricants/ hydraulic fluids.
3. Electronic waste
    - Equipment (machinery, etc.).

2.12.2 Waste Material Recovery

During the project lifecycle, the materials that shall be of economic value if re-used or can be recycled for use gain should be identified. In this regard, there is a need to identify suitable recycling and disposal options for the equipment and materials that are dismantled, in line with best management principles of the waste hierarchy. The project should employ the 3Rs Strategy where material waste resulting from the construction activities shall be reduced, most of which should be re-used directly and where the same can be re-modelled for other uses through recycling. Recycling and reuse of material waste should be maximized to the greatest extent possible, subject to safety and pollution considerations. Where practicable, and subject to considerations about safety and pollution, local people should be provided with the first choice concerning acquisition of recyclables or reusable materials if the same are not feasible on the project construction activities.

2.12.3 Waste disposal

Open air burning is the commonly used method of waste disposal along the project area. Waste collection points along the area are not well defined except the Dumping Site area at Dandora (01°1450.06''S/36°54'8.10''E) leading to pollution.

Open air burning points observed are presented in the table below.

Table 4: Open air burning points observed

Location	GPS
Along kilometre 0 to 0+0.19	01°17'51.6''S/36°48'20.70''E
Along kilometer0+0.19 to 0+3.00	01°17'42.79''S/36°48'41.28''E
Along Kilometre 0+0.19 to 0+3.00	01°16'49.27''S/36°49'56.18''E
Along Kilometre 0+10.9 to 0+11.00	01°15'39.99''S/36°52'0.70''E

All waste should be collected and segregated at the campsite prior to being disposed of properly. This will include:

- Non–Hazardous Waste;
- Construction rubbles/ waste or debris should be collected onsite and be disposed of after completion of construction process;
- Biodegradable waste: Food waste should be collected on a daily basis and disposal undertaken weekly during both construction and operational phases;
- Combustible waste: paper, cardboard, wood and derivatives (chipboard, etc.). This type of waste should be collected on weekly basis;
- Non-combustible waste: scrap metal, cables and wires, tyres, glass, etc. Non-combustible waste should be collected and stored at a designated area on the site, tyres, filters, wires and scrap metals should be stored at the mechanic workshop area while tins, plastic bottles, cans and glasses should be kept at the recycling area. This waste should then be transferred to NEMA designated sites by an approved waste collector for onward disposal;
- Effluent/ sewage: Connection to a Sewage Treatment Plant installed at the camp site.

2.12.4 Storage of Waste

Waste storage areas should be located with respect to minimizing/ eliminating the following:

- Impact with respect to mobilization of dust/ particles;
- Visual impacts at the project site;
- General site security.

Waste storage areas shall be operated and maintained in accordance with the following principles:

- Storage areas should be clearly indicated with signs indicating the type of waste being stored; where appropriate, the Safety Data Sheets (SDS) shall be displayed in close proximity;
- Suitable fire protection and spill/ leak contingency should be provided;
- Storage areas should be maintained and kept clean and tidy;
- Storage areas should be inspected on a daily basis for leakages spills, etc.

In the storage of hazardous waste, the following principles should be adhered to:

- Hazardous or other "special" waste should be stored and handled in accordance with any specific stipulations as stated in the respective Safety Data Sheets (SDS), which should be displayed in close proximity;
- As a minimum, hazardous waste should be stored on an impermeable surface with surround drainage or in a bund and should be protected from the elements. Due to the limited space available, storage areas will be small and therefore waste should be regularly collected for disposal.

2.12.5 Transfer of Waste

Waste transfer should always be overseen by a nominated waste handler on the site during construction. Waste Transfer Notes (WTN) shall be completed for every waste transfer and filled with the correct details from the approved agents. All records shall then be kept on the site by the Contractor during the construction phase and the Plant Manager at operational level.

2.12.6 Waste Register

The objective of the register is to allow the Prime Contractor/ Plant Manager to record every waste product generated from any activity in as accurately as possible. The Waste Transfer Notes (WTN) shall be completed by the Safety Health and Environment (SHE) Manager/ designated employee on the site responsible for waste management. These shall be based on visual inspection to allow an estimation of weight and actual waste weights as determined by the waste collector. A copy shall then be submitted to the agent in charge of transportation for final disposal.

2.12.7 Inspections and Audits

Waste management should be an integral part of the Prime Contractor routine weekly / monthly inspection and auditing system. In addition, HSE Manager and management personnel should on a day-to-day or on weekly basis carry out a visual check of:

- Storage of hazardous substances;
- Storage of non-hazardous substances;
- Cleaning of storage areas;
- Suitable fire protection;
- Suitable spill and leak containment; and
- Inspection of handling practices.

2.12.8 Managing Spillage of Hazardous Materials and possible Pollution from Waste Oil and Fuel Spills

The impacts of improperly stored fuel and other chemicals could prove detrimental if these fluids infiltrate the surface waters or groundwater systems. Management guidelines should be

implemented in order to regulate and document the use of explosives, chemicals and fuels within the project site. Operators should express due caution when it comes to the re-fueling of equipment on site, as an accidental oil spill is more likely to occur during these activities.

The following measures shall be implemented to mitigate the potential impact due to leakage of hazardous chemicals:

- Underground fuel storage tanks shall not be allowed
- Fuel storage tank(s) at the campsite will be installed in a concrete containment.
- Fueling stations, equipment service bays and pits shall be concrete paved and provide with drains and oil-water separators
- Refueling at campsite will be done by pumps
- Refueling of construction equipment shall be closely supervised to avoid leaks or releases. Should a spill occur during refueling, it shall immediately be properly cleaned up.
- When filling machinery and equipment with oils, the oil shall be pumped from a tank within a temporary secondary containment area to contain any spillage.
- All hazardous materials will be stored in appropriately bounded containers and placed on concrete floor as where applicable.
- Maintaining spill response kits at the camp level and at the construction site at all times.
- Prepare and display on site spill response procedures and training of workers on spill response and management.
- The campsite design should incorporate oil sumps at the parking areas to isolate oil spills from parked vehicles that might spill to the storm drains.
- Install oil-trapping equipment in areas where there is a likelihood of oil spillage; collect the used oils and re-use, re-sell, or dispose of appropriately using expertise from licensed waste handlers.
- Immediately institute clean up measures in case of an oil spill; design the project sites to have spill prevention and detection systems to protect the environment especially where the transformers will be located.
- Design appropriate protection devices against accidental discharge of transformer oil substances; route drains through an oil/water separator; ensure regular inspection and maintenance of the transformers to minimize spillage; ensure that all waste oils from maintenance of transformers and other associated equipment should be segregated and disposed properly by a reputable/registered waste handler in accordance with the waste disposal plan.

2.13 Project phases

The proposed project activities can generally be divided into five phases, namely: project design/permitting and approvals; procurement of Project Implementation Consultant (PIC) and Works Contractor, mobilization, construction; operation; and eventual decommissioning of the proposed project.

2.13.1 Project Design/Procurement PIC & Contractor/Permitting and approvals

A Project Implementation Consultant will be appointed and will include the provision of procurement support to NaMATA for prequalification and subsequent procurement of the works tender, design review and supervision services of the Contractor as well as supervision of the procurement of BRT e-buses/charging infrastructure, procurement of ITS equipment, ticketing and information systems.

In addition, the PIC will provide assistance to the Employer and other Government institutions related to project preparatory works, which will include; permits, resettlement, land acquisition, relocation of utilities and in the engagement of an operations Consultant for the operation of BRT buses, ticketing and ITS systems.

The scope of this study is however, limited to the NEMA approvals and input from the other entities was sought through stakeholder engagement. The proponent will thus be required to initiate and make relevant applications to the different entities. As part of the ESIA, stakeholder design concerns and impacts shall be integrated in the final designs.

Local concerns have also been assessed and mitigation measures developed and proposed through this ESIA process. Commonly accepted international standards, i.e., the EIB's Environmental and Social Standards, AFD Environmental and Social Framework and WB-ESS have been integrated in the project.

2.13.2 Mobilization Phase

It is envisaged that the Contractor's mobilization period would be 6 months from order to commence, and the overall Construction period inclusive of mobilization is 30 months, followed by a 12 month Defects Liability Period.

During the mobilization period the Contractor will be required to set up his construction camp and provide housing and office facilities for his own staff.

The Contractor will also mobilise and place orders for importation of plant, equipment and materials required for execution of the Works during the initial 6 months of the Contract.

During this mobilization period the Contractor will undertake the following preparatory works:

- Obtain all required government approvals and permits for Construction, fire, safety and any other regulatory permits from organizations such as NCA, NaMATA, KeNHA, KURA, NEMA, NCC, NMS, WARMA.

- Undertake topographical and cadastral surveys, update of Resettlement Action Plan (If any) along the proposed Corridor.
- Develop and implement a Construction Environmental and Social Management Plan detailing the positive and negative effects on the environment with suggested mitigation measures.
- Undertake detailed design of the BRT 'Core' Line 3 Corridor from Hospitals to Dandora including related infrastructure as well as upgrading and adjustment of general traffic lanes and NMT along the BRT Line 3 Corridor, based to a large extent and in principle on the design provided to bidders.
- Develop a Traffic Management Plan for efficient control of traffic during construction.

It is anticipated that the Design and Construction works for the General Traffic and BRT Lanes would be undertaken in the following sub-sections and works in these subsections scheduled independently from one another:

Section	Start/End
L3-2	Hospitals
	Uhuru Highway/Haile Selassie Roundabout
L3-3	Uhuru Highway/Haile Selassie Roundabout
	Kariokor Market
L3-4	Kariokor Market
	Melawa/Juja Rd Intersection
L3-5	Melawa/Juja Rd Intersection
	Koma Rock/Mutarakwa Rd Intersection
L3-6	Koma Rock/Mutarakwa Rd Intersection
	Dandora

2.13.3 Construction phase

Construction of the proposed project shall be executed in accordance with a standard planning framework that will be reviewed as it becomes expedient by PIC to ensure maximum efficiency in construction; minimum adverse environmental and health impacts; earliest completion time; and compliance with the laws of the land and all regulatory requirements. The Design & Build Contractor shall set out levels of the works at intervals as are required to do the works. Before commencement of any excavation, the site shall be surveyed in conjunction with the Contractor's Engineer to establish existing ground levels and these agreed levels shall form the basis for the calculation of

quantities of any subsequent excavation and backfilling. The BRT construction activities shall include site clearance, civil, mechanical and electrical Works and supervision. The estimated workforce will be determined once the construction works begins.

Construction stages

In order to minimise traffic disruptions, the Infrastructure Works will be undertaken in 3 main chronological stages:

- Stage 1: Construction of the new road extension lanes for General Traffic Lanes and NMT.
- Stage 2: Reconstruction/Rehabilitation of the Existing Road General Traffic Lanes and NMT.
- Stage 3: Construction of BRT Lanes.

This approach is planned for ease of traffic management with the construction works first undertaken in the new part of the road with the existing road used for diversion of public traffic.

Once the Works on the new part of the road are complete public traffic will be diverted onto this and work on the existing General Traffic Lanes completed.

Following completion of the General Traffic Lanes, Construction Works on the BRT Lanes will be undertaken.

Appropriate traffic guidance signs will be provided to minimize traffic disruption.

The road and bridge works to be undertaken include:

- Organizing Utilities relocation by service providers, including provision of sleeves for new utilities such as ITS, power, fibre optic, telephone, water and sewage;
- Provision of Cross Drainage facilities;
- Reconstruction of existing footbridges:
- Ring Rd Ngara Footbridge
- Pangani Girls Footbridge
- Construction of Flyovers and Bridges:
- Green Park Footbridge
- Race Course Rd Bridge
- Kariokor Viaduct
- Pangani Viaduct
- Dandora Viaduct
- Koma Rock Bridge
- Outer Ring Rd Underpass
- Construction of BRT stations and platforms;
- Construction of Feeder Bus Stations at Hospitals and Dandora;
- Park and Ride facility at Dandora;

- Earthworks and Construction of Pavement Layers for the General Traffic Lanes, BRT lanes and NMT;
- Installation of ITS, road furniture and road markings.

Construction of Depot and Workshop

Depot and workshop construction works will run independently from the general infrastructure works.

Tests and Commissioning

On completion of the works and once the buses have been procured tests and trial runs will be carried out over a 6-month period.

Construction Method Statement

The project construction sequence is envisaged to be undertaken in 7 main tasks as follows:

- Mobilization and Preparation of Detailed Design
- The General Infrastructure Construction
- Construction of Structures
- Installation of Street Lighting, ITS and traffic Control Systems
- Depot & Workshop construction,
- BRT vehicles and ITS equipment procurement, supply and commissioning
- Tests and Trial runs before commissioning and start of BRT service operation
- Works start only after end of formal Land acquisition and resettlement process
- Depot construction and vehicles supply are interrelated as vehicles delivery cannot start until the depot is ready
- Tests and Trial runs cannot start until all other construction and equipment supply have been completed.

Contractor's Camp, laydown areas and estimated workforce

The location of the Contractor's Site Camp will be proposed by the Contractor and would ideally be in the vicinity of the project, possibly in Kasarani, Clayworks, Dandora or an Industrial area, Similarly the suitability of locations for the material and equipment storage/laydown areas and soil dumping areas will also be assessed by the Contractor.

Careful siting of the Construction Camps and Laydown Areas is the most effective mitigation measure, as so some specific aspects should be taken in consideration:

- Care should be taken to site Construction Camps and laydown areas, at least (preferably more than) 250 m from sensitive receptors (health and educational facilities, residential homesteads) where applicable.

- As possible, laydown areas shall be set up in non-vegetated areas to avoid vegetation clearing
- Oil, fuel and other hazardous substances shall not be stored in laydown areas
- Position the materials yard/ laydown areas, waste disposal sites, spoil dumping areas and
- access roads as far as possible from local watersheds, i.e. on local high points, to minimise
- risk of affecting surface water quality.
- Identify appropriate areas for the dumping of excess earth material. This should preferably be done in consultation with the local NEMA offices to identify potential areas such as old quarries and borrow-pits which may require backfilling and rehabilitation.
- Spoil/excavations should be visually assessed to determine if it is contaminated. In the event that the spoil is contaminated, it should be handled as a hazardous material and disposed of under supervision and into controlled dumping areas
- Such areas shall be restored to, at least, their original state after use
- Both the construction camp, laydown and disposal areas, shall comply with the Project Waste Management Plan (WMP), be provided with appropriate waste handling equipment and will be subject to approval of the PIC and GoK (NEMA and NaMATA) representatives.
- For the implementation the Contractor will provide a team of experts for the construction activities.
- The professional staff for the construction phase will include: Site Agent; Deputy Site Agent; Site Engineer; Senior Foremen; Site Surveyor; Earthworks Foremen; Bituminous Works Foreman; Concrete Foreman; Drainage Foremen; Pavement Foremen; Materials Technologists and Plant/Equipment Manager.

It is anticipated that the Contractor's workforce during construction to be about 300 staff members comprising both skilled, semi-skilled and unskilled workers.

2.14 Operation Phase

The bus service plan is based on the demand forecast for the opening year (~ 2024) and the time horizons 2035 and 2045 as follows:

- During the initial years the buses will primarily run along the whole corridor between Hospitals and Dandora Railway Station. During the peak hours there will be some buses that will serve only specific sections to increase the capacity, especially between the City Square and Outer Ring Road;

- In future years the BRT system will be an 'open' type system so that buses can travel off the corridor in mixed traffic on selected/pre-defined routes;
- Commercial speed: will be on average 20 km/h;
- Total travel time from Hospitals to Dandora: between 34 and 38 minutes, depending on type of service;
- The BRT fleet required for the Core Line 3 at opening year (2023) comprises 110 articulated 18m electric buses. This fleet shall cover service operation needs and reserve vehicles for incident management and maintenance assurance;
- In the longer term the BRT fleet shall increase for the operation of the entire Line 3 (Showground to Dandora) and to meet passenger demand.

BRT services will operate from 5:00 a.m. to 10:00 pm.

In the section between Moi Avenue and Hospital Road the BRT Core Line 3 infrastructure will be shared by BRT Line 2. Additional BRT lines will intersect Line 3 within the CBD in the future.

The infrastructure is designed to accommodate the proposed passenger demand numbers. Tickets will be pre-paid with off-board fare collection points at the stations.

The operation is developed across 3 stages:

1. **Phase I**: Operation on the BRT Core Line 3 only – Closed BRT System.
2. **Phase II**: Operation beyond the BRT Core Line 3 (to e.g., Showground and to Njiru) – Open BRT System.
3. **Phase III**: Operation of other bus services along the BRT corridor – 3rd Generation BRT System.

Phase I will last several years. The other phases will start depending on the future renovation of roads, especially side roads. Therefore, it is likely to be approximately 10 years before a 3rd Generation System is implemented.

Operation at Phase I

For Phase I buses are parked at the depot in Dandora only. Just a very limited number of parking places are provided for buses at the other end (Hospitals) or stations in between. Due to the limited parking places the buses will circulate without much buffer time at the terminus stations on the corridor on different lines:

1. Line Dandora – Hospitals
2. Line Dandora – City Square
3. Line Ring Road – Hospitals
4. Line Ring Road – City Square
5. Line Chai Road – Hospitals
6. Line Chai Road – City Square

Buses will run between Dandora and Hospitals throughout the day. The other lines are relevant at peak hours when parts of the fleet circulate at shorter sections in the middle of the corridor to increase the capacity in sections with the highest demand. On average buses could operate every

30 seconds in sections with the highest demand. In the sections at the ends of the corridor (City Square to Hospitals and Ring Road to Dandora) the planned fleet size of 110 buses will still allow for a circulation of buses every 90 seconds (per direction) in the peak hours.

Since all buses circulate on the corridor only and circulate quite frequent there is no need to allow boarding of all passengers in the bus. Boarding procedure therefore can be interrupted to ensure departures on time. This will be supported by staff at the stops.

In Phase I there will be enough space on the platform so no separation of alighting and boarding passengers will need to be implemented even during peak hours.

2.15 Decommissioning phase

It is anticipated that the BRT Road Project will be continuously maintained and repaired and will be operated for several decades. Because of its long useable life, the circumstances under which it might ultimately be decommissioned are difficult to foresee at this stage. Thus, only a site construction decommissioning approach could be considered at this stage in this ESIA study. As a result, the practical decommissioning will for now involve the following:

- Restoration of sites through levelling and re-vegetation measures;
- Removal of obsolete equipment and associated equipment parts;
- Demobilisation and return of imported labour force after the project;
- Grievance management mechanisms with the host communities before site closure;
- Repairs of damaged road access routes and route deviations;
- Removal of construction debris and unused materials.

3. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

3.1 INTRODUCTION

It is a requirement under the Environmental Management and Co-ordination Act No. 8 of 1999 (Amendments, 2015) and Environmental (Impact Assessment and Audit) Regulations 2003; 2018 to carry out an Environmental Impact Assessment (EIA) as per Section 58 of the EMCA for all projects in the second schedule. Section 18 of the regulations sets out the information to be captured in the EIA report. The institution charged with overseeing the implementation of Cap 387 is the National Environment Management Authority (NEMA). The policy frameworks under which activities such as the one being proposed here fall include Environment and Development Policy, National Policy on Water Resources Management and Development (Sessional Paper No.1 of 1999), Energy Policy (Sessional Paper No.4 of 2004), Feed in Tariff Policy, Health Policy, Economic Recovery for Wealth and Employment Creation Strategy, Kenya Vision 2030 etc. Acts that have a bearing on the rules and regulations and relate to energy exploitation and use include: Public Health Act, Cap 242; Water Act, 2016; Local Government Act, Cap 265; Penal Code, Cap 63; Electric Power Act, 1997 among others.

3.1 THE CONSTITUTION OF KENYA, 2010

The Constitution provides that every person has the right to a clean and healthy environment (Article 42). The State is obliged to ensure that the environment and natural resources are conserved and genetic resources and biological diversity are protected. In that regard, it must eliminate any processes or activities that would be likely to endanger the environment. Everyone is expected to cooperate with the State organisations and other people to protect and conserve the environment and ensure that the use and development of the natural resources are ecologically sustainable (Article 69). These environmental rights are enforceable in a court of law (Article 70).

Article 174 of the Constitution sets out the objects of devolution of government, which include: (a) giving powers of self-governance to the people and enhancing their participation in the exercise of the powers of the State and in making decisions affecting them; (b) recognizing the right of communities to manage their own affairs and to further their development; (c) protecting and promoting the interests and rights of minorities and marginalized communities; (d) promoting social and economic development and the provision of proximate, easily accessible services throughout Kenya; (e) ensuring equitable sharing of national and local resources throughout Kenya; and (f) facilitating the decentralization of State organs, their functions and services, from the capital of Kenya.

The undertaking of this assessment recognizes both the National and County laws and relevance of the Constitution in protecting the environment.

3.2 THE POLICY FRAMEWORK

3.2.1 National Environment Action Plan

The National Environment Action Plan (NEAP) for Kenya was formulated in 1994 through a consultative process involving various stakeholders. The action plan was aimed at integrating environmental considerations into the country's socio-economic development. The integration process was to be realized through development of a comprehensive framework that ensures linkage of environmental management of natural resources to decision-making processes. The NEAP also established the process of identifying environmental problems and issues, awareness raising, building national consensus, defining policies, legislation and institutional needs, and planning environmental projects.

The proposed BRT Project intends to abide by this paper hence the reason for undertaking this Environmental and Social Impact Assessment.

3.2.2 Environmental policy, 2013

Modern day environment management and planning in Kenya can be traced to the Rio Earth Summit of 1992, which helped a great deal in raising the understanding of the link between environment and development. Following the Summit, Kenya initiated the National Environment Action Plan (NEAP) process that was completed in 1994. The policy making process culminated into the Sessional Paper No. 6 of 1999 entitled Environment and Development. The legislative process gave forth the Environmental Management and Coordination Act (EMCA) No. 8 of 1999 as Kenya's first framework environmental law. The promulgation of the Constitution of Kenya 2010 and other new developments like climate change marked an important section in Kenya's environmental policy development. The then Ministry of Environment and Mineral Resources initiated the process of formulating this policy in 2006 through a participatory and a consultative process that involved public and key institutions engagement with taskforces from various stakeholders. This culminated in the production of the Draft National Environment Policy, 2008 that was however not finalized. Upon the promulgation of Constitution of Kenya 2010, it was found necessary to review the draft policy of 2008 to accommodate any new developments due to time lapse and to align it to the Constitution; this led to the wide stakeholder consultations from September 2011 to February 2013. This policy points out that the survival and socio-economic wellbeing of Kenyans is ultimately intertwined with the environment. Therefore, under this paper, broad categories of development issues among them the infrastructural development, have been covered that require sustainable approach. The policy recommends the need for enhanced re use/ recycle of residues including wastewater, use of low non-waste technologies, increased public awareness and appreciation of clean environment. It also encourages participation of stakeholders in the management of waste within their localities. Regarding human settlement, the paper encourages better planning in both rural and urban areas and provision of basic needs such as water, drainage and waste disposal facilities among others.

This assessment was initiated to ensure that all the possible environmental impacts or potential disturbances are identified earlier for incorporation into the Project Design.

3.2.3 Land policy, 2009

First principle, as stated in the Sessional Paper No. 3 of 2009 reflects an emphasis over the last 50 years on individual ownership of land. It adopts the position that individual tenure and customary tenure should co-exist and benefit from equal guarantees of tenure security. It reflects, especially in its discussion of the need for constitutional change, a conviction of the need for land reform, stressing that the current distribution of land is inequitable and arguing that the constitution should not protect private property rights that have been acquired in "an illegitimate manner".

The overall objective of the National Land Policy is to secure land rights and provide for sustainable growth, investment and the reduction of poverty in line with the government's overall development objectives. Specifically, it seeks to develop a framework of policies and laws designed to ensure the maintenance of a system of land administration and management that will provide all citizens with:

- The opportunity to access and beneficially occupy and use of land;
- Economically, socially equitable and environmentally sustainable allocation and use of land;
- Effective and economical operation of the land market;
- Efficient use of land and land-based resources; and
- Efficient and transparent land dispute resolution mechanisms.

In Section 2, land policy is linked to constitutional reforms; regulation of property rights is vested in the Government by the Constitution with powers to regulate how private land is used in order to protect the public interest. The Government exercises these powers through compulsory acquisition and development control. Compulsory acquisition is the power of the State to take over land owned privately for a public purpose. However, the Government must make prompt payment of compensation.

Section 4 of the land policy under Environmental Management Principles, the National Land Policy provides for the policy actions for addressing the environmental problems such as the degradation of natural resources, soil erosion and pollution. For the management of the urban environment, it provides guidelines to prohibit the discharge of untreated waste into water sources by industries and County Authorities; it also recommends for appropriate waste management systems and procedures, including waste and wastewater treatment, reuse and recycling.

The policy goes further to advocate for environmental assessment and audit as a management tool to ensure environmental impact assessments and audits are carried out on all land developments that may degrade the environment and take appropriate actions to correct the situation. Public participation has been identified as key in the monitoring and protection of the environment.

Section 6 under land issues require special intervention assets that "Land rights of minority communities shall be protected through a law to be passed specifically to secure their rights as individuals and groups and recognition of their resource management systems to ensure

sustainability." It further states that, "Land rights of vulnerable groups (namely subsistence farmers, pastoralists, hunters and gatherers, agricultural laborers, unskilled workers, unemployed youths, persons with disabilities, persons living with HIV & AIDS, orphans, slum and street dwellers and the aged) shall be addressed by creating system for identifying, monitoring and assessment, resettling them, facilitating their participation in decision making over land and land-based resources and protecting their land rights."

The Resettlement Action Plan (RAP) will be prepared to identify all impacts associated with possible land acquisition or disturbances and make recommendations on implementation.

3.2.4 National Policy on Water Resources Management and Development

This policy is famously referred as Sessional Paper No.1 of 1999. The National Policy on Water Resources Management and Development (1999) seeks to enhance a systematic development of water facilities in all sectors for the country's socio-economic progress, and therefore calls for development of appropriate sanitation systems to protect people's health and water resources from pollution. It also sets guidelines for the utilization of water resources to prevent overexploitation and depletion of the resource. Development projects, therefore, should be accompanied by corresponding waste management systems to handle the wastewater and other waste emanating there from. The policy also requires that such projects should undergo comprehensive Environmental Impact Assessments that will provide suitable measures to be undertaken to ensure environmental resources and people's health in the immediate neighbourhoods and further downstream are not adversely affected by any emissions or discharges. (GOK, 1999).

Adequate measures have been proposed for implementation in this ESIA report for implementation by the proponent and Contractor both at the camp and field level.

3.2.5 Kenya Vision 2030

Kenya Vision 2030 is the new country's development blueprint covering the period 2008 to 2030. It aims at making Kenya a newly industrializing 'middle income country providing high quality life for all its citizens by the year 2030. The vision has been developed through an all-inclusive stakeholder consultative process, involving Kenyans from all parts of the country. The vision is based on three 'pillars' namely; the economic pillar, the social pillar and the political pillar. The vision 2030 came in after the successful implementation of the Economic Recovery Strategy (ERS) for Wealth and Employment Creation 2003-2007. The overall goal of the Strategy is to ensure clear improvements in the social and economic well-being of all Kenyans, thereby giving Kenyans a better deal in their lives and in their struggle to build a modern and prosperous nation. The social pillar of the Vision seeks to build 'a just and cohesive society with social equity in a clean and secure environment'. On the other hand, the political pillar aims at realizing a democratic political system founded on issue – based politics that respects the rule of law and protects the rights and freedoms of every individual in the Kenyan society.

This proposed Project is a step towards Vision 2030 achievement concerning road infrastructure.

3.2.6 Big Four Agenda

The President's Speech during the 54th Jamhuri Day Celebrations on 12th December 2017 elaborated the specific agenda (Big Four Agenda) and measures the Jubilee administration will focus on and dedicate energy, time and resources over the next 5 years. The agendas are as follows:

- Enhance manufacturing in the country from 9.2% to 20% of Gross Domestic Product by 2022.
- Food security and nutrition through 100% food and nutrition security commitment.
- Universal health coverage by scaling up National Hospital Insurance Fund uptake to 100%.
- Affordable housing by implementing 500,000 new affordable homes.

Infrastructure integration is an enabler to the Big Four Agenda.

3.2.7 National Biodiversity Strategy of 2000

The National Biodiversity Strategy and Action Plan (NBSAP) were formulated in order to enable Kenya address National and International commitments defined in Article 6 of the Convention on Biological Diversity. The strategy is a national framework of action for ensuring that the present rate of biodiversity loss is reversed and present levels of biological resources are maintained at sustainable levels for posterity. The general objectives of the strategy are to conserve Kenya's biodiversity; to sustainably use its components; to fairly and equitably share the benefits arising from the utilization of biological resources among the stakeholders; and to enhance technical and scientific cooperation nationally and internationally, including the exchange of information in support of biological conservation.

Impacts to the environment have been identified as a potential impact especially during construction phase, mitigations and responsibilities have been identified in the ESMP.

3.2.8 Occupational Health and Safety Policy of 2012

This policy is intended to protect safety and health of workers in work places. The proposed BRT Project will provide employment opportunities to many workers at various categories. The main Contractor will be expected to comply with the requirements of this policy when engaging workers in various construction activities.

The ESMP provides proposed mitigation measures that can be implemented to ensure compliance with the requirements of this policy.

3.2.9 HIV/AIDS Policy of 2009

The policy identifies HIV/AIDS as a global crisis that constitutes one of the most formidable challenges to development and social progress. The pandemic heavily affects the Kenyan economy through loss of skilled and experienced workforce due to deaths, loss of person-hours due to prolonged illnesses, absenteeism, reduced performance, increased stress, stigma, discrimination and loss of institutional memories, among others.

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

3.2.10 Public Health (Prevention, Citation. Control and Suppression of COVID-19) Rules, 2020

This is captured in Legal Notice 49 of 2020. The rules require that in the wake of the Coronavirus Disease 2019 (COVID – 19) pandemic that has ravaged the world over, Kenya has not been spared. COVID – 19 has affected the health, economic and social status of Kenya's population. In line with its mandate, Kenya Law has kept track of the various directives and legislation that the government has passed in tackling the COVID–19 pandemic. The various presidential addresses on the state of interventions to cushion Kenyans against economic effects of COVID – 19 have had tremendous implications on legislative reforms in Kenya.

The proponent is required to ensure full compliance to MOH and WHO COVID-19 guidelines Protocols during the entire project lifecycle.

3.2.11 HIV/AIDS Prevention and Control

PART II – HIV and AIDS education and information

The Government shall promote public awareness about the causes, modes of transmission, consequences, means of prevention and control of HIV and AIDS through a comprehensive nationwide educational and information campaign conducted by the Government through its various Ministries, Departments, authorities and other agencies. In conducting the educational and information campaign referred to in this section, the Government shall collaborate with relevant stakeholders to ensure, the involvement and participation of individuals and groups infected and affected by HIV and AIDS, including persons with disabilities.

HIV and AIDS education in the workplace:

The Government shall ensure the provision of basic information and instruction on HIV and AIDS prevention and control to Employees of all Government Ministries, Departments, authorities and other agencies; and employees of private and informal sectors.

HIV and AIDS information in communities:

Every Local Authority, in collaboration with the Ministry, shall conduct an educational and information campaign on HIV and AIDS within its area of jurisdiction.

The Proponent and the Contractor shall abide by this regulation especially during the construction phase.

3.2.12 National Gender and Equality Commission Act, 2011

An Act of Parliament to establish the National Gender and Equality Commission as a successor to the Kenya National Human Rights and Equality Commission pursuant to Article 59(4) of the

Constitution; to provide for the membership, powers and functions of the Commission, and for connected purposes. The functions of the Commission shall be to —

a) Promote gender equality and freedom from discrimination in accordance with Article 27 of the Constitution;

b) Monitor, facilitate and advise on the integration of the principles of equality and freedom from discrimination in all national and county policies, laws, and administrative regulations in all public and private institutions;

c) Act as the principal organ of the State in ensuring compliance with all treaties and conventions ratified by Kenya relating to issues of equality and freedom from discrimination and relating to special interest groups including minorities and marginalized persons, women, persons with disabilities, and children;

d) Co-ordinate and facilitate mainstreaming of issues of gender, persons with disability and other marginalized groups in national development and to advise the Government on all aspects thereof;

e) Monitor, facilitate and advise on the development of affirmative action implementation policies as contemplated in the Constitution;

f) Investigate on its own initiative or on the basis of complaints, any matter in respect of any violations of the principle of equality and freedom from discrimination and make recommendations for the improvement of the functioning of the institutions concerned;

g) Work with other relevant institutions in the development of standards for the implementation of policies for the progressive realization of the economic and social rights specified in Article 43 of the Constitution and other written laws;

h) Co-ordinate and advise on public education programmes for the creation of a culture of respect for the principles of equality and freedom from discrimination;

i) Conduct and co-ordinate research activities on matters relating to equality and freedom from discrimination as contemplated under Article 27 of the Constitution;

j) Receive and evaluate annual reports on progress made by public institutions and other sectors on compliance with constitutional and statutory requirements on the implementation.

The Project proponent shall promote gender equality and freedom from discrimination in executing the Project.

3.2.13 Vulnerable and Marginalized Groups Framework (VMGF) 2016

Principled International Banks have provided financing only where free, prior, and informed consultation results in broad community support by a project especially the affected vulnerable and marginalized groups. Such Bank-financed projects include measures to:

a) Avoid potentially adverse effects on the Indigenous Peoples' communities;

b) When avoidance is not feasible, minimize, mitigate, or compensate for such effects;

c) Ensure that the vulnerable and marginalized people receive social and economic benefits that are culturally appropriate and gender as well as inter-generationally inclusive; and that the VMGF is based on free, prior and informed consultations with indigenous peoples leading to broad community support.

The objectives of the policy are to avoid adverse impacts on vulnerable and marginalized groups (VMGs), secure broad community support for projects and to provide VMGs with culturally appropriate benefits. The project should therefore ensure inclusivity of VMGs throughout the design, implementation and operational/ utilization stages.

This ESIA has identified women, elderly and People Living with Disability (PLWDs) as part of the VMGs *and appropriate measures have been proposed for adoption through* VMGs *participation.*

3.2.14 Public Health Policy of 2014

The public health policy calls upon the project proponents to ensure that buildings are adequately provided with utilities so that they are fit for human habitation.

The Contractor and proponent should ensure that labour camps are provided with all amenities/ utilities that are essential for safeguarding public health for all people using the facilities.

3.2.15 The National Environmental Sanitation and Hygiene Policy 2007

The Environmental Sanitation and Hygiene Policy (ESH) is intended to improve people's health and quality of life. Strategic interventions have been developed to determine the success of the policy implementation. One of the key purposes of this policy is to clarify the various roles in order to enhance the existing legal and constitutional framework and to encourage the private sector, civil society and community participation in the planning, implementation and ownership of ESH services. It is envisaged that all households have been educated and made aware of the importance and need for improved environmental sanitation and hygiene practices for improved health, resulting in positive behavior change.

The project health risks associated with poor OSH issues during construction phase have been identified and mitigation measures proposed for implementation.

3.3 KENYA LEGISLATION, REGULATIONS AND STANDARDS

3.3.1 EMCA (Amendments) Act, 2015, Cap 387

EMCA Cap 387 provides for the establishment of an appropriate legal and institutional framework for managing the environment and matters connected with it. NEMA ("the Authority") is established under Section 7 of the Act. Its mandate is to monitor the operations of industries, projects or activities to determine their immediate and long-term effects on the environment. The Authority may prescribe measures to ensure that the biological resources in place are preserved, issue guidelines to promote the conservation of the various terrestrial and aquatic systems, and protect species, ecosystems and habitats threatened with extinction. Below are some of the subsequent regulations under EMCA.

The Project was commissioned as per the requirements of this Act.

3.3.2 EMCA (Water Quality) Regulations, 2006

These regulations are contained in the Kenya Gazette Supplement No. 68, Legal Notice No. 120. They apply to waters used for domestic, industrial, agricultural and recreational, fisheries and wildlife, and water used for any other purposes. Different standards apply to different modes of usage. These regulations provide for the protection of lakes, rivers, streams, springs, wells and other water sources. It is an offence to contravene the provisions of these regulations with a fine being imposed on the offender.

The proponent shall comply with these regulations by implementation of the ESMP.

3.3.3 EMCA (Waste management) Regulation, 2006

The Waste Management Regulations (2006) are contained in the Kenya Gazette No. 69, Legal Notice No. 121. The Waste Management Regulations are meant to streamline the handling, transportation and disposal of various types of waste streams including:

- Domestic waste;
- Industrial waste;
- Hazardous and toxic waste;
- Pesticides and toxic substances;
- Biomedical waste;
- Radioactive waste.

The aim of the Waste Management Regulations is to protect human health and the environment. The regulations place emphasis on waste minimization, cleaner production and segregation of waste at source. The regulation requires licensing of transporters of waste and operators of disposal site (sections 7 and 10 respectively). Of immediate relevance to proposed development for the purposes of this project report is Part II Sections 4(1-2). Section 4 (1) states that —No person shall dispose of any waste on a public highway, street, road, recreational area or any other public place except in a designated waste receptacle and Section 4(2) and 6 explains that the waste generator must collect, segregate (hazardous waste from non-hazardous) and dispose waste in such a facility that shall be

provided by the relevant local authority. Regulation 19 (1) requires every person who generates toxic or hazardous waste to treat or cause to be treated such hazardous waste.

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

3.3.4 EMCA (Noise and Excessive Vibration Pollution Control) Regulations, 2009

These Regulations require that no person or activity shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise that annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment. In determining whether noise is loud, unreasonable, unnecessary or unusual, the following factors may be considered: time of the day; proximity to residential receptors; noise frequency, level and intensity; and whether the noise is subject to be controlled without unreasonable effort or expense to the person making the noise. These regulations also relate noise to its vibration effects and seek to ensure that no harmful vibrations are caused by controlling the level of noise. Part II Section 4 state that: except as otherwise provided in these Regulations, no person shall: a) Make or cause to be made excessive vibrations that annoys, disturbs, injures or endangers the comfort, response, health or safety of others and the environment; or b) Cause to be made excessive vibrations which exceed 0.5 centimetres per second beyond any source property boundary or 30 meters from any moving source.

Part III Section 2 (1) states that any person wishing to a) operate or repair any machinery, motor vehicle, construction equipment, pump, fun, air conditioning apparatus or similar mechanical device; or b) engage in any commercial or industrial activity, which is likely to emit noise or excessive vibrations shall carry out the activity or activities within the relevant levels provided in the First Schedule to these Regulations. Any person who contravenes these Regulations commits an offence.

The second Schedule of the Regulations provides for the maximum permissible level of noise at construction sites. Under section 15, the Regulations require the Proponent during EIA studies to:

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

The Proponent shall comply with these regulations by implementation of the proposed mitigation measures for controlling construction-induced noise.

3.3.5 EMCA (Air Quality) Regulations, 2014

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

that no person shall cause the emission of air pollutants listed under First Schedule (Priority air pollutants) to exceed the ambient air quality levels as required/ stipulated under the provisions of the Seventh Schedule (Emission limits for controlled and non-controlled facilities) and Second Schedule (Ambient air quality tolerance limits). The regulations provide for the establishment of emission standards for various sources, including as mobile sources (e.g., motor vehicles) and stationary sources (e.g., industries) as outlined in the Environmental Management and Coordination Act, 1999. It also covers any other air pollution source as may be determined by the Minister in consultation with the Authority.

The Regulations prohibits the Proponent from:

- Acting in a way that directly or indirectly cause or may cause air pollution to exceed levels set out in the second Schedule to the Regulations
- Allowing particulates emissions into the atmosphere from any source not listed in the six schedules of the Regulations
- Causing ambient air quality in controlled areas (listed in Schedule Thirteen) to exceed those stipulated under second Schedule.
- Allowing (during construction and demolition) emission of particulate matter above the limits stipulated in Second Schedule.
- Causing or allowing stockpiling or storage of material in a manner likely to cause air pollution.
- Causing or allowing emissions of oxides of nitrogen in excess of those stipulated in the eleventh Schedule of the Regulation.

The ESIA observes the regulatory requirements and proposes mitigation measures proposed in an effort to comply with the provisions of these Regulations on abatement of air pollution.

3.3.6 EMCA (Wetlands, Riverbank, Lakeshore and Seashore Management) Regulations, 2009

The Environmental Management and Co-ordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009 applies to all wetlands in Kenya whether occurring in private or public land. The objectives of the regulation are to provide for the conservation and sustainable use of wetlands and their resources in Kenya and promote the integration of sustainable use of resources in wetlands into the local and national management of natural resources for socio-economic development. The regulations also aim at ensuring the conservation of water catchments and the control of floods and the sustainable use of wetlands for ecological and aesthetic purposes for the common good of all citizens.

The ESIA will observe the regulation and ensure that no impact result to wetland resource along the RoW.

3.3.7 EMCA (Controlled Substances) Regulations, 2007; Legal Notice No. 73

The Controlled Substances Regulations defines controlled substances and provides guidance on how to handle them. The regulations stipulate that controlled substances must be clearly labelled with among other words, "Controlled Substance-Not ozone friendly'' to indicate that the substance or

product is harmful to the ozone layer. Advertisement of such substances must carry the words, "Warning: Contains chemical materials or substances that deplete or have the potential to deplete the ozone layer." Persons handling controlled substances are required to apply for a permit from NEMA.

Controlled substances are grouped into three lists as indicated below:

- Group 1 list consists of halogenated flouro-chemicals with ozone depleting substances (ODS).
- Group 2 list consist of hydrobromo-flourocarbons with ODS.
- Group 3 list consist of bromo-chloromethane with ODS.

Products containing controlled substances include air conditioners, air coolers, refrigerants, portable fire extinguishers, heat pump equipment, dehumidifiers, insulation boards, panels and pipe covers, pre-polymers, etc.

The ESMP includes for measures to reduce GHG in executing the project.

3.3.8 EMCA (Fossil Fuel Emission Control) Regulations, 2006

The EMC (Fossil Fuel Emission Control) Regulations, 2006 aims at eliminating or reducing emissions emitted from internal combustion engines to acceptable levels. The regulation provides guidelines on use of clean fuels, use of catalysts and inspection procedures for engines and generators.

The project was designed to promote the reduction of fossil fuel emissions in Nairobi.

3.3.9 The EIA Guidelines and Administrative Procedures

The EIA and Administrative Procedures arose from the policy framework and the legislative and regulatory (the Principal Act 1999, and its regulations) procedures in order to assist in the integration of environmental concerns in economic development so as to foster sustainable development. The document sets out guidelines for carrying out EIA, Environmental Audit and Monitoring, Strategic Environmental Assessment (SEA) and dealing with issues of trans-boundary, regional and international conventions, treaties and agreements. It sets out the procedure in EIA studies and Environmental Audits as well as the contents and format of the reports required to be submitted to NEMA for consideration. The EIA study review process and decision-making are also explained. The guidelines are mainly intended to assist project proponents, EIA practitioners, lead agencies and members of the public to understand the process and form the basis on which decisions are made.

The guidelines have informed the ESIA study and requirement for the study have been complied with during the course of study.

3.3.10 Guidelines on Air Quality

Kenya has imposed an air quality regulation to address air pollution known as Environmental Management and Co-ordination Act (Air Quality) Regulations, 2014. Therefore, the standards used

to evaluate the measured values will be derived from the EMCA (air quality) regulations 2014 and the WHO ambient air quality standards, 2005.

Table 5: EMCA (air quality) Regulations 2014

Pollutant	Time Weighted Average	Residential, Rural & Other Area
Particulate matter (PM10)	Annual Average*	50 µg/m3
	24 hours**	100 µg/m3
Oxides of Nitrogen (NOx)	Annual Average*	60 µg/m3
	24 hours**	80 µg/m3
Sulphur Oxides (SOx)	Annual Average*	60 µg/m3
	24 hours**	80 µg/m3
Carbon Monoxide (CO)/ Carbon Dioxide (CO2)	8 hours***	2.0 mg/m3
	1 hour	4.0 mg/m3

Table 6: Level of exposure to particulate matter – 24-hour average

Particulate matter	EMCA (Air Quality) Regulations, 2014 (µg/m3)	WHO Air quality guidelines for PM10 (µg/m3)/24hrs	The 2006 National Ambient Air Quality Standard for Particulate Matter (EPA) (µg/m3)/24HRS
PM10	70	50	150
PM2.5	-	25	35

Table 7: Limits for nitrogen dioxide and sulphur dioxide

Pollutant	Averaging Period	WHO Limit Guideline Value (µg/m3)	EMCA (Air Quality) Regulations, 2014 (µg/m3)
NO2	24 -hour	200	150
SO2	24 -hour	20	125

World Health Organization Air Quality Guidelines

The World Health Organization (WHO) has published air quality guidelines (AQG's), 2005; these are listed in Table 13 (IFC 2007). The limits are broadly similar to EU Limit Values and are not mandatory; they have been set at a level that provides protection of human health for all members of the public.

Table 8: WHO Ambient Air Guidelines, 2005

Parameter	Averaging Period	Guideline Value in µg/m3
Particulate Matter PM10	1-year 24-hour	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline) 150 (Interim target-1)
Particulate Matter PM2.5	1-year 24-hour	35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline) 75 (Interim target-1)
Sulphur dioxide (SO2)	24-hour 10 minutes	125 (Interim target-1) 50 (Interim target-2) 20 (guideline) 500 (guideline)
Nitrogen dioxide (NO2)	1-year 1-hour	40 (guideline) 200 (guideline)

In addition to guideline values, interim targets are given for each pollutant. These are proposed as incremental steps in a progressive reduction of air pollution and are intended for use in areas where pollution is high. These targets aim to promote a shift from high air pollutant concentrations, which have acute and serious health consequences, to lower air pollutant concentrations. If these targets were to be achieved, one could expect significant reductions in risks for acute and chronic health effects from air pollution. Progress towards the guideline values should, however, be the ultimate objective of air quality management and health risk reduction in all areas.

3.3.11 Guidelines on Noise

In general, the standards applied by the international community are similar for different countries. Internationally, the current trends are to apply more stringent criteria due to the deteriorating noise climate.

The noise impacts due to a proposed project are generally based on the difference between the expected noise level increase and the existing noise levels in the area, as well as on comparisons against area-specific noise guidelines.

International Guidelines

The available international guidelines discussed below and have taken into consideration the following adverse effects of noise:

- Annoyance;
- Speech intelligibility and communication Interference;
- Disturbance of information extraction;
- Sleep disturbance;
- Hearing impairment.

The World Health Organization (WHO) together with the Organization for Economic Co-ordination and Development (OECD) has developed their own guidelines based on the effects of the exposure to environmental noise. These provide recommended noise levels for different area types and time periods.

The World Health Organization has recommended that a standard guideline value for average outdoor noise levels of 55 dB (A) be applied during normal daytime, in order to prevent significant interference with the normal activities of local communities. The relevant night-time noise level is 45 dB (A). The WHO further recommends that, during the night, the maximum level of any single event should not exceed 60 dB (A). This limit is to protect against sleep disruption. In addition, ambient noise levels have been specified for various environments. These levels are presented in the table below.

Table 9: WHO Guidelines for Ambient Sound Levels

Environment	Ambient Sound Level LAeq (dB(A))			
	Day-time		Night-time	
	Indoor	Outdoor	Indoor	Outdoor
Dwellings	50	55	-	-
Bedrooms	-	-	30	45
School	35	55	-	-

The WHO specifies that an environmental noise impact analysis is required before implementing any project that would significantly increase the level of environmental noise in a community (WHO, 1999). Significant increase is considered a noise level increase of greater than 5 dB.

World Bank Group (WBG)/International Finance Corporation (IFC) have developed a program in pollution management so as to ensure that the projects they finance in developing countries are environmentally sound. Noise is one of the pollutants covered by their policy. It specifies that noise levels measured at noise receptors, located outside the project's property boundary, should not be 3 dB (A) greater than the background noise levels, or exceed the noise levels depicted in Table below.

The Standard also refers to the WHO Guidelines for Community Noise (WHO, 1999) for the provision of guidance to environmental health authorities and professionals trying to protect people from the harmful effects of noise in non-industrial environments.

Table 10: World Bank/IFC Ambient Noise Guidelines

Receptor	Maximum Allowable Ambient Noise Levels 1-hour LAeq (dB(A))	
	Day Time	Night-Time
	0700-2200	2200-0700
Residential, institutional, educational	55	45
Industrial, commercial	70	70

Kenya Noise and Excessive Vibration Pollution Control Regulations

The EMCA, 1999 part 101 provides for NEMA-Kenya to recommend guidelines for the abatement of unreasonable noise and vibration pollution emitted into the environment from any source. Pursuant to this, the Environmental Management and Coordination (Noise and excessive vibration pollution control regulations, 2009 (Legal Notice No. 61) were developed.

The Environmental Management and Coordination (Noise and Excessive Vibration Pollution Control) Regulations, 2009 sets out maximum permissible noise levels in the First Schedule of the Regulation for various zones. Part IV of the regulations state that where a sound source emits noise which fail to comply with provisions of the Regulations, such person shall apply for a license to the Authority. Table 16 below shows the different guideline values for different zones.

Table 11: Kenya's Ambient Noise Guidelines

Zone		Sound Level Limit dB(A) (Leq, 14h)	
Time Frame **Day**: 6:01am- 8:00 pm (Leq. 14h) **Night**: 8:01pm-6:00 am (Leq. 10h)		**Day**	**Night**
A	Silent Zone	40	35
B	Places of Worship	40	35
C	Residential: Indoor Outdoor	45 50	35 35
D	Mixed Residential (with some commercial and places of entertainment)	55	35
E	Commercial	60	35

3.3.12 The Public Health Act, Cap. 242

This statute relates to the waste generated at the camp and worksite(s) and its safe disposal and/or discharge. The Act states that no person or institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires local authorities to take all lawful, necessary and reasonably practicable measures to maintain areas under their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable for injurious or dangerous to human health. Such nuisance or conditions are defined under section 188 waste, sewers, drains or refuse pits in such a state, situated or constructed as in the opinion of the medical officer of health to be offensive or injurious to health. Noxious matter or waste flowing or discharged from any premises into a public street or into the gutter or side channel or watercourse, irrigation channel or bed not approved for discharge is also deemed as a nuisance. Other nuisances are accumulation of materials or refuse which in the opinion of the medical officer of health is likely to harbour rats or other vermin. On the responsibility of local authorities, part XI section 129 of the Act states in part "It shall be the duty of every local authority to take all lawful, necessary and reasonably practicable measures for preventing any pollution dangerous to health of any supply of water which the public within its administrative unit has a right to use and does use for drinking or domestic purposes". The Act states that collections of water, sewage, rubbish, refuse and other fluids which permits/ facilitate breeding or multiplication of pests shall be deemed nuisance and are liable to be dealt with in the manner provided by this act.

The proponent shall ensure that the Act is complied with by implementing the ESMP to mitigate the negative environmental health and safety to the public.

3.3.13 The Penal Code Cap 63

Section XVII on —Nuisances and offences against health and convenience contained in the penal code strictly prohibits the release of foul air into the environment that affects the health of the persons. It states —Any person who voluntarily vitiates the atmosphere in any place so as to make it noxious to the health of persons in general dwelling or carrying on business in the neighbourhoods or passing along a public way is guilty of a misdemeanour. Section 191 of the Act states that any person or institution that pollute water from public springs or reservoir, rendering it less fit for its ordinary use is guilty of an offence. Monthly and quarterly monitoring on the level of implementation of the provisions of the ESMP shall be carried out and further mitigation measures given in case of any negative impacts to the environment and its resources. The proponent is also required to comply with any improvement orders provided by the relevant national and county government officials and departments.

The proponent is required to ensure strict adherence to the ESMP in order to mitigate against any possible negative impacts to the community and the environment.

3.3.14 The Occupational Safety and Health Act, No. 15 of 2007

The Act requires all employers to register their premises by making an application before they start operations. The Act also sets minimum standards that are to be maintained in such workplaces to safeguard health, safety and welfare of workers. These are all aimed at elimination of hazards from workplaces. The act makes it mandatory for occupiers or employers to provide Personal Protective Equipment (PPE) and practicable means to prevent injury to health of workers who are exposed to any potentially harmful substances or conditions. The Act further requires all workplaces to have stocked first aid boxes under the charge of trained first aid attendants. The Act offers more specific guidelines under rules made to govern certain aspects of health and safety.

The proponent is required to ensure strict adherence to the ESMP in order to comply with requirements of OSHA, 2007 as required under the different regulations and rules.

3.3.15 The Water Act, 2016 and Water Resources Management Rules (2007)

This Act provides for the regulation, management, and development of Water resources and water and sewerage services in line with the 2010 Constitution. Section 21 provides for national monitoring and information systems on water resources. Following on this, subsection 2 allows the Water Resources Authority to demand from any person, specified information, documents, samples or materials on water resources. Under these rules, specific records may be required to be kept and the information thereof furnished to the authority on demand.

Section 36 of the Act requires a permit to be obtained for among others any use of water from a water resource, discharge of a pollutant into any water resource. As per section 40 of the same Act, application for such a permit shall be subject to public consultation as well as an Environmental Impact Assessment as per the EMCA, Cap 387. The conditions of the permit may also be varied if the authority feels that the water so used is causing deterioration of water quality or causing shortage of water for other purposes that the Authority may consider has priority. This is provided for under section 46 of

the Act. Section 63 of the Act accords every person in Kenya right to clean and safe water in adequate quantities and to reasonable standards of sanitation as stipulated in Article 43 of the constitution.

Section 143 states that a person shall not, without authority conferred under this act, interfere with, divert or obstruct water from any water resource. They shall also not cause pollution to the water resource in any way. In section 145 (d) no person shall without lawful authority, wilfully let off or discharge water from the works of any permit holder so that the permit holder loses the use of that water.

The Water Resources Management Rules, 2007 apply to the safe discharge of waste emanating from camp and worksites These Rules are described in Legal Notice Number 171 of the Kenya Gazette Supplementary Number 52 of 2007. They apply to all water resources and water bodies in Kenya, including all lakes, watercourses, streams and rivers, whether perennial or seasonal, aquifers, and shall include coastal channels leading to territorial waters. The Water Resources Management Rules empower Water Resources Authority (WRA) to impose management controls on land use falling under riparian land. It also enables any person with a complaint related to any matter covered by these rules to the appropriate office in WRA as per the Tenth Schedule that provides a format for report on complaints. WRA is to reply to the complainant with "copies to all other relevant parties within twenty-one days of receiving the complaint, starting with what action is being taken, the position of the Authority on the matter and any recommendation to the complainant."

The Contractor is required to ensure strict adherence to the ESMP in order to obtain the necessary permits to abstract the water from the rivers, or any other sources, and shall abide by the conditions attached to the permit (s) including need to have adequate sanitation measures.

3.3.16 The National Land Commission Act, No. 5 of 2012

Section 5(1) outlines the function of the National Land Commission, which are: to manage public land on behalf of the national and county governments; to recommend a national land policy to the national government; to advise the national government on a comprehensive programme for the registration of title in land throughout Kenya; to conduct research related to land and the use of natural resources, and make recommendations to appropriate authorities; to initiate investigations, on its own initiative or on a complaint, into present or historical land injustices, and recommend appropriate redress; to encourage the application of traditional dispute resolution mechanisms in land conflicts; to assess tax on land and premiums on immovable property in any area designated by law; and to monitor and have oversight responsibilities over land use planning throughout the country.

The Contractor is required to ensure strict adherence to the ESMP in order to engage all the relevant Authorities including NLC.

3.3.17 Land Control Act Cap. 302

This is an Act of Parliament to provide for controlling in agricultural land. Each of the following transactions that is to say: (a) the sale, transfer, lease, mortgage, exchange, partition or other disposal of or dealing with any agricultural land which is situated within a land control area; (b) the division of any such agricultural land into two or more parcels to be held under separate titles, other than the

division of an area of less than twenty acres into plots in an area to which the Development and Use of Land (Planning) Regulations, 1961 (L.N. 516/1961) for the time being apply; and (c) the issue, sale, transfer, mortgage or any other disposal of or dealing with any share in a private company or co-operative society which for the time being owns agricultural land situated within a land control area is void for all purposes unless the land control board for the land control area or division in which the land is situated has given its consent in respect of that transaction in accordance with this Act.

The proponent required to ensure strict adherence to the ESMP and engage the Nairobi City County Land Department in case of issues that might arise during project construction phase.

3.3.18 The Matrimonial Property Act 2013

This is an Act of parliament to provide for the rights and responsibilities of spouses in relation to matrimonial property and for connected purposes. For the purpose of this Act, matrimonial property means:

- The matrimonial home or homes;
- Household goods and effects in the matrimonial home or homes; or
- Any other immovable and movable property jointly owned and acquired during the subsistence of the marriage.

Despite subsection (1) trust property including property held in trust under customary laws does not form part of matrimonial property and parties to an intended marriage may enter into an agreement before their marriage to determine their property rights.
Part II gives equal status of spouses despite any other law; a married woman has the same rights as a married man:

- To acquire, administer, hold, control, use and dispose of property whether movable or immovable;
- To enter into a contract; and
- To sue and be sued in her own name.

In case of any involuntary resettlement, the proponent to recognize female household heads and female spouses who also have rights in property ownership.

3.3.19 The Physical Planning Act, Cap. 286 Part V—Control of development

This statute covers all development activities that may result in adverse effects on the environment, particularly the generation of waste and the method of its discharge. Section 30. (1), No person shall carry out development within the area of a local authority without a development permission granted by the local authority under this section. (2) Any person who contravenes sub-section (1) shall be guilty of an offence and shall be liable to a fine not exceeding one hundred thousand shillings, to an imprisonment not exceeding five years, or to both. (3) Any dealing in connection with any development in respect of which an offence is committed under this section shall be null and void and such development shall be discontinued. (4) Notwithstanding the provisions of sub-section (2) (a) The local authority concerned shall require the developer to restore the land on which such development has

taken place to its original condition within a period of not more than ninety days; (b) If on the expiry of the ninety days' notice given to the developer such restoration has not been effected, the concerned local authority shall restore the site to its original condition and recover the cost incurred thereto from the developer. Section 31. Any person requiring development permission shall make an application in the form prescribed in the Fourth Schedule, to the clerk of the local authority responsible for the area in which the land concerned is situated. The application shall be accompanied by such plans and particulars as are necessary to indicate the purposes of the development, and in particular shall show the proposed use and density, and the land which the applicant intends to surrender for: a) Purposes of principal and secondary means of access to any subdivisions within the area included in the application and to adjoining land; and b) Public purposes consequent upon the proposed development.

ection 36, If 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 shall be required to submit together with the application an EIA report. Accordingly, Section 29 (a) of the Physical Planning Act has granted all county governments in Kenya, the County Government of Nairobi being no exception, the power to prohibit or control the use and development of land and buildings.

3.3.20 Urban Areas and Cities Act No. 13 of 2011

This Act came into operation on the repeal of the Local Government Act (Cap.265) as per section 1(2) Subject to subsection (3); this Act entered into operation after the first elections held under the Constitution. Section 36, sub section (1); Every city and municipality established under this Act shall operate within the framework of integrated development planning which shall—(d) be the basis for—(i) the preparation of Environmental Management Plans;(vi) overall delivery of service including provision of water, electricity, health, telecommunications and solid waste management. In addition, section 37, sub section (1); A city or urban area integrated development plan shall be aligned to the development plans and strategies of the county governments.

According to section 26 (c) the council is expected to exercise control over land use, land sub-division, land development and zoning by public and private sectors for any purpose including agriculture, industry, commerce, markets, employment centres, residential, recreational parks, entertainment, passenger transport freight and the transit stations within framework of spatial and master plans for the city and municipality.

Section 44 provides for the council to form partnership on provision of social infrastructural services with companies within and outside the country. This includes construction of roads, environment conservation and preservation, construction of health centres and promotion of tourism and cultural events.

The project is within Nairobi City County Government jurisdiction and the planning requirements of the County shall be observed, the living standards of communities in the project area is likely to be improved by the proposed project.

3.3.21 Employment Act 2007

This is an Act of parliament that applies to all employees employed by any employer under a contract of service. The Act came in operation in June 2008. Employment of children is prohibited under this Act.

The development of an employment policy to be used by the Contractor will be based on this Act. The Contractor is equally tasked to ensure no under-age (18 years) is employed and that the employment process is fair and seen to be fair. From the public consultation, the community members expect most of the unskilled jobs to be given to local members.

3.3.22 The Labour Relations Act, 2007

The principal objective of this Act is to provide a legal framework to promote freedom of association and the right to collective bargaining , to streamline the registration process of trade unions, employees organizations and federation of trade unions and employers; organizations to provide mechanisms for the effective management of property, funds and accounts of trade unions , employers organizations and their respective federations, and to promote expedition and conclusive dispute settlements. It provides for establishment and registration of trade unions and employers organization. It sets out the procedure for the application and consequences of registration and also provides for suspension and cancellation of registration of trade unions and employers organizations.

3.3.23 Work Injury Benefits Act (WIBA)

It is an act of Parliament to provide for compensation to workers for injuries suffered in the course of their employment. It outlines the following: Employer's liability for compensation for death or incapacitation resulting from accident; Compensation in fatal cases; Compensation in cases of permanent or partial incapacity; Compensation in-case of temporary incapacity; Persons entitled to compensation and methods of calculating the earnings; No compensation shall be payable under this Act in respect of any incapacity or death resulting from a deliberate self-injury; and Notice of an accident, causing injury to a workman, of such a nature as would entitle him for compensation shall be given in the prescribed form to the Director DOSHs.

3.3.24 The Environment and Land Court Act, 2011

This is an Act of Parliament to give effect to Article 162 (2) (b) of the Constitution to establish a superior court to hear and determine disputes relating to the environment and the use and occupation of land. The Environment and Land Court is one of the courts contemplated by article 162(2). It is a Superior Court and has the same status as the High Court. The court is established under section 4 of the Environment and Land Court Act No. 19 of 2011. It has jurisdiction to hear any other dispute relating to environment and land. The jurisdiction of the court is provided under section 13 of the Act. The court has powers to deal with disputes relating to land administration and management. The court is also empowered to hear cases relating to public, private and community land and contracts or other instruments granting any enforceable interests in land. The court also exercises appellate jurisdiction over the decisions of subordinate courts or local tribunals in respect of matters falling within the

jurisdiction of the Court. The court further exercises supervisory jurisdiction over the subordinate courts, local tribunals, persons or authorities in accordance with Article 165(6) of the Constitution.

These courts are mandated to handle any matter regarding the environment and land that may arise from the proposed project. However, priority is on handling of such issues by the Grievance Redress Committee formed during the project construction phase.

3.3.25 The Roads Act, 2007

The Roads Act 2007 aims at harmonizing the duties and functions relating to the construction and maintenance of roads in Kenya previously exercised at National and Local Government levels through the Ministry of Roads and Public Works and the various City, Municipal, County and Town Councils of the Republic of Kenya. The Act also decentralizes the affairs relating to roads management, development, rehabilitation and maintenance to three stakeholders namely the National, Rural and Urban levels, and the creation of an Authority at each level.

The proposed project RoW traverses' different sections of the roads within the project which fall under different entities that shall be approached for their approvals and granting of permits for the construction of the Project.

3.3.26 The Traffic Act, Cap 403

The Traffic Act reserves the use of the road corridor for road facilities only. Any vegetation grown to protect the road edges should not cause problems during maintenance. Encroachment along the road corridor will have to be checked especially during the operational/ utilization phase of the project. The Act also spells out conditions for use of roads by motorists, among others.

The Act also empowers police officers to stop and remove from the road vehicles producing noxious emissions or to charge their owners in a court of law. Pollution of the atmosphere occurs on the road either by use of adulterated petroleum products or un-roadworthy vehicles. The Act requires that vehicles shall only use the fuel specified in the vehicle license but does not specify air pollution/quality standards.

The proponent shall engage the relevant departments for the use of the road corridor for the Project RoW.

3.3.27 The County Governments Act No. 4, 2012; 2017

This Act repealed the Local Government Act 265 in response the Kenya's Constitution requirements on devolved governance. The proponent will according to the County Government Act of 2012(Rev. 2017) ensure that the project activities conform to the regulation that shall be passed.(section 135 (1) The Cabinet Secretary may make regulations for the better carrying out of the purposes and provisions of this Act and such Regulations may be made in respect of all county governments and further units of decentralization generally or for any class of county governments and further units of decentralization.) comply to the set regulations and bye laws.

The proponent shall work in liaison with Nairobi City County Government for any permits, approvals and licenses required.

3.3.28 Public Roads and Roads of Access Act (Cap 399)

Sections 8 and 9 of the Act provides for the dedication, conservation or alignment of public travel lines including construction of access roads adjacent to lands from the nearest part of a public road. Sections 10 and 11 allows notices to be served on the adjacent landowners seeking permission to construct the respective roads.

The proponent shall issue notices to land-owners adjacent to the project area before construction works begins.

3.3.29 Access to Information Act, 2016

The Access to Information Act was enacted in 2016, it grants the legally enforceable right for every Kenyan citizen to access information held by public entities and private bodies. The Aarhus Convention is not directly applicable in Kenya, although offers significant pointers on effective information governance. The project developer NaMATA was required to disclose relevant project information upon request, except any information whose disclosure is likely to "substantially prejudice the commercial interests, including intellectual property rights, of that entity or third party from whom information was obtained.

The Information Act's definition of "public entity" is deemed to apply to NaMATA: (a) any public office, as defined in Article 260 of the Constitution; or (b) any entity performing a function within a commission, office, agency or other body established under the Constitution.
From Section 5.(e) of the Access Information Act, a public entity shall, upon signing any contract, publish on its website or through other suitable media the following particulars in respect of the contract entered into: (i) the public works, goods acquired or rented, and the contracted service, including any sketches, scopes of service and terms of reference; (ii) the contract sum; (iii) the name of the service provider, contractor or individual to whom the contract has been granted; and (iv) the periods within which the contract shall be completed.

This information shall be disseminated taking into consideration the need to reach persons with disabilities, the cost, local language, the most effective method of communication in that local area, and the information shall be easily accessible and available free or at cost taking into account the medium used.

The Act also delineates procedures by which citizens can access information, and procedures for public entities and private bodies to disclose information systematically, as well as provision for exempt information subject to international standards.

The proponent has ensured that the public, stakeholders and lead agencies are informed of the proposed Project and their input sought.

3.4 INSTITUTIONAL FRAMEWORK

In 2001, the Government established the administrative structures to implement the Environmental Management and Co-ordination Act 1999/ Cap 387 (herein referred to as the Principal Act). Later the Act was amended in 2015. There are over twenty (20) institutions and departments that deal with environmental issues in Kenya. Some of the key institutions include the National Environmental Management Authority, Kenya Forest Service, Kenya Wildlife Services, Kenya Marine and Fisheries Research Institute and Water Resources Authority among others. There are also local and international NGOs involved in environmental issues in the country. Described here below are legal organizations whose aim is to ensure sustainable management of environmental resources, ensuring communities are beneficiaries of development projects within their surrounds, protecting vulnerable ecosystems or organisms and facilitate for coexistence between the built and natural environment.

The institutional involvement and roles are highlighted in the table below

Table 12: Institutional Involvement and Role in ESIA

Institution	Roles Expected
Ministry of Transport and Infrastructure	Provides funds for the implementation of all mitigation measures provided in the approved ESMP and for the appointment of suitably qualified staff within the Project Implementation Unit to oversee and monitor ESMP implementation
NaMATA	▪ Appoints suitably qualified Environmental Health and Safety officer within the Project Implementation Unit to oversee and monitor ESMP implementation; ▪ Develops a corporate Environmental Management System
NLC	Approving payment/compensation to the PAP, and ensuring prompt, fair and adequate compensation.
NEMA	Reviews the ESIA report / ESMP and subsequent approval/licensing Undertakes environmental audits and enforcement during construction and operation
Nairobi City County Government	May become a stakeholder in the detailed design and implementation phase, particularly in relation to those sections of the Project which are in the CBD.
Ministry of Interior and Coordination	Organizing meetings between the proponent and PAPs

3.5 INTERNATIONAL CONVENTIONS AND AGREEMENTS

3.5.1 The 1985 Vienna Convention for the protection of the Ozone Layer

The Vienna Convention for the Protection of the Ozone Layer, 1985 was adopted after consensus was reached on 22nd March 1985 in Vienna, Austria. The overall objective of the Vienna Convention

is to protect human health and the environment against the effects of ozone depletion. As a framework convention, it does not establish any specific controls on ozone depleting substances. Instead, it establishes a general obligation on the parties to protect the ozone layer (Article 2) and emphasizes the need for international cooperation. The following chemical substances of natural and anthropogenic origin are thought to have potential to modify the chemical and physical properties of the ozone layer, carbon substances, nitrogen substances, chlorine substances, bromine substances and hydrogen substances.

As indicated in the ESMP the Contractor and the Proponent shall ensure that no ozone depleting substances are used.

3.5.2 The 1987 Montreal Protocol on Substances that Deplete the Ozone Layer

The Montreal Protocol on Substances that Deplete the Ozone Layer is a significant milestone in international environmental law. It establishes firm targets for reducing and eventually eliminating consumption and production of a range of ozone depleting substances. These substances are enumerated in Annexes A-E to the Protocol and are to be phased out within the schedule given in article 2A-2I. On October 15, 2016, Parties to the Montreal Protocol adopted the Kigali amendment to phase down production and consumption of hydrofluorocarbons (HFCs). HFCs are widely used alternatively to ozone depleting substances such as hydrochloro-fluorocarbons (HCFCs) and chlorofluorocarbons (CFCs, already controlled under Protocol).

The Contractor will comply by use of HCFCs and document a phase out program as per the schedule stipulated in the Protocol on substance that depletes the Ozone Layer.

3.5.3 The United Nations Convention on Climate Change ("1992 UNFCCC")

The objective of the 1992 UNFCCC is to tackle the negative effects of climate change. The Conventions' stated aim is to stabilize greenhouse gas concentrations at a level that allows ecosystems to adapt naturally to climate change so that food production is not threatened, while enabling economic development to proceed in a sustainable manner (article 2). The Convention sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change, recognizing that the climate system can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases. Articles 2 and 3 particularly apply to this project. Nairobi City County should support the Government of Kenya in her responsibility to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects by minimizing or eliminating activities that would bring about environmental degradation and climate change.

3.5.4 The Kyoto Protocol

The Kyoto Protocol was adopted in December 1997 at the Third Conference of the Parties held in Kyoto. The Kyoto Protocol requires stronger commitments from Annex1 parties to achieve quantified emission reductions within a specific timeframe. These commitments cover the six greenhouse gases listed in Annex A of the Kyoto Protocol.

3.5.5 Ramsar Convention

The Convention on wetlands is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. It was adopted in the Iranian city of Ramsar in 1971 and came into force in 1975, and it is the only global environmental treaty that deals with a particular ecosystem. The Convention's member countries cover all geographic regions of the planet.

3.5.6 Earth Summit on Sustainable Development Agenda 21

Agenda 21 is a non-binding, voluntarily implemented action plan of the United Nations with regard to sustainable development. It is a product of the Earth Summit (UN Conference on Environment and Development) held in Rio de Janeiro, Brazil, in 1992. It is also regarded as an action agenda for the UN, other multilateral organizations, and individual governments around the world that can be executed at local, national, and global levels. Agenda 21 Section I on Social and Economic Dimensions is directed toward combating poverty, especially in developing countries, changing consumption patterns, promoting health, achieving a more sustainable population, and sustainable settlement in decision making. Section II on Conservation and Management of Resources for Development includes atmospheric protection, combating deforestation, protecting fragile environments, conservation of biological diversity (biodiversity), control of pollution and the management of biotechnology, and radioactive waste. Section III focuses on strengthening the Role of Major Groups including the roles of children and youths, women, NGOs, local authorities, business and industry, and workers; and strengthening the role of indigenous peoples, their communities, and farmers.

The Sustainable Development Goals (SDGs), otherwise known as the Global Goals, are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity. These 17 Goals build on the successes of the Millennium Development Goals, while including new areas such as climate change, economic inequality, innovation, sustainable consumption, peace and justice, among other priorities. The goals are inter-connected – often the key to success on one will involve tackling issues more commonly associated with another. The SDGs work in the spirit of partnership and pragmatism to make the right choices now to improve life, in a sustainable way, for future generations. They provide clear guidelines and targets for all countries to adopt in accordance with their own priorities and the environmental challenges of the world at large.

3.5.7 The International Convention on Trade in Endangered Species (CITES)

This treaty acknowledges that flora and fauna are an irreplaceable part of the natural systems and therefore aims to protect certain species of wild fauna and flora against over-exploitation through international trade. The treaty provides guidelines on exportation, re-exportation, importation and introduction from the sea. It strives to ensure that international trade in specimens of wild animals and plants does not threaten their survival.

3.5.8 Convention for the Protection of World Cultural and National Heritage (1972)

Adopted by the General Conference of UNESCO at its seventeenth session in Paris, 1972. The convention aims to promote cooperation among nations to protect culture and heritage around the world with outstanding universal value for current and future generations. It demonstrates the necessity, for everyone regardless of their nation, to safeguard the unique and irreplaceable property, to whatever people it may belong.

3.5.9 United Nations Convention to Combat Desertification

The purpose of this Convention is to combat desertification and mitigate the effects of drought in Africa. It encourages international collaboration at all levels and arrangement of partnerships that would together contribute to the achievement of sustainable development in affected areas. This would result in improved land productivity as well as improved ecosystem resources and services hence improving living conditions particularly at the community level.

3.5.10 Basel Convention, 1989

This Convention is based on the control of trans-boundary movements of hazardous waste and their disposal. It requires that hazardous waste and other waste be accompanied by a movement document from the point at which a trans-boundary movement commences to the point of disposal. The objective is to protect human health and the environment against the adverse effects of hazardous waste. The implementation of the proposed project will not trigger the applicability of this Convention.

3.6 European Investment Banks (EIB) Guidelines

3.6.1 Background

Development partners or their agencies fund most development projects in developing countries, Kenya inclusive. The international development assistance provided to developing and underdeveloped countries by International Financial Institutions (IFIs) is governed by safeguard and sustainability policies which aim to protect and sustain environment and livelihoods of communities from adverse social and environment impacts of development projects. A number of multilateral and bilateral lending agencies e.g. The World Bank Group, International Finance Corporation (IFC), Asian Development Bank (ADB), European Investment Bank (EIB), Japanese International Corporation Agency (JICA), African Development Bank (AfDB), each have their safeguard policies.

The proposed project will be funded by the EIB and AFD; thus, the proponent is bound to abide by the policies of EIB and AFD. The sections below will discuss safeguard policies from EIB triggered as a result of the proposed project.

3.6.2 Assessment and management of environmental and social impacts and risks (EIB ESS 1)

The assessment of environmental and social impacts and risk, including their significance and materiality, as well as the development of adequate management plans and programmes are key tools for achieving sound environmental and social performance. In this respect, all EIB-financed operations comply with national legislation and international conventions and agreements ratified by the host Country.

The EIB also recognizes the need for a proactive approach to ensure that environmental and social considerations are taken into account during the early stages of strategic decision-making by promoters so as to have a real influence on the choice of alternative developments.

The proponent has conducted an Environmental and Social Impact Assessment (ESIA) of the proposed Project in an integrated manner to include key aspects such as

- Accurate Project description, including alternatives;
- Appropriate social and environmental baseline data identification;
- Consideration of all relevant social and environmental risks and impacts in the Project's Area of Influence (PAI) during construction;
- Appropriate stakeholder engagement through disclosure of the Project-related information and consultation on matters that directly affect stakeholders; and
- Appropriate Project Affected Persons (PAPs) identification in the PAI.

3.6.3 Pollution prevention and abatement (EIB ESS 2)

Pollution prevention and control are key pillars of EU environmental policy that, in general, contribute significantly contribution to the wider Europe 2020 agenda as well as to the EU's broader objectives of smart, sustainable and inclusive growth.

A project level-approach to pollution prevention and control therefore, means that all EIB-financed operations within EU, Candidate or potential Candidate countries shall comply with EU environmental standards as laid down in applicable Community environmental acquis. Operations outside the EU, Candidate and potential Candidate countries must meet best international practices in this regard and be consistent with the relevant EU principles and standards.

The objectives of the standard include:

- Avoidance of any deterioration in the quality of human health or the environment, and any loss of biodiversity, by avoiding, reducing and, if possible, compensating/remedying significant adverse effects of projects supported by the EIB;
- Support to the EU aims of reducing greenhouse gas emissions and enhancing resource efficiency, that will ease pressures on the environment and bring increased competitiveness through cost savings from improved efficiency, commercialization of innovations and better management of resources over their whole life cycle; and,
- Promotion of an integrated approach to prevention and control of emissions into air, water and soil, to waste management, to energy efficiency and to accident prevention for the

protection of the environment as a whole and therefore, avoiding the shift of pollution from one environmental medium to another.

The applicability of this Performance Standard is established during the environmental and social risks or impacts identification process. The implementation of the actions necessary to meet the requirements of this Performance Standard is managed through the proposed ESMP. During the project life cycle, the Proponent will consider ambient conditions and apply technically and financially feasible resource efficiency and pollution prevention principles or techniques that are best suited to avoid, or where avoidance is not possible, minimize adverse impacts on human health and the environment.

3.6.4 Biodiversity and ecosystems (EIB ESS 3)

Biodiversity and healthy ecosystems are necessary for human survival and a good quality of life but are being lost and degraded at a greatly accelerated rate because of human activities. The planet's biodiversity, ecosystems and their associated services (provisioning, regulating, supporting, and cultural) are under threat from climate change, accelerated development and pollution.

The EIB is committed to development that is compatible with maintaining the resilience of ecosystems

and their functions and processes in order to achieve at least no net loss of biodiversity and ecosystem services.

Underpinning the Biodiversity and Ecosystem Standard of the EIB is the overall goal of maintaining the integrity of areas important for biodiversity as well as the natural functions, processes, and resilience of ecosystems, with the aim of achieving no net loss or a net gain of biodiversity and ecosystem. The rationale is that for any given environment, it is possible to compare current biodiversity values with those that would occur in an ideal state of conservation. All projects should seek to contribute towards this state, avoid or minimize further losses and finally compensate for any residual impact.

3.6.5 Climate related (EIB ESS 4)

EIB financing as a whole is aligned with EU climate policies, which should be taken into account at all stages of the project cycle, in particular regarding the assessment of the economic cost of greenhouse gas emissions and the climate vulnerability context.

Project promoter must ensure that the project comply with appropriate national and, where applicable, EU legal requirements, including multilateral agreements, related to climate change policy. The promoters should also provide information on expected absolute and relative GHG emissions from the project it finances.

At all times, the proponent will aim to reach the minimum climate impact, following the project ESMP as main reference.

3.6.6 Cultural Heritage (EIB ESS 5)

EIB recognizes the central role of cultural heritage within individual and collective identity, in supporting sustainable development and in promoting cultural diversity. Consistent with the applicable international conventions and declarations, this standard aims at the identification, management and protection of tangible and intangible cultural heritage that may be affected by project activities. It emphasises the need for the implementation of a "chance-find procedure", which outlines the actions to be taken if previously unknown cultural heritage is encountered.

The proponent's main responsibilities in terms of cultural heritage management, associated with the project operations, are:

- support the conservation of cultural heritage;
- protect cultural heritage from adverse impacts of project activities by promoting the cultural heritage impact assessment and management;
- promote the equitable sharing of benefits from the use of cultural heritage in project activities; and,
- promote the awareness of and appreciation of cultural heritage, where possible.

This Standard apply to cultural heritage, tangible or intangible, regardless of whether or not it has been legally protected or previously disturbed.

The applicability of this Standard is established during the environmental and social impacts identification process. The implementation of the necessary mitigation actions is managed through the proposed ESMP, including the chance-find procedure.

3.6.7 Involuntary Resettlement (EIB ESS 6)

According to EIB, Project-induced involuntary resettlement should be avoided by analyzing alternative project designs and locations. If it is unavoidable, the proponent, with full involvement in the decision-making process of all stakeholders, and in particular the affected people, should adopt adequate steps to minimize and mitigate its adverse impacts from an early stage. Resettlement is a process to assist those displaced to replace their housing, assets, livelihoods, land, access to resources and services and to improve or at least restore their socioeconomic and cultural conditions to those levels existing prior to the project.

The objectives of this standard including

- Avoid or, at least minimize, project-induced resettlement whenever feasible by exploring alternative project designs;
- Avoid and/or prevent forced evictions and provide effective remedy to minimize their negative impacts should prevention fail;
- Ensure that any eviction which may be exceptionally required is carried out lawfully, respects the rights to life, dignity, liberty and security of those affected who must have access to an effective remedy against arbitrary evictions;
- Respect individuals', groups and communities' right to adequate housing and to an adequate standard of living, as well as other rights that may be impacted by resettlement;

- Respect right to property of all affected people and communities and mitigate any adverse impacts arising from their loss of assets, or access to assets and/or restrictions of land use, whether temporary or permanent, direct or indirect, partial or in their totality.
- Assist all displaced persons to improve, or at least restore, their former livelihoods and living standards and adequately compensate for incurred losses, regardless of the character of existing land tenure arrangements (including title holders and those without the title) or income-earning and subsistence strategies;
- Uphold the right to adequate housing, promoting security of tenure at resettlement sites;
- Ensure that resettlement measures are designed and implemented through the informed and meaningful consultation and participation of the project-affected people throughout the resettlement process
- Give particular attention to vulnerable groups, including women and minorities, who may require special assistance and whose participation should be vigilantly promoted.

3.6.8 Rights and interests of vulnerable groups (EIB ESS 7)

As a result of the negative project impacts of an infrastructure project. Some individuals or groups within a community may be less resilient to risks and adverse impacts than others. Within the context of EIB operations, individuals and/or groups who are at a higher risk of being unable to anticipate, cope with, resist and recover from project-related risks and/or adverse impacts are considered vulnerable. Vulnerable individuals or groups may include women, children, the elderly, the poor, ethnic, religious, cultural or linguistic minorities, or indigenous groups.

This standard sets out to avoid or minimize, or otherwise mitigate and remedy, potential harmful effects of a project to vulnerable individuals and groups whilst seeking that these populations duly benefit from such projects.

Objectives of the standard including

- Affirm, respect, and protect the rights and interests of vulnerable individuals and groups within the designated operational scope, throughout the project lifecycle. Such rights include the right to non-discrimination, the right to equal treatment between women and men and the rights of indigenous peoples;
- Adopt a gender-sensitive approach to the management of environmental and social impacts, that takes into account the rights and interests of women and girls, men and boys, including specific attention to the differentiated burden of impacts that women and girls might face;
- Identify and avoid adverse impacts of EIB operations on the lives and livelihoods of vulnerable individuals and groups, including women and girls, minorities and indigenous peoples. Where avoidance is not feasible, to reduce, minimize, mitigate or effectively remedy impacts;
- Ensure that vulnerable individuals and groups are duly and early on identified in EIB operations and that engagement is meaningful, taking into account individuals' and communities' specificities, and delivered in an appropriate form, manner and language; and
- Enable vulnerable groups, including women and girls, minorities and indigenous peoples to benefit from EIB-financed operations.

3.6.9 Labour Standards (EIB ESS 8)

Good labour practices and the use of appropriate codes of conduct are important to ensure the fair treatment, non-discrimination and equality of opportunity of workers. This standard aims at ensuring that promoters of EIB projects comply with the core labour standards of the International Labour Organisation and with national labour and employment laws. This standard also requires the establishment, maintenance and improvement of worker-management relationships.

This Standard applies in full to all workers directly engaged by the promoter throughout the project life cycle. Regarding workers engaged through third parties, the promoter must determine that such third parties are legitimate and that their workers are protected consistently with these standards.

The promoter must ensure that the project embraces the principles of International Labour Standards. The specific objectives of these standards are to:

- Foster and realise non-discrimination and fair and equal treatment and opportunity at work;
- Promote the freedom of association and collective bargaining;
- Ensure, develop and maintain a sound worker-management relationship;
- Promote compliance with national labour and employment laws and with internationally recognised labour standards as defined by the ILO, particularly its Core Labour Standards (as defined in the following section of these standards);
- Protect workers, including vulnerable categories (such as migrants, indigenous peoples or illiterate workers) and workers engaged by promoters' primary contractors and first-tier/direct suppliers, from unacceptable forms of labour and employment practices, exploitation and violation of the core labour rights; and,
- Avoid the use of forced and child labour.

The project promoter will comply with the relevant national labour laws and implement the principles of the Core Labour Standards of the ILO Declaration on Fundamental Principles and Rights at Work throughout the entire lifecycle of the project, ensuring similar adherence of its primary contractors and first-tier suppliers.

The promoter will develop and update an appropriate human resources policy, as well as an effective management system. This management system shall cover the enforcement and compliance of labour standards, and the monitoring of the promoter's contractors/suppliers.

3.6.10 Occupational and public health, safety and security (EIB ESS 9)

Projects often bring employment, economic growth and social improvement opportunities to both workers and communities. Benefits can also result from access to health, education or social protection. Project activities, however, can also increase exposure to hazards, risks and negative impacts in terms of public health and safety. These may arise through or be amplified by project-related occurrences such as increased environmental pollution, elevated noise levels the spread of communicable diseases or disproportionate use of violence by private or public security forces. Considerations should also be given to occupational health and safety issues arising in the context of projects.

Objectives of the standard include:

- Promote and protect the health and safety of employees at work throughout the project life cycle by ensuring safe, healthy, hygienic and secure working and accommodation conditions and, effectively, a working environment that respects and safeguards the right to privacy, and when appropriate, to the enjoyment of the highest attainable standard of physical and mental health of workers and their families (e.g., in worker's accommodation);
- Ensure that promoters duly anticipate, avoid or minimize, and effectively mitigate risks and adverse impacts to the health and safety of host communities within the project's determined area of influence (including all associated facilities) as well as end users, during both construction and operation phases;
- Help promote public health and safety across the project's area of influence by inter alia supporting and promoting programmes which aim at preventing the spread of major communicable diseases;
- Ensure the provision of private or public security to protect the project's workers and assets consistent with international human rights standards and principles; 41 and,
- Ensure effective access to grievance mechanism and recourse to remedy for all project workers and members of the public in cases of violations of their rights falling within the scope of the present Standard.

The applicability of this Performance Standard is established during the environmental and social risks and impacts identification process. The implementation of the actions necessary to meet the requirements of this Performance Standard is managed through the proposed ESMP.

3.6.11 Stakeholder Engagement (EIB ESS 10)

This safeguard recognizes the importance of open and transparent engagement between the Borrower and project stakeholders as an essential element of good international practice. Effective stakeholder engagement can improve the environmental and social sustainability of projects, enhance project acceptance and make a significant contribution to successful design and implementation.

As a public institution, the EIB actively promotes the right to access to information, as well as public consultation and participation; the right to access to remedy, including through grievance resolution, is equally acknowledged and actively promoted by the EIB. This standard affirms the EIB's expectation that promoters uphold an open, transparent and accountable dialogue with all relevant stakeholders at the local level targeted by its EIB operations. This standard stresses the value of public participation in the decision-making process throughout the preparation, implementation and monitoring phases of a project.

The specific objectives of this project including

- Establish and maintain a constructive dialogue between the promoter, the affected communities and other interested parties throughout the project life cycle;
- Ensure that all stakeholders are properly identified and engaged;

- Engage stakeholders in the disclosure process, engagement and consultations in an appropriate and effective manner throughout the project lifecycle, in line with the principles of public participation, non-discrimination and transparency;
- Ensure that the relevant stakeholders, including commonly marginalized groups on account of gender, poverty, educational profile and other elements of social vulnerability, are given equal opportunity and possibility to voice their opinions and concerns, and that these are accounted for in the project decision-making; and,
- Duly verify and assess that the quality and process of engagement undertaken by third parties on the project conform to the provisions included in the present standard.

Stakeholder engagement is an integral part of the ESIA, the consultant met both the secondary and primary stakeholders. Stakeholders were engaged through face-to-face interviews and through use of an open-ended questionnaire. Local community were engaged through FGDs. Stakeholder engagement will not end with completion of the ESIA report it will be a continuous process throughout the project life cycle.

3.7 AFD Social Safeguards

AFD aims to promote sustainable and equitable development in all operations funded, by ensuring that these operations effectively contribute to the objective of sustainable development (combating poverty and ensuring the satisfaction of human needs, strengthening solidarity between human beings and between territories, preserving biodiversity, preserving habitats and natural resources, combating climate change). All operations financed by AFD are required to comply with the national regulations of the country where the operation is implemented, including for environmental and social issues. However, as regulations in the countries where AFD operates are sometimes incomplete or under development, AFD uses as a reference a number of rules, good practices and directives produced by international standard-setting organizations and proven with more than 70 years of experience in the financing of development projects. The AFD adheres to the World Bank Safeguard Policies for public sector financing. The WB policies are identified below depending on which ones have relevance to the BRT Core Line 3 Project.

Table 13: World Bank Group Environmental and Social Safeguards (ESS)

ESS No.	World Bank Group Safeguard Policy	Applicability	
		Yes (√)	No (×)
1)	Assessment and Management of Environmental and Social Risks and Impact	(√)	
2)	Biodiversity Conservation and Sustainable Management of Living Resources	(√)	
3)	Labour and Working Conditions	(√)	
4)	Cultural Heritage	(√)	
5)	Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities		(×)
6)	Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	(√)	
7)	Community Health and Safety	(√)	
8)	Resource Efficiency and Pollution Prevention and Management	(√)	
9)	Financial Intermediaries	(√)	
10)	Stakeholder Engagement and Information Disclosure	(√)	

3.7.1 Assessment and Management of E & S Risks and Impact (ESS1)

ESS1 sets out the Borrower's responsibilities for assessing, managing, and monitoring environmental and social risks and impacts associated with each stage of a project supported by the Bank. ESS1 helps Borrowers to manage the risks and impacts of a project, and improve their environmental and social performance, through a risk- and outcomes-based approach. The borrower is required to conduct environmental and social assessment of projects proposed for Bank financing to help ensure that projects are environmentally and socially sound and sustainable. The environmental and social assessment will be proportionate to the risks and impacts of the project. It will inform the design of the project and be used to identify mitigation measures and actions and to improve decision making.

The key objectives of ESS 1 include:

- To identify, evaluate, and manage the environment and social risks and impacts of the project in a manner consistent with the ESSs
- To adopt differentiated measures so that adverse impacts do not fall disproportionately on the disadvantaged or vulnerable, and they are not disadvantaged in sharing development benefits and opportunities resulting from the project.
- To utilize national environmental and social institutions, systems, laws, regulations, and procedures in the assessment, development, and implementation of projects, whenever appropriate.

- To promote improved environmental and social performance, in ways which recognize and enhance Borrower capacity.
- To adopt Mitigation measures that will minimize or reduce risks and impacts to acceptable levels.

The whole ESIA process forms the basis of meeting this ESS.

3.7.2 Labour and Working Conditions (ESS2)

The ESS2 recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. Borrowers can promote sound worker management relationships and enhance the development benefits of a project by treating workers in the project fairly and providing safe and healthy working conditions.

The objectives of this Environmental and Social Standard are:

- To promote safety and health at work;
- To promote fair treatment, non-discrimination and equal opportunity of project workers;
- To protect project workers, including vulnerable workers such as migrant workers, women and disabled, contracted workers, etc. as appropriate;
- To prevent use of all forms of forced labour and child labour;
- To support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law;
- To provide project workers with accessible means to raise workplace concerns.

During the ESIA stakeholder consultations, job allocation for locals was a key concern. The contractor is advised to implement the measures proposed in the developed ESMP.

3.7.3 Resource Efficiency and Pollution Prevention and Management (ESS3)

ESS3 sets out the requirements to address resource efficiency and pollution1 prevention and management throughout the project life cycle consistent with Global International Industry Practice (GIIP). It recognizes that economic activity and urbanization often generate pollution to air, water, and land, and consume finite resources that may threaten people, ecosystem services, and the environment at the local, regional, and global levels. The current and projected atmospheric concentration of greenhouse gases (GHG) threatens the welfare of current and future generations. At the same time, more efficient and effective resource use, pollution prevention, and GHG emission avoidance, and mitigation technologies and practices have become more accessible and achievable.

The objectives of this ESS include:

1. To promote the sustainable use of resources including energy, water and raw materials.
2. To avoid or minimize adverse impacts on human health and the environment by avoiding pollution from project activities.

3. To avoid or minimize project related emissions of short term and long lived climate pollutants.
4. To avoid or minimize generation of hazardous and non-hazardous waste.
5. To minimize and manage the risk and impacts associated with pesticide use.

During the project life cycle, the Proponent will implement the ESMP and apply technically and financially feasible resource efficiency and pollution prevention principles or techniques that are best suited to avoid, or where avoidance is not possible, minimize adverse impacts on human health and the environment.

3.7.4 Community Health and Safety (ESS4)

It recognizes that project activities, equipment and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration or intensification of impacts due to project activities. It also addresses the health, safety, and security risks and impacts on project-affected communities and the corresponding responsibility of Borrowers to avoid or minimize such risks and impacts, with particular attention to people who, because of their particular circumstances, may be vulnerable.

The following are the objectives:

1. To anticipate and avoid adverse impacts on health and safety of the project on communities throughout project life cycle.
2. To promote quality and safety and considerations relating to climate change, in the design and construction of infrastructure
3. To avoid or minimize community exposure to project-related traffic and road safety risks, diseases and hazardous materials.
4. To have in place effective measures to address emergency events.
5. To ensure that the safeguarding of personnel and property is carried out in a manner that avoids or minimizes risks to the project-affected communities.

The implementation of the actions necessary to meet the requirements of this ESS is managed through the proposed ESMP. The ESMP caters for pre-construction, construction and operational phases of the project.

3.7.5 Land Acquisition, Restrictions on Land Use and Involuntary Resettlement (ESS 5)

It recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons. Project-related land acquisition1 or restrictions on land use may cause physical displacement (relocation, loss of residential land, or loss of shelter), economic displacement (loss of land, assets, or access to assets leading to loss of income sources or other means of livelihood), or both. The term "involuntary resettlement" refers to these impacts.

Resettlement is considered involuntary when affected persons or communities do not have the right to refuse land acquisition or restrictions on land use that result in displacement.

The objectives of this ESS include:

i. Avoid or minimize involuntary resettlement where feasible, exploring all viable alternative project designs;

ii. Assist displaced persons in improving their former living standards, income earning capacity, and production levels, or at least in restoring them;

iii. Encourage community participation in planning and implementing resettlement; and

iv. Provide assistance to affected people regardless of the legality of land tenure.

This ESS covers not only physical relocation, but any loss of land or other assets resulting in: -

i. Relocation or loss of shelter;

ii. Loss of assets or access to assets;

iii. Loss of income sources or means of livelihood, whether or not the affected people must move to another location.

It also applies to the involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons.

The proposed project will result in involuntary resettlement in some areas due to land acquisition. The major Land Acquisition and Resettlement impacts are involved with the feeder areas, project corridor up-gradation, Park & Ride, bus stations and depots/ terminal components.

3.7.6 Biodiversity Conservation and Sustainable Management of Living Resources (ESS6)

ESS6 recognizes that the conservation of natural habitats is essential to safeguard their unique biodiversity and to maintain environmental services and products for human society and for long-term sustainable development. The Bank therefore supports the protection, management, and restoration of natural habitats in its project financing, as well as policy dialogue and economic and sector work. The Bank supports, and expects borrowers to apply, a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development. Natural habitats are land and water areas where most of the original native plant and animal species are still present. Natural habitats comprise many types of terrestrial, freshwater, coastal, and marine ecosystems. They include areas lightly modified by human activities but retaining their ecological functions and most native species.

This policy is triggered by any project (including any subproject under a sector investment or financial intermediary) with the potential to cause significant conversion (loss) or degradation of natural habitats, whether directly (through construction) or indirectly (through human activities induced by the project)

The Environmental Monitoring Management Plan (ESMP) in the ESIA addresses all impacts related to degradation of natural habitats within the project area. As a matter of priority, the proponent will seek to avoid impacts on biodiversity and ecosystem services.

3.7.7 Cultural Heritage (ESS8)

ESS8 recognizes that cultural heritage provides continuity in tangible and intangible forms between the past, present, and future. People identify with cultural heritage as a reflection and expression of their constantly evolving values, beliefs, knowledge, and traditions. Cultural heritage, in its many manifestations, is important as a source of valuable scientific and historical information, as an economic and social asset for development, and as an integral part of people's cultural identity and practice. ESS8 sets out measures designed to protect cultural heritage throughout the project life cycle.

The main objectives of this ESS include:

- To protect cultural heritage from the adverse impacts of project activities and support its preservation;
- To address cultural heritage as an integral aspect of sustainable development;
- To promote meaningful consultation with stakeholders regarding cultural heritage;
- To promote the equitable sharing of benefits from the use of cultural heritage.

3.7.8 Financial Intermediaries (ESS9)

The ESS recognizes that strong domestic capital and financial markets and access to finance are important for economic development, growth and poverty reduction. The Bank is committed to supporting sustainable financial sector development and enhancing the role of domestic capital and financial markets.

Financial Intermediaries (FIs) are required to monitor and manage the environmental and social risks and impacts of their portfolio and FI subprojects, and monitor portfolio risk, as appropriate to the nature of intermediated financing. The way in which the FI will manage its portfolio will take various forms, depending on a number of considerations, including the capacity of the FI and the nature and scope of the funding to be provided by the FI. The objectives include:

1. To set out how the Financial Intermediaries (FI) will assess and manage environmental and social risks and impacts associated with the subprojects it finances.
2. To promote good environmental and social management practices in the subprojects the FI finances.
3. To promote good environmental and sound human resources management within the FI.

3.7.9 Stakeholder Engagement and Information Disclosure (ESS10)

This ESS recognizes the importance of open and transparent engagement between the Borrower and project stakeholders as an essential element of good international practice. Effective stakeholder

engagement can improve the environmental and social sustainability of projects, enhance project acceptance and make a significant contribution to successful design and implementation. This ESS must be read in conjunction with ESS1, ESS2, ESS5, ESS7, ESS8 and ESS4. The objectives include:

1. To establish a systematic approach to stakeholder engagement to help Borrowers identify stakeholders and build and maintain a constructive relationship with them.
2. To assess the level of stakeholder interest and support for the project and to enable stakeholders' views to be taken into account in project design and environmental and social performance.
3. To promote and provide means for effective and inclusive engagement with project-affected parties throughout the project life cycle on issues that could potentially affect them.
4. To ensure that appropriate project information on environmental and social risks and impacts is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner and format.

Stakeholder engagement is an integral part of the ESIA and the Consultant engaged both the primary and secondary stakeholders in the area of influence. Stakeholder engagement will not end with completion of the ESIA report it will be a continuous process throughout the project life cycle and more of it will be during the RAP stage.

3.8 Promoter's Environmental and Social Standards

The Nairobi Metropolitan Area Transport Authority (NaMATA) was established in February 2017 through an Executive Order signed by the President. This agency was formed so as to oversee the establishment of an integrated, efficient, effective and sustainable planning system within the Nairobi Metropolitan Area which also comprises of Nairobi, Kiambu, Machakos, Kajiado and Murang'a.

As a key function as per the executive order, NaMATA shall be in charge of the formulation and oversight of a sustainable, evidentially based, integrated mass rapid transit strategy. NaMATA shall also be in charge of the development of an MRTS system which includes both BRT and commuter rail. These provisions thus place the BRT projects under the jurisdiction of NaMATA. Therefore, once properly constituted, the BRT projects shall be under the jurisdiction of NaMATA.

3.9 Gap Analysis and Project Compliance to National and Lender Standards

The primary objective of this gap analysis is to inform the opinions of both the National and Lender guidelines with a view of harmonising and the requirements for synchronised applications, and determination of the most superior policies that the project should adopt in order to be proactive, acceptable and protective of the common interest in providing an efficient transport system under Core Line 3 of the Nairobi BRT.

The existing policies for the assessment and management of environmental and social impacts and risks and the policies of the national and development banks shall be harmonised along these lines and shall provide comfort for all players in the understanding that the best practices are being adopted on the proposed project.

The table below provides a succinct comparison of six thematic environmental and social themes that are key to the project.

Table 14: Comparison of Kenyan Policies/Laws with AFD and EIB on Key ESIA Issues

No.	Environmental and Social Theme	Government of Kenya	AFD	EIB
1	Stakeholder Participation	The Environmental (Impact Assessment and Audit) Regulations, 2003 provides for public participation during the EIA and ESIA process. Section 17 of the Act requires the proponent to seek the views of the persons who may be affected by the project and to publicise the project and its anticipated effects.	During Consultation, appropriate information should be provided to allow for affected parties to be meaningfully consulted, to form an opinion and to comment on the proposed course of action. EIAs and/or other relevant environmental analyses will be made available to the public. During execution, affected parties should be kept informed of those project-related environmental and associated social mitigation measures affecting them, as defined in the ESMP.	Stakeholder engagement is an inclusive and iterative process that involves, in varying degrees, stakeholder analysis and engagement planning, and stakeholder participation, and a mechanism ensuring access to grievance and remedy. Standard 10 outlines a systematic approach to stakeholder engagement. Stakeholder engagement, including disclosure and dissemination of information, will be planned for and carried out in line with the principles of prior, informed and free engagement and informed participation. In the event that broad community support is not attained, the promoter is expected to dedicate all necessary resources and time to additional community engagement and public consultation initiatives, as required.
REQUIREMENT		The project Stakeholder Engagement Plan should be countersigned by all parties and NaMATA should commit and budget for this Plan through itself and all partners and contractors.		
2	Natural Habitats/Biodiversity	The EMCA (Amendments) Act Cap 387 provides the mandate to monitor the operations of industries, projects or activities to determine their immediate and long-term effects on the environment. The Authority may prescribe measures to ensure that the biological resources in place	All Projects and Sub-projects must be designed and implemented in a manner that ensures protection and conservation of biodiversity and cultural habitats, maintaining the benefits of ecosystem services, and promoting the sustainable use and management of living natural resources.	For all projects financed by the EIB, the promoter must demonstrate that a range of alternatives and their impacts on biodiversity has been analyzed. The promoter is also required to apply the mitigation hierarchy, i.e. to take appropriate measures to avoid, minimize or rehabilitate/mitigate impacts that may damage biological biodiversity. Where residual adverse impacts on biodiversity

No.	Environmental and Social Theme	Government of Kenya	AFD	EIB
		are preserved, issue guidelines to promote the conservation of the various terrestrial and aquatic systems, and protect species, ecosystems and habitats threatened with extinction.	E&S risk identification process has to identify potential negative impacts of program activities on biodiversity and natural resources, and, where possible, appropriate measures must be adopted to avoid such negative impacts.	remain, the promoter may propose biodiversity offsets, where appropriate.
REQUIREMENT		The Recipient and the Lenders have sufficient safeguards to meet the thematic requirements. A robust monitoring plan for greening and maintenance of the landscape shall be sufficient to protect the flora and fauna.		
3	Gender Mainstreaming/ Vulnerable groups	Kenya National Policy on Gender and Development (NPGD), 2009 spells out affirmative action for the marginalized mainstreaming and empowerment of women, girls, men and boys to participate in and benefit equally in development processes. This is possible via extensive public participation and engagement of all the stakeholders.	Project consultation provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people, is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.	EIB's Standard (Rights and interests of Vulnerable groups) sets out to avoid or minimize, or otherwise mitigate and remedy, potential harmful effects of EIB operations to vulnerable individuals and groups whilst seeking that these populations duly benefit from such operations. Some of the key objectives include; • Adopting a gender-sensitive approach to the management of environmental and social impacts, that takes into account the rights and interests of women and girls, men and boys, including specific attention to the differentiated burden of impacts that women and girls might face; • Enable vulnerable groups, including women and girls, minorities and indigenous peoples to benefit from EIB-financed operations.

No.	Environmental and Social Theme	Government of Kenya	AFD	EIB
REQUIREMENTS		Both the Recipient and the Lender have sufficient safeguards addressing gender mainstreaming. NaMATA shall adopt the gender Mainstreaming Charter and endorse the Gender Analysis Review of the Project. Furthermore NaMATA shall budget, monitor and evaluate gender mainstreaming on the project. They will also provide on a regular basis the Project Gender Audit Report.		
4	Labour standards	Articles 70 to 86 of the current Constitution deal with fundamental rights. Basically, the Constitution guarantees fundamental rights and freedoms of the individual. Among these fundamental rights, a range of general principles underpinning labour rights are anchored in the Constitution itself. The Constitution provides for principles, such as the prohibition of inhuman treatment (Art. 74) and the protection from slavery and forced labour (Art. 73). The Kenya Labour Relations Act 2007 is in line with the ILO requirements.	The bank policies aim to protect the rights of workers and provide the basic needs and are in line with main international conventions and instruments, including those of the ILO Core Labour standards and the UN. The policies also protect the workforce from inequality, social exclusion, child labour, and forced labour.	Standard 8 of the Environmental Social Safeguards policies aims at ensuring that the promoter respects the Core Labour standards of the International Labour Organisation (ILO), as well as at promoting the relevant rights under the UN Guiding Principles on Business and Human Rights for the project to be financed. The standards set out herein seek to protect and support the fundamental rights of workers in EIB-financed operations. All operations financed by the EIB, whether located inside or outside the EU, are subject to these standards throughout their entire lifecycle.
REQUIREMENTS		Both the Recipient and the Lender have demonstrated good and relatively similar standards on the implementation of Labour Standards.		
5	Climate Change	The Climate Change Act, 2016 establishes a framework to respond to climate change. It establishes the National Climate Change Council as the coordinate and develop national climate	The Bank encourages the reduction and control of greenhouse gas (GHG) emissions in a manner appropriate to the nature and scale of operations. Operations that produce significant quantities of greenhouse gases will	The policies streamlines that all projects must comply with appropriate national and where applicable EU legal requirements, including multilateral agreements, related to climate change policy. In carbon-intensive sectors all

No.	Environmental and Social Theme	Government of Kenya	AFD	EIB
		change mechanisms, advise on climate change policies, administer the Climate Change Fund, and set targets for the regulation of greenhouse gases. The Act requires public agencies to integrate the National Climate Change Action Plan in its activities, report on sectoral greenhouse gas emissions for the national inventory, put in place and implement sustainability measures, and to report annually all climate change related duties and functions. This Act grants NEMA the authority to monitor, investigate, and report on climate change compliance activities. NEMA is required to report annually on these compliance activities. The Act also creates a Climate Change Fund that will help promote and incentivize actions to prevent and limit climate change.	annually quantify direct GHG emissions, in accordance with the emission estimation methodologies of the Intergovernmental Panel on Climate Change (IPCC) or other internationally accepted methodologies.	projects must use sector-specific best available techniques, which among other things requires a rational approach to resource use, including the most effective measures in the field of energy efficiency. The EIB encourages project promoters to provide information on expected absolute and relative GHG emissions from the project it finances.
REQUIREMENTS		The Recipient has demonstrated a more stringency and clarity in dealing with climate change issues on the project. There exists a legal framework, institutional arrangement and monitoring & evaluation arrangements that are key to projects implementation. NaMATA shall incorporate this requirement in her Service Charter.		
6	Human Rights	Article 174 of the Constitution sets out the objects of devolution of government, which include: (a)	The Bank's mission of poverty reduction and sustainable development by ensuring that the	This Standard is consistent with and supports international and EU human rights law. It specifically supports the right to property, to

No.	Environmental and Social Theme	Government of Kenya	AFD	EIB
		giving powers of self-governance to the people and enhancing their participation in the exercise of the powers of the State and in making decisions affecting them; (b) recognizing the right of communities to manage their own affairs and to further their development; (c) protecting and promoting the interests and rights of minorities and marginalized communities; (d) promoting social and economic development and the provision of proximate, easily accessible services throughout Kenya; (e) ensuring equitable sharing of national and local resources throughout Kenya; and (f) facilitating the decentralization of State organs, their functions and services, from the capital of Kenya.	development process fully respects the dignity, human rights, economies, and cultures of Indigenous Peoples. Also, to design and implement projects in a way that fosters full respect for Indigenous Peoples' identity, dignity, human rights, livelihood systems, and cultural uniqueness.	adequate housing and standard of living and food. The right to adequate housing of those affected by involuntary resettlement under EIB-supported projects and associated operations, shall be respected with non-discrimination as a central human rights principle. This applies to affected persons, groups and communities subjected to involuntary resettlement as well as host communities at relocation sites. It applies to all such persons, whether or not they hold a legal title to their home or property under domestic law. To ensure respect for this right in practice, certain procedural safeguards must be in place, such as involvement of affected persons in decision-making processes and access to grievance mechanisms, as further described in this Standard.
REQUIREMENTS		Both the Recipient and Lender have demonstrated a great interest in the human rights with Kenya having a complete Bill of Rights. The Bill of Rights is structured around International Human Rights Law and forms a good basis for domestication international law. It therefore behoves NaMATA to adopt the Charter and sign it off as a part of their operational principles and report on the same annually or as may be required by the Laws and Lenders.		

4 PROJECT ALTERNATIVES

4.1 Introduction

Identification of alternatives is one of the key aspects of a success of the ESIA. Alternatives to a project are defined as functionally different ways of achieving the same end (CEA Agency, 1997). Under the NEMA Environmental (Impact Assessment and Audit) regulations, of 2003; 2016, analysis of alternatives to a proposed project is a requirement. The alternatives considered in a project include alternative technologies and processes available and reasons for preferring the chosen technology and processes, analysis of project site, design and technologies alternatives and reasons for preferring the proposed site, design and technologies.

In accordance with current ESIA good practice and as one of the NEMA requirements for the ESIA process in Kenya, it is appropriate for the ESIA process to investigate alternatives to a proposed project. This section outlines various alternatives that have been considered to the project design or implementation, focusing on the environmental and social implications. This section aims at establishing whether there are reasonable alternatives, which could be pursued to meet the project's objectives with less impact on the environment and the society, and if there are, to explain what other factors determined the choice of proposal. Two types of alternatives exist: Fundamental Alternatives and Incremental Alternatives.

Fundamental Alternatives are projects that are completely different from the proposed project and usually involve a different type of methodology on the proposed site, or a different location for the proposed project. Conversely, Incremental Alternatives are modifications or variations to the design of a project that provide different options to reduce or minimize environmental impacts. Alternatives are "different means of meeting the general purpose and requirements of the project" which includes alternatives to:

- The proposed project location;
- The type of project to be undertaken;
- The design or layout of the project;
- The technology to be used in the project; and
- The operational aspects of the project.

For this specific project, the following activities were analysed:

- No Project alternative;
- The Alternative site;
- Project development with mitigation measures.

4.1 No Project Alternative

The "no development option" entails leaving the current status of the site as it is. The environmental effects of the proposed development will be avoided. Significant investment will be spent in

construction materials, employment, etc. including road accessibility, besides the potential of the project stimulating development in the area will not be realized. This is owing to the fact that BRT will enhance transport efficiency compared to what is currently experienced.

4.2 Alternative Site

Pursuing a change of site alternative on the other hand requires that the project be implemented at an alternative site other than the one already existing. This would entail purchasing alternative parcels of land. NaMATA, however, has access to only the existing road corridor and based on financial feasibility, it's worthy to note that this would be expensive for the stated development. The resultant effect of changing the site would be an increase in timeframe and resources required to realize the development. The unpredictability of financial resources and the lag time required in acquiring and designing the development may mean that the project may be delayed. These reasons make this alternative more undesirable.

4.3 Project Development With Mitigation Measures

Pursuit of proposed project will entail going forward with the development but taking into account all the potential impacts on the biophysical environment by incorporating and integrating the recommended mitigation and enhancement measures into the project designs and implementation. The potential negative impacts to the environment will also be ameliorated by coming up with the ESMP that incorporates the formulated mitigation measures.

Regarding the positive impacts of having a BRT System in place, these will include:

- Reducing air pollution from switching from old vehicles to BRT operated by e-Buses;
- Efficient performance of new electric buses, which reduces fuel consumption and ultimately reducing air pollution;
- Substitution of multiple low occupancy vehicles with a BRT e-buses leads to less overall fuel consumption and reduction in GHG emissions
- Reduced injuries and fatalities from accident;
- Faster travel-time on a dedicated lane with proper traffic management and scheduled timetables;
- Increased potential for developments of other public transport services (e.g., taxis) around.

4.4 Analysis Of Alternative Construction Materials And Technology

The BRT works will meet the Kenya Bureau of Standards and Planning/ Zoning requirements within the Project area. The technology to be adopted will be the most economical and one sensitive to the environment.

On the alternative construction materials and technology, rainwater should be harvested and be used in construction activities and supply to labour camps for flushing toilets and other non-domestic activities. Community members should also be encouraged to harvest rainwater not only to supplement the water supplied but also to help reduce pressure on the drainage structures. Heavy use of timber and wood during construction should be discouraged to minimize destruction of natural

resources. The exotic tree species should be preferred to indigenous species in the construction of the project components where need will arise as they can be replanted with ease.

Asphalt mixers, crushers and other construction equipment and machinery should be incorporated with pollution control devices like dust arrestors/precipitators, emission control, noise abatement devices and desulfurization devices. The equipment and vehicles should have highest levels of combustion efficiency, capability to use cleaner fuels like biofuels and should have enhanced safety features.

5 PHYSICAL ENVIRONMENT BASELINE

The project area from Hospitals to Dandora is characterized by developed residential buildings, slum dwellings, industrial buildings and high concentrations of trading areas and other social services. There are various facilities and institutions in the areas of influence that include schools, hospitals and faith-based institutions. With the project traversing the Central Business District (CBD) at Landhies Road and Temple Road, the commercial settings are well defined. From the area along Kariokor, Juja Road interchange to the end station at Dandora, the land is characterized by densely populated settlements which include, Kariokor, Pangani, Mlango, Kubwa, Eastleigh, Mathare, Huruma, Kariobagi South, Kariobangi North, and Dandora Phase1 and Phase 2.

The Poject area also goes through Kariokor Market (01°16'41.12''S/36°50'8.13''E) Kamukuji Market, and Korogocho Market (01°15'28.74''S/36°53'6.24''E).

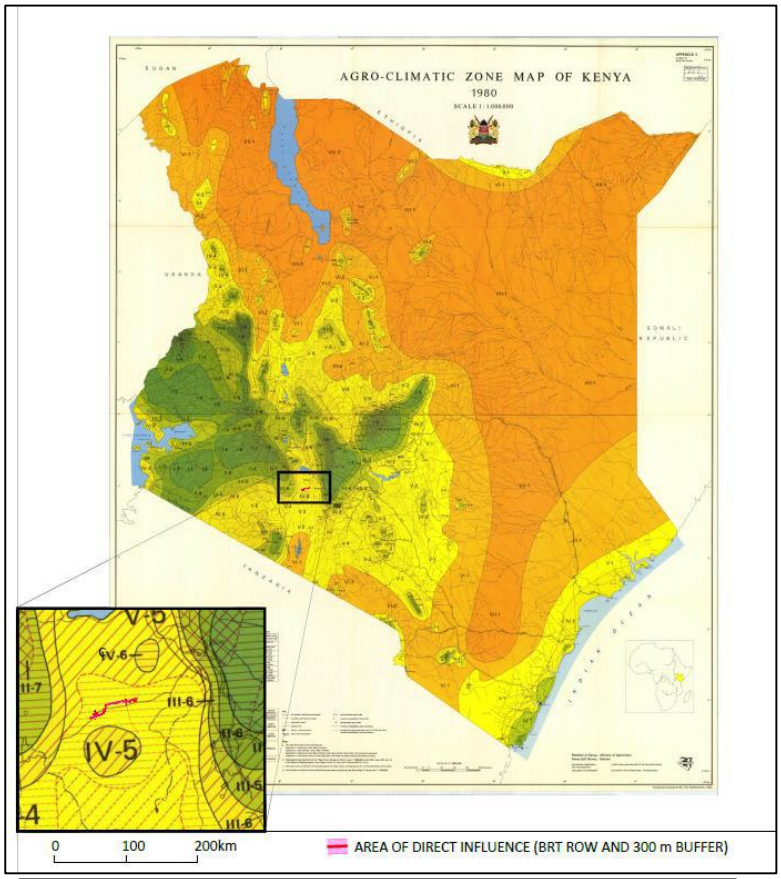
The physical environment characteristics of the study area constitute the baseline environment.

5.1 Climate

Nairobi's elevation strongly influences the City's climate. In general temperatures are fairly uniform with the coolest periods ranging from June to August while the hottest temperatures typically occur from December to March.

Nairobi has a bimodal rainfall regime with long and short rainy seasons in March-May and October-December respectively. Northeast monsoons are common during December to February, and southeast monsoons during June to August are associated with depressed rainfall conditions. The mean annual rainfall in Nairobi ranges between 800 mm and 1300 mm p.a. More than 50 % of the total rainfall occurs during the long rainy season, whereas the mean temperature ranges from 18 to 20 ºC.

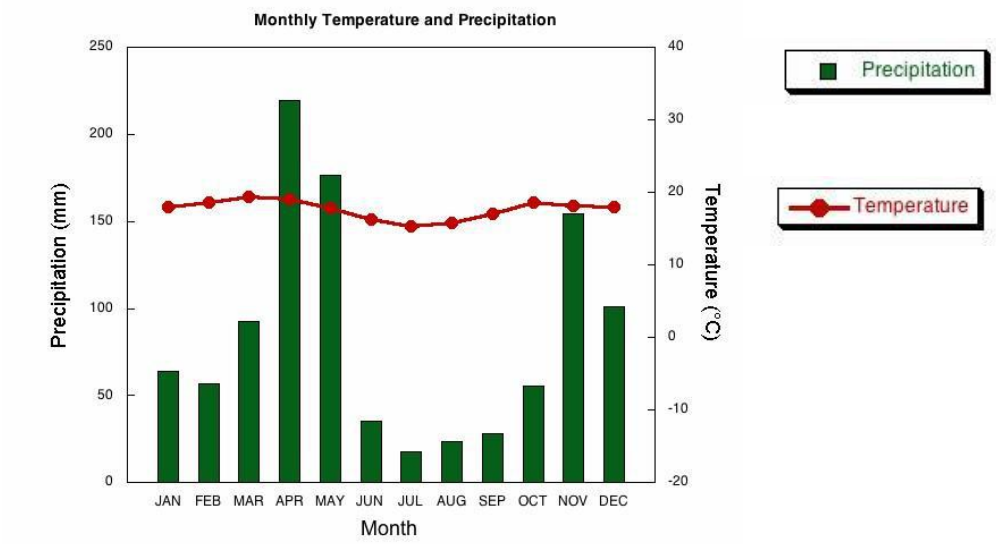
Figure 14: Extract of the Agro-climatic zone map of Kenia



zone	r/Eo (%)	classification	average annual rainfall (mm)	Eo average annual potential evaporation (mm)	vegetation	potential for plant growth	risk of failure of an adapted maize crop
			excluding areas above 10,000 ft altitude			assuming that soil conditions are not limiting	
V	25 - 40	semi-arid	450 - 900	1650 - 2300	bushland	medium to low	high (25 - 75%)

zone	mean annual temperature (°C)	classification	mean maximum temperature (°C)	mean minimum temperature (°C)	absolute minimum temperature (°C)	night frost	altitude (feet)	altitude (meters)	general description
4	18 - 20	warm temperate	24 - 26	12 - 14	4 - 6	none	5000 - 6000	1500 - 1850	

Figure 15: Nairobi monthly average temperature and rainfall



The winds over the city are associated with precipitation occasioned by moisture inflow from the Indian Ocean. The prevailing wind directions in Nairobi are mainly easterlies implying that air

pollutants will mainly be transported to the southwest and northwest of the city. This was confirmed by a study undertaken in 2014 which showed a generally easterly flow of pollutants emitted within the city throughout the year. The study also showed that air pollutants are dispersed beyond 100 km within one hour with the least dispersion occurring during the long rain season (Ongoma et al., 2014).

5.1.1 Climate change

From the early 1960s, Kenya has generally experienced increasing temperatures over vast areas. Over inland areas, the trends in both minimum (night-time/early morning) and maximum (daytime) temperatures depict a general warming through time. However, the increase in the minimum temperatures is steeper than in maximum temperatures. The minimum temperature has risen by 0.7 – 2.0oC and the maximum by 0.2 – 1.3°C, depending on the season and region. The combined effect of a steeper increase in minimum temperatures and a less steep increase in maximum temperatures is a lower daily (diurnal) temperature range.

Rainfall is projected to increase with many models indicating an intensification of heavy rainfall especially during the wet seasons, and an associated increased risk of flood. Seasonal rainfall trends are mixed, with some locations indicating increasing trends while others show no significant changes. The annual rainfall totals show either neutral or slightly decreasing trends due to a general decline in the main long rains (March -April-May - MAM) season. Most of the standard seasons also depict the same type of patterns in the highest daily rainfall values observed.

5.1.2 Observed impact of climate change on the urban environment

The destruction of infrastructure including roads and bridges during storms is increasingly becoming a common phenomenon during the El Niño–Southern Oscillation (ENSO) events and causes untold economic loss to the country. In October 2006, torrential rains pounded the eastern part of Kenya causing massive damage to roads, cutting off several of them and washing away bridges. In 2007, brief but also intense rains caused the collapse of the Kainuk Bridge in Rift Valley Province cutting off the supply of crucial goods including foodstuff to the agriculturally unproductive districts of the country (MEMR, 2010).

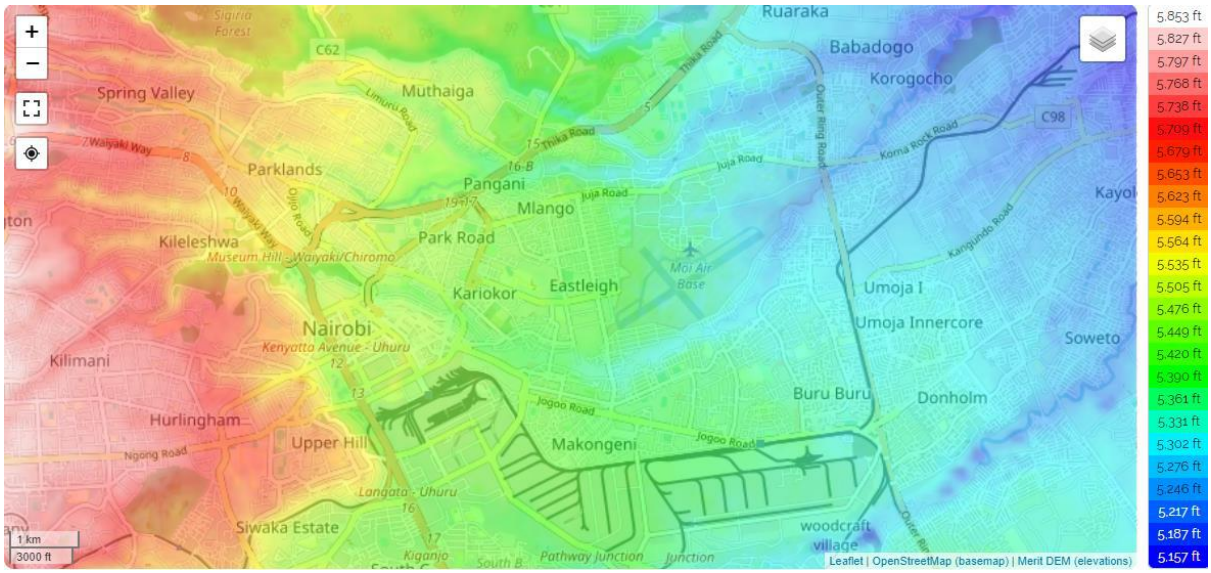
During stakeholder consultations several institutions reported about events attributed to climate change which have resulted in unprecedented floods and significant damage on infrastructure in Nairobi.

It is noted that the occurrence of unprecedented floods and damage to infrastructure indicate worsening of the existing situation – consequently, the Project needs to adopt climate change adaptation measures to ensure that worsening conditions – in particular, associated with drainage – will not put the various structural components of the Project, its operation or passengers at risk.

5.2 Topography

The topography along the BRT route can be described as mainly flat. An exception to this is the westernmost part of the Project route at Upper Hill, where the BRT route descends from Hospitals towards the crossing with Uhuru Highway. The western part of Nairobi is on high ground (approximately 1700–1800 msl) with rugged topography, and the eastern side is generally low (approximately 1600 msl) and flat. The elevation at Dandora Depot (eastern side) and its environs is approximately 1631 above Sea Level and it lies in the catchment of Nairobi River and slopes toward the eastern side.

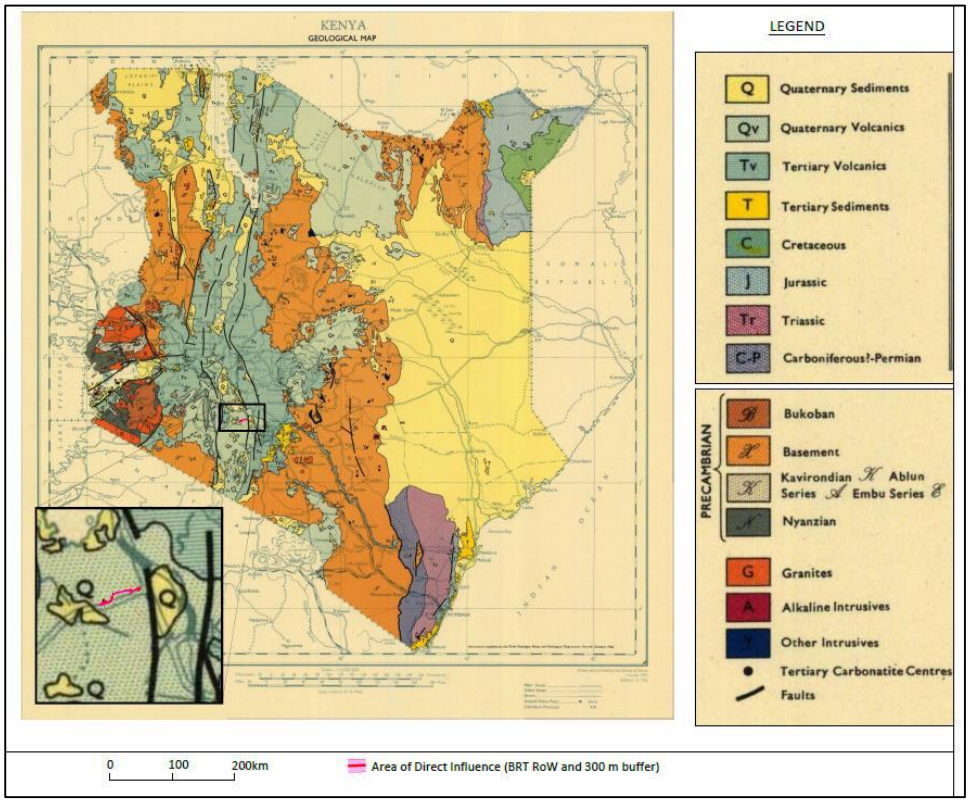
Figure 16: Nairobi Topographical map



5.3 Geology and Soils

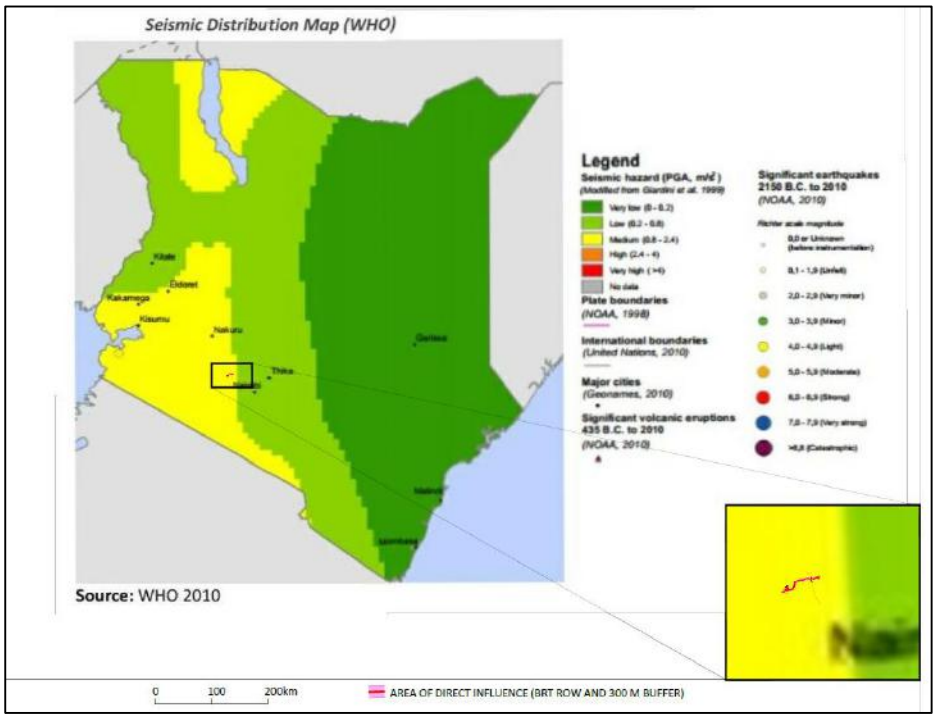
Nairobi is mainly underlain by pyroclastic volcanic rocks that were deposited during the formation of the East African Rift Valley. Some of the volcanic rocks were deposited in aqueous conditions over a long period of time and are intercalated with lacustrine sediments. River valleys and other depressions that existed during the periods of intermittent inactivity were filled with alluvium and clays. At building sites, the alluvium, clays as well as decomposed volcanic tuffs are found to have variable thicknesses and sensitive to moisture. The geology of Dandora area and the neighbouring areas is characterized mainly by a succession of volcanic rocks of Quaternary Volcanics age. Underlying the volcanic rocks is a foundation of folded crystalline metamorphic rocks (gneisses and schists) of Precambrian age. The volcanic rocks are part of a wider East African alkaline suite characterized by a dominance of soda over potash.

Figure 17: Geology map along the study area



Regarding seismic activity in Nairobi falls under medium seismic hazard according with he the Seismic Distribution Map by WHO, 2020.

Figure 18: Seismic map along the study area



5.4 Hydrology and Water Resources

Nairobi sits on a drainage basin between highlands in the northwest and plains east of the city. Its main rivers (from north to south) Mathare, Nairobi and Ngong converge into Nairobi River in the east of the city. Nairobi River itself is a tributary of Athi River which flows into the Indian Ocean. Nairobi's watercourses divide the city as the main roads are generally aligned along these rivers in roughly east-west orientation, while only few roads cross them. This not only divides the city but also contributes to Nairobi's heavy traffic congestions.

Key water supply points mapped during the study include boreholes that are presented in the map Appendix 5.

Along the project area Nairobi River crosses at point (01°16'57.52''S/36°50'0.81''E) along kilometre 0+0.19 to 0+3.00 and (011543.39''S/52'57.76''E) along Kilometre 0+11.0 to 11.5 (see Appendix 5).

Picture 1 and Picture 2: Nairobi River at Starehe Sub County and Nairobi River Bridge along Koma Rock Road (Njiru Sub County)

5.5 Water Quality

With the rapid urbanization and population growth in Nairobi city, a lot has changed in a city that used to be of good environmental health. Following the inadequate handling of waste management, residents do not dispose their solid waste appropriately. As a result, they dump waste randomly within the local environment including near the riverbanks. The rivers are as a result polluted with human waste alongside other domestic sources. Most adverse pollution sources of Nairobi natural waters have been attributed to industrial and agricultural effluents. However, measures and standards have been put in place to ensure that industries treat their effluent before releasing it to the sewers.

The Nairobi River that transverses the project area twice (at Njiru sub-county and Starehe sub-county) is the biggest river in Nairobi and flows through the residential and industrial areas of Nairobi City. It receives and drains untreated and treated discharges of various types. Water from this river is used for agriculture and domestic purposes especially by people living downstream. Piped water

especially at the informal settlements are normally polluted by sewers due to the poor maintenance of the pipes.

The Nairobi water utility Nairobi City Water and Sewerage Company (NCWSC) has put in place water quality monitoring programs to ensure the water they supply the city is safe for drinking. However, due to high leakage in the network and intermittent supply treated water is sometimes re-contaminated before it reaches the tap.

5.6 Noise and Air Quality

5.6.1 Introduction and methodology

Air quality and noise measurements were undertaken along the proposed BRT corridor aiming at establishing the baseline conditions and to allow the impact identification and assessment. The objective of the measurements was to obtain the concentration of both PM2.5, PM10, total suspended particulate (TSP), Ozone (O3), Carbon Monoxide (CO), Volatile Organic Compounds (VOCs), Hydrogen Sulphide (H2S), Sulphur Oxide (SO2) and Nitrogen Oxide (NO2) and sufficient ambient noise data to identify the current noise conditions.

The measurements were carried out at 7 predetermined sampling points along the BRT corridor at the main receptor points. The standards used to evaluate the measured values are derived from EMC (Air Quality) Regulations, 2014 for ambient air quality standards and the Environmental Management and Co-ordination (Noise and Excessive Vibration Pollution Control) Regulations, 2009.

The following approach was used to assess the existing ambient air quality and noise along the proposed BRT corridor:

- Measurement of the ambient air quality and noise at different predetermined points;
- The ambient air quality and noise measurements were carried out on 25th July 2021 at seven sampling points and their GPS coordinates recorded and indicated in the report; and
- The ambient air quality and noise measurements were executed during daylight hours.

Assessment of the ambient conditions was carried out by comparing the measured results with the acceptable limits of EMCA (Air Quality) Regulations, 2014 and the Environmental Management and Co-ordination (Noise and Excessive Vibration Pollution Control) Regulations, 2009. Compiling the findings of the Ambient Air Quality and Noise Assessment in a final report.

The full report is presented in Appendix 7 and a summary of the findings is presented below.

5.6.2 Receptors for air and noise impacts

Off-site receptors for air quality and noise are identified in the map included in Appendix 6.

5.6.3 Monitoring locations

The proposed BRT Core Line 3 is running along Koma Rock Road, Juja Road, Ring Road Ngara, Haile Selassie Avenue and part of Ngong Road in Nairobi County. The sampling points were picked based

on closeness to public utilities, social amenities, human habitation and road junctions. The sampling points are described in Table 15 below. Maps with the sensitive receptors identified and with the monitoring locations for the air quality are presented in Appendix 6 and 7.

Table 15: Description of measurement locations

LOCATION	POINT COORDINATES	DESCRIPTION
MP 1: *Dandora Railway Station*	1°15'26.20"S 36°53'47.58"E	The point is located at the main entrance of Dandora Railways Terminus. Sources of air and noise pollution is mainly from traffic along the Koma Rock Road.
MP 2*: Kariobangi Roundabout*	1°15'44.96"S 36°52'42.98"E	The point is located at the Kariobangi Roundabout towards Juja Road. The main source of pollution is from the traffic and vehicles within the Bus Stage.
MP 3: *Pangani Roundabout*	1°16'13.26"S 36°50'12.38"E	The measurement point is located at the centre of the roundabout. The main source of pollution is from the traffic at the roundabout
MP 4: *New Kariokor Market*	1°16'48.76"S 36°49'58.87"E	This point is located at the boundary wall of the Newly built Kariokor Market. Sources of pollution are mainly from the traffic and human activities around the market and along the Ring Road.
MP 5: *TUK boundary wall*	1°17'27.08"S 36°49'28.84"E	The point is located at the boundary wall of TUK along Haile Selassie Avenue. The main source of pollution is the traffic.
MP 6: Green Park Bus Station wall	1°17'35.67"S 36°49'2.31"E	The point is located at the boundary wall of New Railways Bus Station along Haile Selassie Avenue. The main source of pollution is the traffic.
MP 7: *KNH Junction*	1°17'48.43"S 36°48'28.64"E	The point is located at the Junction of KNH and 5th Ngong Avenue Road. The main source of pollution is the traffic.

5.6.4 Prevailing meteorological conditions at the time of measurement

The prevailing weather conditions during the diurnal measurement period were characterized of South Easterly winds with maximum speed of 7km/h on the Beaufort scale and sky partially covered cumulus clouds with no rainfall during the sampling period.

The nocturnal schedule was too characterized by South Easterly winds with speeds of between 6-10km/h on the Beaufort scale. The sky was fully covered with cumulus clouds to an extent of 07 oktas with temperatures of 22.8°C.

5.6.5 Ambient Air Quality Measurement results

The average summary of Ambient Air Quality Measurement results for particulate matter TSP, PM10, PM2.5 and pollutant gases concentrations have been presented in the tables below.

Particulate Matter Result Analysis

Table 16: TSP, PM10 and PM2.5 Analysis Result

Description	Time	Units	Parameters		
			TSP	PM10	PM2.5
MP 1	24 hours	µg/m³	191.2	150.07	64.73
MP 2			203.43	143.57	65.45
MP 3			132.03	81.57	44.2
MP 4			216.5	135.65	73.85
MP 5			285.43	190.57	103.23
MP 6			92.6	62.5	29.83
MP 7			97.6	70.55	34.12
EMCA (Air Quality Regulations, 2014	**24 hr**	**µg/m³**	**500**	**150**	**75**

From the results analysis for TSP, PM_{10} and $PM_{2.5}$ presented in above; all sampled points recorded concentration within the Environmental Management and Co-ordination (Air Quality) Regulations, 2014 except for PM_{10} and $PM_{2.5}$ concentrations at Sampling point 5 (TUK Boundary wall) which recorded high levels compared to the Environmental Management and Co-ordination (Air Quality) Regulations, 2014.

The result at MP5 was greatly influenced by the busy Haile Selassie Avenue at the time of measurement.

Gaseous Result Analysis

Table 17: O_3, CO, NO_2 H_2S, Total VOCs and SO_2 Analysis Result

Description	Time	Parameters					
		O_3 µg/m³	**NO_2 µg/m³**	**SO2 µg/m³**	**H_2S µg/m³**	**CO g/m³**	**Total VOCs**
MP 1	**24 hours**	37.35	77.41	0.0	48.51	1.41	103.0
MP 2		53.89	63.1	115.35	19.76	2.13	213.29
MP 3		40.14	28.63	8.75	3.6	2.18	192.75
MP 4		30.73	47.54	0.0	4.56	1.47	160.4
MP 5		40.45	24.43	1.69	3.65	1.2	155.65
MP 6		55.73	21.35	0.0	2.91	0.65	130.86
MP 7		49.58	17.61	0.0	5.71	0.64	132.64
EMCA (Air Quality Regulations, 2014	**24 hr**	**120**	**100**	**125**	**150**	**5**	**600**

From the table above the gaseous Concentration results for the O3, CO, NO_2, H_2S, Total VOCs and SO_2 were within the limits of EMC (Air Quality) Regulations, 2014 for all the Sampling points.

Status of Air Quality

From the obtained results, the ambient air quality for the 7 sampling points had their concentration within the Environmental Management and Co-ordination (Air Quality) Regulations, 2014, for all selected monitored parameters except for PM10&2.5 Sampling point 5 (TUK Boundary wall) which recorded high levels compared to the Environmental Management and Co-ordination (Air Quality) Regulations, 2014. The result at MP5 was greatly influenced by the busy Haile Selassie Avenue at the time of measurement.

5.6.6 Noise measurements results

The noise levels ($_{LAeq}$) for each measurement location are presented in the below.

Measurements were undertaken during both diurnal and nocturnal schedule i.e. (day: 06:01 a.m. - 8:00 p.m. (Leq. 14h); night: 8:01p.m.-6:00a.m. (Leq. 10h). The measurement results are expressed as follows:

- Lmax, Maximum sound pressure level obtained during the measurement period
- Lmin, Minimum sound pressure level obtained during the period of measurement
- Leq, Value of A-weighted sound pressure level of a continuous steady sound that, within a specified interval, has the same mean square sound pressure as a sound under consideration whose level varies with time.

Table 18: The results of Diurnal Environmental Noise measurements in dB(A)

Point	LAmin	LAmax	LA 10	LA 50	LA 90	LA peak (Max)	LAeq	EMCA Guidelines (LN. 61 of 2009)	IFC World Bank EHS Guidelines
Point 1	51.1	81.3	70.9	64.7	59.1	106.6	**68.0**	**60**	**70**
Point 2	65.7	95.2	75.3	71.2	68.4	117.7	**74.0**		
Point 3	62.8	91.2	78.0	72.2	67.4	120.5	**75.6**		
Point 4	59.8	87.0	74.8	69.9	65.3	106.1	**72.2**		
Point 5	60.3	88.5	80.3	76.3	71.0	110.3	**77.4**		
Point 6	58.9	78.7	76.6	69.7	64.1	102.5	**70.6**		
Point 7	56.3	92.5	76.5	69.9	62.6	114.5	**74.2**		

The results presented in

Table *18* above shows that all the measured points in the diurnal schedule were above the Environmental management and co-ordination Act (LN. 61 of 2009) and IFC/World bank guidelines except point 1which obtained levels within IFC/World bank guidelines except. The following are the diurnal noise 1/3 octave band measurement history graph logs.

Status of noise levels

All the measured points in the diurnal schedule were above the Environmental Management and Co-ordination Act (LN. 61 of 2009) and IFC/World Bank guidelines except Point 1, which obtained levels within IFC/World bank guidelines.

It is recommended that the monitoring of both air quality and noise during the construction of the BRT Core Line 3 Project is continued to ascertain the deviation from ambient values.

6 ECOLOGICAL ENVIRONMENT BASELINE

6.1 Ecosystem

The ecosystem of the project area is in harmony with that of the larger Nairobi's built environment, which is represented by modified habitats (novel ecosystem) but presence of restricted pockets of natural habitats present opportunity to trace back the originally naturally occurring vegetation (Somali – Masai *Acacia – Commiphora vegetation*), particularly within the protected areas.

Using the physiognomic characteristics, White (1983[1]) classified naturally occurring vegetation in Africa into 17 major vegetation types in 5 categories. Nairobi lies within the Somali - Masai *Acacia – Commiphora* deciduous woodland/shrubland and thickets. The vegetation comprises of dense shrub lands with height ranging between 3 and 5m but with scattered emergent trees of over 9m. The vegetation in this ecoregion is influenced by climatic and edaphic conditions.

Nairobi is mainly a novel ecosystem except the protected Nairobi National Park. The park presents remnant vegetation from which original natural types for the larger County can be traced back. The patterns generated connect with other scattered pockets of natural vegetation in the outskirts of Nairobi which present the remnant patches of the southern *Acacia-Commiphora* Association. This vegetation association formed the expansive cover of the natural vegetation spreading through the east into Nairobi National Park to Kajiado County, west up to the Oldonyo Sabuk National Park and southwards into the Tsavo National Park. The southern *Acacia-Commiphora* is part of the Somalia-Masai **Acacia-Commiphora** deciduous bushland and thicket which is part of the savanna systems that occupy about 40% of the land area in Africa. This vegetation association is characteristic of lowland dryland areas.

According to the Eco-climatic zoning by Pratt and Gwynne (1977[2]), Nairobi lies within Zone III classified as moist grass and woodland savannah with high potential for agro-pastoralism and an average annual rainfall of more than 600 mm. The zoning generated six categories by analysing natural habitats and vegetation in relation to climate across Eastern Africa.

Human presence and intensity of land use along project corridor has resulted in modified environments and insignificant natural habitats. Vegetation succession and colonizer species have established due to a range of factors: vegetation clearance, infrastructure development and introduction/invasion of non-native species. Levels of ambient pollution within Nairobi are also a contributing factor to the loss of native and colonization by non-native species especially along the riparian courses. Efforts to landscape with non-indigenous ornamental or the establishment of single species plantation within privately owned lands and public open spaces has also contributed to species succession within the project corridor:

[1] White, F. 1983. *The vegetation of Africa, a descriptive memoir to accompany the UNESCO/AETFAT/UNSO Vegetation Map of Africa*. UNESCO, Paris.

[2] Pratt, D. J. and Gwynne, M. D., (eds) 1977: *Rangeland management and ecology in East Africa*. London: Hodder and Stoughton.

Table 19: Overview of the project DAA and DAI Flora

Project Area	Species Observed	Vegetation Mix
Haile Selassie Avenue	*Eucalyptus globulus, Jacaranda mimosifolia,* Senna *siamea, Croton megalocarpus, Olea africana,* Sabal palmetto (palm trees) and *Lantana camara.*	Exotic tree species planted for landscaping and soil stabilization. *L. camara* is a shrub identified as invasive by IUCN's ISSG. *Eucalyptus* spp. remains controversial regarding soil dehydration and invasive nature.
Kenyatta National Hospital (along Ngong Road)	*Ricinus communis, Milicia excels, Cupressus lusitanica, Euphorbia canariensis, Grevillea robusta, Casuarina equisetifolia* and *Pinus strobus.*	Exotic tree and shrub planted for landscaping. *R. communis* is a colonizer weedy species with potential of succeeding in abandoned disturbed sites.
Kariokor (along Ring Road Ngara)	*Senna siamea, Grevillea robusta, Casuarina equisetifolia* and *Pinus strobus.*	Comprise of landscaping species. *Callistemon* spp. and *G. robusta* are known to flower and attract pollinators and nectar sipping animals especially bees and sunbirds. Nonetheless, *G. robusta* is listed by the IUCN's ISSG as an invasive species[3].
Dandora (Koma Rock Road)	Citrinus (pink flower), Pine, Kim star tree, *Melaleuca citrina, Callistemon citrinus* and *Cercis Canadensis.*	

Natural causes such as climate change driven desertification has not only led to vegetation succession but also increased bare surfaces; although this is a global phenomenon.

In the absence of the proposed Project, the loss of native plant species characterising the primary natural vegetation association will persist unless conservation and restoration interventions are undertaken. The recovery of such vegetation association is highly unlikely since the project area is within a built environment and most land uses may not reconcile with the realities of the required conservation and restoration measures.

3 ISSG: website http://www.iucngisd.org/gisd/search.php

6.1 Floral Species

A list of floral species identified along the project corridor is presented in the table below.

Table 20: Floral Species Present on the DAA and DAI

Common Name	Scientific Name	Locations Observed
Tasmanian Blue Gum	*Eucalyptus globulus*	Along Nairobi River, Korogocho, Haile Selassie Avenue, Railway Kenya Golf Club, Kenyatta National Hospital (along Ngong Road)
Castor oil Plant	*Ricinus communis*	Rail Crossway, mowlem
Croton	*Croton megalocarpus*	Haile Selassie Avenue
Blackwood Cassia	*Senna siamea*	Haile Selassie Avenue, Kenyatta National Hospital (along Ngong Road), Kariokor (along Ring Road Ngara)
African olive	*Olea africana*	Haile Selassie Avenue
Curse of India	*Lantana camara*	Haile Selassie Avenue
Sabal palmetto (palm trees)		Haile Selassie Avenue
Silky Oak	*Grevillea robusta*	Kenyatta National Hospital (along Ngong Road), Kariokor (along Ring Road Ngara)
Desert Cactus	*Euphorbia canariensis*	Kenyatta National Hospital (along Ngong Road)
Mexican Cypress	*Cupressus lusitanica*	Kenyatta National Hospital (along Ngong Road)
Milicia	*Milicia excelsa*	Kenyatta National Hospital (along Ngong Road)
Brazilian Rosewood	*Jacaranda mimosifolia*	Haile Selassie Avenue, Huruma (along Juja Road)
Cold hardy palm trees		Kariokor (along Ring Road Ngara)
Whistling Pine	*Casuarina equisetifolia*	Kenyatta National Hospital (along Ngong Road), Kariokor (along Ring Road Ngara)
Eastern White Pine	*Pinus strobus*	Kenyatta National Hospital (along Ngong Road), Kariokor (along Ring Road Ngara)
Eastern Redbud	*Cercis canadensis*	Dandora Railway Station
Crimson Bottlebrush	*Callistemon citrinus*	Haile Selassie Avenue, Dandora Railway Station
Lemon bottlebrush	*Melaleuca citrina*	Dandora
Kim star tree		Dandora
Pine		Dandora
Citrinus (pink flower)		Haile Selassie Avenue

Among the listed, species *R. communis, G. robusta* and *L. camara* have been listed by the Invasive Species Specialist Group (ISSG) of the Species Survival Commission (SSC) of the International Union for Conservation of Nature (IUCN) as globally invasive species threatening ecosystems.

6.2 Avifauna

About 19 species of birds in 13 Families were observed, see Table below. All the species were listed by the IUCN Red list as least concern thus not under any conservation threat.

Two migrant species that is African Pipit and Black Kite were among the observed.

The House sparrow is listed by the ISSG of the SSC of the IUCN as an invasive species.

Table 21: Fauna Species Present on the DAA and DAI

COMMON NAME	SCIENTIFIC NAME	FAMILY	OBSERVATION LOCATION	OBSERVED ACTIVITY	CONSERVATION STATUS	INVASIVE / MIGRANT STATUS
African pipit	*Anthus cinnamomeus*	Motacillidae	Canaan (rail)	Foraging and flying	Least Concern	M- Migrant
Speckled mouse bird	*Colius striatus*	Coliidae	James Gichuru Primary and Haile Selassie Avenue, Uhuru Park	Foraging	Least Concern	
House sparrow	*Passer domesticus*	Passeridae	Railway Station, Korogocho, Nairobi River and Kariokor	Foraging	Least Concern	Invasive species
Speke's weaver	*Ploceus spekei*	Ploceidae	Railway cross way and Mowlem	Building nest	Least Concern	
Ring necked dove	*Streptopelia capicola*	Columbidae	James Gichuru Primary School	Flying	Least Concern	
Black kite	*Milvus migrans*	Accipitridae	Railway station, Haile Selassie, Uhuru Park, Kenyatta National Hospital and Kariokor	Foraging and resting, flying	Least Concern	Afro-tropical Migrant
marabou stork	*Leptoptilos crumenifer*	Ciconiidae	Dandora Dump site, Haile Selassie Avenue, Uhuru Park, Dandora Dump Site	Feeding and Resting	Least Concern	
Hadada ibis	*Bostrychia hagedash*	Threskiornithidae	Rail crossway and Mowlem	Resting	Least Concern	

COMMON NAME	SCIENTIFIC NAME	FAMILY	OBSERVATION LOCATION	OBSERVED ACTIVITY	CONSERVATION STATUS	INVASIVE / MIGRANT STATUS
Sacred ibis	*Threskiornis aethiopicus*	Threskiornithidae	Rail Crossway	Resting	Least Concern	
Little egret	*Egretta garzetta*	Ardeidae	Rail crossway Mowlem and Nairobi River	Foraging	Least Concern	
Stray dogs			Korogocho, Nairobi River	Moving		
Common bulbul	*Pycnonotus barbatus*	Pycnonotidae	Uhuru Park	Foraging	Least Concern	
White browed Sparrow weaver	*Plocepasser mahali*	Ploceidae	Uhuru Park and Kenyatta National Hospital	Building nest and Resting	Least Concern	
Pied crow	*Corvus albus*	Corvidae	Haile Selassie Avenue and Kariokor	Flying	Least Concern	
Superb starling	*Lamprotornis superbus*	Sturnidae	Kenyatta Hospital	Feeding	Least Concern	
African Pied Wagtail	*Motacilla aguimp*	Motacillidae	Kenyatta National Hospital	Resting	Least Concern	
Olive thrush	*Turdus olivaceus*	Turdidae	Haile Selassie Avenue	Feeding	Least Concern	

A mole rat was also observed within the project area. This is an invasive species and indicative of degradation in the area.

6.3 Lessons on Urban Conservation Experiences Related to Road Developments

6.3.1 Creation of New Nesting/Roosting Colony Sites

Expansion of corridors will introduce massive structures such as grade separations and landscaping works [by planting vegetation to restore ecosystem services]. The bottom side of a bridge deck for a grade separation may be an attraction for roosting/nesting colonies of bats or birds (swifts/swallows). Such cooperative breeding behavior and colonies may bloom into thousands of individuals which create a spectacle to motorists driving through. Curious motorists may pose road safety concerns. Moreover, droppings and nesting materials falling off the broods to the road may be unhygienic and potential for spread of zoonotics.

Palm (among other tree species) in built areas have also been attracted nest colonies of birds and bats. For instance, mature palm trees plated during the vegetation restoration along the Uhuru Highway (near Laico Regency) have seasonal stoppage and roosting site for over 6,000 individuals of migrating straw-coloured fruit bats (*Eidolon helvum*) classified as Near Threatened under the IUCN list of endangered species and in Appendix II of the Conservation of Migratory Species (CMS)[4]. Nevertheless, the proximity to the Five Star Hotel (Laico Regency), the hotel management are concerned of possible hygiene problems. Research missions by the NMK Mammalogy Section have addressed the concerns of Laico. Other brood colony forming bat species found in Nairobi is the epauletted fruit bat (*Epomophorus wahlbergi*).

In Kenya, the Kenya Wildlife Service is mandated to undertake wildlife translocation.

Spread of Invasive/Alien Species

There already exists invasive/alien species within the project corridor:

R. communis natural origin is traced in some parts of East Africa (the Ethiopian region). The plant initially under cultivation, escaped the cultivation fields and has now become a weed and colonizer in the wild. **Mechanical control:** Cutting down stumps and applying herbicides as well as uprooting seedlings.

L. camara was introduced in Kenya in 1930s and has allelopathic capacity by releasing certain allelochemicals that inhibit other plants. **Mechanical control**: Stickraking, bulldozing, ploughing and grubbing. Re-vegetation of a treated site by planting trees or encouraging naturally occurring seedlings is recommended as a post control measure.

Enhancement of the threat of invasive species during project implementation occurs by:

[4] Kenya Bats Conservation Network (KenBAT) website: https://kenbats.wordpress.com/2017/ straw-coloured-fruit-bats-in-nairobi-city-amazing/

- Re-use of contaminated equipment and machinery from another construction site has potential of introducing / increasing spread of invasive propagules;
- Excavation and material borrowing from contaminated areas for use in the construction works;
- Improper handling or disposal of uprooted or cleared plant material that have invasive propagules leading to translocation.

6.3.2 Waste disposal and scavenging species

After construction, neglected areas such as floors underneath bridge decks that are lowly illuminated, moistened and used for clandestine waste damping of litter may attract scavenging rodents and vermin which become a hygiene nuisance and potential for spread of zoonotic.

While native *Acacia xanthophloea* form suitable restoration and soil stabilization species; those planted too close to the Road can present unnecessary nuisances to motorists. For instance, along Uhuru Highway (near Nyayo Stadium) and Harry Thuku Road (Near University of Nairobi), ibis (Sacred and Hadada) as well as Marabou Storks roost in colonies posing nuisance to motorists. Droppings from the roosting birds soil vehicle screens and the road. Mitigation measures applied include trimming of branches extending to the road.

7 SOCIO-ECONOMIC ENVIRONMENT BASELINE

7.1 Methodology

For the definition of the baseline socio-economic environment, we will present data sourced from the following documents:

- Nairobi Census 2019;
- Socio-Economic Baseline Survey developed in 2016 and updated in 2017 for the BRT – line 3 project with the following principles:
  - The census and inventory of losses was conducted on all of the potentially affected households;
  - The socio-economic survey was conducted on a sample of households in the project area.

7.1 Project location

The project analysed in this ESIA is located in the Nairobi County and the area of indirect influence include the sub counties of Westlands, Starehe, Kasarani, Njiru, Embakasi, Makadara, Dagoreti and Kamukunji as shown in the figures below.

Figure 19: Location of the project

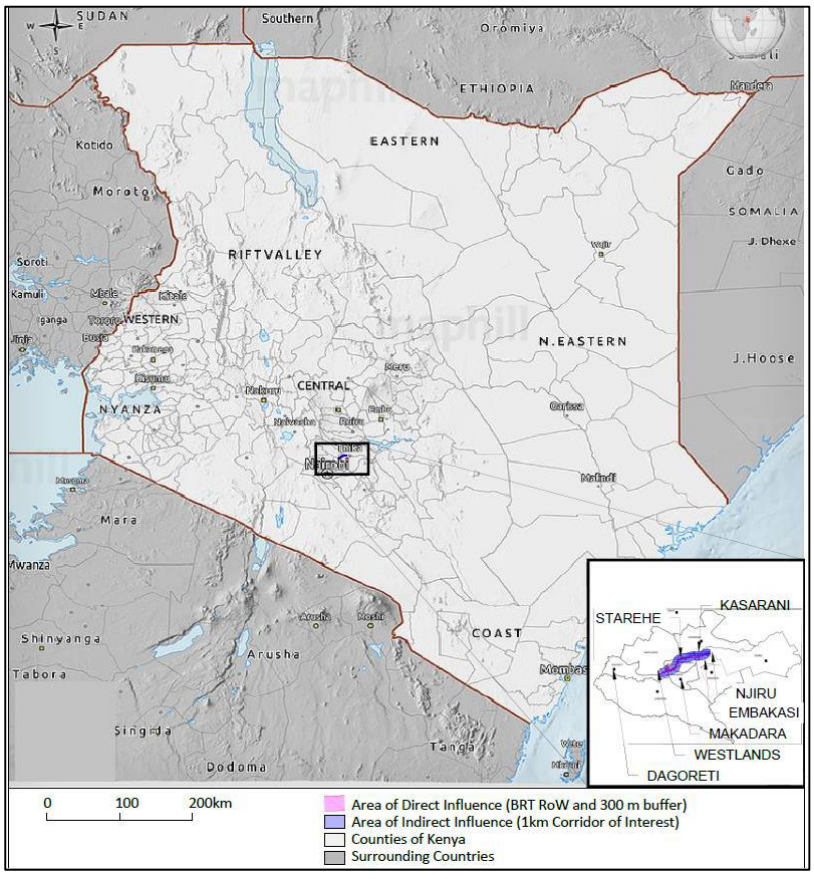
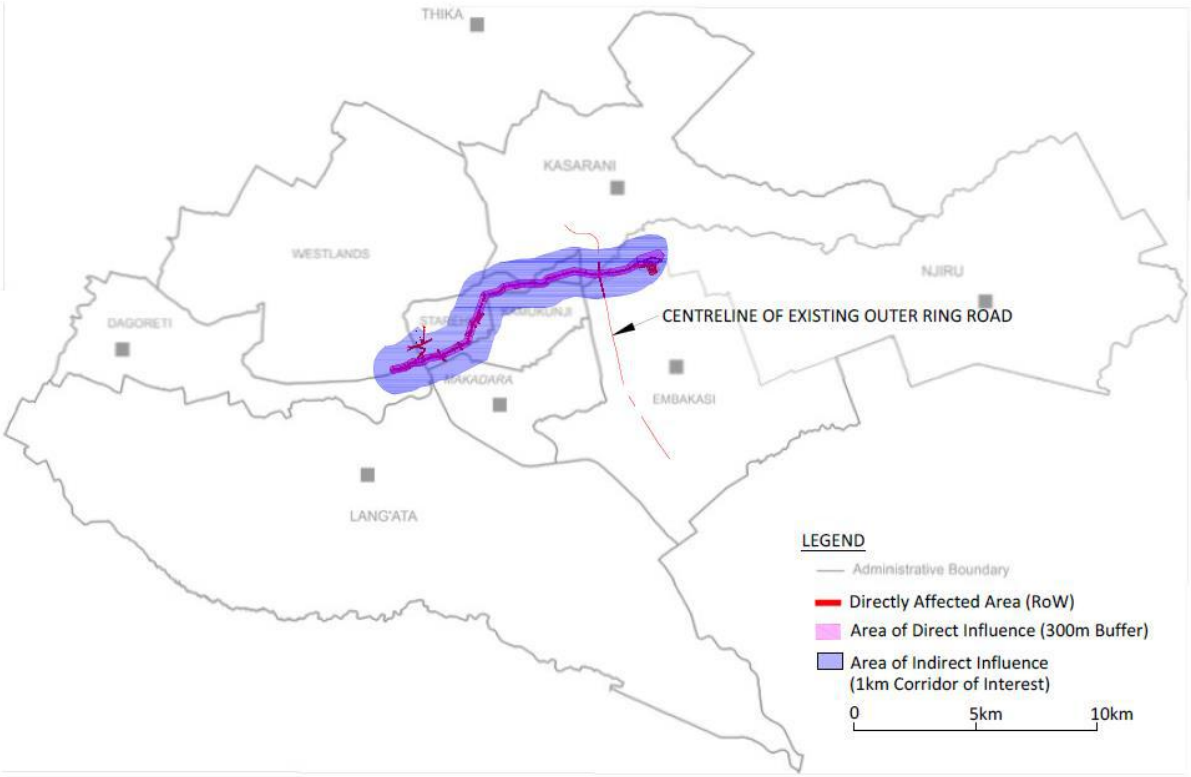


Figure 20: Affected sub counties



7.2 Population & Demographics

According to the population census 2019, the population of Kenya was reported to be 47.5 million in 2019, compared to 28.7 million in 1999, 21.4 million in 1989 and 15.3 million 1979. This is an increase by a factor of 3.1 over 40 years. Based on the projections of the latest UN data, the population of Kenya has reached 55.4 million in 2021.

Similarly, as the Census, Nairobi had a population of 3.62 million citizens representing 8.1% of the national population (3,618,293 citizens in 2009). Nairobi has experienced one of the highest growth rates of any city in Africa. Since its foundation in 1899, Nairobi has grown to become the second largest city in the African Great Lakes, despite being one of youngest cities in the region.

Regarding the project affected sub-counties the population is as follows:

Table 22: Distribution of Population, Number of Households and Average Household Size by Sub-County

County/subcounty	Population	Number of households	Average Household size	% of Population in relation to Nairobi County
Nairobi	4,337,080	1,506,888	2.9	-
Starehe	194,726	69,389	2.8	4,49
Kasarani	772,586	271,290	2.8	17,81
Njiru	623,471	204,563	3.0	14,38
Embakasi	983,232	347,955	2.8	22,67
Makadara	188,792	70,361	2.7	4,35
Dagoreti	432,331	155,089	2.8	9,97
Kamukunji	263,462	84,365	3.1	6,07
Westlands	301,295	104,980	2.9	6,95

We can see that the Kasarani, Njiru and Embakasi contain the biggest percentage of population in relation to Nairobi County.

Regarding the distribution of this population per gender and land area this is the following:

Table 23: Distribution of Population by Sex and Sub-County

County/subcounty	Male	Female	Intersex
Nairobi	2,192,452	2,204,376	245
Starehe	109,173	101,238	12
Kasarani	381,234	399,385	37
Njiru	307,642	318,809	31
Embakasi	492,476	496,270	62
Makadara	96,369	93,157	10
Dagoreti	217,651	216,526	31
Kamukunji	136,670	131,599	7
Westlands	153,818	155,021	15

Table 24: Distribution of population by land area and population density by Sub-County

County/subcounty	Population	Land Area (Km^2)	Population Density (No. per Sq. Km)
Nairobi	4,337,080	703.9	6,161.5
Starehe	194,726	20.6	9,452.7
Kasarani	772,586	86.2	8,962.7
Njiru	623,471	129.9	4,799.6
Embakasi	983,232	86.3	11,393.2
Makadara	188,792	11.7	16136,1
Dagoreti	432,331	29.1	14,856.7
Kamukunji	263,462	10.5	25,091.6
Westlands	308,854	97.5	3,167

Source: Exploring the Spatial Distribution of PLWA in Nairobi City

According to the census and the Socio-Economic Baseline Survey developed, the area of indirect influence had 2.152.724 persons in 2016.

7.3 Education

The literacy rate is high in the project area: 98% are reported literate (Table 25) while the illiterate population is only 2%. Ultimately an outcome of government policy is to expand access to all levels of education system, with a special emphasis placed on secondary education because it directly benefits the poor. The respondents with primary (5 years of schooling) education are 31%,

secondary are 44%, diploma holders are 14%, graduates are 06% and the proportion of the population with a Master's degree is 8%.

Table 25: Education level of households

Educational Level	Project Area	
	No. of respondents	Percent
Illiterate	6	02
Primary	93	31
Secondary	133	44
Diploma	42	14
Graduate	18	06
Master	08	03
Total	**300**	**100**

Almost 47% children are enrolled in primary classes, 24% in secondary, while 14% and 15% have been enrolled in graduation and master level study. The surveyed respondents advised the survey team that a child begins school at the age of 3 and continues to the age 20 whereupon full time employment is then sought.

7.4 Occupation/Employment

Nairobi commands the largest share of the formal sector wage employment in Kenya. The manufacturing industry accounts for the highest wage employment followed by trade, restaurants and hotels. The construction, transport and communications industry also play key role in generation of wage employment. Other important sectors include finance, real estate and business services. The main formal employment zones in Nairobi are the Central Business District (CBD), Industrial areas along Mombasa Road, Thika Road and Dandora.

A large segment of the labour force in Nairobi is self-employed largely in the informal sector with 1,548,100 being employed in this sector. This is about 3.5 times those in wage employment. The informal sector covers small scale activities that are semi-organized, unregulated and uses low and simple technologies while employing few people per establishment.

The ease of entry and exit into the informal sector, coupled with the use of low level of technology at all makes it easy avenue for employment creation especially for the youth.

The level of unemployment in Nairobi stands at 14.70 per cent with the female unemployment rate standing at 18.99 per cent while that of males is 11.55 per cent.

Employment is a major source of income and an important determinant of social and economic outcomes. Holding all other factors constant, households that are most affected by unemployment are more often poor households. Urban poverty and labour force participation are strongly related because earnings in the labour market are the main source of income for urban dwellers. However, participation in the labour market does not guarantee being above the poverty line.

The "working poor" account for a substantial proportion of all the poor in Nairobi. This reflects in part the fact that the poor are employed in low productivity industries, including the informal sector.

Numerous income generating activities are practiced in the project area. These include employment in government and private sector, operating own business such as running fuel stations, auto workshops, shopkeepers, traders, chemist, technicians, plumbers, drivers and transporters. The detail is reflected in Table 25 and suggests that most (61%) of the respondents are affiliated with the businessmen profession, followed the 15% employed in government and 4% in the private sector.

The survey also reveals that 11% of the respondents are self-employed and in addition to managing the shop related to their skill, are also providing their services at the "door step" of the local community. However, the remaining 9% of the respondents are involved with the driving and labour work. These latter workers are mostly low paid workers.

Table 26: Occupation in the project area

S #	Occupation	No. of Respondents	Percentage (%)
1	Businessmen	112	61
2	Self Employed (technicians, mechanic, carpenter & plumber, …)	21	11
3	Employee in Government	28	15
4	Employee in private sector	07	4
5	Labourers	07	4
6	Drivers	10	5
TOTAL		**185**	**100**

Almost 71% of the people are employed while 29% are reported unemployed. The unemployment rate in the project area is high as compared to average (1999 – 2011) national unemployment rate which stands at 22.3 percent (KNBS, 2019). However, 70 per cent of the employed are under paid and hence unable to take care of day-to-day needs.

7.5 Household Income

The survey data presented in Table 27 shows that the average monthly income is approximately KES 25,637. In terms of income distribution practices, the majority (48%) of the respondents are earning above KES 25,000. followed by 36% respondents with their monthly income ranging between KES 10,001 – KES 25,000. Contrary to this, only 2% are falling in the low-income category with their meagre monthly income up to KES 5,000 and other 14% of the respondents are earning up to KES 10,000/- per month. These 16% of the respondents (falling in 1st two income (low) categories), have no regular income and simply survive from hand to mouth to meet their daily expenses on food and non-food items.

Table 27: Monthly household income level – Project area

Income level (KES)	Monthly Household Income (No)	Monthly Household Income (%)
5,000 and below	04	02
5,001 – 10,000	24	14
10,001 – 25,000	62	36
Above 25,000	82	48
TOTAL	172	100

7.6 Household expenditure

Field investigations revealed the average monthly expenditure of the respondents is KES 14,546 - Table 28. From the expenditure distribution perspective, 17% of the respondents are spending more than KES 25,000 to meet their day-to-day food requirements. Notably, the people with high income have more saving capacity compared to low income.

Table 28: Monthly household expenditure level – Project area

Expenditure level (KES)	Monthly Household Income (No)	Monthly Household Income (%)
5,000 and below	25	15
5,001 – 10,000	61	35
10,001 – 25,000	57	33
Above 25,000	29	17
TOTAL	**172**	**100**

7.7 Housing types

Materials used in the construction of dwelling units are an indicator of housing conditions and the extent to which they protect occupants from the elements and other environmental hazards. Availability of materials, costs, weather and cultural conditions have a major influence on the type of materials used in different localities.

The housing type by wall materials in Nairobi County is mainly characterized by stone, brick/block, mud/wood and corrugated iron sheet. The stone and block walled houses account for 65.9 per cent while wood and corrugated iron sheet account for 31.1 per cent.

The classification by floor type indicates that 75.8 per cent of household have cement floor, 14.2 per cent earthen floor, 7.5 per cent tiles and 2.2 per cent for those with wooden floor. Most of the households in Nairobi have corrugated iron sheet roofed houses which accounts for 56.6 per cent.

Tiles and concrete roofs account for 12.4 per cent and 27.9 per cent respectively.

7.8 Vulnerable population

The word vulnerability stems from the Latin verb vulnerare, which means to wound. In the context of human subject's research individuals or groups are vulnerable if they are unable fully and independently to protect their own interests, either due to intrinsic characteristics (e.g., age or immaturity), or circumstances (e.g., illness, incarceration, or poverty). The presence of vulnerable population is 2.4% of the total surveyed households in the project area. The vulnerable includes on widows, physically handicapped persons, mentally retarded persons and orphans, as reflected in Table 29.

Table 29: Detail of vulnerable population

Population	%
Widow	0.11
Mentally Retarded Person	0.32
Physically Disabled Persons	1.2
Orphans	0.77

Additionally, 270 households are assessed as vulnerable from the project area owing to having low-income level. They are hard core poor households, and their income is below the poverty level, i.e., government fixed minimum wage rate of the labour (KES 13000).

7.9 Infrastructure & Services

The main sources of energy in Nairobi County are electricity, solar, LPG, biogas paraffin, charcoal and firewood. Lack of access to clean sources of energy is a major impediment to development through health-related complications such as increased respiratory infections and air pollution. The

type of cooking fuel used by households is related to the socio-economic status of households/individuals.

A map presenting the affected infrastructure and services in presented in Appendix 8.

High level energy sources are cleaner but cost more and are used by households with higher levels of income compared with simpler sources of fuel, mainly firewood, which are mainly used by households with a lower socio-economic profile. For instance, 63.2 per cent of the population use paraffin as cooking fuel. Other sources of energy for cooking include LPG gas (20.2per cent), charcoal (10.5 per cent) and firewood (1.8 per cent). About 68.2 per cent of households use electricity as a means of lighting 28.8 per cent use paraffin while 2.9 per cent and 1.7 per cent use grass and dry cells respectively.

Access to safe water and sanitation is essential for health, security, livelihood, and quality of life, and is especially critical for women and children. Improved water supply and sanitation could thus provide a wide range of benefits like longer lifespan, reduced morbidity and mortality from various diseases, and low health costs, (Evans 2005). However, the available existing structure in the project area is discussed as under in Table 30.

Table 30: Access to social amenities in the Project area

S #	Social amenities	Available	No access	Satisfaction level
1	Electricity	99%	01%	91%
2	LPG	39%	61%	61%
3	Water Supply	85%	15%	75%
4	Sewerage/Drainage	86%	14%	77%
5	Hospital	100%	100	81%
6	School	100%	100	73%

This table indicates that a significant majority of the households in the project area have the basic infrastructure facilities. We can see that 99% of the houses are electrified, 85% have water supply, 86% of the houses are linked up with the sewerage and drainage system, while almost all have access to hospital and educational infrastructure. 39% of the households use LPG for cooking.

In relation to housing conditions, the respondents generally felt that basic infrastructure was being provided. However, there was a significant level of dissatisfaction in relation to power failures, lack of clean drinking water, sewerage and general drainage conditions. Site visits along the alignment revealed significant problems with drainage and solid waste pollution. This supports the view of residents surveyed that public utilities are in need of improvement. The households also complained of the poor service available in the government hospital. Doctors and medicines are hardly available; hence the people are compelled to go to private practitioners for their treatment. In addition, 27% of the respondents are not satisfied with the existing education system in terms of limited staff

(teacher) strength as compared to the number of the students, i.e., on average one teacher is available for 50 students.

7.10 Transport

The current road network in the County is inadequate in terms of coverage to meet current and future demands as envisaged in the Vision 2030. There is heavy congestion on most of the city roads especially during the morning and evening peak hours. The total road network covers 3602 Km out of which 1735Km are tarmac road while 1867 Km are earth roads. The current poor state of road network is a great impediment to socio-economic growth leading to high production costs and low productivity. The completion the Elevated Expressway from the airport to Westlands, the Thika Super Highway, by-passes and missing links within the County will help in reducing traffic congestion.

Nairobi County hosts 3 airports; Jomo Kenyatta International Airport, Wilson Airport and Eastleigh Airport. Jomo Kenyatta International Airport (JKIA) is the biggest Airport in East and Central Africa and is the focal point for major aviation activity in the region. Its importance as an aviation Centre makes it the pacesetter for other airports in the region. JKIA, located 18 kilometers to the East of Nairobi City centre, is served by 49 scheduled airlines. JKIA has direct flight connections to Europe, the Middle East, Far East and the rest of Africa. JKIA has five cargo facilities with a capacity to handle 200,000 tonnes of cargo annually, and an animal holding facility which occupies 4,318.95 square feet. The Airport has a runway measuring 4,117m long and 45m wide on 4,472.2 ha of land.

Wilson Airport is the second airport in the County. It has two runways one that is 1,463m long and 24m wide while the other is 1,558m by 24m with displaced threshold giving a landing distance of 1,350m.

The County has a railway network of 75Km and a total of 15 functional railway stations which are: Embakasi, Makadara, and Nairobi main terminal, Dandora, Githurai, Kahawa, Kibera, Dagoretti, JKIA and Syokimau. The establishment of Makadara and Imara Daima railway stations and expansion of the Nairobi platform will help to improve public transportation in Nairobi for socio-economic development.

7.11 Traffic Surveys

Transport in Nairobi comprises of both non-motorised (NMT) and motorised means, including, Cars, Pick-Up, Matatu, Small Bus, Large Bus, Light Good Vehicles (LGV), Medium Goods Vehicles (MGV), and Heavy Goods Vehicles (HGV).

Classified Direction-wise Traffic Volume surveys have been conducted in the context of the project, and traffic volumes have been obtained from traffic counts carried out during the period 12th September 2015 to 15th September 2015 –period includes a weekend – between 0500 and 2200 hrs. The counts were undertaken simultaneously at 18 locations including Ngong Road (Kenyatta Hospital) and Juja Road (Pangani Girls School) at 15-minute time interval. To obtain a conversion to daily traffic along each corridor the sites on Ngong Road, Haile Selassie Road and Juja Road were counted over a 24-hour period.

Several transport surveys have been carried out in the context of the present project, including Transport Survey 7 – Origin and Destination and Opinion Survey. This survey led to the information that, along Line 3, 95.7% of the people surveyed would use a new BRT system.

7.12 Present Traffic Volumes

The following table provides the total daily traffic at Kenyatta Hospital followed by Table 32 to Table 34 that provides the composition of this traffic.

Table 31: Total Daily Traffic Ngong Road (Kenyatta Hospital)

Direction	Total Daily Flow	Total Buses	% Buses
Eastbound	14,248	3,602	25.3
Westbound	14,466	3,565	24.6
Total	28,714	7,167	25 (average)

Table 32: Mode composition (%) of Vehicular Traffic on Ngong Road (Kenyatta Hospital)

Transport	% of vehicles
M/C	7.6
Tuk	0.2
Car	39.5
Large Car	20.5
Pick-Up	3.5
Matatu	12.9
Small Bus	13.5
Large Bus	0.9
LGV	0.5
MGV	0.5
HGV	0.2
Artic	0.1
Other	0.1

Table 33: Total Daily Traffic Juja Road (Pangani Girls School)

Direction	Total Daily Flow	Total Buses	% Buses

Eastbound	10,148	4,483	44,2
Westbound	13,125	4,710	35.9
Total	23,273	9,331	45.0 (average)

Table 34: Mode split (%) of Vehicular Traffic on Juja Road (Pangani Girls School)

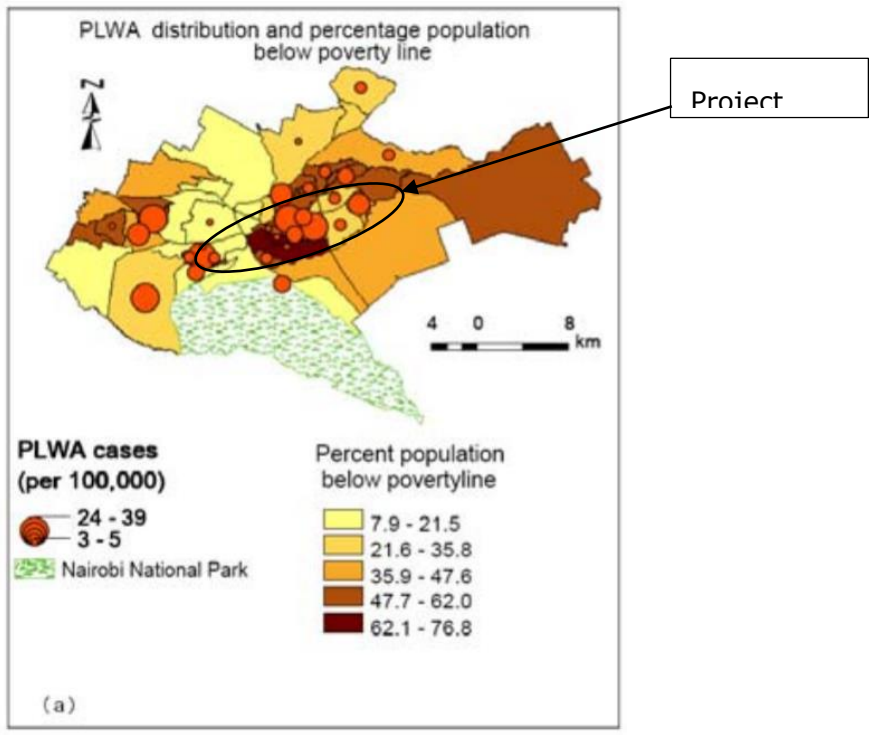
Transport	% of vehicles
M/C	8.0
Tuk	0.2
Car	37.3
Large Car	8.6
Pick-Up	2.9
Matatu	11.4
Small Bus	26.8
Large Bus	1.5
LGV	1.2
MGV	1.5
HGV	0.6
Artic	0.1
Other	0.0

7.13 Socio-economic differences

Analysing the mode of transport, the number of personal vehicles decrease along the eastern section of the BRT corridor and the number of buses increase. This is the result of prevailing social differences along the proposed BRT route, i.e., there is a higher percentage of middle/ upper class in the western part compared to a higher percentage of poorer sub-counties in the eastern part, including several slums served by the buses.

This is corroborated by a study developed in 2015 that explored the Spatial Distribution of PLWA (people living with Aids) in Nairobi City and that referred the following regarding the persons below poverty line:

Figure 21: Percentage of population below urban poverty line in Nairobi



Source: Exploring the Spatial Distribution of PLWA in Nairobi City, Moses Murimi NGIGI, 2015

In this figure we can see the differences between the project locations in terms of percentage of persons living under the poverty line, the east is (especially sub-county Westland has a higher income area that decreases when we reach the west part of the project (sub-counties Kasarani, Njiru, Makadara).

7.14 Information, communication and technology

Posts and telecommunication sub-sector have experienced mixed growth in the recent past. While the County has 38 post office branches, the growth of postal services has been declining due to an increase in mobile telephony. Mobile telephony has the highest coverage in Nairobi compared to other parts of the country with over 95% of the inhabitants having access to mobile communication. The players engaged in mobile telecommunication include: Safaricom, Orange, Airtel and YU while those in mailing services include Kenya Postal Corporation, Group 4 Securities (G4S), Direct Handling Limited (DHL), Wells Fargo among others.

7.15 Crop, Livestock production and value addition

Food production and value addition is one component of urban agriculture in Nairobi that addresses food and nutrition insecurity in addition to supplementing household incomes.

Most of the production is to a large extent small-scale, market oriented and subsistence farming where farmers have small portions of land. Horticulture farming takes lead in crop production in the

county. The main vegetables grown include tomatoes, kales, spinach, cabbage, local vegetables, onions, capsicum and carrots. Fruits grown include passion fruits, mangoes, bananas and avocado. Several varieties of herbs and spices are also grown. Cut flowers are also grown, especially in Langata Sub County.

The main food crops grown are maize, beans and Irish potatoes on small scale basis especially in peri-urban Sub-counties of Dagoretti South, Langata, Westlands, Kasarani and Roysambu. The crops are grown for both household consumption and for commercial purposes.

7.15.1 Tourism and wildlife

Nairobi County is a major centre of tourism in the region. Its relative proximity to many tourist attractions both in Kenya and East Africa makes it an asset of great importance in the tourism sector. As the capital City and commercial centre, it attracts many businessmen and leisure tourists. This is partly because the Jomo Kenyatta International Airport (JKIA) the main point of entry to Kenya by air is located in the County.

The County has major parks and museum which serves as main tourist attractions and activities centres. The main national parks are Nairobi National Park, Nairobi Safari Walk and Nairobi Mini Orphanage. The Nairobi Safari Walk is a major attraction to tourists as it offers a rare foot experience for wildlife viewing.

The County boasts of the Nairobi National Museum which houses a large collection of artifacts portraying Kenya's rich heritage through history, nature, culture and contemporary art. Other important museums include Nairobi Gallery and the Nairobi Snake Park.

7.16 Sensitive receptors

The sensitive receptors in the area of direct influence of the project are shown in the Map presented in Appendix 6 and include hospitals and other health related buildings, schools and universities, government buildings, cult buildings and other cultural heritage places and other receptors considered sensitive.

7.17 Land Use

The table below shows the land use type and coverage in the County.

Table 35: Land Use Type by Area and Percentage Cover in Nairobi county

Land use type	Area (Km^2)	Cover (%)
Residential areas	175.6	25.22
Industrial/ commercial/ service centres	31.8	4.57
Infrastructure	15.9	2.28
Recreation	12	1.72
Water bodies and riverine areas	11.8	1.69
Urban agriculture	96.8	13.9
Open lands	198.8	28.55
Others (including protected areas)	153.6	22.06
Total	**696.3**	**100**

Source: GoK/UNEP 2007

The projected housing land requirement is estimated to be 250 Km2. Land meant for urban agriculture has been on the decline as more of it is turned to residential use with the city relying on other counties for supply of food items. The industrial areas are largely concentrated in Industrial Area, Kariobangi South and Baba-Dogo.

The distribution of farming households by mean agricultural parcels and land holding sizes by poverty status in Nairobi County shows that the poor have a mean agricultural parcel of 1.2 acres and holding size of 0.9 acres while the non-poor have a mean agricultural parcel of 1.4 acres and mean holding size of 1.3 acres.

The proportion of households that have title deeds in the County is low, a higher proportion of the non-poor compared to the poor own title deeds. The numbers of parcels held by the poor stands at 1,565 while those of the non-poor stands at 6,944. It is worth noting that all of the 1,565 parcels operated by the poor have no title deeds. This situation is also shared by 33.4% of the non-poor operating about 2,389 parcels.

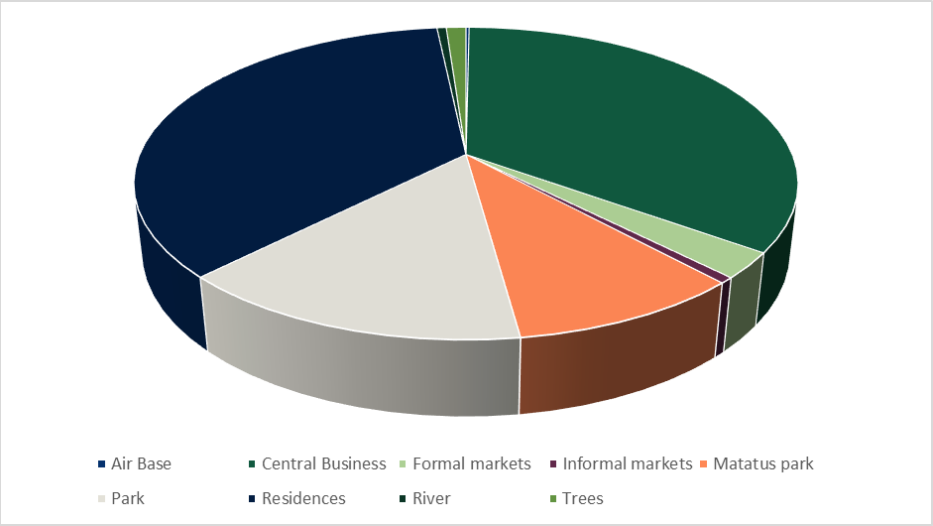
The complexity of land issues in the County has affected a big proportion of its residents both poor and non-poor with the poor living in informal settlements bearing the highest burden of landlessness. This situation is fuelled partly by historical land injustices, land grabbing and influx of unskilled and semi-skilled job seekers from rural areas. About 450,000 households living in informal settlements experience some form of landlessness.

In the area of direct and indirect influence 9 different categories of land use were found as shown in Table 36 and Land use map presented in Appendix 9.

Table 36: Land use categories in the area of direct influence

Category	Description	Area (ha)	Percentage
Air Base	Land owned by Moi Air base	0.58	0,18
Central Business	Business buildings and areas, churches, schools	110.83	34,72
Formal markets	Markets that possess structures	8.51	2,67
Informal markets	Areas with mobile vendors	1.92	0,60
Matatus park	Areas that matatus use for parking	30.83	9,66
Park	Green areas	46.81	14,66
Residences	Areas mainly used for residence	114.38	35,83
River	River area	1.73	0,54
Trees	Areas with isolated trees	3.65	1,14

Figure 22: Land use categories in the area of direct influence



Picture 3: Example of central business areas (km 3+200)

Picture 4: Example of central residential areas (km 7+600)

Picture 5: Example of central residential areas (km 9+100)

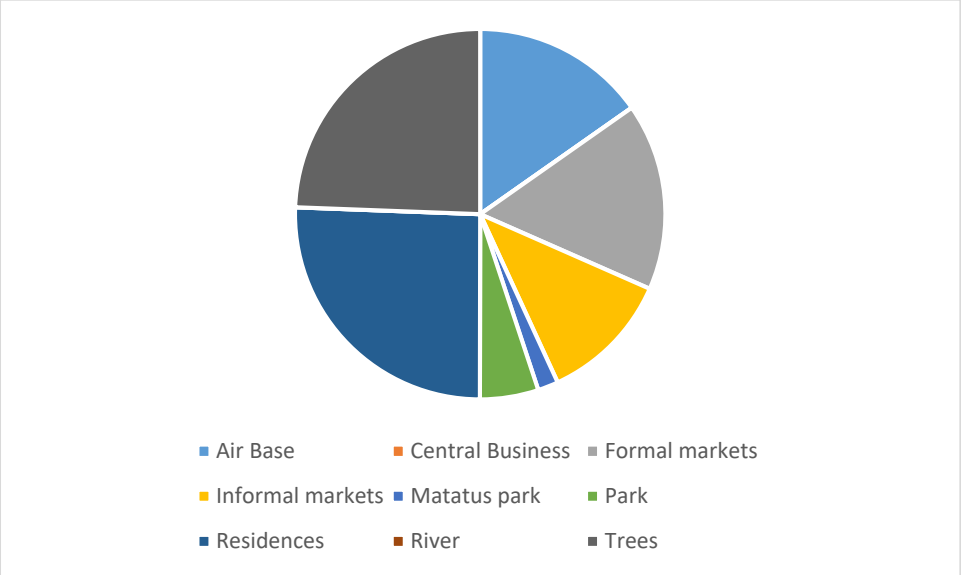
Picture 6: Example of informal markets areas (km 5+900)

Picture 7: Example of Matatu parking areas (km 10+200)

Table 37: Land use categories in the Right of Way

Category	Description	Area (ha)	Percentage
Air Base	Land owned by Moi Air Base	1,2196	15,25
Central Business	Business buildings and areas, churches, schools	0	0,00
Formal markets	Markets that possess structures	1,3069	16,34
Informal markets	Areas with mobile vendors	0,922	11,53
Matatus park	Areas that matatus use for parking	0,1435	1,79
Park	Green areas	0,408	5,10
Residences	Areas mainly used for residence	2,0447	25,57
River	River area	0	0,00
Trees	Areas with isolated trees	1,9513	24,40

Figure 23: Land use categories in the Right of Way



7.18 Gender Analysis

7.18.1 Women Participation Level

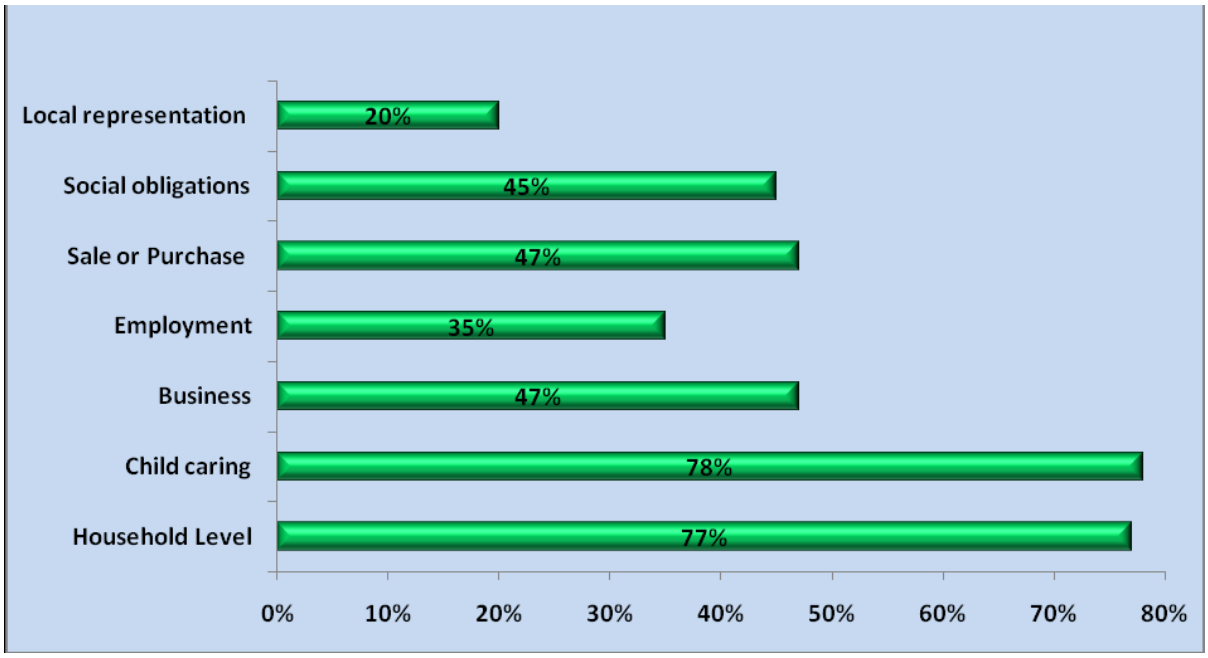
However, in the Project area, the women are participating in the routine activities and their participation level is varied for the different activities. Almost one-third of the respondents reported that there is inequality between males and females, as the males are more powerful than the females. They can spend the money by their own wishes while the women are unable to act as per their wishes. Similarly, the respondents reported that there is gender discrimination at the government level; regardless of this the government is claiming for the gender equality and woman empowerment but factual position is different.

Recently, there was an induction in the police department and only one woman was recruited compared to 11 men. To address this matter government needs to consider actions to keep the gender balance. In term of women participation in the project, women participation in childcaring and household management is comparatively high, 78% and 77% respectively. Eventually these actives are perceived more women related job and they can care the children and house in a better way as compared to men. Surprisingly, women participation in the local representation is very low, although the Political Parties Act which address key issues of gender equitable representation and requires that one third of political parties' office bearers should be of opposite gender.

The women participation level in employment is not encouraging. Only 35% are reportedly employed and majority is for services in private sector. Although, the Employment Act 2007, which addresses key issues of gender equity including gender discriminative practices in the socio-economic sphere, women participation levels in business activities, sales and purchase of items and social obligation are almost same, i.e., 45% - 47%. Notably, the field survey showed that the majority of the men encouraged the women to obtain a job if they can find one, preferably in the government sector.

Both are of the view that employment is essential for both genders to meet the requirements of daily life.

Figure 24: Women participation in various activities



7.18.2 Women Issues

The women of the project area reported the following issues during the survey which are prioritized as under:

- Lack of Job Opportunities: Job opportunity was ranked as the priority issue for the women of the area. They complained that there is discrimination, especially in the government sector and men are always preferred over the women in job distribution. Few women raised the voice that they are capable to do the job at par with the men, even in the private sector including in transport sector. However, women are not employed as drivers. This lack of job opportunity is adversely affecting the socioeconomic condition of women who can be the sole income earner upon which the family is dependent. Even Government has put in place a number of measures (in the form of establishing catalytic funds) aimed at empowering women and increasing their participation in the country's development in all sectors to help eradicate poverty and improve the economic status of women.
- Lack of Safety and Security: From a safety and security perspective, a number of respondents (20%) felt insecure while travelling on Juja Road (especially in the evening). The incidence of women sexual harassment was reported despite the presence of Sexual Offences Act 2006 and Female Genital Mutilation Act 2011, outlawing specific forms of violence against women. The principal cause of this insecurity was due to the lack of males assisting with the care of children. In addition, the women, in particular the young complained about the betrayal attitude of their boyfriends, who left them around the corner

during pregnancy to ultimately live in a helpless condition when the parents also repudiated them.

- Poor Transport System: A further cause for concern was the un-reliable transport services where due to frequent traffic jams, workers had to leave home very early to be able to arrive at the destination in time for work and similarly reach home late in the evening after work. In these circumstances, it is mainly the children who suffered.
- Poor Medical Services: The surveyed women of the project area highlighted the lack of quality treatment services in the government hospitals and that which was available was at a limited benefit. Ultimately, they commented that they are forced to attend private practitioners. For the poor people, they cannot afford private treatment.
- Lack of Basic Necessities of Life: The women particularly the residents of the slums pinpointed the dearth of basic necessities such as: potable water, sewerage and drainage system, solid waste management, education and health facilities in the slum areas.
- Loss of Livelihood: The few women whose livelihood is threatened as a result of the proposed project, showed deep concerns for future livelihood. Even the women squatters were more worried in the absence of alternate source of income.
- Lack of Access over the Business Centre: Few women were anticipating the interruption to have the easy access on their business centres during the project implementation. They felt that ultimately it will have adverse impact on their business if an alternate route or proper access to their business is not provided during the construction stage.

8 STAKEHOLDER IDENTIFICATION AND PUBLIC PARTICIPATION

8.1 Introduction

During ESIA Studies, the Environmental Management and Co-ordination (Amended) Act 2015, requirements read together with EIA/EA Guidelines of 2003 (2018) require that the general public and key stakeholders be consulted on the impacts to the environment that may be occasioned by projects either in the public or private domain.

The Constitution of Kenya 2010 provides a strong foundation for participatory governance. While the Constitution does not use the term community engagement, it is replete with provisions on public participation, and establishes public participation as a key value and principle in governance. As per EMCA regulations and NEMA requirements, there are usually two forms of public involvement in the EIA process. The first is direct involvement of the affected public or community in public consultations during the ESIA study. These consultations allow the developer to provide information to the public about the project and to determine what issues the public wishes to see addressed. Community interaction and transparency is a critical area of focus for the success of this development. The extent and results of the consultations undertaken and has been included in this ESIA Report. The second level of involvement is at the discretion of the Authority - NEMA and takes place after the ESIA Study Report, if any, has been prepared and after the applicant has provided the information needed for adequate review by NEMA and the public. Public disclosure on the other hand is important as it is critical to the effective participation of project-affected populations. An informed public is more likely to understand the trade-offs between project benefits and its demerits; be able to contribute meaningfully to project design; and have greater trust in the project proponent. For this case, the practice of engaging communities specifically and only to meet licensing and permitting requirements, or when troubles arise, is a practice that leads to community dissatisfaction. It is an approach that can very well lead to an environment of enmity between stakeholders and developers.

In addition to this as per the EIB Environmental and Social Standard 10: Stakeholder Engagement and, the objectives of engaging stakeholders and the community during the ESIA and Resettlement Action Plan (RAP) process, and beyond include:

- Establish and maintain a constructive dialogue between the promoter, the affected communities and other interested parties throughout the project life cycle;
- Ensure that all stakeholders are properly identified and engaged;
- Engage stakeholders in the disclosure process, engagement and consultations in an appropriate and effective manner throughout the project lifecycle, in line with the principles of public participation, non-discrimination and transparency;
- Ensure that the relevant stakeholders, including commonly marginalized groups on account of gender, poverty, educational profile and other elements of social vulnerability, are given equal

opportunity and possibility to voice their opinions and concerns, and that these are accounted for in the project decision-making; and,

- Duly verify and assess that the quality and process of engagement undertaken by third parties on the project conform to the provisions included in the present standard.

A Stakeholder Engagement Plan was prepared as an integral part of the ESIA (See Appendix 10) and both the primary and secondary stakeholders were engaged for the Indirect Area of Influence. Stakeholder engagement will not end with completion of the ESIA report it will be a continuous process throughout the project life cycle and more of it will be during the RAP stage.

For purposes of the ESIA process, public consultation and disclosure process are conducted for any project to intimate the community about the project, its activities and associated benefits, impacts, risks etc. so that people can participate in the project activities in an informed manner and can raise their concerns to be addressed. This consultation process effectively manages public apprehensions, identifies control measures for these apprehensions in association with the public stakeholder and also facilitates in implementation of the identified measures. Public participation tries to ensure that due consideration is given to public values, concerns and preferences when decisions are made. It encompasses the public actively sharing in the decisions that government and other agencies make in their search for solutions to issues of public interest.

8.1 Objectives

The objectives of stakeholder engagement and public participation include:

- To inform the local people, leaders and other stakeholders about the proposed project and its objectives.
- To establish if the local people foresee any positive or negative environmental

  impacts from the project and if so, how the impacts can be addressed.
- Aid in increasing transparency and participation in the EIA process;
- Provision for opportunities for future participation by: -
  - Minimizing conflicts by identification of contentious issues early enough.
  - Pointing out and recognizing local leaders who can lead the process and push for further discourse in consequent stages of the project.
- Increase institutional coordination by sensitization of the project activities while integrating institutional stakeholders' views: -
- Enhancement of long-term sustainability and ownership of the project; and
- Provide correct and accurate information regarding the project.

8.2 Stakeholder Identification

It is essential to know the people who may be impacted by a project and who may have an influence on its ultimate success. Communities are not homogeneous and are comprised of people with different lived realities and different interests and concerns relating to development. Multiple discussions with other stakeholder groups are critical to triangulate information collected from various tools and resources. As such, discussions with the community, civil society, and government agencies should be reviewed side-by-side to get the correct picture. The effectiveness of the ESIA is directly linked to the degree of continuing involvement of those affected directly or indirectly by the project. The aim was to ensure that all stakeholder interests were identified and incorporated in project development: at planning, implementation and operation phases. The stakeholder engagement process was carried out at two levels: local communities and County/National Governing bodies. Different communication methods and time were also framed.

8.3 Approach to Public Participation Process

Public participation is a deliberative process in which the public is involved in problem solving or decision-making in policy formulation, legislation, or project implementation. It is a process by which community concerns, needs, and values are incorporated into government and corporate decision-making. Public participation recognizes the diversity of group aspirations, needs, and values, and permits collective decision-making, thereby allowing consensus designed to achieve more policies that are legitimate. The essence of public participation is to strengthen and deepen democratic governance. Residents of a proposed project have to live with the project if implemented. They have the most to gain if the project impacts are beneficial to them. Conversely, they have the most at stake if the project goes awry. Not just residents but for projects whose impacts have a wide geographical spread, distant communities need to be involved. Stakeholder input was thus vital at the earliest stage possible in project development and should continue throughout the project cycle.

The approach undertaken for information disclosure and consultation at the ESIA stage involved the following key processes.

- Mapping and Identification of key stakeholders such as primary and secondary and prioritizing them according to their influence;
- Conducting expert consultations, informal interviews and Key Informants;
- Explanation of the project and its impacts (both positive and negative).
- Assessing the influence and impact of the project on these stakeholder groups and vice versa;
- Summing up of key findings and observations from the consultations;
- Preparing a future engagement plan taking into account the project lifecycle phases and their implications on the stakeholder.

Appendix 10 of the ESIA presents a detailed description of the stakeholder engagement, identification and mapping, as well as the Public Participation process including the major findings.

8.4 Summary of FGD

Based on the 41 interviews to the focal groups along the BRT RoW during January 2021, became clear that most of the affected communities understand the benefits of a better transport system and share similar concerns and suggestions for the BRT project.

The main short-term concerns are as expected, along the reallocation and compensation process. Communities are aware of the necessary remobilizations but are concerned with the loss of properties and business, the conflicts that may arise and the inclusion of the right affected personnel. It is of major importance that the resettlement process is completed prior to construction phase.

During the construction phase, common concerns are related to the interference with the local business, jobs and lifestyle: alternative routes increasing traffic jams and possible accidents, interference with public utilities (like schools, hospitals, or others), interruption on basic services supply (water, sewar, electricity) and the noise and air pollution are among the main concerns. Also, the rise of insecurity due to loss of jobs or business and the possible Matatus price raising. As a positive factor, communities consider that the construction phase should raise job opportunities for the youth.

There are positive expectations for the BRT operation. Hopes are that the cost and time of travel and goods transport will decrease significantly. It is also expected a fixed price table and schedule to be established. BRT will also provide ease access to public utilities (Hospitals, schools, Central Business district, others) and improve the security in the area and road safety. The project will increase local infrastructure and economy, provide local youth with job opportunities and revenue to the GoK. BRT it will maintain better road conditions and reduce the noise, traffic and fuel consumption/air pollution. The communities are happy to have a new, safer and more comfortable mean of transport with proper attention to vulnerable groups, the opening of new routes, a fair price ticketing and a cleaner, safer and prosper environment.

Main concerns with the general project include the time to complete the project, the loss of jobs and business on parallel markets (e.g., hawking), competition with Matatu business and that outsiders will be brought to work instead of local personnel.

As ways to minimize the impacts derived from the BRT project, the community recommends creating counselling and guidance sessions along the project, to involve the community on updates or changes, aid on youth education and to provide local job opportunities. It is also recommended proper safety measures to be putted in place along the BRT RoW (lighting, bumps, zebras, signalling, crossings bridges, special seats for vulnerable groups, etc), pollution to be avoid (ex: spray water on sandy roads) and that Matatu to be engaged. During construction phase, fair compensation must be provided and

proper diversion alternatives with safety signalling and officers controlling the diversions as to avoid accidents and traffic jams should be created.

On gender-based concerns the communities are unanimous suggesting the future employment should consider gender-balanced personnel, that security should be improved on buses and stations and that local development programs for woman and youth should be developed and that would be positive to create awareness and public education on sexual harassment as well as sensibilization sessions for the BRT workers.

In summary, the communities would like to see the following recommendations to be considered for the Project:

- BRT should work 24h;
- There should be a good supervision on the resettlement process;
- Special attention should be given to Kariakor Market in compensation phase;
- Communities should be kept informed on the Project and possible changes;
- Proper and permanent kiosks should be provided to be let to small business;
- There should be awareness on road safety before project commences;
- Empower and promote local job opportunities, especially for youth (internships);
- Engage local leaders when recruiting local employers;
- Increase security - street lights and cameras;
- Students and special groups should have special fare;
- Online access to tickets;
- Booking, ticketing and design/comfort should consider the vulnerable groups (Old, PLWD, illiterate, others);
- Ensure that system is affordable and accommodative to all people;
- Initial trips should involve awareness;
- Matatus' owners should be consulted and have the opportunity to work in BRT.

It is the general opinion that the BRT project will bring advantages for the local communities and should be implemented.

9 ENVIRONMENTAL AND SOCIAL IMPACTS

9.1 Introduction

An ESIA is "a structured approach for obtaining and evaluating environmental information prior to its use in decision-making in the development process. This information consists, basically, of predictions of how the environment is expected to change if certain alternative actions are implemented and advice on how best to manage environmental changes if one alternative is selected and implemented" (Bisset, 1996). An environmental impact is any change to the existing condition of the environment caused by human activity or an external influence. Impacts may be positive (beneficial) or negative (adverse). Negative impacts need to be abated, while those identified as positive will need to be strengthened so that the objective of the project is enhanced. They may also be direct or indirect, long-term or short-term in duration, and wide-spread or local in the extent of their effect. Impacts are termed cumulative when they add incrementally to existing impacts. In the case of the proposed BRT Project, potential environmental impacts would arise during mobilization, construction, demobilization, operation and decommissioning phases of the project and at both stages; positive and negative impacts have been identified to occur.

The environmental baseline information collected, and the project characteristics discussed formed the basis for impact identification and evaluation. Assessment of impacts was dependent on the nature and magnitude of the envisaged activities to be undertaken as well as the type of environmental control measures that are proposed for implementation. Impacts have been identified and discussed in all phases of the proposed project cycle; mobilization, construction, demobilization, operation and decommissioning. Currently, there are residential structures, commercial structures and several business kiosks along the RoW. These infringements at the project site may require relocation as well as a redesign of the project. In addition, there might be shifting of public utilities such as water supply and sewer pipelines, fibre connection data cables and electrical lines since they pass through the proposed route.

9.2 Impact Identification & Assessment Methodology

9.2.1 General Approach

Project impacts on the biophysical and socio-economic environment are identified based on baseline conditions of the environment, Project and its components and on appropriate information on potentially affected environmental receptors as well as expert judgement and experience.

Based on this information the significance of the expected environmental and social impacts are assessed with regard to their nature, spatial and temporal scale, reversibility, probability, and

magnitude. In the urban context, most project impacts are directly associated with construction and operation. Decommissioning impacts are relatively short-lived and should result in an *improvement* in conditions relative to the operational period. A '*significant impact'* is an impact which by its spatial extent, duration, probability of occurrence and / or magnitude may have a notable effect on one or more aspects of the environment.

Significant negative Project impacts are

- subject to legislative control;
- affect legally protected natural, cultural or historic sites or areas;
- are of concern or interest to the general public;
- affect sensitive environmental or social factors or parameters.

Identified significant Project impacts will be the focus of the proposed mitigation strategy and along the mitigation hierarchy (avoid, minimize; mitigate; compensate). In case effective mitigation cannot be achieved, adjustment of project features may be required.

The objective of this general methodological approach is to provide a framework for the appropriate assessment of the Project and associated activities in the biophysical, social and socio-economic spheres. It aims to ensure that all legal requirements and environmental considerations are met in order to have a complete and integrated environmental framework for impact evaluations.

9.2.2 Significance Criteria

The criteria used to assess the significance of the potential construction or operational Project impacts include the spatial and temporal extent, reversibility, probability, and magnitude. Professional judgement and expertise are used to determine significance as a function of these criteria.

a) **SPATIAL EXTENT** of the impact: *'the spatial influence of the impact or the area that will be affected by the impact'*

EXTENT or **SPATIAL INFLUENCE** of impact of impact	**Project footprint**	Limited to BRT
	Construction area	Construction area incl. ancillary facilities will be affected
	Local area/county	Local area / county (neighbouring properties; transport routes; & adjacent settlements are affected)

b) **TEMPORAL EXTENT**: 'the estimated period of time the impact will be effective'.

DURATION of the impact	**Short term**	Construction phase
	Medium term	1 to 3 years after construction
	Long term	More than 3 years after construction

c) **Impact REVERSIBILITY**: *'the chance of an impact to be changed from a state of affecting aspects to a state of non-affecting aspects'*.

Reversibility of the impact	**Reversible**	Impacts can be reversed through the implementation of mitigation measures
	Irreversible	Impacts are permanent and cannot be reversed by the implementation of mitigation measures.

d) **Impact PROBABILITY**: '*the estimated chance of the impact to occur'*.

PROBABILITY of the impact	**High**	May occur (chance 0 – 50%)
	Medium	Likely to occur (51 – 75%)
	Certain	Will certainly occur (76 -100%)

e) Impact MAGNITUDE: *'a brief description of the intensity or amplitude of the impact on socio-economic or environmental aspects'*.

MAGNITUDE / INTENSITY of impact (at the specified scale)	**Low**	Natural & / or social functions & / or processes are negligible or only slightly altered
	Medium	Natural & / or social functions & / or processes are notably altered
	High	Natural & / or social functions & / or processes are severely altered

k) Impact SIGNIFICANCE: the combination of impact duration and importance in terms of physical and socio-economic extent, resulting in an indicative level of mitigation required.

NON-SIGNIFICANT IMPACT	
Minimal effects	Potential effects could result in a small localized effect on a sensitive receptor during construction and should be negligible to the overall baseline status of the affected receptor or resource
Minor effects	Potential effects could result in a localized or short-term impact on a sensitive receptor during the life of the Project.
Medium effects	Potential effects could result in a negative impact in terms of quality and quantity but does not affect the long-term sustainability (that is the impact is considered reversible)
SIGNIFICANT IMPACT	
Major effects	Potential impact could jeopardize the long-term integrity of the affected receptor

Table 38: Assessment of Impact Significance

Nature of impact / impact description	Spatial extent			Temporal extent			Reversibility		Probability			Magnitude			Impact significance			
	BRT corridor	Construction area	Local area county	Short term	medium	Long-term	Reversible	Irreversible	Medium	High	certain	Low	Medium	high	Minimal effects	Minimal effects	Minimal effects	Major effects

9.2.3 Cumulative Impacts

Potential cumulative sources of impacts around the Project Site include the following:

- The existing direct and indirect areas of influence where the BRT System will operate is characterized by heavy urbanization and traffic congestion. On-road traffic is already contributing to national air pollution emission levels, ambient air quality and GHG emissions, and elevated noise levels.
- The noise pollution in the area of influence is on already at a higher level due to the high number 'matatus' plying that route.
- Poor safety record on the roads and accident rates are already very high.

Whenever applicable, the effect of these potential cumulative impacts on the different receptors will be taken into consideration as part of the subsequent assessment of project related impacts.

9.2.4 Steps of Impact Assessment

The potential impacts of the proposed Project were assessed using the following steps:

- Characterization of the baseline conditions or rather the existing conditions before the Project is undertaken and any effects are generated;
- Description of the Project components throughout the Project lifespan (mobilization, construction, operation and decommissioning);
- Evaluation of alternatives to the Project to see if impacts can be reduced;
- Identify sources of impacts and the impacts themselves that are generated by any aspect of the Project;
- Rating of impacts before any mitigation (for negative impacts) or enhancement (for positive impacts) is implemented;
- Identification of mitigation and enhancement measures to address the impact; and
- Rating impacts after mitigation to produce a "residual" impact rating.

9.3 Impacts at the Mobilization Phase

The main activities during mobilization phase of the project will be the transportation of construction equipment to the site, establishment of camps, and establishment of sources of naturally occurring construction materials. The camp will be required for the storage of construction materials and equipment or material processing. The camp will also be required to provide site office and accommodation for Supervising Consultant and a few senior staff of the Contractors / proponent. Accommodation is not necessary for workers coming from the project area.

Mobilization activities are expected to bring about the following impacts.

1. Creation of employment during mobilization

Establishment of construction campsite will create direct and indirect employment to the local as well as people from other places. Direct employment will be in the form of skilled labour as well as non-skilled labour. Indirect employment will include employment of food vendors (especially women) and other small businesses like soft drinks. The impact will be as follows.

Table 39: Impact from the creation of employment during mobilization

Spatial extent	Local area/county
Temporal extent	Short-term
Reversibility	-
Probability	Certain
Magnitude	Medium
Impact significance	-

2. Loss of Vegetation

Clearing works during establishment of camps and material borrow areas will involve removal of vegetation, including trees. Clearing of vegetation apart from exposing soil to water erosion, it will remove fertile topsoil that is good for supporting plant growth. The negative impact is gauged to be of low magnitude and irreversible.

Table 40: Impact from the loss of vegetation during mobilization

Spatial extent	Construction area
Temporal extent	Short term
Reversibility	Irreversible
Probability	Certain
Magnitude	Low
Impact significance	**Medium**

3. Generation of noise

Pollution due to noise will result from operations of construction equipment and trucks during transportation and delivery of construction materials and works at the camps. Increased traffic movement along settlements is likely to cause considerable noise and vibrations. The impact is likely to be eminent if the equipment and trucks are poorly maintained. Since there are settlements throughout along the proposed BRT route, the impact due to noise will be felt by both residents of the direct area of influence and construction workers. The negative impact due to noise is gauged to be direct, medium, but short term.

Table 41: Impact from the generation of noise

Spatial extent	Construction area
Temporal extent	Short term
Reversibility	Reversible
Probability	Medium
Magnitude	Medium
Impact significance	**Medium**

4. Deterioration of ambient air quality

Deterioration of ambient air quality will be due to generation of dusts at the campsite, during site preparation, construction activities especially those involving the use of cement and extraction of materials at material borrow sites. Deterioration of ambient air quality will also arise from transportation and stockpiling of construction materials at campsite. In addition, the transport trucks may generate clouds of dust as they move across the local roads. The impact is estimated to be medium, short term, and reversible.

Table 42: Impact from the deterioration or ambient air quality

Spatial extent	Construction area
Temporal extent	Short term
Reversibility	Reversible
Probability	Medium
Magnitude	Medium
Impact significance	**Medium**

5. Risk of road traffic accidents

Project activities during mobilization phase will increase the traffic volume and movements. This is likely to increase the likelihood of accidents, especially along materials stock/ source routes discussed in borrow pits) and road crossings, especially settlement centers. Settlements that are likely to be affected most are the relatively high-populated ones such as Mathare, Huruma, Kariobangi North and Dandora. The impacts due to pressure on traffic and road safety are gauged to be medium, short term and reversible.

Table 43: Impact from the risk of read traffic accidents

Spatial extent	Construction area
Temporal extent	Short term
Reversibility	Reversible
Probability	Medium
Magnitude	Medium
Impact significance	**Medium**

9.4 Impacts at the Construction Phase

1. Creation of employment

Construction phase of the project will create both direct and indirect employment. Directly employed people will be those working in the direct construction of the project and will include skilled labor (engineers, surveyors, technicians, machinery and equipment operators, drivers etc.) and unskilled labor. Indirect employed people will include food vendors (especially women) and other small businesses like soft drinks, which are likely to be concentrated at village centres, active construction sites as well as in the neighbourhood of campsites. This will be a medium, and short-term impact since it will only occur during the construction period of the project. The proponent has committed to ensure that priority is given to the local community during employment.

Table 44: Impact from the creation of employment during construction

Spatial extent	Local area / county
Temporal extent	Short-term
Reversibility	-
Probability	Certain
Magnitude	Medium
Impact significance	**-**

2. Informal sector benefits

The project will require supply of large quantities of building materials most of which will be sourced locally. It will also spur the growth of small business enterprises including kiosks to serve construction workers and employees, barbershops, food vendors, photocopying shops etc.

Table 45: Impact from the informal sector benefits

Spatial extent	Local area / county
Temporal extent	Short-term
Reversibility	-
Probability	Certain
Magnitude	Medium
Impact significance	**-**

3. Development of other sectors

Increase in reliability and security of power supply in national power grid will enhance efficiency and productivity of other sectors including health, education, water supply, agriculture and livestock production, industry, etc.

Table 46: Impact from the development of other sectors

Spatial extent	Local area / county
Temporal extent	Short-term
Reversibility	-
Probability	Certain
Magnitude	Medium
Impact significance	**-**

4. Improvement of growth of the economy and trade

Using locally available materials during the construction phase of the project including cement, concrete poles and other construction materials the project will contribute towards growth of the economy by contributing to the Gross Domestic Product (GDP). The consumption of these materials, fuel oil and others will attract taxes including VAT which will be payable to the government hence increasing government revenue while the cost of these raw materials will be payable directly to the producers. The construction workers required will provide ready market for various goods and services, leading to several business opportunities for small-scale traders as indicated.

Table 47: Impact from the improvement of growth of the economy and trade

Spatial extent	Local area / county
Temporal extent	Short-term
Reversibility	-
Probability	Certain
Magnitude	Medium
Impact significance	**-**

5. Temporary Loss of Land

The analysis of the potential impact discussed in this section is based on the fact that land will need to be acquired before implementation of the proposed Project. The proposed development will displace people within the right of way, and they will be forced to relocate leading to loss of land. The proponent will acquire the land using the relevant land legislative framework as stated in Section 3 of the report. On areas requiring acquisition of private or community land the same legislative framework will be used to ensure both rightful and non-rightful owners including squatters and other informal land users will be identified and compensated. Loss of land can be sub-divided into two categories; temporary land acquisition and permanent land acquisition.

It is estimated that a total of **225,834 m^2 of land** will be affected due to project interventions. Table below indicates that the land will be acquired under 6 different components. The table also reveals that the Bus Depot Dandora will require a significant amount of land.

Table 48: Estimated land impacted upon or required for various components of the project

Estimated land impacted upon or required for various components of the project

Item	Area (m2)	Remarks
Constructed cadastral impact	4,844	Building along the corridor is given (permanent/concrete structures)
Constructed cadastral impact	7,891	Building along the corridor is given (temporary structures)
Unconstructed cadastral impact	17,990	Open area along the corridor is given
Feeder stations	32,296	Land
Parking relocation	0	Land
Matatu Drop off Points		To be determined in vicinity of Kariokor Market
Bus depot at Dandora	110,509	50% of buildings area is also included
Park & Ride at Dandora	11,707	Land
Total	***185,237***	

Land acquisition map presented in Appendix 11 shows the area of affected properties along the BRT RoW.

Picture 8: Land to be acquired at LR No 36/VI/293 and at LR No. 209/11384/1

The impacts for the temporary and permanent loss of land are presented in the Table 49 below.

Table 49: Impact from the temporary loss of land

Temporary Loss of land	
Spatial extent	Construction area
Temporal extent	Short term
Reversibility	Reversible
Probability	Certain
Magnitude	Medium
Impact significance	**Medium**

6. Permanent Loss of Land

In addition to permanent land acquisition, land is also acquired on a temporary basis by the Contractor to carry out the construction related activities such as work team residential quarters, workshops to repair vehicles, storage places for equipment and borrow/spoils deposit areas. Hence, 4 hectares of land will be required by the Contractor through negotiation with the landowners in the form of a lease agreement under the intimation and approval of NaMATA. Upon completion of construction, the Contractor will then restore the land to its original condition before handing over to the owner.

Table 50: Impact from the permanent loss of land

Spatial extent	Project footprint
Temporal extent	Long term
Reversibility	Irreversible
Probability	Certain
Magnitude	High
Impact significance	**Major**

7. Loss of properties

I. Loss of Residential Structures

As per the land acquisition report done in 2021, **a total of 90 residential structures would be affected as a result of project implementation**. Among the total, 54 are made of concrete while 36 are of semi-permanent.

There is a significant reduction in the number of structures affected, compared to the design undertaken by the previous Consultants.

Picture 9: Affected houses at Old Race Course Estate (Block 42/300-block 43/314)

II. Loss of Commercial Structures

As per the land acquisition report; project implementation will cause the loss of about 7 multi-storey buildings, the area occupied under these concrete buildings is 823 m^2 of floor area. As per the Land acquisition report the PAPs expressed deep concerns over the loss of their multi-story buildings and suggested to consider design alternatives in order to protect them.

There is a significant reduction in the number of buildings affected, compared to the design undertaken by the previous Consultants.

Note: *Caution should be undertaken with the numbers of affected structures and buildings mentioned above. As part of the Resettlement Action Plan (RAP) the valuer will visit all the properties and will review the actual floor areas. The valuer will decide whether it makes sense to acquire a specific area and whether an entire building is actually affected.*

Picture 10 and Picture 11: Commercial structures at LR. 36/V/24 and at Lr No 36/I/261

III. Loss of Shed & Shacks

The Project will also cause the dislocation of about 1474 shed/shacks made of iron and wood.

Picture 12 and Picture 13: Sheds in Starehe and Mathare Sub Counties

Table 51: Impact from the loss of properties

Spatial extent	Project footprint

Temporal extent	Long term
Reversibility	Irreversible
Probability	Certain
Magnitude	High
Impact significance	**Major**

8. Removal and disturbance of flora

Project implementation will result in clearing of some of the existing vegetation along the Directly Affected Area (DAA). Vegetation clearance may also occur when creating sites for accommodation and storage of construction materials. Movement of vehicles, machines and people on vegetation along the proposed route due to diversions will result in additional damage to plants due to pressure exerted. This will interfere with biological processes in the plants and can lead to death of the plants. As indicated earlier, the project DAA along the different road is characterized by different types of vegetation consisting of woody mature trees and shrubs. Removal of vegetation will amount to further degradation of land and landscape, making the area susceptible to water and wind erosion. The source of potential impact is from the activities of construction of the right-of-way. The construction of the BRT therefore would have a negative impact by altering and reducing the woody vegetation along the ROW; The impact is gauged to be medium, short term, and reversible.

Picture 14 and Picture 15: Trees within the RoW


Table 52: Impact from the removal and disturbance of flora

Spatial extent	Construction area
Temporal extent	Short term
Reversibility	Reversible
Probability	Certain
Magnitude	Medium
Impact significance	**Medium**

9. Soil compaction, erosion and land degradation

As vehicles, machines and people move on ground the soil is compacted. Compaction has the un-desired effect of hindering air and water penetration beneath the soil surface and thus limiting aerobic activities of soil dwelling organisms which lowers soil productivity. When water penetration into the soil is interfered with, surface run-off during the rainy season is enhanced resulting into soil erosion and siltation. Compaction will only be significant if diversions are created, and land used for cultivation is used for movement of vehicles.

Excavation just like clearance of vegetation will result into loose soil that is prone to both water and wind erosion. Loosening of soil interferes with soil structure. Most of the excavated soil will be utilized on site to adjust levels where necessary. However, if excess soil is not properly disposed, it results into nuisance as solid waste. Removal of soil cover and excavation works associated with this project may lead to increased soil erosion at the project site and release of sediments into the drainage systems especially if construction works are done during the rainy seasons.

Clearing of vegetation during extraction of construction materials is likely to cause soil erosion in pits and quarries. Soil erosion will occur because both vegetation and topsoil are removed or disturbed, leaving behind loose soil, which is too poor to sustain good plant growth and resist erosion due to surface

runoff. The impact is likely to be worse if borrow sites are located on steep slopes and near a watercourse. Roadside soil erosion will occur because, vegetation will be cleared, and top soil will be removed/ disturbed, leaving behind infertile soil, which is too poor to sustain good plant growth. The impact due to soil erosion is estimated to be medium, reversible, and long term.

Table 53: Impact from the soil compaction, erosion and land degradation

Spatial extent	Construction area
Temporal extent	Short term
Reversibility	Reversible
Probability	High
Magnitude	Medium
Impact significance	**Medium**

10. Generation of solid waste

Considerable volumes of solid waste will be generated during the clearance and construction works, which would include some vegetation and typical construction waste such as wasted concrete, waste earth materials, etc. This waste will negatively impact the aesthetic value of the site and surrounding environments if not properly managed and disposed of at an approved dumpsite. Solid waste, if allowed to accumulate on the ground, could cause localized pooling and flooding. Pooling of water, in turn, would create conditions conducive to the breeding of nuisance and health-threatening vectors such as mosquitoes. Improper management of construction waste constitutes a short-term negative impact. The negative impact is gauged to be medium, reversible, and short term as disposal of solid and liquid waste shall be part of the construction activities of the project.

Table 54: Impact from the soil compaction, erosion and land degradation

Spatial extent	Construction area
Temporal extent	Short term
Reversibility	Reversible
Probability	High
Magnitude	Medium
Impact significance	**Medium**

11. Water quality deterioration

Sources of water contaminants during the construction phase include minor (small-scale) spillage of fuels, lubricants and other toxic materials. Other sources include discharge of silt-laden run-off and the disposal of waste and wastewater from the worker's camp. The analysis of potential project impacts discussed in this section is related to the possibility that during the implementation of the proposed project, transportation of contaminants from the project site by natural flow (in the case of a spill), or by storm water to surface water bodies may occur and negatively impact surface water quality. There is only one river within the project area of which the proposed BRT is bound to cross twice. Given scarcity of water resources in the area, any minor pollution of existing surface water can be seriously detrimental to local communities. Inappropriate disposal of waste and wastewater from the campsite also has the potential to have negative effects on water quality. Their impacts are classified as short term; however, they can be long-term depending on the disposal mechanism used.

Table 55: Impact from the soil compaction, erosion and land degradation

Spatial extent	Construction area
Temporal extent	Short term
Reversibility	Reversible
Probability	Medium
Magnitude	Medium
Impact significance	**Medium**

12. Wastewater generation and disposal

Workers should be provided with sanitary conveniences during the construction process. The disposal of the wastewater generated at the campsite has the potential to have a minor negative impact on groundwater. Among the waste that will be generated at the construction camps will be sanitary waste from construction workers. If sanitation facility is not provided for, they are likely to relieve themselves in the bush, causing outbreak of waterborne diseases such as dysentery and diarrhoea. Lack of or inadequate provision of toilets for use by workers can lead to adhoc defecation in secluded areas or structures along the ROW, thus creating unsanitary conditions and sources of fly infestation. This can threaten the health of neighbours and workers themselves. Indiscriminate sewage disposal can also result to contamination of underground water resources. For this case, the campsite shall have a septic tank with capacity to handle the amount of wastewater envisaged to be released. The impact will be medium, short term and reversible.

Table 56: Impact from the water quality deterioration

Spatial extent	Construction area
Temporal extent	Short term
Reversibility	Reversible
Probability	Medium
Magnitude	Medium
Impact significance	**Medium**

13. Increment of noise levels from the construction works

Noise is unavoidable at any construction site due to the use of machines such as concrete mixers, moving vehicles and shouting by workers. Earth moving, compaction, and other construction activities will generate noise and vibrations due to reactions between earth and equipment. In addition, movement of the machinery, equipment, and dump trucks will also generate noise and vibrations. The noise and vibrations generated will agitate and impair audio communications at settlements along the RoW and among the construction workers.

There are sensitive receptors such as educational institutions along the RoW that include Dandora Girls High Schools, Dandora Vocational Centre, Moi Airbase Primary, Pangani girls among others that will be impacted by the noisy environment. There are also have health facilities like Juja Maternity and the Pumwani Referral hospital along the area of influence that will be directly affected. The commercial centres along the RoW will also feel the noise impact.

This effect will however be localized and temporary in duration. Albeit annoying, this negative impact will be short-term (limited to the construction phase at the specific site). Noise beyond some level is itself a nuisance and need to be avoided. Such noise emissions should be minimized as much as possible from the source point through appropriate measures. The negative impact is gauged to be direct, moderate, reversible, and short term since it will only be felt during the construction phase of the project.

Table 57: Impact from the increment of noise levels

Spatial extent	Construction area
Temporal extent	Short term
Reversibility	Reversible
Probability	Medium
Magnitude	Medium
Impact significance	**Medium**

14. Deterioration of ambient air quality

During the construction phase, air quality is expected to decline as a result of an increase in levels of fugitive dust from excavation works, the stockpiled earth materials. Dust emission is likely to occur during the site clearance, excavation and spreading of the topsoil during construction. Motor vehicles accessing the site may also lead to dust emissions. Conversely, exhaust emissions are likely to be generated by the motored equipment during the construction phase.

Exhaust fumes from stationery as well as or moving construction machinery and equipment will emit SO2 NOX, CO, and CO2 as well as generation of Particulate Matter. In addition, moving of earth as well as movement of construction machinery and vehicles will generate clouds of dust. Although dust is a permanent feature along local road sections during the dry season, it is likely to increase beyond the current levels due to increased traffic volume and movements. Apart from nuisance, excessive dust level can negatively affect human health. Dust can cause several bronchial problems, including URTI (Upper Respiratory Tract Infection).

Additionally, dust particles can affect the growth the crops along the Nairobi River and other vegetation across the RoW. Dust abrading leaf surfaces, dust blocking stomata (clogging of pores) of plants, dust increasing the amount of absorbed incident radiation. Overall, the effects seem to be a reduction in photosynthetic abilities, the result of which can be stunting their growth due to shading effect and clogging of the plant's pores.

The negative impact is estimated to be medium magnitude for short periods in close proximity to active construction sites.

Table 58: Impact from the deterioration of ambient air quality

Spatial extent	Construction area
Temporal extent	Short term
Reversibility	Reversible
Probability	Medium
Magnitude	Medium
Impact significance	**Medium**

15. Accidental spillage of hazardous materials

Motorized machinery on the proposed site may be containing moving parts that will require continuous oiling to minimize the usual corrosion or wear and tear. There is also a potential for oil spills and accidents during oil transportation, storage and operations of the transformers and batteries.

Poor maintenance and operation of heavy trucks and equipment might lead to oil and fuel spills at the construction site that may contaminate land or water resources. Release of hydrocarbons to the environment has several impacts including sub-soil and groundwater contamination; air pollution, fire and effects on human health due to dermal contact, inhalation or ingestion. It is important to note that oil/grease spills are prevalent in construction sites and in most areas that make use of petroleum products. Though this may not be common at the site, it is wise to control and observe the little that could occur especially during maintenance of the involved machinery.

Table 59: Impact from the accidental spillage of hazardous materials

Spatial extent	Local area/ county
Temporal extent	Short term
Reversibility	Reversible
Probability	Medium
Magnitude	Low
Impact significance	**Minimal**

Fire due to electrical faults and flammable substance is a possible effect of the proposed project. Since some of the proposed project activities will be dealing with electricity, workers and other people who gain access to the project sites risk being electrocuted or receiving electric shocks. Some intensive dry processes will be conducted on site at the camp level. Such a process may result to a fire outbreak within the campsite especially if flammable materials such as vehicle fuel will be stored on site. Minor welding works will also be carried out on site to repair broken down machines or vehicles and this

increases the chances of fire outbreak. Fire damage is unpredictable but can occur in any phase of the proposed project. Possible fire sources include:

- Lightening;
- Leaking methane gas and fumes;
- Leaving flammable material near fire points;
- Careless disposal of lighting matchsticks or cigarette stabs;
- Poor handling of electrical appliances that may also lead to shocks, electrocution and damage to electrical appliances.

If appropriate measures are not put in place, a fire outbreak can occur and cause great damage to property and even lead to death.

Table 60: Impact from the risk of fire outbreak

Spatial extent	Construction area
Temporal extent	Short term
Reversibility	Reversible
Probability	Medium
Magnitude	Low
Impact significance	**Minimal**

16. Increment of traffic

During the construction phase, increased project activities will increase traffic volume as well as movements. These activities will cause traffic congestion and disruption; and possibly accidents, especially because the existing right of way is too narrow to allow for construction of diversion roads in some of the sections for the ROW. It is likely that half width construction will be necessary to allow third party/ public traffic movement during construction. Moreover, along materials stock routes, and specifically at road crossings, especially settlements centres, road accidents may occur during construction phase. Other accident black spot areas are where school pupils and students have to cross the project road. The schools include; Dandora Girls High School, St. Peters Clavers School, Pangani Girls High school, etc. Though this increased traffic during construction is a short-term impact, it has the effect of causing congestion on the road that may subsequently results in accidents on the roads in urban areas and market centres. The negative impact due to pressure on traffic and road safety is minor and reversible.

Table 61: Impact from the increment of traffic

Spatial extent	Construction area
Temporal extent	Short term
Reversibility	Reversible
Probability	High
Magnitude	Low
Impact significance	**Minor**

17. Increment of water demand and pressure on existing supply

A considerable amount of water will be required during the construction works, especially for use by construction workers (washing), for material mixing and for wetting of the site to control dust. This may place some amount of strain on water supply at the project level. The main source of water across the project area is piped water from Nairobi Water and Sewerage Company and the project will utilise this water and also water from water bowsers. The impact is estimated to be medium for short periods in close proximity to active construction sites.

Table 62: Impact from the increment of water demand and pressure on existing supply

Spatial extent	Construction area
Temporal extent	Short term
Reversibility	Reversible
Probability	Medium
Magnitude	Medium
Impact significance	**Medium**

18. Extraction of construction materials

As referred in section 2, construction materials for the proposed project will be obtained from quarries, borrow pits and hardware shops who extract such materials from natural resource banks such as river banks and land. Since substantial amount of these materials will be required for camp construction as well as for preparation of poles, the availability and sustainability of such resources at the extraction sites will be negatively affected as they are not renewable in short term. In addition, the sites may be significantly affected in several ways including landscape change and opening of depressions on the surface leading to several human and animal health impacts. This can happen at any site area where excavations will be done and left unattended to. The proposed project will require significant amounts of materials stated. Fuel will be consumed indirectly through machines. The overall environmental impacts depend on the amounts required. Many construction materials are components of natural

resources and their extraction has an effect of depleting land resources alongside subsequent off-site degradation of the environment. The negative impact is gauged to be high, short term irreversible.

Table 63: Impact from the extraction of construction materials

Spatial extent	Local area/ county
Temporal extent	Medium term
Reversibility	Irreversible
Probability	Certain
Magnitude	High
Impact significance	**Medium**

19. Construction works energy demand

Energy in form of electricity will be consumed to operate construction machinery and equipment as well as other transportation facilities. Kenya Power and Lightening Company is the sole electricity provider in Kenya and it will provide it during the project phases. The costs to be incurred will be determined once the project begins. More energy in the form of fuel and lubricants will be consumed during the construction stage of the project.

Table 64: Impact from the construction works energy demand

Spatial extent	Local area/ county
Temporal extent	Short term
Reversibility	Reversible
Probability	Medium
Magnitude	Medium
Impact significance	**Medium**

20. Disruption of public utilities

The proposed project being within an urban area, there is potential for a few disruptions of utilities.

The necessary relocation of utility lines will inevitably entail temporary interruptions of services such as water supply, sewage, electricity and telecommunications. This includes:

- Kenya power lines;
- Nairobi water and sewerage lines;
- Street lightning masts;
- Kenya data Network communications carrier.

One main utility identified during the ESI process is a railway crossing at coordinates -1.259064, 36.893487 (Just near the proposed Dandora Bus Stop) along the road connecting Kangundo road and Koma Rock Road.

Picture 16 and Picture 17: Power line along Juja Road and Railway Crossing

Table 65: Impact from the disruption of public utilities

Spatial extent	Project footprint
Temporal extent	Short term
Reversibility	Reversible
Probability	Medium
Magnitude	Medium
Impact significance	**Medium**

21. Socio-economic, cultural impacts and increased social vices

The influx of new workers across the areas of influence during construction is potentially a source of social and environmental problems as a result of interaction of local people and workers in the project area. With an increase in the population of the area boosted by the project employees the social set up of the area will be affected.

During the implementation of project activities, the local social service sector will also be overwhelmed by the presence of project employees who may be in need of these services. The intensity of this impact is low, moderate impact severity and irreversible. Some of the resulting impacts include the following:

- **Induced informal settlements**

There is a likelihood of induced informal businesses near or along the road utilized for the project due to construction activities for small traders such as food kiosks and informal settlements created by the needs and demand of such services by the construction workers near the project area. This informal settlement might go beyond construction period, posing a threat to future development of the area.

- **Social unrest from local population if locals are not recruited**

There is potential of social unrest from the local people in the area when not considered for employment. This can bring negative publicity to the project during the construction period of the project, including stoppage of works that can delay the project progress.

- **Possible proliferation of social vices**

The project will attract new people to the area, especially unskilled construction workers, and increase the amount of disposable cash in the area, especially for local traders and business people. This may lead to increase of crime in the area.

- **Gender equity and sexual harassment**

There is a potential that gender inequality might occur during project construction through unequal distribution of work, discrimination against women, and unequal pay for women, among others. Sexual harassment against women might also happen as a result of mixing of women and men at the construction site or camp level. A majority of people who will be affected by the project, the project proponents and Contractor need to ensure the right people are identified and compensated.

- **Marital and Social Conflicts**

The project will lead to increased marital and social conflicts because of increased interaction. Project workers with extra earnings could be the sources of conflicts as they engage in extra-marital affairs. The impact will be indirect, moderate, and short term.

- **Increase in unwanted Pregnancies**

Increased and unwanted pregnancies especially among school girls as project workers could easily entice school girls with money in return for sexual relationships. This will be a medium and short-term negative impact.

Table 66: Socio-economic, cultural impacts and increased social vices

Spatial extent	Local area/ county
Temporal extent	Short term
Reversibility	Reversible

Probability	Medium
Magnitude	Medium
Impact significance	**Medium**

22. Impact on vulnerable groups

Vulnerable groups are defined as those who by virtue of gender, ethnicity, age, physical or mental disability, economic disadvantage, or social status, may be less able to participate fully in processes related to displacement, and are more adversely affected by the impacts of the Project.

Vulnerability is considered at a household rather than individual level. This is because it is expected that where potentially vulnerable people are present within a household with people who are not vulnerable, these other members will continue to provide support to the potentially vulnerable member and include them in household decision making to the degree possible. Where an individual is vulnerable because they live alone, they also then constitute a vulnerable household.

For this Project, the vulnerable groups are considered to include Project Affected Households (PAHs) who will lose their income source and do not have alternative income sources. Other vulnerable PAHs include the destitute, although low incomes do not necessarily always imply vulnerability. This is because of the strength of social support networks, with communities reporting that orphans, the physically disabled, older farmers, receive extensive support from family and the community.

In the construction phase vulnerable PAPs will be impacted by the loss of land, loss of structure and or temporary land acquisition. These impacts will be permanent in the operation phase. It is estimated a number of 270 vulnerable PAPs to be affected by the BRT project. The expected impacts are presented below.

Table 67: Impact on vulnerable groups

Spatial extent	Local area/ county
Temporal extent	Long term
Reversibility	Reversible
Probability	Medium
Magnitude	Medium
Impact significance	**Medium**

23. Impacts on the existing public transport operators

Public transport operators in Nairobi, particularly Matatus, will be affected by the construction activities of the project as their routes will be altered according to the proposed works in the RoW. These impacts are temporary in the construction phase and will become permanent in the operation phase of the project. This could have a negative impact on the operator's income and livelihoods.

The BRT system in Nairobi has to work together with the existing buses and if possible, help them to become a part of the new arrangement. The BRT system should be seen as an important long-term mechanism to resolve the current transport problems and therefore NaMATA is engaging with all stakeholders involved in Matatu and PSV businesses to ensure there is a smooth transition. Matatus will continue to play a key role in providing a number of feeder services along the BRT corridor.

NaMATA has been having detailed discussions with the PSV operators for the last few years. The project will serve as a catalyst for reform of the informal (Matatu) bus sector, offering the opportunity to involve and incorporate current operators into a formal system of public transport service provision. Local operators will benefit from investing in and participating in the operation and maintenance of all aspects of the service as well as the provision of the allied feeder services.

A key priority for NaMATA is to introduce BRT on several corridors along with a transition of the present matatu and bus sector.

The EU's Consultants NTU will be undertaking a study along BRT Line 3 to determine which Matatus and PSVs are affected by the project. Further discussions will then be held with NaMATA.

Table 68: Impact from the on the existing public transport operators

Spatial extent	Local area/ county
Temporal extent	Long term
Reversibility	Irreversible
Probability	Medium
Magnitude	High
Impact significance	**Major**

24. Occupational Health and Safety hazards - workers

Project workers may be exposed to various risks and hazards including slips and trips, falls, flammable and explosive substance, electrical shocks, dust, noise and vibrations, poor hygiene, fire, bruises and cuts, etc. It is also expected that construction workers are likely to have accidental injuries and hazards as a result of manual handling and exposure to hazardous waste. Because of intensive engineering and construction activities including excavations, poles erection, concrete work among others, construction workers will be exposed to risks of accidents and injuries. All necessary health and safety guidelines should be adhered to avoid such circumstances. Workers are more likely to be exposed to diseases from contact with potentially hazardous materials.

Table 69: Impact from the workers Occupational Health and Safety hazards

Spatial extent	Local area/ county
Temporal extent	Short term
Reversibility	Reversible
Probability	Medium
Magnitude	Medium
Impact significance	**Medium**

25. Occupational Health and Safety hazards - community

The Project construction activity will be conducted in heavily populated areas with high volumes of pedestrians and vehicular traffic which exposes the public using the roads and living near the construction sites to the construction hazards.

Without implementing the appropriate safety measures regarding the people who are: (i) living or using the households located close to the planned work areas and/or (ii) might be passing within or close to the work zones; there is a major possibility for impacting the safety of the people who are passing through the work areas as a result of:

- The possible collisions between their personal vehicles and the project vehicles or other private vehicles as a result of the expected traffic congestions. This potential impact may occur also during the movement of the project machinery from one working site to another without implementing an appropriate traffic management plan.
- Accidental collision between the private vehicles and the project barriers due to the absence of reflective diversions or caution signs.
- Pedestrians "run over" accidents by the project machinery. Special attention should be given to the presence of small children close to the construction sites, and also the fact that many of the existing pedestrian crossing areas will be removed and reconstructed by the Project.
- Pedestrians "run over" accidents by road using vehicles along the BRT route and the detours and traffic diversion areas. Particular attention is needed for students and young children especially during the time of going to school and returning from school. Coordination and collaboration with school administrations, Sheikhs of mosques, and most importantly with the traffic police is needed to control and limit such impacts and risks, and to implement schools-focused awareness and communication programme for safety on roads.
- Road lighting is a major issue of concern during the construction phase, as lacking sufficient and well distributed lighting will increase the risks of accidents and put people lives and safety at higher risk. This impact will be of higher magnitude at current road hazard points (curves, near bridges, major economic activities, etc.) and also at all parts and sections of the road where construction works will be taking place.

Differential impacts on women and men from the influx of male workers and likely increase in "social vices" (alcohol, gambling, prostitution) are likely. It is widely recognized that construction crews can facilitate the spread of HIV/AIDS, and prevention measures are required. There is potential risk to women of increased domestic violence as they attempt to benefit from the increased potential to have a better living, as part of the community participation in project activities. According to the ESIA consultations with local people, "Most people associated Contractors with social misdemeanor such as illicit sexual behaviour with local women and girls". Prostitution, gambling, abuse of alcohol, and Sexually Transmitted Diseases (STDs) can cause disruption of social networks and social tension between local people and outsiders. Child labour and school dropout as a result of children helping in petty trade to provide food and supplies to the project workers were also mentioned.

Table 70: Impact from the community Occupational Health and Safety hazards

Spatial extent	Local area/ county
Temporal extent	Short term
Reversibility	Reversible
Probability	Medium
Magnitude	Medium
Impact significance	**Medium**

26. Impacts on worker's rights

The construction phase and physical installation of the infrastructure can generate worker's rights impacts, with potentially severe impacts on workers and communities.

The negative impacts may include impacts on wages, working conditions, worker accommodation, retrenchment, and labour impacts in the construction supply chain. The influx of foreign labour may affect the ability of the local labour force to benefit from the project.

Table 71: Impact on worker's rights

Spatial extent	Local area/ county	
Temporal extent	Short term	
Reversibility	Reversible	
Probability	Medium	
Magnitude	Medium	
Impact significance	**Medium**	

27. Archaeology & Cultural Heritage

Developments that involve excavation, movement, or disturbance of soils have the potential to impact archaeological materials, if present. Activities such as road construction, land clearing, and excavation are all examples of activities that may adversely affect archaeological deposits.

The field investigation conducted indicated that the Kariokor Market is gazetted as historical site. Measures will be taken as per national policy and "is aimed at ensuring the fullest possible expression of culture and heritage in all their facets including equal access for all cultures to art and to scientific and technological knowledge, including in digital form".

Chance funds will be developed in case of an unforeseen impact. The funds will be distributed to preserve the cultural heritage. The Contractor will be bound accordingly.

Table 72: Impact on archaeology & cultural heritage

Spatial extent	Construction area
Temporal extent	Short term
Reversibility	Reversible
Probability	Medium
Magnitude	Low
Impact significance	**Minor**

9.5 Impacts at Operation phase

1. Reduction of GHG emissions

Pollutant emissions and greenhouse gas emissions caused by functioning of internal combustion engines, such as CO2, NOx, and PM (particulates), have been shown to lead to serious problems, with negative impacts on the environment and human health. Bus Rapid Transit (BRT) systems have shown to be one of the biggest reducers of greenhouse gases emissions in cities of developing countries. The sustainability of BRT systems however depends critically on the energy source, fuel type and quality, vehicle technology and the infrastructure available. It also depends on improved non-motorized infrastructure transport infrastructure, travel demand and other supporting policies.

BRT Core Line 3 will use Battery Powered Electric Buses which will be powered by battery packs that are recharged by plug-in chargers using electricity from transmission grid or stand by battery package. The fact that they do not use gasoline or diesel, battery powered electric buses do not produce tailpipe pollution.

Some of the main positive impacts of electric buses include:

- They produce significantly lower greenhouse gas emissions than diesel, diesel hybrid and natural gas-powered buses. Introduction of electric buses could eliminate more tons of greenhouse gas emissions each year;
- By eliminating diesel exhaust emissions, particulate pollution and pollutants that contribute to the formation of ground-level ozone, the buses will improve the air quality in Nairobi City;
- By reducing air pollution, electric buses can also deliver significant societal benefits, including avoided healthcare expenses resulting from cleaner air;
- Electric buses can deliver financial benefits, including substantially reduced maintenance costs and, in places where utility rate policies are favourable, reduced fuel costs.

Table 73: Impact from the reduction of GHG emissions

Spatial extent	Local area/county
Temporal extent	Long term
Reversibility	-
Probability	Certain
Magnitude	High
Impact significance	**-**

2. Community support and livelihoods opportunities

Beyond short-term employment, BRT construction can contribute to local economic development through, development of local commerce and industry. Community support measures and specific activities targeting women, the elderly and youths/ children could promote community development and enhance the local reputation of BRT post project implementation involving community employment and development.

Table 74: Impact from the community support and livelihoods opportunities

Spatial extent	Local area/county
Temporal extent	Long term
Reversibility	-
Probability	Certain
Magnitude	Medium
Impact significance	**-**

3. Road maintenance negative impacts

During the operational phase, frequent road maintenance will be done. Solid wastes will be generated during maintenance and may include road resurfacing waste (removal of the old road surface material), road litter, illegally dumped waste, or general solid waste from rest areas, vegetation waste from right-of-way maintenance; and sediment and sludge from storm water drainage system maintenance. Paint waste may also be generated from road and bridge maintenance (due to removal of old paint from road stripping and bridges prior to re-painting).

The impact will be low, short term, and reversible.

Table 75: Impact from the road maintenance

Spatial extent	Project footprint
Temporal extent	Long term
Reversibility	Reversible
Probability	Medium
Magnitude	Low
Impact significance	**Minor**

4. Solid waste generation

During operation period, road users spilling materials (oils, foodstuffs, plastic materials, and other waste), tends to leave pollutants on the road reserve, bus stops and the adjacent lands compromising the natural resources and people's health. Hazardous waste including used battery will be generated during the project operation. This will have impact on ground and surface water.

The impact will be medium, short term, and reversible.

Table 76: Impact from the solid waste generation

Spatial extent	Project footprint
Temporal extent	Long term
Reversibility	Reversible
Probability	Medium
Magnitude	Medium
Impact significance	**Medium**

5. Impacts on the existing public transport operators

Public transport operators in Nairobi, particularly Matatus, will be affected by the construction activities of the project as their routes will be altered according to the proposed the works in the RoW. These impacts are temporary in the construction phase and will become permanent in the operation phase of the project. This could have a negative impact on the operator´s income and livelihoods.

The BRT system in Nairobi has to work together with the existing buses and if possible help them to become a part of the new arrangement. The BRT system should be seen as an important long-term mechanism to resolve the current transport problems and therefore NaMATA is engaging with all stakeholders involved in Matatu and bus business to ensure there is a smooth transition. Matatus will continue to play a key role in providing a number of feeder services along the BRT corridor.

The impact will be medium, long term, and irreversible.

Table 77: Impact on the existing public transport operators

Spatial extent	Local area/county
Temporal extent	Long term
Reversibility	Irreversible
Probability	Medium
Magnitude	Medium
Impact significance	**Medium**

9.6 Impacts at Decommissioning Phase

During the decommissioning phase, a Decommissioning Plan shall be prepared based on the intended new use of the site.

1. Noise levels increment

The Project decommissioning works will result in increased noise as a result of the various demolition activities.

Table 78: Impact from the noise levels increment

Spatial extent	Construction area
Temporal extent	Short term
Reversibility	Reversible
Probability	Medium
Magnitude	Medium
Impact significance	**Medium**

2. Solid waste generation

The waste generated during the construction phase may lead to the release of certain hazardous chemicals into the environment.

Table 79: Impact from the solid waste generation

Spatial extent	Construction area
Temporal extent	Short term
Reversibility	Reversible
Probability	Medium
Magnitude	Medium
Impact significance	**Medium**

3. Dust emissions

Large quantities of dust will be generated during decommissioning works at the campsite. This will impact negatively on the workers as well as the neighbouring residents.

Table 80: Impact from dust emissions

Spatial extent	Construction area
Temporal extent	Short term
Reversibility	Reversible
Probability	Medium
Magnitude	Low
Impact significance	**Minor**

4. Occupational Health and Safety hazards

Decommissioning works will inevitably expose workers and the public to occupational health and public safety risks in particular, working with heavy equipment; handling and use of tools engender certain risks. The workers are also likely to be exposed to risk of accidents and injuries resulting from accidental falls, falling objects, injuries from hand tools and other equipment.

Table 81: Impacts from Occupational Health and Safety hazards

Spatial extent	Local area/county
Temporal extent	Short term
Reversibility	Reversible
Probability	Medium
Magnitude	Medium
Impact significance	**Medium**

9.7 Summary of impacts

Table 82 presents a summary of the impacts to environmental resources and receptors assessed in this section.

Table 82: Summary of impacts

Nature of impact / impact description	**Spatial extent**			**Temporal extent**			**Reversibility**		**Probability**			**Magnitude**			**Impact significance**
	Project	Construction area	Local area	Short term	Medium	Long-term	Reversible	Irreversible	Medium	High	Certain	Low	Medium	High	
Mobilization Phase															
3. Creation of employment			X	X							X		X		-
4. Loss of vegetation		X		X				X			X	X			
5. Generation of noise		X		X			X		X				X		
6. Deterioration of ambient air quality		X		X			X		X				X		
7. Risk of road traffic accidents		X		X			X		X				X		
Construction Phase															

Nature of impact / impact description	Spatial extent			Temporal extent			Reversibility		Probability			Magnitude			Impact significance
	Project	Construction area	Local area	Short term	Medium	Long-term	Reversible	Irreversible	Medium	High	Certain	Low	Medium	High	
8. Creation of employment			X	X							X		X		-
9. Informal sector benefits			X	X							X		X		-
10. Development of other sectors			X	X							X		X		-
11. Improvement of growth of the economy and trade			X	X							X		X		-
12. Temporary loss of land		X		X			X				X		X		
13. Permanent loss of land	X					X		X			X			X	
14. Loss of properties	X					X		X			X			X	
15. Removal and disturbance of flora		X		X			X				X		X		
16. Soil compaction, erosion and land degradation		X		X			X			X			X		
17. Generation of solid waste		X		X			X			X			X		
18. Water quality deterioration		X		X			X		X				X		

Nature of impact / impact description	Spatial extent			Temporal extent			Reversibility		Probability			Magnitude			Impact significance
	Project	Construction area	Local area	Short term	Medium	Long-term	Reversible	Irreversible	Medium	High	Certain	Low	Medium	High	
19. Wastewater generation and disposal		X		X			X		X				X		
20. Increment of noise levels		X		X			X		X				X		
21. Deterioration of ambient air quality		X		X			X		X				X		
22. Accidental spillage of hazardous materials			X	X			X		X			X			
23. Risk of fire outbreak			X	X			X		X			X			
24. Increment of traffic		X		X			X			X		X			
25. Increment of water demand and pressure on existing supply		X		X			X		X				X		
26. Extraction of construction materials			X		X			X			X			X	
27. Construction works energy demand			X	X			X		X				X		
28. Disruption of public utilities	X			X			X		X				X		

Nature of impact / impact description	Spatial extent			Temporal extent			Reversibility		Probability			Magnitude			Impact significance
	Project	Construction area	Local area	Short term	Medium	Long-term	Reversible	Irreversible	Medium	High	Certain	Low	Medium	High	
29. Socio-economic, cultural impacts and increased social vices			X	X			X		X				X		
30. Impact on vulnerable groups			X	X			X		X				X		
31. Impacts on the existing public transport operators			X			X		X	X					X	
32. Occupational Health and Safety Hazards - workers			X			X	X		X				X		
33. Occupational Health and Safety Hazards - community			X			X	X		X				X		
34. Impacts on worker's rights			X			X	X		X				X		
35. Archaeology & Cultural Heritage		X		X			X		X			X			
Operation Phase															
36. Reduction of GHG emissions			X			X					X			X	-
37. Community support and livelihoods opportunities			X			X					X		X		-

Nature of impact / impact description	Spatial extent			Temporal extent			Reversibility		Probability			Magnitude			Impact significance
	Project	Construction area	Local area	Short term	Medium	Long-term	Reversible	Irreversible	Medium	High	Certain	Low	Medium	High	
38. Road maintenance negative impacts	X					X		X		X			X		
39. Solid waste generation	X					X		X	X				X		
40. Impacts on the existing public transport operators			X			X		X	X			X			
Decommissioning Phase															
41. Noise levels increment		X		X			X		X				X		
42. Solid waste generation		X		X			X		X				X		
43. Dust emissions		X		X			X		X			X			
44. Occupational Health and Safety hazards			X	X			X		X				X		

9.8 Cumulative Impacts

As described in section 9.2 cumulative impacts occur as a result of a series of activities that, when combined or overlapping, could potentially cause a significant impact to occur. When considered together, a series of impacts assessed within the individual phases of this project, which could exert greater pressures on the environment than on their own.

Potential cumulative sources of impacts around the Project Site include the following:

- The existing direct and indirect areas of influence where the BRT System will operate is characterized by heavy urbanization and traffic congestion. On-road traffic is already contributing to national air pollution emission levels, ambient air quality and GHG emissions, and elevated noise levels.
- The noise pollution in the area of influence is on already at a higher level due to the high number 'matatus' plying that route.
- Poor safety record on the roads and accident rates are already very high.

Heavy urbanization and traffic congestion are likely to have similar impacts to the Project, including impacts associated with construction works, emissions, vehicle traffic and noise. Given the anticipated levels of impact for all project activities, it is very unlikely that these impacts could act together with impacts from the other projects in order to create any significant cumulative impacts.

10 MITIGATION MEASURES

10.1 Introduction

This section presents mitigation measures and/or compensatory actions or measures for the identified impacts. The section seeks to provide mitigation measures to address, as far as possible, any adverse impacts due to proposed project and utilizing existing environmental attributes for optimum development. The proposed mitigation measures endeavour to avoid, reduce and remedy the potential impacts and where possible maximize potential positive effects.

Many of the potential impacts identified the previous section can be eliminated or reduced through the implementation of appropriate mitigation measures either at the planning stage or when applied to specific project tasks and activities. The proponent will ensure that any significant impacts identified are managed within its capability in collaboration with other relevant stakeholders and the Contractor.

Mitigation measures are preceded with an id number for the impact identified in the previous section.

10.2 Mitigation measures during mobilization and construction phases

MM2. and MM3. Loss of vegetation and removal and disturbance of flora

To minimize destruction of existing vegetation along the ROW, the Contractor will; avoid unnecessary vegetation clearing; ensure proper demarcation and delineation of the project area to be affected by construction works; and areas of the site which should be used for equipment and machine storage; with assistance from the community, Nairobi City County Government and Kenya Forest Service (KFS), initiate a tree planting exercise within the project area; and support County - community tree planting initiatives.

To mitigate the impact of loss of vegetation, the following measures are proposed:

- *A comprehensive vegetation impact survey should be conducted which should indicate all affected vegetation.*
- *Avoid cutting of short trees whose heights are lower than the power line.*
- *Equipment to be used should be decontaminated e.g., washing equipment to remove soil potentially carrying invasive plants propagules.*
- *Avoid importing soils/gravels to use for level grounds for vehicles to pass in ROW should be avoided. If brought from outside, the surface of the soil should be removed to avoid mixing of soils potentially harbouring invasive plants propagules.*
- *Site clearance shall be minimized but will permit safe and efficient movement of personnel, materials and equipment.*
- *Cleared trees should be left for the local people to collect as firewood.*
- *The Contractor shall avoid unnecessary removal of the vegetation, especially woody trees. When removal of vegetation is not avoidable, they shall be replaced by original or indigenous vegetation species soon after completion of construction works within the project area.*

- *During site clearing for the camps, top soil shall be stockpiled so that it is used for vegetation during site reinstatement Develop and implement a ROW vegetative maintenance plan*
- *Restoration/ Rehabilitation plan for disturbed areas*
- *Under any circumstances, the Contractor shall not use the cleared trees for other purposes such as firewood.*
- *The Contractor will prevent vegetation trampling by restricting access to the construction areas only.*
- As much as it is practical, existing vegetation shall be preserved to the extent possible, by confining construction activities to road alignment.

MM10, MM11 and MM12. Loss of land and loss of properties

As indicated in the impact assessment section, there will be loss of land and loss of property due to the proposed Project. The proponent is advised to undertake the following to mitigate against the envisaged impacts. The proposed mitigation measures shall include:

- *Conducting a Resettlement Action Plan to EIB AND AFD standards to determine the persons affected and are eligible for compensation.*

  The RAP must include the following:

  - *Need to consider economic displacement and loss of household income.*
  - *Consideration of both rightful and non-rightful owners, squatters and other categories of informal land users.*

  The following eligibility must be recognized and applicable where the project undertakes land acquisition or impacts the livelihoods of local residents:

  - *People who occupy or derive livelihoods from a piece of land prior to the cut-off date and who will be physically and/or economically displaced due to permanent or temporary loss of land, structures and/or livelihood, whether full or partial, as a consequence of the project will be eligible for compensation:*
  - *Such eligible PAPs include the following:*
  - *Owners of land and/or structures, including those recognized as legally titled or legalized on the basis of claims recognizable under national law;*
  - *Lessees (leaseholders) of state or private land, whether long-term or short-term;*
  - *Tenants with or without formal legal registration according to national law;*
  - *PAPs that neither have formal legal rights nor recognizable claims to lands will be entitled to be compensated for their non-land assets. The eligibility also includes both those who are temporarily/permanently or partially/fully affected by the project including squatters or encroachers;*
  - *Business owners, whether registered under national law or informal;*
  - *Employees of private or public businesses or enterprises, whether registered under national law or informal;*
  - *Cultivators of plants and tree seedlings, irrespective of legal status of property relation to land;*

- *Vulnerable persons, including households headed by women, elderly and/or disabled persons, the households in local context with per capita incomes at or below the poverty line.*
- *Mobile vendors and others who may be drawing livelihoods from the project area.*

- *The proponent should work with Nairobi City County Governments, County Administration and other local leaders to sensitize public on the intentions of land acquisition where the wayleave width is not adequate. This must be done prior to project implementation to give people sufficient time for planning and proper assessment.*

Any anticipated compensation for land or assets affected should be done prior to project implementation.

MM14. Soil compaction, erosion and land degradation

To reduce soil erosion, the proponent will; apply soil erosion control measures such as levelling of the project site to reduce run-off velocity and increase infiltration of storm water into the soil; ensure that construction vehicles are restricted to use existing graded roads; ensure that any compacted areas are ripped to reduce run-off; develop and implement a storm water management plan that minimizes impervious area infiltration by use of recharge areas and use of detention and/or retention with graduated outlet control structure. The specific mitigation measures include the following:

- *Totally avoid encroachment into private or public properties by properly demarcating the project area to be affected by the construction works and restricting construction works including movement of vehicles to the actual project area to avoid effects spilling over into neighbouring areas.*
- *Drainage works for storm water must adhere to the Public Works specifications.*
- *Supervise all construction works. All excavation and cutting to take place as instructed in the approved structural plans for the proposed project structures.*
- *Monitor areas of exposed soil during periods of heavy rainfall throughout the construction phase of the project to ensure that any incidents of erosion are quickly controlled.*
- *Safe storage areas should be identified and retaining structures put in place.*
- *Materials to be delivered on site in instalments to avoid stockpiling and possible wastage.*
- *Areas of ground surface clearance (exposed soil) will be minimized by re-vegetating with natural vegetation.*
- *Unnecessary disturbance of sensitive areas like steep slopes shall be avoided as much as possible.*

MM15. Generation of solid waste

To avoid waste generation or to minimize the amount of waste generated, the following measures are recommended;

- *A waste management plan must be prepared by the Contractor for the construction and post-construction (demobilisation) phases of the project.*

- *Special attention should be given to minimizing and reducing the quantities of solid waste produced during site preparation/ clearance, excavation and construction activities.*
- *Any combustible waste must not be burned on the site.*
- *Reusable inorganic waste (e.g., excavated sand/soils) should be stockpiled away from drainage features and used for in filling where necessary and/or possible.*
- *The Nairobi City County Government must dispose of unusable construction waste, such as formwork and other construction material, at an approved dumpsite.*
- *Skips and bins should be strategically placed within the campsite and emptied regularly. The skips and bins at the campsite should be adequately designed and covered to prevent access by vermin and minimize odour.*
- *Construction waste to be managed in accordance with national standards. Hazardous waste such as spent transformer oil should be collected/disposed through an authorized dealer.*
- *Scrap steel and other salvaged materials to be disposed/ recycled off-site by licensed vendors.*

MM16. Water quality deterioration

The proposed mitigation measures for alleviating potential impacts on the water resources and water quality include:

- *Install treatment facilities and/or oil/water separators to remove oil and grease from drainage water prior to discharge at campsite.*
- *Implement the construction waste and wastewater management plan.*
- *The construction vehicles and equipment will be regularly maintained from a recognized garage off-site or a well bounded onsite area thus minimizing the potential for leakages to the natural environment.*
- *Secondary containment measures in areas where fuels, oils, lubricants and construction materials such as cement are stored and loaded or unloaded, including fueling points should be installed.*
- *Design and install a septic tank system for human sanitary purposes at the campsite.*
- *Provide disposal facilities for waste at the campsite and properly allocate the dumping site.*
- *Undertake regular water quality testing in NEMA accredited laboratories.*
- *Avoiding alignments that are susceptible to erosion, such as those along or crossing steep slopes.*
- *Preventive measures for runoff, erosion and sediment control.*

MM17. Wastewater generation and disposal

The impact due to improper disposal of human sanitary waste shall be mitigated by construction of sanitation facility at the camp. The type of facility will be of water closet (flush type). The sanitary wastewater shall be treated and disposed of on-site by septic tank – soak away method.

MM3 and MM18. Increment of noise levels

Ensure that noise levels emanating from machinery, vehicles and noisy construction activities (e.g., excavation, blasting) are kept at a minimum for the safety, health and protection of workers within the vicinity of site and nearby communities. The Contractor will adhere to the EMCA Noise and Excessive Vibration Pollution Control Regulation, 2009 and will be required to implement noise control measures amongst exposed work force and community. This will include provision of hearing protective devices such as ear plugs and earmuffs; avoiding construction or demolition activities during the night, education and awareness programmes and creation of a buffer to propagate against noise pollution among other noise control measures.

The proposed mitigation measures include the following:

- *Provision of protective devices like earmuffs/earplugs to workers, who are continuously exposed to high levels of noise during construction activities.*
- *Providing silencers or enclosures for noise generating machines such DG sets, compressors, etc.*
- *Restrict noisy construction activities to normal working hours (8am - 5pm).*
- *Use equipment that has low noise emissions as stated by the manufacturers.*
- *Use equipment that are properly fitted with noise reduction devices such as mufflers*
- *Limit pickup trucks and other small equipment to an idling time of five minutes, observe a common-sense approach to vehicle use, and encourage workers to switch off vehicle engines whenever possible.*
- *All construction equipment should be regularly inspected and serviced.*

MM4 and MM19 Deterioration of ambient air quality

The only potential direct impact from the proposed Project construction as it relates to air quality is dust emissions and exhaust fumes/ emissions. The impact due to pollution of ambient air by dust and exhaust fumes shall be mitigated as follows:

- *The project ROW road, material haul/ access roads and diversion roads across settlements and active construction sites shall be sprayed with water at least twice a day to suppress the generation of dust.*
- *Haulage trucks carrying dusty material shall be covered with tarpaulin to prevent escape of dust from material being transported.*
- *When equipment is not in use, they shall be switched off to minimize the concentration of exhaust fume from equipment and so protect the workers at material borrow sites.*
- *The Contractor shall properly tune engine of equipment to ensure complete combustion of fuel and so minimize exhaust fumes.*
- *The Contractor shall provide workers with dust masks and ensure that they are used properly to prevent them from inhaling polluted air.*
- *Stockpiles of fine materials (e.g., sand and concrete) should be wetted or covered with tarpaulin during windy conditions.*
- *Regular inspection and maintenance of construction equipment.*
- *Avoid burning of solid waste at the campsite.*

MM20. Accidental spillage of hazardous materials

A Hazardous Substances Management Program must be prepared by the Contractor.

MM21. Risk of fire outbreak

To mitigate against fire outbreaks, the proponent will;

- *Ensure compliance with fire safety regulations and install all necessary fire safety equipment.*
- *Conduct regular trainings and fire drills for employees.*
- *Provide adequate number of appropriate firefighting equipment and Post 'No smoking signs' where flammable materials will be stored at the campsite level.*
- *Organize for inspection and maintenance of fire equipment at least once in a period of three months for site.*
- *Declare places with flammable materials as "NO SMOKING ZONES" and display conspicuous notices of the same.*
- *Establish and mark a "FIRE ASSEMBLY POINT" and designate parking spaces for emergency management vehicles at strategic outdoor points at the site.*
- *Clearly mark "FIRE EXIT" points from the proposed campsite and ensure that they are visible.*
- *Develop and post at the camp site, fire emergency and evacuation procedures*
- *Weather-proof all lighting and power points at the site.*
- *At least one person trained on handling firefighting techniques should be available through-out the construction phase of the project.*

MM5 and MM22 Increment of traffic and risk of road traffic accidents

Traffic congestion due to increased movement of construction equipment and vehicles, diverting the already congested public traffic to narrow and relatively poor diversion roads will be a major and short-term significant impact. The proposed mitigation measures are therefore not expected to mitigate the impact fully. The following control measures for the localized traffic are proposed for implementation:

- *The Contractor must prepare a Traffic management Plan, including deploying traffic management personal at all active construction sites.*
- *Issue notices/advisories of pending traffic inconveniences and solicit tolerance by local residents before the commencement of construction works.*
- *Appropriate traffic warning signs, informing road users of construction activities ahead and instructing them to reduce speed, should be placed along the road sections used for the BRT construction.*
- *Flag-women should be employed to control traffic and assist construction vehicles as they use the road section under the construction site.*
- *As far as possible, transport of construction materials should be scheduled for off-- peak traffic hours. This will reduce the risk of traffic congestion and of road accidents on the road sections.*
- *Proper planning of transportation of construction materials to ensure that vehicle fills are increased in order to reduce the number of trips done or the number of vehicles on the road.*

- *Erection of signs ahead of the works warning motorists of the heavy/construction units entering the road sections along the ROW.*

MM23. Increment of water demand and pressure on existing supply

The proposed construction activities will require water for use at the camp level as well as water needed by the construction workers. This will result to increased water demand throughout the construction phase. The area being scares of water resources; the proponent is advised to seek out a reliable means of water to use both during construction as well as at operational stage. Increase in water demand can be minimized by:

- *Implementing appropriate water conservation measures and sensitize construction workers on the importance of proper water management.*
- *Develop water abstraction plan to minimize conflict with local residents.*
- *The Contractor should generate a water utility management plan.*
- *The Contractor should minimize damage to public water utilities during construction activities;*
- *Ensure provision of adequate water storage facilities on the camp site to meet project needs during periods of high demand externally and refill of storage tanks during periods of low demand;*
- *Repair water equipment as needed to prevent unintended discharges.*

MM24. Extraction of construction materials

The project and material requirements will be evaluated and quantified to ensure that the design optimizes the use of materials. This will help to prevent misuse of the materials.

- *Immediately after construction, all the borrow pits shall be rehabilitated according to the plans approved*
- *Material for construction must be taken for testing and approval by relevant departments at the Public Works offices before they are used for construction.*
- *Proper planning of transportation of materials will ensure that products of fossil fuels (diesel and petrol) are not excessively consumed.*
- *Waste rock/spoil materials should be placed at designated areas with proper biological reclamation.*
- *Compaction and re-vegetation of exposed areas as soon as possible.*
- *Topsoil deteriorates in quality while stockpiled. To help maintain soil quality, topsoil should be kept separate from overburden and other materials; and should be protected from erosion. Also, wherever possible, stripped topsoil should be placed directly onto an area being rehabilitated.*
- *If the topsoil is to be stored for a long duration, it should have a vegetal cover of, preferably, leguminous species (grasses and shrubs).*

MM25. Construction works energy demand

Possible options for minimization of energy include:

- *Limiting unnecessary idling of construction equipment as well as adequately tuning of engines of the construction equipment and vehicles to minimize fuel consumption).*
- *Encourage carpooling (sharing of vehicles) among construction workers.*
- *The Contractor shall not be allowed to use firewood and charcoal for boiling of bitumen. In addition, the Contractor shall not be allowed to use firewood (including trees cleared from the road side) and charcoal as sources of energy for cooking.*
- *Use of energy efficient night-time lighting only at the camp-site.*
- *Light sensor switches can be used to ensure outdoor lights are not used during daytime.*
- *All energy using equipment used should be switched off when not in use.*
- *Control of fires and explosions is important in energy-use and management to reduce damage on property, avoid injuries and accidents and protect electrical appliances and lives.*

MM26. Disruption of public utilities

- *A Utility Management Plan must be prepared by the Contractor and implemented prior to the construction phase.*
- *The proponent to consult the service providers in case of any relocation exercise.*
- *Consumers to be informed prior of any interruption to services.*

MM27. Socio-economic, cultural impacts and increased social vices

To mitigate the impact due to resource use conflict, the Proponent shall not approve the siting of the construction campsite in the neighbourhood of settlements and the camp shall be totally catered for by the Contractor. The camp shall be furnished with all the necessary social services to minimize interactions of the foreign workers with the community save only for the locally employed workers.

The proposed project will result in an influx of outsiders into the community and this is likely to bring conflict if either party is not respectful of each other. To minimize project effects on local social set up, the proponent will; conduct periodic sensitization forums for employees on ethics, morals, general good behaviour and the need for the project to co-exist with the neighbours; offer guidance and counselling on HIV/AIDS and other STDs to employees; provide condoms to employees; and ensure no sexual harassment and abuse of office at the workplace.

Cross-cultural training that relays information regarding the variety of cultures represented during the construction phase of the project would be provided during employee orientation. An understanding of cultural behavioural differences can reduce risks for workplace violence. Specific security measures would be in place to address violence at the work site and security problems. Project Contractors would be responsible for developing and implementing an accident/injury prevention plan(s) to address worker safety. There will therefore be a need to develop and foster peaceful co-existence:

- *Employ workers from the immediate area where feasible to avoid social conflict.*
- *Establish a code of conduct for the project workers*
- *Creating awareness towards the diversity of cultures and different economic background of the people in the project staff and residents through sensitization. Additionally, sensitize*

foreign workers to respect and obey the local customs and social norms of the project area community.

- *The Contractor should develop and implement labor influx plan during the project implementation phase.*
- *Non-native workers during the construction phase should be housed in the temporary workers' camp while the local workers will return to their homes in the local communities. The camp will have the necessary social service amenities like health, water and sanitation facilities for the workers.*
- *Employ local security personnel to protect Contractor's assets as well as the staff on the campsite.*
- *Restrict construction workers to the campsite and limit their mingling with the local residents who are not project workers.*
- *Develop a Grievance Redress Mechanism (GRM) that should outline how the Contractor will address any complaints or grievances raised by the communities or by their employees.*
- *Promoting social cohesion and integration among people in the area.*
- *Restrict unauthorized entry to the campsite by non-workers; keep records of entry and exits for people, vehicles and materials to site.*
- *All communications with the community should be documented.*
- *Display communicative posters within site on HIV/AIDS related messages at the campsite and avail literature on HIV/AIDS awareness to staff.*
- *Proponent to ensure the public are involved in all stages and that their recommendations and concerns are addressed to encourage ownership of the project.*

Some of the identified and evaluated social issues include the following:

Accidents Involving Community Members

It is possible that accidents involving local community members along the project road sections within the ROW could occur at some stage during the construction phase of the project. This could include traffic- related accidents or accidents involving falling in open excavations, or other accidents. Traffic related accidents during the construction phase of the project could be caused by increased traffic volume. If construction works are not properly conducted and managed with safety measures considered, people passing near the construction site could be at risk. If accidents happen to any community member it will have a major residual impact in terms of diminishing the quality of life for the victim, negatively impacting them or their household livelihood, and potentially creating hostility towards the project and project team.

The mitigation measures include

- *Installing proper barricades, signs, providing flags, lights and personnel to control the traffic and separate the construction area from potential receptors;*
- *Emergency plans/ evacuation plans to be in place in case of injuries and accidents.*

Un-met employment expectations

Because there are higher unemployment rates in the project area, residents in directly affected settlements that are unsuccessful in their job applications are likely to become frustrated when they do not gain employment. All the villages along the project ROW will anticipate employment opportunities. This could create resentment and possibly hostility towards those who win job and could cause resentment towards the project. Measures to manage expectations regarding employment opportunities will help to reduce this potential impact. However, it is likely to remain a key concern of communities and the public in general given the high interest in employment found during the consultations. Hence, the impact could be major. It is also possible that there will be a short-term residual impact of discontent and perhaps resentment towards the project arising from perceptions of bias in recruitment process. Experience of large-scale construction projects indicates that it will be extremely difficult to eliminate all bias from the recruitment process.

The mitigation measures include;

- *Implementing a collaborative hiring process by involving different people to be in charge of the hiring process. This will ensure diversity and inclusion of personnel with different attributes to offer.*
- *Building awareness on hiring bias to all the personnel that will be responsible for recruitment of those that will work on the project.*
- *Ensure gender mainstreaming during the hiring process.*

Tension between communities, workers and the project (Resources Use Conflict)

It is likely that there will be incidents and tensions between workers and communities at particular times and locations during the construction phase given the number and range of impacts that will affect communities. The mitigation measures proposed will minimize the project impacts but where any incidents are not completely resolved there could be a localized residual impact in loss of trust and increased discontent with the project and project team. The community relations plan and activities should be designed to address these situations and to minimize residual discontent or resentment among communities.

Marital and Social Conflicts

The impact due to marital and social conflicts will be a residual impact, and it can be mitigated at the project level by enforcing a code of conduct that will define the ethics in solving these conflicts.

Increased Transmission of STIs/HIV

To mitigate the impact due to increased transmission of STIs/ HIV, there shall be a HIV alleviation program. The Contractor should hire an organization (Sub-Contractor) experienced in the provision of HIV/AIDS awareness and prevention activities to prepare and implement HIV alleviation program on their behalf. The Sub-Contractors shall work closely with various stakeholders (including communities and their leaders, schools and health centers, civil societies to have an educational awareness campaign during mobilization, construction, and demobilization phases of the project in order to prevent the further spread of HIV/AIDS due to construction activities. There is a residual risk that interaction of the workforce with local communities will increase the transmission of communicable diseases such as HIV/AIDS and other STIs, despite health training on communicable diseases. The likelihood and severity will depend upon the health of the workforce and the level of interaction with the local settlements. This impact may include short-term outbreaks of diseases (STDs), but also more serious communicable diseases with long-term effect on community mortality levels (HIV/AIDs).

MM28. Impacts on vulnerable groups

- *Vulnerable households, legal/ legalizable owners, tenants or encroachers will be entitled to one vulnerable impact allowance equal to the market value of the harvest of the lost land for one year (summer and winter), in addition to the standard crop compensation.*
  The aim of this payment is to assist severely displaced persons to overcome the short term adverse impacts of land and asset loss and help them to readjust to their changed circumstances while they are making replacement earning arrangements. The one-time payment should, at the absolute minimum be adequate to provide them with equivalent level of livelihood than they had previously.
- *All vulnerable PAPs affected by the loss of land will be assisted with the identification and purchase or rental of a new plot and/or structure, as the case may be, as well as the administrative process of land transfer, including cadastral mapping and registration of their property titles.*
- *All vulnerable PAPs affected by the loss of a structure will be assisted with the construction of a new structure or the identification and purchase or rental of a new structure, as the case may be.*
- *Temporary occupation of land at properties owned or occupied by vulnerable persons will be avoided and, if unavoidable, preferentially mitigated.*

MM29. Impacts on the existing public transport operators

- *Public transport operators must be informed of the construction scheduling;*

- *Contractor and proponents must assist the Matatus operator in planning the rerouting for the circulation during the construction phase.*

MM30. Occupational Health and Safety hazards – workers

Specific measures will be in place to maintain a safe work environment and prevent accidents. Site-specific medical emergency response plans will be in place for all work locations. Should an incident occur, specific investigation procedures would be in place to determine the cause and prevent future occurrences. During orientation, on-site safety training for all project personnel and driver safety training for all drivers will be provided. Project workers will be required to use appropriate safety equipment and follow site safety practices. Road safety signage shall be installed along existing road sections utilized for the project. Pictorial construction safety signage around all construction sites shall be provided. Access to construction areas will be limited. The project workforce, including drivers shall participate in a drug and alcohol program.

This will be enhanced through the following approaches:

- *Formulation and implementation of safety policy for the proposed Project.*
- *The Contractors must have a health and safety officer to manage all the accidents and safety concerns on site.*
- *Advice workers and visitors to take precautions not to cause any effect on their own health or to the health of other persons.*
- *Engaging only those workers who are trained to operate specific machines and equipment.*
- *Proper signs on construction sites to warn workers of safety requirements as regards machines with moving parts and other equipment at site.*
- *Provide a First Aid Box and have a trained person to handle site emergencies and incidences.*
- *Display in the campsite telephone numbers of ambulances or provide a site vehicle to specifically transport the injured to hospital.*
- *Provide fire-fighting mechanism at the campsite. Display emergency call numbers that can be used in case of a site fire.*
- *Provide washing (enclosed bathroom) and toilet facilities at site with both drinking and washing water. The number of workers engaged determines the number of the toilets and bathrooms provided. These facilities should be adequate and fit for use for both genders both at the campsite and along the construction site.*
- *Ensure the project areas are marked and appropriate signage used to warn the public of the ongoing project.*
- *Enforcing adherence to safety procedures and preparing contingency plan for accident response.*
- *Providing all employees with suitable safety and protective gears (PPEs);*
- *Ensuring that all machinery used on the site are properly maintained and inspected before use;*
- *Place warning signs for hazardous or flammable substances and ensure chemicals are stored safely and MSDS are made available educating workers on the same.*

- *Excellent housekeeping standards should be maintained on site and construction stores.*
- *Ensure that provisions for reporting incidents, accidents and dangerous occurrences during construction using prescribed forms obtainable from the Directorate of Occupational Health and Safety Services (DOSHs) are in place.*

Project Contractors, including trucking/transportation Contractors, will be required to implement STD programs aimed at reducing the transmission of STDs/HIV. Distribution and availability of condoms will be aggressively promoted. The Government of Kenya will be responsible for implementing its existing programs and policies with the continued support of other development partners currently involved in Kenya's STD/HIV initiatives. These efforts will be concentrated in the project area during project construction. The role of the government in the overall approach to the problem of STDs is critical since the movement and activity of high-risk commercial sex workers is an issue that cannot be controlled by the project. Ongoing monitoring and surveillance of HIV/AIDS rates for the community will be the responsibility of the government using existing policies, procedures, protocols, and strategies. Any monitoring of the work force or other activities for STD/HIV will be consistent and compatible with the overall Kenyan strategies for HIV/AIDS.

Mitigation Measures recommended for implementation to enable reduce the spread of the virus include the following:

- *Proponent and Contractor to consider employing local labourers as this limits the number of labourers settling in new places leaving their families behind.*
- *Develop HIV/AIDS awareness programmes or initiatives to target the construction workers, institutional communities and the general members of the community, particularly the youths; with the objective of reducing the risks of exposure and the spread of HIV virus in the project area.*
- *Develop appropriate training and awareness materials for Information, Education and Communication on HIV/AIDS.*
- *Develop an intervention strategy compatible with the construction programme to address success of the HIV/AIDS prevention and provide peer educators for sustainability in collaboration with other stakeholders.*
- *Integrate monitoring of HIV/AIDS preventive activities as part of the construction supervision. Basic knowledge, attitude and practices are among the parameters to be monitored, and particularly on provision of condoms, status testing and use of ARVs.*

The proponent shall develop and implement Covid-19 Policies and Workplace Readiness. These shall be communicated to all employees, a COVID-19 Preparedness Policy Statement that address all aspects of COVID-19 readiness including but not limited to Policy, Planning and Organizing activities for COVID-19; Occupational Safety and Health Risk Assessment, Management and Communication; Prevention and Mitigation Measures against COVID-19 and arrangements for dealing with suspected and confirmed COVID-19 cases and clear guidelines and specific requirements when sick or ill staff may be absent to attend hospital and to staff who are not sick or ill but need to be absent to care for others, especially family members. The prevention and mitigation measures shall include but not limited to infection control plans, ensuring social distancing of not less two (2) meters between

employees in all directions, suitable hand sanitizing facility or handwashing soap and water and the strict proper use of facemasks throughout all working hours and public places. A summary of the Policy Statement and level of COVID-19 Readiness and preparedness shall be submitted to the Director of Occupational Safety and Health Services within thirty (30) days from the date of opening the work workplace.

MM31. Occupational Health and Safety hazards – community

Implement appropriate safety measures regarding the people who are living or using the households located close to the planned work areas, and/or might be passing within or close to the work zones. The following mitigation measures to ensure public safety shall be implemented by the Contractor:

- *Implement precautions to ensure that objects (e.g., equipment, tool, debris, precast sections, etc.) do not fall onto or hit people, vehicles and properties in adjoining areas.*
- *Fencing of construction sites and regular patrols to restrict public access.*
- *Prior to excavation work, provide fencing on all sides of areas to be excavated.*
- *Provide warning signs at the periphery of the construction site.*
- *Strictly impose speed limits along residential areas and where other sensitive receptors are located.*
- *Educate drivers on safe driving practices to minimize accidents and to prevent spill of hazardous substances and other construction materials during transport.*

The following are measures within the ESMS that must be implemented to guarantee the health, safety and security conditions of the communities that could be directly affected by the Project:

- *An Emergency Preparedness and Response Program must be prepared by the Contractor and must include an identification of areas where accidents and emergency situations may occur, communities and individuals that may be affected, response procedures, provision of equipment and resources, designation of responsibilities, communication, including that of potentially affected communities and periodic training to ensure an effective response;*
- *A Security Personnel Program must be prepared by the Contractor to manage and control potential security risks and impacts resulting from the recruitment and performance of the Project's security personnel.*

Additionally, the Project the following mitigation measures must be implemented by the Contractor in the construction phase:

- *Waste Management Plan*;
- *Hazardous Substances Management Program*;
- *Transit* Management Program;
- *A* Risk Management Plan with the implementation of the mitigation above defined.

MM32. Impacts on worker's rights

Low awareness of labour laws

Contractors and Sub-Contractors shall ensure that operative's health is well maintained and arrange a regular periodic health examination and follow up with any serious issues. Contractors and Sub-Contractors shall ensure control measures in place to protect employees from dust, noise and infections by providing adequate rest areas and toilets, and by monitoring the hygienic condition of the site and welfare facilities. Regular testing to drinking water shall be made to all drinking points on site.

Construction is one of the most dangerous occupations in the world, incurring more occupational fatalities than any other sector. This section intends to provide the workers with the right knowledge and information, enabling them to understand their responsibilities and rights as an employee of the construction industry in Kenya.

Low awareness of Labour Laws

It is crucial that labour is aware of their rights as well as their duties. Educated workers will create a healthier construction site. Contractors are requested to inform and educate labour of their own rights and obligations by:

- *Setting health and safety requirements in tender specifications, meeting* EIB's requirements.
- *Ensuring all persons, incl*uding managers, are trained and able to carry out their work without risk to the safety or health of themselves or other workers.
- *Ensure proper training and precise information on labour law.*

Low wages

- *Make sure that all workers are informed of their r*ights including wages and benefits and on their fundamental right to associate freely under the law;
- *Communicate policies to labour intermediaries as appropriate and make sure they understand;*
- *Make policies contractually binding under the service agreeme*nt with labour intermediaries;
- *Appoint a supervisor(s) to physically observe, on a periodic basis, the payment of wages and inspect welfare facilities and OHS practices on sites;*
- *Implement a risk-free communication channel to receive workers' complaints* – openly or anonymously – on labour rights violations including payment of wages;
- *Develop policies on remuneration, working conditions.*
- *Strikes and Forced Labour*

Terrorism, Riots and Civil Disobedience

As part of mitigations measures for Terrorism, riots, hostile mobs, civil disobedience, muggings, robberies, and car-jackings and landmines (Landmines are most common in the southern provinces outside the cities.)

- *Ensuring all persons, including managers,* are trained and able to act on such emergency happenings.

- *Local authorities´ emergency telephone numbers to be shown at all strategic places and accessible to all personnel.*
- *Security 24/7 must be deployed at site.*
- *Site and surroundings must have adequat*e suitable lighting and signage.
- *Ensuring all persons, including managers, are trained and able to act on such emergency happenings.*
- *Local authorities´ emergency telephone numbers to be shown at all strategic places and accessible to all personnel.*

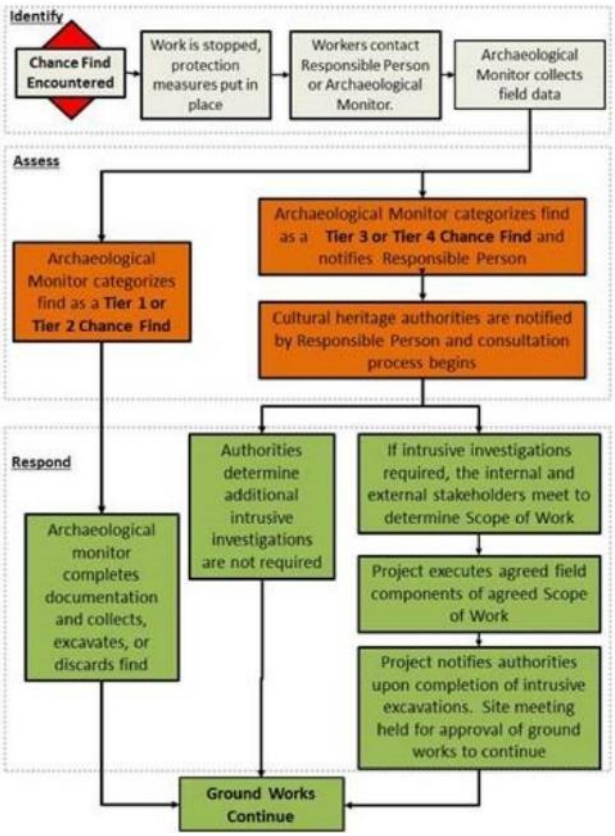
MM33. Archaeology & Cultural Heritage

A Cultural Heritage Management Plan (CHMP) must be prepared aimed at preserve and protect cultural heritage sites or artefacts from adverse impacts associated with Project activities. The CHMP will aim to minimise the chance of damage to any archaeological or culturally significant sites during construction and will present a methodology and procedure for adequately mitigating for "chance finds" should they be discovered. The Chance Finds Procedure (CFP) must outline the cultural heritage management principles and procedures to be followed during construction and operations in accordance with the Project's policies and national legal requirements.

The CFP must include the following elements:

- *A review of* Kenyan heritage legislation as it relates to chance finds and government agency or ministry notification requirements and procedures;
- *A multi-tiered classification system for chance finds based on previously id*entified cultural heritage resources types and protections afforded to different types of cultural heritage resources by Kenya heritage legislation, IFC PS 8, and recognized industry standards.
- *A step-by-step procedure to be followed by Company staff in the* event that a chance find is discovered, including clear criteria for potential temporary work stoppages in the area of the find;
- *Clearly defined roles and responsibilities and response times* required from both Company staff and relevant heritage authorities;
- *A framework for defining the scale and scope of potential mitigation measures (e.g.*, collection, rescue excavations, or relocation), including guidelines for estimating time and cost associated with these measures;
- *Procedures for consulting with* heritage authorities during the development of mitigation measures for significant chance finds;
- *Procedures for monitoring and verifying compliance with the CFP;*
- *Chain of custody instructions for recovered artefacts*.

Figure 25: Example of a Chance Finds Procedure Approach



10.3 Mitigation measures during the operational phase

MM34. Road Management negative impacts

- *Incorporating recycling of road resurfacing waste where possible;*
- *All vegetation cuttings for road clearance maintenance suspected to be from invasive alien species should be burnt on site or translocated to minimize dispersal;*
- *Manage sediment and sludge removed from storm water;*
- *All removed paint materials suspected or confirmed as containing lead should be treated as a hazardous waste.*

MM35. Solid waste generation

- *A waste management plan must be prepared by the Proponent for the operation phase of the project;*
- *Enforcement of laws and by-laws for the buses and other motorists on improper disposal of solid waste from vehicles;*
- *No vehicles should be serviced along the roads or at bus stops – all should be in a licensed garages or service stations;*
- *Road signage prohibiting disposal of waste;*

- *Regular cleaning, collection and disposal of solid waste by the local authorities (at bus stops), and performance-based Contractor that will be assigned on the road for maintenance (along the roads).*

MM36. Impacts on the existing public transport operators

- *Rerouting and monetary compensation: The operator's license and permit should be transferred to another route.*
- *Incorporation into the BRT operation: Impacted operators could be "rerouted" to serve on the BRT as to feed the BRT routes.*

10.4 Mitigation measures during the decommissioning phase

MM37. Noise levels increment

Significant impacts on the acoustic environment will be mitigated as described below;

- *Inform local residents beforehand, via notices and advisories, of pending noisy periods and solicit their tolerance well before the commencement of demolition works.*
- *Workers operating equipment that generates noise shall be equipped with noise protection gear including earmuffs and plugs.*
- *Limit pick-up trucks and other small equipment to an idling time of five minutes, observe a common-sense approach to vehicle use, and encourage workers to shut off vehicle engines whenever possible.*
- *All machines and equipment should be regularly inspected and service.*

MM38. Solid waste generation

The Contractor should prepare a site waste management plan prior to commencement demolition activities. This shall include designation of appropriate waste storage areas, collection and removal schedule, identification of approved disposal site, and a system for supervision and monitoring. The mitigation measures are as applicable during the construction phase.

MM39. Dust emissions

High levels of dust concentration resulting from decommissioning or dismantling works will be minimized by implementing the following measures:

- *Covering of all haulage vehicles carrying debris for dumping at approved sites.*
- *Stockpiles of fine materials should be wetted or covered with tarpaulin during windy conditions.*
- *Workers should be issued with proper Personal protective equipment.*

MM40. Occupational Health and Safety hazards

To safeguard the health and safety of the workers during decommissioning, the following shall be implemented.

- *Workers shall be issued with appropriate PPEs and use enforced.*
- *All workers will be sensitized/ inducted before the decommissioning exercise begins.*
- *A comprehensive contingency plan will be prepared before decommissioning activities begins.*
- *Adherence to safety procedures will be enforced at all stages of the exercise.*
- *All workers, pursuant to labour laws, shall be accordingly insured against accidents.*
- *Decommissioning activities will be limited to daytime only to avoid worker's accidents due to poor visibility at night.*

10.5 Summary of mitigation measures

Table 82 presents a summary of the mitigation measures to the impacts on environmental resources and receptors assessed in this section.

Table 83: Summary of mitigation measures

Nature of impact / impact description	Impact	Mitigation measures
Mobilization phase		
43. Creation of employment	Low, short term, certain, medium	-
44. Loss of vegetation	Construction area, short term, irreversible, certain, low	▪ A comprehensive vegetation impact survey should be conducted which should indicate all affected vegetation. ▪ Avoid cutting of short trees whose heights are lower than the power line. ▪ Equipment to be used should be decontaminated e.g., washing equipment to remove soil potentially carrying invasive plants propagules. ▪ Avoid importing soils/gravels to use for level grounds for vehicles to pass in ROW should be avoided. If brought from outside, the surface of the soil should be removed to avoid mixing of soils potentially harbouring invasive plants propagules. ▪ Site clearance shall be minimized but will permit safe and efficient movement of personnel, materials and equipment. ▪ Cleared trees should be left for the local people to collect as firewood. ▪ The Contractor shall avoid unnecessary removal of the vegetation, especially woody trees. When removal of vegetation is not avoidable, they shall be replaced by original or indigenous vegetation species soon after completion of construction works within the project area. ▪ During site clearing for the camps, topsoil shall be stockpiled so that it is used for vegetation during site reinstatement Develop and implement a ROW vegetative maintenance plan. ▪ Restoration/ Rehabilitation plan for disturbed areas. ▪ Under any circumstances, the Contractor shall not use the cleared trees for other purposes such as firewood. ▪ The Contractor will prevent vegetation trampling by restricting access to the construction areas only. ▪ As much as it is practical, existing vegetation shall be preserved to the extent possible, by confining construction activities to road alignment.

Nature of impact / impact description	Impact	Mitigation measures
45. Generation of noise	Construction rea, short term, reversible, medium, medium	▪ Provision of protective devices like earmuffs/earplugs to workers, who are continuously exposed to high levels of noise during construction activities. ▪ Providing silencers or enclosures for noise generating machines such DG sets, compressors, etc. ▪ Restrict noisy construction activities to normal working hours (8am - 5pm). ▪ Use equipment that has low noise emissions as stated by the manufacturers. ▪ Use equipment that are properly fitted with noise reduction devices such as mufflers ▪ Limit pickup trucks and other small equipment to an idling time of five minutes, observe a common-sense approach to vehicle use, and encourage workers to switch off vehicle engines whenever possible. ▪ All construction equipment should be regularly inspected and serviced.
46. Deterioration of ambient air quality	Construction rea, short term, reversible, medium, medium	▪ The project ROW road, material haul/ access roads and diversion roads across settlements and active construction sites shall be sprayed with water at least twice a day to suppress the generation of dust. ▪ Haulage trucks carrying dusty material shall be covered with tarpaulin to prevent escape of dust from material being transported. ▪ When equipment is not in use, they shall be switched off to minimize the concentration of exhaust fume from equipment and so protect the workers at material borrow sites. ▪ The Contractor shall properly tune engine of equipment to ensure complete combustion of fuel and so minimize exhaust fumes. ▪ The Contractor shall provide workers with dust masks and ensure that they are used properly to prevent them from inhaling polluted air. ▪ Stockpiles of fine materials (e.g., sand and concrete) should be wetted or covered with tarpaulin during windy conditions. ▪ Regular inspection and maintenance of construction equipment. ▪ Avoid burning of solid waste at the campsite.

Nature of impact / impact description	Impact	Mitigation measures
47. Risk of road traffic accidents	Construction rea, short term, reversible, medium, medium	▪ The Contractor must prepare a Traffic management Plan, including deploying traffic management personal at all active construction sites. ▪ Issue notices/advisories of pending traffic inconveniences and solicit tolerance by local residents before the commencement of construction works. ▪ Appropriate traffic warning signs, informing road users of construction activities ahead and instructing them to reduce speed, should be placed along the road sections used for the BRT construction. ▪ Flag-women should be employed to control traffic and assist construction vehicles as they use the road section under the construction site. ▪ As far as possible, transport of construction materials should be scheduled for off-- peak traffic hours. This will reduce the risk of traffic congestion and of road accidents on the road sections. ▪ Proper planning of transportation of construction materials to ensure that vehicle fills are increased in order to reduce the number of trips done or the number of vehicles on the road. ▪ Erection of signs ahead of the works warning motorists of the heavy/construction units entering the road sections along the ROW.
Construction phase		
48. Creation of employment	Local area county, short term, certain, medium	---
49. Informal sector benefits	Local area county, short term, certain, medium	---

Nature of impact / impact description	Impact	Mitigation measures
50. Development of other sectors	Local area county, short term, certain, medium	---
51. Improvement of growth of the economy and trade	Local area county, short term, certain, medium	---
52. Temporary loss of land	Construction area, short term, reversible, certain, medium	▪ *Conducting a Resettlement Action Plan to EIB AND AFD standards to determine the persons affected and are eligible for compensation.* *The RAP must include the following:* ○ *Need to consider economic displacement and loss of household income.* ○ *Consideration of both rightful and non-rightful owners, squatters and other categories of informal land users.*
53. Permanent loss of land	Project footprint, long term, irreversible, certain, high	

Nature of impact / impact description	Impact	Mitigation measures
54. Loss of properties	Project footprint, long term, irreversible, certain, high	*The following eligibility must be recognized and applicable where the project undertakes land acquisition or impacts the livelihoods of local residents:* ○ *People who occupy or derive livelihoods from a piece of land prior to the cut-off date and who will be physically and/or economically displaced due to permanent or temporary loss of land, structures and/or livelihood, whether full or partial, as a consequence of the project will be eligible for compensation:* ○ *Such eligible PAPs include the following:* ○ *Owners of land and/or structures, including those recognized as legally titled or legalized on the basis of claims recognizable under national law;* ○ *Lessees (leaseholders) of state or private land, whether long-term or short-term;* ○ *Tenants with or without formal legal registration according to national law;* ○ *PAPs that neither have formal legal rights nor recognizable claims to lands will be entitled to be compensated for their non-land assets. The eligibility also includes both those who are temporarily/permanently or partially/fully affected by the project including squatters or encroachers;* ○ *Business owners, whether registered under national law or informal;* ○ *Employees of private or public businesses or enterprises, whether registered under national law or informal;* ○ *Cultivators of plants and tree seedlings, irrespective of legal status of property relation to land;* ○ *Vulnerable persons, including households headed by women, elderly and/or disabled persons, the households in local context with per capita incomes at or below the poverty line.* ○ *Mobile vendors and others who may be drawing livelihoods from the project area.* ▪ *The proponent should work with Nairobi City County Governments, County Administration and other local leaders to sensitize public on the intentions of land acquisition where the wayleave width is not adequate. This must be done prior to project implementation to give people sufficient time for planning and proper assessment.*

Nature of impact / impact description	Impact	Mitigation measures
55. Removal and disturbance of flora	Construction area, short term, reversible, high, medium	Same as #2
56. Soil compaction, erosion and land degradation	Construction area, short term, reversible, high, medium	▪ *Totally avoid encroachment into private or public properties by properly demarcating the project area to be affected by the construction works and restricting construction works including movement of vehicles to the actual project area to avoid effects spilling over into neighbouring areas.* ▪ *Drainage works for storm water must adhere to the Public Works specifications.* ▪ *Supervise all construction works. All excavation and cutting to take place as instructed in the approved structural plans for the proposed project structures.* ▪ *Monitor areas of exposed soil during periods of heavy rainfall throughout the construction phase of the project to ensure that any incidents of erosion are quickly controlled.* ▪ *Safe storage areas should be identified and retaining structures put in place.* ▪ *Materials to be delivered on site in instalments to avoid stockpiling and possible wastage.* ▪ *Areas of ground surface clearance (exposed soil) will be minimized by re-vegetating with natural vegetation.* ▪ *Unnecessary disturbance of sensitive areas like steep slopes shall be avoided as much as possible.*

Nature of impact / impact description	Impact	Mitigation measures
57. Generation of solid waste	Construction area, short term, reversible, high, medium	▪ *A waste management plan must be prepared by the Contractor for the construction and post-construction (demoblization) phases of the project.* ▪ *Special attention should be given to minimizing and reducing the quantities of solid waste produced during site preparation/ clearance, excavation and construction activities.* ▪ *Any combustible waste must not be burned on the site.* ▪ *Reusable inorganic waste (e.g., excavated sand/soils) should be stockpiled away from drainage features and used for in filling where necessary and/or possible.* ▪ *The Nairobi City County Government must dispose of unusable construction waste, such as formwork and other construction material, at an approved dumpsite.* ▪ *Skips and bins should be strategically placed within the campsite and emptied regularly. The skips and bins at the campsite should be adequately designed and covered to prevent access by vermin and minimize odour.* ▪ *Construction waste to be managed in accordance with national standards. Hazardous waste such as spent transformer oil should be collected/disposed through an authorized dealer.*
58. Water quality deterioration	Construction area, short term, reversible, medium, medium	▪ *Install treatment facilities and/or oil/water separators to remove oil and grease from drainage water prior to discharge at campsite.* ▪ *Implement the construction waste and wastewater management plan.* ▪ *The construction vehicles and equipment will be regularly maintained from a recognized garage off-site or a well bounded onsite area thus minimizing the potential for leakages to the natural environment.* ▪ *Secondary containment measures in areas where fuels, oils, lubricants and construction materials such as cement are stored and loaded or unloaded, including fueling points should be installed.* ▪ *Design and install a septic tank system for human sanitary purposes at the campsite.* ▪ *Provide disposal facilities for waste at the campsite and properly allocate the dumping site.* ▪ *Undertake regular water quality testing in NEMA accredited laboratories.* ▪ *Avoiding alignments that are susceptible to erosion, such as those along or crossing steep slopes.* ▪ *Preventive measures for runoff, erosion and sediment control.*

Nature of impact / impact description	Impact	Mitigation measures
59. Wastewater generation and disposal	Construction area, short term, reversible, medium, medium	▪ *The impact due to improper disposal of human sanitary waste shall be mitigated by construction of sanitation facility at the camp. The type of facility will be of water closet (flush type). The sanitary wastewater shall be treated and disposed of on-site by septic tank – soak away method.*
60. Increment of noise levels	Construction area, short term, reversible, medium, medium	Same as #3
61. Deterioration of ambient air quality	Construction area, short term, reversible, medium, medium	Same as #4
62. Accidental spillage of hazardous materials	Local area county, short term, reversible, medium, low	*A Hazardous Substances Management Program must be prepared by the Contractor.*

Nature of impact / impact description	Impact	Mitigation measures
63. Risk of fire outbreak	Local area county, short term, reversible, medium, low	▪ *Ensure compliance with fire safety regulations and install all necessary fire safety equipment.* ▪ *Conduct regular trainings and fire drills for employees.* ▪ *Provide adequate number of appropriate firefighting equipment and Post 'No smoking signs' where flammable materials will be stored at the campsite level.* ▪ *Organize for inspection and maintenance of fire equipment at least once in a period of three months for site.* ▪ *Declare places with flammable materials as "NO SMOKING ZONES" and display conspicuous notices of the same.* ▪ *Establish and mark a "FIRE ASSEMBLY POINT" and designate parking spaces for emergency management vehicles at strategic outdoor points at the site.* ▪ *Clearly mark "FIRE EXIT" points from the proposed campsite and ensure that they are visible.* ▪ *Develop and post at the camp site, fire emergency and evacuation procedures* ▪ *Weather-proof all lighting and power points at the site.* ▪ *At least one person trained on handling firefighting techniques should be available through-out the construction phase of the project.*
64. Increment of traffic	Construction area, short term, reversible, high, low	Same as #5
65. Increment of water demand and pressure on existing supply	Construction area, short term, reversible, medium, medium	▪ *Implementing appropriate water conservation measures and sensitize construction workers on the importance of proper water management.* ▪ *Develop water abstraction plan to minimize conflict with local residents.* ▪ *The Contractor should generate a water utility management plan.* ▪ *The Contractor should minimize damage to public water utilities during construction activities;* ▪ *Ensure provision of adequate water storage facilities on the camp site to meet project needs during periods of high demand externally and refill of storage tanks during periods of low demand;* ▪ *Repair water equipment as needed to prevent unintended discharges.*

Nature of impact / impact description	Impact	Mitigation measures
66. Extraction of construction materials	Local area, county, medium, irrelevant, certain, high	▪ *Immediately after construction, all the borrow pits shall be rehabilitated according to the plans approved* ▪ *Material for construction must be taken for testing and approval by relevant departments at the Public Works offices before they are used for construction.* ▪ *Proper planning of transportation of materials will ensure that products of fossil fuels (diesel and petrol) are not excessively consumed.* ▪ *Waste rock/spoil materials should be placed at designated areas with proper biological reclamation.* ▪ *Compaction and re-vegetation of exposed areas as soon as possible.* ▪ *Topsoil deteriorates in quality while stockpiled. To help maintain soil quality, topsoil should be kept separate from overburden and other materials; and should be protected from erosion. Also, wherever possible, stripped topsoil should be placed directly onto an area being rehabilitated.* ▪ *If the topsoil is to be stored for a long duration, it should have a vegetal cover of, preferably, leguminous species (grasses and shrubs).*
67. Construction works energy demand	Local area county, short term, reversible, medium, medium	▪ *Limiting unnecessary idling of construction equipment as well as adequately tuning of engines of the construction equipment and vehicles to minimize fuel consumption).* ▪ *Encourage carpooling (sharing of vehicles) among construction workers.* ▪ *The Contractor shall not be allowed to use firewood and charcoal for boiling of bitumen. In addition, the Contractor shall not be allowed to use firewood (including trees cleared from the road side) and charcoal as sources of energy for cooking.* ▪ *Use of energy efficient night-time lighting only at the camp-site.* ▪ *Light sensor switches can be used to ensure outdoor lights are not used during daytime.* ▪ *All energy using equipment used should be switched off when not in use.* ▪ *Control of fires and explosions is important in energy-use and management to reduce damage on property, avoid injuries and accidents and protect electrical appliances and lives.*

Nature of impact / impact description	Impact	Mitigation measures
68. Disruption of public utilities	Project footprint, short term, reversible	▪ *A Utility Management Plan must be prepared by the Contractor and implemented prior to the construction phase.* ▪ *The proponent to consult the service providers in case of any relocation exercise.* ▪ *Consumers to be informed prior of any interruption to services.*

69. Socio-economic, cultural impacts and increased social vices	Local area, county, short term, reversible, medium, medium	▪ *Employ workers from the immediate area where feasible to avoid social conflict.* ▪ *Establish a code of conduct for the project workers* ▪ *Creating awareness towards the diversity of cultures and different economic background of the people in the project staff and residents through sensitization. Additionally, sensitize foreign workers to respect and obey the local customs and social norms of the project area community.* ▪ *The Contractor should develop and implement labor influx plan during the project implementation phase.* ▪ *Non-native workers during the construction phase should be housed in the temporary workers' camp while the local workers will return to their homes in the local communities. The camp will have the necessary social service amenities like health, water and sanitation facilities for the workers.* ▪ *Employ local security personnel to protect Contractor's assets as well as the staff on the campsite.* ▪ *Restrict construction workers to the campsite and limit their mingling with the local residents who are not project workers.* ▪ *Develop a Grievance Redress Mechanism (GRM) that should outline how the Contractor will address any complaints or grievances raised by the communities or by their employees.* ▪ *Promoting social cohesion and integration among people in the area.* ▪ *Restrict unauthorized entry to the campsite by non-workers; keep records of entry and exits for people, vehicles and materials to site.* ▪ *All communications with the community should be documented.* ▪ *Display communicative posters within site on HIV/AIDS related messages at the campsite and avail literature on HIV/AIDS awareness to staff.* ▪ *Proponent to ensure the public are involved in all stages and that their recommendations and concerns are addressed to encourage ownership of the project.* ▪ *Installing proper barricades, signs, providing flags, lights and personnel to control the traffic and separate the construction area from potential receptors;* ▪ *Emergency plans/ evacuation plans to be in place in case of injuries and accidents.*

Nature of impact / impact description	Impact	Mitigation measures
		▪ *Implementing a collaborative hiring process by involving different people to be in charge of the hiring process. This will ensure diversity and inclusion of personnel with different attributes to offer.* ▪ *Building awareness on hiring bias to all the personnel that will be responsible for recruitment of those that will work on the project.* ▪ *Ensure gender mainstreaming during the hiring process.* ▪ *The community relations plan and activities should be designed to address these situations and to minimize residual discontent or resentment among communities.* ▪ *The impact due to marital and social conflicts will be a residual impact, and it can be mitigated at the project level by enforcing a code of conduct that will define the ethics in solving these conflicts.* ▪ *There shall be a HIV alleviation program.* ▪ *The Contractor should hire an organization (Sub-Contractor) experienced in the provision of HIV/AIDS awareness and prevention activities to prepare and implement HIV alleviation program on their behalf. The Sub-Contractors shall work closely with various stakeholders (including communities and their leaders, schools and health centers, civil societies to have an educational awareness campaign during mobilization, construction, and demobilization phases of the project in order to prevent the further spread of HIV/AIDS due to construction activities.*

Nature of impact / impact description	Impact	Mitigation measures
70. Impact on vulnerable groups	Local area, county, short term, reversible, medium, medium	▪ *Vulnerable households, legal/ legalizable owners, tenants or encroachers will be entitled to one vulnerable impact allowance equal to the market value of the harvest of the lost land for one year (summer and winter), in addition to the standard crop compensation.* ▪ *The aim of this payment is to assist severely displaced persons to overcome the short term adverse impacts of land and asset loss and help them to readjust to their changed circumstances while they are making replacement earning arrangements. The one-time payment should, at the absolute minimum be adequate to provide them with equivalent level of livelihood than they had previously.* ▪ *All vulnerable PAPs affected by the loss of land will be assisted with the identification and purchase or rental of a new plot and/or structure, as the case may be, as well as the administrative process of land transfer, including cadastral mapping and registration of their property titles.* ▪ *All vulnerable PAPs affected by the loss of a structure will be assisted with the construction of a new structure or the identification and purchase or rental of a new structure, as the case may be.* ▪ *Temporary occupation of land at properties owned or occupied by vulnerable persons will be avoided and, if unavoidable, preferentially mitigated.*
71. Impacts on the existing public transport operators	Local area, county, long term, irreversible, medium, high	▪ *Public transport operators must be informed of the construction scheduling;* ▪ *Contractor and proponents must assist the Matatus operator in planning the rerouting for the circulation during the construction phase.*

72. Occupational Health and Safety Hazards - workers	Local area county, long term, reversible, medium, medium	▪ *Formulation and implementation of safety policy for the proposed Project.* ▪ *The Contractors must have a health and safety officer to manage all the accidents and safety concerns on site.* ▪ *Advice workers and visitors to take precautions not to cause any effect on their own health or to the health of other persons.* ▪ *Engaging only those workers who are trained to operate specific machines and equipment.* ▪ *Proper signs on construction sites to warn workers of safety requirements as regards machines with moving parts and other equipment at site.* ▪ *Provide a First Aid Box and have a trained person to handle site emergencies and incidences.* ▪ *Display in the campsite telephone numbers of ambulances or provide a site vehicle to specifically transport the injured to hospital.* ▪ *Provide fire-fighting mechanism at the campsite. Display emergency call numbers that can be used in case of a site fire.* ▪ *Provide washing (enclosed bathroom) and toilet facilities at site with both drinking and washing water. The number of workers engaged determines the number of the toilets and bathrooms provided. These facilities should be adequate and fit for use for both genders both at the campsite and along the construction site.* ▪ *Ensure the project areas are marked and appropriate signage used to warn the public of the ongoing project.* ▪ *Enforcing adherence to safety procedures and preparing contingency plan for accident response.* ▪ *Providing all employees with suitable safety and protective gears (PPEs);* ▪ *Ensuring that all machinery used on the site are properly maintained and inspected before use;* ▪ *Place warning signs for hazardous or flammable substances and ensure chemicals are stored safely and MSDS are made available educating workers on the same.* ▪ *Excellent housekeeping standards should be maintained on site and construction stores.* ▪ *Ensure that provisions for reporting incidents, accidents and dangerous occurrences during construction using prescribed forms obtainable from the Directorate of Occupational Health and Safety Services (DOSHs) are in place.* ▪ *Proponent and Contractor to consider employing local labourers as this limits the number of labourers settling in new places leaving their families behind.*

Nature of impact / impact description	Impact	Mitigation measures
		▪ *Develop HIV/AIDS awareness programmes or initiatives to target the construction workers, institutional communities and the general members of the community, particularly the youths; with the objective of reducing the risks of exposure and the spread of HIV virus in the project area.* ▪ *Develop appropriate training and awareness materials for Information, Education and Communication on HIV/AIDS.* ▪ *Develop an intervention strategy compatible with the construction programme to address success of the HIV/AIDS prevention and provide peer educators for sustainability in collaboration with other stakeholders.* ▪ *Integrate monitoring of HIV/AIDS preventive activities as part of the construction supervision. Basic knowledge, attitude and practices are among the parameters to be monitored, and particularly on provision of condoms, status testing and use of ARVs.*

Nature of impact / impact description	Impact	Mitigation measures
73. Occupational Health and Safety Hazards - community	Local area county, long term, reversible, medium, medium	▪ *Implement precautions to ensure that objects (e.g., equipment, tool, debris, precast sections, etc.) do not fall onto or hit people, vehicles and properties in adjoining areas.* ▪ *Fencing of construction sites and regular patrols to restrict public access.* ▪ *Prior to excavation work, provide fencing on all sides of areas to be excavated.* ▪ *Provide warning signs at the periphery of the construction site.* ▪ *Strictly impose speed limits along residential areas and where other sensitive receptors are located.* ▪ *Educate drivers on safe driving practices to minimize accidents and to prevent spill of hazardous substances and other construction materials during transport.* ▪ *An Emergency Preparedness and Response Program must be prepared by the Contractor and must include an identification of areas where accidents and emergency situations may occur, communities and individuals that may be affected, response procedures, provision of equipment and resources, designation of responsibilities, communication, including that of potentially affected communities and periodic training to ensure an effective response;* ▪ *A Security Personnel Program must be prepared by the Contractor to manage and control potential security risks and impacts resulting from the recruitment and performance of the Project's security personnel.* ▪ *Waste Management Plan;* ▪ *Hazardous Substances Management Program;* ▪ *Transit Management Program;* ▪ *A Risk Management Plan with the implementation of the mitigation above defined.*

Nature of impact / impact description	Impact	Mitigation measures
74. Impacts on worker's rights	Local area county, long term, reversible, medium, medium	▪ *Contractors and Sub-Contractors shall ensure that operative's health is well maintained and arrange a regular periodic health examination and follow up with any serious issues. Contractors and Sub-Contractors shall ensure control measures in place to protect employees from dust, noise and infections by providing adequate rest areas and toilets, and by monitoring the hygienic condition of the site and welfare facilities. Regular testing to drinking water shall be made to all drinking points on site.* ▪ *Setting health and safety requirements in tender specifications, meeting EIB's requirements.* ▪ *Ensuring all persons, including managers, are trained and able to carry out their work without risk to the safety or health of themselves or other workers.* ▪ *Ensure proper training and precise information on labour law.* ▪ *Make sure that all workers are informed of their rights including wages and benefits and on their fundamental right to associate freely under the law;* ▪ *Communicate policies to labour intermediaries as appropriate and make sure they understand;* ▪ *Make policies contractually binding under the service agreement with labour intermediaries;* ▪ *Appoint a supervisor(s) to physically observe, on a periodic basis, the payment of wages and inspect welfare facilities and OHS practices on sites;* ▪ *Implement a risk-free communication channel to receive workers' complaints – openly or anonymously – on labour rights violations including payment of wages;* ▪ *Develop policies on remuneration, working conditions.* ▪ *Ensuring all persons, including managers, are trained and able to act on such emergency happenings.* ▪ *Local authorities emergency telephone numbers to be shown at all strategic places and accessible to all personnel.* ▪ *Security 24/7 must be deployed at site.* ▪ *Site and surroundings must have adequate suitable lighting and signage.* ▪ *Ensuring all persons, including managers, are trained and able to act on such emergency happenings.* ▪ *Local authorities emergency telephone numbers to be shown at all strategic places and accessible to all personnel.*

Nature of impact / impact description	Impact	Mitigation measures
75. Archaeology & Cultural Heritage	Construction area, short term, reversible, medium, low	*To prepare an chance find Procedure including following elements:* ▪ *A review of Kenyan heritage legislation as it relates to chance finds and government agency or ministry notification requirements and procedures;* ▪ *A multi-tiered classification system for chance finds based on previously identified cultural heritage resources types and protections afforded to different types of cultural heritage resources by Kenya heritage legislation, IFC PS 8, and recognized industry standards.* ▪ *A step-by-step procedure to be followed by Company staff in the event that a chance find is discovered, including clear criteria for potential temporary work stoppages in the area of the find;* ▪ *Clearly defined roles and responsibilities and response times required from both Company staff and relevant heritage authorities;* ▪ *A framework for defining the scale and scope of potential mitigation measures (e.g., collection, rescue excavations, or relocation), including guidelines for estimating time and cost associated with these measures;* ▪ *Procedures for consulting with heritage authorities during the development of mitigation measures for significant chance finds;* ▪ *Procedures for monitoring and verifying compliance with the CFP;* ▪ *Chain of custody instructions for recovered artefacts.*
Operation phase		
76. Reduction of GHG emissions	Local area, county, long term, certain high	---
77. Community support and livelihoods opportunities	Local area county, long term, certain, medium	---

Nature of impact / impact description	Impact	Mitigation measures
78. Road maintenance negative impacts	Project footprint, long term, irreversible, high, medium	▪ *Incorporating recycling of road resurfacing waste where possible;* ▪ *All vegetation cuttings for road clearance maintenance suspected to be from invasive alien species should be burnt on site or translocated to minimize dispersal;* ▪ *Manage sediment and sludge removed from storm water;* ▪ *All removed paint materials suspected or confirmed as containing lead should be treated as a hazardous waste.*
79. Solid waste generation	Project footprint, long term, irreversible, medium, medium, medium	▪ *A waste management plan must be prepared by the Proponent for the operation phase of the project;* ▪ *Enforcement of laws and by-laws for the buses and other motorists on improper disposal of solid waste from vehicles;* ▪ *No vehicles should be serviced along the roads or at bus stops – all should be in a licensed garages or service stations;* ▪ *Road signage prohibiting disposal of waste;* ▪ *Regular cleaning, collection and disposal of solid waste by the local authorities (at bus stops), and performance-based Contractor that will be assigned on the road for maintenance (along the roads).*
80. Impacts on the existing public transport operators	Local area county, long term, irreversible, medium, low	▪ *Rerouting and monetary compensation: The operator's license and permit should be transferred to another route.* ▪ *Incorporation into the BRT operation: Impacted operators could be "rerouted" to serve on the BRT as to feed the BRT routes.*
Decommissioning phase		
81. Noise levels increment	Construction rea, short term, reversible, medium, medium	▪ *Inform local residents beforehand, via notices and advisories, of pending noisy periods and solicit their tolerance well before the commencement of demolition works.* ▪ *Workers operating equipment that generates noise shall be equipped with noise protection gear including ear muffs and plugs.* ▪ *Limit pick-up trucks and other small equipment to an idling time of five minutes, observe a common-sense approach to vehicle use, and encourage workers to shut off vehicle engines whenever possible.* ▪ *All machines and equipment should be regularly inspected and service.*

Nature of impact / impact description	Impact	Mitigation measures
82. Solid waste generation	Construction rea, short term, reversible, medium, medium	The Contractor should prepare a site waste management plan prior to commencement demolition activities. This shall include designation of appropriate waste storage areas, collection and removal schedule, identification of approved disposal site, and a system for supervision and monitoring. The mitigation measures are as applicable during the construction phase.
83. Dust emissions	Construction rea, short term, reversible, medium, low	▪ *Covering of all haulage vehicles carrying debris for dumping at approved sites.* ▪ *Stockpiles of fine materials should be wetted or covered with tarpaulin during windy conditions.* ▪ *Workers should be issued with proper Personal Protective Equipment.*
84. Occupational Health and Safety hazards	Local area county, short term, reversible, medium, medium	▪ *Workers shall be issued with appropriate PPEs and use enforced.* ▪ *All workers will be sensitized/ inducted before the decommissioning exercise begins.* ▪ *A comprehensive contingency plan will be prepared before decommissioning activities begins.* ▪ *Adherence to safety procedures will be enforced at all stages of the exercise.* ▪ *All workers, pursuant to labour laws, shall be accordingly insured against accidents.* ▪ *Decommissioning activities will be limited to daytime only to avoid worker's accidents due to poor visibility at night.*

11 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

11.1 Introduction

This section provides a summary of the ESMP prepared to cover the design, construction, operation and maintenance and decommissioning of the proposed 12.4 Km long BRT Project "Clean BRT Core Line 3". To be able to implement the proposed mitigation measures, a written/ action plan should be prepared and be implemented within a given time period. The objectives of the ESMP are:

- To ensure that mitigation measures are implemented;
- To establish systems and procedures for this purpose;
- To monitor the effectiveness of mitigation measures; and
- To take any necessary action when unforeseen impacts occur.

From the analysis provided, implementation of the Project has the potential to generate various impacts on the environment. Some of the negative impacts need mitigation measures to prevent or subdue their occurrence. The mitigation measures have been translated into action plans (ESMP) that need to be part of the project implementation program. The ESMP has been developed to assist in prioritizing the key findings of the ESIA, suggesting necessary mitigation actions and allocating responsibilities.

The Contractor will be responsible for the implementation of the construction phase ESMP. The Contractor will identify responsibilities and organization required to implement the accountabilities of the construction phase ESMP. The construction phase ESMP will apply to the Contractor and all Sub-Contractors. The Contractor will also be responsible for developing and implementing a site-specific induction for all construction workers. This induction will include all EHS hazards and their control measures. The Contractor will ensure that all construction workers are trained, competent and hold the appropriate certification for the tasks that they will be undertaking. Responsibility for the incorporation of mitigation measures for the proposed project lies with the proponent (NaMATA), who must ensure specified mitigation measures are implemented and monitored during construction, operation and decommissioning. The estimated costs for the various mitigation measures have been provided where possible.

The ESMP is presented as a standalone document part of the ESIA.

11.2 Environmental Management Plan

The Environmental and Social Management Plan (ESMP) is developed to demonstrate how site-specific concerns and mitigation measures are addressed during construction and operation of the proposed project development activities. The ESMP has been developed with project knowledge and information available to date. The impacts originating from the project road development (construction and operation phases) have been identified. To ensure that the negative environmental impacts and risks can be controlled and mitigated effectively, a thorough scientific management and

monitoring plan has been prepared. This will ensure that all the targets are achieved and that the environmental responsibilities and obligations of EIA are met during project implementation. As a progressive approach, components of the ESMP may require updating throughout the initiation and scheduling of plans for the project. Thus, this is a working document subject to amendments whenever new information is received or project road conditions change.

11.3 Purpose and Objective of ESMP

The ESMP describes the range of environmental and social issues associated with the project and outlines corresponding management strategies that will be employed to mitigate potential adverse environmental impacts. The ESMP conveys the Project's environmental and social constraints. The project will comply with all local laws & regulations and the Lenders (EIB & AFD) requirements, which seek to ensure that the construction and operation does not adversely affect the environment and social community resources.

The project supervision may periodically revise the ESMP in consultation with the Contractor, and subject to the approval from National Environment Management Authority (NEMA). The revisions may be made to accommodate changes in work, weather, and road conditions. The ESMP should be made available to all the project staffs.

The objectives of the ESMP are:

- To serve as a commitment and reference for the project planners and implementers including conditions of approval from NEMA;
- To serve as a guiding document for the environmental and social monitoring activities for future studies, on requisite progress reports;
- To provide detailed specifications for the management and mitigation of activities that have the potential to impact negatively on the environment;
- To 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;
- To document environmental concerns and appropriate protection measures; while ensuring that corrective actions are completed in a timely manner;
- To address capacity building requirements within the proponent team, if necessary.

11.4 Auditing of the ESMP

11.4.1 Introduction

A key function of the Proponent environmental team will be to undertake compliance audits throughout the Project. The audit program will include and / or allow for the following audits as a minimum:

- An environmental compliance and system audit within one week of commencement of the Project Works or Temporary Works;
- HS and labour audits;
- Quarterly environmental compliance and management system audit; and
- Demobilisation audits three months prior to demobilisation completion and one on the planned last day of demobilisation

11.4.2 Audit Protocols

Audit protocols will be in the form of audit tables that include columns for:

- The commitment or condition;
- A reference to the source document;
- The auditor's assessment (compliant, non-compliant or partially compliant);
- A detailed description of any findings;
- Details of audit activities performed to arrive at the finding (i.e., list of documents and records reviewed, names of interviewees, descriptions of physical observations);
- References to evidence (document numbers, photographs and record numbers); and
- Recommendations and opportunities for improvement.

11.4.3 Contractor Environmental Audits

Contractors shall develop a similar environmental audit schedule to mirror the audits outlined above and the audit schedule shall be submitted to the Proponent for review and approval and to integrate this into the environmental audit schedule. Contractor will be responsible for all Sub-contractors environmental, health and safety, labour and OHS compliance.

Proponent will undertake Contractor Environmental audits as part of the audit program noted above.

11.5 Responsibilities of the ESMP

In order to ensure the sound development and effective implementation of the ESMP, it will be necessary to identify and define the responsibilities and authority of the various persons and organisations that will be involved in the project. The following entities will be involved in the implementation of the ESMP:

- NaMATA;
- Ministry of Transport, Infrastructure, Housing and Urban Development;
- Ministry of Environment and Forestry;
- National Environment Management Authority;
- National Museums of Kenya.
- National Lands Commission.
- Project Implementation Consultant (PIC);
- Design & Build Contractor;
- Nairobi County Government.

11.5.1 NaMATA

According to the **BRT Design Framework** of **Feb 2018**; "*……. Gazette Notice No. 1093, dated 17 February 2017, established the Nairobi Metropolitan Area Transport Authority (NaMATA). The mandate of NaMATA is to oversee the establishment of an integrated, efficient, safe, reliable and sustainable transport system within the Nairobi Metropolitan Area comprising of Nairobi City, Kiambu, Kajiado, Machakos and Murang'a County. Five corridors have been identified for the implementation of mass rapid transit (MRT), with planning and design underway for some corridors due to high existing public transport ridership and potential to benefit the greatest number of residents."*

11.5.2 Ministry of Transport, Infrastructure, Housing and Urban Development

This ministry is formulated to facilitate development and sustenance of transport infrastructure, maritime economy, public works and housing for sustainable socio-economic development. The Ministry has five state departments. The State Department for Infrastructure is one of the Departments whose functions include policy management for road development. NaMATA falls under the State Department for Infrastructure.

11.5.3 Ministry of Environment and Forestry

The Ministry of Environment and Forestry's mandate is to undertake National Environment Policy and Management, Forestry development policy and management, Development of re-afforestation

and agro-forestry, Restoration of strategic water towers, Protection and conservation of Natural environment, Pollution control, Conservation and protection of wetlands and Climate change affairs.

The facilitates the enabling policies, legal and regulatory reforms for promoting sustainability of the environment and forest resources, while at the same time, mitigating the effects of climate change.

11.5.4 National Environment Management Authority

The responsibility of the National Environment Management Authority (NEMA) is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government in the implementation of all policies relating to the environment and to ensure that all mitigation measures proposed are actually implemented.

11.5.5 National Lands Commission (NLC)

It is the responsibility of the NLC to monitor and have oversight responsibilities over Land Use Planning throughout the country. It will therefore oversee the land take and compensation procedures involved in the CL3 Project.

11.5.6 National Museums of Kenya (NMK)

NMK is a multi-disciplinary institution whose role is to collect, preserve, study, document and present Kenya's past and present cultural and natural heritage. Regarding the road project, realignment has been proposed to avoid the established sensitive sites as Gazetted in the Project area.

11.5.7 Project Implementation Consultant (PIC)

The Project Implementation Consultant will be required to oversee the construction programme and construction activities performed by the Contractor, in compliance with the present ESMP. The Consultant will have Environmental and Social Specialists in its team to co-ordinate all aspects of the environment during project implementation. This will include following the construction to monitor, review and verify the implementation of the project's ESMP. Moreover, keep track of project compliance regarding permits and approvals necessary from the relevant authorities.

11.5.8 Design & Build Contractor

The Contractor will be required to comply with the requirements of the EIA/ ESMP and the Standard Specifications in Kenya, which include specifications for environmental protection and waste disposal, borrow pit and quarry acquisition and exploitation, landscaping and grassing among others. The Contractor shall be required to have an environmentalist, a sociologist and an occupational health and safety specialist on site to oversee the ESMP implementation.

11.5.9 Nairobi County Government

The relevant departmental officers in the County Government of Nairobi shall be called upon where necessary during project implementation to provide the necessary permits and advisory services to the project implementers.

11.6 Environmental and Social Management Plan (ESMP) during Construction and Operation Phases

An Environmental and Social Management Plan (ESMP) is prepared as a logical framework within which the identified negative environmental and social impacts will be mitigated and monitored during the construction process of the development project.

The cost of the ESMP implementation applicable to the Contractor will be incorporated in the works BoQ.

11.7 ESMP Review

Once finalised, this ESMP will be reviewed on a regular basis as deemed necessary by NaMATA and the Lenders. This will include, but not be limited to:

- When there are changes in contractual or project requirements;
- When there are changes to legislation or approval conditions;
- To correct disparities identified during project auditing;
- As a result of significant environmental incidents or non-conformances; and
- As a result of any changes to the project management system which may affect the management of environmental aspects.

12 GRIEVANCE REDRESS MECHANISM

Grievance redress mechanisms (GRM) provide a formal avenue for affected groups or stakeholders to engage with the project implementers or owners on issues of concern or unaddressed impacts. Grievances are any complaints or suggestions about the way a project is being implemented. They may take the form of specific complaints for damages/injury, concerns about routine project activities, or perceived incidents or impacts. Identifying and responding to grievances supports the development of positive relationships between projects and affected groups/communities, and other stakeholders.

Grievance mechanisms should receive and facilitate resolution of the affected institutional or communities' concerns and grievances. Both EIB and World Bank Safeguard Policies states the concerns should be addressed promptly using an understandable and transparent process that is culturally appropriate and readily acceptable to all segments of affected communities, at no cost and without retribution. Mechanisms should be appropriate to the scale of impacts and risks presented by a project.

Grievance Redress Mechanism for this project is presented in detail in the Appendix 10 – Stakeholder Engagement Plan.

13 CONCLUSIONS AND RECOMMENDATIONS

This ESIA Report has been prepared to provide sufficient and relevant information on the proposed BRT Project development to enable GoK (NEMA) and the project Financiers establish the sustainability of the project and whether activities of the proposed Project are likely to have significant adverse environmental impacts. Mitigation measures have been proposed for the identified impacts in this report and an ESMP for the implementation of the proposed measures has been presented. The ESMP presented as a standalone document to this report is a tool to be used by the Project team, Contractor and NaMATA during the entire lifecycle of the project. To ensure distribution of implementation responsibility of finding and recommendations of this ESIA study, the ESMP should be reflected in the Conditions of Contract and Bills of Quantities. It is the responsibility of the Project Proponent to ensure these measures are incorporated into these two documents.

It is anticipated that it will be possible to successfully mitigate impacts associated with the development. The ESMP includes plans to be formulated during the construction, operational and decommissioning phases respectively and has been developed as part of the ESIA to manage potential impacts. The Project is also anticipated to offer several benefits (positive impacts) either directly or through the spin-offs generated by the development and operation of the proposed project.

The Clean BRT Core Line 3 will introduce Electric Buses that have been assessed to contribute to decreased air pollution and GHG emissions compared to the current transport systems. Once operational the noise levels will go down and the benefits will ultimately be realized through reduced time and lower overall mobility costs. The Project will however have adverse effects across the phases especially the construction phase. Noise, dust, traffic is among the effects that will be in place. All the identified potential adverse impacts of the proposed project shall be mitigated or reduced through the implementation of the recommended ESMP. The benefits that will be derived from the proposed Project are therefore much greater than the short-term environmental and social effects.

A Resettlement Action Plan is being developed to provide a guide for resettlement and restoration of the Project Affected Persons (PAPs); so that their losses owing principally to the construction of the BRT system are compensated or mitigated and their standard of living improved or at least restored to the pre-project levels.

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APPENDICES

APPENDIX 1 – CERTIFICATE & LICENSE – FIRM OF EXPERTS

APPENDIX 2 – CERTIFICATE & LICENSE – LEAD EXPERT

APPENDIX 3 – NEMA APPROVAL OF THE TERMS OF REFERENCE

APPENDIX 4 – BRT CORRIDOR GAZETTE NOTICE

APPENDIX 5 – HYDROLOGY MAP

APPENDIX 6 – AMBIENT AIR QUALITY RECEPTORS

APPENDIX 7 – AMBIENT AIR QUALITY AND NOISE MEASUREMENT REPORT

APPENDIX 8 – UTILITIES MAPS

APPENDIX 9 – LAND USE

APPENDIX 10 – STAKEHOLDER ENGAGEMENT PLAN

APPENDIX 11 – LAND ACQUISITION MAP