



Strategic Environmental Assessment of the Proposed Northlands Masterplan in Ruiru, Kiambu County



Final SEA Study Report

10465K-SEA-H-0001

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Rev. 2

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Declarations

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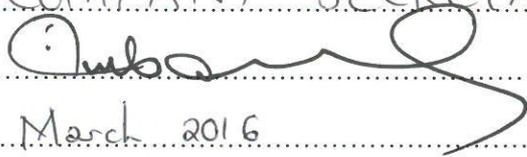
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Acronyms and Abbreviations

AWSB:	Athi Water Services Board
CBD:	Central Business District
CIDP:	County Integrated Development Plan
CoN:	City of Nairobi
EA:	Environmental Audit
EIA:	Environmental Impact Assessment
EHS:	Environment, Health and Safety
EMCA:	Environmental Management and Coordination Act
ESMP:	Environmental and Social Management and Monitoring Plan
GCA:	Groundwater Conservation Area
GoK:	Government of Kenya
HWCs:	Human – Wildlife Conflicts
KCG:	County Government of Kiambu
KeNHA:	Kenya National Highways Authority
KETRACO:	Kenya Electricity Transmission Company
KP:	Kenya Power
KRC:	Kenya Railways Corporation
KURA:	Kenya Urban Roads Authority
KV:	Kilo Volts
KWS:	Kenya Wildlife Service
LT:	Long Term
MEAs:	Multilateral Environmental Agreements
MVA:	Mega Volt Amperes
NEMA:	National Environment Management Authority
NAS:	Nairobi Aquifer System
NIUPLAN:	Nairobi Integrated Urban Development Masterplan
NGO's:	Non-Governmental Organizations
NMP:	Northlands Masterplan
NMR:	Nairobi Metropolitan Region
NWSC:	Nairobi Water and Sewerage Company
OSHA:	Occupational Safety and Health Act
PAPs:	Project Affected Persons
PEIA:	Plan Environmental Impact Analysis
PPE:	Personal Protective Equipment
PPP:	Policy, Plan and Programme
RUIWASCO:	Ruiru Juja Water and Sewerage Company
SEA:	Strategic Environmental Assessment
ST:	Short Term
TIS:	Traffic Impact Studies
WCAs:	Wetland Conservation Areas
WRMA:	Water Resource Management Authority
WSP:	Water Service Provider



Non-Technical Summary

1. Background

Howard Humphreys East Africa was commissioned by Integer Limited to carry out a Strategic Environmental Assessment (SEA) of the proposed Northlands Masterplan (NMP) in September 2014. The Proponent envisions the future of Northlands being a place in which all sections of the community and businesses aspire to locate to. One of the key aspirations for the NMP is to create a prestige community befitting of the future role and direction which Nairobi is progressing towards. Northlands will contribute towards meeting some of the aspirations set out in Vision 2030 and the Nairobi Metro Strategy 2030 which seeks to establish Nairobi as a World Class African City.

The SEA commission entailed carrying out the study in accordance with the set regulations and guidelines, submission of draft and final SEA Reports to NEMA for review, and follow up to provide any additional information to enable approval of the Masterplan. This Draft SEA Report provides information on the plan proponent, an outline of the NMP and a description of the SEA process including the assessment's outcomes and recommendations.

2. The Northlands Master Plan

The Northlands Masterplan is set on an 11,576 acre-parcel of land located in Ruiru Municipality, Kiambu County. The Masterplan is comprised of various proposed land uses as follows:-

- a) Residential uses (3,570 acres):
 - Low density Residential (Northlands Meadows) : 3,134 acres
 - High density Residential (Northlands Boulevards): 306 acres
 - Medium density Residential (Northlands Heights): 130 acres
- b) Educational uses (86 acres)
- c) Commercial uses (390 acres)
 - Central Business District (CBD): 355 acres
 - Hotel/Mall: 33 acres
 - Club House: 2 acres
- d) Industrial uses (695 acres)
 - Logistics Park: 630 acres
 - Brookside Dairies: 65 acres
- e) Recreational uses (1,697 acres)
 - Recreational Parks and buffer zones: 1,431 acres
 - Water features: 266 acres
- f) Agricultural/wildlife conservation uses
 - Ranching and wildlife conservation zone: 5,156 acres
- g) Other public uses
 - Internal roads (Spine Roads): 232 acres
 - Reserves for sewer trunks and high voltage power lines
 - Space allocations for Hospitals; Petrol Station; Interchange; Substation; Police station; Fire station; Heliport



3. Rationale For Undertaking a Strategic Environmental Assessment for The Northlands Master Plan

The general aim of Strategic Environmental Assessment (SEA) is to scrutinize new management plans and ensure that they are environmentally sustainable and compliant to the exiting environmental obligations in policies, legal frameworks, strategic plans and MEAs. An *Ex ante assessment* of the proposed NMP was undertaken in this study and the purpose was to identify, describe and assess at a strategic level the environmental and socio-economic opportunities/constraints of implementing the proposed Masterplan, develop practical mitigation measures for addressing the identified limitations as well as the enhancement of opportunities. The SEA is intended to ensure that environmental and social considerations are included in the planning, implementation and operation of the Northlands Masterplan.

4. Objectives for the Strategic Environmental Assessment

- To assess whether the NMP has properly integrated the existing national environmental policies and legal frameworks;
- To assess the level of integration of the NMP with other relevant plans and strategies;
- To evaluate whether the proposed activities in the NMP are compliant with the EMCA 1999 and its subsidiary legislation;
- To identify, describe and assess the likely significant environmental effects of implementing the plan;
- To integrate stakeholders' socio-economic and environmental perspectives into the proposed land use plan;
- To provide information to better integrate environmental considerations into decisions, implementation, and monitoring in order to minimize risks to the plan and risks emanating from the plan;
- To assess alternatives and options that can improve the land use plan; and
- To provide strategic-level recommendations on how to minimize potential negative effects and optimize positive effects.

5. Sea Approach and Methodology

The following systematic chain of broad activity clusters were adopted in the SEA implementation:-

- a) Orientation consultations with the client
- b) Screening and scoping of issues to be considered in the SEA
- c) Documentary analysis for the preparation of a comprehensive PPP framework for the SEA
- d) Preparation of a PPP Brief and submission of the same to NEMA for approval
- e) Field reconnaissance and stakeholder identification.
- f) Preparation of screening and scoping report and ToR for submission to NEMA
- g) Policy, plan and programme (PPP) analysis
- h) Field missions for baseline situation analysis
- i) Stakeholder consultations and public participation
- j) Plan environmental impact analysis
- k) Impact mitigation planning
- l) Identification of gaps and alternatives actions
- m) Preparation of an Environmental Management and Monitoring Plan (ESMP)
- n) Presentation of findings and stakeholder dialogue
- o) Compilation, validation and submission of final SEA report

6. PPP framework

There are various plans, policies, legislation and programmes that set the context for developments of the proposed nature, some directly and others indirectly. These instruments will influence how the Masterplan is developed and implemented. The NMP was subjected to a comprehensive PPP analysis based on the environmental obligations using a PPP framework, which was developed for the SEA. The PPP framework



for the SEA comprised the following instruments: - a) national environmental policies, b) legal frameworks, c) national strategic plans, and d) international environmental frameworks (MEAs) for the global obligations. A total of 40 PPPs were identified as relevant for the SEA which included 14 policies and 11 legal frameworks, 9 strategies and plans and 6 MEAs.

7. Findings

PPP obligations and integration status

The PPP analysis established that the implementation of the NMP will support the national goals for environmental sustainability as highlighted below.

Environmental management framework	Value addition
a) Sessional Paper No. 6 of 1999 on Environment and Development (GoK, 1999)	Encouraging rain water harvesting around the country
b) Draft Environment Policy, 2012 (GoK, 2012)	Supporting the establishment of constructed wetlands for waste management and reuse
	Supporting the increase of forest and tree cover to at least 10% by 2030
c) National Land Policy, 2009 (GoK, 2009)	Encouraging the development of wildlife sanctuaries and conservancies
d) National Water Policy, 2012 (GoK, 2012)	Enhancing storm water management and rainwater harvesting
	Encouraging the treatment of effluent waters for recycling and re use
	Supporting rain water harvesting
e) Draft National Policy on Wetlands Conservation and Management, 2013 (GoK, 2013)	Ensuring that natural wetlands under private ownership will be subject to regulations
f) Draft Wildlife Policy, 2011 (GoK, 2011)	Promoting the conservation and management of wildlife conservation areas and sanctuaries
g) Vision 2030 (GoK, 2008)	Supporting the increase of forest and tree cover to 10% by 2030
	Supporting water harvesting and storage
h) National Environment Action Plan, 2009 - 2013 (GoK, 2009)	Enhancing the protection of wildlife resources
	Supporting the increasing of forest cover in Kenya
	Promoting efficient water harvesting, storage and usage
i) Nairobi Metro 2030 (GoK, 2008)	Establishing the Nairobi Metropolitan Region (NMR) as a regional and global services centre through the development of industrial and technology parks
	Establish world class infrastructure and utilities in the NMR which are supportive of world class living, working and business environment
	Supporting the NMR to increase forest cover within its area of jurisdiction to 30% by 2030
j) Kiambu Integrated Development Plan (2013-2017)	Increasing forest cover in the county
	Promoting and sustaining a vibrant, competitive and diversified industrial sector in the county
k) African Convention on the Conservation of Nature and Natural Resources (AU, 1968)	Setting aside areas for the propagation, protection, conservation and management of wildlife
l) Article II Fundamental Principle	

The findings indicated that the NMP has not adequately integrated a number of national environmental PPP frameworks as highlighted below.

PPP Framework	Integration gaps
a) Draft Environment Policy, 2012 (GoK, 2012)	Developing response systems for climate change and disaster risks
b) National Policy for Disaster Management, 2009 (GoK, 2009)	Promoting the mainstreaming of disaster management and climate change into development planning and management for sustainability Integrating climate change disaster risk reduction initiatives
c) Environmental Management and Coordination Act (EMCA) No. 8 of 1999 (GoK, 1999)	Supporting environmental restoration Supporting the rehabilitation, regeneration and restoration of degraded rivers
d) Vision 2030 (GoK, 2008)	Supporting the rehabilitation, regeneration and restoration of degraded Rivers in the area
e) National Environment Action Plan, 2009-2013 (GoK, 2009)	Strategies for controlling of fire outbreaks
f) National Climate Change Response Strategy, 2009 (GoK, 2010)	Ensuring that all new infrastructure is climate proof over its lifespan
g) Kiambu Integrated Development Plan, 2013-2017 (KCG, 2013)	Inadequate strategies for ensuring a reduction in carbon emission

8. Plan Environmental Impacts, Mitigation Strategies And Alternative Options

The report has provided a detailed section on the environmental impacts expected from each of the development clusters in the NMP. The strategies and alternative options for the negative impacts and unsustainable development interventions are also provided.

9. Proposed Environmental Management And Monitoring Plan

An elaborate Environmental and Social management and Monitoring Plan (ESMP) is provided in the SEA report for the use in the implementation of the NMP. The ESMP contains the following: a) specific management and monitoring actions to address the recommended alternative options from the PPP analysis and mitigation measures emanating from the plan environmental impact analysis, b) recommendations on the monitoring frequency and indicators for each management action, c) the environmental management and monitoring standards, d) roles and responsibilities, and e) relevant implementation guidelines.

10. Conclusion and Recommendation

The SEA for the Northlands Master Plan arrived at the following conclusions based on the findings of the baseline situation analysis, PPP analysis, plan impact analysis and stakeholder consultations:

- a) The NMP is a good and commendable plan with minimal negative environmental impacts. The implementation of the plan will support sustainable environmental governance in the country.



- b) The SEA findings showed that the NMP is suitable for the area based on the current state of environment and the available technology as established in the baseline survey. The overall benefits of the proposed development are far higher than the potential cost of the negative environmental changes are likely to occur. The master plan is desirable because it will improve the socio-economic status of Kiambu County and the City of Nairobi including the Nairobi Metropolitan Region (NMR). It will create employment and deliver a wide range of other socio-economic benefits. The implementation of the NMP will also have a positive impact on social capital through direct employment, the multiplier effect in the local economy. The project will contribute in the development agenda in Kenya and it will as well help significantly in the realization of the goals for the Vision 2030 by contributing in the economic and social pillars.

The SEA recommends the approval of the NMP subject to addressing the gaps highlighted in the report.



Acknowledgements

The Consultants are grateful for the excellent support given by the Northlands Management in terms of information and facilitation for site activities. Special appreciation in this regard is given to Tomie Hellerstedt, Collins Kowuor Angela Kyungu, Tom Tomlinson and Paul Maina.

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1 Introduction

1.1 Background

Howard Humphreys East Africa was commissioned by Integer Limited to carry out a Strategic Environmental Assessment (SEA) of the proposed Northlands Masterplan (NMP) in July 2014. The commission entailed carrying out the study in accordance with the set regulations and guidelines, submission of draft and final SEA Reports to NEMA for review, and follow up to provide any additional information to enable approval of the Masterplan. This Draft SEA Report provides information on the plan proponent, an outline of the NMP and a description of the SEA process including the assessment's outcomes and recommendations.

1.2 Proponent's Vision of Northlands

The Proponent envisions the future of Northlands being a place in which all sections of the community and businesses aspire to locate to.

1.3 Proponent's aspirations of Northlands

- To create a prestige community befitting of the future role and direction which Nairobi is progressing towards. Northlands will contribute towards meeting some of the aspirations set out in Vision 2030 and the Nairobi Metro Strategy 2030 which seeks to establish Nairobi as a World Class African City.
- To provide a quality environment not currently provided for at scale in the city which provides pleasant, clean and safe mixed communities for living, work and play.
- To raise the bar in terms of the standard of development in the city especially in terms of its design, quality and sustainability performance.
- To meet some of the future growth needs of the city as well as provide choices and options for existing residents wishing to live in a high quality urban environment with a full range of amenities and easy access to services and employment opportunities. The area will have a distinct character and an identity with neighbourhoods catering for a range of tastes and desires for a variety of income levels, ages and lifestyles.
- To establish epicentres or anchors to provide a focus for the uses and character of each area. Each development area will be self-contained in terms of the range of functions needed to support day to day needs. Potential anchors include a business and commercial cluster, retail hub and so on, as well as smaller scale uses for residential areas such as recreation options.
- To provide residential areas to meet all major segments of the Nairobi market. Whilst a key focus will be to meet the needs of the emerging middle class, different areas will cater for older couples, families, young professionals etc. Areas of lower cost housing will also be provided in order that unplanned slum areas are not stimulated to meet the needs of the development in terms of lower skilled occupations and servicing functions.
- To provide commercial facilities that will as a minimum meet the needs of the future population at Northlands. However they will also provide for the expanding needs of the city in terms of retailing, business and commercial space, leisure options and hospitality.
- To provide a wide range of recreational options including strategic and local level amenities at the appropriate scale. The site is located in a wide and open landscape with several habitats and natural features including rivers. There is potential to incorporate features such as dams, forest plantations, wildlife sanctuary and other features into an integrated green network which connects and defines different character areas within the site.
- To provide a wide range of transport options for Northlands including convenient vehicular access and a range of public transport options which may include light rail or bus transit as well as internal shuttle routes.
- To provide a secure environment and appropriate access to different parts of the Plan with some public, semi public and private/restricted access areas.



1.4 General Plan Description

A master plan is a blueprint for the intended utilization and management of an area. It also includes how the area's environmental and natural resources will be utilized and managed within a specified period of time. The plan usually serves as a critical point of reference which can clearly indicate the progress made or lack of it in terms of the proposed management actions and interventions within the specified period of time. It is also a vital tool in monitoring and evaluation of subsequent development activities and future environmental change.

The Northlands Masterplan is set on an 11,576 acre-parcel of land located in Ruiru Municipality, Kiambu County. The geographical location of the site is shown in Figure 1.

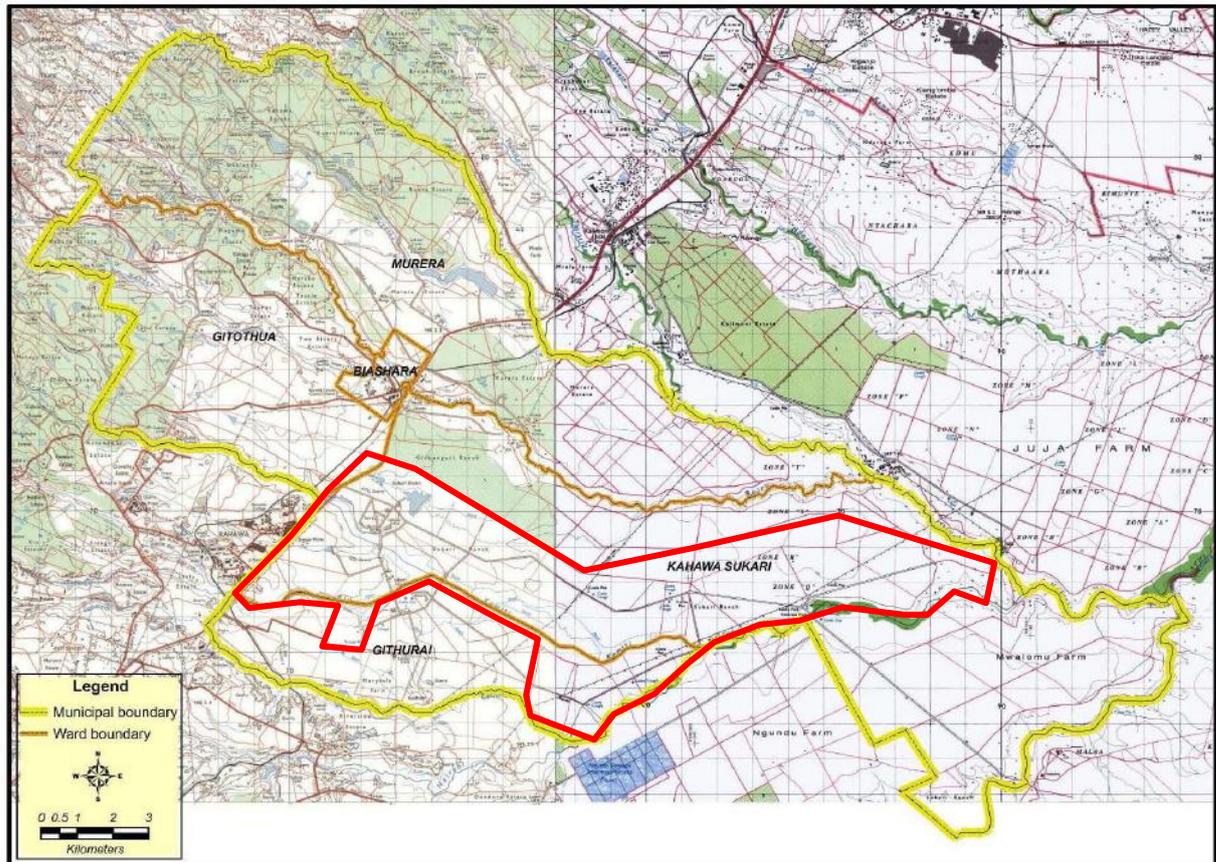


Figure 1: Location of Northlands site in Ruiru Municipality (sub-County)

The Masterplan is comprised of various proposed land uses. This are:

1.4.1 Residential uses (3,570 acres)

Residential areas will be provided to meet all major segments of the Nairobi market. Whilst a key focus will be to meet the needs of the emerging middle class, different areas will cater for older couples, families, young professionals etc. Areas of lower cost housing will also be provided in order that unplanned slum areas are not stimulated to meet the needs of the development in terms of lower skilled occupations and servicing functions. Residential areas will be aspirational and meet the needs of existing and new generations. Providing a liveable, green, clean, safe and secure environment is key to this in which people can enjoy the public realm, parks open spaces, local facilities and services rather than being confined to their plot or having to use the car to drive to exclusive enclosed amenities. Proposed space allocations for residential uses include:

- Low density Residential (Northlands Meadows) :3,134 acres

- High density Residential (Northlands Boulevards): 306 acres
- Medium density Residential (Northlands Heights): 130 acres

1.4.2 Educational uses (86 acres)

Currently, Peponi School and Uhuru Kenyatta Secondary School are located on the site and occupy approximately 86 acres of land. However, additional allocations for educational uses will also be made within the residential zones in line with the expected catchment population and in compliance with the Physical Planning guidelines.

1.4.3 Commercial uses (390 acres)

The proposed commercial facilities will as a minimum meet the needs of the future population at Northlands. They will also provide for the expanding needs of the city in terms of retailing, business and commercial space, leisure options and hospitality. Northlands will have the potential to provide the full range of amenities sought by businesses and inward investors as well as visitors. The proximity of the site to major road arteries and Kenyatta University also presents opportunities. The proposed space allocations include:

- Central Business District (CBD): 355 acres
- Hotel/Mall: 33 acres
- Club House: 2 acres

1.4.4 Industrial uses (695 acres)

- Logistics Park: 630 acres
- Brookside Dairies: 65 acres

1.4.5 Recreational uses (1,697 acres)

The site sits in a wide open landscape with several habitats and natural features including rivers. The development will be provided with a wide range of recreational options including strategic and local level amenities at the appropriate scale. Features such as the existing Northlands dam and other natural/man-made ponds, forestry plantations (mainly *Eucalyptus*) and other features will be incorporated into an integrated green network which connects and defines different character areas within the site. The proposed space allocations include:

- Recreational Parks and buffer zones: 1,431 acres
- Water features: 266 acres

1.4.6 Agricultural/wildlife conservation uses

The Northlands Masterplan proposes to retain the existing agricultural use on 5,156 acres of the land. This shall be designated as a ranching and wildlife conservation zone. Brookside Dairies obtains part of its raw milk supply from Gicheha farm, also located in Northlands. The farm keeps large herds of cattle and flocks of sheep that range/graze the expansive land and obtain additional fodder from plantations within Northlands. On the land also, are found wildlife species such as Thompson's gazelles, bush bucks, common duiker, baboons and numerous types of birds. The proposal entails maintaining the existing use on part of the land east of the bypass and trans-locating the wild animals that range in other parts of the property to this area for conservation. No consideration has been made for the introduction of new species of wildlife into the land. This can only happen in collaboration with the wildlife management Agency – KWS, and after a thorough assessment of the carrying capacity of the land.

1.4.7 Other public uses

- Internal roads (Spine Roads): 232 acres
- Reserves for sewer trunks and high voltage power lines



- Space allocations for Hospitals; Petrol Stations; Interchange; Substation(s); Police station; Fire station; Heliport. Planning guidelines will also be adhered to in determining the numbers and locations of the public/social amenities in Northlands

Figure 2 identifies the various land uses in the area.

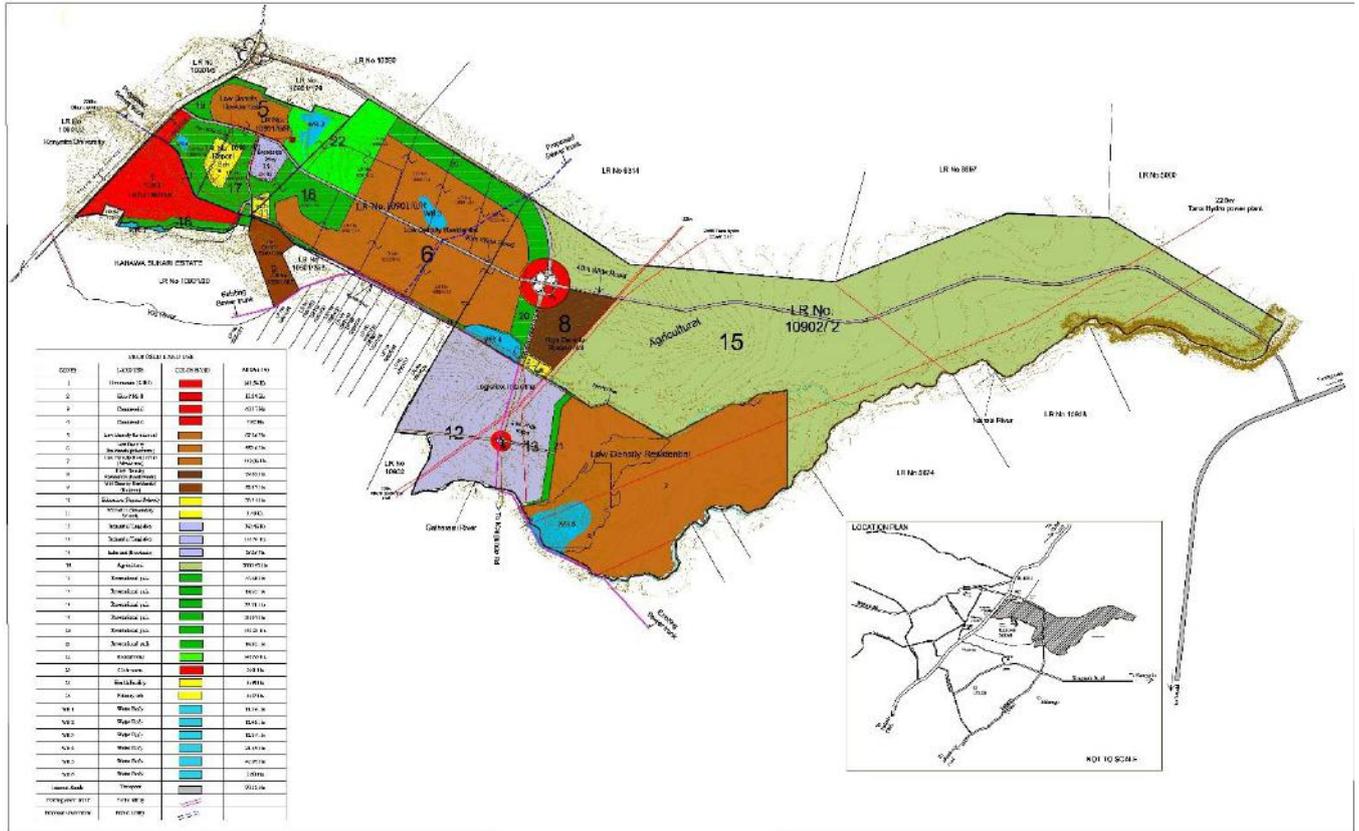


Figure 2: Proposed land uses in Northlands

1.5 Projections on population, resource use and waste generation and traffic

1.5.1 Population, resource use and waste generation

Zoning guidelines on the various land uses have been developed for the NMP to guide future developments. Based on these guidelines, projections were made on the population, energy and water demand, and waste generation (both sewerage and solid waste). Table 1 below provides a summary of the projections. The assumptions and factors used in calculating estimates were drawn from sources such as “Water Design Manual – Practice Manual for Water Supply Services in Kenya 2006”, known generation rates for solid waste in Nairobi, and Architectural design manuals. **Appendix D** provides the Zoning guidelines and the projections for the NMP

Table 1: Population, resource use and waste generation projections

Land Use	Population Estimate	Water Demand (m ³ /d)	Energy Demand (MVA)	Effluent (m ³ /d)	Solid Waste (tons/d)
Residential Use	62,439	15,610	66	12,488	43.7
Commercial Use (offices)	92,293	2,307	12	1,961	64.6
Hotels, Hospitals, Shopping Malls	6,693	440	5	374	4.7
Educational Use	3,154	79	1	67	2.2
Industrial Use	86,020	9,486	81	8,063	60.2
Total	250,598	27,921	165	22,953	175.4



1.5.2 Traffic Studies

Based on the traffic volumes conducted along the existing road network in 2015, the traffic volume along the Nairobi - Thika super Highway to the west of the development has a total volume of 54,249 vehicle per day in both directions with a directional split of 46: 54 to and from Nairobi. The traffic volumes have not been broken down to the volume using the main carriageway and the volume on the service roads. The volume on the latter will also have an influence on the development traffic impacts since it provides the access to and from the development. The Eastern by-pass on the other hand fronting the development to the east currently has a total daily traffic of 17,366 vehicle per day, with a split of 47:53 to and from Kangundo direction.

The projected total daily vehicular trips to and from the development to the west (Thika Road) is given as up to 27,324 at the end of phase 3 while to the East (eastern Bypass) is given as 30,010 vehicles per day at the end of phase 3. This volumes are expected to have a considerable impact on the traffic flow and capacity of the existing roads as well as the adjacent intersections.

1.6 Masterplan Informants

The site has been subject to detailed site appraisal in order to identify the existing key features of the site. These have helped to inform the development of the Masterplan strategy and are summarized below.

1.6.1 Landscape, Topography and Natural Features

The site is largely undeveloped at present and as such the site is well defined by landscape and natural features including:

- Nairobi and Kamiti Rivers define the southern edge of the site;
- The site is largely flat with a slight slope eastwards from Thika Road to the confluence of the Nairobi River and Thiririka River;
- Some gentle undulations on the site as a result of local drainage systems and channels;
- The Nairobi River has a 30m high waterfall;
- The site is largely *Acacia drepanolobium* – *Themeda triandra* grassland mosaic; and
- The landscape pattern allows wide long distance views eastwards towards Mt Kilimambogo.

1.6.2 Existing Uses

There are various existing uses on the site, some of which will need to be incorporated into the development of Northlands. The existing uses that will be retained as part of the development include the Peponi School within Sukari Farm, Brookside Dairies, and the existing forestry plantation.

1.6.3 Transport

At present, access to the site is limited, due to the rural location of the site. The main formal access to the site is from Thika Super Highway to the west of the site which serves the uses within the Sukari Farm cluster. Completion of the Eastern Bypass has opened access to the rest of the site and increased the capacity of the site to accommodate development. This is one of the key informants of the Masterplan approach.

1.6.4 Environment

There are a number of wetland, riverine and tree / shrub habitats on the site. Large parts of the site are dry savannah or open grass plains with scattered acacia bushes.

1.7 Strategic Environmental Assessment Requirement

One of the main challenges of sustainable environmental management is that of ensuring that all new management plans in a country are properly aligned and configured within the national goals for environmental sustainability at all levels, namely, local, county, national, regional and global levels. This obligation requires the management plans to effectively integrate the various instruments of sustainable environmental management such as policies, legal frameworks, strategic plans, regional frameworks and international multilateral environmental agreements (MEAs). Without such integration, formulation of management plans might not effectively correspond with the national and international sustainability goals. It is also necessary to



ensure that the package of development activities in a management plan does not introduce negative environmental impacts because this can have devastating implications for the county and nation on the long-term.

The general aim of Strategic Environmental Assessment (SEA) is to scrutinize new management plans and ensure that they are environmentally sustainable and compliant to the exiting environmental obligations in policies, legal frameworks, strategic plans and MEAs.

The central legislation which serves as the bedrock for environmental protection in Kenya is the Environmental Management and Coordination Act (EMCA, 1999) which is the umbrella legislation that takes precedence over other sectoral environmental legislation. EMCA 1999 provides the National Environment Management Authority (NEMA) with powers to approve or disapprove major developments based on proper planning and assessment of environmental impacts. The Act gives “teeth” and “muscle” for NEMA to spearhead precautionary activities in order to ensure sustainable development in conservation areas and other valued and sensitive environments in the country. All these measures are meant to ensure that development, which is an inevitable necessity in any country including Kenya does not in any way undermine the very objectives of environmental conservation. In other words, it is necessary to regulate development so that in the long-term, it doesn’t destroy the environment from which the valued goods and services it requires are obtained.

The Environmental (Impact Assessment and Audit Regulations) 2003 provide for Strategic Environmental Assessment of Plans, Policies and Programmes (PPP). The assessment should consider the effect of implementation of PPP actions taking into consideration the use of natural resources; the protection and conservation of biodiversity; human settlement and cultural issues; socio-economic factors; and the protection, conservation of natural physical surroundings of scenic beauty as well as protection and conservation of built environment of historic or cultural significance.

1.8 Purpose of the SEA

An *Ex ante* assessment of the proposed NMP was undertaken in this study and the purpose was to identify, describe and assess at a strategic level the environmental and socio-economic opportunities/constraints of implementing the proposed Masterplan, develop practical mitigation measures for addressing the identified limitations as well as the enhancement of opportunities.

The SEA shall ensure that environmental and social considerations are included in the planning, implementation and operation of the Northlands Masterplan.

The objectives of the SEA are to:

- To assess whether the NMP has properly integrated the existing national environmental policies and legal frameworks;
- To assess the level of integration of the NMP with other relevant plans and strategies;
- To evaluate whether the proposed activities in the NMP are compliant with the EMCA 1999 and its subsidiary legislation;
- To identify, describe and assess the likely significant environmental effects of implementing the plan;
- To integrate stakeholders’ socio-economic and environmental perspectives into the proposed land use plan;
- To provide information to better integrate environmental considerations into decisions, implementation, and monitoring in order to minimize risks to the plan and risks emanating from the plan;
- To assess alternatives and options that can improve the land use plan; and



- To provide strategic-level recommendations on how to minimize potential negative effects and optimize positive effects.

1.9 Methodology for carrying out the SEA

The SEA was carried out in line with the provisions of the Environmental Management and Coordination Act, 1999, the Environmental (Impact Assessment and Audit) Regulations 2003, the 2012 National Guidelines for Strategic Environmental Assessment in Kenya, as well as international guidelines on environmental and social impact management. The SEA process was organized in two phases: Phase 1 – Screening and Scoping, and Phase 2 – the Study.

The Screening and Scoping Phase served to establish the spatial and technical focus and content of the SEA and the relevant criteria for assessment. The main activities in this phase included:

- Determination of the appropriate type of SEA for the NMP;
- Identification of the key stakeholders;
- Identification of the main issues & concerns (to be further studied during the detailed SEA);
- Determining the SEA objectives (i.e., the evaluation framework);
- Identification of alternative options (to be assessed during the Analysis Phase of the SEA); and
- Identification of data sources and data gaps, and provide input to the type of methodology to be used during the detailed SEA study.

The SEA study entailed the following:-

- Intensive analysis of the NMP in order to identify the proposed development interventions which are proposed in the area on the long term;
- Intensive literature review of strategic environmental documents in order to develop a comprehensive environmental regulatory framework for the PPP analysis;
- Collection of additional baseline information on the physical, biological and socio-cultural environment as identified in the scoping studies;
- Stakeholder engagement to deliberate on the proposed plans and identified alternatives;
- Analysis of the environmental and socioeconomic baseline data to identify trends, opportunities and constraints in relation to the plans;
- Intensive plan environmental impact analysis for identification, prediction and quantification of the significant environmental and social impacts of the proposed plan, evaluation of alternatives including their direct, secondary and cumulative effects, and selection of suitable alternatives that enhance environmental and social benefits;
- Identification of measures to enhance opportunities and mitigate adverse impacts; and
- Preparation of a comprehensive environmental management and monitoring framework to be used during the long term implementation of the NMP

Table 1 summarizes the key stages and tasks undertaken in the SEA.

Table 2: Stages and Tasks in the SEA of the NMP

SEA Stages and Tasks	Purpose
Stage 1: Setting the context and objectives, establishing the baseline and deciding on the scope	
A: Identifying other relevant plans/strategies, programmes legislation and environmental protection objectives	To establish how the plan is affected by outside factors, to suggest ideas for how any constraints can be addressed, and to help to identify SEA objectives



B: Collecting baseline information	To provide an evidence base for environmental problems, prediction of effects, and monitoring; to help in the development of SEA objectives
C: Identifying environmental problems	To help focus the SEA and streamline the subsequent stages, including baseline analysis, setting of the SEA objectives, prediction of effects and monitoring
D: Developing SEA objectives	To provide a means by which the environmental performance of the plan and alternatives can be assessed
E: Consulting on the scope of SEA	To ensure that the SEA covers the likely significant environmental effects of the plan
Stage 2: PPP analysis	
A: Preparation of a comprehensive environmental framework	To determine the judgement criteria be used in assessing the environmental strengths and weaknesses in the NMP
B: PPP analysis	To identify the national environmental policies and strategic plans which have not been effectively considered in the NMP
C: Identification of alternative options	To recommend suitable options for addressing the PPP gaps identified in (B) above
Stage 3 Plan environmental impact assessment	
Identification of impact indicators	To undertake a comprehensive analysis of the biophysical and socio-economic benefits and potential adverse effects of the NMP
Consultations with the Public and Lead Agencies on potential impacts, alternatives and mitigation measures	To give an opportunity to the public and lead agencies to outline their concerns, and ideas on how potential challenges of the plan can be overcome
Stage 4: Developing and refining alternatives and assessing effects	
Testing the plan objectives against SEA objectives	To identify potential synergies or inconsistencies between the objectives of the plan and the SEA objectives in developing alternatives
Developing strategic alternatives	To develop and refine strategic alternatives
Predicting the effects of the plan, including alternatives	To predict the significant environmental effects of the plan and its alternatives and assist in the refinement of the plan.
Evaluating the effects of the plan, including alternatives	To evaluate the predicted effects of the plan and its alternatives and assist in the refinement of the plan
Mitigating adverse effects	To ensure that adverse effects are identified and potential mitigation measures are considered.
Proposing measures to monitor the environmental effects of plan implementation	To detail the means by which environmental performance of the plan can be assessed.
Stage 3: Preparing the Draft SEA Report	
Preparing the SEA Report	To present the predicted environmental effects of the plan, including alternatives, in a form suitable for public consultation and use by decision makers.
Stage 4: Consultation on the Masterplan and Draft SEA Report	
Consulting the public and lead agencies on the Masterplan and the Draft SEA Report	To give the public and the Lead Agencies an opportunity to express their opinions on the findings of the Draft SEA Report and to use it as a reference point in commenting on the Masterplan
Assessing significant changes	To ensure that the environmental implications of any significant changes to the draft plan at this stage are assessed and taken into account.

Providing information and making decisions	To provide information on how the SEA Report and stakeholder opinions were taken into account in deciding the final form of the plan to be adopted
Stage 5: Monitor the significant effects of implementing the plan	
Develop aims and methods for monitoring	To track the environmental effects of the plan to show whether they are as predicted; to help identify adverse effects
Responding to adverse effects	To prepare for appropriate responses where adverse effects are identified

1.10 Study Limitations

At the time of undertaking the SEA a land use plan defining the various land uses had just been finalized. The zoning guidelines for developments within the Masterplan had also been developed. Preliminary estimates of the population, water and power demand, effluent generation and solid waste generation were made from the zoning plans. Traffic volumes to be generated by the development were also estimated.

These projections are high level there was therefore a fairly high degree of uncertainty in the prediction of the second, third and fourth order of impacts on the relevant resources and aspects such as energy resources, water resources, waste management, traffic and transport.

Detailed engineering studies on water and power demand and supply, solid and effluent waste management, storm water, hydrogeology, and traffic and transportation will require to be carried out before implementation of the development.

1.10.1 Recommendations

This SEA includes recommendations to carry out the following studies:

- **Water demand and supply studies.** These will include: hydrogeological studies to establish the potential of ground water resources in Northlands; hydrological studies to establish the amounts of storm water that can be harvested for utilization; the supply potential of Nairobi Water and Sewerage Company (NWSC), Ruiru-Juja Water and Sewerage Company (RUJWASCO) and others; the potential amount of water that can be recycled from effluent;
- **Waste management studies.** These should entail an assessment of the existing and planned waste management infrastructure on site and Ruiru sub-county and the capacity to manage waste from Northlands; and the potential of alternative waste management technologies such as on-site treatment and recycling or disposal;
- **Traffic studies:** these entail an assessment of projected volumes of vehicular and pedestrian traffic to be generated by Northlands, capacity of existing traffic and transport infrastructure to support the traffic, and suitable traffic management options.

For the actual impacts to be evaluated as well as the improvement/modifications to be recommended including the type and capacity of the access junction to be established, the peak hourly traffic volume along the existing roads as well as from the development needs to be established. Further trip distribution and route assignment of the development traffic needs to be established. The data requires to be forecasted into the future planning horizon of each phase to establish the future capacity of the roads considering the

expected traffic to be generated by the development. This will be achieved through a comprehensive Traffic Impact Assessment of the development.

1.11 SEA Study Team

The SEA study team was comprised of the following:

- Dr Francis Mwaura: Team Leader and SEA Expert
- Simon Wandeto : Project Manager and Environmentalist
- Lawrence Njue: Environmentalist
- Kennedy McAbongo: Environmentalist
- Dr Edward Ontita: Socio-economist
- Lydia Njeru: Sociologist
- Dr Robert Chira: Ecologist
- Evans Mairura: Urban/Regional Planner

Other experts engaged included a Water and Sanitation Engineer, Electrical Engineer and a Highways/Traffic Engineer all of whom provided inputs in the estimation and proposals for water and energy demand/supply, waste generation/disposal, and traffic impacts of the NMP.

2 General Description of the Area

2.1 Plan area description

The site occupies a strategic location in Ruiru Sub-County on the north east fringe of Nairobi city approximately 15 kilometers from the City Centre and represents one of the largest development opportunities near the city. The site is in an accessible location, with good access to the strategic road network, has good access to the airport and City Centre.

2.2 Environmental Baseline conditions

2.2.1 Physical environmental setting

2.2.1.1 Climate

The Climate in Ruiru is mild; generally warm and temperate, and is classified as Csb by the Köppen-Geiger system. Rainfall in the area averages 797 mm, and is lowest in July, with an average of 13 mm. In April, the precipitation reaches its peak, with an average of 170 mm. the difference in precipitation between the driest and wettest months is 157 mm.

The temperatures in Ruiru average 19.5 °C. March is the hottest month of the year at an average temperature of 21.0 °C, while July is the coldest month of the year at 17.2 °C on average. The variation in annual temperature is around 3.8 °C. (<http://en.climate-data.org>)

Table 3: Climate Graph of Ruiru

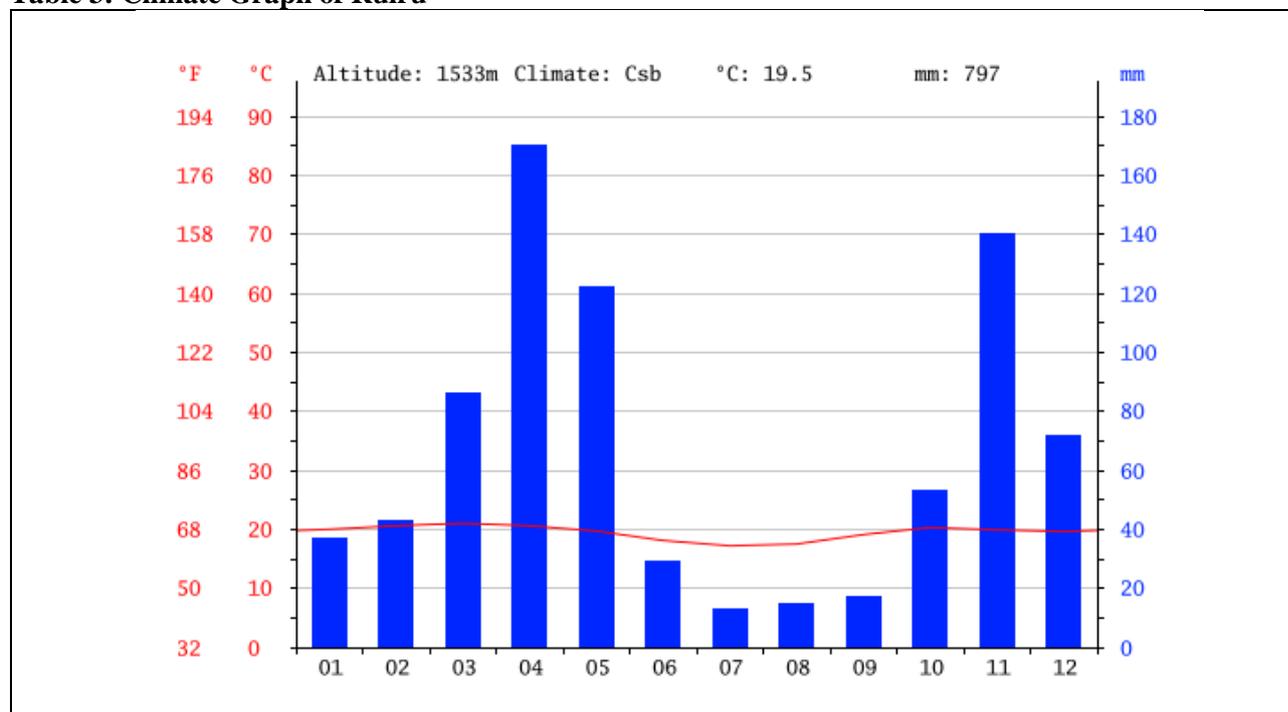


Table 4: Temperature Graph of Ruiru

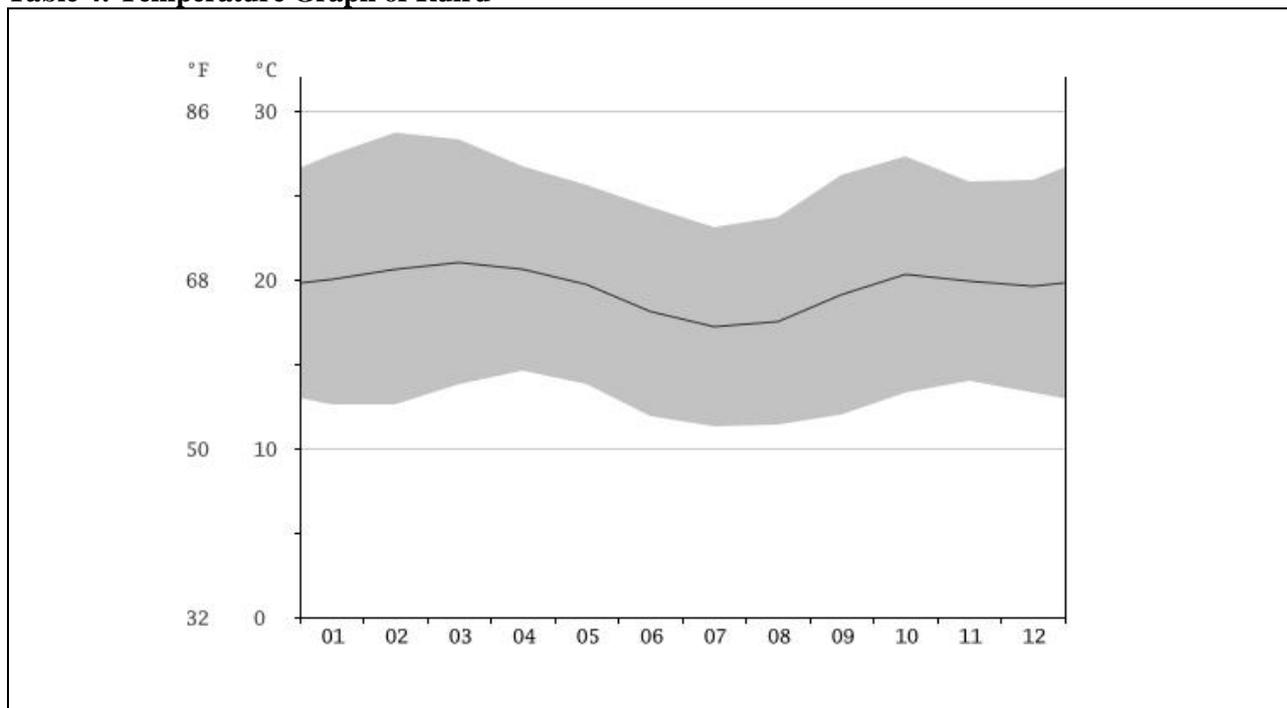


Table 5: Climate Table for Ruiru

month	1	2	3	4	5	6	7	8	9	10	11	12
mm	37	43	86	170	122	29	13	15	17	53	140	72
°C	20.0	20.6	21.0	20.6	19.7	18.1	17.2	17.5	19.1	20.3	19.9	19.6
°C (min)	12.6	12.6	13.8	14.6	13.8	11.9	11.3	11.4	12.0	13.3	14.0	13.3
°C (max)	27.4	28.7	28.3	26.7	25.6	24.3	23.1	23.7	26.2	27.3	25.8	25.9
°F	68.0	69.1	69.8	69.1	67.5	64.6	63.0	63.5	66.4	68.5	67.8	67.3
°F (min)	54.7	54.7	56.8	58.3	56.8	53.4	52.3	52.5	53.6	55.9	57.2	55.9
°F (max)	81.3	83.7	82.9	80.1	78.1	75.7	73.6	74.7	79.2	81.1	78.4	78.6

2.2.1.2 Topography

Kiambu County in general is divided into four broad topographical regions namely Upper Highland, Upper Midland, Lower Highland and Lower Midland. The Upper Highland is an extension of the Aberdare Ranges, which are steep and form important water catchments for rivers like Bathi and Gatamaiyu.

The upper Midland lies below 1,500 m above sea level. The major features are widespread ridges and volcanic or footbridges.

The lower Highland (of which the site is part of) is found mainly in Limuru and parts of Kikuyu and Githunguri. The area generally has a few ranges with wide spaced parallel ridges. Plateaus and high-level structural plains characterize it. The Project area is gently sloping north-west to south-east and lies at an elevation of approximately 1500 above sea level.



The lower midland zone is found in parts of Kikuyu (Karai) and Limuru (Ndeiya) Divisions. The soils are dissected erosional plains and vary from well drained, shallow, and dark red to yellowish red, stony loamy sand to imperfectly drained, very deep, dark brown and strongly calcareous soils with sodic clay topsoil.

2.2.1.3 Geology and soils

Ruiru lies in the tertiary volcanic region of Kenya. The local rocks are basically alkaline in character. Tertiary sediments occur 6 kilometres East of Ruiru Township.

There is an established, leased soil quarry utilised for clay products raw materials to the west of the site. There also exists a massive solid rock outcrop on the far east of the property which had been blasted illegally but has since been stopped. This appears to have been targeted for extracting building blocks.

2.2.1.4 Water resources

The proposed Northlands site is situated in the Upper Athi catchment where surface water resources are abundant. Several streams and rivers traverse the project area including Komothai, Thiririka, Ruiru, Makuyu, Kiu, Kamiti, Gatharaini, and Nairobi Rivers. Most of the rivers however are polluted; with pollution originating from residential, commercial, industrial and agricultural developments in the City of Nairobi, Ruiru, and Kiambu. These rivers together with several dams impounded mainly for coffee irrigation and for livestock, form the main sources of water for domestic, irrigation and for livestock in Ruiru Municipality. Ground water resources have been extensively exploited in the settled areas of Ruiru Municipality, especially in Gitambaya, Membley and Murera.

The quality of water from the boreholes is of varying degrees of salinity and hardness with incidences of high fluoride content, and complaints abound in the area that borehole water stains sanitary fittings, cooking utensils and clothing. The recommended spacing of boreholes is at least 0.8km radius to avoid interference of the cones of depression. Other aquifer characteristics such as depth and yield as observed from the many boreholes vary a great deal and it is therefore difficult to give general values at this juncture. A more thorough study will need to be carried out to establish characteristics of the aquifer and thus quantify more accurately the quantity of ground water that can be obtained from the aquifer within Northlands project area.

There is a risk of pollution of ground water due to rapid increase of population, and poor means of sewage disposal in Ruiru.

2.2.2 Biological environmental setting

2.2.2.1 Flora

The common flora in the area includes indigenous trees such as the *Newtonia buchananii* (Mukoi) and *Trichilia-roke* (Mutuati) trees. In some areas, the vegetation is primarily dry savannah, open grass plains with scattered *Acacia* bushes. Permanent rivers with a riverine forest are also evident. Stands of *Olea africana* and *Croton dichogamus*, *Brachylaena hutchinsii* and *Calodendrum capense* can also be found in the Project area.

The most dominant grasses include the *Themeda triandra*, *Cyperus spp*, *Digitaria spp*, and *Cynodon dactylon* with scattered yellow-barked *Acacia xanthophloea*. In addition there are stretches of broken bush country particularly along the wet valleys. Plantations of *Eucalyptus sp* are also found along the Eastern bypass and Thika superhighway.



2.2.2.2 Fauna

In the settled areas, any wildlife found are non-resident and could just be straying. The project area together with the neighbouring large ranches remains the key sanctuaries for a wide and diverse fauna represented by mammals, reptiles and aves among others. The species previously sighted on the area include:

- Sacred Ibis (*Threskiornis aethipica*);
- Spur winged Geese (*Plectropterus gambensis*);
- Cattle egret (*Bubulcus ibis*);
- Squacco heron (*Ardeola ralloides*);
- Whistling duck (*Dendrocygna bicolor*);
- Black kite (*Elanus caeruleus*);
- Hippopotamus (*Hippopotamus amphibious*).
- Hyena (*Crocuta crocuta*) and
- Thomson's gazelles (*Eudorcas thomsonii*)

2.2.3 Socio-economic environmental setting

2.2.3.1 Population

According to the Population and Housing Census of 2009, Kiambu County had a population of 1,697,887 while Ruiru Constituency had a population of 201,986 with a density of 1,122 people per square kilometre.

2.2.3.2 Land use and Local economy

The combination of good soils, suitable climate, well developed infrastructure and the proximity to the most important capital city in the region has all served to make Kiambu the most lucrative farming County in the country. Farms range from less than 0.3 ha to large plantations of well over 1,000 ha. Over 90% of the total rural land mass is suitable for farming.

Agricultural activity has a major new competitor in the form of real estate as housing, trading centers and shopping malls offer more reliable dividends to investment than farming. Horticulture, the growth industry of the last two decades appears capable of out-earning tea and coffee – the traditional cash crops of this region.

Other agricultural activities include dairy farming, and growing of pyrethrum and subsistence crops such as maize, beans and locally consumed vegetables.

2.2.3.3 Mean land holding size

The size of arable land in the County is 1,878.4 Km² while that of the non-arable land is 649.7 Km². Water masses (dams, ponds and rivers) cover 15.5 Km² of the County. The average small-scale land holding size is 0.36 Ha while the large-scale land-holding size is 69.5 Ha.

The small-scale land holdings are mostly found in upper parts of Gatundu North, Gatundu South, Kiambaa, Limuru and Kikuyu constituencies while the large-scale land holdings are usually found in the lower parts of the County especially in Juja constituency and the upper highlands in Limuru and Lari constituencies.



2.2.3.4 Infrastructure and Access

Road and Rail Network: The County has a good road network. It has a total of 2,033.8 km of roads under bitumen standards, 1,480.2 km under gravel surface and 430.1 km under earth surface. The County also has 131 km of railway line and four railway stations in Ruiru, Thika, Kikuyu and Limuru towns. The rail is not fully utilised in the County and only passenger trains operate between the City of Nairobi and the four stations.

Posts and Telecommunications: Mobile communication network coverage in Kiambu County is estimated at 98% while fixed line coverage is poor with only 214 connections in the entire County. This may be attributed to the fact that fixed lines are rapidly becoming obsolete in addition to the high maintenance cost of the fixed line network. There are 19 post offices and 14 sub-post offices which are fairly distributed within the County.

2.2.3.5 Financial Institutions

There are a total of 17 commercial banks with branches well distributed within the County. In addition, there are eight microfinance institutions, one building society, four village banks and 12 insurance companies. This is may be an indicator of the vibrant economic activities in the County able to sustain the financial sector and making it one of the fastest growing sectors in the County over the last five years.

2.2.3.6 Education Institutions

There are numerous educational institutions distributed throughout the County comprised of about 1,595 ECD centres (1,063 private and 532 are public), 934 private and public primary schools, while the secondary schools are 303 out of which 227 are public and 76 are Private. The County has one public University, five private universities a number of tertiary colleges.

2.2.3.7 Energy Access

Firewood is the main fuel used in cooking by 47.3% of the households in the County, while paraffin is the major fuel used in lighting. This poses a great challenge to the realization of 10% forest cover within the County.

98% of all trading centres within the County are connected to the national grid. However, connection to individual homes is low and there is need for up-scaling of the rural electrification programme.

2.2.3.8 Markets and Urban Centres

The County has a total of 2,517 trading centres with 6,634 registered retail traders and 750 registered wholesale traders. Urban centres in the County include Thika town, Kiambu and Karuri towns in Kiambaa constituency, Kikuyu town in Kabete constituency, Limuru town in Limuru Constituency, Gatundu town in Gatundu South Constituency and Ruiru town in Juja Constituency.

2.2.3.9 Housing

According to the 2009 Kenya Population and Housing Census, 48.3% of all homes in the County are stone – walled, 4.9% are brick/block, while 4.8% are mud/wood walled. 74.6% of the houses have cemented floors while 87.5% have corrugated iron sheets. A small proportion (0.1%) of the houses have other forms of roofing materials.



The proximity of the County to the city of Nairobi has seen the conversion of large parcels of agricultural land into residential and/or mixed use developments as many of those working in Nairobi opt to reside in the County.



3 Plan, Policy and Programme (PPP) Analysis

3.1 Introduction

There are various plans, policies, legislation and programmes that set the context for developments of the proposed nature, some directly and others indirectly. These instruments will influence how the Masterplan is developed and implemented.

The NMP was subjected to a comprehensive PPP analysis based on the environmental obligations using a PPP framework, which was developed for the SEA. The PPP framework for the SEA comprised the following instruments: - a) national environmental policies, b) legal frameworks, c) national strategic plans, and d) international environmental frameworks (MEAs) for the global obligations.

A total of 38 PPPs were identified as relevant for the SEA which included 12 policies and 7 legal frameworks, 13 strategies and plans and 6 MEAs. These included the following:

3.1.1 National environmental policies

- The Constitution of Kenya, 2010 (GoK, 2010)
- Sessional Paper No. 6 of 1999 on Environment and Development (GoK, 1999)
- Draft Environment Policy, 2012 (GoK, 2012)
- National Land Policy, 2009 (GoK, 2009)
- National Water Policy, 2012 (Draft) (GoK, 2012)
- National Policy for the Sustainable Development of Arid and Semi-Arid Lands of Kenya, 2012 (GoK, 2012)
- Draft National Policy on Wetlands Conservation and Management, 2013 (GoK, 2013)
- Draft Wildlife Policy, 2011 (GoK, 2011)
- National Policy for Disaster Management, 2009 (GoK, 2009)
- National HIV Policy, 1997 (GoK, 1997)
- National Environmental Sanitation and Hygiene Policy, 2007 (GoK, 2007)
- Draft National Tourism Policy, 2007 (GoK, 2007)

3.1.2 Legal frameworks

- Environmental Management and Coordination Act (EMCA) No. 8 of 1999 (GoK, 1999)
- EMCA (Wetlands, river banks, lake shores and sea shore management) Regulations, 2009 (GoK, 2009)
- Physical Planning Act, 1996 (GoK, 1996)
- Water Act, 2002 (GoK, 2002)
- Wildlife (Conservation and Management) Act Cap 376 of 2013 (GoK, 2013)
- Public Health Act, Cap 242 (GoK, 1986)
- Energy Act No 12 of 2006 (GoK, 2006)

3.1.3 National Strategic plans

- Vision 2030 (GoK, 2008)
- National Environment Action Plan, 2009-2013 (GoK, 2009)
- National Biodiversity Strategy and Action Plan, 2000 (GoK, 2000)
- National Master Plan for the Conservation and Sustainable Management of Water Catchment Areas in Kenya, 2012 (GoK, 2012)
- Nairobi Metro 2030 (GoK, 2008)
- Agricultural sector Development Strategy 2010-2020 (GoK, 2010)



- National Climate Change Response Strategy, 2010 (GoK, 2010)
- National Tourism Master Plan (GoK, 1995)
- National Water Masterplan 2030(GoK, 2013)
- Nairobi Integrated Urban Development Master Plan (NIUPLAN) - 2014-2030
- Kiambu Integrated Development Plan(KCG, 2013)

3.1.4 MEAs

- Convention on Biological Diversity (CBD Secretariat, 1992)
- United Nations Framework on Combating Climate Change (UN, 1992)
- United Nations Convention to Combat Desertification (UN, 1994)
- Ramsar Convention (UN, 1971)
- Convention on Migratory Species (UN, 1979)
- African Convention on the Conservation of Nature and Natural Resources (AU, 1968)

The analysis involved a comprehensive analysis of the 8 development components in the NMP against the environmental obligations in the obligatory PPPs identified for the SEA process. The results of the comprehensive PPP analysis are shown below (Table 6-9 where ‘+’ means positive impact while ‘-’ means no significant impact).



Table 6: National Policies

National policies	Environmental Requirements	Linkages with the NMP	Compatibility with Northlands Project (0 = Marginal impact, + = Positive Impact, - = Negative impact)							
			Square and office Park	Strip Mall	Heights	Mall	Paradise Park	Meadows	Logistics Parks	Boulevards
The Constitution of Kenya, 2010 (GoK, 2010)	Article 42 – Supporting public involvement in ensuring the rights to a clean and healthy environment.	SEA public consultations	+	+	+	+	+	+	+	+
	Article 43 – Supporting public involvement in ensuring the need for every person to have access to clean and safe water in adequate quantities,	SEA public consultations	+	+	+	+	+	+	+	+
	Article 69 - Environment and natural resources (1) (a) Ensuring sustainable exploitation, utilization, management and conservation of the environment and natural resources	Establishment of a wildlife sanctuary	0	0	0	0	+	0	0	0
	b) Working towards the achievement and maintaining a tree cover of at least 10% of the land area of Kenya by the year 2030 ¹	Establishment of additional greenbelts in addition to the existing ones	+	+	+	+	+	+	+	+
	(g) Eliminating processes and activities that are likely to endanger the environment;	Implementation of the SEA recommendations	+	+	+	+	+	+	+	+
	Article 185: 22 - Protection of the environment and natural resources with a view to establishing a durable and sustainable system of development	Implementation of the SEA recommendations	+	+	+	+	+	+	+	+
Sessional Paper No. 6 of 1999 on Environment and Development (GoK, 1999)	Water resources • Supporting the provision of water for wildlife, livestock and domestic use	Establishment of 3 rainwater harvesting reservoirs in the Northlands	+	+	+	+	+	+	+	+

¹ Maximum tree planting in green/open spaces

	<ul style="list-style-type: none"> • Providing incentives for rain water harvesting 	Establishment of 3 rainwater harvesting reservoirs in the Northlands	+	+	+	+	+	+	+	+	+
	<p>Human settlements</p> <ul style="list-style-type: none"> • Regulating urban development to only those areas which are suitable, avoiding ecologically fragile areas 	Zoning of the area as shown in Column 4	+	+	+	+	+	+	+	+	+
	<p>Other policy goals</p> <ul style="list-style-type: none"> • Encouraging sustainable use of resources and ecosystems 	Zoning of the area as shown in Column 4 in addition to sustainable riparian zone management	+	+	+	+	+	+	+	+	+
	<ul style="list-style-type: none"> • Adherence to the polluter pays principle 	Pollution management in the Logistics Park	0	0	0	0	0	0	0	+	0
	<ul style="list-style-type: none"> • Undertaking EIA for all private and public projects 	SEA identification of ESIA subjectable activities in the NMP	+	+	+	+	+	+	+	+	+
	<ul style="list-style-type: none"> • Increase public awareness on environment 	SEA public consultations	+	+	+	+	+	+	+	+	+
Draft Environment Policy, 2012 (GoK, 2012)	<ul style="list-style-type: none"> • Adopting measures, incentives and disincentives to promote the re-use, recycling and reclamation of re-usable packaging material and combat the pollution of the environment 	Implementation of the SEA recommendations	+	+	+	+	+	+	+	+	+
	<ul style="list-style-type: none"> • Supporting establishment of constructed wetlands for waste management 	Improvement of the exiting CW for the Brookside Dairy Factory	+	+	+	+	+	+	+	+	+
	<ul style="list-style-type: none"> • Developing an integrated, improved early warning and response systems for climate change and disaster risks 	The Northlands environment will be affected by the expected climate change scenarios in Kenya	0	0	0	0	0	0	0	0	0
	<ul style="list-style-type: none"> • Encouraging Kenyans to have family sizes which are sustainable. 	Family Planning and RH services in the proposed Northlands hospital	0	0	0	0	+ ²	0	0	0	0
	<ul style="list-style-type: none"> • Formulating an innovative strategy to increase forest and tree cover from the current 2% to at least 10% by 2030³ 	Establishment of additional greenbelts in addition to the existing ones	+	+	+	+	+	+	+	+	+
	<ul style="list-style-type: none"> • Protecting, conserving, and improving the habitats, corridors, and dispersal areas of wildlife 	Establishment of a wildlife sanctuary in addition to sustainable riparian zone management	+	+	+	+	+	+	+	+	+
	<ul style="list-style-type: none"> • Working with private sector, NGOs and CBOs to enhance corporate and social responsibility and accountability 	Implementation of CSR by the various business communities in the NMP to public schools in the area such as Uhuru Secondary School	+	+	+	+	+	+	+	+	+

² For the hospital³ For all the green/open spaces in the development project

National Land Policy, 2009 (GoK, 2009)	3.4.3.2: Ecosystem management and conservation principles • Surveying of all critical ecosystems to determine their sustainable land use	Zoning of the area as shown in Column 4 in addition to sustainable riparian zone management	+	+	+	+	+	+	+	+	+
	13(c): Encouraging the development of wildlife sanctuaries and conservancies and involve local communities and individuals living contiguous to the parks and protected areas in the co-management of such area	Establishment of a wildlife sanctuary in addition to sustainable riparian zone management	0	0	0	0	+	0	0	0	0
	Other policy goals: • Ensuring sustainable utilization and management of land and its resource	Zoning of the area as shown in Column 4	+	+	+	+	+	+	+	+	+
	• Supporting the implementation of environmental assessments and audits	SEA identification and recommendation of ESIA and EA subjectable activities in the NMP	+	+	+	+	+	+	+	+	+
National Water Policy, 2012 (Draft) (GoK, 2012)	a) Ensuring increased per capita water availability above the international benchmark of 1000 m ³ by 2030	Establishment of 3 rainwater harvesting reservoirs in the Northlands	+	+	+	+	+	+	+	+	+
	d) Enhancing storm water management and rainwater harvesting	Establishment of 3 rainwater harvesting reservoirs in the Northlands	+	+	+	+	+	+	+	+	+
	f) Enhancing pollution control	Implementation of the SEA recommendations	-	+ ⁴	-	-	-	-	-	+	-
	h) Enhancing enforcement of regulation and other IWRM actions	Sustainable riparian zone management in collaboration with relevant stakeholders such as the KiU WRUA	+	+	+	+	+	+	+	+	+
	i) Improve effluent waters treatment and recycle for use	Improvement of the exiting CW for the Brookside Dairy Factory whose waste water is recycled	+	+	+	+	+	+	+	+	+
	5.4: Ensuring public participation in all areas of water affairs, including right to be informed, representation in boards and water dialogue platforms	Collaboration with relevant stakeholders such as the WRMA, ATHI Water and Kiu WRUA	+	+	+	+	+	+	+	+	+
	4.3 (e) Ensuring the establishment of protected areas crucial for water storage	Sustainable riparian zone management for rivers in the property such as Kiu, Kamiti, Gatharaini and Nairobi	+	+	+	+	+	+	+	+	+

⁴ For the petrol station



	Other policy goals: • Ensuring emergency supply of adequate water to protected areas for wildlife use and recreation	Establishment of 3 rainwater harvesting reservoirs in the Northlands	+	+	+	+	+	+	+	+	+
	• Supporting rain water harvesting	Establishment of 3 rainwater harvesting reservoirs in the Northlands	+	+	+	+	+	+	+	+	+
National Policy for the Sustainable Development of Arid and Semi-Arid Lands of Kenya, 2012 (GoK, 2012)	Other policy obligations 3.4.2 Natural resource management • Promoting low-maintenance water technologies, with an emphasis on water harvesting	Establishment of 3 rainwater harvesting reservoirs in the Northlands	+	+	+	+	+	+	+	+	+
Draft National Policy on Wetlands Conservation and Management, 2013 (GoK, 2013)	Policy Statement 1: Ensuring that the ownership of natural wetlands is vested in the state while recognizing legitimate rights of users who depend on them for their livelihoods	Sustainable riparian zone management for rivers in the property such as Kiu, Kamiti, Gatharaini and Nairobi in collaboration with all relevant stakeholders	+	+	+	+	+	+	+	+	+
	Policy Statement 2: Ensuring that natural wetlands under private ownership will be subject to regulations	Sustainable riparian zone management for rivers in the property such as Kiu, Kamiti, Gatharaini and Nairobi in collaboration with all relevant stakeholders	+	+	+	+	+	+	+	+	+
	Policy Statement 8: Ensuring that any land resulting from receding of natural wetlands shall continue to remain inalienable state land and be regarded as riparian land and shall not be allocated as private land	Sustainable riparian zone management for rivers in the property such as Kiu, Kamiti, Gatharaini and Nairobi in collaboration with all relevant stakeholders	+	+	+	+	+	+	+	+	+
	2.2.2 Establishment of Wetland Conservation Areas (WCAs) Policy Statement 1: Promoting restoration and rehabilitation programmes for degraded wetland	Sustainable riparian zone management for rivers in the property such as Kiu, Kamiti, Gatharaini and Nairobi in collaboration with all relevant stakeholders	+	+	+	+	+	+	+	+	+
Draft Wildlife Policy, 2011(GoK, 2011)	• 8.5.3:Wildlife Security • Strengthening wildlife security in wildlife conservation areas	Establishment of a wildlife sanctuary	0	0	0	0	+	0	0	0	0
	• Ensuring good governance in the management of wildlife conservation areas and sanctuaries	Development of a Wildlife Management Plan for the wildlife Sanctuary in collaboration with KWS	0	0	0	0	+	0	0	0	0
	• Erecting and maintaining game barriers and other approved deterrent measures to minimize HWCs	Development of a Wildlife Management Plan for the wildlife Sanctuary in collaboration with KWS	0	0	0	0	+	0	0	0	0
	• Promoting joint ventures in the conservation and management of wildlife conservation areas and sanctuaries	Development of a Wildlife Management Plan for the wildlife Sanctuary in collaboration with KWS	0	0	0	0	+	0	0	0	0



National Policy for Disaster Management, 2009 (GoK, 2009)	2.1: Promoting the mainstreaming of disaster management and climate change into development planning and management for sustainability	-	0	0	0	0	0	0	0	0
	3.1: Providing for well-structured participation of society in disaster management by integrating traditional coping strategies into the DM systems	-	0	0	0	0	0	0	0	0
	Other policy goals: Supporting climate change disaster risk reduction initiatives	-	0	0	0	0	0	0	0	0
National HIV Policy, 1997 (GoK, 1997)	Ensuring that new development projects especially in the urban areas encourage preventive and responsible behavior both for the workers involved in such projects and also the local people within which projects are taking place as a goal towards curtailing the spread of the disease	SEA identification and recommendation of ESIA and EA subjectable activities in the NMP	+	+	+	+	+	+	+	+
National Environmental Sanitation and Hygiene Policy, 2007(GoK, 2007)	4.3: Sanitation and the environment • Protection of the environment from pollution and its negative effect on human health •	Implementation of the SEA recommendations including identification of ESIA and EA subjectable activities in the NMP	+	+	+	+	+	+	+	+
	•Ensuring use of technologies that uphold the right of present and future generations to a healthy and pollution-free environment.	Identification and recommendation by the SEA of ESIA and EA subjectable activities in the NMP	+	+	+	+	+	+	+	+
	• Ensuring the use of sanitation systems that are environmentally sound	Identification and recommendation by the SEA of ESIA and EA subjectable activities in the NMP	+	+	+	+	+	+	+	+
	• Preventing environmental pollution from liquid and solid waste	Identification and recommendation by the SEA of ESIA and EA subjectable activities in the NMP	+	+	+	+	+	+	+	+
	• Other policy goals • Setting of clear standards and guidelines for environmental sanitation	Implementation of the SEA recommendations	+	+	+	+	+	+	+	+
	• Increasing environmental sanitation awareness across the country	Implementation of the SEA recommendations	+	+	+	+	+	+	+	+
Draft National Tourism Policy, 2007(GoK, 2007)	• Making tourism industry in Kenya a leader in responsible and sustainable environmental practices	Establishment of tourism facilities such as shopping malls								
			0	0	0	+	+	+	0	0

	<ul style="list-style-type: none"> Developing integrated environmental management principles for all tourism and other major economic development projects 	Implementation of the SEA recommendations	+	+	+	+	+	+
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Table 7: Legal frameworks

National Legal Frameworks	Environmental Requirements	Linkages with the NMP	Potential Impact of Northlands Project							
			Square and office Park	Strip Mall	Heights	Mall	Paradise Park	Meadows	Logistics Parks	Boulevards
Environmental Management and Coordination Act (EMCA) No. 8 of 1999 (GoK, 1999)	Section 42 – Supporting the protection of rivers and wetlands	Sustainable riparian zone management for rivers in the property such as Kiu, Kamiti, Gatharaini and Nairobi in collaboration with all relevant stakeholders	+	+	+	+	+	+	+	+
	Section 50 – Supporting the conservation of biological diversity	<ul style="list-style-type: none"> Sustainable riparian zone management for rivers in the property such as Kiu, Kamiti, Gatharaini and Nairobi in collaboration with all relevant stakeholders Establishment of a wildlife sanctuary 	+	+	+	+	+	+	+	+
	Section 51 – Supporting the conservation of biological resources in situ	Establishment of a wildlife sanctuary	0	0	0	0	+	0	0	0
	<ul style="list-style-type: none"> Specific integration obligations Controlling and prevention of environmental pollution 	Implementation of the SEA recommendations	+	+	+	+	+	+	+	+
	<ul style="list-style-type: none"> Carrying out EIA for all proposed projects with a potential for adverse impacts 	Identification and recommendation by the SEA of ESIA and EA subjectable activities in the NMP	+	+	+	+	+	+	+	+
	<ul style="list-style-type: none"> Carrying out environmental audit and monitoring of all activities that are likely to have significant effect on the environment 	Identification and recommendation by the SEA of ESIA and EA subjectable activities in the NMP	+	+	+	+	+	+	+	+



National Legal Frameworks	Environmental Requirements	Linkages with the NMP	Potential Impact of Northlands Project						
			Square and office Park	Strip Mall	Heights	Mall	Paradise Park	Meadows	Logistics Parks
	<ul style="list-style-type: none"> Ensuring integration with all other relevant EMCA (1999) Regulations including the following:- <ol style="list-style-type: none"> The Environmental management and coordination (Noise And Excessive vibration Pollution Control) Regulation, 2008 Water Quality Regulations, 2006 (Legal notice No. 121) Waste Management Regulations, 2006 (Legal Notice No.121) Air Quality, Regulations, 2008 Draft E-Waste Management, Regulations 2013 	Identification and recommendation by the SEA of ESIA and EA subjectable activities in the NMP especially in the Logistics Park	+	+	+	+	+	+	+
EMCA (Wetlands, river banks, lake shores and sea shore management) Regulations, 2009 (GoK, 2009)	<ul style="list-style-type: none"> Ensuring that no person shall carry out any of the activities stipulated in Section 42 of the Act without a Wetland Resource Use Permit by the relevant lead agency and an Environmental Impact Assessment License issued by the Authority where applicable 	Sustainable riparian zone management for rivers in the property such as Kiu, Kamiti, Gatharaini and Nairobi in collaboration with all relevant stakeholders	+	+	+	+	+	+	+
	<ul style="list-style-type: none"> Supporting the enforcement of Section 42 (g) of the Act which prohibits the draining wetland 	Sustainable riparian zone management for rivers in the property such as Kiu, Kamiti, Gatharaini and Nairobi in collaboration with all relevant stakeholders	+	+	+	+	+	+	+
Physical Planning Act, 1996 (GoK, 1996)	Section 29: Ensuring that developers to ensure proper execution and implementation of approved physical development plans	Approval of all structural drawings by relevant authorities	+	+	+	+	+	+	+
Water Act, 2002 (GoK, 2002)	Article 20. (1) Ensuring that state schemes shall take precedence over all other schemes for the use of water or the drainage of land	National electricity grid and sewer line	+	+	+	+	+	+	+
	<ul style="list-style-type: none"> Other legal obligations 	Establishment of 4 rainwater harvesting reservoirs	+	+	+	+	+	+	+



National Legal Frameworks	Environmental Requirements	Linkages with the NMP	Potential Impact of Northlands Project							
			Square and office Park	Strip Mall	Heights	Mall	Paradise Park	Meadows	Logistics Parks	Boulevards
	<ul style="list-style-type: none"> Promoting the conservation and proper use of water resources Protection of any water resource, its source or catchment 	Sustainable riparian zone management for rivers in the property such as Kiu, Kamiti, Gatharaini and Nairobi in collaboration with all relevant stakeholders	+	+	+	+	+	+	+	+
Wildlife (Conservation and Management) Act Cap 376 of 2013 (GoK, 2013)	16: (f): Supporting the formation of Wildlife Conservation Committees	Establishment of a wildlife sanctuary and preparation of wildlife management plan	0	0	0	0	+	0	0	0
	33 (c): Supporting the establishment of wildlife Development Fund for development of conservation areas	Sustainable riparian zone management for rivers in the property such as Kiu, Kamiti, Gatharaini and Nairobi in collaboration with all relevant stakeholders	0	0	0	0	+	0	0	0
Public Health Act, Cap 242 (GoK, 1986)	Article 129: Supporting the protection of public water supplies, meat, milk and other articles of food	Establishment of residential infrastructure, commercial business and industrial park	0	+	+	+	0	+	+	0
Energy Act No 12 of 2006 (GoK, 2006)	Article 27 (2): Ensuring permits are secured in respect of supply of electrical energy to other persons or consumers and for a generating plant of over 1000kw intended for own use	Establishment of a Logistical Park	+	+	+	+	+	+	+	+
	67 (d): Promotion of renewable energy sources including solar and hybrid system	-	0	0	0	0	0	0	0	0
	103 (b): Promotion development of renewable energy technologies including biomass, biodiesel, charcoal, solar and wind	-	0	0	0	0	0	0	0	0
	• Supporting environmental conservation and sustainable use of natural resources	Establishment of a wildlife sanctuary and sustainable riparian zone management for rivers in the property such as Kiu, Kamiti, Gatharaini and Nairobi	0	0	0	0	+	0	0	0



Table 8: National/Regional strategies and plans

National Strategic Plans	Environmental Requirements	Linkages with the NMP	Potential Impact of Northlands Project							
			Square and office Park	Strip Mall	Heights	Mall	Paradise Park	Meadows	Logistics Parks	Boulevards
Vision 2030 (GoK, 2008)	f) Supporting the increase of forest and tree cover to 10% by 2030	Establishment of additional green belts in addition to the existing ones	+	+	+	+	+	+	+	+
	i) Supporting the rehabilitation, regeneration and restoration of degraded rivers	Sustainable riparian zone management for rivers in the property such as Kiu, Kamiti, Gatharaini and Nairobi	+	+	+	+	+	+	+	+
	j) Supporting water harvesting and storage	Establishment of 4 rain water harvesting reservoirs	+	+	+	+	+	+	+	+
National Environment Action Plan, 2009-2013 (GoK, 2009)	The management plan is expected to support the following national environmental activities:-	Establishment of a wildlife sanctuary	0	0	0	0	+	0	0	0
	• Enhancing the protection of wildlife resources									
	• Supporting the increasing of forest cover in Kenya	Establishment of additional green belts in addition to the existing ones	+	+	+	+	+	+	+	+
	• Protection of flora & fauna	Establishment of additional green belts in addition to the existing ones	+	+	+	+	+	+	+	+
	• Promoting appropriate land use practices	NMP landuse zoning as in Column 4	+	+	+	+	+	+	+	+
	• Promoting efficient water harvesting, storage and usage	Establishment of 4 rain water harvesting reservoirs	+	+	+	+	+	+	+	+
	• Controlling of fire outbreaks	-	-	-	-	-	-	-	-	-
National Biodiversity Strategy and Action Plan, 2000(GoK, 2000)	The management plan is expected to support the following national environmental strategic actions:- Other Activities • Adopting best practices in conservation and management of natural resources	Establishment of a wildlife sanctuary and sustainable riparian zone management	+	+	+	+	+	+	+	+
National Master Plan for the Conservation and	The management plan is expected to support the following national environmental actions:-	Collaboration with relevant stakeholders such as the WRMA, ATHI Water and Kiu WRUA	+	+	+	+	+	+	+	+



National Strategic Plans	Environmental Requirements	Linkages with the NMP	Potential Impact of Northlands Project									
			Square and office Park	Strip Mall	Heights	Mall	Paradise Park	Meadows	Logistics Parks	Boulevards		
Sustainable Management of Water Catchment Areas in Kenya, 2012 (GoK, 2012)	Supporting the rehabilitation, protection and conservation of important water catchment areas to address the problem of water availability and sustainable use											
Nairobi Metro 2030 (GoK, 2008)	Moving Kenya into a middle income economy by 2030	Establishment of Northlands as an economic hub in the Nairobi Metropolitan Region	+	+	+	+	+	+	+	+	+	+
	Establishing the NMR as a regional and global services centre through the development of industrial and technology parks	Establishment of Northlands as an economic hub in the Nairobi Metropolitan Region	+	+	+	+	+	+	+	+	+	+
	Establish world class infrastructure and utilities supportive of world class living, working and business environment	Establishment of Northlands as an economic hub in the Nairobi Metropolitan Region	+	+	+	+	+	+	+	+	+	+
	Delivering a unique image and identity through effective place branding	Establishment of Northlands as an economic hub in the Nairobi Metropolitan Region	+	+	+	+	+	+	+	+	+	+
	Supporting the County Government to increase forest cover within its area of jurisdiction to 30% by 2030	Establishment of additional greenbelts in addition to the existing ones	+	+	+	+	+	+	+	+	+	+
	Identification, protection and enhancement of ecologically fragile and conservation areas in the NMR such as wildlife areas and swamps	<ul style="list-style-type: none"> Establishment of additional greenbelts in addition to the existing ones Northlands wildlife sanctuary Sustainable riparian zone management for rivers in the property such as Kiu, Kamiti, Gatharaini 	+	+	+	+	+	+	+	+	+	+
	Rehabilitation of the Nairobi River	Sustainable riparian zone management for rivers in the property such as Kiu, Kamiti, Gatharaini	+	+	+	+	+	+	+	+	+	+
Agricultural sector Development Strategy 2010-2020 (GoK, 2010)	<ul style="list-style-type: none"> Improving management of the environment and natural resources Improving environmental conservation 	<ul style="list-style-type: none"> Establishment of additional greenbelts in addition to the existing ones Northlands wildlife sanctuary 	+	+	+	+	+	+	+	+	+	

National Strategic Plans	Environmental Requirements	Linkages with the NMP	Potential Impact of Northlands Project							
			Square and office Park	Strip Mall	Heights	Mall	Paradise Park	Meadows	Logistics Parks	Boulevards
		<ul style="list-style-type: none"> Sustainable riparian zone management for rivers in the property such as Kiu, Kamiti, Gatharaini 								
	<ul style="list-style-type: none"> Improving pollution and waste management 	Implementation of the SEA recommendations	+	+	+	+	+	+	+	+
	<ul style="list-style-type: none"> Enhancing conservation and management of resources 	<ul style="list-style-type: none"> Establishment of additional greenbelts in addition to the existing ones Northlands wildlife sanctuary Sustainable riparian zone management for rivers in the property such as Kiu, Kamiti, Gatharaini 	0	0	0	0	+	0	0	0
	<ul style="list-style-type: none"> 6.6 Forestry and wildlife resources Developing and implementing appropriate mechanisms for protecting, conserving and sustainably managing wildlife resources 	Northlands wildlife sanctuary	0	0	0	0	+	0	0	0
	<ul style="list-style-type: none"> Strengthening forest and wildlife research, extension and training 	Northlands wildlife sanctuary	0	0	0	0	+	0	0	0
National Climate Change Response Strategy, 2010 (GoK, 2010)	<p>The management plan is expected to support the following national strategic actions</p> <p>Water resources</p> <ul style="list-style-type: none"> Supporting the construction of dams and water pans 	Establishment of 4 rain water harvesting reservoirs	+	+	+	+	+	+	+	+
	<ul style="list-style-type: none"> Supporting the protection of water towers, river banks, and water bodies 	Sustainable riparian zone management for rivers in the property such as Kiu, Kamiti, Gatharaini	0	0	0	0	+	0	0	0
	<ul style="list-style-type: none"> Improving municipal water recycling facilities 		+	+	+	+	+	+	+	+
	<p>c) Physical Infrastructure including transportation and telecommunication networks</p> <p>Ensuring that all new infrastructure is climate-proof over its lifespan</p>	-	-	-	-	-	-	-	-	-



National Strategic Plans	Environmental Requirements	Linkages with the NMP	Potential Impact of Northlands Project							
			Square and office Park	Strip Mall	Heights	Mall	Paradise Park	Meadows	Logistics Parks	Boulevards
National Tourism Master Plan (GoK, 1995)	3.1 Security Expansion and maintenance of security on our roads	Police stations	+	+	+	+	+	+	+	+
	Improving safety and security of tourists and wildlife.	Police stations	+	+	+	+	+	+	+	+
National Water Masterplan 2030(GoK, 2013)	Ensuring that improved water and sanitation is available and accessible to all by 2030	Establishment of 4 rain water harvesting reservoirs	+	+	+	+	+	+	+	+
Nairobi Integrated Urban Development Master Plan (NIUPLAN) - 2014-2030	11.5 Environment Improvement Program - Environment improvement program includes storm water drainage and sewerage, solid waste management, and air pollution management	Implementation of the SEA recommendations	+	+	+	+	+	+	+	+
Kiambu Integrated Development Plan(KCG, 2013)	Improving solid waste management	-	-	-	-	-	-	-	-	-
	Ensuring a clean environment	Implementation of the SEA recommendations	+	+	+	+	+	+	+	+
	Increasing forest cover	Establishment of additional greenbelts in addition to the existing ones	+	+	+	+	+	+	+	+
	Reducing air and water pollution	Implementation of the SEA recommendations	-	-	-	-	-	-	-	-
	Reducing carbon emission	-	-	-	-	-	-	-	-	-
	Promote and sustain a vibrant, competitive and diversified industrial sector in the county	Northlands Logistic Park	+	+	+	+	+	+	+	+

Table 9: Multilateral Environmental Agreements (MEAs)

International frameworks (MEAs)	Environmental Requirements	Linkages with the NMP	Potential Impact of Northlands Project							
			Square and office Park	Strip Mall	Heights	Mall	Paradise Park	Meadows	Logistics Parks	Boulevards
Convention on Biological Diversity (United Nations, 1992)	Article 8 - In-situ conservation (d) Promoting protection of ecosystems, natural habitats and maintenance of viable populations of species in natural surroundings	<ul style="list-style-type: none"> Establishment of additional greenbelts in addition to the existing ones Northlands wildlife sanctuary Sustainable riparian zone management for rivers in the property such as Kiu, Kamiti, Gatharaini 	0	0	0	0	+	0	0	0
United Nations Framework Convention on Climate Change (United Nations, 1992)	Article 6: Education, training and public awareness, (i) Development and implementation of educational and public awareness programmes on climate change and its effects	SEA public consultations and involvement	+	+	+	+	+	+	+	+
Convention on Wetlands of International Importance Especially as Waterfowl Habitat (United Nations, 1971)	Article 3 Formulating and implementing wetland planning so as to promote the conservation of wetlands	Sustainable riparian zone management for rivers in the property such as Kiu, Kamiti, Gatharaini	0	0	0	0	+	0	0	0
Convention on Conservation of Migratory Species of Wild Animals (United Nations, 1979)	Article 5 h) Elimination of, to the maximum extent possible, or compensation for activities and obstacles which hinder or impede migration	Northlands wildlife sanctuary	0	0	0	0	+	0	0	0
African Convention on the Conservation of Nature and Natural Resources (Africa Union, 1968) Article II - Fundamental Principle	2 (ii) Setting aside areas for the propagation, protection, conservation and management of vegetation and wild animals as well as for the protection of sites, land-spaces or geological formations of particular scientific or aesthetic	<ul style="list-style-type: none"> Establishment of additional greenbelts in addition to the existing ones Northlands wildlife sanctuary Sustainable riparian zone management for rivers in the property such as Kiu, Kamiti, Gatharaini 	+	+	+	+	+	+	+	+



International frameworks (MEAs)	Environmental Requirements	Linkages with the NMP	Potential Impact of Northlands Project							
			Square and office Park	Strip Mall	Heights	Mall	Paradise Park	Meadows	Logistics Parks	Boulevards
	value, for the benefit and enjoyment of the general public ⁵									
	3.1 (a) Setting aside for the conservation, management and propagation of wild animal life and the protection and management of its habitat	<ul style="list-style-type: none"> Establishment of additional greenbelts in addition to the existing ones Northlands wildlife sanctuary Sustainable riparian zone management for rivers in the property such as Kiu, Kamiti, Gatharaini 	0	0	0	0	+	0	0	0

⁵ Applies for all the green/open spaces



3.2 PPP gaps and conflicting interventions

The analysis indicated that the NMP is in alignment with most environmental PPPs in the country and will significantly add value to these instruments. Only 6 out of 38 PPPs, which amounts to 16% had either, a) environmental obligation gaps and b) conflicting objectives as highlighted in Table 10. Table 10 also highlights the recommended actions to be undertaken in the revised final version of the Northlands Master Plan.

Table 10: Summary of PPP gaps and conflicting interventions

a) Environmental obligations

PPP	Environmental obligation gap	SEA recommendation
Policies		
Draft Environment Policy, 2012 (GoK, 2012)	Developing an integrated, improved early warning and response systems for climate change and disaster risks	Incorporate a Climate Change Mitigation and Adaptation Strategy in accordance with the National Climate Change Response Strategy (2010)
National Policy for Disaster Management, 2009 (GoK, 2009)	Promoting the mainstreaming of disaster management and climate change into development planning and management for sustainability	Incorporate a disaster management strategy in accordance with the policy
Legal frameworks		
Energy Act No 12 of 2006 (GoK, 2006)	Promotion of renewable energy sources including solar and hybrid system	Develop a strategy for the adoption of green energy technologies in all NMP developments especially the residential infrastructure
National/Regional strategies and plans		
National Environment Action Plan, 2009-2013 (GoK, 2009)	Controlling of fire outbreaks and related disasters especially in the proposed wildlife sanctuary area which has previously been experiencing the challenge	Develop a fire disaster management strategy in the NMP by integrating national fire disaster management strategies as recommended in the National Policy for Disaster Management, 2009 (GoK, 2009)
National Climate Change Response Strategy, 2010 (GoK, 2010)	Ensuring that all new infrastructure is climate-proof over its lifespan	Incorporate a Climate Change Mitigation and Adaptation Strategy in accordance with the NCCRS (2009)
Kiambu Integrated Development Plan (KCG, 2013)	Improving solid waste management	Incorporate an integrated SWM strategy in the NMP

b) Conflicting objectives

PPP	Conflicting objectives	Recommendation
Kiambu Integrated Development Plan (KCG, 2013)	Reducing carbon emissions – The Logistical Park (Industrial Development) could increase the level of carbon emission	<ul style="list-style-type: none"> • The NMP should highlight the carbon emission reduction strategies to be used including some of the following among others: • New facilities should be designed and built with energy conservation and efficiency in mind including the use of wind and solar energy as well as natural light • Appropriate landscaping for CO2 absorption

4 Baseline Environmental Assessment and Situation Analysis

4.1 Introduction

A baseline environmental assessment and situation analysis was undertaken through a comprehensive ground inspection conducted in the plan area at various dates between October and December 2014. The assessment mainly focused on water resources and ecology in Northlands.

4.2 Water Resources in Northlands

The Northlands Area is served by a number of rivers which eventually discharge into the Nairobi River. These include Kiu River, Kamiti River, and Gatharaini River.

Previous hydrological studies undertaken in the Kamiti River indicated that the river water had high levels of Copper (Cu), Calcium (Ca), Sodium (Na) and Iron (Fe). The high level of Cu was established to coincide with coffee spraying seasons in the upstream areas. The biological state of river water quality indicated that the total coli forms levels were very high at 2500 counts/100 ml. The fecal coli forms were found to be at 400 counts/100 ml. This reflects a heavily polluted river particularly from domestic and industrial effluent from upstream human activities (MEMR, 2009).

The Nairobi River System in the downstream of the Northlands Area, is a complex of several parallel streams flowing eastwards and eventually joining to the east of Nairobi and feeding into the Athi River, and terminally into the Indian Ocean. The total population dependent on the Athi is estimated at about 3 million (KNBS, 2009).

Previous studies have shown that the Nairobi River is already heavily polluted with recent assessments;

The EC, some heavy metals, and nutrients exceeded WHO and FAO standards for drinking water and irrigation water. The same applied for the TDS while the level of dissolved oxygen was below the natural threshold for aerobic aquatic life (MEMR, 2009).

Northlands has several dams, the largest being to the North near Varsityville estate. The Dam is fed both by storm water from Thika Super Highway and Membley, and treated effluent from the Brookside Milk factory. The dam which discharges southwards towards the proposed Northlands Meadows is characterized by a wide range of avifauna.



Figure 3: The Northlands Dam

4.2.1 Baseline water quality assessment

The baseline situation analysis for the water resources and aquatic environments was conducted in December 2014. It involved a comprehensive survey of all the rivers crossing through the Northlands Area as well as the water bodies in the property.

The aim was to document the distribution and condition of those environments especially with regard to water quality.

Water quality testing was done using both on-site and laboratory analysis. On site testing was done using a HANNA portable multi-parameter water quality analyzer Model HI 9828.

The HI 9828 is a waterproof multi-parameter meter that can measure up to 12 parameters in lakes, rivers and sea through a microprocessor based multi-sensor probe.

The equipment was used for testing general water quality parameters in the field including dissolved oxygen saturation percentage, conductivity, seawater specific gravity and other parameters that ensure life in water such as pH and temperature. The figure below shows the use of the analyser in the field.



Figure 4: Water quality testing using the Hanna HI 9828



Figure 5: A picture of the Hanna HI 9828 multi-parameter water analyser

The findings of the baseline general water quality levels in the Northlands Area based on sampling at the spots indicated in Figure 6 below reflected the following patterns as shown in Table 8 below:

- Water quality in all the waterways was within limits for the parameters considered in the assessment,
- Poor water quality was already evident in the Nairobi River as indicated by low DO levels as well as widespread solid waste
- The TDS and EC levels in the Northlands Dam were very high which indicated that the treatment plant for the Brookside Factory was not sufficiently efficient.



Figure 6: Northlands Water quality sampling locations

Table 11: Baseline water quality in the Northlands area

Site Name	pH	TDS (mg/l)	EC (μ S/cm)	ORP (mV)	DO mg/l)	Salinity (PSU)
WHO/NEMA Limits	6.5-9.5	1200	800	-	4	-
1. Thika Highway Storm Water Stream	6.6	349	741	134.5	5.133	0.34
3. Kamiti River Next to Thika Super Highway	6.7	65	128	-30.8	19.54	0.06
4. Kiu Stream Next to Kahawa Sukari Estate	6.8	233	466	-21.9	1.15	0.22
5. Kamiti stream above KU sewage and after the Kiu integrate	7.1	113	225	71.3	4.28	0.15
6. Kamiti River above the Nairobi River	7.4	185	369	-32	1.60	0.18
7. Kamiti River below the KU Sewage	7.4	118	236	-34	3.48	0.11
8. Gatharaini River at Eastern Bypass crossing	7.3	253	552	-52	1.04	0.27
9. Nairobi River	8.2	464	928	-102	0	0.46
10. Northlands Dam Site 1 (Near the effluent inlet)	8.5	953	1905	-94.3	14.9	0.96
11. Northlands Dam Site 2 (Near the Outlet)	8.4	853	1712	-7.3	21.3	0.86





Figure 7: Water quality in Nairobi River to the South east of the Northlands property



Figure 8: Heavily polluted Nairobi River below the waterfall to the South east of the Northlands property

4.2.2 Ground Water Resources

The groundwater resources in the Northlands Area are part of the Nairobi Aquifer System (NAS) which covers an area of approximately 6,500 km², and underlies much of the Nairobi Metropolitan Region.

These resources are closely associated to the geological characteristics as shown in Figure. According to the existing geological records, the upper parts of the Northlands Area are underlain by the Kerichwa Valley Tuffs while the lower parts are dominated by the Athi Tuffs.

The Kerichwa Valley Tuff series is a group of pumice-rich trachytic tuffs and agglomerates. They are younger than the Nairobi Trachyte, found in Nairobi as part of the sediments that were deposited due to formation of the Rift valley.

The Athi Tuffs occur above 51m below the ground and form a very important part of the NAS because this is where most of the groundwater in the area occurs. Much of the groundwater in the NAS is naturally high in dissolved fluoride, often exceeding the Kenyan standard of 1.5 mg/l (KEBS, 2007). This is particularly so in the deeper aquifers, water from which may exceed 10 mg/l of fluoride.

The NAS is recharged along the eastern edge of the Rift Valley by underground water flowing eastwards from the southern tip of the Aberdare Ranges. The NAS with a recharge rate of 109MCM/yr sustains millions of people in Nairobi City with an abstraction rate of 58MCM/yr (Mumma, Lane, & Kairu, 2011).

It is estimated 4,856 boreholes have now been constructed in the NAS. Figure 9 shows the distribution of groundwater aquifers in the NAS which shows that the Northland Area is located in a high demand and medium groundwater resources zone. This means that the area might still contain adequate groundwater resources although the demand is on the increase.

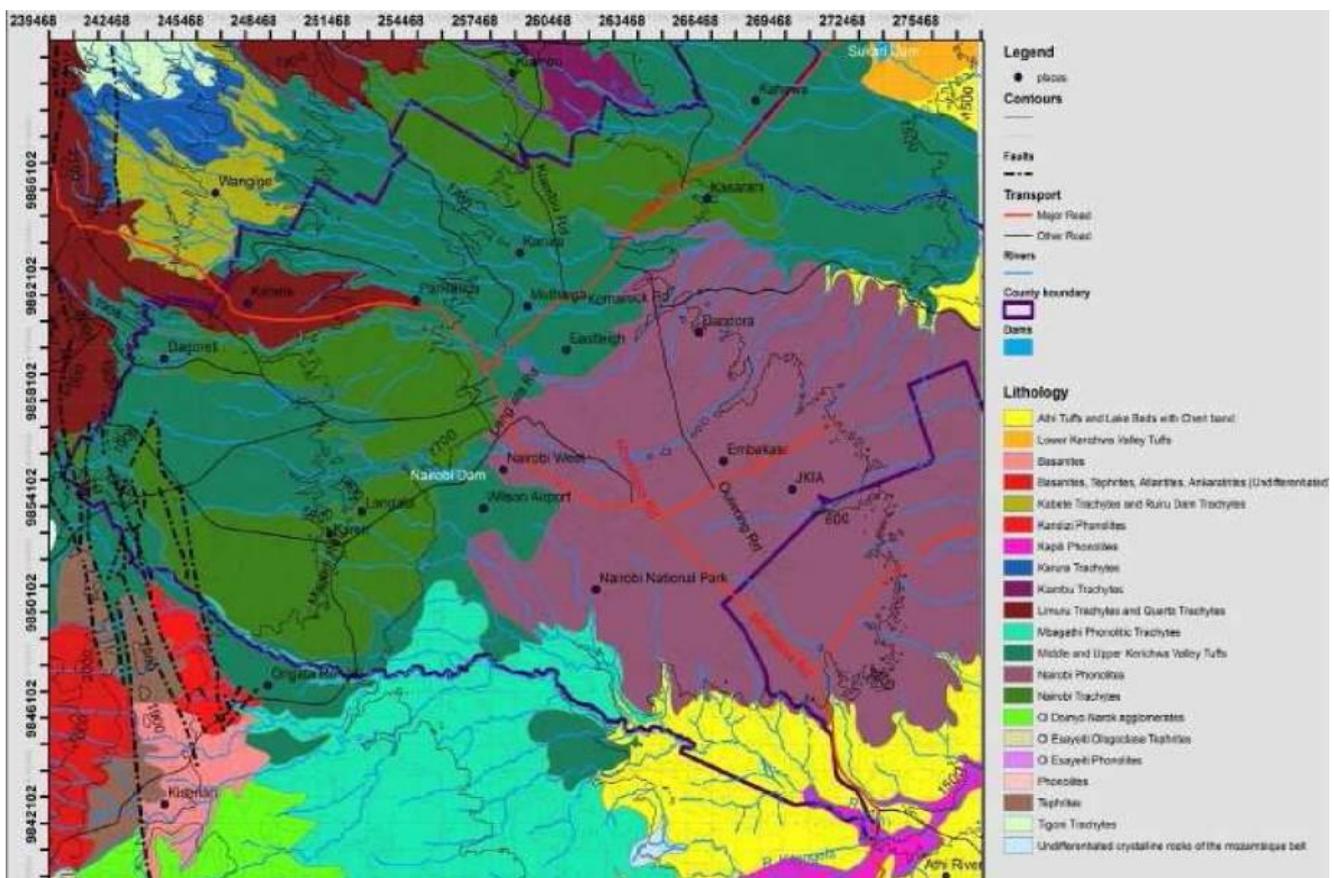


Figure 9: The surface geological map of the NAS (Mumma *et al* 2011)



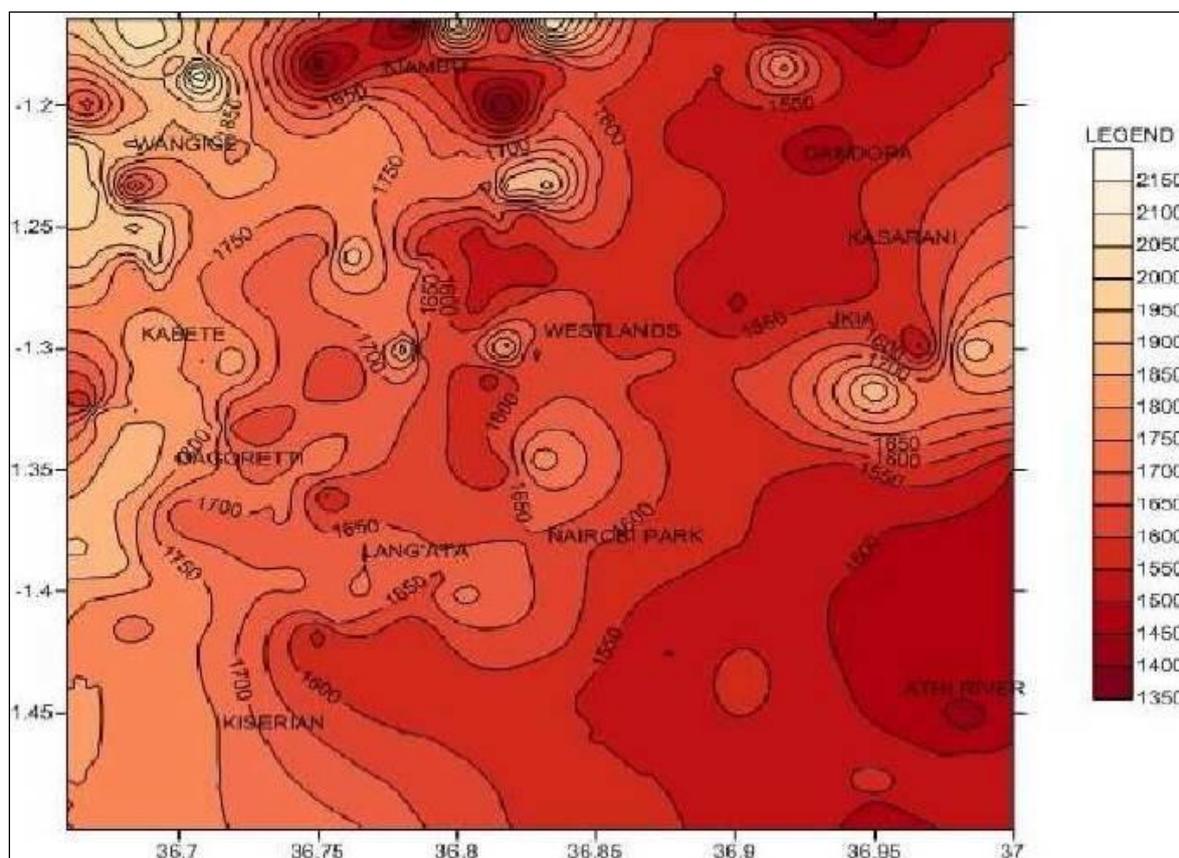


Figure 10: Distribution of groundwater resources in the NAS (Mumma *et al* 2011)

The NAS is the most heavily exploited aquifer in Kenya, and concerns have been growing about the sustainability of the current levels of abstraction. Exploration and drilling began in December 1927 when the first two wells were drilled. By 1934, 190 such boreholes had been drilled (Foster & Albert, 2005).

The peak of drilling in pre-independence Kenya occurred in the 1950-1951 period. Initial efforts to regulate abstraction commenced in the colonial times when the government declared Ruaraka area and its immediate surroundings a Groundwater Conservation Area (GCA) in 1953 (Gevaerts, 1964).

The aim of this was maintain a better control of the groundwater resources. No boreholes were permitted in the conservation area, without the permission of the Water Apportionment Board. Outside the conservation area no restrictions of any kind were placed on boreholes that were drilled more than a kilometre away from any existing ones (Foster & Albert, 2005).

In 1958, the GCA boundaries were extended to include the peri-urban areas around Nairobi City and part of Kamiti area. However, the Nairobi GCA agenda never succeeded because the demand for groundwater increased tremendously as a result of population growth thereby making strict abstraction control very difficult. Consequently, the number of boreholes has grown from less than 200 in 1940, to 2,000 in 2002 (Foster & Albert, 2005), and approximately 4,000 by 2009 (WRMA, 2010).

Figure 11 below shows a recent distribution of boreholes in the Nairobi Region. The figure shows that the Northlands Area (top right corner) is currently not among the high borehole density areas such as Parklands, Westlands, Karen and Dandora. Table 9 shows the characteristics of selected boreholes in the Nairobi Region.

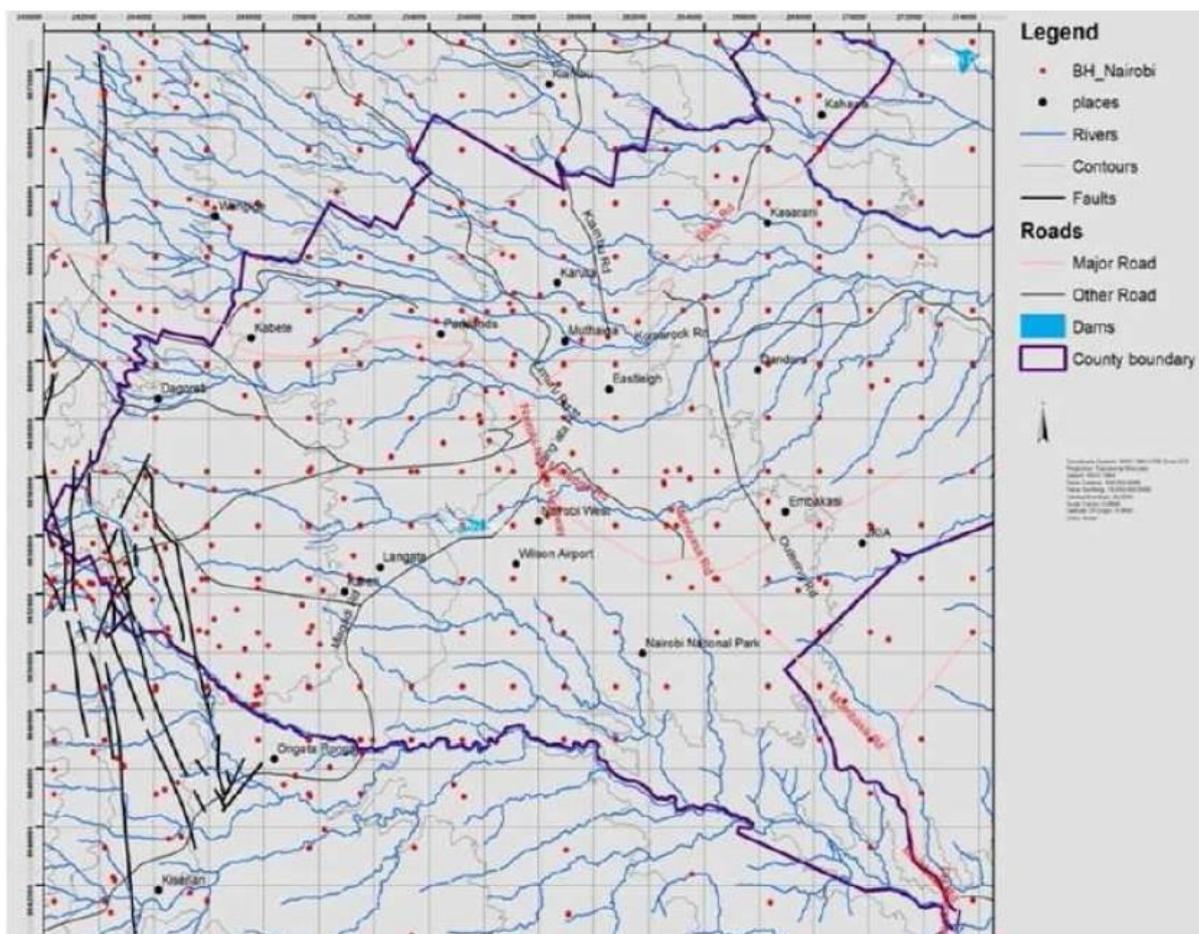


Figure 11: Map showing borehole distribution within the City of Nairobi (WRMA, 2010)

Table 12: Total and per annum change in water rest levels in monitoring wells

BH ID No.	Owner	Date drilled	Total depth (m)	Initial WRL (m)	Change in WRL (m)	Operating years	Av. Pa change (m)
12357	Hindu Temple Pl	1999	204	160	29.80	9	3.31
14539	Riverside Park	2004	280	149	-17.30	4	-4.33
10883	Hill Crest Karen	1994	300	110	-14.00	14	-1.00
10333	Hurlingham	1993	250	152	-31.00	15	-2.07
13860	Hotel Boulevard	2003	255	115	-2.90	5	-0.58
6310	KEWI South C	1985	169	77	-54.20	22	-2.46
8697	Trufoods	1989	164	105	-27.90	19	-1.47
4790	State House	1980	200	146	-19.20	27	-0.71
4147	Unilever	1975	258	79	-87.50	33	-2.65
11592	Uchumi Hyper	1997	250	143	-87.00	11	-7.91
5050	Aga Khan Hosp	1982	171	21	-126.20	25	-5.05
14559	Kabansora Millers	2005	200	102	-4.50	2	-2.25
12885	Keny Poly Host	2000	200	112	-31.00	8	-3.88
15129	Jorgen L Karen	2006	170	92.7	-11.00	5	-2.20
13594	KICC	2002	250	105.4	-31.30	6	-5.22
13069	St Laurence Univ	2000	320	55	-71.00	8	-8.88

WRMA (2010)

In recent years, the NAS has suffered from the threat of groundwater depletion over time due to a high demand for water. With the increasing number of boreholes, the rate of depletion has increased tremendously, with highest incidents recorded in Karen, Langata, Embakasi, Muthaiga, Upper hill, Kilimani, Kamiti and Ruaraka.

Over abstraction during the dry periods is known to lower the water level in many boreholes to the point of abandonment. Table 10 shows the water level drop rates in key groundwater dependent areas in the Nairobi



region. Figure 12 shows the groundwater vulnerability map due to dropping water levels in Nairobi Region. Northlands Area at the moment is shown to be within the medium vulnerability zone.

Table 13: Water rest levels (asl) at large abstraction localities in different decades and the calculated average drop

Period Locality	1927 – 1939	1940 - 1949	1950 - 1959	1960 – 1979	1980- 1989	1990- 1999	2000-2009	Total drop (m)
Karen	1788	1793	1803	1782	1828	1805	1781	7
Langata	1733	1738	1709	1716	1735	1712	1698	35
City center	1644	1641	1605	1609	1556	1562	1542	102
Lower Kabete	1752	1743	1710	1750	1702	1695	1676	76
Industrial Area	1600	1595	1551	1621	1604	1534	1515	85
Ruaraka	1553	1524	1507	1527	1546	1533	1484	69
Average drops from records (m)	5.59	5.51	6.81	-10.57	7.77	24.2	29.46	79.34

WRMA (2010)

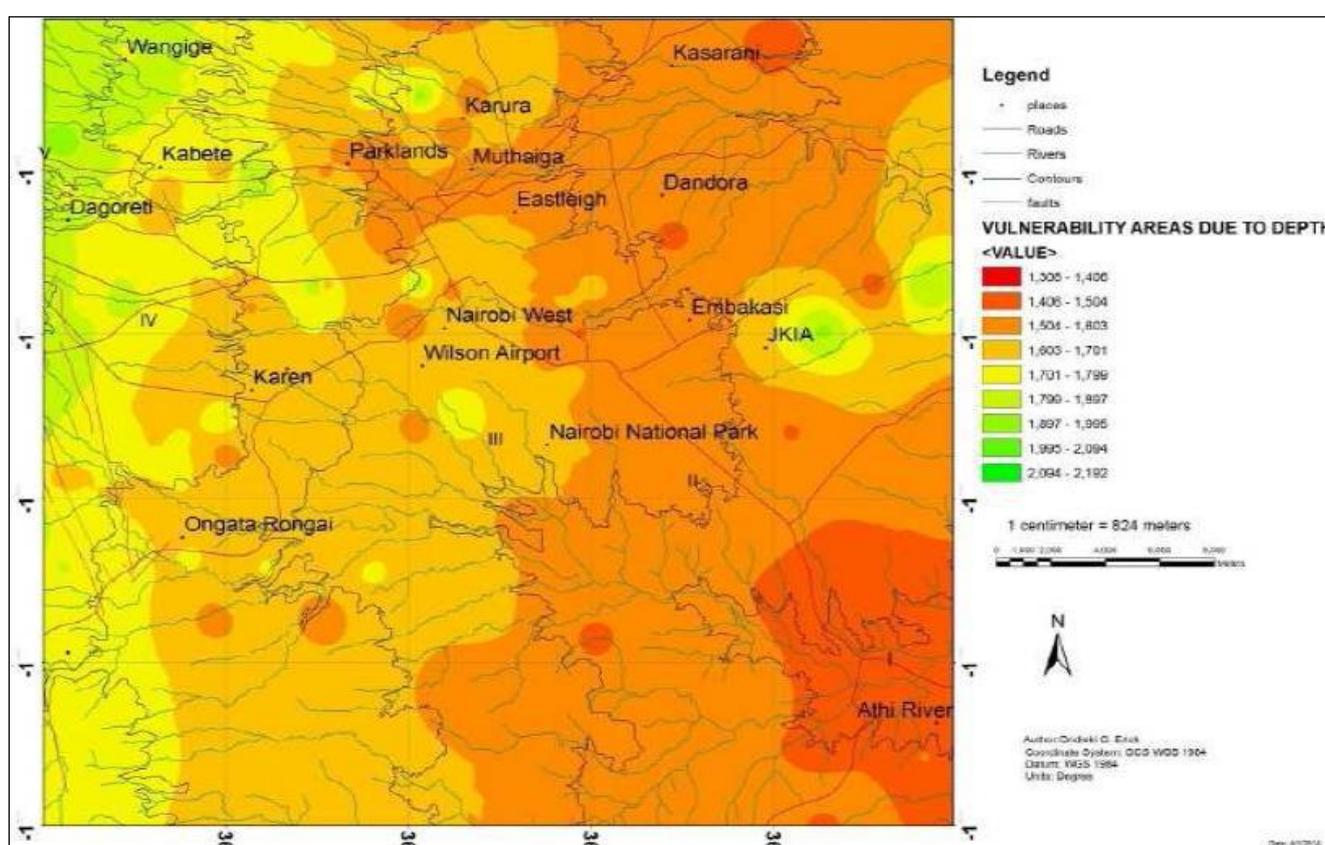


Figure 12: Nairobi region groundwater vulnerability map due to drop in water level (WRMA(2010))

4.2.3 Water Supply

The Nairobi Water and Sewerage Company (NWSC) provides water throughout Githurai ward and a part of Kahawa Sukari. This is sourced from the Ndakaini Dam, which is 40 km away.

The majority of water in Githurai is piped from a T-connection at Roysambu off the main pipe supplying Nairobi. The NWSC in addition to providing water and sewerage services to Nairobi initially inherited the NCC’s involvement in water service provision in Ruiru Municipality.



In recent years, the Ruiru-Juja Water and Sanitation Company (RUJWASCO) took up the mandate to operate and maintain the water supply and sanitation facilities within the region. However, a large number of consumers depend on private boreholes.

Records show that there are more than 60 registered boreholes in Ruiru. Ninety-eight percent of boreholes are privately run, though an increasing number are being managed by the community. These boreholes provide piped connections in some cases or provide kiosk services in other cases.

The Northlands Area at the moment contains a total of 15 boreholes and additional ones are expected as part of the Master plan.

4.2.4 Sewerage treatment

Many parts of Ruiru, Juja and Thika regions are partially connected to a central sewer with some areas connecting to the sewer units for Kenyatta University and Jomo Kenyatta University of Science and Technology.

However most areas are entirely on septic tanks, conservancy tanks and pit latrines. Currently, sewage exhausted from latrines and septic tanks is deposited into Nairobi's main sewage line at the municipality's only connection point at the Kenyatta University oxidation ponds located next to the Northlands Region.

Pit latrines or septic tanks are often too closely spaced to shallow wells, thereby raising a risk of contaminating the water supply. Adequate storm water drainage systems are lacking leading to flooding in some areas.

The government is already addressing this problem by constructing a modern sanitary system in the region which will involve the construction and maintenance of approximately 56.5 km of sewer lines.

The sewerage works involve construction of trunk and tertiary sewers in Murera, Ruiru, Mugutha, Gitambaya, Membley, Peponi and the surrounding areas.

The system will empty the load to the newly constructed Ruiru Sewerage Treatment Plant. The works will also involve construction of 20,736 CMM/day Waste Water Stabilization Pond sewerage treatment system at Ruiru at a cost estimate of 1.02 Billion shillings.

4.2.5 Future scenarios

The following strategic predictions can be made regarding the Northlands Area in relation to the situational analysis for the water resources, water supply and sanitation.

4.2.5.1 Groundwater abstraction

- As the groundwater gets depleted in the NAS including the Northlands Area, this will lead to higher borehole depths as attempts at tapping deeper aquifers are made.
- The drilling of deeper boreholes could lead to increased costs of borehole-drilling. This is due to the fact that with lowering groundwater levels, there is a need to tap into deeper aquifers. Borehole drilling pricing is directly proportional to meter depths reached. The same can be said on running costs since more energy is used to pump water further to reach the surface. For the NAS, depletion is assumed to occur at a rate of 0.5m³/yr, translating to an increase in pumping costs of about 870 million Kenya Shillings annually.
- Excessive abstraction of groundwater in the NAS including the Northlands can lead to well drying or subsidence due to loss of support below ground. This is as a result of reduced internal strength of the



mass, as pores initially filled with water are left only with air; otherwise referred to as dewatering of the aquifer. Although cases of land subsidence have not yet been recorded in Nairobi, the effect has been observed in many cities of the world. In Milan, Italy subsidence of 0.2m was recorded from 1952 to 1972; Mexico City was subsiding at a rate of up to 0.4m annually since the 1920s accumulating to about 10m total although this has been reduced to 300mm/ yr as of 2006; 700 cases of subsidence have been recorded in China affecting more than 50 cities, some of which have 2.5m subsidence such as Tianjin (Margat & Gun, 2013).

4.2.5.2 Water supply

- Given the rapid population growth in the NMR the demand for water resources will keep on growing thereby leading to cut throat competition for groundwater resources.
- In future, it might be advisable to consider alternative sources of water supply in order to reduce the reliance on NWSC and RUJWASCO. The baseline situation analysis established that rainwater and storm water harvesting should be considered as an alternative water source. Rainwater harvesting can be used to compensate for the inadequacies of conventional water supply systems and circumvent the challenges of water contamination and pollution. This method of water supply also encourages private ownership of the water source.
- Given the production of large quantities of grey water within Northlands especially from the Brookside Factory, it is good to explore the possibility for wastewater re-use through Aquifer storage and recovery (ASR). ASR is the re-injection of potable water back into an aquifer for later recovery and use. ASR has been done in many parts of the world for municipal, industry and agriculture use. This approach can be used to mitigate the drop in ground water level within the NAS.

4.2.5.3 Sewerage treatment

- According to the Nairobi Sewerage Master Plan, the peri-urban zones of the City of Nairobi including the Northlands Region is constantly growing and expected to increase to 1.4 million people by 2020. This will pose a major challenge to the County Governments and Central Government due to unavailability of sewerage system in the area.
- The construction of a modern sewer system in the Ruiru area will effectively accommodate sewerage management needs the proposed Northlands development.

4.3 Ecological Assessment of Northlands area

The baseline data collection within the study area involve a desk-based review of existing ecological information, comprising wildlife species and vegetation data, as well as any other information relevant to the proposed project. Field visits for vegetation ground-truthing and faunal assessment was undertaken.

There were consultations in the field with relevant office to acquire data and information on wildlife species and habitats. The following methods were used in meeting the scope of work.

The ecological study involved collecting data on woody and herbaceous vegetation as well as estimating the mammalian and avian wildlife species found in zones targeted for development. The zones are targeted for development of residential areas, industry, recreation, agriculture and commercial centres. The data was collected between 8th and 17th December 2014.

Two band point sampling method was used to estimate avifauna distribution while wandering method and quadrat techniques were used for woody species and herbaceous species sampling.



Most of the study area was under extensive grasslands with a few patches of bushes while some areas were under Eucalyptus plantation. There were 56 herbaceous species encountered during the study with a mean ground cover ranging between 47% and 82%.

Different zones were characterized by different composition of herbaceous species with the most common comprising of *Hyperrhenia hirta*, *Themeda triandra*, *Chloris gayana*, *Pennisetum mesianum*, *setaria sphacelata*, and *Sporobolus pyramidalis*. However, most habitats were dominated by *T. triandra*.

Woody patches were most common within the agricultural/conservancy area where the most dominant of the species was *Acacia drepanolobium* while the recreational area had *Combretum molle* as the most dominant woody species. Other zones had sparse woody vegetation mainly under *A. drepanolobium*, *Acacia senegal* or *Acacia mellifera*.

A total of 45 avian families, comprising 140 species were recorded in the study area represented by various feeding guild of carnivores, granivores, insectivores, nectarivores and omnivores. The frugivores were the least abundant accounting for 3% while carnivores were 6% of the total number encountered. The dominant feeding type was insectivores, accounting for 43% of the total number of species. Other feeding guilds were granivores at 24%, omnivores at 20% and nectarivores at 4%.

Mammalian species were poorly distributed with most species being found within the agricultural land followed by high density residential area comprising of 71% and 28% of the total number of individuals counted in the entire study area. The remaining 1% was found in the low density residential zone. Wildlife was dominated by Thompson's gazelle with a few individuals of bushbuck, common duiker and baboon.

Development of these zoned areas is expected to have implications on the environment especially for the endangered grey crowned crane which may become locally extinct once the areas are fully developed. However, where appropriate mitigation measures are taken into account, there is a possibility of retaining their preferred riverine swamps.

Migratory avian species were also found to utilize the expansive rangelands and will obviously be affected by change in land use. Other passerines will also lose their habitat once the areas switch their land use status.

Woody and herbaceous species did not have critical species of concern but once removed, the associated avian and mammalian habitats/species will also disappear.

Hippos and the crocodiles are the main riverine dwellers with habitats that are at risk due to planned development. Loss of their habitat will impact on their numbers and survival. Although other mammalian species were few, they have a chance of being trans-located into the proposed agricultural land.

The finds of this study prescribe a thorough EIA study for each of the zones identifying mitigation measures to minimize environmental degradation and species loss.

4.3.1 Evaluation of Habitats and Species of Special Interest

The study area is the only continuum of natural vegetation existing in the locality. The surroundings are fast undergoing urbanization with natural vegetation being cleared and replaced with built-in areas. One consequence associated with this land-use change is loss of extensive natural habitats together with its associated biodiversity.



The study area though a modified system, acts as a refuge for displaced species of birds and wildlife from adjoining areas and, therefore, rich in biodiversity content. It has several critical habitats that include the swampy riverine habitats along Kiu, Kamiti and Nairobi Rivers. These are critical habitats for waterfowl birds, reptiles and also act as natural sieves for pollutants and suspended solids, regulate water flow and preserves natural flora. The habitats are also critical to the grey crowned crane, and Nile crocodile which are endangered, and the hippo which is threatened.

The grasslands are important for conservation of Jackson's widowbird that is classified as near threatened. However, although these species are represented elsewhere in their natural range, provisions should be made to ensure their habitats within the study area remains as natural as possible.

The agricultural/conservancy is an opportunity within the study area to allow continued conservation and management of these three species. It could also serve as a refuge for other wildlife displaced from their habitats by proposed development. This can be achieved by trans-locating existing wildlife in other zone into the agricultural portion of the study area.

4.3.2 Environmental Indicators

There are several environmental consideration associated with the planned development in the Northlands area that will require mitigation measures. These environmental issues include:

- Pollution of Kamiti and Nairobi Rivers through effluents emanating from the industrial zone during the operational phase;
- Degradation and modification of Kamiti and Nairobi Rivers riverine vegetation during the construction phase;
- Displacement and modification of crocodile and hippo habitats along Kamiti and Nairobi Rivers;
- Degradation of all riverine swampy areas displacing the endangered grey crowned crane;
- Translocation of mammalian species from target residential zones into the agricultural/conservancy area increasing pressure on food resources in the conservancy and conflict with livestock herding;
- Removal and degradation of grassland and associated habitats affecting avian species biodiversity and distribution;
- pollution of the environment by solid wastes from labor camps during construction and residential, industrial and commercial establishments during operation phase;
- Noise and air pollution affecting the Northlands and neighborhood emanating from industrial activities during operation phase;
- Soil pollution and contamination of water bodies through oil and grease spills during construction phase for various zones within the Northlands; and
- Increased storm water from built in areas impacting on water flow regimes of Kiu, Kamiti and Nairobi Rivers especially during the wet seasons.

A detailed ecological Study Report is attached in **Appendix C** of this document.



5 Stakeholder Engagement

5.1 Purpose of the stakeholder consultation and participation

The stakeholder engagement process sought to achieve the following:

- Inform the stakeholders about the proposed plan and provide opportunities for influencing/amending the plans;
- Collect stakeholders' views on the proposed plan including potential positive/negative impacts stakeholders associate with the proposed plan and Stakeholders' preferred development;
- Get local knowledge on any sensitive areas within the plan scope (physical/environmental, cultural or proposed facilities); and
- Get expert advice on land use/ area zoning, water availability and supply, power and road infrastructure in the area.

5.2 Stakeholder Identification

A stakeholder analysis was conducted to identify the stakeholders after which an engagement and disclosure plan was developed to ensure that the process was meaningful and productive.

The identified stakeholders included:

5.2.1 Governmental Stakeholders

- Minister for Planning Kiambu County
- Minister for Environment, Water And Natural Resources Office
- Deputy County Commissioner-Ruiru Sub County
- Kiambu County NEMA County Director
- County Physical Planning Officer

5.2.2 Technical Stakeholders

- Kenya Power
- Kenya Electricity Transmission Company Limited (KETRACO)
- Ruiru Municipal Council
- Ruiru Water and Sewerage Company
- Nairobi Water and Sewerage Company
- Water Resources Management Authority (WRMA)
- Athi Water Services Board(AWSB)
- Kenya Urban Roads Authority (KURA)
- Kenya National Highways Authority (KeNHA)
- Kenya Wildlife Service (KWS)
- Kenya Railways Corporation (KRC)
- Kenya Civil Aviation Authority

5.2.3 Internal Stakeholders

- Peponi School
- Brookside Dairy

5.2.4 Neighbouring Institutions and Individual Households

- Kenyatta University
- Uhuru Kenyatta Secondary School
- Ndiini Primary School
- Kenya Clay Products Ltd
- Mwhoko Estate
- Kahawa Sukari Estate
- Kahawa Sukari Ward
- Gatongora ward;
- Varsityville Estate;
- Residents neighboring Northlands on the Eastern Bypass side

5.2.5 Security Agencies

- The Kenya Police Service
- The Kenya Prisons
- The Judiciary;
- The Kenya Defense Forces

5.3 Stakeholder Analysis

In this study, the ‘importance’ of a stakeholder is defined by whether the stakeholder is directly or indirectly affected. For instance, stakeholders directly affected by the proposed development directly are viewed as more ‘important’ as they are first-hand recipients of the accruing impacts.

Impacts on the stakeholders are as analysed in Table 14

Table 14: Stakeholder characterization

	Category	Details	Level of impact
			Directly Affected (DA) /Indirectly Affected (IA)
Institutional Stakeholders			
Minister for Planning, Kiambu County	Government Agency	<ul style="list-style-type: none"> ▪ This is the regional center of power in the county for matters concerning development projects such as the proposed project. ▪ The Planning Minister will provide information about the County's development plans and how these may affect or be affected by the proposed development. 	IA
Minister for Environment, Water & Natural Resources	Government Agency	<ul style="list-style-type: none"> ▪ This is the stakeholder mandated to monitor, protect, conserve and manage the environment and natural resources even as developments like Northlands come up. ▪ He will thus be consulted to shed light on the interrelation between the proposed development and the Environment and natural resources in the project area. 	IA
Deputy County Commissioner-Ruiru	Government Agency	<ul style="list-style-type: none"> ▪ The Deputy County Commissioner is mandated to assist in coordination of national government functions at the county level. ▪ Being the project area's government representative, his permission to carry out the consultation exercise Ruiru Sub-county will be sought. 	IA
Kiambu County NEMA office	Government Agency	<ul style="list-style-type: none"> ▪ The National Environment Management Authority (NEMA) is mandated to supervise and coordinate over all matters relating to the environment. ▪ The Kiambu County NEMA office will be consulted as it is the principal instrument of Government in the implementation of all policies relating to the environment in the project area. 	IA
County Physical Planning Office	Government Agency	<ul style="list-style-type: none"> ▪ This is the County level head in charge of development and zoning plans. ▪ This stakeholder will be consulted about the zoning plans for the project area and related matters to ensure the proposed project is compliant to the county's zoning plans. 	IA
<ul style="list-style-type: none"> ▪ Kenya Police Service ▪ Kenya Prisons ▪ The Judiciary ▪ The Kenya Defense Forces 	Government Agencies	<ul style="list-style-type: none"> ▪ Government institutions in charge of security. ▪ These stakeholders are key in the development and they will be consulted on their ability in terms of capacity to handle security matters as they may arise from the proposed development. ▪ Their expert advice on how to ensure security for the proposed development and its neighbors 	IA

Kenya Power	Service Provider	<ul style="list-style-type: none"> ▪ Kenya Power is mandated to plan for sufficient electricity generation and transmission capacity to meet demand; building and maintaining the power distribution and transmission network and retailing of electricity to its customers. ▪ This stakeholder will thus be consulted to provide baseline information and advice on matters of electrical transmission, and distribution to the proposed development. 	IA
Kenya Electricity Transmission Company Limited (KETRACO)	Government Agency	<ul style="list-style-type: none"> ▪ KETRACO's mandate is to design, construct, operate and maintain new high voltage electricity transmission infrastructure that forms the backbone of the National Transmission Grid. ▪ This stakeholder will thus be consulted to shed light on its plans on high voltage electrical transmission in the project area and its environs. 	IA
Athi Water Services Board	Government Agency	<ul style="list-style-type: none"> ▪ Mandated to develop bulk water infrastructure, this stakeholder will be consulted on matters water supply and sewerage connectivity in the proposed development. 	IA
Water Resources Management Authority (WRMA)	Government Agency	<ul style="list-style-type: none"> ▪ WRMA's principal mandate is to work as the lead agency in the management of water resources in the whole country. ▪ WRMA-Kiambu County will thus be consulted as the stakeholder dealing with effective regulation and management of water resources in the project area including the issuing of permits for water abstraction. 	IA
Ruiru Municipal Council-Fire Department	Government Agency	<ul style="list-style-type: none"> ▪ The Ruiru Fire Department responds to fire and fire alarms so as to ensure efficient management emergencies. ▪ The stakeholder will thus be consulted on its capacity to cover emergency preparedness in the project area as well as their advice on best practices for such issues. 	IA
Ruiru Water and Sewerage Company	Service Provider	<ul style="list-style-type: none"> ▪ Ruiru Water and Sewerage Company is the stakeholder mandated with the task of water service provision in Ruiru sub-county. ▪ The company will thus be consulted on matters water supply and waste water management in the project area especially their ability in terms of capacity to handle water demand and waste water from the proposed development 	IA
Kenya Civil Aviation Authority	Government Agency	<ul style="list-style-type: none"> ▪ This stakeholder is mandated to plan, develop, manage, regulate and operate a safe, economically sustainable and efficient civil aviation system in Kenya, in accordance with the provisions of the Civil Aviation Act, 2013. ▪ He will be consulted because of the development's possibility of having a heliport on site. 	IA
Nairobi Water and Sewerage Company	Service Provider	<ul style="list-style-type: none"> ▪ This stakeholder has been appointed by the Athi Water Services Board as the Water Services Provider (WSP) in the City. ▪ Consultation will thus focus on infrastructure owned by the NWSC `within the project site, and its ability to handle the proposed development's demands. 	IA

Kenya Railways Corporation	Government Agency	<ul style="list-style-type: none"> ▪ The Corporation is mandated to promote, facilitate and participate in national and metropolitan railway network development ▪ Consultation with this stakeholder will thus seek KRC's current and future plans on rail transport in Ruiru Sub-county and the larger Kiambu County due to the possibility of the development considering use of light rail transport within the master plan. 	IA
Kenya National Highways Authority (KeNHA)	Government Agency	<ul style="list-style-type: none"> ▪ KeNHA's mandate is to manage, develop, rehabilitate and maintain national roads. ▪ In this respect, this stakeholder will be consulted on an expertise level as it manages Thika super highway which neighbors the project site as well as the proposed greater Eastern Bypass which will also be close to the development. 	IA
Kenya Urban Roads Authority (KURA)	Government Agency	<ul style="list-style-type: none"> ▪ KURA is mandated to manage, develop, rehabilitate and maintain all public roads in the cities and municipalities in Kenya except where those roads are national roads. ▪ The proposed 40m wide access road to the development is expected to be under KURA's jurisdiction thus their expert advice on the same will be sought. 	IA
Kenya Wildlife Service (KWS)	Government Agency	<ul style="list-style-type: none"> ▪ KWS's mandate is to conserve and manage wildlife resources in Kenya as directed in the Wildlife (Conservation and Management) (Amendment) Act of 1989. ▪ The state corporation will thus be consulted to provide expert advice as there exists wildlife at the project site currently. 	IA
Internal Stakeholders			
Peponi School	Institution	<ul style="list-style-type: none"> ▪ An immediate neighbor to the project site, this stakeholder will be key in regard to mapping of potential project impacts. 	DA
Brookside Dairy	Business	<ul style="list-style-type: none"> ▪ An immediate neighbor to the project site, this stakeholder will be key in regard to mapping of potential project impacts. 	DA
Neighboring Institutions and Individual Households			
<ul style="list-style-type: none"> ▪ Kenyatta University ▪ Ndiini Primary School ▪ Uhuru Kenyatta Secondary School ▪ Clayworks Limited ▪ Mwihoko Estate ▪ Kahawa Sukari Estate ▪ Varsityville Estate ▪ Gatongora ward: Residents on the Eastern Bypass side of the Northlands property 	Neighboring Community	<ul style="list-style-type: none"> ▪ The neighboring individuals and institutions are key stakeholders with regard to mapping of potential project impacts and identification of mitigation measures for adverse impacts. 	DA

5.4 Engagement Methodology

Stakeholder engagement entailed the employment of various methods of communication such as interviews, use of structured questionnaires and stakeholder workshops.

Interviews were used particularly in engaging the technical stakeholders on specific issues such as water, power and transportation.

A standard public consultation and participation form was administered to the internal stakeholders, and the neighbouring households and institutions to obtain their views, comments and concerns. The filled-in questionnaires are attached as **Appendix E** of this Report.

A stakeholder meeting was held on 26th February 2015 to discuss the Proposed Plan in detail. The meeting involved both the project affected and interested persons including but not limited to technical stakeholders and representatives of the neighbouring communities. Minutes of the stakeholders meeting are attached in **Appendix E** of this Report.

5.5 Outcomes of stakeholder engagement

General stakeholders' views on the proposed development covering potential positive and/or negative impacts anticipated from the project included:

- Increase in business and employment opportunities as a result of implementation of proposed developments;
- Improved county economy as more industries, goods and services are created from the proposed developments;
- Improvement in Health, Safety and security as hospitals, schools, shopping malls and security organs come closer to the people; and
- Socio-economic development as improved infrastructure and services unlock the socio-economic potential of the area.
- Increased traffic resulting in traffic jams, noise, dust, air pollution and accidents;
- Strain on available water resources from many competing uses
- Potential increase in air pollution from vehicular traffic, industries and residential developments
- Changes in land quality and aesthetics as the landscape changes from natural vegetation to urban developed areas
- Potential rise in insecurity with influx of people into the area

Community representatives have identified sensitive issues with potential to pose threats to the successful implementation of the proposed plan. These include:

- Location of the proposed link road to the Greater Eastern Bypass: there are concerns from communities in Gikumari location (Kamakisi area and its environs) on the location of this link road. Concerns are that if the link road is located within the NMP area, the community will not have access to it;
- Relocation of Uhuru Kenyatta secondary and Ndiini primary schools: It is felt that being public schools, relocation should be to a convenient place that enables easy access for students from Mwihoko, Kahawa Sukari and Wendani areas.

- Transport linkages between Mwihoko – Eastern Bypass and Northlands – Kahawa Sukari: it is felt that these linkages should be enhanced through adequately sized access roads to enable smooth and seamless flow of traffic through these areas.

Specific concerns by the various government agencies, service providers and neighbouring communities are provided in the table below.

Table 15: Stakeholder comments, issues and concerns

Stakeholder	Comment/issue/concern
Ministry of Planning - Kiambu County	<ul style="list-style-type: none"> • Ruiru sub-County has no development master plan. However, a spatial plan for Kiambu County is currently being developed; • The pre-urban area plan for Ruiru is available but it has not been approved yet; • The proposed greater eastern bypass reserve has already been acquired but further surveying input will be required in clearly demarcating the road reserves; • Concerning the proposed wildlife conservancy, a sufficient buffer will be required to avoid human-wildlife conflicts. Kenya Wildlife Service is to be consulted on any species to be introduced or trans-located; • The planning department has in principal accepted the Northlands land use plan. However, detailed plans for each of the projects within the master plan must be submitted for approval. Further, all infrastructure will have to be put in place before any building plan is approved, while a slip road of not less than 9m will be required along Thika road to provide for deceleration lanes.
Ministry of Environment, Water and Natural Resources – Kiambu County	<ul style="list-style-type: none"> • Plans to include measures to avoid human-wildlife conflict • Ensure effluent and solid waste generated from the development is properly managed • Ensure proper drainage systems are provided bearing in mind that the area is underlain by black cotton soil • Conform to the Kiambu County Spatial Plan
Ruiru Sub-County Administration	<ul style="list-style-type: none"> • The development is a worthwhile investment in Ruiru Sub County because putting the idle land to use will spark development in Kiambu County. • The population in Ruiru Sub County will increase leading to high crime rates, pollution and inadequate social amenities.
NEMA – Kiambu County	<ul style="list-style-type: none"> • Eucalyptus trees currently planted on site are not recommended for wetlands and recharge areas; • Existing marshy areas within the master plan should be left as they are; • establishment of the wildlife conservancy in the development will be subject to Kenya Wildlife Service approval; • A safe transport system will be key for the development; • Anticipated loss of biological resources as a result of the development should be documented including any loss of endangered/threatened species; • Conservation of sensitive ecological areas such as pockets of marshy areas within the development to be carefully looked into; • Consider having only medium to light industries. This will also be subject to the type of technology applied; • Adherence to zoning plans for the area is critical and must be respected; • Solid waste management for the development is critical and the proponent can consider designating an area in the NMP for a sanitary land fill. Working with the County government on this would give the best results. • NEMA will not approve the NMP without a comprehensive waste water management plan; • The proposed Ruiru sewer system can serve the proposed development if all legal hurdles existing are resolved. However, NEMA may not approve the plans based on connections to the sewer line as construction of the treatment works may be far into the future; • It may also not be practical to have one waste water treatment plant because of the gradient of the site • NEMA does not approve septic tanks as a means of liquid waste disposal especially around Memberley and Juja since the shallow-lying substrate rock makes septic tanks inefficient.

Stakeholder	Comment/issue/concern
Kenya Power	<ul style="list-style-type: none"> • The Proponent should reserve land for construction of a substation. • Land for this substation should be reserved at a location where most of the consumption will be e.g. the Industrial park; • The substation will most likely be connected to the nearby 66KVA line. • The Proponent should observe power line way leaves requirements keenly
Kenya Electricity Transmission Co. Ltd	<ul style="list-style-type: none"> • The existing power infrastructure within the project site belongs to Kenya Power; • There are plans to erect an electricity transmission line from Isinya to Nairobi East which is likely to pass near or through the project area. The ESIA for the new transmission line has already been done
Water Resources Management Authority (WRMA)	<ul style="list-style-type: none"> • Effluent discharge for the development should be handled as per the established regulations; • Water abstraction for the development should be subject to availability assessments and the relevant laws; • Water abstraction permits must be sought from WRMA for groundwater after hydrogeological surveys; • Any works touching rivers, ground water, wetlands and riparian land should be guided by the relevant water resource management regulations; • Effluent discharge and solid waste management should be efficiently handled to avoid pollution of water bodies; • The Proponent should ensure human-wildlife conflict on water resources is mitigated against or avoided altogether; • Conservation of riparian reserves and catchments areas within the development is key; • The Proponent should have a plant for treating Industrial effluent before release into the main effluent treatment system. • The National Water Master Plan (2030) should be reviewed to ensure that the planned development is in line with the Water Masterplan; • Ruiru and Kamiti rivers Water Resource Users Associations (WRUAs) should be consulted about sub-catchment management plans.
Kenya National Highways Authority	<ul style="list-style-type: none"> • The Thika super highway is access controlled thus no permission will be granted to directly access it from the development; • Any construction of additional interchange(s) will require thorough traffic studies; • Footbridges would be good alternatives to ensure safety for pedestrians crossing from one side to the other of the busy highway. • Proponent to confirm with the KeNHA surveyor about the proposed greater Eastern bypass (Athi River to Thika) and how this relates to the Northlands development. • If the proposed 40m wide road will be a public road, the Proponent should follow the requisite procedures with the National Land Commission so that when subdividing the land, the portion reserved for the road can be surrendered to KeNHA
Kenya Urban Roads Authority	<ul style="list-style-type: none"> • KURA will have jurisdiction over the development's proposed 40m wide road • A Traffic Impact Assessment Study will be required for the development. • KURA is negotiating with the Proponent to acquire land and develop the road from Mwhoko to Z - corner along the eastern bypass.
The Kenya Police Service (Ruiru OCPD)	<ul style="list-style-type: none"> • Currently, there are four officers stationed at the Brookside farm. • Ruiru division has night mobile patrols; • The existing electric fence has helped improve security because previously, criminals used to escape through the farm; • A police post is recommended near Kamakis where businesses are growing. The area is also strategic for location of a police post as there is a tendency for criminals to escape to Ruiru after committing crimes in Nairobi.
The Judiciary	<ul style="list-style-type: none"> • Currently, establishment of courts by the Judiciary is majorly determined by distance to the existing nearest court, besides case load. • Kiambu County has six (6) courts i.e. Thika, Kiambu, Gatundu, Githunguri, Limuru and Kikuyu Law Courts. Therefore, it is considered to be one county where litigants do not have to travel long distances to access Justice as the courts are said to be evenly distributed.

Stakeholder	Comment/issue/concern
Kenya Railways Corporation	<ul style="list-style-type: none"> • The Authority is ready to provide technical expertise should the Proponent choose to pursue a light rail proposal within the development
Ruiru Municipal Council Fire Department	<ul style="list-style-type: none"> • The department faces challenges of understaffing and equipment such as inspection vehicles • Ruiru Sub County does not have a fire station. • The development planners should consult the fire department when planning buildings. • The developer should provide roads passable by fire engines/hydrants within the estates. • Awareness creation should be done to all residents on 'What to do in case of a fire'. • Future Northlands residents should have volunteer firefighters within the community for easier management as the County fire department responds
Ruiru Water & Sewerage Company	<ul style="list-style-type: none"> • The Company currently has capacity to supply 15,000m³ of water per day but the plan is to expand the capacity up to 100,000m³ of water per day by the end of 2015. • The sewer system currently under construction has capacity to handle up to 20,000m³ per day. • The Company intends to decommission septic tanks within the service area and ensure connection to the main Ruiru wastewater treatment plant. • The company is well able to provide water supply and sewerage services to the proposed development.
Nairobi Water & Sewerage Company	<ul style="list-style-type: none"> • NWSC operates the sewer line along the Eastern bypass from the Kamiti River to the Ruai Treatment works; • The company also intends to construct a new sewer line between Thika road and Kangundo road; • The Proponent should do his own in-house water infrastructure design and then decide where to tap the water from; • should the Proponent decide to engage NWSC, their infrastructure is sufficient to serve the proposed development
Athi Water Services Board (AWSB)	<ul style="list-style-type: none"> • AWSB has two major sewer projects; one draining into the Ruai Treatment Works. The DN1350 line is complete but because the area is flat, a pump station will be required and it has not been installed yet. • The other will drain into Ruiru treatment works. This DN600 line can only cater for a portion of the development e.g. the commercial area, and not the entire development. • The trunk sewers within the Brookside farm belong to AWSB
Kenya Prisons	<ul style="list-style-type: none"> • Kiambu County has 4prisons: Ruiru, Kiambu and Thika prisons for men and Thika prison for women. • In case of excesses due to population influx anticipated from the proposed development and depending on the offense, Kamiti Maximum prison can accommodate the excess; • The current capacity is however sufficient for the County.
Kenya Wildlife Service(KWS)	<ul style="list-style-type: none"> • Kenya Wildlife Service will require to know the habitat and soil characteristics of the area reserved for the wildlife conservancy. • The zone mapped for the wildlife conservancy will require a wildlife management plan to be prepared and submitted to Kenya Wildlife Service; • Kenya Wildlife Service will require the Proponent to specify the exact type of conservancy they intend to have
Uhuru Kenyatta Secondary School and Ndiini Primary School	<ul style="list-style-type: none"> • Relocation of Uhuru Kenyatta Secondary and Ndiini Primary schools to a place convenient for the students should be a priority for the project • The project is expected to improve the road network between the school and the neighboring Mwioko Estate. • The security situation around schools will improve as more people come to the area • With increased population and vegetation loss, the ambient air quality around the schools will degrade



Stakeholder	Comment/issue/concern
Brookside Dairies	<ul style="list-style-type: none"> • Both vehicular and human traffic is bound to increase due to increased activity within the farm. However, an exhaustive transport/traffic management system will be put in place. • The main source of water for the farm has been boreholes and the water table is bound to go down. However, this can be mitigated by procuring the water services of Ruiru and Nairobi Water Sewerage Companies. • Air pollution is expected from dust and vehicular emissions but a lot of green areas will be retained to counter this. • Increase in population will lead to increased business for the Brookside Dairy factory shop. • Currently, security at Brookside Dairy is good, and in future the intention is to involve both the government and neighboring communities to avoid mushrooming of shanties.
Kahawa Sukari Residents Welfare association	<ul style="list-style-type: none"> • There will be increased traffic along the service road between Kenyatta University and Engen petrol station. Traffic congestion will also become worse at the underpass entering Kahawa Sukari estate. A common major solution must be put in place before allowing the generated traffic to use the same. • The riparian area of the river at the boundary of Northlands and Kahawa Sukari Estate should be accessible from both sides. This is to allow future development of water sports facilities including reclaiming exercises of the river. The residents assume that uptake of water for human consumption will not affect the flow of piped water into Kahawa Sukari Estate; • During construction, adequate measures must be taken to minimize air pollution. • The Proponent should adopt green concepts in the development's design so as to promote green technologies in land use and aesthetics. If the proposed development is well done, it will improve the aesthetics of the area. • The new development should create employment especially for the low income earners and create facilities for them with respect to accommodation, schools, and other social amenities. • Schools like Ndiini primary school should be constructed into a centre of excellence for both primary and secondary education. This should be done in a manner to ensure the children of low income earners constitute over 85% of the school population and at the same time offer high quality education standards. Measures should be established to subsidize tuition for the poor. • The two existing schools Ndiini primary and Uhuru secondary must be well taken care of including providing them with access to/from Kahawa Sukari Estate. • During construction and operation, noise should be kept minimal, and meeting the specified threshold for such facilities. • The existing flora/fauna should be enhanced and protected. • The river separating Northlands and Kahawa Sukari Estate will be polluted by effluent from the new development. To promote a healthy environment, sewer lines reticulations should be done within the new development and the neighborhood. This will minimize pollution of the common river. • Proper security measures should be put in place within the development and its environs.
Kahawa Sukari Administration (Area Chief)	<ul style="list-style-type: none"> • Human/vehicular traffic is expected to increase • Water supply problems may increase as the residents of Kahawa Sukari usually do their own piping • Emissions from the proposed industrial parks will be a source of concern • There may be challenges in maintaining zoning controls as population increases • the socio-economic environment may improve as people earn livelihoods from the development • There may be increase in prostitution and spread of STIs in the area as construction workers from the development interact with students from the area's educational and security institutions.

Stakeholder	Comment/issue/concern
Mwihoko Area Administration (Area Chief)	<ul style="list-style-type: none"> • There are plans to convert the current Kahawa Sukari police post into a full police station so as to improve security • Destruction of roads in Mwihoko may occur if heavy construction vehicles and machinery access the development through the estate • Water and air pollution may occur from construction activities in Northlands • Employment opportunities may be created for residents of Mwihoko estate during construction works • Business will grow as construction workers might rent houses in Mwihoko estate • Construction vehicles should observe low speed in estates and near schools to avoid dust and noise pollution; • Mwihoko estate hosts pastoralists from the Maasai community and who have large herds of cattle. Drivers of construction vehicles should be careful to avoid accidents with cattle as this would precipitate into major conflicts
Gatongora ward (neighboring Northlands East of the bypass)	<ul style="list-style-type: none"> • The greater eastern bypass (or link road to the greater eastern bypass) should be gazetted along the boundary of Gicheha farm so that it can serve the wider community as opposed to passing through the Northlands development which is private land

5.6 Stakeholder Validation of the Draft SEA Report

The Draft SEA Report for the Northlands Masterplan was subjected to a public participation process whereby the document was uploaded to the NEMA website, and newspaper advertisements and Kenya Gazette notices made inviting the public to comment on the proposed development and the SEA Study. This was followed by a Stakeholder validation workshop to confirm the contents of the study and the Draft SEA Report. Minutes of the validation workshop are attached in **Appendix F** of this Report.



Figure 13: the NMP SEA Validation Workshop at Kenyatta University Conference Centre (KUCC)

5.7 Consultation and Grievance Redress Mechanisms

5.7.1 Overview

Stakeholder consultations and grievance redress are important actions that ensure acceptance, support and the successful implementation of any PPP or project by any PAPs. Effective and strategically aligned stakeholder engagement can have impacts such as:

- Lead to more equitable and sustainable social development by giving those who have a right to be heard the opportunity to be considered in decision-making processes;
- Enable better management of risk and reputation;
- Allow for the pooling of resources (knowledge, people, money and technology) to solve problems and reach objectives that cannot be reached by single organizations;
- Enable understanding of the complex business environment, including market developments and identification of new strategic opportunities;
- Enable corporations to learn from stakeholders, resulting in product and process improvements;
- Inform, educate and influence stakeholders and the business environment to improve their decision-making and actions that impact on the developer(s) and on society;
- Build trust between developer(s) and stakeholders;

Stakeholders who have been identified as PAPs by the NMP are listed and discussed in Section 4 of this Report.

During implementation of the Masterplan, the Proponent will establish a management entity which will be responsible for management of the development and shall be the interface between the developer and stakeholders.

5.7.2 Mechanisms for engagement

The stakeholder consultation process will be based on the overarching principle of inclusivity. This will entail a commitment by the established management entity, to reflect at all stages of the process, the views and needs of all Stakeholder groups. Stakeholder views will be obtained through an engagement process that allows them to be expressed without fear or restriction (AccountAbility, 2005).

Inclusivity will be achieved by adherence to the following three principles:

- **Materiality:** this requires knowledge of what concerns are important to the Proponent, the management entity and to the stakeholders;
- **Completeness:** requires understanding of the development's impact and the perceptions/expectations of the stakeholders; and
- **Responsiveness:** requires coherently responding to stakeholders' and the organization's material issues

Various approaches will be used in stakeholder engagement. The approach will depend on factors such as:

- The development's strategic engagement objectives;
- The current approach to and level of engagement with the stakeholders;
- The maturity of the issue;
- Management entity and the stakeholders' expectations regarding the outcomes of the engagement;
- Available resources to undertake engagements; and
- The magnitude of change that the management entity is seeking and the margins of movement

Therefore, the overall engagement and communication strategy shall include:

- **Information:** this is where the goal shall be to inform or educate the stakeholders and shall take the form of continuous issuance of bulletins/letters/brochures, speeches/public presentations or advertisements. The proponent will in this regard maintain suggestion boxes at appropriate points in order to capture responses to written communication and advertisements on a regular basis. The idea of speeches and public presentations is intended to inform and engage with stakeholders especially neighboring community members in high density estates who may not have opportunities to offer written responses to information provided in bulletins or advertisements. Ideally these forums will offer opportunities to those in the margins of neighboring communities.
- **Consultation:** where the goal is to gain information and feedback from stakeholders to inform them of decisions made internally. This shall entail surveys, focus groups, one-to-one meetings, public meetings and workshops. Consultation of these types offers stakeholders opportunities to reflect on issues, mobilize and respond more critically than when brought directly to workshops. These lines of communication also help keep dialogue on the development alive and thus generate discourses in everyday life that better inform decisions.
- **Involvement:** where the goal is to work directly with stakeholders to ensure that their concerns are fully understood and considered in decision making. This will be achieved through multi-stakeholder forums, advisory panels, consensus building processes and participatory decision-making processes. These avenues of engagement are meant to provide opportunities for stakeholders to participate and thus freely interrogate the development as it forms and unfolds.
- **Social and Environmental Safeguards Office:** where the NMP will engage the services of a competent officer to coordinate engagement with stakeholders ensuring that the communication strategy is followed through and especially to ensure that all social and environmental safeguards proposed in this SEA and



in specific ESIA's and relevant studies in the future are adhered to and that stakeholders have opportunities to be properly represented in any environmental audits in the future and until the NMP is fully implemented.

5.7.3 Grievance Redress Mechanisms

A key element in the success of the engagement process is the development and implementation of a grievance mechanism. The grievance mechanism will be scaled to fit the level of risks and impacts of the Masterplan and will flow from the Northlands management entity's broader process of stakeholder engagement and business integrity principles, and integrate the various approaches of engagement.

Grievance procedures will be established by the management entity and agreed with the stakeholders. These will be published and explained to the relevant stakeholder groups. The procedures will enable the stakeholders and (especially the community) to lodge complaints or concerns, without cost, and with the assurance of a timely and satisfactory resolution of the issue(s). The procedures will be in place from the beginning of the social and environmental assessment process and exist throughout construction and operations through to the end of project life.

As with the broader process of stakeholder engagement, the management will be continually informed and involved so that decisive action can be taken when needed to avoid escalation of disputes (IFC, 2007). A resource with community liaison skills will be employed by the management entity and who will also be the contact person in order to personalize the relationship between the development and the community. This will create an informal atmosphere in which grievances can be aired and sorted out, or referred up the chain of command.

The Grievance procedures will not replace the existing legal process but will seek to resolve issues quickly without resulting to expensive and time-consuming legal actions.

The grievance redress mechanism will have established timeframes within which to respond to all recorded complaints. The response time will be enforced to allay frustration by letting people know when they can expect to receive a response to their complaint. This shall be combined with a transparent process by which stakeholders can understand how decisions are reached in order to inspire confidence in the system.

Records of all complaints shall be kept in a log or database. The record shall contain the name of the individual or organization; the date and nature of the complaint; any follow-up actions taken; the final result; and how and when this decision was communicated to the complainant. To prevent any perceived intimidation of complainants and therefore marginal success of the mechanism, any complainant uncomfortable with diverging overly personal data will be allowed to lodge their complaint.

6 Plan Impact Analysis

6.1 Introduction

The NMP was subjected to a systematic environmental impact analysis following a pre-determined evaluation methodology and using indicators and targets identified mostly from the information and realities on the ground as gathered during the baseline situation assessment.

6.2 Impact identification and evaluation methodologies used in the SEA study

The table below summarizes the impact identification and evaluation methodologies that were used in the SEA study.

Table 16: Impact identification and evaluation methodology

Theme	Aspects	Impact Identification	Evaluation
Biological Environment	<ul style="list-style-type: none"> • Habitats • Biodiversity 	<ul style="list-style-type: none"> • Document Review • On-site observation • Stakeholder working sessions 	<ul style="list-style-type: none"> • Matrix and Multi- criteria analysis including compliance with the relevant environmental protection regulations • Stakeholder working sessions
Physical Environment	<ul style="list-style-type: none"> • Soil • Land quality • Water • Waste generation and management • Energy • Traffic and transport 	<ul style="list-style-type: none"> • Document review • On-site observation • Questionnaire responses • Interviews • Stakeholder working sessions 	<ul style="list-style-type: none"> • Matrix and Multi- criteria analysis including compliance with the relevant laws and regulations on each aspect • Stakeholder working sessions
Social Cultural/economic environment	<ul style="list-style-type: none"> • Food security and Nutrition • Health • Gender & Children • Governance • Poverty and income • Livelihoods • Transport and infrastructure • Major development activities that are currently proposed • Potential forms of development including those that are compatible with the County's development plans for the area 	<ul style="list-style-type: none"> • Document review • On-site observation • Questionnaire responses • Stakeholder working sessions 	<ul style="list-style-type: none"> • Matrix • Stakeholder working Sessions
Institutional component	<ul style="list-style-type: none"> • Planning, Capacity and enforcement 	<ul style="list-style-type: none"> • Questionnaire responses • Interviews • Stakeholder working sessions • Checklists 	<ul style="list-style-type: none"> • Matrix • Stakeholder working Sessions

Impact characterization was undertaken by considering the following attributes:- a) level of impact (County-wide, Ruiru area, NMR, CoN or in Northlands only), b) probability and risk of occurrence, c) duration of impact, d) magnitude, e) impact reversibility, and f) level of importance.

Major and minor impacts were determined on the following basis:

Table 17: Determination of major and minor impacts

Major Impact	Minor Impact
Extensive	Localized
Will affect many people	Will affect few people
Large change in environmental conditions	Small change in environmental conditions
Effect will be unusual or particularly complex	Effect will be ordinary or simple
Will affect valuable or scarce features or resources	Will not affect valuable or scarce resources
High risk that environmental standards will be breached	Lower risk that environmental standards will be breached
High likelihood that protected sites, areas or features will be affected	Lower likelihood that protected sites, areas or features will be affected
High probability of effect occurring	Lower probability of effect occurring
Long term / permanent	Short term / temporary
Irreversible	Reversible
Mitigation difficult	Mitigation easier

The PEIA was undertaken by considering the strategic environmental impacts in each of the 8 proposed development zones as follows:-

- Square and office Park
 - Northlands Strip Mall
 - Northlands Mall
 - Northlands Heights
 - Paradise Park
 - Meadows
 - Logistics Parks
 - Boulevards
- } Northlands CBD

Table 18: Indicators and targets for plan environmental impact analysis (PEIA)

Impact Category	SEA Objective	Potential Outputs(s)	Indicators
Biological Impacts			
Biodiversity, flora and fauna	<ul style="list-style-type: none"> •Ensure the conservation, and where possible enhancement of important habitats and species •Ensure Protection and where possible enhancement of local biodiversity, flora and fauna 	<ul style="list-style-type: none"> •A practical biodiversity enhancement plan that enhances indigenous vegetation to the site •Conservation of threatened species in the property •Conservation of watercourses/rivers and wetlands •Establishment of sanctuaries for the sustenance of traditional wildlife habitats •Restoration of degraded areas in the property into a high quality environments 	<ul style="list-style-type: none"> •Area of green space safeguarded/enhanced as part of environmental enhancement •Measures for protection of water courses/rivers and wetlands •Measures for protection of threatened species •Sustenance of valued wildlife habitats •Measures in place to ensure environmental rehabilitation
Physical Impacts			
Development and land –use planning	<ul style="list-style-type: none"> •Ensure that land-uses are sustainable and compatible with local development plans •Reduce the level of negative visual impact through the use of green infrastructure 	<ul style="list-style-type: none"> •A land use plan that is compatible with local development plans •Modern and green infrastructure that blends with the surrounding 	<ul style="list-style-type: none"> •Conformity to land-use plans for the area •Green infrastructure developed on the property
Energy use and supply	<ul style="list-style-type: none"> •Ensure the conservative use of available energy resources •Ensure that renewable energy opportunities are identified and harnessed 	Practical energy management and conservation options	<ul style="list-style-type: none"> •Energy conservation measures put in place •Renewable energy opportunities harnessed
Climate Change	Mitigation of climate change impacts	<ul style="list-style-type: none"> •Discouraging environmentally destructive land uses and improper non-green infrastructure whose impacts could eventually amplify the effects of climate change •Reduce the negative effects of urban heat island effects 	<ul style="list-style-type: none"> •Measures in place for Climate change mitigation and adaptation •Measures to mitigate Urban heat island effects
Water supply and Sanitation	<ul style="list-style-type: none"> •Ensure the protection and improvement of the surface and groundwater environment, in terms of water quality and quantity, for the benefit of the human and/or natural environment •Ensure the conservative use of water resources •Ensure the disposal of effluent in an environmentally friendly manner 	<ul style="list-style-type: none"> •Sustainable water resource protection, conservation and exploitation options 	<ul style="list-style-type: none"> •Surface and ground water quality from periodic tests and analysis •Ground water yields from continuous monitoring •Quantities of water Recycled and/or harvested



Solid waste management	<ul style="list-style-type: none"> •Ensure the reduction in solid waste generation •Ensure the proper handling and disposal of generated waste 	<ul style="list-style-type: none"> •Practical and sustainable waste management options / plans 	<ul style="list-style-type: none"> •Number of transfer stations established in the development •Methods of collection and disposal of generated wastes
Traffic and Transport	<ul style="list-style-type: none"> •Mitigation of negative impacts from increase in vehicular traffic 	<ul style="list-style-type: none"> • A practical and effective Traffic Management Plan for Northlands 	<ul style="list-style-type: none"> •Seamless flow of traffic, few traffic incidences and accidents
Economic Impacts			
Micro/Macro scale economy	<ul style="list-style-type: none"> •Ensure the enhancement/ protection of important new and existing material assets and infrastructure in the area •Ensure the enhancement of economic benefits of the plan to the surrounding community 	<ul style="list-style-type: none"> •Tangible socio-economic benefits to the community •Safeguards for important community/national assets 	<ul style="list-style-type: none"> •Number of new infrastructure projects implemented/or existing infrastructure enhancements and attributable to the plan •Number of employment or business opportunities created as a result of the plan
Social Impacts			
Human health and safety	Ensure the improvement/ enhancement of the health and wellbeing of the surrounding communities	Practical safeguards for community health and safety	Number of injuries / illnesses attributable to development activities i.e. construction phase and operation phase activities
Community integration	Ensure integration of the in-coming community with the host community	Community integration initiatives through information sharing, joint activities/ programmes and sharing of resources/facilities	Activities done jointly with surrounding community, information sharing, facilities open to other members of surrounding communities



6.3 Impact Characterization for the Potential Negative Impacts

6.3.1 General environmental social and economic impacts

6.3.1.1 Square and Office Park, Strip Mall (Zone 1 and 2)

Potential negative impact	Principal Receptor	Probability & risk of occurrence	Duration of impact	Magnitude	Reversibility	Importance
Negative visual impact due to loss of visual amenity from dense urban structures	Northlands & neighborhood	High	Long-term	Medium scale	Irreversible	Moderate
Long term evolution of urban heat islands	Northlands and neighborhood	High	Long-term	Medium scale	Irreversible	Moderate
Risk of urban heat island effects	Northlands and neighborhood	High	Long-term	Medium scale	Irreversible	Moderate
High water demand in offices, malls and the Green/Open spaces in lawn watering	Northlands and neighborhood	High	Long-term	Small scale	Reversible	Moderate
Increased water abstraction from Kiu, Kamiti and Gatharaini Rivers	Northlands	High	Long-term	Large scale	Reversible	High
High ground water abstraction leading to lowering of ground water levels and long term risk of land subsidence	Nairobi/Kiambu region	High	Long term	Large scale	Irreversible	High
Water pollution in the Kamiti River, Kiu River	Nairobi River/Athi River	Low	Long-term	Large scale	Reversible	High
Increased traffic activities and traffic interruptions and traffic incidences	Ruiru area	High	Long-term	Medium scale	Irreversible	High
Parking problems	Northlands	High	Long-term	Large scale	Reversible	High
Increased solid and sewerage waste generation	Kiambu region	High	Long term	Large scale	Irreversible	High
Increased crime from neighboring areas such as Mwhoko, Ruiru, Juja and Ruai	Northlands	High	Long term	Medium scale	Reversible	High
Spread/Transmission of HIV/AIDS and other STIs	Ruiru area	High	Long-term	Medium scale	Irreversible	High
Increase in storm water generation resulting in flooding and soil erosion	Northlands	High	Long-term	Medium scale	Reversible	High
Increased energy consumption	Northlands and neighborhood	high	Long-term	Medium scale	Reversible	High
Loss of habitats for the hippos in the area	Kiu and Kamiti Riverine ecosystems	Moderate	Long-term	Small scale	Reversible	Moderate
Loss of avian species habitats and avian species diversity	Northlands area and neighborhood	High	Long term	Large scale	Irreversible	High
Clearance/modification of the riparian vegetation along Kiu/Kamiti and Gatharaini Rivers	Kiu/Kamiti/Gatharaini Riverine ecosystem	Moderate	Long-term	Small scale	Reversible	Moderate
Creation of new avian species habitats	Northlands area	Moderate	Long term	Medium scale	Irreversible	Moderate

6.3.1.2 Recreational Areas (Zones 16-22)

Potential negative impact	Principal Receptor	Probability & risk of occurrence	Duration of impact	Magnitude	Reversibility	Importance
Modification of avian species habitats and creation of new avian species habitats	Northlands area and neighborhood	Moderate	Long term	Medium scale	Irreversible	Moderate
Effect of wastes generated by visitors on avian species	Northlands area	High	Long term	Large scale	Irreversible	Moderate

6.3.1.3 Low, Mid and High Density Residential Areas (Zones 5, 6, 7, 8 and 9)

Potential negative impact	Principal Receptor	Probability and risk of occurrence	Duration of impact	Magnitude	Reversibility	Importance
Loss of avian species habitats and avian species diversity	Northlands area and neighborhood	High	Long term	Large scale	Irreversible	High
Loss of natural vegetation and wildlife habitats	Northlands	Medium	Long term	Mediums scale	irreversible	High
Negative visual impact due to loss of visual amenity from dense urban structures	Northlands & neighborhood	High	Long-term	Medium scale	Irreversible	Moderate
Modification and channeling of WR3 (water body)	Northlands area	Moderate	Long term	Medium	Irreversible	Moderate
Modification of riverine vegetation	Kamiti River	Moderate	Long term	Medium scale	Irreversible	Moderate
Increased storm water generation with potential increase in soil erosion	Northlands area / Kiu and Kamiti Rivers	Moderate	Short term	Small scale	Reversible	Moderate
Increased solid and sewerage waste generation	Nairobi region	High	Long term	Large scale	Irreversible	High
Increased demand for water and energy resources	Northlands Area	High	Long term	Large scale	Irreversible	High
Increased traffic activities and traffic interruptions and traffic incidences	Ruiru area	High	Long-term	Medium scale	Irreversible	High
Increased infestation by malaria transmitting mosquitos due to water features WR 3, 4 and 5	Northlands Area	Moderate	Long term	medium scale	Reversible	High

6.3.1.4 Logistics park (Zone 12, 13)

Potential negative impact	Principal Receptor	Probability & risk of occurrence	Duration of impact	Magnitude	Reversibility	Importance
Loss of avian species habitats and avian species diversity	Northlands area and neighborhood	High	Long term	Large scale	Irreversible	High
Loss of natural vegetation and wildlife habitats	Northlands	Medium	Long term	Mediums scale	irreversible	High
Modification of riverine vegetation along Kamiti River	Kamiti Rivers	Moderate	Long term	Medium scale	Irreversible	Moderate

Increased storm water generation with potential increase in soil erosion	Northlands area / Kamiti and Nairobi River	High	Long term	Large scale	Reversible	Moderate
Increased potential of air pollution, noise pollution, water pollution and soil pollution from industries	Northlands area	High	Long term	Medium	Irreversible	High
Increased solid and sewerage waste generation	Ruiru area	High	Long term	Large scale	Irreversible	High
Increased traffic activities and traffic interruptions and traffic incidences	Ruiru area	High	Long-term	Large scale	Irreversible	High

6.3.1.5 Agriculture/Conservation Area (Zone 15)

Potential negative impact	Principal Receptor	Probability & risk of occurrence	Duration of impact	Magnitude	Reversibility	Importance
Effects of wildlife introduction	Northlands area	Low	Long term	Medium scale	Reversible	Medium
Concentration of wildlife, habitat degradation and conflict with livestock	Northlands area	Medium	Long term	Medium scale	Reversible	Medium
Risk of long term loss of species due to in-breeding	Northlands area	Medium	Long term	Medium scale	Reversible	Medium
Wildlife habitat deterioration due to low carrying capacity	Northlands area	Medium	Long term	Medium scale	Reversible	Medium

6.4 Risk Assessment

6.4.1 Overview

Risk is defined as the chance of an event occurring which would cause actual project circumstances to differ from those assumed when forecasting project benefits and costs. The amount of Risk can be affected by the level of influence one has over events, and the level of information available about the present and the future. Influence relates to the power to create action and determine outcomes, and can come from good management and organization, and from specific knowledge. Information is directly related to risk. It is precisely because we usually don't have all the information that we can't predict future outcomes for certain. When we have better information we are better able to foresee and reduce risk

There is no such thing as an 'accurate' risk analysis. Rather, risk analysis is subject to judgement and subjectivity, both in the risk model and in the data which quantifies it. Therefore, Risk assessment for the Northlands Masterplan is based on the details provided on the Masterplan components, and the prevailing/foreseeable environmental, social, political and economic conditions as judged by the SEA team.

6.4.2 Risk of incompatibility with surrounding land uses or inappropriate land use

Conflicting land uses either within the Northlands Masterplan, or between Northlands and the surrounding land uses can cause economic, physical, and social stresses on the communities where the conflicts occur.

Land use incompatibility can create barriers to new investment and discourage existing land owners from investing in their properties, thereby creating a drain on the vitality of the community as a whole. An example would be the location of a dam close to Varsityville Estate and other residential settlements.

On the other hand, proposed land uses in Northlands can be inappropriate meaning that opportunities or potential for beneficial relationships may not materialize because the full potential was not recognized and/or not established as an attainable goal before development of the land.

The Northlands Masterplan has established the various forms of land use based on the Planned Unit Development concept. The concept promotes a mixture of land uses and densities and permits the incorporation of nonresidential service facilities into otherwise residential developments for convenience and variety. However, inconsistencies can arise if an area that would be described as primarily residential in character, is adversely affected by the intrusion of nonresidential uses. This would make the neighborhood concept- with its cohesive and social fabric, difficult to achieve.

There's a potential risk that a proposed land use in Northlands may not adequately buffer its own undesirable characteristics from adversely affecting adjacent land uses thus creating conflicts. Such undesirable characteristics could include increased traffic, air pollution, odors, excessive noise, water pollution, excessive lighting, vibrations, increased storm runoff, or unattractive building appearances. These would be especially pronounced where residential, industrial, commercial and recreation uses are involved. A potential risk also exists that land development will lead to loss of the intrinsic environmental qualities of the site. Presently, the site has scenic views of wetlands along watercourses, savannah grasslands, and forested areas.

To mitigate these risks, the Plan Proponent engaged a team of land use planners to investigate and identify land uses that attain the highest and best use of land and avoid wasteful and inefficient spatial arrangements. During plan implementation, strict enforcement of these plans will be required to prevent intrusion of one land use by another. Detailed site planning will also require a careful choice of facilities in order to maintain the envisaged land use character.

Adequately sized buffer zones and technologies will be established/installed where potential conflicts in land uses can arise. Such potential conflict areas include location of industrial zones near residential and recreational areas.



Development of Northlands should reflect the characteristics of the area in which it is located and should enhance, rather than detract from, these qualities. Natural features such as wetlands, grasslands, woodlands and other cultural or man-made elements of the landscape should be considered in the development.

6.4.3 Sustainability Risks/Environmental degradation

The extent, and type of land use directly affects wildlife habitat and thereby impacts local and global biodiversity. Human alteration of landscapes from natural vegetation (e.g. wilderness) to any other use typically results in habitat loss, degradation, and fragmentation, all of which can have devastating effects on biodiversity. Land conversion is the single greatest cause of extinction of terrestrial species

6.4.4 Planning risks

This Refers to the risk that the pre-development studies (technical, legal, financial and others) conducted are inadequate or not robust enough resulting in possible deviations from the outcomes that were planned or expected in the Northlands development. It may include incorrect forecasts and assumptions on demographics, demand, and limited understanding of market dynamics. Planners and project sponsors may tend to adopt assumptions which favor a development, which might be gaming (also known as ‘strategic misrepresentation’), or might be genuine optimism.

6.4.5 Risk of mushrooming of slums in the area

A slum is a contiguous settlement where the inhabitants are characterized as having inadequate housing and basic services. A slum is often not recognized and addressed by the public authorities as an integral or equal part of the city (UN-HABITAT, 2002). This definition encompasses a wide variety of low-income settlements and poor human living conditions and includes the traditional meaning of slums, which are old residential areas that were once respectable or even desirable, but over time, have deteriorated through neglect, as the original occupants have moved out, and the units have been progressively subdivided and rented out to poorer households (UN-HABITAT, 2003a). Slums in this context also include squatter settlements/informal settlements which are residential districts created by the illegal occupation of land and largely in contravention of official building regulations. Acquisition of the land usually involves planned invasion of unused land whose ownership is unclear and where occupation is unlikely to be opposed or prevented by the relevant authorities. Such settlements have emerged due to the inability of conventional housing markets to cope with the demand created by rapid urbanization. People living in these settlements experience deplorable living and environmental conditions, characterized by inadequate water supply, squalid conditions of environmental sanitation, breakdown or non-existence of waste disposal arrangements, overcrowded and dilapidated habitation, hazardous location, insecurity of tenure, and vulnerability to serious health risks. Slum residents are also excluded from participating in the economic social, political and cultural spheres of the city— all of which create and nurture capabilities.

The rapid urban growth or rural urban migration is the major factor determining the proliferation of slums and squatter settlements in developing countries. While the rapid pace of urbanization experienced by African countries over the last three decades certainly plays an important role in the prevalence of slums, there are other economic, social, political, institutional and historical factors whose impacts are not known with much degree of certainty, as they have rarely been the focus of rigorous empirical investigation (Arimah, 2009). In addition, the regulatory framework governing the delivery of planned residential land is a major factor accounting for the prevalence of slums among African countries. The regulatory framework breeds bureaucratic procedures that make land unavailable and unaffordable to low income households (Payne, 2005; Kironde, 2006). Given this scenario, low-income families face several possible alternatives, which include: the construction of unauthorized housing often on marginal land, which not only contravenes building and land-use regulations, but also lacks basic amenities; and to increasingly share space meant for fewer people,

thereby leading to overcrowded habitation and overstretching of housing amenities. In either case, slum-like conditions develop.

The pernicious effect of urbanization on the incidence of slums is indicative of the process of urbanization without development or limited development. This type of urbanization is characterized by rapid urban growth occurring in the face of economic stagnation or low economic growth, poor agricultural performance, rising unemployment, financially weak municipal authorities, poor governance, and the absence of coherent urban planning policy (Cheru, 2005; Annez et al, 2010)

To forestall the growth of new slums, the Northlands planning team should play an active role in advocating the improvement of the performance of the local authorities, i.e. the Kiambu County Government (KCG), in managing future urban growth via effective land use planning and mobilization of local resources. KCG should also be active in formulating a strategy that advocates developing property rights, which among others entails the regularization of insecure tenure in informal settlements where these exist near Northlands. The benefits of security of tenure include: it addresses the problem of tenure insecurity in already established slums, which otherwise would translate into a vicious circle of construction, demolition, eviction and reconstruction; it encourages the provision of urban services that were previously absent; secure tenure motivates residents to invest and contribute to the management their built environment; tenure security could in principle contribute to the financial base and resources of local governments by improving tax recovery on both property and economic activities; and from a political perspective, tenure regularization can be seen as a means of ensuring social cohesion and stability in cities. (Durand-Lasserve, 1999)

Improving the stock of existing infrastructure such as roads has the effect of reducing the incidence of slums among African countries. Improved road network can also reduce the level of social exclusion by improving the access of residents of slum and squatter settlements to various employment and activity nodes. Furthermore, investment in trunk infrastructure for access, water, sanitation and power supply can serve as a means for preventing the formation of new slums, reducing the health burden faced by slum dwellers and delivering major benefits in economic growth, poverty alleviation and environmental sustainability.

The implications of the above on the prevention of mushrooming of slums around Northlands are that Kiambu County Government should develop and enforce land use plans for the area, ensure that all land within its jurisdiction is surveyed and ownership established, and provide infrastructural services to the surrounding areas in the interest of orderly development. However, a significant aspect in favor of controlled/organized development and prevention of the proliferation of slums around Northlands is that all land in the area has been adjudicated whereby existing rights in all parcels of land have been finally and authoritatively ascertained. This process has seen the conversion of land held under customary tenure into individual holdings resulting in the registration of the land parcels in the area.

6.4.6 Financing Risks

Refers to the risk that sufficient finance will not be available for the Masterplan at reasonable cost (eg, because of changes in market conditions or credit availability) resulting in delays in the financial closure for the development.

6.4.7 Design Risks/ Technology Risks

Design Risk: Refers to the risk that proposed designs will be unable to meet the performance and service requirements in the output specification and can result in additional costs for modification and redesign. This is especially so for the infrastructure services (access roads, junctions, water supply, power, sewerage network etc) to be established in the Northlands Masterplan. There is the risk that the designs of these infrastructural services may not adequately cater for the requirements of the population generated by Northlands.



Technology risks also arise whereby there is potential that the technology used in design of the infrastructure will unexpectedly become out of date during the life of the Masterplan and will not be able to satisfy the requirements in the output specifications. It would result in increased costs of a replacement technology.

6.4.8 Political and Regulatory Risks

Political and regulatory risk is a categorization that includes those risks arising from individual political and regulatory decisions that affect a development project or an existing asset. Regulatory risk refers to the risk that the current legal / regulatory regime will change, having a material adverse impact on the project. In practice most private sector infrastructure owners are subject to regulation and the regulator is a major influencer of the way investment programmes are shaped, modelled and delivered.

A well-designed system of regulation is advantageous for society, and investors usually have no problem with regulation per se. Rather, the concern is that laws and regulation can change unexpectedly giving rise to political and regulatory risks. For large development projects, there occurs a mismatch between the project cycle and political cycle as the projects outrun the term of any individual government. Given this mismatch between political cycles and the project cycle, investors are understandably cautious and want to be fairly sure not only that the current government meets its commitments but also that the decisions of a future parliament or administration will not affect their investment too severely (World Economic Forum, 2015).

Political uncertainty may arise from an evolving structure of public interests and can affect projects which are potentially sensitive to stakeholders. The “public interest” as such is not necessarily constant over time. Instead, it might change, owing to societal concerns that are inconsistent over time. For example, during the long lifetime of a project, the perception of technological safety or environmental responsibility might change, so the risk arises that regulation would change too

Political & regulatory risk can also be caused by a misperception by private actors. The investors or developers might perceive political decisions as unpredictable and hence “risky”, even though such decisions are almost inevitable. A reason for this faulty perception is perhaps investors’ inadequate sensitivity to shifting societal concerns: so the investors would find it surprising when political decisions are made in response to public pressure or are motivated by a new understanding of socially desirable policies

Under political and regulatory risks are other risks which can be classified under planning/design/construction phases or operations phase.

6.4.9 Risks during the planning/design/construction phases

Risk concerning environmental and other permits. Northlands will have complex permit requirements with multiple agencies or branches of government, occasioning Approvals risks. This refers to the risk that delays in approvals to be obtained during the construction phase will result in a delays in implementation of the Masterplan as per the implementation schedule. Such delays in obtaining approvals may lead to cost overruns. Construction permit delays can have a severe impact on a project’s profitability, as cash flows start later than anticipated. Such delays can be from the unexpected outcomes of environmental and social-impact studies. Even permits issued promptly can contain unforeseen and costly conditions, such as compensation requirements or usage restrictions eg on ground water resource use.

Risk of community stakeholders’ opposition. The Local communities can affect the Northlands Masterplan in ways that do not just influence permit procedures. The Constitution of Kenya gives the local populations formal and informal veto rights over projects which have potential to cause adverse impacts within their territories. Action groups can organize protests that prompt politicians and regulators to withdraw or suspend permission, and so on. A lack of an institutionalized process to manage stakeholders can result in inadequate stakeholder involvement, misunderstandings, and lack of cooperation which can affect approval and/or implementation of the Masterplan.

6.4.10 Risks during the operation phase

Risk of expropriation. This is a political risk faced by private infrastructure owners which is the risk of outright confiscation or nationalization of their asset. More subtly, a series of renegotiations or regulatory changes can result in de facto expropriation, or “creeping expropriation”. Northlands will establish infrastructure for access and transportation, water and power supply, and effluent disposal which can eventually be taken over by the government in public interest.

Risk of asset-specific regulation. For projects/assets that could seriously impact on communities or on the natural environment e.g. industries and waste disposal plants, the operating regulations are specific. Any small change to the details – such as permissible noise levels, or water-quality requirements – can have a hugely detrimental effect on revenues or cost and potentially affect the viability of the project/asset.

Force majeure: Risk of natural disasters, e.g. earthquake, flooding or, landslide. Northlands area is within sight of the Kilimambogo Seismic Station located at about 30 kilometres away and sits close to the eastern flanks of the Great Rift Valley. Recent revelations are that the Valley may be expanding at a rate of (2-3) mm per year due to tensional forces in the crust (Waithaka, 2001). The high heat flow beneath the crust is represented by the geothermal activities at Olkaria, Bogoria and Kapedo in Turkana District and the high seismicity around Lake Magadi is evidence of the continental plate break-up (Prodehl, Keller, & Khan, 1991).

Various studies have also been carried out on the seismic risk of Kenya and Nairobi. Wayumba (2001) carried out studies to determine the potential disaster sites within the city of Nairobi and its environs. He concluded that there were fault lines that affected a good number of plots in the western side of Nairobi including the prime areas of Karen and Langata. The Ngong/Ongata/Kiserian area showed a lot of seismicity and numerous fault lines. He also found that there were virtually no fault lines in the eastern side of Nairobi – in the direction of Northlands. The Seismology data indicated very minimal earthquake activity in the general area of Nairobi but high activity in the Ongata Rongai/Ngong areas of the western parts of the city and Lake Magadi area.

The topography of Northlands is relatively flat (Approx. 1500m asl) but gently slopes north-eastwards. The risk of landslides is therefore nil or negligible. The top soil on the land is predominantly black cotton soil, which is expansive clay not suitable for foundation works. Due to the flat nature of the site and the poor drainage characteristics of the soil, the risk of waterlogging at the site is considered to be relatively high in the absence of proper drainage structures.

6.4.11 Climatic risks

Land-use change can be a factor in CO₂ (carbon dioxide) atmospheric concentration, and is thus a contributor to climate change. Conversion of large expanses of savannah grassland (which is the current status of Northlands) to urban developed areas will cause changes in carbon stocks by releasing significant amounts of CO₂ into the atmosphere.

Carbon stored in grassland vegetation (above ground carbon) is very small compared to that in the soil. Below-ground carbon dominates in grassland, mainly in roots and soil organic matter. In general, soil carbon stocks are highest under forestland, followed by grassland, cropland, wetland, settlements and ‘other’. These differences are due to the differences in carbon inputs to the soil from the vegetation (i.e. leaf litter, woody litter and rhizo-deposition), and outputs from the soil due to microbial respiration, erosion and percolation. Any change in land use results in a change in these inputs and outputs of carbon such that a new equilibrium is reached. A move from a land use with higher soil carbon stocks to one with lower carbon stocks will result in the loss of carbon, much of which will be to the atmosphere in the form of CO₂ produced by microbial respiration.

Thus, when forestland is converted to grassland, croplands or settlements, soil carbon stores are generally expected to reduce, with the greatest reduction occurring when forestlands are converted to settlements, closely followed by croplands, and to a lesser extent grasslands. Where grasslands are the original land use, soil carbon storage can usually be increased by planting trees, while where croplands are the original land

use, gains can be made when converting to forestland or grassland, but reductions are made when converting to settlements. The greatest improvements in soil carbon storage can be gained by converting settlements to forestland, grassland and cropland respectively.

In terms of biomass carbon stores, forestlands are the land use providing the highest above ground carbon storage. A change to any other land use will lead to carbon loss and conversely a change from grassland, cropland or settlement to forestland will lead to an increase in carbon storage. Biomass carbon gains and losses occurring as a result of transitions between cropland, grassland and settlements are very small. However, converting grassland to crops will lead to a small loss of above ground carbon, while converting to settlements will increase the carbon stored and changing cropland to either grassland or settlements will lead to net carbon gains, whereas changing settlements to croplands or grassland will lead to net carbon losses

In order to mitigate climatic risks of implementing the Northlands Masterplan, the planning team can develop a biogeochemical model that takes into account several factors, including existing carbon stocks, soil type and weather conditions to account for the carbon lost when grasslands are converted into settlements or other development. It can be used both on a property-level scale and to measure the carbon lost on a regional scale.

It is worth noting that a large portion of the land that was originally grassland has been converted to Eucalyptus plantations and will be retained in the Northlands Masterplan as a buffer between the busy Eastern Bypass and developments within the Plan. The Eucalyptus plantations have had the effect of increasing biomass carbon stocks which is a significant offset against losses expected in conversion of grasslands into settlements and other developments.

Increasing tree cover in the green and open spaces of the Northlands Masterplan will lead to greater carbon sequestration, both in the soil and the biomass, and can therefore help to mitigate climate change by reducing net GHG emissions. The displacement of Gicheha farm's livestock by settlements and other vegetation will also lead to a reduction in methane emissions.

6.4.12 Best-practice framework for risk mitigation

Appropriate use of financial instruments: Within the framework set by the government, Northlands has to effectively and efficiently manage the risk inherent in the Masterplan. An array of measures is available to this end, such as financial instruments that allow Northlands to directly address important aspects of political & regulatory risk. Risk guarantees and political-risk insurance are instruments that can be used to transfer political & regulatory risk from the Plan Proponent and financiers to a party better suited to bearing it (such as a development bank or an insurance company), and thereby protect themselves from adverse incidents.

Effective interaction with the public sector: To mitigate political & regulatory risk, the Plan Proponent should make a conscious effort to facilitate constructive interaction with the public sector. Such interaction will prevent misunderstandings, create transparency on the impact of regulations for the public and private sectors, and contribute to an overall mutually beneficial atmosphere. This can be done through constructive communication with public agencies and sharing of information, monitoring of political developments, and advocacy strategy in order to influence matters of industry-wide regulation.

Inclusive community engagement: The Plan Proponent will also need to engage constructively with the public at large. By involving the affected communities throughout the Masterplan's life cycle – from planning and construction through to operations, the Plan Proponent can reduce the chance of political intervention. Engagement will include:

- *Early and meaningful community consultations* through appropriate formats. Such consultations will help to ease local anxieties, and improve the Masterplan and project design by taking the community's concerns into account;
- *Continuous communication.* Starting in the planning period, and continuing during construction, the Plan Proponent should communicate with local residents on progress and potential impacts – to satisfy

curiosity, allay justified fears and dismiss those unjustified, and generate a positive public involvement with the project;

- *Responsible business conduct*: Responsible business conduct is a prerequisite for sustainable economic success. If the society at large accepts the behavior of the developer(s), stakeholder satisfaction will increase and the likelihood of policy-makers intervening will be reduced. Responsible conduct will include managing their operations sustainably, which involves respecting norms on the environment, human health and safety, and other areas.

6.5 Direct and indirect Drivers of Change Resulting from the PPP Implementation

The PPP implementation is likely to have certain implications for the existing society around the Northlands area. These implications have been discussed in the previous sub-sections of this chapter. In a nutshell, these implications may be clustered under the following sub-headings.

6.5.1 Demographic

According to the 2009 Kenya Population and Housing Census, Kiambu County population for 2012 was projected to be 1,766,058 with 873,200 males and 892,857 females. Further, the population is expected to reach 2,032,464 people by the end of 2017. This is influenced by the county's high population growth rate, which is at 2.81 per cent and the influx of people working in the city who prefer to stay in Kiambu and its environs where there is less congestion and well developed infrastructure.

As soon as implementation of the PPP commences there is likely to be an influx of people from other parts of the country including Nairobi City, from within Kiambu County, Machakos County and other neighbouring counties in the hope getting jobs at the construction sites and emerging enterprises. This implies that during the construction phase, there will be pressure on neighboring facilities including housing estates, water supply systems, health facilities and security structures.

As the various phases of the Masterplan are completed, the resident and working population will also grow significantly as residential developments are occupied, and the commercial and industrial developments become operational.

6.5.2 Economic

The PPP implementation offers economic opportunities for the local people in a variety of ways including business and employment opportunities both during construction and on commissioning. It also promises to grow the Kiambu County economy in significant ways from an increase in trade and commerce, and Government revenue from a wider tax base of new industries and enterprises. Northlands will eventually emerge as key economic hub for Kiambu County and Nairobi County which is in line with the spirit of Kenya Vision 2030

6.5.3 Social

As implementation commences and the local population increases, the new complex urban environment will disrupt local social networks and organization, creating new social problems including possible rise in crime and cultural shocks for migrant workers. The unskilled/semi-skilled labour force necessary for successful implementation of the Masterplan requires affordable housing and this may lead to growth of informal settlements in the neighbourhood. It is from such informal settlements that many antisocial behaviours including crime emanate.

At any rate, the Masterplan implementation will create new opportunities to bring into Northlands and its environs people from all walks of life with the result that there may be initial tensions through crimes such as robbery, car-jacking and vandalism as people get used to changes in the social landscape and settle in to accept it. Eventually, the social welfare standards in both Kiambu and Nairobi counties will rise as a result of the improved social services

The management shall need to work with Kiambu County Government to ensure proper planning not only of the PPP but also in the neighbourhood and ensure low income staff and workers are properly housed in labour camps to reduce impact on the surrounding community.

6.5.4 Political

The new population concentrations to be associated with the implementation of the PPP will have some political implications. As population suddenly grows, there will be agitation for re-drawing of political boundaries for better representation at the county assembly and the national parliament.

Kiambu County has twelve (12) constituencies, which are Gatundu South, Gatundu North, Juja, Thika Town, Ruiru, Githunguri, Kiambu, Kiambaa, Kikuyu, Kabete, Limuru, and Lari. These constituencies are further divided into 60 electoral wards. Ruiru Constituency which hosts Northlands development, has the highest number of wards with 8 wards, while the rest of the constituencies have five each with the exemption of Kiambu, Gatundu South and Gatundu North which has four each.

The New population at Northlands will require representation and will alter the political boundaries of the County. Politically, there may be tension between the host population and the immigrant population over who should be the legitimate representatives of the people given that majority of residents are likely to be from outside the local area

6.5.5 Science and Technology

The implementation of the PPP embodies changes in local understandings and workings of science and technology. Green development concepts in construction, rain-water harvesting technologies as well as water re-cycling technologies will take time to be accepted in the wider emerging Northlands. The diffusion of new scientific and technological ideas and practices from the core Northlands to the periphery may be disruptive initially but will nonetheless change local values and valuations.

Overall, the PPP promises to change the social, political and economic landscape of the Northlands and its environs and this call for more efficient governance structures that will be readily responsive to emerging challenges by facilitating harnessing of new opportunities and resources for the benefit of all residents in and around the Northlands for sustainable development.

6.6 Social and economic benefits at strategic level to the local and national development

6.6.1 Residential uses

The Nairobi Metropolitan Plan quantifies the overall level of level of growth envisaged within the wider metropolitan region over the plan period to 2030. The population of the Metropolitan Region is projected to grow from 4.78 m in 1999 to 12.54m by 2030. In terms of households the number increases from 14,485 in 1999 to 38,000 in 2030.



The Northlands site can reasonably be expected to cater for the growth requirements of the Core Nairobi Urban Area and the Northern Metro Area where the number of households increases from 10,545 (1999) to 28,606 by 2030. Increased household formation is largely due to the natural increase in the population with migration accounting for a relatively small share.

To cater for the growth in population, the Plan identifies that some 36,010 Hectares of land is required to meet the housing needs of the Nairobi Core and Northern Metro area (excluding supporting facilities). The Northlands site has potential to accommodate a significant share of the overall housing needs. In pure quantitative terms, Northlands could potentially meet up to 13% of the overall requirement for the city (if the whole site was developed for this purpose and not accounting for other supporting uses).

A study was done by ATKINS (2010), to quantify the potential demand which may be attracted to the site. This included an analysis of future needs based upon the research undertaken to inform the Nairobi Metropolitan Plan, and an examination of the changing shares in the quality of housing stock required by high medium and low income groups up to 2030.

The Plan forecasts that living standards will rise significantly over the plan period and that this will lead to significantly larger high and middle income groups with an associated requirement for better quality housing. It was projected that that the proportion of households living in slums would fall from around 45% in 2007 to around 22% by 2030 with the middle income group rising to almost 2/3rds of households in the city as shown in the table below.

Income group	1999	2007	2012	2017	2022	2027	2030
High Income	20%	15%	12%	11%	18%	15%	15%
Middle Income	37%	40%	46%	51%	49%	58%	64%
Low Income	43%	45%	42%	38%	34%	27%	22%

The study also identified the overall needs attributable to the Nairobi Core and Northern Metro areas for each market segment which account for 75% of the whole Metropolitan area. The Table below shows the overall requirements which project that the number of high income households will increase by 268% (+25,139 households) and the number of middle income households will increase by 685% (+648,782 households).

The largest increases in requirements for middle and high income housing are required for the period from 2017 onwards.

Category	1999	2007	2012	2017	2022	2027	2030	Change 2007-2030
High Income	17,982	14,926	13,070	12,064	39,487	39,356	40,065	+25,139
Middle Income	59,781	110,734	179,746	277,868	308,128	563,272	759,516	+648,782
Low Income	83,354	142,255	152,838	151,953	144,809	122,199	87,932	-54,323
Total	161,117	267,915	345,654	441,886	492,424	724,827	887,513	+619,598
Change	-	106,798	77,739	96,231	50,539	232,403	162,686	

6.6.2 Qualitative factors informing the proposed mix of development at Northlands

6.6.2.1 Housing supply

Overall, the supply of housing in Nairobi City has been increasing with most new housing developed being apartment style housing. In addition, there has been considerable growth in slum development. The overall density of development in the city has increased due to infilling of the inner urban and suburban areas, the



expansion of satellite settlements, and the growth of slum areas. Demand for housing has also been increasing due to social changes leading to the growth in smaller nuclear independent families.

Northlands has potential to secure a significant share of the Nairobi Core and Northern Metro markets by virtue of the size of the site, its location and accessibility. The proportion of land allocated for housing within the Masterplan reflects the balance between commercial and residential activities which may be attracted and site environmental opportunities which inform land use suitability.

6.6.2.2 Non-residential Uses

To establish the future potential for non-residential uses in Northlands, a review was undertaken at the city level of future economic growth at the city level and associated premises requirements. In addition, documents and strategies and surveys for future industrial and commercial development were also considered

6.6.2.3 Nairobi's Floor-space requirements

Vision 2030 provides an overarching economic strategy for Kenya. This includes plans and proposals for the future development of the economy, and identifies the supporting actions and strategies to deliver this. An aspiration is established for the economy to grow rapidly by an average of 10% GDP growth per annum.

Plans and proposals have been put forward for the growth of several key sectors including agriculture, business process outsourcing, financial services, tourism, wholesale and distribution, and industrial activities. These are expected to significantly increase Nairobi's floor-space requirements.

Future floor-space needs for economic activities can be derived from examining employment trends. To project future employment, two scenarios were developed using statistics of employment by sector in Nairobi:

Scenario 1: Using an average of sector specific growth rates for the last 5 years to provide a proxy for future growth. Sector specific growth rates were then established.

Scenario 2: The assumption was that employment growth would rise in tandem with GDP and that an average increase of 7% per annum can be used to capture growth to 2030. The table below summarizes recorded growth in 2008 and future growth within the city.

Sector	Nairobi 2008: Wage Employment (000s)	Scenario 1 Trend Based	Scenario 2 7% CAGR
		Nairobi 2030: Projected Wage employment (000s)	Nairobi 2030: Projected Wage employment (000s)
Manufacturing	88.00	36.04	389.87
Electricity and water	10.64	11.87	47.12
Construction	44.60	73.55	197.59
Wholesale, retail, trade, restaurants and hotels	70.90	198.88	314.11
Transport and communications	37.60	511.71	166.58
Finance insurance and real estate	45.40	86.99	201.14
Community, social and personal services	182.20	221.89	807.20
Total	479.32	1,240.93	2,123.60

To translate employment projections into an assessment of future floor-space needs, the property requirements for each economic sector were assessed in terms of the type of buildings required. In addition, employment densities were used to translate employment into floor space requirements. Overall floor-space for the city is set out in the following table:

Projected Floor-space	Scenario 1 Trend Based	Scenario 2 7% CAGR
Office	3,589,358	14,806,758
Industry	1,339,789	8,608,148
Distribution	23,994,358	14,304,305
Retail	805,107	2,258,381
Hotel	1,452,100	2,795,226
Total Non-Residential	31,180,712	42,772,818

The Northlands site is well located in relation to the city with good accessibility to the City Centre and JKIA. In addition the proposals are transformational and cater for demand which is not catered for at the moment in the City. By providing a well-planned high quality scheme, Northlands has the potential to capture a significant share of overall growth in the city as well as meeting the needs of existing businesses and occupiers whose premises and related amenities are not adequately met at present and who would consider relocating to Northlands.

6.6.2.4 Business Process Outsourcing (BPO) and Information Communication Technology (ICT)

Vision 2030 aims to make Kenya the top BPO destination in Africa. Some of the key strengths which make Kenya – and especially Nairobi, a favorable destination for BPO include: a highly skilled and competitive labor force; strategic location as a regional hub for communication and finance; and a good telecommunications infrastructure network. BPO companies on the whole are looking for accommodation in a business park environment with purpose built modern business premises, high quality ICT infrastructure and supporting facilities such as banks, shops, restaurants, leisure facilities and open space in order to attract clients and employees.

Northlands has the potential to create an environment which meets the needs of local and international BPO companies who are seeking to diversify and expand their operations. The site has potential to provide good access to high quality telecommunications infrastructure that BPO businesses require, with fiber optic cables passing along Thika Super Highway and Eastern Bypass which can serve Northlands. In addition, the site's close proximity to Kenyatta University means that the BPO businesses can attract the graduates that they will require in the industry and develop links with the university and other training institutes in the city.

Many BPO providers are also keen to have the workforce accommodated nearby as often BPO operations are 24 hours a day. The potential mix of uses on the site allows for the possibility of providing accommodation that will meet the needs of the BPO employees including serviced accommodation and entry level apartments geared towards graduates.

6.6.2.5 Financial and business services

Vision 2030 seeks to create a vibrant and globally competitive financial sector in Kenya. The Vision sets out the aim of introducing legal and institutional reforms, and the creation of a critical mass of skills in financial management. With the establishment of an East African Community (EAC) Common Market in 2010, opportunities have been created to take advantage of a much larger market place. Nairobi is already the biggest commercial center in the East Africa region and the opportunities provided by freedom of trade and greater integration amongst the EAC nations will allow the City to build on this position. There is scope for growth



in the banking and insurance sectors and other supporting industries such as consultancy, accountancy, legal and other professional services.

The City has out grown its Central Business District (CBD), and experiences problems of congestion, lack of adequate office and parking facilities and a poor environment. Many of the office buildings within the CBD are not well suited to modern business requirements, and some businesses are now considering moving out of the CBD, or have moved out and have opted for edge of city centre or suburban locations. However, many of the new office locations which have been developed lack critical mass and do not provide the full range of amenities and facilities. They also do not provide a vibrant and quality environment which is better able to attract higher skilled employees and which can be an important consideration in a competitive labor market. Northlands has the potential to create an integrated central business district and business park environment which provides for the needs of the sector.

6.6.2.6 Diplomatic uses and Institutions

Nairobi is the seat of Kenyan government, with government buildings located in the CBD. Presently, some government functions are located in outdated buildings and other functions occupy prime locations which may be better suited to other activities. The Government has stated its intention to decentralize some Government functions away from the city center. As an international city, Nairobi also hosts several other international functions including foreign embassies and consulates. However, many of the embassies are in converted residential buildings within residential areas that are not always suited to the purpose or meet optimal security requirements. Nairobi is also home to numerous international institutions and with the growth of EAC, there is potential to draw further international institutions to Nairobi. Many of these functions have the potential to be located at Northlands within a secure but liveable environment mixed in with other uses and providing adequate supporting amenities

6.6.2.7 Light Industry

Manufacturing has been identified as one of the six key priority sectors in Vision 2030. The aim is to become the 'provider of choice for basic manufactured goods in eastern and central Africa'. Niche products such as organic foods and beverages are targeted as well as a range of medium and light industries. The Government's vision is to produce consumer goods that compete with imports in key local industries, and raise the market share in the regional market from 7% to 15%. Kenya aims to increase the level of value addition by additional processing of local agriculture products. Secondary products have wider market demand, fetch higher incomes and provide opportunities for job creation.

The Vision identifies that manufacturing is expected to raise its contribution to GDP by 10% per annum. Northlands has the potential to be an attractive location for businesses requiring quality light manufacturing premises which are compatible with other activities at Northlands. It has good access to the strategic road network and a secure environment can be provided which is a key factor for prospective occupiers.

6.6.2.8 Wholesale and Retail

Informal and formal trade currently accounts for 10% of GDP and 10% of employment. The sector has been rapidly expanding since 1990s. However, most employment has tended to be in the informal sector. Jobs in the formal sector are more permanent and high quality and therefore the challenge is to provide support to the sector in order that the sector becomes more formalised. Key subsectors within the industry include wholesaling, retail, distribution, logistics and haulage. Each of these has the potential to be located at Northlands. The site has significant potential as a location to accommodate distribution and logistics uses. It has good access to the national road network as well as the airport and other industrial areas.



6.6.2.9 Tourism

Tourism is identified as one of the key drivers in achieving the goals of Vision 2030, and the plan sets three specific goals for tourism which include increasing tourism's GDP contribution, raising the number of international visitors and increasing hotel beds capacity with an emphasis on high quality. There is potential to secure greater revenue from tourism by seeking to lengthen the stay of visitors through providing better quality accommodation (attracting international chain hotels or boutique hotels). There is also potential particularly in Nairobi to provide more business tourism facilities. This could include providing facilities for meetings, conferences and exhibitions.

Northlands has the potential to cater for the needs of several additional niches including attraction of boutique hotel, MICE (meetings, incentives, conferences and exhibitions) tourism, business tourism and event related tourism based on Nairobi's rising prominence, and further domestic tourism based on provision of leisure facilities and hospitality for weddings and other events.

6.6.2.10 Education

Vision 2030 aims to promote the expansion of university education and training in tandem with population growth. The most significant opportunity for Northlands is its potential to accommodate an expansion or spin off institutes linked with Kenyatta University located to the north west of the site. In addition, further education colleges and training institutes could be attracted to the site.

6.6.2.11 Health care services

The Government's 2030 vision aims to improve access to health care provision. Generally as the population becomes more affluent, the demand for private healthcare increases. There is an opportunity in Northlands to provide a dedicated healthcare cluster linked to a major private facility.

6.7 Other Benefits of the PPP Implementation

The SEA studies and the stakeholder consultations (as shown in Section 5.5) reveal a number of strategic social and economic benefits accruing from the PPP implementation. These include:

6.7.1 Improvement of County and National Economy

The overall investment outlays arising from the Northlands will grow the county economy, but also spur national development in terms of the confidence to replicate similar developments elsewhere in the country. The Northlands also promises tourism development opportunities not just to the conservancy but also the planned city, hence domestic and regional tourists mainly from the East African Community will arrive.

6.7.2 Social Infrastructure

The development will come with high-end social infrastructure including schools, roads, hospitals and shopping malls. This will benefit neighbouring middle class communities such as those in Kahawa Sukari through opportunities for health care and convenience next door. The property prices in such estates will increase to the benefit of residents.

6.7.3 Security

Because of the new population concentration in and around Northlands, steps will be taken to enhance security in the areas as a prerequisite for smooth and fruitful business in the long run. This will benefit local



communities and give confidence to other investors to undertake similar private ventures elsewhere in the county.

Overall, the PPP will be beneficial to local people, the county and national economy in the long-run. This will happen during and after construction. The success of the PPP will not only benefit the proponent and the emergent Northlands communities and their neighbors, but will also spur similar developments around the country in smaller and bigger scales alike. Hence, the PPP will be a confidence booster to investors in the country.

7 Identification of environmental problems and mitigation measures

7.1 Introduction

The PEIA established that the Masterplan will have significant impacts on the following environmental and social themes in the plan area.

- Traffic and Transport
- Surface and ground water resources:
- Energy Resources
- Ambient noise and air quality
- Waste management
- Landscape, geology and Soils
- Biodiversity and Nature Conservation
- Health and Safety

7.2 Traffic and Transport

Northlands is likely to have impacts on traffic and transportation in the area both during construction and operation phases of the development.

The impacts include such as: an increase in the number of vehicles with the resultant increase in traffic along the Thika Super-Highway, Eastern By-pass, Kangundo Road, and other planned roads in the area. This may in turn lead to requirements for additional maintenance of these roads due to damage caused by the vehicles and especially from the weight of construction vehicles.

Increased vehicular traffic may also lead to higher air and noise emissions adversely affecting the local air quality and ambient noise levels.

To mitigate the negative impacts of traffic increase, a comprehensive Traffic management plan will be required for the development following a Traffic Impact Study (TIS) of the NMP.

A TIS is required due to the expected delays, unstable and/or forced traffic flow conditions and the significant increase in potential risk of a traffic incident (i.e. congestion related collisions, non-standard sight distance considerations, increase in traffic conflict points).

The TIS will also identify the roadway improvements required to ensure that the road network will operate safely and efficiently upon completion of the development.

7.3 Water Resources

The development is likely to lead to increased demand on water resources both for construction purposes and during operations. This water will be sourced from existing boreholes and others to be drilled, supply from NWSC and RUJWASCO, flood water and rain water harvesting, and river abstraction.

Without conservative use of these water resources, there is likely to be adverse impacts such as depletion of groundwater resources from over-abstraction, and increased water scarcity in Ruiru area.



Measures to ensure adequate water supplies for Northlands have been established in the master planning. Further, water conservation measures will be instituted in the construction and operation phase environmental management plans for the various proposed projects to ensure conservation of water resources.

Effluent from the proposed developments in the NMP has potential to cause ground/surface water pollution, and health hazards to human and aquatic life. Management of construction wastewater, spill control mechanisms, and treatment of effluent will be required to ensure protection of water resources.

7.4 Energy Resources

The proposed development will result in a higher demand on energy resources both during construction and operation phases of the development. The forms of energy to be utilized include grid energy and fossil fuel. Construction activities will mostly require fossil fuel in the running of construction vehicles, and generators.

Some grid energy will also be required during construction but will be more so required for lighting and powering of machinery/equipment in residential, commercial and industrial establishments in the operation phase.

The development site is well served with power supply infrastructure such as 11kv, 66kv, 132kv and 220kv transmission lines. In addition, the Government of Kenya (GoK) has the intent to increase energy production from the current 1,800MW to 23,000MW by 2030 in order to provide the energy required to accelerate growth of the economy and meet the industrial and domestic energy demand.

It is however imperative for Northlands to institute energy conservation measures in proposed developments while at the same time taking advantage of the renewable energy opportunities that the site and proposed developments provide. These include the harnessing of solar energy, and generation of energy from waste.

7.5 Soils and Geology

Northlands is mainly underlain by black cotton soils which due to their expansion properties, are unsuitable for establishment of foundations. There is therefore need for excavation and removal of the soil till a hard/stable bed is reached.

Geotechnical investigations have established that the depth of the black cotton soil in Northlands is between 0 – 1.5m after which soft grey, brown or yellowish brown volcanic tuff is encountered.

Development will therefore affect the soil and geology of the site in ways such as depletion of the local soil resource from excavation and carting away of spoil material, and soil degradation from compaction and soil sealing leading to increased surface runoff and soil erosion.

Spillage of hazardous construction chemicals (such as oils, fuel, grease, paints, solvents, curing compounds, adhesives, acids, soil stabilizers and binders etc) may also lead to soil contamination while importation of soil in landscaping and fill activities may lead to introduction of invasive species / noxious weeds and pathogens such as bacteria, fungi and nematodes.

It is considered that these impacts can be mitigated and shall be adequately addressed in construction/operation phase Environmental Management Plans.



7.6 Biodiversity and nature conservation

The proposed site and the surroundings, due to the existing vegetation cover and water bodies, forms good habitats and forage grounds for birds, mammals and herpetofauna, besides Gicheha Farm's livestock.

An ecological study of Northlands revealed that there were over 56 herbaceous species the most common being grasses such as *Hyparrhenia hirta*, *Themeda triandra*, *Chloris gayana*, *Penisetum mesianum*, *Setaria sphacelata*, and *Sporobolus pyramidalis*. The dominant woody species were *Acacia drepanolobium* and *Combretum molle*. Other common species include *Acacia Senegal* and *Acacia mellifera*.

In addition, a total of 45 avian families, comprising 140 species were recorded in the study area represented by various feeding guild of carnivores, granivores, insectivores, nectarivores and omnivores. Mammalian species were observed to be poorly distributed with most species being found within the agricultural. The mammals were dominated by Thompson's gazelle with a few individuals of bushbuck, common duiker and baboons.

Development of Northlands has potential to cause adverse impacts on the endangered grey crowned crane which may become locally extinct once the areas are fully developed. However, with retention of their preferred areas such as riverine swamps/marshy areas, these impacts can be mitigated.

Migratory avian species were also found to utilize the expansive rangelands and are likely to be affected by changes in land use. Other passerines will also lose their habitats with land use changes.

There were no critical woody and herbaceous species of conservation interest observed. However, with removal of the vegetation, the associated avian and mammalian habitats/species are likely to disappear.

Hippopotamus and crocodiles are the main riverine dwellers with habitats that are at risk due to planned development. Loss of their habitat is likely to impact on their numbers and survival.

Other mammals found in Northlands can be trans-located from the proposed development areas to the agricultural/wildlife conservation area.

Before development of each area, specific environmental impact assessments will be required to identify potential impacts such as species losses and conservation measures.

A wildlife management plan will also be developed in collaboration with the Kenya Wildlife Service (KWS) to determine the carrying capacity of the conservation area, translocations and/or introduction of any new wildlife species.

7.7 Air quality

The local air quality will be impacted both during the construction and operation phases of the development. This will mostly be from dust emitted during excavation/earthworks and aggregate transportation to construction sites, and from construction vehicles and machinery emitting oxides of carbon, nitrogen, and sulphur into the atmosphere during the construction phase.

Upon completion of the development, the most likely sources of air pollution include emissions from standby generators, motor vehicles and kitchen fires. Other potential sources would be from incineration on site, and odours from sewer treatment plants/waste transfer sites.

With adequate measures in the construction/operation phase environmental management plans, these impacts can be mitigated.

7.8 Noise and vibrations

Construction works will most likely result in noise generation as a result of the machines in use e.g. excavation equipment, mixers and construction vehicles delivering materials to active construction sites. The noise is expected to last for the entire construction period and is likely to affect the neighbouring residents and institutions. Off-site noise will also be experienced near and along the access roads to the construction materials sources.

It is expected however that there will be a permanent increase in ambient noise levels with the completion and occupation of the developments. The ambient noise elevations will arise from the mundane activities in an urban developed area

With proper planning of the various land uses to locate the more noisy activities (such as industrial and commercial uses) near main roads or peripheral areas, and the residential/recreational/educational uses inwards in the more serene areas, noise impacts can be mitigated. Establishment of buffer zones between different land uses will attenuate noise, further reducing the potential impacts.

7.9 Health and safety

During construction, safety hazards are likely to increase resulting in a possible increase in accidents involving workers and/or the general public. The construction works will expose workers to occupational health and safety risks and injuries resulting from accidental falls, or use of hand tools and construction equipment.

Safety hazards are also posed to the public especially pedestrians and motorists passing near construction sites while the lack of provision of adequate sanitary facilities can lead to health hazards affecting both workers and the surrounding community.

When the development is complete (or various phases/projects are complete) and in operation, potential health and safety hazards may arise in the event of a lack of adequate facilities, protection measures, worker-protection measures, and general laxity in adherence to best practices and OSHA, 2007 regulations.

Adequate health and safety plans will therefore be implemented during construction/operation to mitigate all foreseeable health and safety risks in the development.

7.10 Waste

Wastes will be generated both during construction phases of proposed projects and during the operation phases of these projects.

During construction, spoil materials (soil, rocks, vegetation) packaging materials (e.g. paper, polythene, plastic and metallic packaging), reject materials (including damaged bricks, concrete and mortar, plastics), waste water, used oil among others will be generated.

Adequate waste management measures are required as dumping/careless disposal both on-site and off-site will cause environmental pollution, interfere with aesthetics and lead to creation of breeding grounds for vermin.

The households, commercial and industrial developments are also likely to generate significant amounts of effluent and organic/inorganic wastes. These wastes require proper handling and disposal to avoid environmental pollution.

Inadequate management of solid and sewerage waste from the development projects will lead to pollution and creation of human health hazards endangering the residents and the public. Proper effluent management plans including treatment and discharge into the existing trunk sewer systems and recycling of waste water will be required to mitigate the potential adverse impacts of the generated effluent.

An integrated solid waste management strategy that includes reduction at source, reuse, recycling, incineration and disposal in designated landfill site(s) will also be required for management of solid waste from the developments. Opportunities for generation of energy from solid waste and/or effluent will also be explored.

7.11 Indirect, Cumulative and Synergistic Impacts

Cumulative effects can be defined as the net result of environmental impact from a number of projects and activities. With reference to development plans, cumulative effects can occur from the combined impacts of policies and proposals on specific areas or sensitive receptors. Cumulative effects can occur from combined impacts of a plan with impacts of another plan, affecting the same receptor; Interaction of policies within a plan on the same receptor; or Interaction of impacts from proposals within a plan affecting the same receptor (Cooper, 2004).

Cumulative effects occur when there is: Spatial crowding or temporal overlap between plans, proposals and actions; repeated removal or addition of resources due to proposals and actions; or repeated alteration of the landscape in the plan area.

The following questions were used to help determine whether significant cumulative effects could result from the implementation of the Northlands Masterplan

- Are the potential effects from the plan together with the impacts from other plans likely to be significant?
- Are the potential effects from the plan or proposals within it likely to be cumulative?
- Are there valued environmental resources in the wider plan area likely to be affected by the plan's proposals?
- What is the sensitivity or capacity of these valued environmental resources? What is its state in relation to environmental quality standards or thresholds? Would additional impacts result in limits to be breached?
- How long and frequent are the potential impacts?

Studies established that the Northlands Masterplan has potential to have significant impacts on valued environmental resources in the surroundings. The potential impacts were cumulative either being additive, synergistic or neutralizing, and partly indirect.

The Valued environmental resources identified in Northlands included:

- Rivers: The permanent rivers Kamiti, Gatharaini, Kiu and Nairobi Rivers that either traverse the site or flow along the plot boundaries
- Wetlands: The wetlands that include dams, riparian zones, flood plains and seasonally waterlogged areas



- Ground water resources: The ground water resources in the area
- Wildlife: The *Acacia drepanolobium* – *Themeda triandra* grassland, the resident wildlife that includes Thompson’s gazelles, bush bucks, common duiker and baboons, and avifauna
- Serenity: being historically undeveloped/undisturbed and in the natural state, and having a very low population density, the area has been free from anthropogenic activities that cause pollution

The status of these Valued Environmental Resources and historical context has been described in Sections 4.2 and 4.3 of this Report. These were considered to be the resources most at risk from cumulative change. The table below summarizes the cumulative effects issues in Northlands and the surroundings, their causes and proposed mitigation measures. However, effective control of cumulative effects requires regional or area-wide planning and inter-agency cooperation with such entities as Kiambu County Government, The National Environment Management Authority, Water Resource Management Authority, Kenya National Highways Authority, Kenya Wildlife Service, among others.

Cumulative effects issues	Causes	Mitigation
<ul style="list-style-type: none"> • Increase in traffic and congestion 	<ul style="list-style-type: none"> • Increase in residents: both motorists and pedestrians • Increase in commerce and trade activities thus attracting and commuters and other population 	<ul style="list-style-type: none"> • Promote use of public transport • Provide cycle lanes and pedestrian pathways
<ul style="list-style-type: none"> • Changes in ambient air quality/ Increase in air pollution 	<ul style="list-style-type: none"> • Increased vehicular exhaust emissions • industrial releases of nitrogen oxides (from boilers, gensets etc) 	<ul style="list-style-type: none"> • Maintenance and enhancement of green zones to sequester carbon from emissions • Develop an air quality policy that binds industrial developments to pollution control and adherence to air quality regulations
<ul style="list-style-type: none"> • Increase in ambient noise levels 	<ul style="list-style-type: none"> • incremental noise from several separate developments 	<ul style="list-style-type: none"> • Adherence to noise ordinances • Employment of noise attenuation mechanisms for point sources
<ul style="list-style-type: none"> • Increase in flood risk • Changes in water quality in surrounding rivers from increased surface water runoff 	<ul style="list-style-type: none"> • increase in water run-off from built up areas within Northlands • Increase in runoff from built up areas in Ruiru region 	<ul style="list-style-type: none"> • Adopt storm water management practices that not only focus on flood control but also on water quality, volume reduction and ground water recharge within Northlands. • Safeguarding of green corridors along the waterways emanating from the Kiambu Hills
<ul style="list-style-type: none"> • Reduction in ground water resources • Changes in water table from ground water abstraction 	<ul style="list-style-type: none"> • Increased water demand from residential, commercial and industrial developments and over abstraction of ground water 	<ul style="list-style-type: none"> • Formulation and adoption of policy to enhance water conservation in designs of developments in Northlands. Policy to include rain water harvesting, conservative consumption, and recycling strategies
<ul style="list-style-type: none"> • Habitat loss and fragmentation • Loss of open space to developments • Landscape transformation and gradual loss of natural grassland and wildlife habitats through discreet developments. 	<ul style="list-style-type: none"> • Use of grasslands for development of infrastructure, residential, commercial and industrial enterprises 	<ul style="list-style-type: none"> • Provision of large expanses of recreation areas with natural or enhanced vegetation cover • Ecological surveys to establish critical species requiring conservation/preservation • Creation of a conservation area/habitat that supports wildlife to ensure no net loss of species

		<ul style="list-style-type: none"> • Concentration of developments at nodal points to allow for larger open spaces
<ul style="list-style-type: none"> • Increase in waste production and • Environmental pollution 	<ul style="list-style-type: none"> • increase in industrial, commercial and residential activities 	<ul style="list-style-type: none"> • Partner with the local authorities and community in adoption of effective waste management strategies
<ul style="list-style-type: none"> • Increased demand for utilities (electricity), and services (schools, health and recreational facilities) • Strain on local infrastructure requiring frequent expansion 	<ul style="list-style-type: none"> • growth in resident and non-resident population 	<ul style="list-style-type: none"> • Phasing of the development so that infrastructure and services grow in line with the needs of new communities
<ul style="list-style-type: none"> • Positive impacts on environmental quality- improved infrastructural services, enhanced public spaces and recreational areas and visual quality 	<ul style="list-style-type: none"> • Balanced land use plan, provision of infrastructural services, focus on environmental conservation 	
<ul style="list-style-type: none"> • Long term decongestion of the Nairobi Central Business District 	<ul style="list-style-type: none"> • The Transit-Oriented Development Model of comprehensive/mixed use development will draw activity away from the congested Nairobi CBD 	
<ul style="list-style-type: none"> • Induced commercial and residential developments as a result of plan implementation • Growth of Kiambu’s economy from trade and commerce, and agricultural production 	<ul style="list-style-type: none"> • Increased business opportunities, higher population and ready market for agricultural products 	

8 Alternative Plan Options Considered

8.1 Introduction

The identification of alternative options was mostly undertaken on the basis of the following considerations:

- Exploration of various land use options and infrastructure options;
- Enhancing the level of integration in the Northlands Master Plan of obligatory PPP environmental issues. This is necessary in order to ensure that the Master Plan is properly aligned to the overall goals, principles and plans for environmental sustainability in Kenya; and
- Elimination, downscaling or modification of any Master Plan activities with a potential for adverse environmental impacts

8.2 Land use options

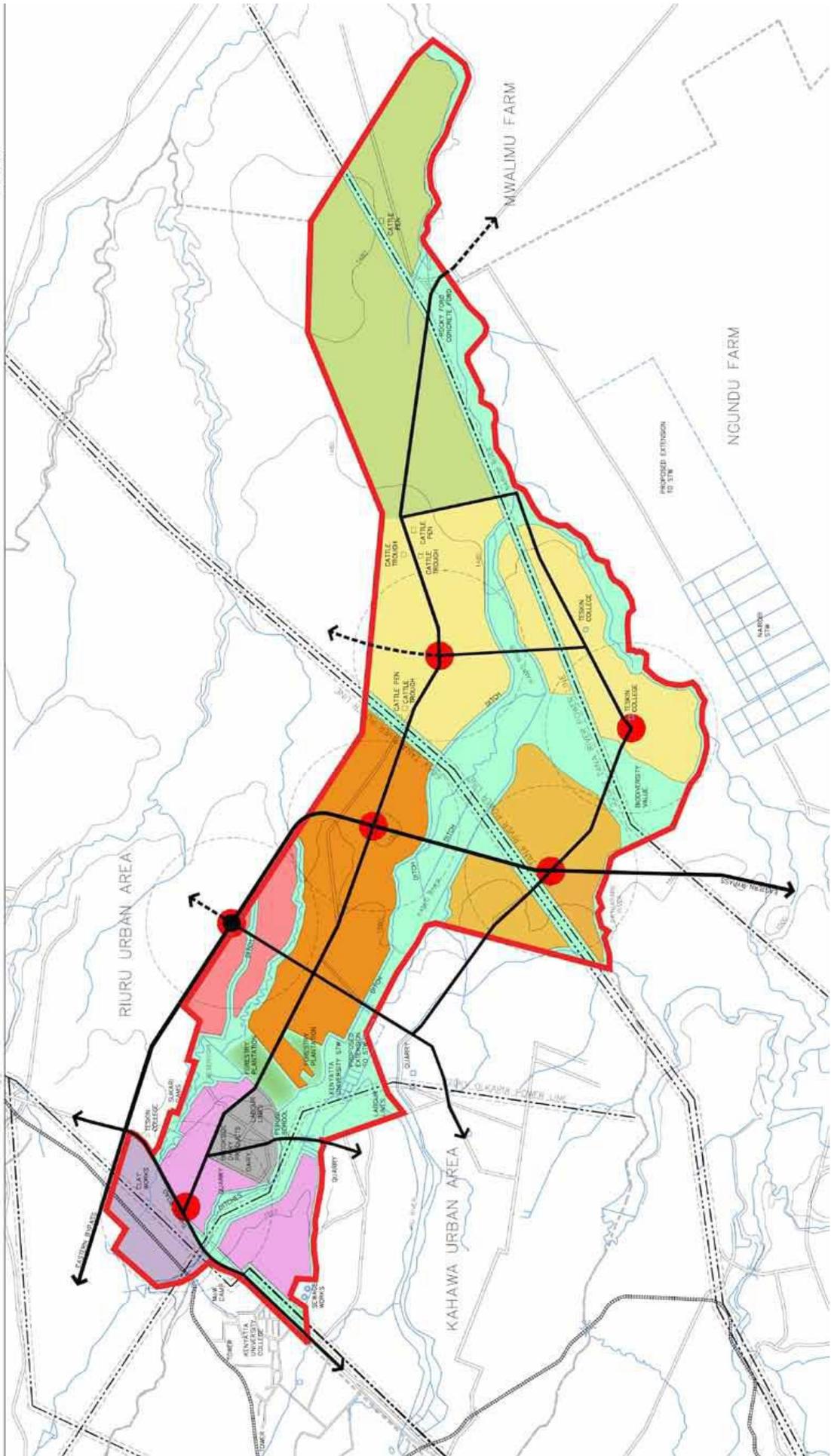
Four options have been developed to test the capacity of the site and to help establish the optimum mix of land uses.

Option 1: Focuses employment and commercial uses on the western boundary of the site served from the Thika Road and a new junction on the Eastern Bypass. The central part of the site contains four new residential district each with its own center within 15 minutes' walk. The eastern part of the site is allocated for tourism and leisure.

Land Use	Developable Area (ha)
High Density Residential	596.2
Medium Density Residential	384.7
Low Density Residential	887.6
Sub Total	
Employment	260.4
Mixed use commercial	149
Existing Industrial area	163.8
Tourism	879.1
Airfield	0
Green space & river corridors	1,538.2
Existing Plantations	69.5
Existing Developments	87
Total	5,015.5

Northlands Concept Masterplan
Option 1 scale 1:50,000@A3

-  Site Area
 5,015.5ha
-  Existing Developments
 87.0ha
-  Proposed Junction with Eastern Bypass
-  District/Commercial Centre with 1200m Catchment
-  Employment
 260.4ha
-  Mixed Use Commercial
 149.0ha
-  Existing Industrial Area
 163.8ha
-  High Density Residential
 596.2ha
-  Medium Density Residential
 384.7ha
-  Low Density Residential
 887.6ha
-  Tourism and Leisure
 879.1ha
-  Green Space, Power Line and River Corridors
 1538.2ha
-  Existing Plantations
 69.5ha



Option 2: Focuses mixed use and commercial uses at the center of the site either side of a new junction on the Eastern Bypass. Four residential districts surround this center. The eastern part of the site is allocated for tourism and leisure together with an airfield for tourist flights and executive jets.

Land Use	Developable Area (ha)
High Density Residential	240.4
Medium Density Residential	533.7
Low Density Residential	887.6
Sub Total	
Employment	260.4
Mixed use commercial	320.2
Existing Industrial area	163.8
Tourism	698.3
Airfield	180.8
Green space & river corridors	1,573.8
Existing Plantations	69.5
Existing Developments	87
Total	5,015.5

Option 3: Has the same centrally located commercial center as Option 2 but introduces a second junction on the Eastern Bypass to provide the catalyst for a major employment area which will form the southern gateway to the development. In contrast to the two previous options the majority of the eastern part of the site is allocated for low density housing.

Land Use	Developable Area (ha)
High Density Residential	276
Medium Density Residential	649
Low Density Residential	1,035.4
<i>Sub Total</i>	
Employment	520.4
Mixed use commercial	444.9
Existing Industrial area	163.8
Tourism	231.3
Airfield	0
Green space & river corridors	1,538.2
Existing Plantations	69.5
Existing Developments	87
<i>Total</i>	<i>5,015.5</i>

Option 4: This Option has some similarities with Option 1 but focuses on residential and industrial uses on the southern parts of the site. The option also allocates a larger area to wildlife conservation and agriculture (ranching) to the east of the Bypass.

Land Use	Developable Area (ha)
High Density Residential	79.02
Medium Density Residential	52.83
Low Density Residential	1,268.92
<i>Sub Total</i>	
Commercial	205.88
Industrial area	405.26
Agricultural (wildlife conservation and ranching)	2000.51
Recreational Parks	579.46
Water Features	107.52
Education Facilities	38.89
Health facility	4.05
Internal Roads	90.35
<i>Total</i>	4,832.69

Option 4 has been selected as the most suitable as it integrates well with existing land uses such as Peponi School, Brookside Dairies, ranching, and the green areas.

8.3 Infrastructure Options

8.3.1 Water supply

8.3.1.1 Potential water supply sources

The identification of potential water supply sources for Northlands was based on previous studies of water resources in the wider Nairobi area. The identified water sources which were investigated are listed as follows:

- Nairobi Water Supply system (from NWSC)
- Ruiru Water Supply System (From RUJWASCO)
- Dam on Kamiti River - at the confluence with Ithuru
- Weir Intake on Ruiru River – at 1,580masl
- Weir Intake on Kamiti River – At the confluence with Kiu River
- Well field - located west of Nairobi Falls
- Dam on Thiririka River – at the confluence with Ruiru River

8.3.1.1.1 Nairobi Water Supply System

A DN 300 pipeline terminates at the gate of Kenyatta University. Its capacity has not been ascertained yet, but is capable of supplying all of Area 1 by gravity. Currently, Athi Water is updating the Water Sourcedworks Master plan in its area of jurisdiction. However, the development program of the Master plan may not suit Northlands Development Program. Therefore, in the initial development stages, Northlands will have to find alternative water source.

Water supply from Nairobi water system is the most cost effective as it will involve payment for the bulk water supply without the need for development and maintenance of source works, treatment works pumping stations and water transmission systems. Development of this source will involve construction of a one day - storage reservoir and a short transmission pipeline to connect to Northland system

The advantages and disadvantages of this source are in comparison with the other source works are as listed below:

Advantages	Disadvantages
<ul style="list-style-type: none"> • No cost of development of source works • No O&M cost for source works treatment and transmission; • Connection at the Optimum connection point • Gravity water supply system, • Good quality water requiring no further treatment 	<ul style="list-style-type: none"> • No ownership or control; • Efficiency of supply by others • Can serve only a small portion of Northland currently.

8.3.1.1.2 Ruiru Water Supply System

The ongoing development of at Ruiru will increase the water supply capacity to 10,000m³/d, which is not adequate for the current (Year 2010) demand. From previous studies on possible water sources for Nairobi, a dam at the confluence of Ruiru and Bathi Rivers was identified, which if fully developed could enhance water production from Ruiru River to about 50,000m³/d. A dedicated pipeline to supply clean water to Northland with a bulk meter at the upstream end can be provided by Ruiru and Juja Water and Sewerage Company.

However, the development program for this dam may not suit Northlands Development Program. Therefore, unless TWSB are requested to prioritize development of this dam, then it will not qualify as a water source for Northlands. Development of this source would involve construction of the following components:

- A 10km of treated water transmission pipeline dedicated to Northlands;
- One day storage reservoir; and
- A short transmission pipeline to connect to Northland system

The advantages and disadvantages of this source are in comparison with the other source works are as listed below:

Advantages	Disadvantages
<ul style="list-style-type: none"> • No cost of development of source works • No O&M cost for source works treatment; • Connection at the Optimum Connection Point • Gravity water supply system, • Good quality water requiring no further treatment 	<ul style="list-style-type: none"> • No full ownership and control of source works; • Efficiency of supply determined by others

8.3.1.1.3 Dam on Kamiti River

This dam site is located in the coffee zone, downstream of the confluence with Ithuru River about 1,560masl. It will be possible to supply water to Northlands by gravity. Development of this source will involve land acquisition and construction of the following components:

- Dam across Kamiti River;
- Short Raw water Pipeline;
- Treatment works;
- One day treated water storage tank; and
- Treated water transmission pipeline, approximately 9.5km long

The advantages and disadvantages of this source are in comparison with the other source works are as listed below:

Advantages	Disadvantages
<ul style="list-style-type: none"> • Ownership and control, • Gravity water supply system, • Relatively good raw water quality, • Relatively low O&M costs 	<ul style="list-style-type: none"> • Land acquisition, • Dam construction, • Treatment Works, • 9.5km transmission pipeline, • High initial capital costs. • O&M expenses on offsite works

8.3.1.1.4 Intake Weir on Kamiti River

This intake site is located within Northlands project area, upstream of the confluence with Nairobi River about 1,480masl. It will not be possible to supply water by gravity and pumping of raw and treated water will be required. Development of this source will not require acquisition of land and will involve construction of the following components:-

- Concrete weir across Kamiti River;
- Short Raw water Pipeline;
- Treatment works;
- One day treated water storage tank;
- Raw and Treated water pumping station;

- Treated water pumping main, approximately 6km long

The advantages and disadvantages of this source are in comparison with the other similar source works are as listed below:

Advantages	Disadvantages
<ul style="list-style-type: none"> • Ownership and control; • No land acquisition required; 	<ul style="list-style-type: none"> • Relatively poor water quality; • High O&M cost due to pumping; • High initial capital cost; • Treatment Works; • Low reliability of supply (the river dried up completely in 2009) • 7.5km pumping Main.

8.3.1.1.5 Intake on Ruiru River

This intake site is located in the coffee zone, downstream of the confluence with Komothai River about 1580masl. It will be possible to supply water to Northlands by gravity from this intake. Development of this source will involve land acquisition and construction of the following components:-

- Concrete weir across Ruiru River;
- Short Raw water Pipeline;
- Treatment works;
- One day treated water storage tank; and
- Treated water transmission pipeline, approximately 7.0km long

The advantages and disadvantages of this source are in comparison with the other source works are as listed below:

Advantages	Disadvantages
<ul style="list-style-type: none"> • Ownership and control, • Gravity water supply system, • Relatively good raw water quality, • Relatively low O&M costs 	<ul style="list-style-type: none"> • Land acquisition; • 9.5km transmission pipeline; • Other major water users upstream; • High initial capital costs; • O&M expenses on offsite works

8.3.1.1.6 Dam on Thiririka River

This intake site is located east of Northlands downstream of the confluence with Ruiru River at about 1460masl. It will require pumping of treated water to supply Northlands from this intake site. Development will involve land acquisition of land and construction of the following components:

- Dam on Thiririka River;
- Short Raw water Pipeline;
- Treatment works;
- One day treated water storage tank;
- Treated water transmission pipeline, approximately 17.0km long
- Treated water pumping station

The advantages and disadvantages of this source are in comparison with the other source works are as listed below:

Advantages	Disadvantages
<ul style="list-style-type: none"> • Ownership and control; • Gravity water supply system, • Abundant quantity of raw water • Most of the treated water transmission pipeline is in Northlands 	<ul style="list-style-type: none"> • Land acquisition involving many land owners; • 17.0km transmission pipeline; • High initial capital costs; • Poor quality of raw water • O&M expenses on offsite works, • Demand for water by the surrounding communities.

8.3.1.1.7 Well-field West of Nairobi Falls

The well field as identified in past hydrogeological reports covering Northland site is located in the project area along Nairobi River, about 1460masl. It will involve development of the well field and requires pumping of treated water to supply Northlands. Development will involve construction of the following components:

- Well field;
- Raw water collection network;
- Treatment works;
- One day treated water storage tank;
- Treated water pumping station;
- Treated water transmission pipeline approximately 7.0km long

The advantages and disadvantages of this source in comparison with the other sources are as listed below:

Advantages	Disadvantages
<ul style="list-style-type: none"> • No land acquisition required; • Ownership and control; • Relatively good quality of raw water; • Can be developed in Phases. 	<ul style="list-style-type: none"> • Development of well field; • Low yield per borehole about 20m³/h max; • Receding water level in boreholes in the area; • High initial capital costs; • Pumping of raw and treated water; • High O&M expenses on offsite works.

8.3.1.1.8 – Waster water reuse

At the moment waste water from the Brookside Dairy Factory in Northlands is processed through a series of oxidation ponds and artificial wetlands and then released into a recreational reservoir as shown in Plate X and Plate Y. One of the future options for water supply in the Northlands could involve the re-use of waste water through artificial recharge and recovery strategy (ARS). This will involve the pumping of semi treated wastewater into the local groundwater aquifer through recharge boreholes and then recovering the same after additional natural treatment using normal groundwater abstraction boreholes. This option has been used in other water stressed environments in the world.

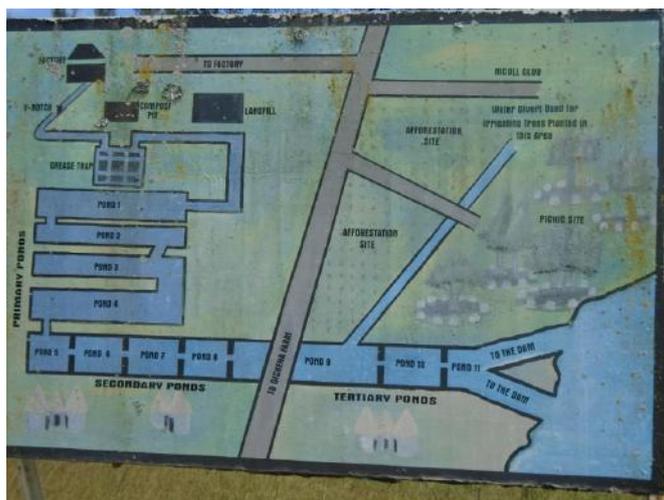


Plate X – The current waste water treatment plant at the Northlands



Plate Y – Waste water treatment ponds in the Northlands

8.3.2 Power supply

The power demand for the site will be increasing based on the additional load demand per phase. As the load is substantial for the various phases, substations will be erected to ensure that the demands are met for each particular phase. The possible sources of power are;

- Hydro energy
- Geothermal
- Wind
- Thermal
- Solar

8.3.2.1 Hydro energy

Hydro power is the main supply to the national grid. The hydro power is sourced from the Tana River development, Sondu Miriu and Turkwel hydro stations. These are transmitted to Dandora substation where it is distributed to the rest of the country.

The Nairobi river waterfall on the site could be harnessed to generate further hydro power to serve the specific needs of the site or be fed to the national grid. KenGen would be responsible for licensing the project. This

could be used to serve the needs of the site depending on the total power generated. In case the power generated is more than enough for the site the extra could be sold to KPLC who would take and distribute power to supply other customers.

8.3.2.2 Geothermal energy

Geothermal energy is the second leading power source and is being expanded to meet the demand for more energy as it is a renewable source and not affected by variable weather conditions. The Olkaria power line provides the energy from the geothermal source and passes the site through a 220Kv power line to Dandora for distribution to the rest of the country. The site will benefit from this as KenGen is expanding generation in order to ensure self-reliance in energy for the country. KPLC could tap the power from Dandora substation to supply the site.

8.3.2.3 Wind energy

This is projected to provide about 20% of the energy to the national grid when production is completed in Ngong Hills, Turkana, Isiolo, Lamu, Marsabit and Malindi. This will be fed into the national grid and will therefore be utilized on site. The potential to establish a wind farm on site is likely to be limited due to the relatively low wind speeds and due to urbanization which will affect local wind movements in the future.

8.3.2.4 Thermal energy

Generator energy is also used to add to the national grid to meet power needs. The site will require some standby power depending on the need of the various clients. This option will not be economical on a Masterplan scale as the plant are relatively costly to run and maintain.

8.3.2.5 Solar energy

Solar energy could be utilized in solar water heating for individual properties and premises to cut down on power costs used in the heating of water. Consideration could also be given to solar street lighting and other ambient forms of solar energy.

8.3.3 Effluent Management

The design criteria guidelines to be adopted for Northlands Sewerage design are those widely used in Kenya and recommended by the Ministry of Water and Irrigation Design Manual for Sewerage Services in Kenya, 2009 edition. However, some changes will be made to address the unique nature of the proposed Northlands Plan.

Three sewage treatment works sites exist in the vicinity of the project area as follows:-

- Kenyatta University sewage treatment works site
- Ruiru Sewage Treatment works
- Nairobi Sewage treatment works

These sites have been identified in the sewage Master plans for Nairobi and Ruiru. Kenyatta University and Nairobi Sewage treatment works have been developed while Ruiru sewage treatment works are in advanced stages of design by the Athi Water Services Board. There is potential that the treatment works may be developed within the program for development of the Northlands Plan.

Based on the topography of the site, four sewage drainage zones have been identified as follows:

- Zone 1 – Will collect into the trunk sewers leading to the existing Kenyatta University treatment works which are located within the project area, south of Brookside factory.



- Zone 2 – Sewage from this zone will be collected into the trunk sewer leading to Ruiru 1 sewage treatment works located east of the Northlands site.
- Zone 3 – Sewage from this zone will be collected into the trunk sewers leading to the existing Nairobi Sewage Treatment works located south of the Northlands site.
- Zone 4 – Sewage from this zone will be collected into the trunk sewer leading to the planned Ruiru II Sewage Treatment works located at the extreme eastern tip of the Northlands site (near Juja Farm)

This zoning is intended to eliminate any need for pumping and therefore all sewage will be collected and transmitted to the treatment works by gravity, thus minimizing operations and maintenance costs.

8.4 Solid waste management

Figure 13 shows the estimate waste production levels for the City of Nairobi whereby the NMP area is within the zone of 1123 -2351 tones. Some of the solid waste is disposed in the Dandora dumpsite while some is disposed in the Murera dumpsite which might not cope with increased solid waste production.

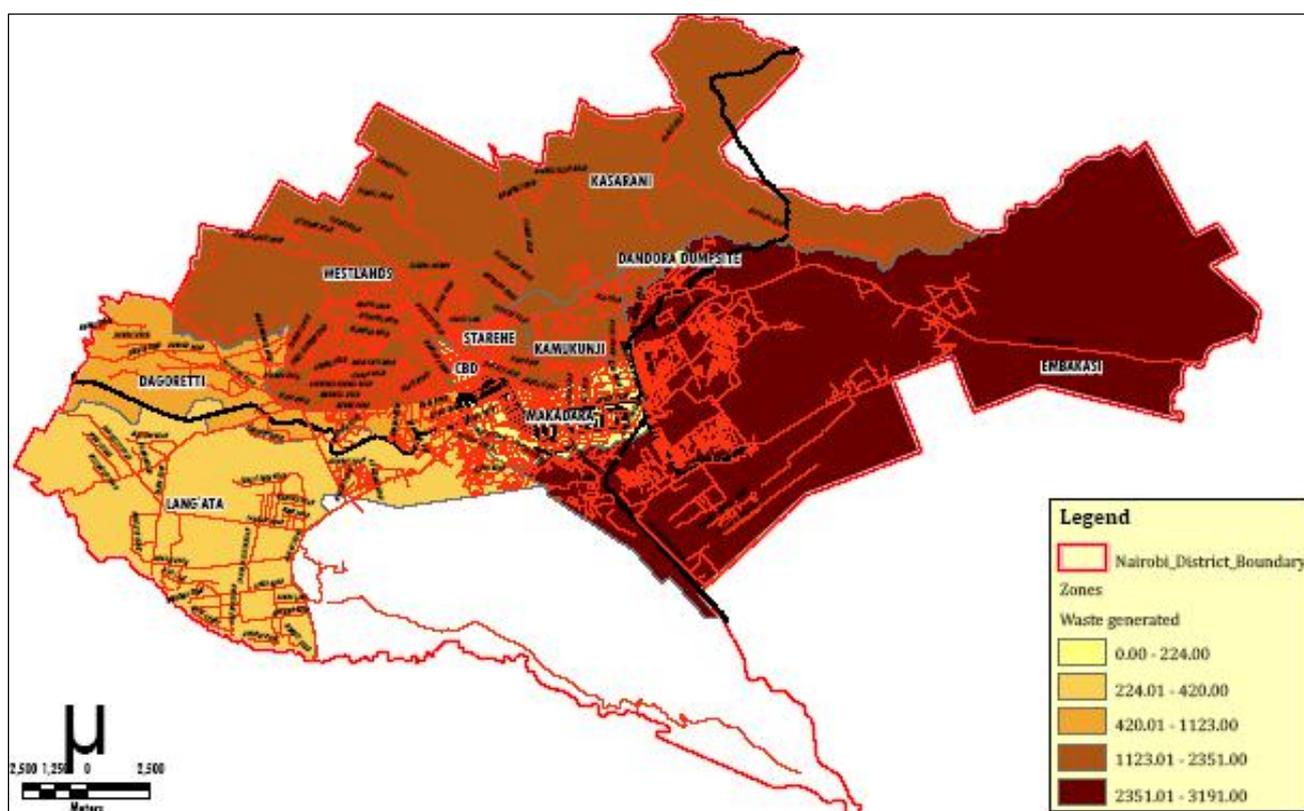


Figure 14: Solid waste production in Nairobi.

NEMA has developed a National Solid Waste Management Strategy to guide sustainable solid waste management in Kenya in order to ensure a healthy, safe and secure environment for all. The Strategy is a deliberate and visionary commitment for the country in the management of solid waste. The main guiding principle on the National Waste Management Strategy is the Zero Waste Principle whereby waste is viewed as a resource that can be harnessed to create wealth, employment and reduce pollution of the environment. The National Strategy invites the participation of governmental, civil society, private sector and the public as actors in the successful implementation of the strategy.

The NMP acknowledges that waste composition data is important in developing an effective integrated solid waste management strategy. Analysis of the waste offers important vistas to the form, quantity and quality of



different components of the solid waste stream and provides important leads for selecting appropriate technologies for their handling, processing and treatment. The NMP however relies on waste characterization studies done for Nairobi and other major towns to identify the major components of municipal solid waste. Similar patterns of waste composition are expected from developments in Northlands albeit on a micro scale.

It is also acknowledged that the Kiambu County, and indeed all the 47 Counties face major challenges in solid waste management. Over the years, most local authorities did not prioritize the establishment of proper waste management systems and hence the County Governments have inherited this state of affairs. (NEMA, 2015). The growing population, household incomes and the Kenyan economy against poorly developed mechanisms for collection, transportation and disposal of solid waste has compounded the problem.

The proposed SWM strategy for NMP is in line with the National Solid Waste Management Strategy and proposes to employ a multi-pronged approach that revolves round the '4R' participatory principle of Reduce, Reuse, Recycle and Reject. The strategy will employ four main elements. They are:

- Engagement of an affordable mix of appropriate technical options to Reduce, Reuse, Recycle and Reject;
- Involvement of all stakeholders in the implementation;
- Strengthening institutional SWM capacity of the Northlands management entity; and
- Enforcement of laws and policies;

8.4.1 Engaging an affordable mix of appropriate technical options to Reduce, Reuse, Recycle and Reject

The strategy is based on the broadly accepted hierarchy of waste management which gives a priority listing or the waste management options available. The hierarchy gives important general guidelines on relative desirability of different management options. The Northlands management entity will emphasize the use of an affordable mix of appropriate technical options and thus will cease to depend solely on the conventional collection and disposal method. The proposed mix of options is:

- Creation of an environment friendly, eco-sensitive plan area;
- Promotion of waste reduction at the source of generation;
- Separation of waste at source of generation;
- Return of recyclable material to the market;
- Composting and home-gardening;
- Research in to anaerobic digestion;
- Exploration of waste to energy opportunities from incineration of combustible waste in Northlands;
- Scientific handling of clinical and hazardous waste;
- Door to door collection of household waste;
- Set up polluter pay system for special waste such as hazardous waste etc.
- Sanitary landfill as the last resort.

Northlands aims to collect 100% of all solid waste generated within the development either directly or through an intermediary. To ensure this, all residents, offices, industrial and commercial properties will have a solid waste management fee incorporated in their sale or lease agreement. This is in recognition that a waste collection levy is necessary for a sustainable waste management plan. The waste management levy will be applied in two categories; a levy where premises have fully separated their solid waste at source, and a levy where premises have in any way or form failed to conduct such full separation.

Solid waste that is not separated at source will be separated by Northlands at a transfer station designed for that purpose and from where each separated waste group will be transported to appropriate sites for further processing.



It is anticipated that 51% of solid waste will be organic. This waste will be separated from other waste and mixed with animal organic waste at Gicheha farm to create biodynamic fertilizer. In a future scenario, the organic waste will be put in bio-digesters to create energy for Northlands.

Recyclable waste such as paper, plastic, glass and metals are expected to form 38% of total waste generated. Glass and metals will be separated and sold to operators who recycle those materials. Paper and plastics will be separated and sold to operators or in a future scenario incinerated to generate energy for Northlands.

Residual waste is expected to form 11% of total waste generation and part of this will be Hazardous waste. Northlands will work jointly with Kiambu and Nairobi County Governments to manage these wastes.

8.4.2 Engaging stakeholders in the implementation

The strategy is built on the premise that solid waste management requires the participation of every single resident and user of Northlands' facilities. The Northlands management entity will use the following approaches to mobilize their cooperation and support.

- Creation of institutional mechanisms such as a waste management committee and regular consultations to involve the residents individually and collectively;
- Conduct of education programmes on waste management;
- Encouraging the educational institutions within the Plan area to form School Environment Committees and get involved in social mobilization;
- Publication of waste collection schedules; and
- Recognition and facilitation of the private informal sector especially in reuse and recycling

8.4.3 Strengthening Solid Waste Management/Environmental Planning and Management Institutional Capacity of the management entity

The management entity will pursue the following to improve its institutional capacity to address EPM and SWM issues

- Adopt a comprehensive environmental management approach;
- Non-negotiable emphasis on Waste Reduction;
- Staff mobilization, training and education;
- Strengthening the Environmental Management Committee;
- Formulation and follow up of a Strategy Implementation Plan to operationalize the strategy;
- Improved public relations to enhance management entity – public interaction and cooperation;
- Regular process and progress documentation to enhance administration and decision making;
- Establishment of a Complaints Redress System to collect and address complaints from residents and users of Northlands facilities;
- Improved Management and Monitoring of the implementation of the SWM strategy

8.4.4 Strict enforcement of Laws & Policy

This Strategy aims at helping the management entity implement the National Strategy for Solid Waste Management in a manner that suits the local conditions. It derives power from the National Strategy, the Environmental Management and Coordination Act, 1999, and the Environmental Management and Coordination (waste Management) Regulations 2006 among other sectoral laws and regulations.



- The Environmental Management Committee will sanction studies to assess the existing legal and administrative provisions that govern solid waste management nationally and in Kiambu County and propose appropriate revisions to make the frameworks more resident-friendly, efficient and speedy;
- The Committee will review the available environmental by-laws on SWM and implement them with immediate effect giving wide publicity followed by community level public education;
- An effective punitive action process will be enforced as a deterrent, preceded by a time-bound phase of public education, domestic sensitization and social mobilization to help enforce laws and policy.

8.4.5 Alternative Solid Waste Management Approach

An alternative and sustainable option for the NMP would be for the County Government of Kiambu to establish a sanitary landfill to serve the rapidly urbanizing Ruiru, Juja and Thika. The key advantages of this SWM approach include: Reduction of odor levels; reduction of rodents and birds; prevention of leachate leakage; improvement of waste unloading and reduction of waste; and improvement of waste picking activities. The sanitary landfill approach is in line with the Integrated Urban Development Master Plan for the Nairobi Metropolitan Region (JICA 2014).

9 Environmental and Social Management and Monitoring Plans

9.1 Introduction

The aim of the Environmental and Social Management and Monitoring Plan (ESMP) is to detail the actions required to effectively implement the mitigation measures and alternative options for the environmental obligation gaps identified and recommended in the SEA as highlighted in Section 3 and Section 7.

These actions are necessary in order to:

- Minimize the negative impacts which might originate from the plan implementation and instead enhance the positive impacts of the NMP; and
- Support the long term management and monitoring of the environmental issues during plan implementation.

It is important to note that an ESMP is a living entity which might require regular review as new information such as policies, national strategies and plans are developed throughout the lifespan of the NMP.

9.2 Management and monitoring action

The SEA has prescribed applicable mitigation measures for each of the plan activities with a potential for negative environmental impact and also recommended suitable alternative options to deal with the environmental obligation gaps which were identified in the PPP analysis.

The SEA has recommended simple, straight-forward and tangible management actions which are specific to each of the mitigation measures and alternative options. These can be considered as the direct environmental management prescriptions which will deal with the environmental challenges identified in the NMP.

The various actions should be implemented to ensure that the environmental weaknesses are addressed for the good of the locality. Because of the complexity of cumulative effects problems at a strategic level, there will be uncertainty about impact predictions. Monitoring is therefore important in order to assess the accuracy of the predictions and to monitor the effectiveness of mitigation measures.

The monitoring frequency and indicators have been recommended for each management action. Regular monitoring using the recommended indicators will indicate the level of progress with regard to ensuring environmental sustainability in Northlands.

9.3 Environmental management and monitoring standards and guidelines

Specific standards and guidelines have been identified for each management action. These were identified mostly from the PPP framework against which the NMP was evaluated in the SEA. This will be used during the environmental management and monitoring of the NMP.

9.4 Roles and responsibilities

It is the responsibility of the Northlands Management to implement the ESMP and to make sure that all the actions are carried out in partnership with stakeholders as outlined in the ESMP. The successful implementation of the ESMP is however dependent on clearly defined roles and responsibilities for each of the management actions given as clearly indicated in the ESMP.



9.5 ESMP schedule

The schedule serves to give the list of environmental action to be undertaken. The ESMP schedule is given in the following tables.

9.5.1 Waste Management

Table 19: ESMP for solid and effluent waste

Potential Adverse Impact:	High generation of solid and effluent waste from residential, commercial and industrial areas			
Objective	Eliminate impact on public health due to the poor waste management on location			
Management strategy	Removal of agents of environmental pollution and proper disposal of wastes			
		Responsibility	Timing	Costs
Recommended Management and Monitoring Action	<ul style="list-style-type: none"> ▪ Adoption of an integrated solid waste management plan that includes reduction, reuse, recycling, incineration, composting and land filling ▪ Pursue waste minimization at source principles e.g. zero generation, reduction, re-use and/or recycling; ▪ segregation of domestic and industrial waste to be done and managed separately ▪ Provide mechanisms to segregate wastes at source to enable recycling ▪ Provision of transfer stations from where waste will be disposed in designated areas ▪ and ensure that all wastes are stored temporarily at the designated transfer stations, and that they are regularly carried away for disposal in designated areas; and ▪ connection to existing trunk sewers in Northlands ▪ pre-treatment of industrial effluent before discharge into sewers 	Northlands Management	During Plan implementation	Cost of waste collection and disposal systems to be determined in the detailed planning for each phase of the development
Performance indicators	Housekeeping, littering, and status of solid waste management in Northlands, functional waste management facilities			
Monitoring requirements	Periodical inspection of waste management operations			
Reporting	Environmental Audits and other Statutory and non-statutory reports			
Interface	Comply with the provisions of the Waste management Regulations on Waste management			

9.5.2 Traffic and Transport

Table 20: ESMP for Traffic and Transport

Potential Adverse Impact:	<ul style="list-style-type: none"> ▪ Increased human and vehicular traffic/ Risk of traffic congestion within Northlands ▪ Increased traffic activity and traffic interruptions along the Thika Super Highway and Eastern Bypass 			
Objective	Ensure the smooth flow of pedestrian and vehicular traffic and minimize risks of accidents			
Management strategy	<ul style="list-style-type: none"> ▪ Provision of adequate facilities and infrastructure, ▪ separation of pedestrian and vehicular traffic; ▪ Continually monitoring traffic incidences, establish their root cause and provide solutions 			
		Responsibility	Timing	Costs
Recommended Management and Monitoring Action	<ul style="list-style-type: none"> ▪ Ensure a good connection between spine roads and the Super Highway, Eastern Bypass and Greater Eastern Bypass ▪ Provision of adequate vehicular circulation space and parking areas ▪ Provision of pedestrian walkways along all roads within the development. ▪ Paving all pedestrian walk ways with robust, durable, and non-slippery materials. ▪ Provision of all necessary street furniture along all roads within the development to accommodate users (including the disabled, elderly, and children) and to enhance security. ▪ Provision of bollards in appropriate areas to prevent vehicles from encroaching into the pedestrian domains. ▪ Provision of street lights to provide sufficient light for both pedestrian areas and carriage ways. ▪ Provision of trees along pedestrian walkways for shading and that require minimum maintenance; preferably indigenous for ecological and cultural advantages. 	Northlands Management	During Plan implementation	<p>Cost of signage and warnings in hazard prone areas and other infrastructure shall be included in the project costs during construction:</p> <p>Additional safety measures/features to be procured at prevailing rates during operations</p>
Performance indicators	<ul style="list-style-type: none"> ▪ Traffic status ▪ Ease of access and circulation 			
Monitoring requirements	Regular monitoring of traffic flow			
Reporting	Incidence logging			
Interface	<ul style="list-style-type: none"> ▪ Nairobi Urban Master Plan ▪ Physical Planning Handbook ▪ Traffic design and management guidelines 			

9.5.3 Water Resources

Table 21: ESMP for Water Resources

Potential Adverse Impact:	<ul style="list-style-type: none"> ▪ High water demand in residential, commercial and industrial areas and from irrigation of recreational areas ▪ High water abstraction from Kiu, Kamiti and Gatharaini Rivers ▪ Pollution of Kamiti River, Kiu River, Gatharaini River and Nairobi River ▪ Decline in groundwater levels 			
Objective	Minimize impact on available water resources and ensure their conservation			
Management strategy	Conservation of water resources through sustainable utilization			
		Responsibility	Timing	Costs
Recommended Management and Monitoring Action	<ul style="list-style-type: none"> ▪ Rain water harvesting ▪ Conservative water use in low volume fixtures in buildings ▪ Use of recycled and harvested storm water in cleaning and irrigation ▪ Incorporate water accounting systems and metering for all areas ▪ Continually seek new avenues for water conservation as international best practices evolve ▪ Limited abstraction of river water and instead use of alternative sources of water such as roof catchment rain water harvesting and harvesting of flood waters ▪ Undertake EIA for all development activities along the rivers ▪ Pre-treatment of all effluent before discharge into rivers ▪ Undertake a hydrogeological study in collaboration with WRMA to determine the sustainable ground water abstraction levels 	Northlands Management	During Plan implementation	<p>Cost of water efficient fixtures and appliances will be part of project costs</p> <p>Cost of water monitoring including viable conservation measures to be determined and procured at prevailing rates during operations</p>
Performance indicators	<ul style="list-style-type: none"> ▪ Water use levels ▪ Borehole yields 			
Monitoring requirements	A water use monitoring and evaluation schedule			
Reporting	Logs of inspections			
Interface	The Water Act, Water Resource Management Rules 2007			

9.5.4 Energy Resources

Table 22: ESMP for Energy Resources

Potential Adverse Impact:	<ul style="list-style-type: none"> High water demand in residential, commercial and industrial areas 			
Objective	Minimize impact on available energy resources and ensure their conservation			
Management strategy	Conservation of energy resources through lowering of consumption levels			
		Responsibility	Timing	Costs
Recommended Management and Monitoring Action	<ul style="list-style-type: none"> Institution of awareness programmes to conserve energy; Energy conservation through installation/use of energy efficient appliances/fittings; Adoption of green energy sources e.g. solar energy, waste to energy projects etc Use of green building designs that allow for passive heating and cooling, and maximum utilization of natural light in buildings Continually seek avenues for energy conservation as international best practices evolve 	Northlands Management	During Plan implementation	<p>Cost of energy efficient fixtures and appliances will be part of project costs</p> <p>Cost of energy monitoring including viable conservation measures to be determined and procured at prevailing rates during operations</p>
Performance indicators	Energy use levels against benchmarks			
Monitoring requirements	Metering, Energy use monitoring and evaluation schedule			
Reporting	Energy Audit reports			
Interface	<ul style="list-style-type: none"> The Energy Act 2006, Subsidiary legislation under the Energy Act International Best Practices 			

9.5.5 Biodiversity and Nature Conservation

Table 23: ESMP for Biodiversity and Nature Conservation

Potential Adverse Impact:	<ul style="list-style-type: none"> ▪ Loss of habitats for the hippos in the area ▪ Modification of riverine vegetation ▪ Modification of river channels ▪ Clearance of the riparian vegetation along Kamiti River and Water pollution in the Kamiti River ▪ Loss of wildlife habitats especially for the Grants Gazelles and Bush bucks ▪ Disturbance of the grey-crowned crane habitat ▪ Wildlife habitat deterioration due to low carrying capacity 			
Objective	Conservation of wildlife and biodiversity on site			
Management strategy	Protection of endangered/threatened/vulnerable species and habitats , enhancement of biodiversity on site			
		Responsibility	Timing	Costs
Recommended Management and Monitoring Action	<ul style="list-style-type: none"> ▪ Protection of the riparian environment and establishment of a riparian reserve management plan ▪ Establishment of a wildlife management plan in collaboration with KWS ▪ EIAs to be undertaken for all development activities along the rivers ▪ Relocation of mammals to the Agricultural and Conservation Zone (Zone 15) through the use of a wildlife management plan ▪ Preservation of the grey crowned crane habitat near the Brookside Milk Processing Plant 	Northlands Management	During Plan implementation	Cost of EIAs and preparation of management plans to be determined at prevailing rates during plan implementation
Performance indicators	<ul style="list-style-type: none"> ▪ Number of hippos; ▪ Size of riparian zone ▪ Numbers of gazelles and Bush Bucks ▪ Number of grey-crowned cranes 			
Monitoring requirements	Periodical ecological surveys and mammal counts			
Reporting	Ecological Survey Report			
Interface	<ul style="list-style-type: none"> ▪ Riparian Reserve Management Plan ▪ Wildlife Management Plan ▪ Wildlife Management and Conservation Act 2013 ▪ The Water Act 2002, ▪ Water Resource Management Regulations 2007, ▪ Wetlands, Riverbanks, Lakeshores and Sea Shores Management Regulations 2009 			

9.5.6 Environmental and Landscape Changes

Table 24: ESMP for Environmental and Landscape Changes

Potential Adverse Impact:	<ul style="list-style-type: none"> ▪ Negative visual impact due to loss of visual amenity from dense urban structures ▪ Long term evolution of urban heat islands ▪ Risk of urban heat island effects ▪ Increased risk of flooding due to increase in storm water generated on site ▪ Poor ambient air quality and increase in background noise levels 			
Objective	Ensuring positive landscape changes and enhancement of environmental quality			
Management strategy	Protection of endangered/threatened/vulnerable species and habitats , enhancement of biodiversity on site			
		Responsibility	Timing	Costs
Recommended Management and Monitoring Action	<ul style="list-style-type: none"> ▪ Ensure adequate tree cover and gardens within developed areas to provide shade and cooling effect ▪ Ensure adequate drainage of the site through drainage works. Plenty of gardens and green areas within developed areas will enable percolation of rainfall and reduce runoff ▪ Ensure plenty of vegetation cover (trees and shrubs) as buffers between land-uses to reduce noise effects ▪ Enforcement of pollution control measures for air pollution sources in Northlands ▪ Tarmacking all major roads to enhance movement in all-weather and to avoid dust generation 	Northlands Management	During Plan implementation	Cost of landscaping to be determined at prevailing rates during plan implementation
Performance indicators	<ul style="list-style-type: none"> ▪ Percentage green spaces vis a vis developed spaces ▪ Size of buffer zones ▪ Background noise and ambient air quality 			
Monitoring requirements	Periodical surveys and measurements			
Reporting	Audit Report			
Interface	Physical Planning Handbook			

9.6 Construction environmental management and monitoring plans

Implementation of specific projects within the Northlands Master Plan will be preceded by project-specific Environmental Impact Assessments. Environmental management and monitoring plans developed in these EIAs shall be in line with the ESMP developed for the NMP. As a minimum, the Construction Environmental Management and Monitoring Plans (CEMMP) to be developed shall address the following issues identified as key in Northlands:

- Physical setting, flora and fauna;
- Noise and vibrations;
- Water resources;
- Energy resources;
- Air quality;
- Traffic Management;
- Waste management; and
- Occupational health and safety.

The contractors who shall be appointed for construction of the various developments shall develop their own EMPs to ensure actions and mitigation necessary to protect the environment are incorporated into all site procedures. At a minimum, a contractor's EMP must address the following:

- Policy
- Planning
- Implementation and Operation

9.6.1 Policy

The contractor will develop an environmental policy that includes, as a minimum, the following:

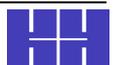
- A commitment to comply with applicable regulations and other requirements that the company subscribes to;
- A commitment to provide a safe work environment;
- A commitment to provide the training and equipment necessary to for employees to conduct their work safely;
- A commitment to continuously improve performance and to pollution prevention;
- A commitment to communicate the policy to all persons working for and on behalf of the company;

9.6.2 Planning

Environmental issues and the legal and other requirements for the development have been identified in the SEA. These shall be further expounded in subsequent EIAs for the various projects within the NMP. The Contractor must demonstrate within his plan that he has read and understood the SEA and EIA Reports and their provisions for environmental management and monitoring.

9.6.3 Implementation and Operation

Roles, responsibilities and authorities should be defined, documented and communicated to ensure effective environmental and social management. A specific management representative should be assigned that is responsible for ensuring that the EMP is established, implemented and maintained and is responsible for reporting performance, reviewing the Plan and making recommendations for improvement. Documented



confirmation is required that the training needs of all persons working for or on the company's behalf whose work pose significant hazards to their health and safety and / or may create a significant impact on the environment has been identified. Records of all training must be maintained.

Management, Supervisory, and Employee responsibilities must be communicated to all employees through training, formal job descriptions, work experience, hiring practices, etc. Awareness training should be provided that includes the importance of conforming to the policy and procedures, the significant environmental, and the roles and responsibilities of management and staff.

Records shall be legible, identifiable and traceable to the activity. Records shall be stored and maintained in such a way that they are retrievable and protected against damage, deterioration or loss.

The contractor will establish, implement and maintain procedures to identify potential emergency situations and potential accidents that can have an impact on the environment, surrounding communities, the employees, and / or the public.

The contractor should be prepared to respond to actual emergency situations and accidents and prevent or mitigate associated adverse environmental or social impacts. The EMP must also address how the contractor will receive, document and respond to external interested parties.

9.7 Environmental Monitors

Independent Environmental Monitors will be identified and contracted to perform the following:

- Verify that all project approvals and permits are in place prior to the start of construction;
- Evaluate contractor plans (e.g., EMP, Spill Response and Waste Management) and monitor implementation;
- Develop inspection checklists to ensure site inspections are focused and useful
- Conduct environmental monitoring of construction works; the environmental monitor will ensure the protection of the environment, that mitigation measures are appropriately implemented and to facilitate communication between the Contractor, the Project Team and NEMA; and
- Prepare regular written reports to the Project Team, Contractor and, where need be, NEMA on an agreed to schedule.

10 Conclusion and Recommendations

10.1 Conclusion

The SEA for the Northlands Master Plan arrived at the following conclusions based on the findings of the baseline situation analysis, PPP analysis, plan impact analysis and stakeholder consultations:-

- a) The NMP is a good and commendable plan with minimal negative environmental impacts. The implementation of the plan will support sustainable environmental governance in the country through the following areas of value addition.

Environmental management framework	Value addition
Sessional Paper No. 6 of 1999 on Environment and Development	Encouraging rain water harvesting around the country
Draft Environment Policy, 2012	Supporting the establishment of constructed wetlands for waste management and reuse Supporting the increase of forest and tree cover to at least 10% by 2030
National Land Policy, 2009	Encouraging the development of wildlife sanctuaries and conservancies
National Water Policy, 2012	Enhancing storm water management and rainwater harvesting Encouraging the treatment of effluent waters for recycling and re use Supporting rain water harvesting
Draft National Policy on Wetlands Conservation and Management, 2013	Ensuring that natural wetlands under private ownership will be subject to regulations
Draft Wildlife Policy, 2011	Promoting the conservation and management of wildlife conservation areas and sanctuaries
Vision 2030	Supporting the increase of forest and tree cover to 10% by 2030 Supporting water harvesting and storage
National Environment Action Plan 2009-2013	Enhancing the protection of wildlife resources Supporting the increasing of forest cover in Kenya Promoting efficient water harvesting, storage and usage
Nairobi Metro 2030	Establishing the Nairobi Metropolitan Region (NMR) as a regional and global services centre through the development of industrial and technology parks Establish world class infrastructure and utilities in the NMR which are supportive of world class living, working and business environment Supporting the NMR to increase forest cover within its area of jurisdiction to 30% by 2030
Kiambu Integrated Development Plan 2013-2017	Increasing forest cover in the county Promoting and sustaining a vibrant, competitive and diversified industrial sector in the county
African Convention on the Conservation of Nature and Natural Resources (AU, 1968) Article II Fundamental Principle	Setting aside areas for the propagation, protection, conservation and management of wildlife

- b) The findings indicated that the NMP has not adequately integrated a number of national environmental PPP frameworks as highlighted below.

PPP Framework	Integration gaps
Draft Environment Policy (2012)	Developing response systems for climate change and disaster risks
National Policy for Disaster Management (2009)	Promoting the mainstreaming of disaster management and climate change into development planning and management for sustainability
	Integrating climate change disaster risk reduction initiatives
Environmental Management and Coordination Act (EMCA) No. 8 of 1999	Supporting environmental restoration
	Supporting the rehabilitation, regeneration and restoration of degraded rivers
Vision 2030	Supporting the rehabilitation, regeneration and restoration of degraded Rivers in the area
National Environment Action Plan (2009-2013)	Strategies for controlling of fire outbreaks
National Climate Change Response Strategy (2009)	Ensuring that all new infrastructure is climate proof over its lifespan
Kiambu Integrated Development Plan (2013-2017)	Inadequate strategies for ensuring a reduction in carbon emission

The SEA findings showed that the NMP is suitable for the area based on the current state of environment and the available technology as established in the baseline survey. The overall benefits of the proposed development are far higher than the potential cost of the negative environmental changes are likely to occur.

The master plan is desirable because it will improve the socio-economic status of Kiambu County and the City of Nairobi including the Nairobi Metropolitan Region (NMR). It will create employment and deliver a wide range of other socio-economic benefits.

The implementation of the NMP will also have a positive impact on social capital through direct employment, the multiplier effect in the local economy. The project will contribute in the development agenda in Kenya and it will as well help significantly in the realization of the goals for the Vision 2030 by contributing in the economic and social pillars.

10.2 Recommendations

The Consultant recommends approval of the NMP. However, implementation of the Masterplan should consider the following:-

10.2.1 Location of Educational Institutions and recreational facilities around residential areas

A desirable type of land use compatibility is the one that exists between educational and recreational facilities and residential land use forms. From the residential standpoint, it is desirable to have schools and parks located in close proximity to residential areas. Likewise, it is desirable to have the parks and educational facilities in close proximity to their primary users.

Consideration of the planning principles above should therefore be made in the detailed planning of zones 5, 6, 7, 8 and 9.



10.2.4 Restrictions on the type of industrial use

The Northlands Masterplan is cognizant of the potential that exists for growth of industries following the recent and ongoing upgrade of infrastructural services in the area. However, it is also important to note that not all types of industries are compatible with other land-uses such as residential, commercial or recreational uses. For Northlands, industrial uses should be restricted to light industrial developments which as defined in the Physical Planning Handbook published under the Physical Planning Act, 1996 are those that are compatible with residential areas due to low adverse impact on other neighbouring land uses. These include workshops, laundries, printing, packaging, food processing, light assembly and furniture making establishments (Department of Physical Planning, 2002). Warehousing and Logistics establishments are uses that also compatible with residential uses. Preference should be given to agro-processing industries that tap the agricultural potential of Kiambu and neighbouring Counties, and logistics firms for whom nearness to major population centers is critical. The site offers easy access to the national road network hence providing the ideal location for efficient, streamlined distribution center operations.

The industrial establishments to be located in Northlands should also be encouraged to the use of low carbon technology in order to reduce the emission levels in accordance with Kiambu Integrated Development Plan (2013-2017).

10.2.5 Location of residential land uses away from utilities right of way

Undesirable land use relationships are also found between residential land use forms and utility rights-of-way and utility sites. While it is recognized that some very small utility facilities are often an integral part of residential areas, significant utility sites and rights-of-way are generally undesirable in residential areas. Likewise, these facilities do not benefit by their proximity to residential areas. High voltage power lines 220kV, 132kV and 2x66kV traverse the site, and especially High Density Residential Zone 8, and Low Density Residential Zone 7. It is recommended that a buffer zone, in addition to the stipulated wayleave distance for the respective utility, be created for the affected Zones. Buildings should also be set back as far as possible from these utilities.

10.2.6 Industrial Waste Management

The NMP should encourage the adoption of an Industrial Ecology Approach for the Industrial Park in the Masterplan. Industrial Ecology is a paradigm based on the idea of making industrial systems emulate more efficient and sustainable natural systems to reduce the industrial systems' environmental impacts. One of its key components is to change from linear (open) processes to cyclical (closed) processes, so that the waste from one industry is used as an input for another, in an effort to mirror an ecosystem. For example, waste from one agro-processing enterprise can be used as raw materials in the manufacture of products such as animal feeds, and so on. This will reduce the total amount of solid waste requiring offsite disposal from Northlands.

10.2.7 Habitat and Wildlife management

The Northlands management in consultation with KWS should prepare an Integrated Wildlife Management Plan (WMP) which should include the conservation and management of the wildlife in the area. The Wildlife Management Plan should among other things, clearly prescribe how excess wildlife species in the sanctuary will be trans-located to other wildlife conservation areas in the country.



Since the NMP will be implemented in phases, phasing should begin with securing the wildlife conservation area to safeguard the existing wildlife population.

Provisions should be made to ensure that habitats of Jackson's widowbird, hippopotamus, grey-crowned crane and Nile crocodile within the study area remains as natural as possible even though these are represented elsewhere in their natural range, . The agricultural zone/conservancy is an opportunity within the study area to allow continued conservation and management of wildlife. Development of the various zones should check against degradation and modification of riverine vegetation to minimize eventual displacement and modification of grey-crowned crane, crocodile and hippo habitats along Kiu, Kamiti and Nairobi Rivers,

10.2.8 Environmental and Social Management and Monitoring

The Northlands Management should establish entity to monitor and evaluate implementation of the NMP and ensure adherence with the ESMP developed for the Master Plan. The entity will also ensure that ESIA's for each of the proposed activities are carried out and that effective environmental management plans in line with the SEA are developed for all the developments.

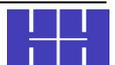


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12 Appendices



12.1 Appendix A: Northlands Land Use Plan





12.2 Appendix B: Northlands Masterplan Scoping Report





Strategic Environmental Assessment of the Proposed Northlands Masterplan in Ruiru, Kiambu County



Scoping Report

10465K-PSD-H-0001

January 2015

Rev. 0

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REVISION RECORD SHEET

This page is a record of all revisions, if any, made to the attached document. The revisions are listed under "Revisions/Changes". The revisions are part of the document and override the corresponding parts of the original document.

Revisions/Changes:

Remarks: Issued to NEMA for Review

Client:	Integer Limited						
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Declarations

This **Strategic Environmental Assessment Scoping Report** for the **Proposed Northlands Masterplan in Kiambu County** is prepared and submitted, on behalf of **Howard Humphreys (East Africa) Ltd** by:

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Acronyms and Abbreviations

AWSB:	Athi Water Services Board
EA:	Environmental Audit
EIA:	Environmental Impact Assessment
EMCA:	Environmental Management and Coordination Act
KeNHA:	Kenya National Highways Authority
KP:	Kenya Power
KURA:	Kenya Urban Roads Authority
KV:	Kilo Volts
LT:	Long Term
MVA:	Mega Volt Amperes
NEMA:	National Environment Management Authority
NGO's:	Non-Governmental Organizations
NWSC:	Nairobi Water and Sewerage Company
OSHA:	Occupational Safety and Health Act
PPE:	Personal Protective Equipment
RUJWASCO:	Ruiru Juja Water and Sewerage Company
SEA:	Strategic Environmental Assessment
ST:	Short Term
WRMA:	Water Resource Management Authority



Executive Summary

INTEGER Limited, a company incorporated in Kenya is in possession of a 4788 Ha parcel of land in Ruiru – Kiambu County and desires to develop the land to meet the growing demand for housing, commercial and light industrial developments away –yet proximal to the Nairobi City Centre.

A Strategic Environmental Assessment (SEA) of the proposed development’s master plan has been commissioned whose main objectives are to: identify the likely significant environmental effects of implementing the plan; integrate stakeholders’ perspectives into the proposed land use plan; provide information to better integrate environmental considerations into decisions; to assess alternatives and options that can improve the land use plan; and to provide strategic-level recommendations on how to minimize potential negative effects and optimize positive effects.

The SEA process kicked off with the submission of a Plan Brief Document to NEMA for guidance on whether the plan should be subjected to SEA or not. NEMA’s response was obtained instructing that a SEA of the plan was necessary and should thus commence with the submission of a Scoping Report for approval before the actual SEA study.

Sections 1, 2 and 3 of this Scoping Report introduce the proposed Plan and outline the potential effects of executing the plan. Section 4 provides a legal and policy context for the SEA and briefly describes the bearing of the provisions on the Plan.

A stakeholder analysis was carried out to identify all relevant stakeholders. Consultations with these stakeholders have been carried out at various times during the plan development process to identify their concerns which now form the SEA objectives outlined in Sections 9 and 10 of this Scoping Document.



1. Introduction

The real estate sector in Kenya has been experiencing dramatic growth since the mid-2000s. This has been occasioned by the property market responding to demand created by an expanding middle class with higher disposable income. Kiambu County is one of the main beneficiaries of this growth, the others being Nairobi and Machakos Counties.

Availability of land is one of the major drivers of this growth away from the City. The availability of large parcels of land in Kiambu County has enabled development of large-scale housing schemes and mixed use developments such as Thika Greens, Buffalo Springs and Bahati Ridge, among others. Others such as Tatu City, Albizzia Downs Estate and RedCoral are still in their planning or development stages.

The Plan Proponent, INTEGER Limited, is in possession of a 4,788 Ha parcel of land on the outskirts of the City Centre in Ruiru and is desirous of developing the land into an alternative city to meet the growing demand for housing, commercial and light industrial developments away –yet proximal to the Nairobi City Centre. INTEGER has thus commissioned a Strategic Environmental Assessment (SEA) of the proposed development's master plan.

Administratively, the site is in Kiambu County under Ruiru Municipality but borders Nairobi County to the west and northwest. Development in the general area is heavily influenced by the City responding to the demand for housing, commercial and industrial uses.

1.1 Goals and Objectives of the SEA

The overall goal of the SEA is to ensure that environmental and social considerations are included in the planning, implementation and operation of the planned Development.

Briefly, the objectives of the SEA are to:

- Identify, describe and assess the likely significant environmental effects of implementing the plan;
- Integrate stakeholders' socio-economic and environmental perspectives into the proposed land use plan;
- Provide information to better integrate environmental considerations into decisions, implementation, and monitoring in order to minimize risks to the plan and risks emanating from the plan;
- Assess alternatives and options that can improve the land use plan; and
- Provide strategic-level recommendations on how to minimize potential negative effects & optimize positive effects.

The SEA is organized in two phases: Phase 1 – Scoping, and Phase 2 – the Study, which is more detailed. During the Scoping Phase, one of the preliminary activities was to carry out a stakeholder analysis to identify the stakeholders who should be consulted during all stages of the SEA. During the Scoping Phase, stakeholders provided input to:

- Identify main issues & concerns (to be further studied during the detailed SEA);
- Identify other key stakeholders;
- Select the SEA objectives (i.e., the evaluation framework);
- Select alternatives (to be assessed during the Analysis Phase of the SEA); and
- Identify data sources and data gaps, and provide input to the type of methodology to be used during the detailed SEA study.



The terms of Reference (ToRs) for the SEA are outlined in Chapter 11 of this Scoping Report.

2. Scope of the Masterplan

2.1 Location

The site occupies a strategic location on the north east fringe of Nairobi city and represents one of the largest development opportunities near the city. The site is in an accessible location, with good access to the strategic road network, has good access to the airport and city centre via the Thika – Nairobi railway.

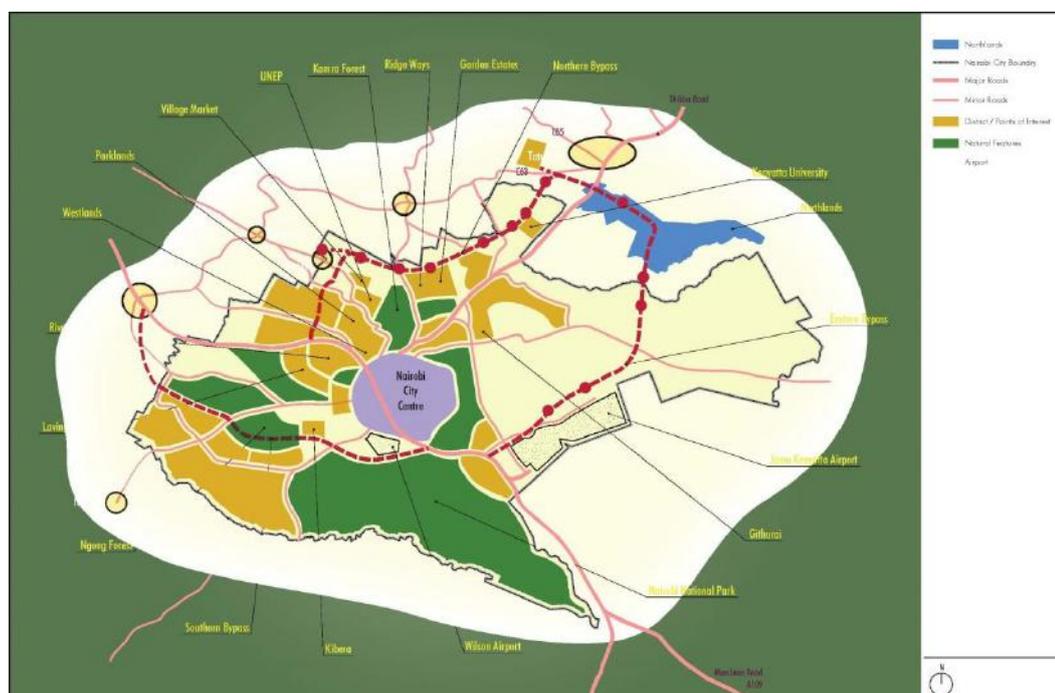


Figure 1: Location of the proposed development

2.2 Plan Objectives

The objective of the plan is to provide a quality environment which affords pleasant, clean and safe mixed communities for living, work and play away from the Capital City. The proposed development when complete will contribute in meeting part of the housing demand in the Nairobi Metropolitan region as well as provide choices and options for existing residents wishing to live in a high quality living environment provided with a wide range of amenities and easy access to services and employment opportunities.

2.3 Land use and zoning

The site has been zoned by various themes in line with the envisaged character of the zone. The intensity of use varies across the site with the more intensive uses in the west and south of the site. The key nodes of intensive land use include offices and commercial uses in the office Parks; industrial use in the logistics parks and residential use along the boulevards.

The less intensive uses include recreational and agricultural whereby approximately 2,088 Ha have been set aside for agricultural uses such as ranching and wildlife conservation while 580 Ha have been allocated to recreational uses such as parks.

Table 1: Northlands square and office Park

Development	Units	Size (m ²)	Acreage	population
Green/ open spaces			188	
Office parks	150	570,300		
City Square		67,500		
Shopping Centre		4,500		
Police and fire station				
Totals			445	40,000

Table 2: Northlands Strip Mall

Development	Units	Size (m ²)	Acreage	population
Green/ open spaces			4	
Mall		6050		
Police Post		67,500		
Petrol Station		4,500		
Fire Station				
Bus interchange				
Totals			11	

Table 3: Northlands Heights

Development	Units	Size (m ²)	Acreage	population
Green/ open spaces			30	
Town houses	670	170		
Flats	368	120		
Shopping centre		2,700		
School		28,700		
Church		3,600		
Police station				
Fire Station				
Totals			119	14,000

Table 4: Northlands Mall

Development	Units	Size (m ²)	Acreage	population
Green/ open spaces			15	
Mall		75,000		
Hotel		84,930		
Totals			30	2,500

Table 5: Northlands Paradise Park

Development	Units	Size (m ²)	Acreage	population
Green/ open spaces			71	
Heliport			9	
Hospital			3	
Country Club				
Wild life conservatory				
School				
Sports facilities				
Totals			285	

Table 6: Northlands Meadows

Development	Units	Size (m ²)	Acreage	population
Green/ open spaces			680	
Villas	601			
Town houses	1320			
Shopping centre		2,700		
School			10	
Totals			1,730	9,120

Table 7: Northlands Logistics Parks

Development	Units	Size (m ²)	Acreage	population
Green/ open spaces			193	
Industries	199		773	
Shopping Centre		2,700		
Substation				
Totals			966	80,000

Table 8: Northlands Boulevards

Development	Units	Size (m ²)	Acreage	population
Green/ open spaces			56	
Flats	6,980			
Town houses	3,100			
Totals			256	50,000

2.4 Estimated Water Demand and Sources

It is estimated that when complete, the development will require approximately 13,894m³ per day for industrial, commercial and residential uses. Potential water sources for the Northlands development include:

- Borehole water supply
- Rainwater harvesting
- Municipal water supply
- Recycling of wastewater for use in irrigation and flushing

2.5 Wastewater Generation and Disposal

When complete, it is estimated that 9,726 m³ of effluent will be generated from the various land uses. Wastewater management proposals for Northlands include:

- Disposal through Nairobi's sewer treatment plant south of the site
- Disposal through a planned treatment plant for Ruiru.

2.6 Solid Waste Generation and Disposal

An estimated 92 tons of solid waste will be generated daily from the various proposed land uses. The table below shows the general sources of solid waste expected from the proposed Northlands Development:-

General sources of solid waste

Source	Typical facilities	Types of solid wastes
Residential	Single-family and multifamily dwellings, low, medium and high-rise apartments, etc	Food wastes, general garbage, ashes, green waste (leaves, grass, etc), occasionally hazardous waste (eg light bulbs, batteries)
Commercial	Stores, restaurants, bars, and offices,	Food wastes, general garbage, ashes, occasionally hazardous wastes
Open areas	Streets, parks, vacant lots, play grounds, recreational areas	Special wastes, rubbish
Industries	Warehouses, offices, vacant lots,	Rubbish, food wastes, occasionally hazardous wastes depending on the type of industries that will operate.

Proposals for solid waste management for the development include an integrated waste management plan comprising of reduction at source, reuse, recycling, incineration and landfilling at designated disposal sites

2.7 Power Demand and Supply

Power demand for the development is estimated at 45MVA. The site and its surroundings are served by 220Kv, 132Kv, 66Kv and 11Kv power lines which can be stepped down at substations to suit the development's requirements. Solar energy will also be utilized in the development.

2.8 Transport

The development will be provided with several of modes of transport including walkways, cycle paths, and spine/feeder roads for vehicular access. It is estimated that the development will have 165km of paved roads. Appropriate round-a-bouts, junctions and flyovers will be designed to ensure seamless traffic flow between the development and the existing government roads.

2.9 Plan implementation

The Masterplan will be implemented in four phases over a period of 50 years. It is estimated that the development will be complete by 2064. The initial phase of development will mainly establish the various zones/land uses while subsequent phases will focus on expansion of these zones.

3. Legal and Policy Framework affecting the Masterplan

3.1 Introduction

The Environmental Management and Coordination Act, 1999, The Environmental (Impact Assessment and Audit) Regulations, 2003, and the National Guidelines for Strategic Environmental Assessment, 2012 provide the basis for the SEA process in Kenya. The SEA will be based on the principles and practices outlined in the guidelines which call for:

- The sustainable use of natural resources.
- The enhancement, protection and conservation of biodiversity.
- Inter-linkages of human settlement and culture.
- Integration of socio-economic and environmental factors.
- The protection and conservation of natural physical surroundings of scenic beauty, as well as protection and conservation of built environment of historic and cultural significance.
- Public and stakeholder engagement.
- Sound conservation and protection of ecologically sensitive areas; and
- Equitable access to land and other natural resources

Both the EMCA, 1999 and the Environmental (Impact Assessment and Audit) Regulations, 2003 require EIA to be undertaken for projects listed in the Second Schedule of the Act. The umbrella body administering this requirement is the National Environment Management Authority (NEMA). The Authority has designated Environmental Committees to oversee the implementation of the EMCA, 1999 both at the National and devolved government levels.

Sections 42 and 43 of the Environmental (Impact Assessment and Audit) Regulations of 2003 describe the national requirements for the conduct of a strategic environmental assessment. While these apply to “public” policies, plans and programmes, NEMA now asks that an SEA is conducted for all policies, plans and programmes that may, among other things:

- Be politically or publicly contentious;
- Have cumulative environmental or social effects;
- Have trans-boundary effects (including those that impact on other municipalities or counties);
- Cause major changes in actions, behaviours or decisions by individuals, businesses, NGOs or government that could lead to, inter alia, major changes in the pattern of settlement, land occupation and/or demographics in an area, or induce changes in society’s consumption of energy or other natural resources.

The following is the legal and legislative framework that will guide the proposed Northlands development.

3.2 Applicable Policies, laws and regulatory frameworks

Item	Relevance
Policies	
Sessional Paper No. 6 of 1999 on Environment and Development	<p>Forest Resources</p> <ul style="list-style-type: none"> • Supporting the increase the total forest area <p>Wildlife Resources</p> <ul style="list-style-type: none"> • Supporting the involvement of local communities and other users in wildlife conservation and management and developing mechanisms that allow communities to



	<p>benefit from wildlife earnings</p> <p>Wetlands</p> <ul style="list-style-type: none"> • Supporting the development of integrated management plans for sustainable and multiple use of wetlands <p>Rangeland resources</p> <ul style="list-style-type: none"> • Discouraging inappropriate conversion of ASALs into agriculture • Promoting the integration of wildlife and livestock management • Instituting measures to manage livestock within the carrying capacity of the land • Promoting wildlife utilization as an alternative form of livelihood <p>Land degradation, drought and desertification</p> <ul style="list-style-type: none"> • Developing drought and desertification monitoring and early warning systems <p>Water resources</p> <ul style="list-style-type: none"> • Supporting the provision of water for wildlife livestock and domestic use • Providing incentives for rain water harvesting <p>Human settlements</p> <ul style="list-style-type: none"> • Regulating urban development to only those areas which are suitable, avoiding ecologically fragile areas • Encouraging Kenyans to have family sizes which are sustainable <p>Other policy goals</p> <ul style="list-style-type: none"> • Encouraging sustainable use of resources and ecosystems • Protecting water catchment areas • Adherence to the polluter pays principle • Undertaking EIA for all private and public projects • Increase public awareness on environment
<p>Draft Environment Policy (2012)</p>	<ul style="list-style-type: none"> • Adopting measures and incentives and disincentives to promote the re-use, recycling and reclamation of re-usable packaging material and combats the pollution of the environment • Supporting establishment of constructed wetlands for waste management • Developing an integrated, improved early warning and response systems for climate change and disaster risks • Developing and implementing Drought and Desertification Monitoring and Early Warning Systems • Encouraging CDM investments for climate change mitigation • Encouraging Kenyans to have family sizes which are sustainable. • Formulating an innovative strategy to increase forest and tree cover from the current 2% to at least 10% by 2030 • Promoting and institutionalizing payment for environmental services schemes to support watershed protection initiatives • Supporting rehabilitation and restoration of degraded wetlands and forests • Promoting the establishment of trans-boundary wildlife



	<p>conservation</p> <ul style="list-style-type: none"> • Promoting application of sound environmental management tools, in particular strategic environmental assessment, EIA, environmental audits, environmental management systems, risk assessment/management and environmental reporting • Protecting, conserving, and improving the habitats, corridors, and dispersal areas of wildlife • Protection and sustainable management of shared/trans-boundary resources • Supporting the establishment of community based conservation areas • Working with private sector, NGOs and CBOs to enhance corporate and social responsibility and accountability
<p>National Land Policy (2009)</p>	<p>Ecosystem management and conservation principles</p> <ul style="list-style-type: none"> • Surveying of all critical ecosystems to determine their sustainable land uses • Identifying, mapping and gazettement critical wildlife migration and dispersal areas and corridors in consultation with the local communities and individual land owners • Encouraging the development of wildlife sanctuaries and conservancies and involve local communities and individuals living contiguous to the parks and protected areas in the co-management of such areas • Providing mechanisms for resolving grievances arising from human/wildlife conflicts • Providing mechanisms for resolving grievances arising from human/wildlife conflicts <p>Other policy goals:</p> <ul style="list-style-type: none"> • Supporting Community land management and dispute resolution • Promoting incentives for communities and individuals to promote resource conservation • Supporting protection of forests • Ensuring sustainable utilization and management of land and its resources • Supporting the implementation of environmental assessments and audits
<p>National Water Policy (2012 Draft)</p>	<p>Ensuring increased per capita water availability above the international benchmark of 1000 m³ by 2030</p> <ul style="list-style-type: none"> • Ensuring progressive restoration and protection of ecological systems and biodiversity in strategic water catchments • Maximizing use of trans-boundary water resources in coordination with other riparian countries • Enhancing storm water management and rainwater harvesting • Enhancing pollution control • Enhancing enforcement of regulation and other IWRM actions • Improve effluent waters treatment and recycle for use • Ensuring that wetlands, flood plains with their associated biodiversity are safeguarded • Ensuring public participation in all areas of water



	<p>affairs, including right to be informed, representation in boards and water dialogue platforms</p> <ul style="list-style-type: none"> • Ensuring the establishment of protected areas crucial for water storage <p>Other policy goals:</p> <ul style="list-style-type: none"> • Ensuring emergency supply of adequate water to protected areas for wildlife use and recreation • Supporting rain water harvesting
National Policy for the Sustainable Development of Arid and Semi-Arid Lands of Kenya (2012)	<p>Natural resource management</p> <ul style="list-style-type: none"> • Promoting low-maintenance water technologies, with an emphasis on water harvesting
Draft National Policy on Wetlands Conservation and Management (2013)	<p>Wetland conservation and management</p> <ul style="list-style-type: none"> • Ensuring that drainage and reclamation of wetlands is not allowed unless a greater public interest is demonstrated. • Ensuring that any alteration of a wetland for public interest will be subject to Environmental Impact Assessment (EIA), cost benefit analysis, and wide stakeholder consultations • Ensuring that uncontrolled burning of wetland biomass will be prohibited • Ensuring that priority will be given to subsistence and environmental needs before considering commercial interests. • Ensuring that site-specific participatory Wetland Management Plans are developed to guide the use of wetlands resources • Ensuring that the ownership of natural wetlands is vested in the state while recognizing legitimate rights of users who depend on them for their livelihoods • Ensuring that natural wetlands under private ownership will be subject to regulations • Ensuring that any land resulting from receding of natural wetlands shall continue to remain inalienable state land and be regarded as riparian land and shall not be allocated as private land • Ensuring that communal ownership of wetlands will be encouraged. • Establishment of Wetland Conservation Areas (WCAs) • Ensuring that special wetland sites are designated and gazette as conservation areas to be protected as wetland reserves where no consumptive uses will be allowed • Promoting restoration and rehabilitation programmes for degraded wetlands
Draft Wildlife Policy (2011)	<ul style="list-style-type: none"> • Supporting the mainstreaming of SEA to guide sustainable development in wildlife conservation areas to minimize negative impacts on species, habitats and ecosystems • Wildlife Security: Putting in place a harmonized and appropriate regulatory framework, Standing Orders and Disciplinary Code for the general control, direction and management of the wildlife security countrywide • Strengthening wildlife security in wildlife conservation areas • Establishing transparent and inclusive mechanisms for recruitment, management and monitoring of wildlife



	<p>security agents countrywide.</p> <ul style="list-style-type: none"> • Strengthening collaboration with local, regional, national and international law enforcement agencies in combating wildlife related crimes. • Other policy goals • Developing and implement wildlife disaster preparedness, response and rescue strategy • Developing recovery plans for the conservation and survival of endangered and threatened species • Educating the public and raising awareness on the critical role of wetlands, rivers and lake ecosystems • Supporting landowners and communities to set aside wildlife conservation areas and sanctuaries within the framework of approved land use plan of the area • Ensuring good governance in the management of wildlife conservation areas and sanctuaries • Erecting and maintaining game barriers and other approved deterrent measures to minimize HWCs • Promoting joint ventures in the conservation and management of wildlife conservation areas and sanctuaries. • Putting in place mechanisms to identify, control and eradicate invasive alien species in wildlife conservation areas in collaboration with relevant lead agencies. • Supporting compensation of wildlife damage to human, crop, livestock and property • Supporting the conservation and management of wetlands • Supporting the development and implementation of approved management plans that incorporate multiple and compatible land use practices through participatory processes. • Supporting the restoration of degraded wetlands, riverbanks and, where appropriate • Support the establishment constructed wetlands in business areas
National Horticulture Policy 2010	<p>Environmental sustainability</p> <ul style="list-style-type: none"> • Enhancing environmental conservation and measures to mitigate the effects of climate change • Instituting appropriate measures to promote water harvesting, irrigation, recycling of water, and damming.
National Forest Policy (2005)	<ul style="list-style-type: none"> • Supporting the enforcement of regulations pertaining charcoal burning • Collaborating with stakeholders in conservation and management of forests • Rehabilitation of forests; Establishment of nurseries and production of seedlings
National Policy for Disaster Management, 2009	<ul style="list-style-type: none"> • Promoting the mainstreaming of disaster management and climate change into development planning and management for sustainability • Providing for well-structured participation of society in disaster management by integrating traditional coping strategies into the DM systems • Supporting climate change disaster risk reduction initiatives



National Gender and Development Policy, 2000	<ul style="list-style-type: none"> • Considering the needs and aspirations of all Kenyan men, women, boys and girls across economic, social and cultural lines • Ensuring the empowerment of women
National HIV Policy (GoK, 1997)	<ul style="list-style-type: none"> • Ensuring that new development projects especially in the rural areas encourage preventive and responsible behaviour both for the workers involved in such projects and also the local people within which projects are taking place as a goal towards curtailing the spread of the disease
National Environmental Sanitation and Hygiene Policy (2007)	<ul style="list-style-type: none"> • Protection of the environment from pollution and its negative effect on human health • Ensuring use of technologies that uphold the right of present and future generations to a healthy and pollution-free environment. • Ensuring the use of sanitation systems that are environmentally sound • Preventing environmental pollution from liquid and solid waste • Setting of clear standards and guidelines for environmental sanitation • Increasing environmental sanitation awareness across the country
Laws and Regulations	
The Constitution of Kenya, 2010	Provision of rights to own property including land
National Guidelines for Strategic Environmental Assessment in Kenya, 2012	Provides for integration of environmental considerations into policies, plans and programmes and evaluate the inter-linkages with economic and social considerations
Environmental impact assessment guidelines and administrative procedures, 2002	Procedural guidelines for implementation of Environmental Impact Assessment (EIA), Monitoring and Environmental Audit (EA) and Strategic Environmental Assessment (SEA).
Environmental Management and Coordination Act 1999	<p>This is the over-arching law concerning environmental management in Kenya. Relevant legislation under the act include:</p> <ul style="list-style-type: none"> • Environmental (Impact Assessment and Audit) Regulations, 2003 • Environmental Management and Co-ordination (Water Quality) Regulations 2006 • Environmental Management and Co-ordination (Waste Management) Regulations 2006 • Environmental Management and Co-ordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009 • Environmental Management and Co-ordination (Fossil Fuel Emission Control) Regulations 2006 • Draft Environmental Management and Coordination (Air Quality) Regulations, 2008 • Environmental Management and Coordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulation, 2009 • Environmental Management and Co-ordination (Conservation of Biological Diversity) Regulations, 2006



	<ul style="list-style-type: none"> • Environmental management and Co-ordination (Controlled Substances) Regulations 2007
The Water Act	Management, development, conservation, use and control of water resources. Also relevant are the Water Resource Management Rules, 2007
The Public Health Act (Cap 242)	Provides for the prevention of the occurrence of nuisance or condition liable for injurious or dangerous to human health
The Wildlife Conservation and Management Act, 2013	Provides for management of wildlife and their habitats located on the development site
The Physical Planning Act, 1999	Provides for the planning of land-uses, the prohibition and control of the use and development of land and buildings in the interest of proper and orderly development of an area
The Employment Act 2007	Provides the conditions of employment and the rights of workers in particular construction workers in the proposed development
Occupational Safety and Health Act, (OSHA) 2007	<p>Provides for the safety, health and welfare of workers and all persons lawfully present at work places. Relevant legislation under OSHA 2007 include:</p> <ul style="list-style-type: none"> • The Factories and Other Places of Work (Safety and Health Committees) Rules 2004 • The Factories and Other Places of Work (Medical Examination) Rules 2005 • The Factories and Other Places of Work (Noise Prevention and Control) Rules 2005 • The Factories and Other Places of Work (Hazardous Substances) Rules, 2007 • The Factories and Other Places of Work (Fire Risk Reduction) Rules, 2007 • Factories and Other Places of Work (Building Operational and Works of Engineering Construction) Rules, 1984 • Factories (First Aid) Rules, 1977

3.3 Plan Analysis

The analysis will involve a counter check of all the proposed developments in the Masterplan (outlined in Section 2.3 of this Report) against the environmental economic and social obligations identified for the SEA process. The obligations which will not appear to be effectively considered in the plan activities will be considered as gaps to be further addressed during refinement of the Masterplan.



4. Possible effects of the plans on the environment and on people due to environmental changes

4.1 Introduction

Preliminary analysis has established that the Masterplan will have significant impacts on the following environmental and social themes in the plan area.

- Traffic and Transport
- Surface and ground water resources:
- Energy Resources
- Ambient noise and air quality
- Waste management
- Landscape, geology and Soils
- Biodiversity and Nature Conservation
- Health and Safety
- Economy and Employment

These potential impacts will be investigated in detail in subsequent studies, and suitable mitigation measures for adverse impacts developed. Enhancement measures for positive impacts will also be identified.

4.2 Methodology for analysis of significant impacts

To appraise the significance of potential impacts on the themes outlined above, the following scores will be used:

- Positive or negative (+ve / -ve) – Positive refers to where the proposal would cause an improvement to the existing environment and negative is taken to mean where the proposal would cause deterioration to the existing environment.
- Major or minor (Major/Minor) – the criteria listed in the table below has been used to establish whether the impacts are major or minor.
- Long or short-term (LT/ST)- this refers to when the impact will occur during the different phases of the plan (construction, operation, decommissioning)

Major and minor impacts will be determined on the following basis:

Major Impact	Minor Impact
Extensive	Localized
Will affect many people	Will affect few people
Large change in environmental conditions	Small change in environmental conditions
Effect will be unusual or particularly complex	Effect will be ordinary or simple
Will affect valuable or scarce features or resources	Will not affect valuable or scarce resources
High risk that environmental standards will be breached	Lower risk that environmental standards will be breached
High likelihood that protected sites, areas or features will be affected	Lower likelihood that protected sites, areas or features will be affected
High probability of effect occurring	Lower probability of effect occurring
Long term / permanent	Short term / temporary
Irreversible	Reversible
Mitigation difficult	Mitigation easier

5. Stakeholder Consultation

5.1 Purpose of the stakeholder consultation and participation exercise

At this stage, stakeholder engagement seeks to achieve the following:

- a) Inform the stakeholders about the proposed plan by introducing the developer and describing the plan components;
- b) Collect stakeholders’ views on the proposed plan including;
 - Potential positive/negative impacts stakeholders associate with the proposed plan; and
 - Stakeholders’ preferred development;
- c) Get local knowledge on any sensitive areas within the plan scope (physical/environmental, cultural or proposed facilities); and
- d) Get expert advice on land use/ area zoning, water availability and supply, power and road infrastructure in the area.

A stakeholder analysis has been carried out and the following table identifies the stakeholders and gives a summary of their relevance to the plans.

Summary of stakeholder characteristics

Stakeholder	Details	Level of impact Directly Affected (DA) Indirectly Affected (IA)
Government Agencies		
Kiambu County Government: <ul style="list-style-type: none"> ▪ Minister for Planning, Kiambu County ▪ Deputy County Commissioner-Ruiru ▪ Kiambu County NEMA office ▪ County Physical Planning Office ▪ Environment, Water And Natural Resources Office 	<p>This is the regional center of power in the county including matters concerning development projects such as the proposed development.</p> <p>The Planning Minister will provide information about the County’s development plans and how these may affect or be affected by the proposed development.</p> <p>The Deputy County Commissioner is the area’s government representative, and his permission to carry out the consultation exercise in his area of jurisdiction will be sought.</p> <p>The Kiambu County NEMA office will be consulted as NEMA is the institutional authority under which the Northlands Master plan SEA must be submitted to ensure implementation and enforcement of various laws and</p>	IA



	<p>regulations on environmental sustainability</p> <p>The County Physical Planning Office will be consulted to ensure that the proposed Masterplan is compliant to the county’s zoning plans.</p>	
<p>Technical Stakeholders:</p> <ul style="list-style-type: none"> ▪ Kenya Power ▪ Kenya Electricity Transmission Company Limited (KETRACO) ▪ Water Resources Management Authority (WRMA) ▪ Ruiru Municipal Council ▪ Ruiru Water and Sewerage Company ▪ Nairobi Water and Sewerage Company ▪ Kenya Railways ▪ Kenya National Highways Authority (KeNHA) ▪ Kenya Urban Roads Authority (KURA) ▪ Kenya Wildlife Service (KWS) 	<p>Each of these agencies is responsible for a specific service within the proposed development .e.g.</p> <ul style="list-style-type: none"> ▪ Kenya Power will provide baseline information and advice on matters of electrical transmission, and distribution to the proposed development. ▪ WRMA is the government agency dealing with water management in the area including the issuing of permits for water abstraction ▪ Ruiru Water and Sewerage Company deals with issues concerning water supply and waste water management in the plan area ▪ Ruiru Municipal Council is the municipality that is closest to the project site and it’s highly likely that it will impact/be impacted by the proposed development. ▪ Kenya Railways. KeNHA and KURA will also be consulted on matters transport infrastructure in the plan area. ▪ KWS will also be consulted on matters concerning expert management of existing wildlife at the site. 	<p>IA</p>
<p>Security Agencies:</p> <ul style="list-style-type: none"> ▪ Kenya Police Service ▪ Kenya Prisons ▪ The Judiciary 	<p>Government institutions dealing with issues of security are very relevant for this development due to the anticipated population increase.</p>	<p>IA</p>
<p>Businesses</p>		
<p>Internal Stakeholders:</p> <ul style="list-style-type: none"> ▪ Peponi School ▪ Brookside Dairy 	<p>Located within the plan area, these are key stakeholders with regard to mapping of potential plan impacts.</p>	<p>DA</p>
<p>Neighboring Community</p>		
<p>Neighboring Institutions and Individual Households:</p> <ul style="list-style-type: none"> ▪ Kenyatta University ▪ Uhuru Secondary School ▪ Clayworks Limited ▪ Mwihoko Estate 	<p>The neighboring individuals and institutions are key stakeholders with regard to mapping of potential plan impacts and identification of mitigation measures for adverse impacts</p>	<p>DA</p>



<ul style="list-style-type: none"> ▪ Kahawa Sukari Estate ▪ Residents on the Eastern Bypass side of the Northlands property especially those located next to the Northlands Dam area and also the Wildlife Conservancy 		
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5.2 Stakeholder Communication Strategy

The communication strategy adopted will take into consideration the issues and key messages to be communicated to the stakeholders, and choosing the communication vehicles for the same.

The key message will be to get the stakeholders informed about the Proposed Northlands Masterplan by introducing the developer and describing the plan components.

The Consultant will also aim at:

- Getting stakeholders’ views on the proposed development i.e. the potential positive/negative impacts stakeholders associate with the proposed Masterplan
- Getting local knowledge on any sensitive areas within the plan scope (physical, cultural or proposed facilities).
- Getting expert advice on land use/ area zoning, water/power availability and supply, and road infrastructure in the area.

Summary of the various types of communication strategies used in the consultation

Audience	Communication Vehicle
<p>Kiambu County Government</p> <ul style="list-style-type: none"> ▪ Minister for Planning Kiambu County; ▪ Deputy County Commissioner-Ruiru; ▪ NEMA Kiambu County Director; ▪ County Physical Planning Officer 	<ul style="list-style-type: none"> ▪ Official meeting with each of these stakeholders
<p>Technical Stakeholders</p> <ul style="list-style-type: none"> ▪ Kenya Power ▪ Kenya Electricity Transmission Company Limited (KETRACO) ▪ Water Resources Management Authority (WRMA) ▪ Ruiru Municipality ▪ Ruiru Water and Sewerage Company ▪ Nairobi Water and Sewerage Company ▪ Kenya Railways ▪ Kenya National Highways Authority (KeNHA) ▪ Kenya Urban Roads Authority (KURA) ▪ Kenya Wildlife Service (KWS) 	<ul style="list-style-type: none"> ▪ Official meeting with each of these technical stakeholders



<p>Internal Stakeholders</p> <ul style="list-style-type: none"> ▪ Peponi School ▪ Brookside Dairy 	<ul style="list-style-type: none"> ▪ A structured interview with each of these stakeholders
<p>Neighboring Institutions and Individual Households</p> <ul style="list-style-type: none"> ▪ Kenyatta University ▪ Uhuru Secondary School ▪ Clayworks Limited ▪ Mwhoko Estate ▪ Kahawa Sukari Estate 	<ul style="list-style-type: none"> ▪ A key informant interview with Kenyatta University ▪ Official meeting with the Eastern Bypass, Mwhoko and Kahawa Sukari Residents Association representatives ▪ Structured interviews with Uhuru Secondary School and Clayworks Ltd representatives
<p>Security Agencies</p> <ul style="list-style-type: none"> ▪ The Kenya Police Service ▪ The Kenya Prisons ▪ The Judiciary 	<ul style="list-style-type: none"> ▪ An official meeting with each of these three key stakeholders

5.3 The way forward for stakeholder engagement

In the next phase of the SEA process i.e. the Study, public meetings and focus group discussions will be held with the stakeholders to discuss the identified pertinent issues, propose alternatives, and adopt an optimal strategy that enhances environmental protection/conservation, social and economic benefits to the community and cohesion among the stakeholders.

6. Description of the scope of the environmental baseline to be prepared in the SEA study

Baseline information is needed so that the possible effects of the proposed plans can be predicted, to see what changes to the baseline might occur and to monitor any such changes. It also helps to identify trends or existing problems that may be influenced (positively or negatively) by the plans.

Partial baseline information has been collected on the site and the surrounding area from a range of information sources, including government websites and publications, and thematic publications and reports on the plan area. However, gathering data is a process, and new data may become available or collected during the SEA process.

Baseline needs are addressed below under the themes Biological, Physical, Social and institutional for which data has been/will be gathered.

Theme	Aspect	Data type	Source
Physical	Soils and soil erosion	Soil types and vulnerability to erosion	Documents Field observations
	Land characteristics	Topography, geology, soil types, soil degradation	Documents
	Land uses	Land use changes	Documents Field observations
	Water catchment	Hydrology and Drainage	Documents
	Water supply and availability	Availability of water in Ruiru, ground water supply potential	Documents Hydrogeological reports
	Surface water quality	Pollution levels	Field measurements
	Climate	Rainfall, temperature and other climatic data	Documents
Biological	Habitats	Habitat types	Field observations
	wildlife	Faunal composition	Field observations
Social	Socioeconomic and culture	<ul style="list-style-type: none"> • Food security • Gender • Governance • Livelihoods • Poverty and income • Economic activities • Community concerns 	<ul style="list-style-type: none"> • Kenya National Bureau of Statistics (KNBS) • Kiambu County Integrated Development Plan • Community Consultations
Institutional	Planning and Regulatory framework	• Development plans and controls	Documents

7. Impact identification and evaluation methodologies to be used in the SEA study

The aim of SEA is to achieve sustainable development in the plan area. Thus the SEA will focus on environmental, social, economic and institutional priorities.

The table below summarizes the impact identification and evaluation methodologies to be used in the SEA study.

Theme	Aspects	Impact Identification	Evaluation
Biological Environment	<ul style="list-style-type: none"> • Habitats • Biodiversity 	<ul style="list-style-type: none"> • Document Review • On-site observation • Stakeholder working sessions 	<ul style="list-style-type: none"> • Matrix and Multi- criteria analysis • Stakeholder working sessions
Physical Environment	<ul style="list-style-type: none"> • Soil • Land quality • Water 	<ul style="list-style-type: none"> • Document review • On-site observation • Questionnaire responses • Interviews • Stakeholder working sessions 	<ul style="list-style-type: none"> • Matrix and Multi- criteria analysis • Stakeholder working sessions
Social Cultural/economic environment	<ul style="list-style-type: none"> • Food security and Nutrition • Health • Gender & Children • Governance • Poverty and income • Livelihoods • Transport and infrastructure • Major development activities that are currently proposed • Potential forms of development including those that are compatible with the County’s development plans for the area 	<ul style="list-style-type: none"> • Document review • On-site observation • Questionnaire responses • Stakeholder working sessions 	<ul style="list-style-type: none"> • Matrix • Stakeholder working Sessions
Institutional component	<ul style="list-style-type: none"> • Planning, Capacity and enforcement 	<ul style="list-style-type: none"> • Questionnaire responses • Interviews • Stakeholder working sessions • Checklists 	<ul style="list-style-type: none"> • Matrix • Stakeholder working Sessions

8. Main issues to be addressed

The analysis of the already collected baseline data and stakeholder consultations has highlighted a number of issues. These include those issues that may constrain the Plan or opportunities where the Plan could contribute to or improve environmental value or quality.

8.1 Development and land-use planning

Kiambu County borders Nairobi and Kajiado Counties to the South, Machakos to the East, Murang'a to the North and North East, Nyandarua to the North West, and Nakuru to the West. The favourable climatic conditions, fertile soils and proximity to Nairobi City make Kiambu County attractive for agriculture, commercial as well as residential developments. The County's high population growth rate, coupled with an influx of people working in the city who prefer to stay in Kiambu due to less congestion and well developed infrastructure may increase the County's population to beyond 2,032,464 people by the end of 2017.

With the increase in population comes the demand for the expansion of infrastructure i.e. transport and communication, energy, and water supply/sewerage infrastructure, as well as higher demand for housing and commercial developments. In particular, the proximity of the County to Nairobi City has seen the transformation of large pieces of agricultural land into residential/comprehensive use developments. Many of the small-scale land owners are also converting their farms into residential and commercial plots to supplement the meagre income from the farms.

With the land-use changes happening around the County, there is potential for the rise in land-use conflicts, disjointed and haphazard development, and wide-scale environmental degradation if development planning, environmental and socio-economic/cultural controls are not considered holistically.

8.2 Water Resource use

The key considerations for this will be a consideration of the following:- a) the current water situation in the Northlands Area in terms of both surface water and groundwater resources, b) future scenario with regard to water demand, and c) implications for and by the Northlands Master Plan.

8.3 Community Concerns

The SEA will undertake a comprehensive stakeholder analysis in the Northlands Area in order to identify the Directly Affected and Indirectly Affected Stakeholders for their consultation and involvement. The latter will focus on the following:- a) participatory identification of the key benefits expected from the development, b) identification of potential negative impacts and public concerns, and c) participatory identification of suitable mitigation strategies for the negative impacts.

8.4 Energy supply and usage

The key considerations for this will be a consideration of the following:- a) the current energy situation in the Northlands Area, b) future scenario with regard to energy demand, and c) implications for and by the Northlands Master Plan.

8.5 Waste management

The key considerations will be on the current waste production levels in the Northlands Area as well as the existing waste management capacity. The assessment will also consider the implication for and by the proposed development on this capacity.



8.6 Biodiversity and wildlife conservation

The assessment will consider the current and future state of the biological environment in the Northlands Area by analyzing the following: a) biodiversity characteristics, b) terrestrial and aquatic ecosystems, c) protection of valued species and habitats.

8.7 Traffic Impact

The assessment will consider the current levels of human and vehicular traffic and the projected levels with the development of Northlands. Impacts of various traffic management options will also be assessed.

9. SEA Objectives

9.1 Introduction

This section sets out the draft objectives, targets and indicators that will be used to predict and assess the nature and degree of potential effects that the plan might have on the different environmental receptors and whether those impacts are significant or not. Only those effects which may be significant will be included in the SEA.

Baseline information, the policy review and identified key environmental issues, along with a review of other potentially relevant SEA objectives have been used to help formulate the SEA objectives.

The SEA guidelines provide for the use of objectives with suitable indicators and criteria for assessment by which effects can be described, analysed and compared at key stages of plan making process. The objectives should cover environmental, social and economic considerations

Topic	SEA Objective	Potential Outputs(s)	indicators
Biodiversity, flora and fauna	<ul style="list-style-type: none"> •Ensure the conservation, and where possible enhancement of important habitats and species •Ensure Protection and where possible enhancement of local biodiversity, flora and fauna 	A practical biodiversity enhancement plan that enhances indigenous vegetation to the site	Area of green space safeguarded/ enhanced as part of environmental enhancement
Development and land –use planning	Ensure that land-uses are sustainable and compatible with local development plans	A land use plan that is compatible with local development plans	Conformity to land-use plans for the area
Energy use and supply	Ensure the conservative use of available energy resources	Practical energy management and conservation options	Energy conservation measures put in place
Water supply and Sanitation	<ul style="list-style-type: none"> •Ensure the protection and improvement of the surface and groundwater environment, in terms of water quality and quantity, for the benefit of the human and/or natural environment •Ensure the conservative use of water resources •Ensure the disposal of effluent in an environmentally friendly manner 	<ul style="list-style-type: none"> •Sustainable water resource protection, conservation and exploitation options 	<ul style="list-style-type: none"> •Surface and ground water quality from periodic tests and analysis •Ground water yields from continuous monitoring •Quantities of water Recycled and/or harvested
Solid waste management	<ul style="list-style-type: none"> •Ensure the reduction in solid waste generation •Ensure the proper handling and disposal of generated waste 	<ul style="list-style-type: none"> •Practical and sustainable waste management options / plans 	<ul style="list-style-type: none"> •Number of transfer stations established in the development •Methods of collection and disposal of generated wastes
Micro/Macro scale economy	<ul style="list-style-type: none"> •Ensure the enhancement/ protection of important new and existing material assets and infrastructure in the area •Ensure the enhancement of economic benefits of the plan to the surrounding community 	<ul style="list-style-type: none"> •Tangible socio-economic benefits to the community •Safeguards for important community/national assets 	<ul style="list-style-type: none"> •Number of new infrastructure projects implemented/or existing infrastructure enhancements and attributable to the plan •Number of employment

			or business opportunities created as a result of the plan
Human health and safety	Ensure the improvement/enhancement of the health and wellbeing of the surrounding communities	Practical safeguards for community health and safety	Number of injuries / illnesses attributable to development activities ie construction phase and operation phase activities

9.2 Management of Environmental Responsibilities

The SEA Process will actively manage environmental responsibilities by considering the following issues:

- Maintain a system to provide up-to-date information about legal responsibilities to the environment, stakeholders’ interests, and other factors
- Identify stakeholders’ interests and what their views are, regarding the proposed environmental activities
- Undertake genuine consultations with key stakeholders and publicize the steps taken to be environmentally sensitive
- Specify objectives and targets for environmental improvement which would be realized by the SEA process

10. Next steps

10.1 Development of the optimal master plan option

Having gathered baseline data, and developed various alternatives in the master plan, the alternatives will then be tested against the SEA and plan objectives to narrow down to the most preferable alternative/options. It is anticipated that these alternatives will stimulate debate among the various stakeholders during the SEA Study besides the identification of other options that are favoured by particular interest groups. These discussions will enable the identification of the optimal option which will then be developed as the Draft Master plan for the site.

For any potential side-effects identified that might be damaging to social welfare, the environment or local economy in the preferred option, the SEA team will explore what steps could be taken to avoid or mitigate the consequences.

11. Terms of Reference (ToRs) for the SEA Study

The Terms of Reference developed and agreed with INTEGER for the SEA were drawn from the National Environment Management Authority's National Guidelines for Strategic Environmental Assessment in Kenya (2012). The ToRs specify the activities the Consultant will undertake for the SEA in line with the NEMA guidelines for SEA.

11.1 Screening

This step was applied to determine what level of assessment is necessary and was done in reference to the requirements of the Environmental Management and Coordination Act, 1999, the Environmental (Impact Assessment and Audit) Regulations, 2003 and other guidelines on Environmental Impact Assessment and Strategic Environmental Assessment. The output of this task was the preparation of a Plan Brief on the proposed development for submission to NEMA. The Authority reviewed the Plan Brief and communicated that a SEA was required for the Masterplan.

11.2 Scoping

Scoping studies have been carried out to establish the focus and content of the SEA and the relevant criteria for assessment. During the studies, an extensive stakeholder analysis was carried out to identify key stakeholders and establish their concerns and priorities in regard to the proposed development. This culminated in a Scoping Report submitted to NEMA for approval. Notwithstanding the previous stakeholder analysis, the Consultant at the start of the SEA study shall conduct a stakeholder gap analysis to identify any relevant stakeholders that might not have been considered during the scoping phases of the development. The consultant shall then prepare a comprehensive set of consultation and participation activities for the SEA and review the consultation and participation plan previously prepared.

11.3 Collection of Baseline Information

Partial baseline information has been collected on the site and the surrounding area from a range of information sources, including site investigations, government websites and publications, and thematic publications and reports on the plan area. The information collected covers the physical, biological and sociocultural/economic environment of the surroundings. However, gathering data is a process, and new data may become available or collected during the SEA process. Baseline data collected and to be complemented in subsequent data gathering activities will ensure that the resilience, vulnerability, and significance to human wellbeing of the local ecological systems and services is understood. The existing environmental protection measures and/or objectives set in international, national, or regional legislative instruments will be outlined and reviewed. In addition compliance of the master plan with the relevant national and regional legislation, guidelines, and objectives will be assessed.

11.4 Identification of key environmental and social issues

The Consultant will identify key environmental and social issues associated with the proposed master plan/development to inform the selection of environmental and social priorities. This identification of key issues will be based on analytical work using matrices and multi-criteria analysis.

11.5 Selection of environmental and social priorities

The scoping studies and stakeholder consultations have identified a number of issues that may constrain the Plan or opportunities where the Plan could contribute to or improve environmental value or quality. These shall form the key focus of the SEA study. They include:

- Development and land-use planning
- Water Resource use
- Community Concerns
- Energy supply and usage
- Waste management
- Biodiversity and wildlife conservation
- Traffic Impacts

In line with the consultation and participation plan of the SEA, these key environmental and social issues resulting from the analytical work shall be reviewed and prioritized in a stakeholders' forum to be organized by the plan proponent. It is expected that the stakeholders will agree on a common set of priorities at this forum and a report on the selection of priorities by the SEA stakeholders shall then be prepared.

The stakeholders to be consulted shall include:

- The neighboring residents and institutions; Consultations with the neighboring residents and institutions will mainly focus on potential impacts of the proposed plan on what this group of stakeholders consider as community assets as well as impacts on their health, safety and repose
- The local authority i.e. Kiambu County Government: Consultations with this stakeholder will enable the outlining of their priorities at a local physical planning perspective
- RUJWASCO and NWSC: This stakeholders will provide inputs with regard to the water supply and sewerage scenario within the locality, proposed plans and possible constraints
- Kenya Power: this stakeholder will provide inputs with regard to the power supply scenario in the locality, i.e. the existing supply, infrastructure, proposed upgrades and possible constraints
- Water Resource Management Authority (WRMA); This stakeholder will provide inputs on the water resource development controls in the area and how the development can conform to these controls
- KeNHA and KURA; These stakeholders will provide insights on how traffic in the plan area will be managed including design standards for connections to the existing national roads
- The National Environment Management Authority (NEMA) – Kiambu County: This being the regulator in environmental management matters, their inputs in regard to what are the acceptable standards/adequate mitigation plans will be sought besides providing insights on other regulatory requirements

11.6 Assessment

The Consultant will assess environmental and social sustainability of the master plan options against the identified stakeholder priorities. The extent to which candidate master plan options address the SEA's environmental and social priorities shall be determined, gaps identified, and specific recommendations made to refine the options to close those gaps. In this way, priority environmental and social considerations will be integrated into the preparation of the master plan.

The revised master plan shall also be assessed against the environmental and social impacts that it may induce or create during its implementation. These environmental and social impacts will be identified vis-a-vis the national and international environmental and social safeguard policies and recommendations including prescriptions made to eliminate or minimize the adverse impacts. Where



some residual risk(s) still remain, these shall be dealt with in the Environmental and Social Management Plans to be prepared during project-specific Environmental Impact Assessments.

11.7 Preparation of the Draft SEA Study Report

A Draft SEA Study Report shall be prepared detailing the proposed plans and objectives, the findings of the study including alternatives that were studied, the selected option, the affected area, the environmental analysis, the impacts expected, the mitigation and enhancement measures, and the proposed monitoring program. The Draft Report shall then be submitted to NEMA in the prescribed format and accompanied with the prescribed fees for review.

11.8 Validation of the assessment

Following NEMA's review and public review and comments, the Consultant shall amend the Draft Report and organize a validation workshop whereby the key stakeholders shall be invited to review and validate the amended Draft SEA Report. The Consultant will then prepare a Final SEA Report in the prescribed format and submit to NEMA for approval.

11.9 Monitoring and evaluation

The Plan proponent shall monitor the plan during implementation and submit reports at regular intervals to NEMA. Monitoring shall enable a determination of the extent to which environmental and social objectives/recommendations made in the SEA are being met. At the end of the plan implementation, evaluation will be carried out to determine whether the SEA led to sustainable plan design and implementation.

11.10 The SEA Study team

The SEA team that will be involved in the Study shall is given in the table overleaf. Their qualifications, area of specialization and accreditations is also provided.

The SEA Study Team

Name	Position	Qualifications	Area of Specialization	Accreditations
Francis Mwaura	Team Leader	PhD - Biogeography	Environment & Natural Resource Management	<ul style="list-style-type: none"> • NEMA Registered Lead Expert (Reg No 077) • Environment Institute of Kenya • International Association of Hydrogeologists (IAH) • International Water History Association (IWHA) • Kenya Forests Working Group (KFWG)
Simon Wandeto	Environmentalist	MSc - Biology of Conservation	Environmental Management and conservation	<ul style="list-style-type: none"> • NEMA Registered Lead Expert (Reg No 885) • Environment Institute of Kenya
Lawrence Njue	Environmentalist	<ul style="list-style-type: none"> • BSc - Environmental and Bio systems Engineering • MSc -Occupational Health and Safety (Ongoing) 	<ul style="list-style-type: none"> • Environmental Management, • Health and Safety 	<ul style="list-style-type: none"> • NEMA Registered Lead Expert (Reg No 0781) • Environment Institute of Kenya
Kennedy Kijana	Environmentalist	<ul style="list-style-type: none"> • BSc - Zoology • MSc -Environmental Science (ongoing) 	Environmental Management	<ul style="list-style-type: none"> • NEMA Registered Lead Expert (Reg No. 1254) • Environment Institute of Kenya
Robert Chira	Ecologist	PhD - Biology of Conservation	<ul style="list-style-type: none"> • Plant and Animal Ecology • Environmental Management 	<ul style="list-style-type: none"> • NEMA Registered Lead Expert • Environment Institute of Kenya
Edward Ontita	Socio-economist	PhD -Development Sociology and African Studies	<ul style="list-style-type: none"> • Development Sociology • Monitoring & Evaluation 	
Lydia Njeru	Sociologist	<ul style="list-style-type: none"> • B.A - Sociology • M.A - Rural Sociology and Community Development (on-going) 	Environmental Sociology	
Evans Mairura	Urban Planner	<ul style="list-style-type: none"> • M.A (Planning), • PhD Urban & Regional Planning (on-going) 	Urban and Regional Planning	<ul style="list-style-type: none"> • NEMA Registered Lead Expert • Environment Institute of Kenya



11.11SEA Programme

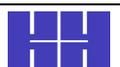
The programme for SEA is provided overleaf giving the time estimates from commencement to completion.

12. References

1. Environmental (Impact Assessment and Audit) Regulations, 2003
2. Environmental Management and Coordination Act (EMCA) – 1999
3. Environmental Management and Coordination (Controlled Substances) Regulations, 2007
4. Environmental Management and Coordination (Fossil Fuel Emission Control) Regulations, 2006
5. Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009
6. Environmental Management and Coordination (Waste Management) Regulations, 2006
7. Environmental Management and Coordination (Water Quality Standards) Regulations, 2006
8. Environmental (Impact Assessment and Audit) Regulations, 2003
9. Environmental Management and Co-ordination (Water Quality) Regulations 2006
10. Environmental Management and Co-ordination (Waste Management) Regulations 2006
11. Environmental Management and Co-ordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009
12. Environmental Management and Co-ordination (Fossil Fuel Emission Control) Regulations 2006
13. Draft Environmental Management and Coordination (Air Quality) Regulations, 2008
14. Environmental Management and Coordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulation, 2009
15. Environmental Management and Co-ordination (Conservation of Biological Diversity) Regulations, 2006
16. Environmental management and Co-ordination (Controlled Substances) Regulations 2007
17. Kenya National Bureau of Statistics: Kenya Population and Housing Census – 2009
18. National Guidelines for Strategic Environmental Assessment, 2012.
19. The Constitution of Kenya, 2010
20. The Energy Act, 2006
21. The Factories and Other Places of Work (Safety and Health Committees) Rules 2004
22. The Factories and Other Places of Work (Medical Examination) Rules 2005
23. The Factories and Other Places of Work (Noise Prevention and Control) Rules 2005
24. The Factories and Other Places of Work (Hazardous Substances) Rules, 2007
25. The Factories and Other Places of Work (Fire Risk Reduction) Rules, 2007
26. The Factories and Other Places of Work (Building Operational and Works of Engineering Construction) Rules, 1984
27. The Factories (First Aid) Rules, 1977
28. The Occupational Safety and Health Act, 2007
29. The Public Health Act (Cap 242)
30. The Physical Planning Act, 1999
31. The Wildlife Conservation and Management Act, 2013



13. Annexure



Annex 1: Land Use Plan





12.3 Appendix C: Ecological Study Report



Strategic Environmental Assessment of the
Proposed Northlands Master Plan, Kiambu
County



Ecological Study Report

10465K-GTR-H-0001

February 2015

Rev. 0

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REVISION RECORD SHEET

This page is a record of all revisions, if any, made to the attached document. The revisions are listed under "Revisions/Changes". The revisions are part of the document and override the corresponding parts of the original document.

Revisions/Changes:

Remarks:

Client:	Integer Limited						
Project:	Strategic Environmental Assessment of the Proposed Northlands Master plan, Kiambu County						
Title	Ecological Study Report						
Doc. No.	10465K-GTR-H-0001	Rev:	0	Date:	Orig.	Check.	Appr.
Attachments	Entire Document		√	Feb 2015	RC	FM	SNW
	Revised Pages Only						

Note: *This page and all its contents are NOT part of the document.*

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1.0 Introduction

The Northlands SEA ecological study involved collecting baseline data on woody and herbaceous vegetation as well as estimating the mammalian and avian wildlife species found in zones targeted for development. The zones are targeted for development of residential areas, industry, recreation, agriculture and commercial centers. The data was collected between 8th and 17th December 2014. Two band point sampling method was used to estimate avifauna distribution while wandering method and quadrat techniques were used for woody species and herbaceous species sampling.

Most of the study area was under extensive grasslands with a few patches of bushes while some areas were under Eucalyptus plantation. There were 56 species of herbaceous species encountered during the study with a mean ground cover ranging between 47% and 82%. Different zones were characterized by different composition of herbaceous species with the most common comprising of *Hyperrhenia hirta*, *Themeda triandra*, *Chloris gayana*, *Penisetum mesianum*, *setaria sphacelata*, and *Sporobolus pyramidalis*. However, most habitats were dominated by *T. triandra*. Woody patches were most common within the agricultural/conservancy area where the most dominant of the species was *Acacia drepanolobium* while the recreational area had *Combretum molle* as the most dominant woody species. Other zones had sparse woody vegetation mainly under *A. drepanolobium*, *Acacia senegal* or *Acacia mellifera*.

A total of 45 avian families, comprising 140 species were recorded in the study area represented by various feeding guild of carnivores, granivores, insectivores, nectarivores and omnivores. The frugivores were the least abundant accounting for 3% while carnivores were 6% of the total number encountered. The dominant feeding type was insectivores, accounting for 43% of the total number of species. Other feeding guilds were granivores at 24%, omnivores at 20% and nectarivores at 4%. Mammalian species were poorly distributed with most species being found within the agricultural land followed by high density residential area comprising of 71% and 28% of the total number of individuals counted in the entire study area. The remaining 1% was found in the low density residential zone. Wildlife was dominated by Thompson's gazelle with a few individuals of bushbuck, common duiker and baboon.

Development of these zoned areas is expected to have implications on the environment especially for the endangered grey crowned crane which may become locally extinct once the areas are fully developed. However, where appropriate mitigation measures are taken into account, there is a possibility of retaining their preferred riverine swamps. Migratory avian species were also found to utilize the expansive rangelands and will obviously be affected by change in land use. Other passerines will also lose their habitat once the areas switch their land use status. Woody and herbaceous species did not have critical species of concern but once removed, it will disappear along with its associated avian and mammalian habitats/species. Hippos and the crocodiles are the main riverine dwellers with habitats that are at risk due to planned development. Loss of their habitat will defiantly impact on their numbers and survival. Although other mammalian species were few, they have a chance of being translocated into the proposed agricultural land. The finds of this study prescribe a thorough EIA study for each of the zones identifying mitigation measures to minimize environmental degradation and species loss.



2.0 Methods

The baseline data collection within the study area involve a desk-based review of existing ecological information, comprising wildlife species and vegetation data, as well as any other information relevant to the proposed project. Field visits for vegetation ground-truthing and faunal assessment was undertaken. There were consultations in the field with relevant office to acquire data and information on wildlife species and habitats. The following methods were used in meeting the scope of work.

2.1 Woody species Sampling

Woody species in the study area are widely scattered while some areas are devoid of woody vegetation. The agricultural/conservation area is either under scattered *Acacia drepanolobium* bushland or open grassland with very few woody species. Owing to scattered nature of woody species, wandering method of vegetation sampling was used. Transects were established randomly in each of the zones. Transects were established within the industrial, agricultural, high density residential, low density residential, recreational and commercial areas. A starting point near the beginning of each transect was selected at random. With the aid of a compass, a quadrant was set-up (90° angle) with the transect line bisecting the angle at 45° . The nearest individual to the point was identified and its point-plant distance measured in that quadrant. The sampled plant served as the apex of a new quadrant whose angle (90° angle) was bisected by a line running parallel to the transect. The nearest woody individual was identified as for the initial starting point and point-plant distance measured. The procedure was repeated until the end of the transect.

2.2 Herbaceous Vegetation Sampling

Herbaceous layer assessment involved use of a 0.5m x 0.5m quadrat. Quadrats were established at equidistance along a baseline in each of the zones. In expansive homogeneous habitats, e.g. the grasslands, quadrats were established 50m apart along a transect measuring 1km in length and in smaller sized zones e.g. woody patches within grasslands, quadrats were established 20m apart along baselines measuring either 100m or 250m long. Data collected in each quadrat involved measurement of herbaceous height with a meter rule at 5 points within each 0.5m x 0.5m quadrat. These measurements were subsequently used to calculate the average herbaceous height within the quadrat. Herbaceous cover was estimated as perpendicular projection of outer-margin of herbaceous foliage onto the ground within each 0.5m x 0.5m quadrat and extrapolating this into 1m² quadrat. The herbaceous cover was estimated for each species sampled.

2.3 Mammalian counts

Mammalian species counts involved fixed width transect sampling technique for total mammalian counts owing to the openness of the area (Sutherland, 1996). Use of binocular aided in observing animals from a distance. Data was collected for each development zones as previously stated. The data was used to estimate mammalian species density in each zone and their distribution. The survey was also used to understanding the types of mammalian species found in different zones, their compatibility with envisaged development.



2.4 Avifauna Counts

Avian species counts involved point transects sampling with two recording bands (Sutherland, 1996). The first band radius was fixed at 20m. Data was collected within the two bands, where avian species were counted and recorded within a radius of 20m and also those occurring beyond the 20m radius. Several avifauna sampling points were established within each zone targeted for various forms of development. The avian data was used to estimate each feeding guild's relative abundance, calculated as total number of individuals belonging to a feeding guild as a fraction of all individuals of all feeding guilds encountered within the study area. The data was also used to estimate avifauna Shannon-Wiener diversity indices (H') for various zones using the formula below:

$$H' = -\sum P_i \log P_i$$

Where P_i is the proportion of each species in the sample. The higher the diversity index value the more important was the habitat in terms of its species numbers and their relative abundances (Cox, 1990).

3.0 Results

3.1 Vegetation

3.1.1 Recreation area bushed grassland (zones 15-16)

The proposed recreation area the larger portion being adjacent to Peponi School was dominated by *Combretum molle* at density of 14 individuals per hectare. Other species comprising of *Erythrina ethiopia*, *Terminalia brownie*, *A. polyacantha* and *Albizia gummifera* each had density of less than 5 individuals per hectare. The area had 13 species constituting herbaceous layer had a mean ground cover of 40% and a mean height of 76cm and 9cm for woody herbs and none woody herbs respectively. Out of the total herbaceous species, nine were woody herbs dominated by *Hibiscus diversifolia* and *Trimffeta flavescens*. The least dominant of the woody herbs comprised of *Leonities hepatifolia* and *Sida kilimandscharicum*. None woody herbs species comprised of *Chriscloe orientalis*, *Hyperrhenia hirta*, *Pernicum maximum* and *Themeda triandra*. *Hyperrhenia. hirta* and *T. triandra* had the highest ground cover while *P. maximum* had the least.

3.1.2 Eucalyptus Plantation Recreation Area (Zone 16 and 20)

This area was under eucalyptus plantation with herbaceous layer being dominated by *Cynodon dactylon* with mean ground cover of 36% out of the 8 species sampled in this habitat. The herbaceous layer mean ground cover was at 68%, averaging 25cm in height. The other important herbaceous species were *S. sphacelata* with a mean ground cover of 18% while *C. esculantus*, *P. maximum* and *A. kiniensis* had the least cover.

3.1.3 Recreation area immature plantation grassland (Zone 20)

The habitat is before the Eucalyptus plantation next to brooke-side dairy treatment pond, WR 2 (water body). Woody species in this area were characterized by immature plantations of indigenous and exotic species. Indigenous species included *Balanitis aegyptiaca*, *Rhus natalensis*, *A. kirkii*, *Podocarpus sp.*, *Tarminalia mendalis*, *Azadaracta indica*, *Acacai mellifera* while exotics were *Cassia didymobotrium*, *Ficus benjamina*, *Eucalyptus sp* and *Jaccarada sp*. Eleven herbaceous species were recorded in this area with mean ground cover of 94%. Herbaceous cover was dominated by that of *Sporobolus*



pyramidalis at 34%. The least important species were *Cynodon dactylon*, *Osmum suave* and *S. sphacelata*. The mean height for herbaceous layer was 35cm above ground.

3.1.4 CBD Open grassland (Zone 1)

The CBD adjacent to Thika Road and Kahawa Sukari and opposite KU was dominated by *Acacia polyacantha* and *Ormocarpum kirkii* at densities of 13 and 11 individuals per hectare respectively. Other woody species encountered in this habitat comprised of *A. tortilis*, *Ziziphus abyssinica*, *Cassia sp.*, *A. kirkii*, *Schinus molle* and *A. senegal* and each had density of less than five individuals per hectare. Herbaceous layer mean ground cover was at 64% and dominated by *T. triandra* and *Heteropogon contortus*. The least dominant were *Eragrostis superb*, *Eragrostis racemosa*, *Aristida keniensis* and *H. hirta*. The habitat had a total of 17 herbaceous species with a mean height of 36cm.

3.1.5 Agricultural/Conservation area *Acacia drepanolobium* grassland (Zone 13)

This habitat was a patch of bushes dominated by one woody species, *A. drepanolobium* at a density of 354 individual per hectare. The other species in this habitat, *Acacia Senegal* was at density of 12 individuals per hectare. The herbaceous layer comprised of 11 species with mean height of 23cm and mean ground cover estimated at 77%. The layer was dominated by *Chloris gayana* followed by *Penisetum masianum* and *T. triandra* in that order of importance. The least in mean groundcover were *Brachiaria brizantha* and *Dychoriste radicans*.

3.1.6 Conservation area *Acacia mellifera* grassland (Zone 13)

The bushland was a patch work of woody species at the northern tip of the agricultural area near Athi-River. It was characterized by four woody species comprising of *A. mellifera*, *A. nilotica*, *A. drepanolobium* and *Rhus natalensis*. The four woody species were dominated by *A. mellifera* and *A. nilotica* at densities of 62 and 44 individuals per hectare respectively. Other two woody species found here were represented by less than 5 individuals per hectare. The herbaceous layer ground cover was dominated by that of *T. triandra*, which was among eight herbaceous species encountered in this habitat. Another species that had a relatively higher mean ground cover was *P. maximum* while *Commelina sp.*, *Sida masaiica* and *B. brizantha* had the least mean cover. The average herbaceous layer height was estimated at 24cm above ground with mean ground coverage of 70%.

3.1.7 Conservation area grasslands (Zone 13)

The grasslands were dominated by *Setaria sphacelata* with a mean herbaceous ground cover of 33%. The species was among three other herbaceous species, *Indigofera schimperi* with the least mean ground cover, *P. mesianum* and *T. triandra*. The herbaceous layer had an average height of 11cm above ground while the mean cover was at 64%.



3.1.8 Logistic Industry and High Density Residential grasslands (Zones 10, 11 and 6)

The area was dominated by *A. drepanolobium* at density of 65 individuals per hectare while other woody species found in this habitat had densities of less than 20 individuals in hectare. These least dominant woody species were *A. mellifera*, *A. kirkii*, *R. natalensis*, *Carrissa edulis* and *A. nilotica*. The herbaceous layer comprised of 20 species with mean ground cover of 57% and averaging 14cm above ground. The most dominant herbaceous species in terms of its ground coverage was *S. sphacelata* at 25% while the least important were *D. radicans*, *I. schimperi*, *A. kiniensis* and *A. mossambicensis*, each with mean ground cover of less than 5%.

3.1.9 Low density residential *Acacia drepanolobium* grassland (Zone 5)

The habitat was to the southeast of the conservation area sandwiched between Kamiti and Nairobi Rivers. A huge section was under papyrus running along Nairobi River, an area that is inundated during the wet seasons of the year by over-flow from Kamiti and Nairobi Rivers. The drier area next to Eastern by-pass was dominated by *A. drepanolobium* at density of 844 individuals per hectare. *Themeda triandra* dominated this area having the highest mean ground cover of 44% out of a total of 80% for the nine herbaceous species found in this habitat. The least important species were *A. kiniensis* and *P. maximum*.

3.1.10 Low density Residential (Zone 3)

This habitat was sandwiched between Thika Road, Eastern by-pass and brooke-side treatment ponds near WR2. The woody vegetation was dominated by *C. molle* and at density of 34 individuals per hectare. Other woody species represented in low densities (less than 10 individuals per hectare) were *Ficus sycomorus*, *Acacia xanthophloea*, *A. polyacantha*, *Schinus molle*, *A. nilotica*, *Z. abyssinica*, *Balanites aegyptiaca* and *Grewia bicolor*. There were 16 herbaceous species encountered in this habitat which had a mean ground cover of 85%. The habitat was dominated by *T. triandra* with a mean ground cover of 27% while the least important species were *Chloris gayana*, *C. orientalis*, *C. dactylon*, *E. superb*, *E. racemosa* and *P. maximum*, each with a mean cover of less than 5%. The average height of the herbaceous layer was at 20% above ground.

3.1.11 Low density Residential bushed grassland (Zone 4)

The patchy bushy areas woody species were dominated by *Acacia Senegal* at a density of 320 individual per hectare followed by *Acacia drepanolobium* (70 individuals/ha). Other woody species present in densities of less than 30 individuals per hectare were *Acacia kirkii* and *Carrisa edulis*. The herbaceous layer mean ground cover was at 47% and of 11cm average mean height above ground. *Themeda triandra* had the highest mean ground cover at 13% dominating the other 14 herbaceous species found in this habitat. The least important herbaceous species based on their mean ground cover were *Dichanthum papillosum*, *I. schimperi* and *Orthosipan parvifollus*.

3.1.12 Low density Residential open grassland (Zone 4)

The open grassland herbaceous layer mean ground cover was at 80%, averaging 12cm in height. The dominant species were *T. triandra* and *S. pyramidalis* with mean ground cover of 32% and 18% respectively. The least important species were *A. mossambicensis*, *C. orientalis*, *C. esculantus*, *Digitaria. scalarum* and *D. radicans*.



3.2 Birds

A total of 45 avian families, comprising 140 species were recorded in the study area (Appendix 2) belonging five feeding classes that included carnivores, granivores, insectivores, nectarivores and omnivores. The frugivore feeding guild was least abundant represented by four species which proportionately accounted for 3% of the total number of species. The carnivores had eight species, representing 6% of the total species. Carnivores are good indicators of ecosystem change due to their status in the food chain. The dominant feeding type was the insectivores, represented by 61 species or 43% of the total number of species. Other feeding guilds were granivores with 34 species at 24%, omnivores with 28 species at 20% and nectarivores with 5 species representing 4% of all species.

Species relative abundance and distribution varied among land use zones, with all feeding types being well represented within the agricultural, low density residential habitats (zone 4) and recreational area habitats (Fig. 1). These zones were predominantly open grasslands interspersed with patches of *Acacia drepanolobium* and *Acacia nilotica* woody species. Granivores and insectivores were the most abundant feeding types and well distributed among different land use types. Omnivores were most abundant in low density residential habitats (zone 4), agricultural area and within the recreation areas.

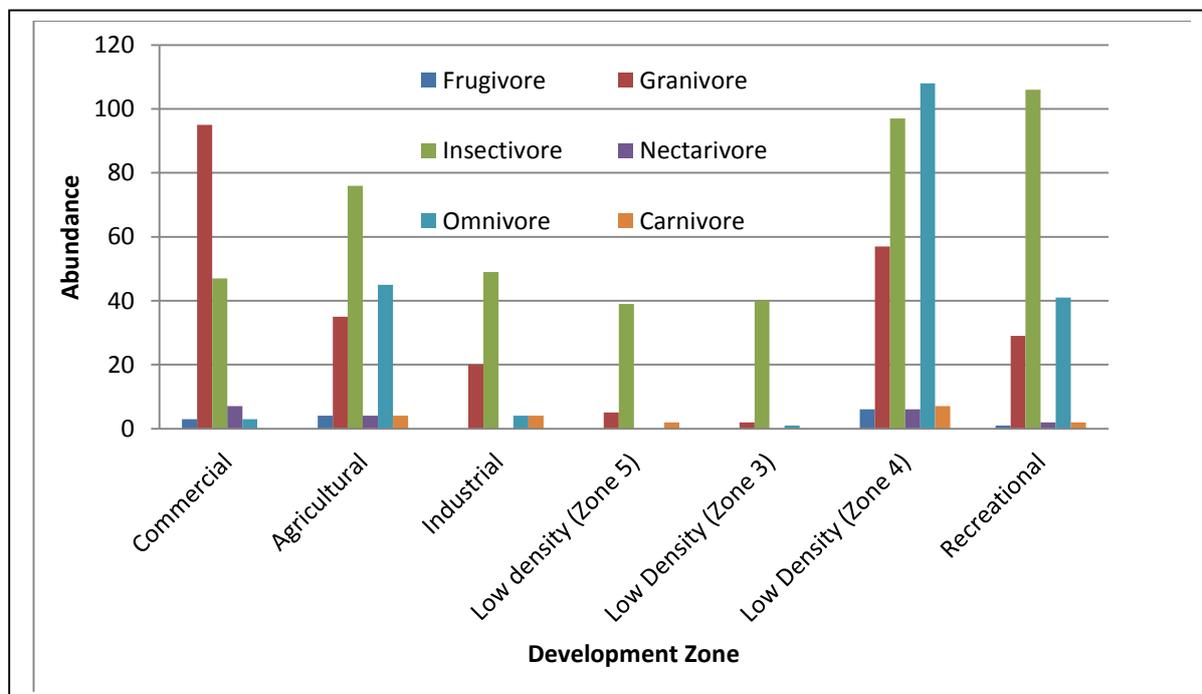


Fig 1: Abundance of various feeding guild classes in different development zones in the study area

Carnivores were most abundant in low density area residential habitats (zone 4) and ubiquitous in distribution covering the agricultural, industrial, low density residential habitats (zone 5) near the swamps and the proposed recreational areas (Fig. 1 and Table 1). Frugivores were few with most being encountered within the proposed low density residential habitats (zone 4), agricultural and commercial areas. Omnivores were most abundant within the low density residential habitats (zone 4), granivores within the proposed commercial and low density residential habitats (zone 4) and agricultural area while nectarivores were more abundant within the low density residential habitats (zone 4), although ubiquitous in distribution within the study area.



The avian species Shannon-Weiner diversity index for the study area was at 1.25. Agricultural area habitats had the highest Shannon-Weiner diversity at $H' = 1.31$ followed by low density residential habitats (zone 4) at $H' = 1.30$ and recreation areas habitats at $H' = 1.07$ (Table 1). The habitats with the lowest species diversity were the commercial and industrial/high density residential areas each at $H' = 0.95$ as well as low density residential habitats (zone 3) area near Thika Road at $H' = 0.3$.

Table 1: Shannon-Weiner (H') Avian Diversity Indices and their abundance in various habitats

	CA	AH	IND	LDS	LDT	LDC	REC	Total
Shannon Weiner	0.95	1.31	0.95	0.52	0.3	1.3	1.07	1.25
Abundance	155	168	77	46	43	281	181	951

KEY: CA-Commercial are Habitats

AH-Agricultural Habitats

IND- Industrial/High Density Habitats

LDS-Low density Residential Habitats (Zone 5)

REC-Recreation Area Habitats

LDC-Low Density Residential Habitats (Zone 4)

LDT Low Density Residential Habitats (Zone 3)

The avian species encountered within the study area that are considered of conservation value are grey crowned crane (*Balearica regulorum*) considered endangered throughout its range and the Jackson's window-bird (*Euplectes jacksoni*) which is near threatened in its known range areas. Grey crowned crane were encountered along swampy riverine areas along Kamiti River opposite Kahawa Sukari estate and near the dam and swampy areas within the proposed low density residential habitats (zone 4). Jackson's window-bird had only two records within the proposed industrial area along the eastern by-pass road.

There were 14 species of avian migrants encountered during the study included that included Common Sandpiper (*Actitis hypoleucos*), Wood Sandpiper (*Tringa glareola*), Little Stint (*Calidris minuta*), Barn Swallow (*Hirundo rustica*), Eurasian Bee-eater (*Merops apiaster*), Yellow Wagtail (*Motacilla flava*), Western Marsh Harrier (*Circus aeruginosus*), Tree Pipit (*Anthus trivialis*), Isabelline Shrike (*Lanius isabellinus*), Common Buzzard (*Buteo buteo*), Common Greenshank (*Tringa nebularia*), Ruff (*Philomachus pugnax*), Amur Falcon (*Falco amurensis*) and Black Kite (*Milvus migrans*). The proposed low density residential habitats (zone 4) had more of the migrant species (11) recorded with the exception of common buzzard, common green shank and ruff and, therefore, an important habitat. Several of the species recorded were represented in low numbers, less than 10 individuals each, except for barn swallow and Eurasian bee-eater which had 46 and 38 individual records respectively.



3.3 Mammals

Mammalian wildlife species in the area are remnants of the rich faunal assemblages characterizing the Ol Donyo Sabuk and Nairobi National Park. The wildlife migrated between the two areas concentrating in Nairobi National Park as a dry season grazing area. This movement is no longer feasible due to human settlements that have created a barrier curtailing former migrations. Increase in human population has also resulted into wildlife malpractices where wildlife has been trapped and slaughtered for bush meat. This has led to local extinction of common zebra (*Equus burchelli*), Maasai giraffe (*Giraffa camelopardalis*), Impala (*Aepyceros melampus*), warthog (*Phacochoerus aethiopicus*), Cape buffalo (*Syncerus caffer*) and Coke's hartebeest (*Alcelaphalus buselaphus*) that were abundant in this area in the 1970's and 1980's. During this survey, wildlife species encountered were few, low in density and poorly distributed. The wildlife species comprised of Thompson's gazelle (*Gazella thomsoni*), Bushbuck (*Tragelaphus scriptus*), Common duiker (*Cephalopus grimmia*), Hippo (*Hippopotamus amphibious*) baboon (*Papio anubis*) and Nile crocodile (*Crocodylus nilotica*). There were reports of Silver backed jackal (*Canis mesomelas*), Bat eared fox (*Otocyon megalotis*) and spotted hyena (*Crocuta crocuta*) occasionally being reported although these species were not spotted during this survey. Thompson's gazelle were the most dominant in the study area although they were only found in the low density residential habitats (zone 4) and agricultural area habitats at density of 26 km⁻² and 23 km⁻² respectively. Bush buck was in densities of 2 km⁻² and 1 km⁻² in low density residential habitats (zone 4) grasslands and Eucalyptus plantation recreational area habitat respectively. The common duiker was recorded in Eucalyptus plantation recreational area habitat only while the baboon was encounter only in agricultural area habitats each at density of 1 km⁻².

3.4 Evaluation of Habitats and Species of Special Interest

The study area is the only continuum of natural vegetation existing in the locality. The surroundings are fast undergoing urbanization with natural vegetation being cleared and replaced with built-in areas. One consequence associated with this land-use change is loss of extensive natural habitats together with its associated biodiversity. The study area though a modified system, acts as a refuse for displaced species of birds and wildlife from adjoining areas and, therefore, rich in biodiversity content. It has several critical habitats that include the swampy riverine habitats along Kiu, Kamiti and Nairobi Rivers. These are critical habitats for waterfowl birds, reptiles and also act as natural sieves for pollutants and suspended solids, regulate water flow and preserves natural flora. These habitats are critical to grey crowned crane, and Nile crocodile which are endangered as well as the hippo which is threatened. The grasslands are important for conservation of Jackson's widow-bird that is classified as near threatened. However, although these species are represented elsewhere in their natural range, provisions should be made to ensure their habitats within the study area remains as natural as possible. The agricultural/conservancy is an opportunity within the study area to allow continued conservation and management of these three species. It could also serve as a refuge for other wildlife displaced from their habitats by proposed development. This can be achieved by trans-locating existing wildlife in other zone into the agricultural portion of the study area.



3.5 Environmental Indicators

There are several environmental consideration associated with the planned development in the Northlands area that will require mitigation measures. These environmental issues include:

- Pollution of Kamiti and Nairobi Rivers through effluents emanating from the industrial zone during the operational phase,
- Degradation and modification of Kiu, Kamiti and Nairobi Rivers riverine vegetation during the construction phase,
- Displacement and modification of crocodile and hippo habitats along Kiu, WR1 (water body), Kamiti and Nairobi Rivers,
- Degradation of all riverine swampy areas and all WR (water bodies) displacing the endangered grey crowned crane,
- Translocation of mammalian species from target residential zones into the agricultural/conservancy area increasing pressure on food resources in the conservancy and conflict with livestock herding,
- Removal and degradation of grassland and associated habitats affecting avian species biodiversity and distribution,
- Solid Waste pollution of the environment by labor camps during construction and by residential estates, CBD and industries during operation phase,
- Noise and air pollution affecting the Northlands and neighborhood emanating from industrial activities during operation phase,
- Soil pollution and contamination of water bodies through oil and grease spills during construction phase for various zones within the Northlands,
- Increased storm water from built in areas impacting on water flow regimes of Kiu, Kamiti and Nairobi Rivers especially during the wet seasons.



4.0: IMPACT CHARACTERIZATION FOR THE POTENTIAL NEGATIVE IMPACTS

4.1: Commercial CBD (Zone 1)

Potential negative impact	Principal Receptor	Probability and risk of occurrence	Duration of impact	Magnitude	Reversibility	Importance
Loss of avian species habitats	Northlands area	High	Long term	Large scale	Irreversible	High
Loss of avian species diversity	Northlands area and neighborhood	High	Long term	Medium scale	Irreversible	High
Loss of Hippo grazing habitats	Kiu and kamiti Rivers	Moderate	Long term	Medium scale	Irreversible	Moderate
Modification of riverine vegetation	Kiu and kamiti Rivers	Moderate	Long term	Medium scale	Irreversible	Moderate
Increased soil erosion	Northlands area	Moderate	Short term	Small scale	Reversible	Moderate
Increased storm water	Kiu and kamiti Rivers	High	Long term	Large scale	Irreversible	High
Effect of noise, vibration and grease on fauna and water	Northlands area and neighborhood	Moderate	Short term	Small scale	Reversible	Moderate
Effect of wastes generated from labor camps on avian species	Northlands area	Moderate	Short term	small scale	Reversible	Low
Effect of wastes generated from built-in area on avian species	Northlands	High	Long term	Large scale	Irreversible	Moderate
Creation of new avian species habitats	Northlands area	Moderate	Long term	Medium scale	Irreversible	Moderate

4.2: Brooke Side Recreational Area (Zones 14-20)

Potential negative impact	Principal Receptor	Probability and risk of occurrence	Duration of impact	Magnitude	Reversibility	Importance
Modification of avian habitats	Northlands and neighbors	Moderate	Long term	Medium scale	Irreversible	Moderate
Effect of wastes generated by visitors on avian species	Northlands area	High	Long term	Large scale	Irreversible	Moderate
Creation of new avian species habitats	Northlands area	Moderate	Long term	Medium scale	Irreversible	Moderate

4.3: Low and Mid Density Residential Areas (Zones 3, 4 and 7)

Potential negative impact	Principal Receptor	Probability and risk of occurrence	Duration of impact	Magnitude	Reversibility	Importance
Loss of avian species habitats	Northlands area	High	Long term	Large scale	Irreversible	High
Loss of avian species diversity	Northlands area and neighborhood	High	Long term	Medium scale	Irreversible	High
Effect of translocation of mammals on biodiversity	Northlands	Medium	Long term	Mediums scale	irreversible	High
Modification and channeling of WR3 (water body)	Northlands area	Moderate	Long term	Medium	Irreversible	Moderate
Modification of riverine vegetation	Kamiti River	Moderate	Long term	Medium scale	Irreversible	Moderate
Increased soil erosion	Northlands area	Moderate	Short term	Small scale	Reversible	Moderate
Increased storm water	Kiu and kamiti Rivers	High	Long term	Large scale	Irreversible	High
Effect of noise, vibration and grease on fauna and water	Northlands area and neighborhood	Moderate	Short term	Small scale	Reversible	Moderate
Effect of wastes generated from labor camps on avian species	Northlands area	Moderate	Short term	small scale	Reversible	Low
Effect of wastes generated from built-in area on avian species	Northlands	High	Long term	Large scale	Irreversible	Moderate
Creation of new avian species habitats	Northlands area	Moderate	Long term	Medium scale	Irreversible	Moderate



4.4: Logistic and High Density Residential area (Zone 10,11 and 6)

Potential negative impact	Principal Receptor	Probability and risk of occurrence	Duration of impact	Magnitude	Reversibility	Importance
Loss of avian species habitats	Northlands area	High	Long term	Large scale	Irreversible	High
Loss of avian species diversity	Northlands area and neighborhood	High	Long term	Medium scale	Irreversible	High
Effect of translocation of mammals on biodiversity	Northlands	Medium	Long term	Mediums scale	irreversible	High
Modification of riverine vegetation	Kamiti and Nairobi Rivers	Moderate	Long term	Medium scale	Irreversible	Moderate
Effects of increased soil erosion	Northlands area	Moderate	Short term	Small scale	Reversible	Moderate
Effect of soil and water pollution from industries	Northlands area	High	Long term	Medium	Irreversible	High
Effects of increased storm water	Kiu and kamiti Rivers	High	Long term	Large scale	Irreversible	High
Effect of noise, vibration and grease on fauna and water	Northlands area and neighborhood	Moderate	Short term	Small scale	Reversible	Moderate
Effect of air pollution from industries	Northlands area and neighborhood	Moderate	Long term	Small scale	Irreversible	Moderate
Effect of wastes generated from labor camps on avian species	Northlands area	Moderate	Short term	small scale	Reversible	Low
Effect of wastes generated from built-in area on avian species	Northlands	High	Long term	Large scale	Irreversible	Moderate
Creation of new avian species habitats	Northlands area	Moderate	Long term	Medium scale	Irreversible	Moderate

4.5: Agriculture/Conservation Area (Zone 13)

Potential negative impact	Principal Receptor	Probability and risk of occurrence	Duration of impact	Magnitude	Reversibility	Importance
Effects of wildlife introduction	Northlands area	Low	Long term	Medium scale	Reversible	Medium
Concentration of wildlife, habitat degradation and conflict with livestock	Northlands area	Medium	Long term	Medium scale	Reversible	Medium



4.6: Low density residential (Zone 5)

Potential negative impact	Principal Receptor	Probability and risk of occurrence	Duration of impact	Magnitude	Reversibility	Importance
Loss of avian species habitats	Northlands area	High	Long term	Large scale	Irreversible	High
Loss of avian species diversity	Northlands area and neighborhood	High	Long term	Medium scale	Irreversible	High
Modification of riverine vegetation	Kamiti and Nairobi Rivers	Moderate	Long term	Medium scale	Irreversible	Moderate
Effects of increased soil erosion	Northlands area	Moderate	Short term	Small scale	Reversible	Moderate
Effects of increased storm water	Kamiti and Nairobi Rivers	High	Long term	Large scale	Irreversible	High
Effect of noise, vibration and grease on fauna and water	Northlands area and neighborhood	Moderate	Short term	Small scale	Reversible	Moderate
Effect of wastes generated from labor camps on avian species	Northlands area	Moderate	Short term	small scale	Reversible	Low
Effect of wastes generated from built-in area on avian species	Northlands	High	Long term	Large scale	Irreversible	Moderate
Creation of new avian species habitats	Northlands area	Moderate	Long term	Medium scale	Irreversible	Moderate



Appendix 1: List of herbaceous species recorded in North Lands study area

No.	Species
1	<i>Dychoriste radicans</i>
2	<i>Aristida kenieisns</i>
3	<i>Aspelia mossambicensis</i>
4	<i>Bidens pilosa</i>
5	<i>Bothrocloa insculpta</i>
6	<i>Brachiaria brizantha</i>
7	<i>Brachiaria brizantha</i>
8	<i>Cassia mimosoidea</i>
9	<i>Chloris gayana</i>
10	<i>Chricloe orientalis</i>
11	<i>Commelina sp.</i>
12	<i>Criscloe orientalis</i>
13	<i>Cynbopogon sp.</i>
14	<i>Cyperus esculantus</i>
15	<i>Dichanthum papillosum</i>
16	<i>Dichoriste radican</i>
17	<i>Digicanthum papillosum</i>
18	<i>Digitaria gazensis</i>
19	<i>Digitaria malanjiana</i>
20	<i>Digitaria scalarum</i>
21	<i>Dychoriste radican</i>
22	<i>Eragrostis racemosa</i>
23	<i>Eragrostis superb</i>
24	<i>Euporbia prostrata</i>
25	<i>Fibristylis monostachya</i>
26	<i>Gnaphalium inteoalbum</i>
27	<i>Heteropogon contortus</i>
28	<i>Hibiscus diversifolia</i>
29	<i>Hibiscus fulscus</i>
30	<i>Hyperlenia hirta</i>
31	<i>Hyperlenia sp</i>
32	<i>Hyperlenia sp</i>
33	<i>Hyperrhenia hirta</i>
34	<i>Indigofera schimperi</i>
35	<i>Laggera brevipes</i>
36	<i>Leonities hepatifolia</i>
37	<i>Lippia japonica</i>
38	<i>Nasea kilimandschricum</i>

No.	Species
39	<i>Ocimum kilimandscharicum</i>
40	<i>Ocimum suave</i>
41	<i>Orthosipon parvifollus</i>
42	<i>Oxalis latifolia</i>
43	<i>Panicum maximum</i>
44	<i>Panicum nipen</i>
45	<i>Phyllanthus maderaspatensis</i>
46	<i>Rhychelytrum repens</i>
47	<i>Setaria sphacelata</i>
48	<i>Sida kilimandscharicum</i>
49	<i>Sida mosaica</i>
50	<i>Solanum incanum</i>
51	<i>Sporobolus pyramidalis</i>
52	<i>Tephrosia sp.</i>
53	<i>Themeda trindra</i>
54	<i>Triffetta flavescens</i>
55	<i>Tinnea aethiopica</i>
56	<i>Vernonia lasiopus</i>



Appendix 2: List of Avian species encountered in Northlands study area

No.	Family	Species Name	Scientific Name
1	Accipitridae	Amur Falcon	<i>Falco amurensis</i>
		Augur Buzzard	<i>Buteo augur</i>
		Ayres's Hawk Eagle	<i>Aquila ayresii</i>
		Black Kite	<i>Milvus migrans</i>
		Black-chested Snake Eagle	<i>Circaetus pectoralis</i>
		Common Buzzard	<i>Buteo buteo</i>
		Tawny Eagle	<i>Aquila rapax</i>
		Western Marsh Harrier	<i>Circus aeruginosus</i>
2	Alaudidae	Fischer's Sparrow Lark	<i>Eremopterix leucopareia</i>
		Rufous-naped Lark	<i>Mirafra africana</i>
3	Alcedinidae	Grey-headed Kingfisher	<i>Halcyon leucocephala</i>
		Pied Kingfisher	<i>Ceryle rudis</i>
4	Anatidae	Egyptian Goose	<i>Alopochen aegyptiaca</i>
		Hottentot Teal	<i>Anas hottentota</i>
		Red-billed Teal	<i>Anas erythrorhyncha</i>
		Spur-winged Goose	<i>Plectropterus gambensis</i>
		White-faced Whistling Duck	<i>Dendrocygna viduata</i>
		Yellow-billed Duck	<i>Anas undulata</i>
5	Apodidae	African Palm Swift	<i>Cypsiurus parvus</i>
		Black-crowned Night Heron	<i>Nycticorax nycticorax</i>
		Black-headed Heron	<i>Ardea melanocephala</i>
		Cattle Egret	<i>Bubulcus ibis</i>
		Little Egret	<i>Egretta garzetta</i>
		Squacco Heron	<i>Ardeola ralloides</i>
		Yellow-billed Egret	<i>Egretta intermedia</i>
6	Capitonidae	D'Arnaud's Barbet	<i>Trachyphonus darnaudii</i>
		Red-fronted Tinker bird	<i>Pogoniulus pusillus</i>
		Blacksmith Plover	<i>Vanellus armatus</i>
		Crowned Plover	<i>Vanellus armatus</i>
		Spur-winged Plover	<i>Vanellus spinosus</i>
7	Ciconiidae	African Open-billed Stork	<i>Anastomus lamelligerus</i>
		Marabou Stork	<i>Leptoptilos crumeniferus</i>
		Yellow-billed Stork	<i>Mycteria ibis</i>
8	Cisticolidae	Grey-backed Camaroptera	<i>Camaroptera brachyura</i>
		Rattling Cisticola	<i>Cisticola chiniana</i>
		Singing Cisticola	<i>Cisticola cantans</i>
		Stout Cisticola	<i>Cisticola robustus</i>
		Tawny-flanked Prinia	<i>Prinia subflava</i>



No.	Family	Species Name	Scientific Name
		Winding Cisticola	<i>Cisticola galactotes</i>
		Wing-snapping Cisticola	<i>Cisticola ayersii</i>
		Yellow-breasted Apalis	<i>Apalis flavida</i>
9	Coliidae	Blue-naped Mouse bird	<i>Urocolius macrourus</i>
		Speckled Mouse bird	<i>Colius striatus</i>
10	Columbidae	African Green Pigeon	<i>Treron calvus</i>
		African Mourning Dove	<i>Streptopelia decipiens</i>
		Emerald-spotted Wood Dove	<i>Turtur chalcospilos</i>
		Emerald-spotted Wood Dove	<i>Turtur chalcospilos</i>
		Laughing Dove	<i>Streptopelia senegalensis</i>
		Red-eyed Dove	<i>Streptopelia semitorquata</i>
		Ring-necked Dove	<i>Streptopelia capicola</i>
11	Coraciidae	Lilac-breasted Roller	<i>Coracias caudatus</i>
12	Corvidae	Pied Crow	<i>Corvus albus</i>
13	Cuculidae	Diederik Cuckoo	<i>Chrysococcyx caprius</i>
		Klaas's Cuckoo	<i>Chrysococcyx klaas</i>
14	Dicruridae	Common Drongo	<i>Dicrurus adsimilis</i>
15	Estrildidae	African Silver bill	<i>Euodice cantans</i>
		Black-faced Waxbill	<i>Estrilda erythronotus</i>
		Bronze Mannikin	<i>Spermestes cucullatus</i>
		Common Waxbill	<i>Estrilda astrild</i>
		Purple Grenadier	<i>Granatina ianthinogaster</i>
		Red-billed Fire finch	<i>Lagonosticta senegala</i>
		Red-cheeked Cordon-bleu	<i>Uraeginthus bengalus</i>
16	Fringillidae	African Citril	<i>Crithagra citrinelloides</i>
		Brimstone Canary	<i>Crithagra sulphurata</i>
		Reichenow's Seedeater	<i>Crithagra reichenowi</i>
		Streaky-headed Seedeater	<i>Crithagra gularis</i>
17	Gruidae	Grey Crowned Crane	<i>Balearica regulorum</i>
18	Hirundinidae	Barn Swallow	<i>Hirundo rustica</i>
		Lesser Striped Swallow	<i>Cecropis abyssinica</i>
		Plain Martin	<i>Riparia paludicola</i>
		Red-rumped Swallow	<i>Cecropis daurica</i>
		Sand Martin	<i>Riparia riparia</i>
19	Jacaniidae	African Jacana	<i>Actophilornis africanus</i>
20	Laniidae	Common Fiscal	<i>Lanius collaris</i>
		Isabelline Shrike	<i>Lanius isabellinus</i>
		Long-tailed Fiscal	<i>Lanius cabanisi</i>
21	Malaconotidae	Slate-coloured Boubou	<i>Laniarius funebris</i>
		Tropical Boubou	<i>Laniarius aethopicus</i>
22	Meropidae	Eurasian Bee-eater	<i>Merops apiaster</i>
		Little Bee-eater	<i>Merops pusillus</i>
23	Motacillidae	African Pied Wagtail	<i>Motacilla aguimp</i>
		Cape Wagtail	<i>Motacilla capensis</i>



No.	Family	Species Name	Scientific Name
		Grassland Pipit	<i>Anthus cinnamomeus</i>
		Tree Pipit	<i>Anthus trivialis</i>
		Yellow Wagtail	<i>Motacilla flava</i>
		Yellow-throated Long claw	<i>Macronyx croceus</i>
24	Muscicapidae	African Grey Flycatcher	<i>Bradornis microrhynchus</i>
		African Paradise Flycatcher	<i>Terpsiphone viridis</i>
25	Musophagidae	White-bellied Go-away-bird	<i>Corythaixoides leucogaster</i>
26	Nectariniidae	Amethyst Sunbird	<i>Chalcomitra amethystina</i>
		Bronze Sunbird	<i>Nectarinia kilimensis</i>
		Collared Sunbird	<i>Hedydipna collaris</i>
		Scarlet-chested Sunbird	<i>Chalcomitra senegalensis</i>
		Scarlet-chested Sunbird	<i>Chalcomitra senegalensis</i>
		Variable Sunbird	<i>Cinnyris venustus</i>
		Variable Sunbird	<i>Nectarinia kilimensis</i>
		Variable Sunbird	<i>Vanellus armatus</i>
27	Numididae	Helmeted Guinea fowl	<i>Numida meleagris</i>
28	Otididae	White-bellied Bustard	<i>Eupodotis senegalensis</i>
29	Passeridae	Grey-headed Sparrow	<i>Passer griseus</i>
		Kenya Rufous Sparrow	<i>Passer rufocinctus</i>
		White-browed Sparrow Weaver	<i>Plocepasser mahali</i>
30	Phalacrocoracidae	Reed Cormorant	<i>Phalacrocorax africanus</i>
31	Phasianidae	Harlequin Quail	<i>Coturnix delegorguei</i>
		Yellow-necked Spur fowl	<i>Francolinus leucoscepus</i>
32	Platysteiridae	Chin-spot Batis	<i>Batis molitor</i>
33	Ploceidae	Baglafaecht Weaver	<i>Ploceus baglafaecht</i>
		Holub's Golden Weaver	<i>Ploceus xanthops</i>
		Jackson's Widowbird	<i>Euplectes jacksoni</i>
		Red-billed Quelea	<i>Quelea quelea</i>
		Red-collared Widowbird	<i>Euplectes ardens</i>
		Spectacled Weaver	<i>Ploceus ocularis</i>
		Speke's Weaver	<i>Ploceus spekei</i>
		White-winged Widowbird	<i>Euplectes albonotatus</i>
		Yellow Bishop	<i>Euplectes capensis</i>
34	Podicipedidae	Little Grebe	<i>Tachybaptus ruficollis</i>
35	Psittacidae	Meyer's Parrot	<i>Poicephalus meyeri</i>
36	Pycnonotidae	Common Bulbul	<i>Pycnonotus barbatus</i>
37	Rallidae	Black Crake	<i>Amaurornis flavirostra</i>
		Common Moorhen	<i>Gallinula chloropus</i>
		Purple Swamp hen	<i>Porphyrio porphyrio</i>
		Red-knobbed Coot	<i>Fulica cristata</i>
38	Recurvirostridae	Black-winged Stilt	<i>Himantopus himantopus</i>
39	Scolopacidae	Common Greenshank	<i>Tringa nebularia</i>
		Common Sandpiper	<i>Actitis hypoleucos</i>
		Common Sandpiper	<i>Actitis hypoleucos</i>



No.	Family	Species Name	Scientific Name
		Green Sandpiper	<i>Tringa ochropus</i>
		Little Stint	<i>Calidris minuta</i>
		Ruff	<i>Philomachus pugnax</i>
		Wood Sandpiper	<i>Tringa glareola</i>
40	Scopidae	Hamerkop	<i>Scopus umbretta</i>
41	Sturnidae	Superb Starling	<i>Lamprotornis superbus</i>
42	Sylviidae	Dark-capped Yellow Warbler	<i>Chloropeta natalensis</i>
		Lesser Swamp Warbler	<i>Acrocephalus gracilirostris</i>
		Moustached Grass Warbler	<i>Melocichla mentalis</i>
		Red-faced Crombec	<i>Sylvietta whytii</i>
43	Threskiornithidae	African Spoonbill	<i>Platalea alba</i>
		Glossy Ibis	<i>Plegadis falcinellus</i>
		Hadada Ibis	<i>Bostrychia hagedash</i>
		Sacred Ibis	<i>Threskiornis aethiopicus</i>
44	Viduidae	Pin-tailed Whydah	<i>Vidua macroura</i>
45	Zosteropidae	Montane White-eye	<i>Zosterops poliogastrus</i>



12.4 Appendix D: Zoning Guidelines and Projections on Population, Resource Use and Waste Generation





12.5 Appendix E: Stakeholder Consultations Minutes and Questionnaires





**MINUTES OF THE STAKEHOLDERS MEETING ON THE
NORTHLANDS MASTERPLAN HELD ON 26TH FEBRUARY 2015**

Minutes of Meeting

SUBJECT: Northlands Masterplan Stakeholders Meeting
HELD AT: Kenyatta University Conference Centre
DATE & TIME: 26th February 2015 from 9.00am to 2.00pm
REFERENCE: 10465K/4/LWN/001

In attendance:

Signed attendance sheet attached.

Absent:

- | | |
|---------------------------|---|
| 1. P. M. Mulwa | The Judiciary |
| 1. Emojel Patrick | Kenya Prisons |
| 2. Josey Njoki Mukiri | Kiambu County NEMA Office |
| 3. Esther Njuguna | C.S, Ministry of Environment, Water & Natural Resources |
| 4. Eng. Lucas Wahinya | Chief officer, Environment, Water & Natural Resources |
| 5. David Moindi | Kenya Electricity Transmission Company Limited |
| 6. Lawrence Mwovi | Nairobi Water and Sewerage Company |
| 7. John Kamau | Kenya Power-North Eastern Region |
| 8. Emily Kilongi | Athi Water Services Board |
| 9. Eng. J. Njuguna Gatitu | Kenya National Highways Authority |
| 10. DVC Administration | Kenyatta University |
| 11. Bruno Giachino | Kenya Clay Products Ltd |
| 12. Mark Durston | Peponi School |
| 13. Director General | Kenya Civil Aviation Authority |

AGENDA

1. Reporting to venue and Registration
2. Opening prayer, introductions and welcome remarks
3. Statement of meeting objectives and overview of the Northlands Master plan
4. Plenary discussions on the Master Plan

Abbreviations

A: Answer;
CDF: Constituency Development Fund
CO: Comment;
EIA: Environmental Impact Assessment;
GoK: Government of Kenya
MEAs: Multilateral Environmental Agreements
PPP: Plans, Policies & Programmes
Q: Question;
RE: Response;



SEA: Strategic Environmental Assessment

WRMA: Water Resources Management Authority

Minutes of the workshop

Minute 1: Opening prayer, opening remarks and introductions

The meeting commenced at 9.00am with a word of prayer.

The workshop facilitator, Simon Wandeto, welcomed everyone to the meeting and invited all to introduce themselves.

Minute 2: Statement of the objectives of the meeting, and overview of the Northlands Master Plan

After introductions, Simon explained that the meeting aimed at:

1. Stakeholder sensitization on the Northlands Master Plan
2. Stakeholder familiarization with the on-going Strategic Environmental Assessment for the above Master Plan
3. Collecting additional stakeholder views on the Northlands Master Plan
4. Providing an opportunity stakeholders to influence decisions on the Plan
5. Compliance with the EMCA, 1999 & other planning regulations; and National Guidelines for Strategic Environmental Assessment, 2012

He went further to describe Strategic Environmental Assessment as a decision-support tool for sustainable environmental management that supports decision-making at strategic levels and involves assessment of the environmental sustainability of new strategic development interventions covering Policies, Plans and Programmes.

Northlands SEA has been ongoing since September 2014, and is expected to be completed by July 2015. The SEA's Plan brief was submitted to NEMA in October 2014, and the scoping report in January 2015 as per the NEMA SEA Guidelines, 2012.

Dr. Mwaura-the SEA study teamleader described the PPP framework for the Northlands Plan SEA as follows:

33 environmental PPPs had been identified as relevant to the Masterplan i.e 13 National Policies , 9 Legal Frameworks , 8 National Strategic Plans and 5 MEAs.

The National environmental policies reviewed include:

1. The Constitution of Kenya, 2010
2. Sessional Paper No. 6 of 1999 on Environment and Development
3. Draft Environment Policy (2012)
4. National Land Policy (2009)
5. National Water Policy (2012 Draft)
6. National Policy for the Sustainable Development of Arid and Semi Arid Lands of Kenya (2012)
7. Draft National Policy on Wetlands Conservation and Management (2013)
8. Draft Wildlife Policy (2011)
9. National Forest Policy (2005)
10. National Policy for Disaster Management, 2009



11. National Environmental Sanitation and Hygiene Policy (2007)
12. Draft National Tourism Policy (2007)
13. Draft National Policy on Peace Building and Conflict Management (2006)

The legal frameworks relevant to the Northlands SEA Plan he listed as follows:

1. Environmental Management and Coordination Act (EMCA) No. 8 of 1999
2. EMCA (Wetlands, river banks, lake shores and sea shore management) Regulations, 2009
3. Physical Planning Act, Cap 286, of 1996
4. Water Act, Cap 372 of 2002
5. Forest Act No. 7, of 2005
6. Wildlife (Conservation and Management) Act 2013
7. Tourism Act, No. 28 of 2012
8. Public Health Act, Cap 242
9. Energy Act No 12 of 2006

In addition, he listed the following strategic plans as linked to the Northlands Plan:

1. Vision 2030
2. Nairobi Metro 2030
3. Kiambu County Integrated Development Plan
4. National Environment Action Plan (2009-2013)
5. National Biodiversity Strategy and Action Plan (2000)
6. National Master Plan for the Conservation and Sustainable Management of Water Catchment Areas in Kenya (2012),
7. National Climate Change Response Strategy (2009)
8. National Tourism Master Plan (GoK, 1995)

Finally, Dr. Mwaura reported that the following MEAs had been reviewed for this study:

1. Convention on Biological Diversity (CBD Secretariat, 1992)
2. United Nations Framework on Combating Climate Change (UN, 1992)
3. United Nations Convention to Combat Desertification (UN, 1994)
4. Ramsar Convention (UN, 1971)
5. Convention on Migratory Species (UN, 1979)

On PPP analysis, Dr. Mwaura pointed out that comprehensive analysis of the 8 development components in the Northlands Master Plan (NMP) against the environmental obligations in the obligatory PPPs had been identified, and environmental obligations not effectively integrated in the Master Plan would be considered as gaps.

He listed the study team as comprising of the following professionals:

1. Dr Francis Mwaura – Team Leader and SEA/EIA Expert
2. Simon Wandeto – EIA Expert
3. Lawrence Njue – EIA Expert
4. Kennedy Kijana – EIA Expert
5. Dr Robert Chira – Ecologist



6. Dr Edward Ontita - Sociologist
7. Lydia Njeru – Sociologist
8. Evans Mairura – Urban/Regional Planner

Brief on the Proponent– Integer Limited: Simon Wandeto informed all that the Proponent/land owner is Integer Limited, and he intends to develop the land into an alternative city to meet the growing demand for housing, commercial and light industrial developments away –yet proximal to the Nairobi City Centre. The parcel of land is traversed by the Eastern Bypass.

He explained that there was need to develop the site for the following reasons:

1. There is a need to have alternative business districts away from the City Centre
2. There is high demand for descent housing and other supporting uses away from Nairobi City Centre;
3. The site is proximal to the City Centre; and
4. There is a trend where such sized parcels of land are available near the City e.g. Bahati Ridge, Tatu City, Thika Greens, Buffalo Springs etc.

To further give the participants a clear picture of the proposed Plan, Simon explained the following about the Northlands Masterplan:

1. Existing site characteristics

Much of the land is currently used as grazing land for livestock and wildlife but with belts of *Eucalyptus sp* plantations. Others include Brookside Dairies, Peponi School and Gicheha Dairy farm.

2. Plan Scope

- a) Residential Precincts on a total of 3,570 acres comprised of:
 - Low density Residential (Northlands meadows) :3,134 acres
 - High density Residential (Northlands Boulevards): 306 acres
 - Medium density Residential (Northlands Heights): 130 acres
- b) Industrial precincts on a total of 695 acres comprised of
 - Logistics park: 630 acres
 - Brookside Dairies: 65 acres
- c) Commercial precincts on a total of 390 acres comprised of:
 - Central Business District (CBD): 355 acres
 - Hotel/Mall: 33 acres
 - Club house: 2 acres
- d) Agricultural/wildlife conservation area on a total of 5,156 acres
- e) Recreational areas/parks including:
 - Recreational Parks and buffer zones: 1,431 acres
 - Water features: 266 acres
- f) Educational areas on a total of 86 acres comprised of:
 - Peponi School: 65 acres
 - Secondary School: 21 acres
- g) Others
 - Internal Roads (Spine Roads): 232 acres
 - Sewer trunks (1 existing and 1 under construction)
 - Hospitals



- Petrol Station
- Interchange
- Substation
- Police station
- Fire station
- Heliport
- High voltage power lines (220Kv, 132Kv, 66Kv): Existing

3. Water Demand and Sources

Water demand estimates: Approximately 13,894m³/day will be required, with the proposed sources being :Borehole water supply, Rain water harvesting, Municipal water supply, Treatment and Recycling of waste water; harvesting of floodwater

4. Effluent Generation and Disposal

The estimated quantity of waste effluent is 9,726m³/day. The proposed disposal options:

- Option 1 – Disposal through trunk sewer to Ruai Treatment Works
- Option 2 – Disposal through trunk sewer to planned Ruiru Treatment works

5. Solid Waste Generation and Disposal

It is estimated that 92 tons of waste will be generated from the various uses. The proposed disposal option is integrated solid waste management which will include reduction at source, recycling, incineration and landfilling at designated sites

6. Power Demand and Supply

Power demand for the Plan is estimated at 45 MVA, and the proposed sources of power include:

- 132kv, 220kv, 66kv, and 11kv Power lines traversing the site;
- Power to be stepped down with appropriate substation(s)
- Solar energy to also be utilized

7. Transportation

The Plan intends to provide walkways, cycle paths, spine and feeder roads. It is estimated that the Plan will have 165kms of paved roads; with roundabouts, junctions and flyovers to be designed to ensure seamless traffic flow.

8. Plan implementation

The masterplan will be implemented in 4 Phases over a period of 50 years, thus should be complete by 2064. The initial phase of development will mainly establish the various zones/landuses, and subsequent phases will focus on expansion of the zones.

At this point, Dr. Ontita-the SEA Sociologist presented to the participants the anticipated impacts of the Master Plan:

Anticipated Positive Impacts:

- Employment opportunities: Mainly in construction and in the emerging industries and businesses after completion
- Improved county economy: More industries, goods and services will ensure an improved socio-economic environment
- Health and convenience: This is bound to improve with hospitals, schools, shopping malls and security organs coming closer to the people.
- Security: due to population concentration more security services both public (police stations and posts) and private security firms will operate.



- Socio-economic development: Development of infrastructure including schools, roads and hospitals should be expected .

Anticipated Negative Impacts:

- Increased traffic flow: More vehicles - traffic jams, dust, air pollution and accidents;
- Strained water resources: Competition for the available water resources. The resource is reported as inadequate for the neighboring areas
- Air pollution: emissions are likely to increase from traffic, industries, offices and domestic developments
- Land quality and aesthetics may drop as vegetation and green areas reduce (people however value different things, some value grasslands, others trees while others value development)
- Noise: Noise levels will go up due to increased traffic, industries and people movement.
- Increased traffic flow: More vehicles - traffic jams, dust, air pollution and accidents;
- Strained water resources: Competition for the available water resources. The resource is reported as inadequate for the neighboring areas
- Air pollution: emissions are likely to increase from traffic, industries, offices and domestic developments

He finally reported that the development is a promising venture likely to spur growth and increase job opportunities for youth in the country, and that mitigation measures will be put in place to counteract anticipated negative impacts.

The Master Plan's ecology report was presented by Dr. Chira who stated that the ecological study had established the following:

45 avian families comprising 140 species, 56 species of herbaceous species, 20 species of woody species and 3 species of mammals (bush buck, Thompson's Gazelle and Duiker).

In his report on critical habitats and species, he mentioned that: Riverines and swamps act as natural sieves for pollutants and suspended solids, regulate water flow and preserve natural flora; the endangered Nile crocodile and threatened hippo and grasslands are important for conservation of Jackson's widow-bird that is classified as near threatened.

He further explained that the following environmental considerations would be important in development of the Masterplan:

- Pollution of Kamiti and Nairobi Rivers through effluents,
- Degradation and modification of Kiu, Kamiti and Nairobi Rivers riverine vegetation,
- Displacement and modification of crocodile and hippo habitats,
- Degradation of all riverine swampy/all water bodies displacing endangered grey crowned crane,
- Translocation of mammalian species from target residential zones,
- Pollution of Kamiti and Nairobi Rivers through effluents,
- Degradation and modification of Kiu, Kamiti and Nairobi Rivers riverine vegetation,
- Displacement and modification of crocodile and hippo habitats,
- Degradation of all riverine swampy/all water bodies displacing endangered grey crowned crane,
- Translocation of mammalian species from target residential zones.

Minute 3: Plenary Discussions on the Masterplan

Q: Daniel Mwangi: When will Uhuru Secondary school be relocated? And where will the school be relocated to? If we are given land to relocate to, will we be given a title deed?

A: Simon Wandeto: The Masterplan has allocated some land to a school. However about Uhuru Secondary school, the management should consider approaching the Client to discuss this further.

CO: Daniel Mwangi: -The Education Policy is also important and should be reviewed
-The School has a Masterplan which should also be considered



-There are only 2 existing schools with over 900 students in the area. Does the Masterplan include more schools for a bigger population?

RE: Simon Wandeto: The education policy will be reviewed and incorporated in the report.

A: Dr. Mwaura: The SEA study is not final, and project-specific EIAs will be done for other developments especially those neighbouring the school.

A: Mairura Omwenga: In Northlands, community facilities such as schools and health facilities have been factored in in residential neighbourhoods. Planning guidelines provide for such facilities in residential neighbourhoods which should in fact be located within walking distances.

CO: Ontiri Muchana: Northlands is an excellent Plan, and we need more like it in Kiambu County. Make sure you research and apply the latest technology in waste management to avoid pollution of rivers especially Kamiti and Kiu rivers.

RE: Dr. Mwaura: Water quality analysis done proved that our rivers are greatly polluted. Nairobi river is particularly in very bad shape, but this should be addressed through the Nairobi River Basin rehabilitation plan. Northlands however, will do its best not to add to the problem of water pollution.

RE: Mairura Omwenga: Pollution can not be tackled effectively at this stage because it requires corporate efforts even by the Kiambu County government, neighbouring counties and the national government.

CO: Peter Mwangi: The public involvement you are implementing at this stage is very commendable.

CO: Peter Mwangi: 50 years from now there will be many changes. I suggest you phase out the Plan into time frames e.g. 5 -10years, 10-20years...etc to give more accurate prediction of impacts

RE: Simon Wandeto: We are at the strategy level of the Plan thus specifics may not be known at this level.

RE: Dr. Mwaura: SEAs present a challenge of identifying specifics. The SEA section on monitoring however will ensure all issues arising are addressed on a regular basis.

RE: Mairura Omwenga: The Master Plan will be broken down into short, medium and long term plans.

CO: Peter Mwangi: KWS would require the habitat and soil characteristics of the area reserved for the wildlife conservancy.

RE: Simon Wandeto: An ecological study has been done. The soil is mostly black cotton and the vegetation is mainly *Acacia drepanolobium* –*Themeda triandra* habitat.

CO: Peter Mwangi: The zonation for the wildlife conservancy would require a wildlife management plan to be submitted to KWS.

Q: Peter Mwangi: Why is the Northlands CBD proposed next to Kenyatta University and the highway?

A: Mairura Omwenga: The CBD is located here because it will integrate well with the highway e.g. travelers can pass by the shopping areas, and K.U students will no longer have to go to Nairobi city for their social and commercial needs.

Q: Peter Mwangi: Is the development a private investment, or a private/public partnership?

A: Simon Wandeto: It could be a hybrid but a definite answer cannot be given for now.

Q: Peter Mwangi: What do you mean by ‘Agricultural’ precinct?

A: Simon Wandeto: This is the wildlife conservation and ranching area. The current land use is agricultural

Q: Peter Mwangi: What type of a wildlife conservancy would you like to have?

A: Dr Chira: A conservancy where the three existing mammalian species are retained or more are



introduced will be determined in collaboration with KWS.

CO: Beatrice Nyambura: Consider including the Basel Convention in your SEA report

RE: Simon Wandeto: The convention will be included.

CO: Beatrice Nyambura: Clearly identify sufficient solid waste management interventions in your Report.

RE: Mary Kamau: We (Kiambu County Government) are in the initial stages of developing a land fill for Kiambu County. The landfill will be sustainable and environment-friendly and able to serve many areas of the County.

RE: Simon Wandeto: The intention is to have an integrated solid waste management including reduction at source, recycling, incineration and landfilling at designated sites.

CO: Beatrice Nyambura: Clearly outline power/energy conservation and renewable energy interventions in your report e.g. bio gas.

RE: Simon Wandeto: the potential for harnessing of renewable energy will be fully explored in the development.

CO: Gideon Onyancha:

- a) This meeting is very informative
- b) Quoted Wangari Maathai “ Don’t destroy the environment or it will destroy you’. Asked for assurance that the wetland which belong to the government within the development wont be destroyed.

RE: Simon Wandeto: Existing wetlands under the protection of WRMA will not be destroyed

CO: Kimiti Ng’ang’a:

- a) Highrise constructions in Northlands will cause more traffic jams in the surroundings.
- b) The Northlands CBD is too near the superhighway and should rather be nearer the eastern bypass.
- c) The proposed wildlife conservancy is too small;
- d) Make use of existing resources e.g. waste water to produce bio gas.

Q: Kimiti Ng’ang’a: What measures will you take to ensure that farmers who have been depending on hay from the Gicheha farm continue to get hay?

Q: Mary Kamau: Do you have population projections for the development?

A: Simon Wandeto: it is estimated that approximately 80,000 people or more will come with the development .

- a) Do we have an alternative plan? Or this must work?
- b) Have you thought about a cemetery for the population to be introduced by the development?

A: Mairura Omwenga: The development will attract huge populations, and cemeteries will be taken into account. However, we need to check whether such facilities are available in Ruiru.

CO: Gideon Munyoki: there should be communication between the development and Kahawa Sukari in form of an arterial road to ease traffic.

Q: Jonathan Kilelo: What is the role of the technical agencies such as Kenya Railways, KURA, KeNHA in the Plan?

A: Simon Wandeto: Techinal stakeholders will be involved to provide technical expertise on various components.

- a) What is the framework of the Proponent-will he sell or rent out?



b) What is the relationship between the Master Plan and the existing services/supplies?

Q: Dorothy Njeru: Do we expect any blasting activity at the development?

A: Simon Wandeto: There are no planned quarries on site but this concern is noted.

CO: Dorothy Njeru: Winds usually blow from the Gicheha farm toward Kahawa Sukari estate; we expect a lot of dust.

Q: Dorothy Njeru: Is the Northlands being developed one-off or in stages?

Q: Dorothy Njeru: What security plans do you have in place? A huge development like this close to residential estates requires stringent security measures.

A: Simon Wandeto: Security concerns will be thoroughly looked into. In fact the Plan proposes to have a police post.

Q: Dorothy Njeru: You mentioned buffer zones within the development. Will there also be a buffer between Northlands and Kahawa Sukari estate?

A: Simon Wandeto: The buffer issues will be looked into to ensure co-existence of the Plan with the existing neighbours.

Q: Dorothy Njeru: What do you mean by low density precincts?

A: Simon Wandeto: At this stage this hasn't been defined yet.

Q: Eng. Geche Karanja: Did you say WRMA hasn't identified any wetlands within the Northlands site?

A: Joseph Mutunga: WRMA hopes that wetlands within the development won't be interfered with. There are concerns that once done, the development could block the Kamiti/Kiu river channels and cause flooding. However, WRMA is mandated to manage riparian land and riverines, and encroachment on these is not acceptable. If there will be dams construction, we hope this will be very well done.

A: Rose Nyamori: I recommend you review the National Water Master Plan 2030. Also, note that pollution of rivers is a major concern and the Northlands Plan must be specific on where their effluent discharge will be directed. This consideration should factor in not only rivers, but also ground water.

Also, explore the services of water service providers before going into drilling of boreholes.

Q: Rose Nyamori: Have you considered recycling water in the Plan?

A: Simon Wandeto: The Plan will explore opportunities for recycling.

Q: Rose Nyamori: Does the Plan comply with the Land Act requiring 10% be reserved for public utilities? What percentage of Northlands is dedicated to the public? And will be open for access by the public?

A: Simon Wandeto: Public utilities will be identified in subsequent planning of the projects.

CO: George Gitau: The National Land Act stipulates that 10% of project land should be reserved for public utilities.

RE:Simon Wandeto: The Consultant will check this to ensure compliance with the National Land Act.

Q: George Gitau: Which animals will be kept in the proposed wildlife conservancy?

A: Simon Wandeto: The conservancy will only be for grazers, and the wildlife management plan will address all this.

CO: Nelson Kamau: We from Mwhoko support the proposed Plan.

Q: Nelson Kamau: Would you provide a murrum road for us from Mwhoko to the Eastern bypass?

A: Simon Wandeto: We have heard that there is a proposed government road from Mwhoko to the



Eastern Bypass

CO: Mary Nduta: On the Northlands land neighbouring Mwioko 2, there are big snakes in the grassland which bother neighbours.

RE: Dr. Chira: When the development starts the snakes may disappear.

- a) The electric fence erected by Northlands neighbouring Mwioko 2 is a hazard especially for children.
- b) There is a boundary dispute between Kiambu and Nairobi Counties over the Kasarani River. The Northlands land also touches this river.

RE: Chief Ndukui: This issue is being addressed at County level by the two concerned counties.

Q: Samuel Mwaniki: Will the development be freehold or leasedhold?

A: Mairura Omwenga: Whether freehold or leasehold, the greater public interest will prevail prior to approval by the County government.

- a) When will you discuss effects of the project with the affected people?
- b) Have you made any plans for spiritual growth for the development?

CO: James Wahome:

- a) As you develop the Northlands, consider Kahawa Sukari as the front-runner and part of the larger farm. It should therefore not be ignored. How will the development reconnect with Kahawa Sukari?
- b) Northlands is a great development. Please plan the development in such a way that it incorporates the existing developments in its surroundings
- c) Kahawa Sukari PCEA and Senior school suffer from mosquitoes and flooding from the neighbouring dam. how will this be dealt with in the new development?
- d) Consultations should not be done in a wishy-washy manner.

CO: Joram Mwai: The link to the greater eastern bypass should be gazetted along the plot boundary so that it can serve the community bordering the property. As it is, having it pass through the Northlands will not be very useful since its private land.

Q: Njau Mburu: Please clarify-where exactly will the greater eastern bypass pass through?

CO: Joses Ntwiga: It will be a great waste to have the greater eastern bypass pass through a private farm.

CO: Lawrence Wachira: KURA is in the process of completing the Githurai-Kimbo (Z Corner) road. Also, Northlands is private property and KURA is negotiating with the Proponent to progress the road from Z corner to the eastern bypass.

Q: Helen Msalari: When will we be moved? I have sponsors for construction of classes for Ndiini primary school but I cannot commence because our stay is not guaranteed.

A: Simon Wandeto: The Consultant recommends that the school approaches the Proponent to discuss this with him.

CO: Mary Mwaniki: Its recommended that the Consultant organises small stakeholder meetings for different clusters of stakeholders e.g. for Kahawa Sukari residents, for Mwioko residents etc.

RE: Simon Wandeto: Consultation with the various stakeholders will be done to the extent possible.

CO: Mr. Kiriba: Provisions for light rail and a modern open air market are highly recommended.

RE: Simon Wandeto: The light rail and modern market proposals are noted.

CO: Simon Ngige: We need to tell the schools-Uhuru secondary and Ndiini primary schools whether they can go ahead and construct classrooms.



CO: Rapael Mutua: There is no access road from Mwihoko to Kahawa Sukari, yet most Mwihoko residents earn their livelihoods at Kahawa Sukari.

CO: Rapael Mutua: Open the road from Mwihoko to the eastern bypass.

Q: Peter Muchangi: Do you have a title deed for the Northlands development?

CO: Peter Muchangi: The electric fence near Ndiini primary school is a hazard to the school children.

A: Simon Wandeto: The Consultant has no information about the Proponent's title deed.

Minute 4: Closing remarks and prayers

Closing remarks were made by Christine Makimei-the chief, Kahawa Sukari location who stated the following:

- a) Ndiini primary school does not have a title deed. This makes it difficult for the school to access funding such as CDF.
- b) Northlands should ensure their development does not overtake service provision i.e. waste management and other plans should be put in place first.

There being no other business, the meeting ended at 2.15pm with a word of prayer led by Eng. Geche Karanja.

Minutes Prepared by: Lydia Njeru, Sociologist-HHEA Ltd

Circulation:

- The Client
- HHEA Project team
- Project stakeholders(on request)





Howard Humphreys (East Africa) Limited

Consulting Engineers



10465K: The 26th February 2015 Northlands Stakeholders Meeting-8.00am to 1pm.

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5	SONKI MSAKIA	MWIHOKO II	0725328932		
6	Wilfred K. Hinga	Mwihoko	0722579104		
7	JAMES W. GATHOGO	KIZITO	0722695173		
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Howard Humphreys (East Africa) Limited

Consulting Engineers



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**STRATEGIC ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED
NORTHLANDS DEVELOPMENT IN KIAMBU COUNTY.**

Integer Limited is desirous of developing a 4,788 Ha. parcel of land in its possession in Ruiru into an alternative city to meet the growing demand for housing, commercial and light industrial developments away –yet proximal to the Nairobi City Centre.

The development shall consist of office parks, meadows, boulevards, industrial & logistics parks, malls, a wildlife conservancy, and open green spaces among other pleasant, clean and safe mixed facilities for living, work and play away from the Capital City.

Howard Humphreys (East Africa) Limited (the Consultant), has been contracted to provide Consultancy services for carrying out Environmental services in the Strategic Environmental Assessment study which comprises of provision of advice and guidelines so that the project objectives and requirements are met.

As an affected and/or interested stakeholder, you are requested to document your views, opinions and concerns regarding the proposed development. Kindly comment on how you think the proposed development will affect the following in your area:

a) Traffic:

Ensure; safety, minimum noise from construction vehicles, and smooth flow of traffic at all especially next to Kenyatta University's fly-over bridge.

b) Water resources:

Ensure adequate supply of water without affecting Kenyatta University supply.

c) Air quality:

Sprinkle or cover earth mounds during construction to avoid or minimize dust. Sprinkle water to earth access roads to minimize dust. Ensure construction vehicles are well serviced to minimize emissions

d) Land quality/characteristics, aesthetics:

Ensure adequate and proper landscaping is done and the buildings aesthetically appealing

e) Socio-economic environment:

Recruit most of the workers from Kiambu County and consider Kenyatta University graduates during employment



f) Noise:

Ensure no construction goes on at night. If possible use manual labour to minimise noise.

g) Flora/fauna:

Plant indigenous trees and shrubs and during landscaping, protect wetlands within the site area.

h) Health and safety:

Use traffic signs and control the spread of construction vehicles. Provide PPEs to the workers. Enforce OSHA 2007

i) Security

Hoard construction site and ensure adequate security for Kenyatta University students at the bus park and around the foot-bridge.

j) Any Other Comment/Suggestions Regarding the Proposed Project:

Provide adequate solid waste and foul water management systems. Make the alternative city as green as possible. Ensure harvesting of rain water and run-off for within the alternative city to minimise use of supplied water

Name of Stakeholder KENYATTA UNIVERSITY	Organization KENYATTA UNIVERSITY
ID Number	Contact Address BOX 43844-00100
Signature/Stamp: 	Date: 10/2/2015



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a) Traffic:

it will improve the road network between the school and the neighbouring Muishoko Estate

b) Water resources:

There is a possibility that if the projects expands water problems that is experienced in the area

c) Air quality:

The school enjoys good quality of air. There is fear of air pollution if the trees are cut and other factors related to population increase

d) Land quality/characteristics, aesthetics:

The land is vast enough to accommodate a project of the said magnitude

e) Socio-economic environment:

It could create employment to the unemployed around Muishoko Area



f) Noise:

The place is quiet and provides a serene learning environment.

g) Flora/fauna:

The Conservancy indicated could make up for the destabilisation of the already existing flora and fauna.

h) Health and safety:

An indication of improvement in health and safety facilities.

i) Security

Improved security as the school is in a lonesome place.

j) Do you know of any sensitive areas within the project site and/or its surroundings that can be a threat to the implementation of the proposed project?

Not any.

k) Any Other Comment/Suggestions Regarding the Proposed Project:

We recommend the project since it will bring development to the area.

Name of Stakeholder Helen Msalani	Organization Ndiini Primary School
ID Number 8473752	Contact Address 899-00232 Ruiru
Signature/Stamp: HEADTEACHER NDIINI PRIMARY SCHOOL P. O. Box 899 - 00232, RUIRU	Date: 28 th January 2015



**STRATEGIC ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED
NORTHLANDS DEVELOPMENT IN KIAMBU COUNTY.**

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a) Traffic:

The project may affect traffic especially on Kahawa Sukari Mushoko Road but is a bit busy consequently alternative roads should be considered to access to MTR Superhighway.

b) Water resources:

Water resources might not be an issue due to Nairobi water and sewer that is readily available.

c) Air quality:

The project may not have issues to do with air quality because there are no industries around.

d) Land quality/characteristics, aesthetics:

The land is prime for construction. Some parts have murums and other rocky and therefore not ideal for the project.

e) Socio-economic environment:

The environment is conducive for its neighbours such as Kahawa Sukari Estate and adjoining Mushoko estates.



f) Noise:

The site is free from noise pollution. There is no heavy traffic of people.

g) Flora/fauna:

The site is beautiful with trees.

h) Health and safety:

For now the only issue that can be addressed is the adjacent Kenyatta University Sewer that can be drained to the sewerage available.

i) Security

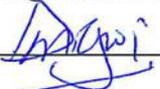
The area is secure and manned by security people from Gitika Farm and Backside Dairy.

j) Do you know of any sensitive areas within the project site and/or its surroundings that can be a threat to the implementation of the proposed project?

The only threat I foresee is Muthoko and surrounding estates accessing the site for there is a road connecting the two. A solution should be explored to avoid conflicts.

k) Any Other Comment/Suggestions Regarding the Proposed Project:

The project should start off by relocating Uhuru Kenyatta Secondary and Ndindi Primary, that are public to a convenient site. They should also provide access to the school for students and public coming from Muthoko, Kahawa Sukari, Kahawa Ukidani areas. If possible they should secure the school from external threats.

Name of Stakeholder DANIEL MUGWI MWANGI	Organization UHURU KENYATTA SECONDARY SCHOOL
ID Number 10709412	Contact Address P.O. BOX 856 RUIRU - 00232
Signature/Stamp: 	Date: 23/01/2015

PRINCIPAL
UHURU KENYATTA SECONDARY
P. O. BOX 856 - 00232, RUIRU
DATE: 23/01/2015



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As an affected and/or interested stakeholder, you are requested to document your views, opinions and concerns regarding the proposed development. Kindly comment on how you think the proposed development will affect the following in your area:

a) Traffic:

Human/vehicular traffic will increase.

b) Water resources:

There might be water problems because people in K. Surua do their own piping.

c) Air quality:

Draining of waste is a concern. Industries are also a concern depending on what they will emitting.

d) Land quality/characteristics, aesthetics:

With increased population, regulation of zoning requirements may be a challenge.

e) Socio-economic environment:

Shopping malls will improve the socio-economic life of the area. People might get jobs in the devpt.



f) Noise:

Noise is expected when the development is completed, especially if there will be entertainment joints / live club.

g) Flora/fauna:

No effect. Garbage to be well managed.

h) Health and safety:

STDs / HIV as in (j) below.

i) Security

Security might be a challenge because things I know affluent areas in the dept. Kahawa sukari police post is being converted to a full police station.

j) Do you know of any sensitive areas within the project site and/or its surroundings that can be a threat to the implementation of the proposed project?

Prostitution, pubs and HIV & other STDs rampant because of major institutions like Army Barracks and students from K.U etc, KCA, D.S.M.S, USIU, GSU camp, R.F, Zetech, NIB, Ruini, Recce and prisons Ruini, Mita Medical, Gretca etc.

k) Any Other Comment/Suggestions Regarding the Proposed Project:

None.

Name of Stakeholder CHRISTINE MAKIMEI	Organization OFFICE OF THE PRESIDENT
ID Number 9088563	Contact Address 0723995396
Signature/Stamp: CHIEF KAHAWA SUKARI LOCATION Date: 21st JANUARY, 2015 Sign: Christine Makimei	Date: 21st JANUARY, 2015



**STRATEGIC ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED
NORTHLANDS DEVELOPMENT IN KIAMBU COUNTY.**

Integer Limited is desirous of developing a 4,788 Ha. parcel of land in its possession in Ruiru into an alternative city to meet the growing demand for housing, commercial and light industrial developments away –yet proximal to the Nairobi City Centre.

The development shall consist of office parks, meadows, boulevards, industrial & logistics parks, malls, a wildlife conservancy, and open green spaces among other pleasant, clean and safe mixed facilities for living, work and play away from the Capital City.

Howard Humphreys (East Africa) Limited (the Consultant), has been contracted to provide Consultancy services for carrying out Environmental services in the Strategic Environmental Assessment study which comprises of provision of advice and guidelines so that the project objectives and requirements are met.

As an affected and/or interested stakeholder, you are requested to document your views, opinions and concerns regarding the proposed development. Kindly comment on how you think the proposed development will affect the following in your area:

a) Traffic:

Use of heavy vehicles (trucks) might destroy the roads in Mwachoko.

b) Water resources:

Mwachoko residents rely on borehole water. Water may be polluted by dust from the project.

c) Air quality:

There will be pollution due to dust and vehicular emissions.

d) Land quality/characteristics, aesthetics:

Dust and emissions from the development.

e) Socio-economic environment:

Mwachoko area will grow, as they might hire casual labourers from the area. Workers might also rent houses in Mwachoko uplifting their living standards.



f) Noise:

Noise expected but developer to consider school children - low speeds in estate and schools to be observed.

g) Flora/fauna:

No fauna. There are Maasai around Mwiloko and they own lots of cows - drivers to be careful not to knock them down.

h) Health and safety:

None. Only concern is of dust.

i) Security

Currently security is good, licence of anything chief willing to assist. With population increase security may improve. Police posts a good idea.

j) Do you know of any sensitive areas within the project site and/or its surroundings that can be a threat to the implementation of the proposed project?

Female gender may be lured into unwanted pregnancies with the deprivt workers due to poverty. Transmission of STIs. Politics might come up with people using excuses like dust etc.

k) Any Other Comment/Suggestions Regarding the Proposed Project:

Project is good. Employees to be careful with their social life. The developer to consider people of Mwiloko e.g. employment opportunities

Name of Stakeholder	Organization
FRANCIS H. HIGUCHI	CHIEF GITHURAI LOCATION
ID Number	Contact Address
4915745	0725 832 383
Signature/Stamp	Date:
	23/11/15



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As an affected and/or interested stakeholder, you are requested to document your views, opinions and concerns regarding the proposed development. Kindly comment on how you think the proposed development will affect the following in your area:

a) Traffic:

Traffic will be affected negatively as more vehicles will result in traffic jams, noise, dust, air pollution and more accidents.

b) Water resources:

There is going to be heavy competition for the available water resources. This is a major concern because the resource is not enough even for the current occupiers.

c) Air quality:

More traffic, industries, offices and domestic development is bound to pollute the air as vegetation and green open areas reduce.

d) Land quality/characteristics, aesthetics:

Land quality/characteristics, aesthetics will drop as in (c) above.

e) Socio-economic environment:

Positive impact with more employment, more industries and goods and service that will ensure social economic environment will improve.



f) Noise:

Noise levels is bound to go up with increased traffic, industries, people movement.

g) Flora/fauna:

Flora/fauna will be affected negatively with most of the green areas giving way to construction.

h) Health and safety:

Health and safety may improve with hospitals, schools, shopping malls etc coming closer to the people.

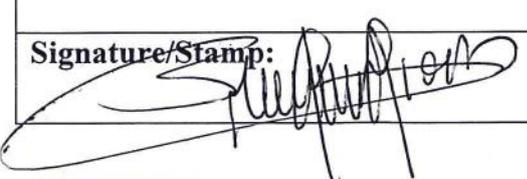
i) Security

More people more activities may mean more insecurity. However, more police stations and police line may enhance security.

j) Any Other Comment/Suggestions Regarding the Proposed Project:

The project is a welcome idea but concerns like scarcity of water, electricity, and pollution ought to be addressed early.

The infrastructure development will certainly open the social economic potential of the area and address a lot of unmet economic needs.

Name of Stakeholder Mr. Bruno Giachino	Organization Kenya Clay Products Limited
ID Number	Contact Address P.O. BOX 236 00232 Ruiru Tel No. 020-2011805
Signature/Stamp: 	Date: 22/1/2015

KENYA CLAY PRODUCTS LTD.
P.O. Box 236 - 00232, RUIRU
TEL: (020) 8016174 / 6 / 2011805
FAX: (020) 2012218 / 2016893



**STRATEGIC ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED
NORTHLANDS DEVELOPMENT IN KIAMBU COUNTY.**

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As an affected and/or interested stakeholder, you are requested to document your views, opinions and concerns regarding the proposed development. Kindly comment on how you think the proposed development will affect the following:

a) Traffic:

Traffic inflow will increase. Because of increased activities in the farm.
Transport management system - Buses with security systems are available for Brookside staff.

b) Water resources:

Main source of H₂O will be boreholes. Water table will get low in quantity thus reduced water.
This can be mitigated by use of Nairobi/Kiambu H₂O companies.

c) Air quality:

There will be dust and pollution from the project works and the industrial dept but alot of green areas will be retained and others planted.

d) Land quality/characteristics, aesthetics:

In the initial stages, the quality of aesthetics will come down - during construction.
If fauna is done away with, that beauty will be lost.

e) Socio-economic environment:

This effect will be gradual. Population will increase. There will be accommodation for all levels of people - people will be more productive if they live near their work places. We have a factory shop, business will increase because increased population will lead to high consumption.



f) Noise:

Distance + trees will mitigate against just noise from construction equipment. It will hardly affect our offices.

g) Flora/fauna:

Animals will/might be moved if this is the best mitigation measure or any other maybe identified.

h) Health and safety:

Not aware about fires (near Tujia) but the development will have measures in place to assure fire safety.

i) Security

Brookside is well fenced, even CCTV cameras and best security equipment will be acquired. Intention is to involve govt and community to ensure there is no mushrooming of shanties.

j) Any Other Comment/Suggestions Regarding the Proposed Project:

Anything that Brookside needs to be aware of regarding food policies/standards can be highlighted at this point to ensure safety.

Name of Stakeholder JACOB OMBONGI	Organization BROOKSIDE DAIRY LTD & RELATED COMPANIES
ID Number 4880412	Contact Address Box 674 98-00200 NAIROBI
Signature/Stamp: 	Date: 19/01/2015

Jacob .O. Ombongi
Certified Public Secretary
Registration No. 0949



STAKEHOLDER INTERVIEW GUIDE

Introduction

"Good morning...Afternoon...evening, my name is, a public Consultation Expert from Howard Humphreys E.A Ltd. I am here today to talk to you about the proposed Northlands development. The Project Proponent, **Integer Limited** - is in possession of a 4,788 Ha. parcel of land in the outskirts of the City Centre in Ruiru and is desirous of developing the land into an alternative city to meet the growing demand for housing, commercial and light industrial developments away – yet proximal to the Nairobi City Centre.

The project will have the following forms of use:

Northlands square and office park	Northlands Strip Mall
Green/ open spaces	Green/ open spaces
Office parks	Mall
City Square	Police Post
Shopping Centre	Petrol Station
Police	Fire Station
	Bus interchange

Northlands Height	Northlands Mall
Green/ open spaces	Green/ open spaces
Town houses	Mall
Flats	Hotel
Shopping centre	
School	
Church	
Police station	
Fire Station	

Northlands Paradise Park	Northlands Meadows
Green/ open spaces	Green/ open spaces
Heliport	Villas
Hospital	Town houses
Country Club	Shopping centre
Wildlife conservatory	School
School	
Sports facilities	

Northlands Logistics Parks	Northlands Boulevards
Green/ open spaces	Green/ open spaces
Industries	Flats
Shopping Centre	Town houses
Substation	



The purpose of this interview is to understand your perception of the proposed project as well collect local knowledge on any sensitive areas/topics that you would like the proponent to be aware of. The interview will take approximately 15minutes.

I shall be taking notes and photographs but this is mainly for report writing purposes. Therefore any information you give us today will be handled with utmost confidentiality. Please remember that in this interview, we do not have any right or wrong answers and you should therefore feel free to contribute.

Objective:

To establish the perceptions, attitudes, expectations of the community towards the project and the developer

- Do you and/or the community know about the proposed project

No

- If so, how did you/they learn about it?

N/A

- What are the community's expectations of the Proposed Project before, during and after implementation stages?

little expected beoz its private land.

- Do you think this project is a worthwhile investment to the community and the area as a whole?

Yes. Putting the idle land to use will spark devpt in Kiambu County.

- Do you think the community will support or reject the project? Give reasons for rejection or supporting the project.



Its a private devpt, so no conflict.
 I think there will be no issues.

Objective:

To establish the impacts the community expects from the project

- How do you think the local community will benefit from the project?

- Eased cong

- If land is available they could purchase.

- How do you think the general population will benefit from the project?

- The country will benefit because the idle land will be put to use.

- Do you anticipate any significant negative impact(s) from the project on the community and the area as a whole? If so, which ones? How best can the developer handle this?

- Influx of people might lead to crime rates.

- Population increase comes with other issues like pollution / overworked social amenities

Objectives:

To establish sensitive issues/areas that may pose risks to the successful implementation of the project

To establish social vices, beliefs or governance/political issues that may hinder project implementation



- What are some of the environmental issues, cultural inclinations, social vices or beliefs, institutional/governance issues and economic issues that may hinder implementation of the project? Indicate how this will affect the project negatively

- Project is private thus there may be no community issues.
 - If developers deliberately interfere with neighbours e.g. careless dumping.

- How do you think the issues you mentioned above can be mitigated against

H/A

- Do you have any other comments or suggestions on the topic we have been discussing?

Consultants to go down to neighbours e.g. KiU, Bahawa sukari etc. and consult them and involve them in the project.

Thank you for your time. Your knowledge and insights will be very helpful to us.

Snr. Asst. County Commissioner
 Mwachidudu Chimera
 0721-890643

CLOSE OF INTERVIEW.

DEPUTY COUNTY COMMISSIONER
 P.O. Box 140-00232,
 RUIRU

dcnru@yohw.com



**STRATEGIC ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED
NORTHLANDS DEVELOPMENT IN KIAMBU COUNTY.**

Integer Limited is desirous of developing a 4,788 Ha. parcel of land in its possession in Ruiru into an alternative city to meet the growing demand for housing, commercial and light industrial developments away –yet proximal to the Nairobi City Centre.

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As an affected and/or interested stakeholder, you are requested to document your views, opinions and concerns regarding the proposed development. Kindly comment on how you think the proposed development will affect the following in your area:

a) Traffic:

Ensure; safety, minimum noise from construction vehicles, and smooth flow of traffic at all especially next to Kenyatta University's fly-over bridge.

b) Water resources:

Ensure adequate supply of water without affecting Kenyatta University supply.

c) Air quality:

Sprinkle or cover earth mounds during construction to avoid or minimize dust. Sprinkle water to earth access roads to minimize dust. Ensure construction vehicles are well serviced to minimize emissions.

d) Land quality/characteristics, aesthetics:

Ensure adequate and proper landscaping is done and the buildings aesthetically appealing.

e) Socio-economic environment:

Recruit most of the workers from Kiambu County and consider Kenyatta University graduates during employment.



f) Noise:

Ensure no construction goes on at night. If possible use manual labour to minimise noise.

g) Flora/fauna:

Plant indigenous trees and shrubs and during landscaping, protect wetlands within the site area.

h) Health and safety:

Use traffic signs and control the spread of construction vehicles. Provide PPEs to the workers. Enforce OSHA 2007

i) Security

Hoard construction site and ensure adequate security for Kenyatta University students at the bus park and around the foot-bridge.

j) Any Other Comment/Suggestions Regarding the Proposed Project:

Provide adequate solid waste and foul water management systems. Make the alternative city as green as possible. Ensure harvesting of rain water and run-off for within the alternative city to minimise use of supplied water

Name of Stakeholder KENYATTA UNIVERSITY	Organization KENYATTA UNIVERSITY
ID Number	Contact Address BOX 43844-00100
Signature/Stamp: 	Date: 10/2/2015



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a) Traffic:

- 1) Reduce traffic within the CBD; Reduce traffic jams
- 2) Less automobile dependence, less energy use
- 3) Less time spent on roads in traffic jams

b) Water resources:

If Northlands is building dams and water catchment structures and not affecting rivers courses. Protecting water sources and providing clean water.

c) Air quality:

It will be crucial to grow trees and protect them. The more green the better for air quality. Using more natural sources of energy all important: Solar and wind- for industries and all other areas of living to keep pollution at its lowest impact.

d) Land quality/characteristics, aesthetics:

Good stewards of land consider soil, aesthetics, wildlife habitat, rare and unique places, plants and natural features. Development should compliment these so that the entire development looks beautiful and clean and pleasant.

e) Socio-economic environment:

In my point of view if this development is to be successful then we must realise that the socio-economic environment is dependent on the natural environment. Human activity can only take place within the natural environment and is subject to its limitations. Adhering to the Law is also crucial as not doing so will entail the breakdown of this environment.



f) Noise:

if the development goes solar and wind powered, noise level will be much reduced from noise of industry and machines.

g) Flora/fauna:

The development should enhance and protect the existing ecosystems

h) Health and safety:

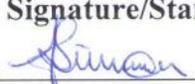
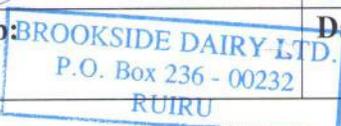
if the development should protect the environment it will reap its own reward with good health of its occupants. Safety should be everyone's concern and all should participate in their own, their neighbour and environments safety

i) Security

Security must be across the board; security for the environment, business, people, food. Security must be provided but is also the responsibility of everyone

j) Any Other Comment/Suggestions Regarding the Proposed Project:

- Continuous maintenance of the development
- Encourage all occupants of the development to "keep clean" and award recognition

Name of Stakeholder ANNE SIMON	Organization BROOKSIDE DAIRY LIMITED
ID Number 7852303	Contact Address Box 236-00232, RUIRU
Signature/Stamp:  	Date: 19 JANUARY 2015



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a) Traffic:

Increase of traffic along the service road between KU and Eugen Petrol Station/ Underpass at Kahawa Sukari Estate Entrance will worsen the current traffic congestion. A common major solution must be put in place before allowing the generated traffic to use the same.

b) Water resources:

The riparian area of the river at the boundary of the said parcel of land and Kahawa Sukari Estate should be accessible from both sides. This is to allow future development of water sports facilities including reclaiming exercises of the river. We want to believe that the uptake of water for human consumption will not affect the flow of piped water in to Kahawa Sukari Estate.

c) Air quality:

During construction care should be taken to minimize air pollution.

c) Land quality/characteristics, aesthetics:

We want to believe that green concepts have been adopted in the designing of the new development which promotes green technologies in land use and aesthetics.

d) Socio-economic environment:

The new development should create employment especially for the low income earners and create facilities for them in respect to accommodation, schools, and other social amenities. School like Ndiaini primary school should be constructed in to a center of excellence for both primary and secondary education. This should be done in such a



manner that the children of low income earners constitute over 85% of the school population and at the same time is of the highest quality of education. Ways should be established to subsidize the tuition for the poor.

e) Noise:

During construction and operation of the new development, noise should be as minimal as possible, meeting the specified threshold for such facilities.

f) Flora/fauna:

The existing flora/fauna should be enhanced and protected.

g) Health and safety:

The river separating the said parcel of the land and Kahawa Sukari Estate should not be polluted by effluents from the new development. To promote healthy environment, sewer lines reticulations should be done within the new development and neighbourhood especially Kahawa Sukari Estate. This will minimize pollution in to the common river.

h) Security

Proper security measures should be put in place within the development and its environs.

i) Do you know of any sensitive areas within the project site and/or its surroundings that can be a threat to the implementation of the proposed project?

Only the above issues which when properly addressed, the project site and surroundings will be safe and healthy for all.

j) Any Other Comment/Suggestions Regarding the Proposed Project:

Please involve all stakeholders, especially the neighbourhood on any proposed change affecting the environment.

Name of Stakeholder Benjamin Chamia	Organization Kahawa Sukari Estate Resident
ID Number 6817715	Contact Address P. O. Box 1336-00618 Nairobi
Signature/Stamp: 	Date: 25-02-2015

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a) Traffic:

The traffic ^{volume} ~~entrance~~ at K.S. underpass will be greatly affected - measure should be taken to avoid gridlock

b) Water resources:

The water serving Brookside from Nairobi Water was the same pipe as for K.S. The volume will need increase

c) Air quality:

d) Land quality/characteristics, aesthetics:

e) Socio-economic environment:

① IVDIINI PRIMARY SCHOOL SERVES PUBLIC FROM AS FAR AS KATHAWA - BLOCKAGE TO SCHOOL WILL HAVE NEGATIVE IMPACT.

② ACCESS TO HEALTH / WORK / EDUCATIONAL / CHURCH FACILITIES BETWEEN MWIHOKO, KY, K.S. +

THIKA ROAD WILL BE NEGATIVELY AFFECTED BY



f) Noise:

g) Flora/fauna:

h) Health and safety:

i) Security

HOPE THE LOW DENSITY ACCESS /
NEIGHBOURHOOD WILL NOT NEIGHBOUR K-S

j) Do you know of any sensitive areas within the project site and/or its surroundings that can be a threat to the implementation of the proposed project?

NDINI PRIMARY SCHOOL

UHURU KENYATTA SEC. SCHOOL

THESE BEING PUBLIC USE FACILITIES NEED CONSIDERATION

k) Any Other Comment/Suggestions Regarding the Proposed Project:

WE IN K-S. WELCOME GOOD NEIGHBOURS
AND PROJECTS THAT BENEFIT ALL AND ENRICH
OUR NEIGHBOURHOOD.

Name of Stakeholder Simon Ng'ani	Organization K-S. WELFARE MEMBER
ID Number 4877550	Contact Address tel-+254722730597
Signature/Stamp 	Date: 10/2/15



**STRATEGIC ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED
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a) Traffic:

Kahawa Sukari is already suffering a serious jam at the entrance. With the new development the jam problem can only increase unless serious alternative is provided.

b) Water resources:

Water is a serious problem in Kahawa Sukari and adjacent estates. The new estate will impact strongly on the existing water problem unless alternative sources are provided.

c) Air quality:

Development need to show how to it will ~~be~~ encompass environmental care to improve air quality. If only concrete will be the only aspect, air quality will be negatively impacted.

d) Land quality/characteristics, aesthetics:

If well done, land quality and aesthetics will improve.

e) Socio-economic environment:

If social amenities are catered for, this may be positively impacted.



f) Noise:

Increased traffic and commercial facilities will increase noise unless addressed.

g) Flora/fauna:

May be positively affected.

h) Health and safety:

May be positively affected if a dispensary and a health centre are provided.

i) Security

May improve if the development has organized security.

j) Do you know of any sensitive areas within the project site and/or its surroundings that can be a threat to the implementation of the proposed project?

The displacement of Uhuru Kenyatta Secondary School and Ndiani Primary School may have serious negative reactions from the community. The community will be very unhappy if the school children are not well taken care of.

k) Any Other Comment/Suggestions Regarding the Proposed Project:

The two existing schools must be well taken care of including providing access to the two from Kahawa Sukari Estate.

Name of Stakeholder Benson M. Mwangi	Organization Kahawa Sukari Welfare Association
ID Number 0618458	Contact Address Box 950 - 00232 Nairobi
Signature/Stamp: 	Date: 22/02/2015

Telegrams: "COURT" NAIROBI
Telephone: Nairobi 2221221
Email : rmc@judiciary.go.ke



REGISTRAR MAGISTRATE'S COURTS,
JUDICIARY,
P.O. Box 30041-00100,
NAIROBI.

When replying please quote

REPUBLIC OF KENYA

Ref: Rmc/Stakhld/6/15

27th January, 2015

The Project Manager,
Howard Humphreys (EA) Ltd,
P O Box 30156-00100,
NAIROBI – KENYA.

Att: Simon Wandeto

Dear Sir,

H. H. (E.A.) LTD.		
NAIROBI		
ACTION	INITIALS	DATE
		03 FEB 2015
FILE	10465/10	

**RE: STRATEGIC ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED
NORTHLANDS MASTER PLAN IN RUIRU SUB-COUNTY**

Your letter to the Chief Registrar of Judiciary dated 20th January, 2015 on the above subject refers.

Currently, establishment of courts by the Judiciary is majorly determined by distance to the existing nearest court, besides case load.

Kiambu County has six (6) courts that is: Thika, Kiambu, Gatundu, Githunguri, Limuru and Kikuyu Law Courts. Therefore, it is considered to be one county where litigants do not have to travel long distances to access Justice as the courts are said to be evenly distributed.

P. M. Mulwa
Registrar Magistrates Courts



12.6 Appendix F: Minutes of the Northlands Masterplan Validation Workshop (February 2016)





MINUTES OF THE 18TH FEBRUARY 2016 NORTHLANDS SEA VALIDATION WORKSHOP

Minutes of Meeting

SUBJECT: Northlands SEA Validation Workshop

HELD AT: Kenyatta University Conference Centre

DATE & TIME: 18th February 2016 from 9.00am to 2.45pm

REFERENCE: **10465K/4/LWN/002**

In attendance:

Signed attendance sheet attached.

AGENDA

1. Opening prayer, introductions and opening remarks
2. A presentation of the SEA Process/Draft Northlands SEA Report
3. Plenary discussions on the Master Plan
4. Endorsement of the Draft SEA Report
5. Closing Remarks/Lunch/Departure

Abbreviations

A: Answer
CO: Comment
O: Observation
Q: Question
RE: Response



Minutes of the workshop

Minute 1: Opening prayer, Introductions and Opening Remarks

The meeting commenced at 9.00am with a word of prayer.

Simon Wandeto welcomed everyone to the meeting and invited all to introduce themselves.

In his opening remarks, Chief Joses Ntwiga (Gikumari location) welcomed all to the project area and explained that the proposed development neighbours both his Gikumari location and Kahawa Sukari Location. He delivered the apologies of Chief Christine Makimei-the Chief, Kahawa Sukari location.

The chief further encouraged all present to actively participate in the workshop explaining that they would be the recipients of all impacts (positive and/or otherwise) resulting from the proposed development. He further registered his concerns about the proposed loop road to the greater eastern bypass passing through the proposed Northlands development – which would not benefit the surrounding developments, and the increased traffic expected as a result.

Minute 2: A presentation on the SEA Process, the Northlands Masterplan, and Draft Northlands SEA Report

Opening Remarks

Simon Wandeto enquired from the participants whether they had been able to access the Draft SEA Report from the link provided in the invitation letters to the workshop. A few people reported having been able to access the Northlands SEA Report online.

He further explained that as part of public consultation and participation, notices had been placed in the dailies requesting the public for comments. He reported that from consultations with NEMA, no issues had been forwarded to NEMA on the SEA Report for the proposed Northlands Masterplan. The Northlands Masterplan was also mentioned in a number of social media sites and had received more publicity following the official newspaper advertisement.

He further reported that after the SEA, the development will have project-specific EIAs. Simon then made a presentation on the Northlands Masterplan while Dr Mwaura made a presentation on the Draft SEA Report. **The Presentations made are attached as an appendix to these minutes.**





Minute 3: Plenary Discussions on the Masterplan

Lydia Njeru introduced the plenary session by giving a legal background for stakeholders consultation and participation. This is provided for by the SEA Guidelines (2012) and the EIA/EA Regulations 2003. She encouraged all to give their comments, concerns and/or ask questions regarding the Draft SEA Report/Northlands Plan.

Lawrence Njagi-Varsityville Estate

CO: Any activity in Northlands will affect us whether positively or negatively by virtue of us being immediate neighbours.

CO: Two letters have been written by Varsityville but have not been answered.

***RE: Lydia Njeru- HHEA:** The Varsityville letters have been seen but these were addressed to the Proponent and not to the Consultant.*

CO: The retainer wall at Northlands causes havoc at Varsityville during rainy seasons as it blocks the natural storm water drainage causing flooding.

***RE: John Mbau-Kiambu County Director of Physical Planning** The retainer wall mentioned by Varsityville does not have the necessary approval.*

***RE: Collins Kowuor-Integer Ltd:** The retainer wall is a development challenge that needs to be addressd. Varsityville should consider coming up with a stormwater drainage design which would then be reviewed and incorporated into the Northlands dam catchment in order to help solve the existing challenge of storm water drainage.*

CO: Development in Varsityville must be controlled to ensure that the beauty of Northlands is not compromised by mushrooming of shanties, and unplanned highrise buildings. This is most likely to affect the low density residential development proposed for Zone 5

***RE: John Mbau-Kiambu County Director of Physical Planning.** The County Government has tried to harmonise physical planning guidelines in the County. The physical planning department has an ongoing Planning clinic and have already met Varsityville estate to discuss development planning issues.*





RE: Hannah Maranga-Physical Planner, Kiambu County: *Neighbourhood associations are being guided to draft their memorandum of understanding (MOU) to enhance control of developments within their jurisdiction*

RE: Collins Kowuor-Integer Ltd: *Northlands will follow all the requisite development regulations e.g. on materials and zoning.*

Q: Varsityville does not have a sewerage drainage system. Can the estate be connected to the sewer line within Northlands?

A: Collins Kowuor-Integer Ltd: *There is a sewerage system in the neighbourhood but Varsityville would need to apply to AWSB for connection.*

Hannah Maranga-Physical Planner, Kiambu County

CO: Participated in the Change of User for the Northlands but environmental integration details for the Plan were not discussed at that time.

Q: The SEA report points to many management plans. At what point will these plans be developed and by who?

A: Dr. Mwaura-HHEA: *The Proponent makes arrangements to have all the composite management plans implemented during project implementation.*

A: Simon Wandeto-HHEA: *NEMA will give conditions in the approvals that require the proponent to implement the management plans. NEMA will also monitor the implementation of these management plans and the proponent will submit implementation monitoring reports to NEMA.*

Q: Can the water demand be broken down further to see the quantities anticipated from each source?

A: Simon Wandeto-HHEA: *No detailed studies on water demand have been done so far. The only studies conducted were prefeasibility studies to identify the potential sources. The studies will then be followed by detailed investigations once the more suitable options are identified.*

Q: Was an application made for works on the retainer wall of the Northlands Dam?





A: Collins Kowuor-Integer Ltd: *Northlands has not raised the retainer or embankment walls of the dam. Rather, the walls were repaired and reinforced due to the expected El-Nino rains.*

O: The Ruiru Development Plan referred to in the Draft SEA report is obsolete and should be removed.

RE: Lydia Njeru-HHEA: *The Draft SEA Report will be updated and the obsolete plan removed.*

CO: The Masterplan recommendations should be adjusted by leaving out relocation of the light industries and instead locating industries that are compatible with the neighbouring land uses such as residential uses.

Eng. Geche Karanja-MCA, Kahawa Sukari Ward

Q: How does the Northlands Master Plan integrate with the Kiambu County Spatial Plan?

Q: How is the development linked to Kahawa Sukari and other plans of the neighbourhood?

A: Collins Kowuor-Integer Ltd *No plan can be perfect, but Integer Ltd is working with the relevant agencies to resolve infrastructure and planning challenges arising with the masterplan proposals. This is a process that will continue*

Q: Is the Kenyatta University Sewerage Treatment Works (STW) being considered in the Northlands Masterplan?

A: Collins Kowuor-Integer Ltd. *The K.U STW is not being considered as an option. K.U has also been advised to connect to the neighbouring trunk sewer which will then lead to decommissioning of the STW.*

Q: Are Uhuru Kenyatta Secondary and Ndii-ini Primary Schools the only ones being considered for relocation or are there more that should also be considered?

A: Collins Kowuor-Integer Ltd. *Discussions on the relocation of Uhuru Kenyatta secondary school and Ndii-ini primary school are ongoing. Relocation will be done with consideration of catchment areas and to ensure integration with masterplan proposals.*

Q: Does the plan provide for public schools which may be necessary 50 year down the road?





Q: Kahawa Sukari already has traffic challenges. How will this be solved with extra traffic expected in the area from the Northlands development?

A: *Collins Kowuor-Integer Ltd.* KURA is redesigning the intersection to Kahawa Sukari to reduce traffic problems in that area. Effective traffic management will however require the input of KURA, KeNHA, NTSA and the other stakeholders such as Kahawa Sukari residents and Northlands.

Richard Mugesi-KeNHA

Q: How does the plan integrate with existing infrastructure e.g. Thika Road and the Eastern Bypass?

A: *Simon Wandeto-HHEA:* There will be junctions and interchanges to connect to Thika Road and Eastern Bypass. The junction and interchange designs to will be prepared and submitted to KeNHA/KURA for approval.

John Ndung'u-Varsityville

Q: The Plan has schools and hospitals but has no churches. Why is this?

A: *Simon Wandeto-HHEA:* Within the various zones of the masterplan, there will be spaces left for different types of amenities

Q: Varsityville is experiencing problems with wildlife especially monkeys brought about by the plantation forest in Northlands. How will this problem be addressed?

A: *Simon Wandeto-HHEA:* Kenya Wildlife Service will advise on how to handle the existing human-wildlife conflicts.

RE: *Lydia Njeru-HHEA:* The human-wildlife concern will be addressed in the wildlife management plan. The plan has been recommended by the Consultant seeing that the Northlands development has a wildlife conservation component.

RE: *Peter Njiiri-KWS:* Primates (monkeys) are a problem everywhere but unfortunately, damages from these are usually not compensated according to the Wildlife Act. Where monkeys have become a problem, it should be reported to KWS so that control measures can be taken. report persistent cases to KWS. Forests are definite attractions for animals and neighbours should institute protective measures such as monkey-proofing their homes using grills on windows, or other scare tactics





Q: On the Northlands solid waste management plan, can the producers get a token for producing waste in order to enhance collection, separation and recycling?

RE: Simon Wandeto-HHEA: *The Northlands solid waste management strategy seeks to ensure proper management of waste from the development. Tokens will be good to have and can be explored, but these will only work where the waste produced has commercial value.*

Mary Nduta Maina-Village elder, Mwihoko

CO: Send us a soft copy of the Northlands Plan.

RE: Simon Wandeto-HHEA: *The entire SEA Report including the plan can be accessed through the link provided in the workshop invitation letter.*

Q: Can you update us on the progress of relocation of the Uhuru Kenyatta secondary/Ndiini primary schools?

A: Collins Kowuor-Integer Ltd: *Discussions with Uhuru Kenyatta Secondary and Ndiini Primary schools are ongoing regarding the relocation.*

CO: The electrical fence around the Northlands property poses safety hazards to people living and/or farming near the boundary, especially in Mwihoko area. The dense vegetation on the property also harbours snakes which are a hazard to communities living proximal to the land.

RE: Peter Njiri-KWS: *Naturally, snakes avoid humans and will shy away from a potential encounter. Snake bites are therefore mostly accidental. Pythons existent in Northlands can be monitored and moved elsewhere to remove the manace from the community*

CO: There should be an access road from Mwihoko and Kahawa Sukari to the Eastern Bypass

RE: Simon Wandeto-HHEA: *The paln to extend Mwihoko road to the Easern Bypass is still ongoing.*

RE: Collins Kowuor-Integer Ltd: *The road from Mwihoko to the Bypass has been factored in the development, and land has been left where the road needs to pass and it is up to the County government to take this up.*





Peter Njiiri-Kenya Wildlife Service

CO: The Northlands Plan has a long timeframe for implementation and it would be better to break it down to shorter projections such as 5 year plans so that impacts are predicted more accurately.

CO: Phasing of the project should probably begin with setting in place the wildlife sanctuary so that atleast we are assured that the animals will still be there 50 years from now because with increase in human population, the wild animals are highly likely disappear.

Mary Kamu-CEC, Environment, Water & Natural Resources-Kiambu County

Q: Was the Consultant able to identify social impacts that are likely to come with the development due to workforce migration?

A: Lydia Njeru-HHEA: Yes, social impacts identification was done. Population increase due to skilled/unskilled workforce migration to the project area was predicted and other cumulative impacts such as moral decay and spread of HIV/AIDS factored in especially with the fact that the development neighbours several universities and army barracks. This is covered in the SEA report.

Kamau Kimenju

CO: Concerned over the clarity of the Northlands map provided.

CO: The link road between the Eastern Bypass and the Proposed Greater Eastern Bypass should be moved to the north of Sukari Ranch o that it can benefit more people.

Joses Ntwiga-Chief, Gikumari Location

CO: The link road to the greater eastern bypass will not be useful if it will pass through private land.

RE: Richard Mugesu-KeNHA: Roads are done to serve a purpose. There are roads constructed to ease conjestion on other roads (such as the southern bypass constructed for through-traffic) while others are constructed to spur development and settlements.

RE: Lydia Njeru-HHEA: KeNHA was consulted on the proposed Greater Eastern Bypass and gave a map of all the bypasses and related link roads.(The map was projected at the workshop).





RE: Simon Wandeto-HHEA The map was developed by the Ministry of Roads and confirms the alignment of the link road through the Northlands Plan. If there will be any changes to the alignment, due process will need to be followed to effect the change. The community will however need to appeal to the relevant authority (KeNHA) who will then negotiate with the Plan Proponent.

Kariuki Muiruri-Gikumari locaton

CO: Establish a disaster management plan to ensure effective emergency awareness and management.

James Nyangweso-WRMA

CO: Need to review the legal framework particularly the Water Act 2002 in the SEA report. The Report should further capture the impacts on water quality, water availability, and mitigation measures.

Mary Mwaniki-Kahawa Sukari Welfare Association

Q: Will the Northlands land be free or lease hold?

A: Jacob Ombongi-Integer Ltd: It will be leasehold.

Q: Since after the SEA we will have project EIAs, will Kahawa Sukari be consulted again?

A: Lydia Njeru-HHEA: Yes, Kahawa Sukari Ward has already been identified as a key stakeholder in the project, thus even at the project-specific EIA stages they will be consulted and allowed to participate.

Minute 4: Endorsement of the Draft SEA Report

Following presentation of the SEA Report, Simon Wandeto asked the participants whether they will endorse the Draft Report as it is, with ammendments, or reject it entirely.

RE: Eng. Kamaru-Kahawa Sukari: The plan and the report is good, but we will endorse it on condition that all issues the participants have raised be addressed.

The participants agreed in acclamation with Eng. Kamaru's viewpoint.





CO: Anastacia Vialu: NEMA CEO-Kiambu County. NEMA has captured all the concerns raised in the meeting. Conditions highlighted by participants will be attached the plan's approval.

Minute 5: Closing remarks and prayers

Simon Wandeto thanked all for attending and participating.

There being no other business, the meeting ended at 2.45pm with a word of prayer led by Mary Mwaniki.

Minutes prepared by: Lydia Njeru(HHEA Ltd)

Circulation: HHEA Project Team, The Proponent, Any other PAP/IAP on request





10465K: The 18th February 2016 Northlands Validation Workshop-8.30am to 3.00pm

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STRATEGIC ENVIRONMENTAL ASSESSMENT FOR THE NORTHLANDS MASTER PLAN IN KIAMBU COUNTY

SEA STAKEHOLDER VALIDATION WORKSHOP

Thursday 18TH February 2016, Kenyatta University Conference Centre

Programme for the validation workshop:

TIME	TOPIC	FACILITATOR
8:30 - 9:00am	Reporting to venue and Registration	HHEA
9:00 –10:00am	Opening Session: Opening Prayer, Introductions and opening remarks by The Kiambu Governor, County Commissioner, Director General - NEMA	Area Chief
10:00 -10:30am	Tea Break	HHEA
10:30 -10:40am	NEMA Report on the Northlands SEA Report	NEMA SEA Team
10:40 -11:40am	A Presentation on the SEA Process /Presentation of the Draft Northlands SEA Report	HHEA
11:40 – 13:30pm	Plenary Discussions	HHEA
13:30 - 13:45pm	Closing remarks	2 Community Reps, and HHEA
13:45 – 13:50pm	Closing Prayers	Volunteer
13:50 – 14:50pm	Lunch and departure	All

Workshop objectives

1. Engage in the finalization of the Strategic Environmental Assessment (SEA) of the Northlands Master Plan
2. Know the public and institutional comments made on the Draft SEA report on the NMP submitted to NEMA and actions taken
3. Contribute towards the finalization of the NMP SEA report
4. Validation and adoption of Northlands SEA report

The Study Team

1. Dr Francis Mwaura - Team Leader and SEA/EIA Expert
2. Simon Wandeto - EIA Expert
3. Lawrence Njue - EIA Expert
4. Kennedy Kijana - EIA Expert
5. Dr Robert Chira - Ecologist
6. Dr Edward Ontita - Sociologist
7. Lydia Njeru - Sociologist
8. Evans Mairura - Urban/Regional Planner
9. Power, Water and Sanitation and Highway Engineering Support from HHEA

Brief on the Proponent- Integer Limited

1. Proponent/land owner is Integer Limited
2. Parcel is traversed by Eastern Bypass
3. Proponent intends to develop the land into an alternative city to meet the growing demand for housing, commercial and light industrial developments away -yet proximal to the Nairobi City Centre

Existing site characteristics

1. Much of the 11,576 -acre parcel of land is currently used as grazing land for livestock and wildlife
2. Belts of *Eucalyptus sp* Plantations
3. Others include Brookside Dairies, Peponi School and Gicheha Dairy farm

Ecology of the Northlands Plan Area

- 45 avian families comprising 140 species recorded
- 56 species of herbaceous species encountered
- 20 species of woody species
- 3 species of mammals (bush buck, Thompson's Gazelle and Duiker)

Critical habitats and species

Riverine areas and swamps:

- ▶ Act as natural sieves for pollutants and suspended solids, regulate water flow and preserves natural flora.
- ▶ critical to grey crowned crane, endangered Nile crocodile and threatened hippo

Grasslands

- ▶ are important for conservation of Jackson's widow-bird that is classified as near threatened

Environmental Considerations

- ▶ Pollution of Kamiti and Nairobi Rivers through effluents,
- ▶ Degradation and modification of Kiu, Kamiti and Nairobi Rivers riverine vegetation,
- ▶ Displacement and modification of crocodile and hippo habitats,
- ▶ Degradation of all riverine swampy/all water bodies displacing endangered grey crowned crane,
- ▶ Translocation of mammalian species from target residential zones,

Environmental Considerations...*cont*

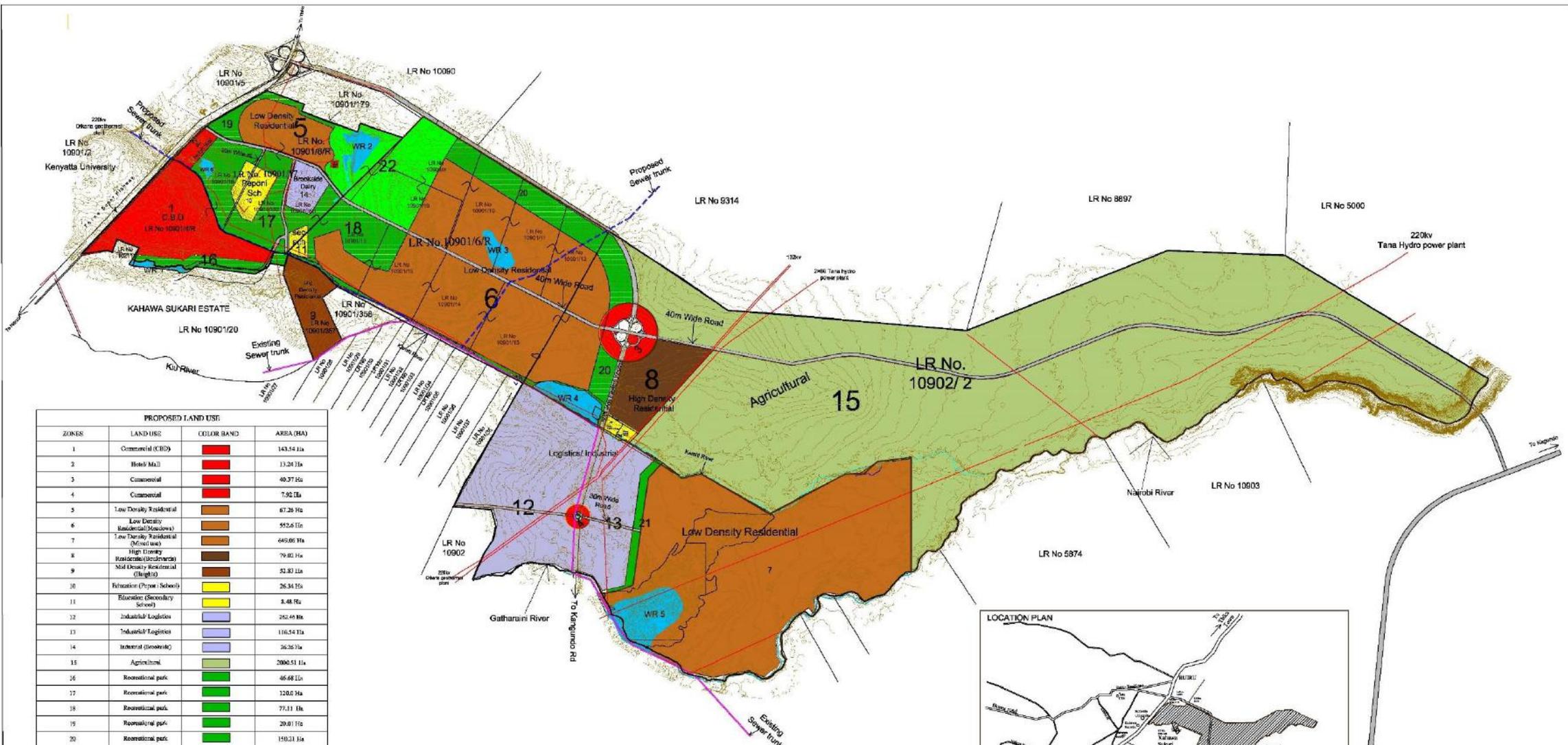
- ▶ Removal and degradation of grassland and associated habitats affecting avian species biodiversity and distribution,
- ▶ Solid Waste pollution of the environment
- ▶ Noise and air pollution affecting Northlands and the neighborhood,
- ▶ Soil pollution and contamination of water bodies
- ▶ Increased storm water from built areas

Need for development of the site

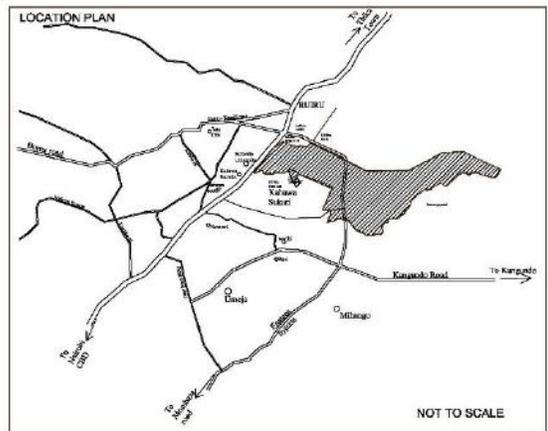
1. Need to have alternative business districts away from the City Centre
2. High demand for descent housing and other supporting uses away from Nairobi City Centre;
3. Site is proximal to the City Centre; and
4. The trend where such sized parcels of land are available near the City e.g. Bahati Ridge, Tatu City, Thika Greens, Buffalo Springs etc.

Plan Scope

1. Residential Precincts
2. Light industrial precinct
3. Commercial precinct
4. Agricultural/wildlife conservation area
5. Recreational areas/parks
6. Educational



PROPOSED LAND USE			
ZONES	LAND USE	COLOR BAND	AREA (HA)
1	Commercial (CBD)	Red	143.54 Ha
2	Hotel (M)	Red	13.24 Ha
3	Commercial	Red	40.37 Ha
4	Commercial	Red	7.92 Ha
5	Low Density Residential	Light Brown	67.26 Ha
6	Low Density Residential (Meadows)	Light Brown	552.6 Ha
7	Low Density Residential (Mixed use)	Light Brown	445.00 Ha
8	High Density Residential (Dormitories)	Dark Brown	70.82 Ha
9	Mid Density Residential (Cloughis)	Dark Brown	52.82 Ha
10	Education (Pre-sec School)	Yellow	26.34 Ha
11	Education (Secondary School)	Yellow	8.48 Ha
12	Industrial/ Logistics	Light Blue	282.49 Ha
13	Industrial/ Logistics	Light Blue	116.54 Ha
14	Industrial (Dormitory)	Light Blue	26.26 Ha
15	Agricultural	Light Green	2000.51 Ha
16	Recreational park	Light Green	46.68 Ha
17	Recreational park	Light Green	120.0 Ha
18	Recreational park	Light Green	77.11 Ha
19	Recreational park	Light Green	20.81 Ha
20	Recreational park	Light Green	150.21 Ha
21	Recreational park	Light Green	18.80 Ha
22	Recreational	Light Green	146.65 Ha
23	Club house	Red	0.81 Ha
24	Health Facility	Yellow	4.05 Ha
25	Primary sch.	Yellow	4.07 Ha
WR 1	Water Body	Light Blue	11.39 Ha
WR 2	Water Body	Light Blue	12.46 Ha
WR 3	Water Body	Light Blue	12.20 Ha
WR 4	Water Body	Light Blue	21.69 Ha
WR 5	Water Body	Light Blue	47.69 Ha
WR 6	Water Body	Light Blue	2.40 Ha
Internal Roads	Transport	Grey	99.22 Ha
Existing sewer trunk	Public utility	Red dashed	
Proposed sewer trunk	Public utility	Blue dashed	



Residential Precincts

- ▶ Low density Residential (Northlands meadows) :3,134 acres
- ▶ High density Residential (Northlands Boulevards): 306 acres
- ▶ Medium density Residential (Northlands Heights): 130 acres
- ▶ ***Total : 3,570 acres***

Educational

- ▶ Peponi School: 65 acres
- ▶ Secondary School: 21 acres
- ▶ ***Total : 86 acres (current)***
- ▶ Additional allocations to be made within the residential uses in accordance to Physical Planning guidelines

Commercial precincts

- ▶ Central Business District (CBD): 355 acres
- ▶ Hotel/Mall: 33 acres
- ▶ Club house: 2 acres
- ▶ ***Total: 390 acres***

Industrial Precincts

- ▶ Logistics park: 630 acres
- ▶ Brookside Dairies: 65 acres
- ▶ ***Total: 695 acres***

Recreational Areas

- ▶ Recreational Parks and buffer zones: 1,431 acres
- ▶ Water features: 266 acres

Agricultural/wildlife conservation area

- ▶ Ranching and wildlife conservation zone: 5,156 acres

Others

- ▶ Internal Roads (Spine Roads): 232 acres
- ▶ Sewer trunks (1 existing and 1 under construction)
- ▶ Hospitals
- ▶ Petrol Stations
- ▶ Interchange
- ▶ Substations
- ▶ Police station
- ▶ Fire station
- ▶ Heliport
- ▶ High voltage power lines (220Kv, 132Kv, 66Kv): Existing

Population Projections

1. Residential uses - 62,439 (25%)
2. Commercial uses - 92, 293
3. Hotels, Hospitals, Malls - 6,693
4. Educational uses - 3,154
5. Industrial uses - 86,020

Total - 250, 599

Resource Use

Land Use	Population Estimate	Water Demand (m3/d)	Energy Demand (MVA)	Effluent (m3/d)	Solid Waste (tons/d)
Residential Use	62,439	15,610	66	12,488	43.7
Commercial Use (offices)	92,293	2,307	12	1,961	64.6
Hotels, Hospitals, Shopping Malls	6,693	440	5	374	4.7
Educational Use	3,154	79	1	67	2.2
Industrial Use	86,020	9,486	81	8,063	60.2
Total	250,598	27,921	165	22,953	175.4

Water Demand and Sources

1. Water demand estimates:

- Approximately **27,921m³/day** will be required

2. Sources:

- Municipal water supply (NWSC, RUJWASCO)
- Borehole water supply
- Rain water harvesting
- Treatment and Recycling of waste water
- Floodwater harvesting

Effluent Generation and Disposal

1. Waste Effluent Generation:

- ❑ estimated quantity of waste effluent - **22,953m³/day**

2. Proposed disposal options:

- ❑ **Option 1** - Disposal through trunk sewer to Ruai Treatment Works
- ❑ **Option 2** - Disposal through trunk sewer to planned Ruiru Treatment works

Solid Waste Generation and Disposal

Solid Waste Generation:

- Estimated 175.4 tons of waste from the various uses

Proposed disposal options:

- Integrated solid waste management including reduction at source, recycling, incineration and landfilling at designated sites

Power Demand and Supply

Power Demand:

- ❑ Estimated demand of **165 MVA**;

Proposed sources of power:

- ❑ 132kv, 220kv, 66kv, and 11kv Power lines traversing the site;
- ❑ Power to be stepped down with appropriate substation(s)
- ❑ Solar energy to also be utilized

Transportation

- ▶ Projected daily vehicular trips to and from the development to the west (Thika Road) may be up to 27,324 at the end of phase 3 (mainly residential and commerce working population traffic)
- ▶ To the East (eastern Bypass) - 30,010 vehicles per day at the end of phase 3 (mainly industrial vehicles and industrial working population)
- ▶ Walkways, cycle paths, spine and feeder roads to be provided
- ▶ Plan estimated to have 165kms of paved roads;
- ▶ Roundabouts, junctions and flyovers to be designed to ensure seamless traffic flow
- ▶ Connections to the Thika Super Highway, Eastern Bypass and Proposed Road from Mwihoko

Plan implementation

- ▶ Masterplan to be implemented in 4 Phases over a period of 50 years
- ▶ Development to be complete by 2064
- ▶ Initial phase of development will mainly establish the various zones/landuses
- ▶ Subsequent phases to focus on expansion of the zones

Alternative Plan Options Considered

- ▶ Identification of alternative options was undertaken based on the following considerations:
 1. Exploration of various land use options and infrastructure options;
 2. Enhancing the level of integration in the Northlands Master Plan of obligatory PPP environmental issues; in order to ensure that the Master Plan is properly aligned to the overall goals, principles and plans for environmental sustainability in Kenya; and
 3. Elimination, downscaling or modification of any Master Plan activities with a potential for adverse environmental impacts

Land use options

- ▶ Four options have been developed to test the capacity of the site and to help establish the optimum mix of land uses.
- ▶ **Option 1:** Focuses employment and commercial uses on the western boundary of the site served from the Thika Road and a new junction on the Eastern Bypass. The central part of the site contains four new residential districts each with its own center within 15 minutes' walk. The eastern part of the site is allocated for tourism and leisure
- ▶ **Option 2:** Focuses mixed use and commercial uses at the center of the site either side of a new junction on the Eastern Bypass. Four residential districts surround this center. The eastern part of the site is allocated for tourism and leisure together with an airfield for tourist flights and executive jets.

Land use options...cont

- ▶ **Option 3:** Has the same centrally located commercial centre as Option 2 but introduces a second junction on the Eastern Bypass to provide the catalyst for a major employment area which will form the southern gateway to the development. In contrast to the two previous options the majority of the eastern part of the site is allocated for low density housing.
- ▶ **Option 4:** This Option has some similarities with Option 1 but focuses on residential and industrial uses on the southern parts of the site. The option also allocates a larger area to wildlife conservation and agriculture (ranching) to the east of the Bypass.

Option 4 selected as most suitable. it integrates well with existing land uses such as Peponi School, Brookside Dairies, ranching, and the green areas.

Infrastructure options - Water supply options

Potential water supply sources

Identified water sources investigated (feasibility, adv & disadv) included:

- ▶ Nairobi Water Supply system (from NWSC)
- ▶ Ruiru Water Supply System (From RUJWASCO)
- ▶ Dam on Kamiti River - at the confluence with Ithuru
- ▶ Weir Intake on Ruiru River - at 1,580masl
- ▶ Weir Intake on Kamiti River - At the confluence with Kiu River
- ▶ Well field - located west of Nairobi Falls
- ▶ Dam on Thiririka River - at the confluence with Ruiru River

Infrastructure options - Power supply

The possible sources of power are;

- ▶ **Hydro energy** - Nairobi river waterfall
- ▶ **Geothermal** -The Olkaria power line (grid)
- ▶ **Wind** - Grid. Onsite is limited due to low wind speeds & urbanization which will affect local wind movements
- ▶ **Thermal** - standby power depending on the need. Option not economical on a Masterplan scale
- ▶ **Solar** - solar water heating for individual properties, solar street lighting

Infrastructure options - Effluent Management

Three sewage treatment works sites exist in the vicinity of the project area:

- ▶ Kenyatta University sewage treatment works site
- ▶ Nairobi Sewage treatment works
- ▶ Ruiru Sewage Treatment works (Proposed - potential that the treatment works may be developed within the program for development of the Northlands Plan)

Solid waste management

Status

- ▶ solid waste is disposed in the Dandora dumpsite while some is disposed in the Murera dumpsite
- ▶ NEMA has developed a National Solid Waste Management Strategy to guide sustainable solid waste management in Kenya;
- ▶ NMP relies on waste characterization studies done for Nairobi and other major towns to identify the major components of municipal solid waste
- ▶ Similar patterns of waste composition are expected from developments in Northlands albeit on a micro scale
- ▶ Kiambu County, faces major challenges in solid waste management

Northlands Solid Waste Management Strategy

- ▶ proposed SWM strategy for NMP is in line with the National Solid Waste Management Strategy.
- ▶ Strategy proposes to employ a multi-pronged approach that revolves round the '4R' participatory principle of **Reduce, Reuse, Recycle and Reject**.
- ▶ The strategy will employ four main elements:
 - Engagement of an affordable mix of appropriate technical options to Reduce, Reuse, Recycle and Reject;
 - Involvement of all stakeholders in the implementation;
 - Strengthening institutional SWM capacity of the Northlands management entity; and
 - Enforcement of laws and policies;

Northlands Solid Waste Management Strategy...cont

The proposed mix of options is:

1. Creation of an environment friendly, eco-sensitive plan area;
2. Promotion of waste reduction at the source of generation;
3. Separation of waste at source of generation;
4. Return of recyclable material to the market;
5. Composting and home-gardening;
6. Research in to anaerobic digestion;
7. Exploration of waste to energy opportunities from incineration of combustible waste in Northlands;

Northlands Solid Waste Management Strategy...*cont*

8. Scientific handling of clinical and hazardous waste;
 9. Door to door collection of household waste;
 10. Set up polluter pay system for special waste such as hazardous waste etc.
 11. Sanitary landfill as the last resort.
- ▶ Northlands aims to collect 100% of all solid waste generated directly or through an intermediary

Northlands Solid Waste Management Strategy...cont

- ▶ 51% of solid waste will be organic. Can be mixed with organic waste from Gicheha farm to create biodynamic fertilizer. In a future scenario, the organic waste will be put in bio-digesters to create energy for Northlands
- ▶ 38% will be recyclable waste such as paper, plastic, glass and metals. Glass and metals will be sold to recyclers. Paper and plastics will also be sold to operators or in a future scenario incinerated to generate energy for Northlands.
- ▶ 11% - Residual waste part of which will be Hazardous waste. Northlands will work jointly with Kiambu and Nairobi County Governments to manage these wastes. (plans underway for a Kshs2B hazardous waste management facility funded by Japan

ToRs for the Strategic Environmental Assessment

1. Determining the scope of the SEA
2. Collection of baseline information and situation analysis
3. Identification of plan alternatives
4. Identification, prediction of impacts and determination of significant impacts
5. Identification of measures to enhance opportunities and mitigate adverse impacts
6. Preparing a Draft Report for national public review through NEMA
7. Stakeholder consultations
8. Preparing a Final SEA report

Objectives for the Northlands Plan SEA

1. Assessing if the NMP is properly integrated the existing environmental policies, legal frameworks, national plans and strategies;
2. Determining and ensuring that proposed NMP is compliant with the EMCA 1999 and its subsidiary legislation;
3. Identifying the likely environmental effects of the NMP;
4. Collating and integrating stakeholders views and concerns into the NMP;
5. Recommending suitable options for mitigating the negative environmental impacts
6. Identifying suitable alternatives and options for the NMP

The SEA Approach & roadmap

1. Intensive analysis of the NMP to understand the proposed interventions;
2. Preparation of a Plan Brief for submission of the same to NEMA
3. Intensive literature review to develop a comprehensive environmental regulatory framework for the NMP SEA
4. Identification of methods and tools in accordance with the National SEA Guidelines (2012)
5. Evaluation of the NMP against the regulatory framework through a comprehensive PPP analysis;
6. Intensive baseline environmental assessment and situational analysis;

The SEA Approach & roadmap...*cont*

7. Intensive stakeholder engagement
8. Analysis of the baseline data to identify environmental status and trends in relation to the NMP;
9. Intensive plan environmental impact analysis (PEIA),
10. Identification of gaps and suitable alternatives plan options
11. Identification of strategies to enhance the positive side and mitigate adverse impacts; and
12. Preparation of a comprehensive environmental management and monitoring framework to guide the long term implementation of the NMP
13. Compilation, validation and submission of SEA reports

Environmental Regulatory Framework for the PPP Analysis

- ▶ The framework used for cross-checking the environmental integrity of the NMP
 1. Environmental policies & legal frameworks
 2. National & County plans & strategies
- ▶ A total of 37 PPPs were identified as relevant for the NMP SEA
 - ▶ 12 policies
 - ▶ 7 legal frameworks,
 - ▶ 12 plans & strategies - National & local
 - ▶ 6 MEAs

Policies

1. The Constitution of Kenya, 2010 (GoK, 2010) - Article 69 on Environment & Natural Resources
2. Sessional Paper No. 6 of 1999 on Environment and Development (GoK, 1999)
3. Environment Policy, 2012 (GoK, 2012) - Draft
4. National Land Policy, 2009 (GoK, 2009)
5. National Water Policy, 2012 (GoK, 2012) - Draft
6. National Policy for the Sustainable Development of Arid and Semi-Arid Lands of Kenya, 2012 (GoK, 2012)
7. National Policy on Wetlands Conservation and Management, 2013 (GoK, 2013)

Policies...*cont*

8. Wildlife Policy, 2012 (GoK, 2012) - Draft
9. National Policy for Disaster Management, 2009 (GoK, 2009)
10. National HIV Policy, 1997 (GoK, 1997)
11. National Environmental Sanitation and Hygiene Policy, 2007(GoK, 2007)
12. National Tourism Policy, 2007 (GoK, 2007) - Draft

Legal frameworks & regulations

1. Environmental Management and Coordination Act (EMCA) No. 8 of 1999 and subsidiary legislation
2. Physical Planning Act, Cap 286, of 1996
3. Water Act, Cap 372 of 2002
4. Wildlife (Conservation and Management) Act Cap 376 of 2013
5. Public Health Act, Cap 242
6. Energy Act No 12 of 2006

Strategic plans - National & County

1. Vision 2030
2. National Environment Action Plan, 2009-2013
3. National Biodiversity Strategy and Action Plan, 2000
4. National Master Plan for the Conservation and Sustainable Management of Water Catchment Areas in Kenya, 2012
5. Agricultural sector Development Strategy 2010-2020
6. National Climate Change Response Strategy, 2010
7. National Tourism Master Plan (GoK, 1995)
8. National Water Masterplan 2030
9. Nairobi Metro 2030
10. Nairobi Integrated Urban Development Master Plan (NIUPLAN) - 2014-2030
11. Kiambu Integrated Development Plan(KCG, 2013)
12. Ruiru Local Physical Development Plan 2005 - 2020

MEAs

1. Convention on Biological Diversity (CBD Secretariat, 1992)
2. United Nations Framework on Combating Climate Change (UN, 1992)
3. United Nations Convention to Combat Desertification (UN, 1994)
4. Ramsar Convention (UN, 1971)
5. Convention on Wetlands of International Importance Especially as Waterfowl Habitat (United Nations, 1971)
6. Convention on Conservation of Migratory Species of Wild Animals (United Nations , 1979)
7. African Convention on the Conservation of Nature and Natural Resources (AU, 1968)

Stakeholder engagement

- ▶ A stakeholder analysis was conducted to identify the both the DAS and IAS stakeholders
- ▶ Engagement strategies
 - One-to-one interactions
 - Group meetings
 - Stakeholder dialogue workshop in 2015
 - Through institutional and public review of draft report circulated by NEMA - September 2015

Governmental Stakeholders

- ▶ Kiambu County Government
 - Ministry for Planning Kiambu County
 - Ministry for Environment, Water And Natural Resources Office
- ▶ National Government
 - County Commissioner
 - National Police
 - Defense,
 - Prisons

Technical Stakeholders

- Kenya Power,
- KETRACO,
- Ruiru Municipality
- WRMA,
- Athi Water Services Board (AWSB)
- Ruiru and Juja Water and Sewerage Company (RUJWASCO),
- Nairobi Water and Sewerage Company (NWSC),
- Kenya Urban Roads Authority (KURA),
- Kenya National Highways Authority (KeNHA),
- Kenya Wildlife Service (KWS),
- Kenya Forest Service (KFS)
- Kenya Railways Corporation (KRC),
- Kenya Civil Aviation Authority (KCAA)

Neighboring Institutions and Individual Households and associations

- Kenyatta University
- Uhuru Kenyatta Secondary School
- Ndii-ini Primary School
- Kenya Clay Products Ltd
- Mwihoko Estate
- Varsityville Estate
- Kahawa Sukari Estate
- Kahawa Sukari Ward
- Gatongora ward
- Residents neighboring Northlands on the Eastern Bypass side
- Peponi School
- Brookside Dairies

The Draft SEA Report

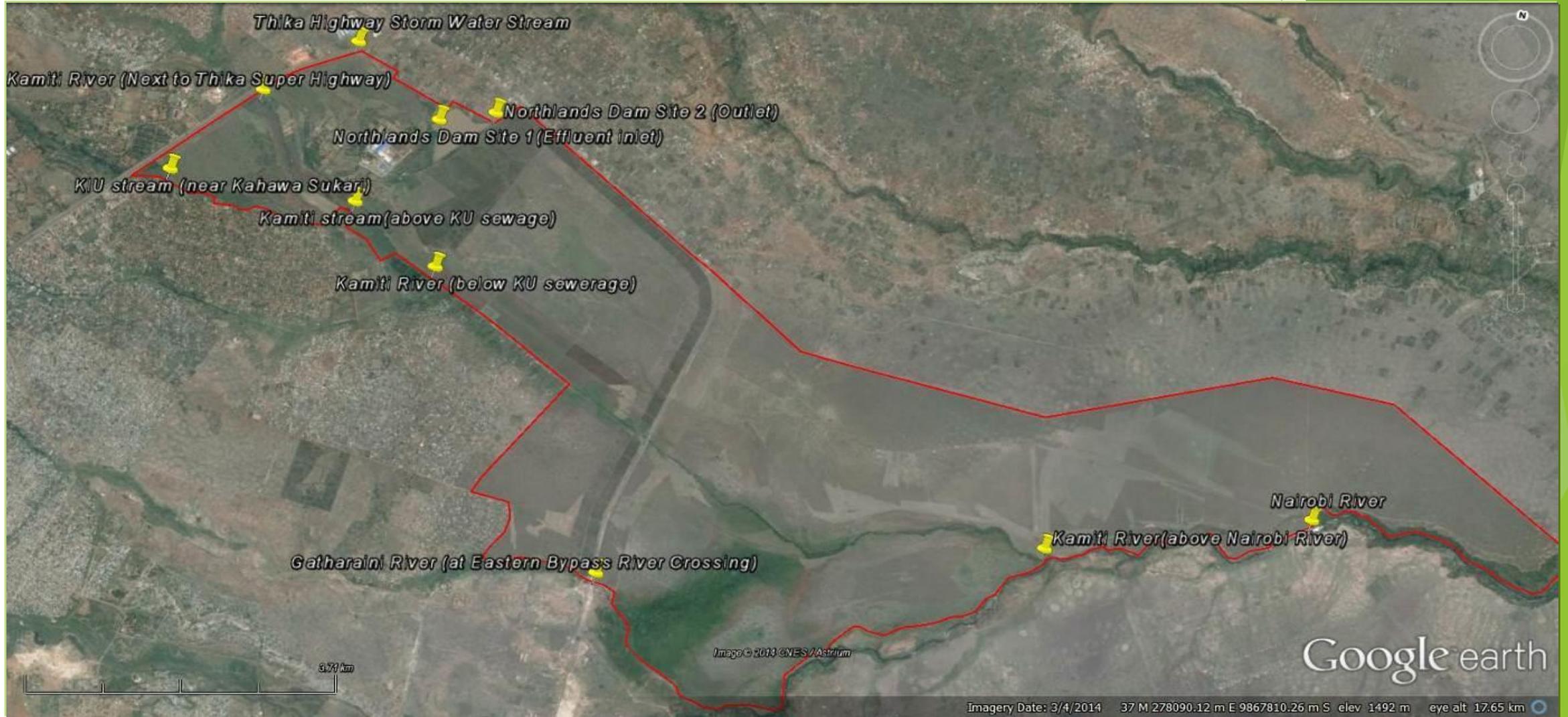
- ▶ A 257 page Document
- ▶ Circulated throughout the country for comments by NEMA

<http://www.nema.go.ke/index.php/reports/sea-reports/776-northlands-draft-sea-report-september-2015-fullversion>

Environmental baseline situation

- ▶ A number of valued environmental assets in the Northlands area
- ▶ Rivers: Kamiti, Gatharaini, Kiu and Nairobi Rivers
- ▶ Wetlands: dams, riparian zones, flood plains and seasonally waterlogged areas
- ▶ Ground water resources: The Northlands is part of the NAS
- ▶ Wildlife: Thompson's gazelles, bush bucks, common duiker and baboons, and avifauna
- ▶ Serenity: The Northlands area has low population density and is generally quiet

Water quality



Site Name	pH	TDS (mg/l)	EC (μ S/cm)	ORP (mV)	DO mg/l
WHO/NEMA Limits	6.5-9.5	1200	800	-	4
1. Thika Highway	6.6	349	741	134.5	5.133
2. Storm Water Stream					
3. Kamiti River Next to Thika Super Highway	6.7	65	128	-30.8	19.54
4. Kiu Stream Next to Kahawa Sukari Estate	6.8	233	466	-21.9	1.15
5. Kamiti stream above KU sewage and after the Kiu integrate	7.1	113	225	71.3	4.28
6. Kamiti River above the Nairobi River	7.4	185	369	-32	1.60
7. Kamiti River below the KU Sewage	7.4	118	236	-34	3.48
8. Gatharaini River at Eastern Bypass crossing	7.3	253	552	-52	1.04
9. Nairobi River	8.2	464	928	-102	0
10. Northlands Dam Site 1 (Near the effluent inlet)	8.5	953	1905	-94.3	14.9
11. Northlands Dam Site 2 (Near the Outlet)	8.4	853	1712	-7.3	21.3



Wildlife heritage

- ▶ Thomson's gazelles, bush bucks and duikers
- ▶ Hippopotamus (*Hippopotamus amphibious*)
- ▶ Hyena (*Crocuta crocuta*)
- ▶ Birdlife - over 140 species of birds recorded
- ▶ Critical habitats for some species (Nile crocodile - Endangered species; Hippo - Threatened species; Grey crowned crane; Jackson's widow-bird - Near threatened species)

Socio-economics

- ▶ Northlands neighborhood land use includes the following:
 - Intensive urban development - Ruiru Town
 - Residential areas - Kahawa Sukari, Mwihoko, Varsityville, By-Pass
 - Educational centres - e.g. KU, Zetech,
 - Industrial operations - Kenya Clay Products and other establishments



PPP analysis

Environmental management framework	Value addition
a) Sessional Paper No. 6 of 1999 on Environment and Development (GoK, 1999)	Encouraging rain water harvesting around the country
b) Draft Environment Policy, 2012 (GoK, 2012)	Supporting the establishment of constructed wetlands for waste management and reuse
	Supporting the increase of forest and tree cover to at least 10% by 2030
c) National Land Policy, 2009 (GoK, 2009)	Encouraging the development of wildlife sanctuaries and conservancies
d) National Water Policy, 2012 (GoK, 2012)	Enhancing storm water management and rainwater harvesting
	Encouraging the treatment of effluent waters for recycling and re use
	Supporting rain water harvesting
e) Draft National Policy on Wetlands Conservation and Management, 2013 (GoK, 2013)	Ensuring that natural wetlands under private ownership will be subject to regulations
f) Draft Wildlife Policy, 2011 (GoK, 2011)	Promoting the conservation and management of wildlife conservation areas and sanctuaries

g) Vision 2030 (GoK, 2008)	Supporting the increase of forest and tree cover to 10% by 2030
	Supporting water harvesting and storage
h) National Environment Action Plan, 2009 - 2013 (GoK, 2009)	Enhancing the protection of wildlife resources
	Supporting the increasing of forest cover in Kenya
	Promoting efficient water harvesting, storage and usage
i) Nairobi Metro 2030 (GoK, 2008)	Establishing the Nairobi Metropolitan Region (NMR) as a regional and global services centre through the development of industrial and technology parks
	Establish world class infrastructure and utilities in the NMR which are supportive of world class living, working and business environment
	Supporting the NMR to increase forest cover within its area of jurisdiction to 30% by 2030
j) Kiambu Integrated Development Plan (2013-2017)	Increasing forest cover in the county
	Promoting and sustaining a vibrant, competitive and diversified industrial sector in the county

PPP Framework	Integration gaps
a) Draft Environment Policy, 2012 (GoK, 2012)	Developing response systems for climate change and disaster risks
b) National Policy for Disaster Management, 2009 (GoK, 2009)	Promoting the mainstreaming of disaster management and climate change into development planning and management for sustainability
	Integrating climate change disaster risk reduction initiatives
c) Environmental Management and Coordination Act (EMCA) No. 8 of 1999 (GoK, 1999)	Supporting environmental restoration
	Supporting the rehabilitation, regeneration and restoration of degraded rivers
d) Vision 2030 (GoK, 2008)	Supporting the rehabilitation, regeneration and restoration of degraded Rivers in the area
e) National Environment Action Plan, 2009-2013 (GoK, 2009)	Strategies for controlling of fire outbreaks
f) National Climate Change Response Strategy, 2009 (GoK, 2010)	Ensuring that all new infrastructure is climate proof over its lifespan
g) Kiambu Integrated Development Plan, 2013-2017 (KCG, 2013)	Inadequate strategies for ensuring a reduction in carbon emission

Plan Impact Analysis

6.3.1.1 Square and Office Park, Strip Mall (Zone 1 and 2)

Potential negative impact	Principal Receptor	Probability & risk of occurrence	Duration of impact
Negative visual impact due to loss of visual amenity from dense urban structures	Northlands & neighborhood	High	Long-term
Long term evolution of urban heat islands	Northlands and neighborhood	High	Long-term
Risk of urban heat island effects	Northlands and neighborhood	High	Long-term
High water demand in offices, malls and the Green/Open spaces in lawn watering	Northlands and neighborhood	High	Long-term
Increased water abstraction from Kiu, Kamiti and Gatharaini Rivers	Northlands	High	Long-term
High ground water abstraction leading to lowering of ground water levels and long term risk of land subsidence	Nairobi/Kiambu region	High	Long term
Water pollution in the Kamiti River, Kiu River	Nairobi River/Athi River	Low	Long-term
Increased traffic activities and traffic interruptions and traffic incidences	Ruiru area	High	Long-term
Parking problems	Northlands	High	Long-term
Increased solid and sewerage waste generation	Kiambu region	High	Long term
Increased crime from neighboring areas such as Mwhoko, Ruiru, Juja and Ruai	Northlands	High	Long term
Spread/Transmission of HIV/AIDS and other STIs	Ruiru area	High	Long-term
Increase in storm water generation resulting in flooding and soil erosion	Northlands	High	Long-term
Increased energy consumption	Northlands and neighborhood	high	Long-term
Loss of habitats for the hippos in the area	Kiu and Kamiti Riverine ecosystems	Moderate	Long-term
Loss of avian species habitats and avian species diversity	Northlands area and neighborhood	High	Long term
Clearance/modification of the riparian vegetation along Kiu/Kamiti and Gatharaini Rivers	Kiu/Kamiti/Gatharaini Riverine ecosystem	Moderate	Long-term
Creation of new avian species habitats	Northlands area	Moderate	Long term

6.3.1.2 Recreational Areas (Zones 16-22)

Potential negative impact	Principal Receptor	Probability & risk of occurrence	Duration of impact
Modification of avian species habitats and creation of new avian species habitats	Northlands area and neighborhood	Moderate	Long term
Effect of wastes generated by visitors on avian species	Northlands area	High	Long term

6.3.1.3 Low, Mid and High Density Residential Areas (Zones 5, 6, 7, 8 and 9)

Potential negative impact	Principal Receptor	Probability and risk of occurrence	Duration of impact
Loss of avian species habitats and avian species diversity	Northlands area and neighborhood	High	Long term
Loss of natural vegetation and wildlife habitats	Northlands	Medium	Long term
Negative visual impact due to loss of visual amenity from dense urban structures	Northlands & neighborhood	High	Long-term
Modification and channeling of WR3 (water body)	Northlands area	Moderate	Long term
Modification of riverine vegetation	Kamiti River	Moderate	Long term
Increased storm water generation with potential increase in soil erosion	Northlands area / Kiu and Kamiti Rivers	Moderate	Short term
Increased solid and sewerage waste generation	Nairobi region	High	Long term
Increased demand for water and energy resources	Northlands Area	High	Long term
Increased traffic activities and traffic interruptions and traffic incidences	Ruiru area	High	Long-term
Increased infestation by malaria transmitting mosquitos due to water features WR 3, 4 and 5	Northlands Area	Moderate	Long term

6.3.1.4 Logistics park (Zone 12, 13)

Potential negative impact	Principal Receptor	Probability & risk of occurrence	Duration of impact
Loss of avian species habitats and avian species diversity	Northlands area and neighborhood	High	Long term
Loss of natural vegetation and wildlife habitats	Northlands	Medium	Long term
Modification of riverine vegetation along Kamiti River	Kamiti Rivers	Moderate	Long term
Increased storm water generation with potential increase in soil erosion	Northlands area / Kamiti and Nairobi River	High	Long term
Increased potential of air pollution, noise pollution, water pollution and soil pollution from industries	Northlands area	High	Long term
Increased solid and sewerage waste generation	Ruiru area	High	Long term
Increased traffic activities and traffic interruptions and traffic incidences	Ruiru area	High	Long-term

6.3.1.5 Agriculture/Conservation Area (Zone 15)

Potential negative impact	Principal Receptor	Probability & risk of occurrence	Duration of impact
Effects of wildlife introduction	Northlands area	Low	Long term
Concentration of wildlife, habitat degradation and conflict with livestock	Northlands area	Medium	Long term
Risk of long term loss of species due to in-breeding	Northlands area	Medium	Long term
Wildlife habitat deterioration due to low carrying capacity	Northlands area	Medium	Long term

PEIA Summary

- ▶ The Master plan could have significant impacts on the following environmental and social themes in the plan area:
 - Traffic and transportation
 - Surface and ground water resources
 - Energy use
 - Ambient noise and air quality
 - Waste management
 - Landscape, geology and soils
 - Biodiversity and nature conservation
 - Health and safety

Summary of stakeholder views on the NMP

1. Increase in business and employment opportunities;
2. Improved county economy as more industries, goods and services are created from the proposed developments;
3. Improvement in Health, Safety and security as hospitals, schools, shopping malls and security organs come closer to the people;
4. Socio-economic development as improved infrastructure and services unlock the socio-economic potential of the area

Stakeholder concerns

1. Increased traffic resulting in traffic jams, noise, dust, air pollution and accidents;
2. Strain on available water resources
3. Potential increase in air pollution from vehicular traffic, industries and residential developments
4. Changes in land quality and aesthetics as the landscape changes from natural vegetation to urban developed areas
5. Potential rise in insecurity with influx of people into the area
6. The proposed link road to the Greater Eastern Bypass: there are concerns from communities in Gikumari location (Kamakis area and its environs) that the link road is located within the NMP area, and the community will not have access to it;

Stakeholder concerns... *cont*

7. Relocation of Uhuru Kenyatta secondary and Ndiini primary schools will seriously affect the access for students from Mwihoko, Kahawa Sukari and Wendani areas
8. Transport linkages between Mwihoko - Eastern Bypass and Northlands - Kahawa Sukari should be enhanced through adequately sized access roads to enable smooth and seamless flow of traffic through these areas

Proposed mitigation strategies

Impact category	Typology of impact	Recommended mitigation
1. Traffic and Transportation	<ul style="list-style-type: none"> Traffic increase along the Thika Super-Highway, Eastern By-pass, Kangundo Road, and other planned roads in the area Higher vehicular air and noise emissions may adversely affect local air quality and ambient noise levels 	<ul style="list-style-type: none"> Develop a comprehensive Traffic Management Plan based on a Traffic Impact Study (TIS) of the NMP
2. Water Resources	<ul style="list-style-type: none"> Increased water demand on water resources both for construction and during operations. 	<ul style="list-style-type: none"> Measures to ensure adequate water supplies for Northlands have been established in the master planning. Use of RWH strategies is recommended Artificial Recharge and Recovery Strategy (ARS) through wastewater recycling
3. Energy Resources	<ul style="list-style-type: none"> Higher energy demand during construction and operation phases. 	<ul style="list-style-type: none"> Northlands to institute energy conservation measures and take advantage of the available renewable energy opportunities
4. Soils and Geology	<ul style="list-style-type: none"> Depletion of the local soil resource from excavation and carting away of spoil material, and soil degradation from compaction and soil sealing leading to increased surface runoff and soil erosion 	<ul style="list-style-type: none"> Compliance with Environmental Management Plans from the EIA ESIA's
5. Biodiversity and nature conservation	<ul style="list-style-type: none"> Negative effect on wildlife species in the area such as thompson's gazelle with a few individuals of bushbuck, common duiker and Baboons Adverse impacts on the endangered grey crowned crane which may become locally extinct once the areas are fully developed. 	<ul style="list-style-type: none"> Develop a comprehensive wildlife management plan will also be developed in collaboration with the Kenya Wildlife Service (KWS)

6. Air quality	<ul style="list-style-type: none"> Negative impacts on local air quality both during the construction and operation phases of the development. 	<ul style="list-style-type: none"> Adequate measures in the construction/operation phase environmental management plans, these impacts can be mitigated
7. Noise and vibrations	<ul style="list-style-type: none"> Permanent increase in ambient noise levels with the completion and occupation of the developments 	<ul style="list-style-type: none"> Establishment of buffer zones between different land uses will attenuate noise, further reducing the potential impacts
8. Health and safety	<ul style="list-style-type: none"> Increase in accidents involving workers and/or the general public. 	<ul style="list-style-type: none"> Adequate health and safety plans during construction/operation to mitigate all foreseeable health and safety risks in the development
9. Waste	<ul style="list-style-type: none"> Wastes production both during construction phases of proposed projects and during the operation phases 	<ul style="list-style-type: none"> An integrated solid waste management strategy that includes reduction at source, reuse, recycling, incineration and disposal in designated landfill site(s) will also be required for management of solid waste from the developments.

Stakeholder grievances - Northlands management to develop a Grievance Redress Mechanism

Environmental management and monitoring plan

9.5.1 Waste Management

Table 19: ESMP for solid and effluent waste

Potential Adverse Impact:	High generation of solid and effluent waste from residential, commercial and industrial areas			
Objective	Eliminate impact on public health due to the poor waste management on location			
Management strategy	Removal of agents of environmental pollution and proper disposal of wastes			
		Responsibility	Timing	Costs
Recommended Management and Monitoring Action	<ul style="list-style-type: none"> ▪ Adoption of an integrated solid waste management plan that includes reduction, reuse, recycling, incineration, composting and land filling ▪ Pursue waste minimization at source principles e.g. zero generation, reduction, re-use and/or recycling; ▪ segregation of domestic and industrial waste to be done and managed separately ▪ Provide mechanisms to segregate wastes at source to enable recycling ▪ Provision of transfer stations from where waste will be disposed in designated areas ▪ and ensure that all wastes are stored temporarily at the designated transfer stations, and that they are regularly carried away for disposal in designated areas; and ▪ connection to existing trunk sewers in Northlands ▪ pre-treatment of industrial effluent before discharge into sewers 	Northlands Management	During Plan implementation	Cost of waste collection and disposal systems to be determined in the detailed planning for each phase of the development
Performance indicators	Housekeeping, littering, and status of solid waste management in Northlands, functional waste management facilities			
Monitoring requirements	Periodical inspection of waste management operations			
Reporting	Environmental Audits and other Statutory and non-statutory reports			
Interface	Comply with the provisions of the Waste management Regulations on Waste management			

Conclusions & Recommendations

- ▶ The NMP is a good plan with room for improvement based on the SEA recommendations
- ▶ The Consultant recommends approval of the NMP subject to the recommended adjustments especially on the following issues:
 - 1) Location of Educational Institutions and recreational facilities around residential areas.
 - From the residential standpoint, it is desirable to have schools and parks located in close proximity to residential areas. Likewise, it is desirable to have the parks and educational facilities in close proximity to their primary users.

Conclusions & Recommendations...cont

2. Location of Industrial uses away from residential uses
 - Both light and heavy industrial forms are classified as undesirable neighbors of residential land uses, especially low density residential developments
3. Restrictions on the type of industrial use
 - Not all types of industries are compatible with other land-uses such as residential, commercial or recreational uses
 - For the Northlands, industrial uses should be restricted to light and low adverse impact industrial developments as recommended in the Physical Planning Act, 1996
 - These include workshops, laundries, printing, packaging, food processing, light assembly and furniture making establishments (Department of Physical Planning, 2002)

Conclusions & Recommendations...*cont*

3. Location of residential land uses away from utilities right of way
4. Developing an industrial waste management plan
5. Developing a habitat and wildlife management plan
6. Establishing a Stakeholder Grievance Redress Mechanism
7. Establishing internal capacity for implementation of the Environmental and Social Management and Monitoring Program

.....End

Plenary Discussions, Q&A