Rwanda Environment and Climate Change Fund (FONERWA)

KFW Development Bank

URBAN DESIGN HANDBOOK

Part of the Green City Kigali Mid Term Feasibility Study

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Produced by Sweco GmbH
Hanauer Landstraße 135-137
60314 Frankfurt am Main
Germany
Tel: +49 69 95921 0
www.sweco-gmbh.de

URBAN PLANNING TEAM

Älgvik Anna, SWECO Environment	F	Environmental engineer
Cochrane Alex , SWECO Architects	M	Urban planner
Kayumba Eudes , LANDMARK	M	Nat. architect & dept. team leader
Kundert Kasper , ESRI	M	GIS specialist
MacPhee Josh , SWECO Architects	M	Urban planner & project support
Sugi Felix , freelance	M	Nat. urban planner
Ueberschär Nicole, ESRI	F	GIS specialist
Warren Mark, freelance	M	Project manager

DISCLAIMER

Views expressed in this report do not necessarily reflect those of the Rwanda Environment and Climate Change Fund (FONERWA), other government bodies, the Government of Rwanda.

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Executive Summary

Executive Summary

This Handbook summarizes the urban planning context of the Green City Pilot, including the rules and requirements contained in the Kigali City Master Plan and its subdocuments for the Kinyinya Hill site. Further, It defines the design framework for the urban and architectural design competition under this project.

INTRODUCTION

The urban planning context was studied using existing planning frameworks as well as by developing sectoral maps and examining possible scenarios for future development of the Hill. The scenarios came about through in-depth discussions between the different sector specialists on the team.

The project site is known as 'Kinyinya Hill' in Kigali which is situated approx. 6.5 km or a 15-minute drive to the north-east of the central business district. The site is characterised by readily developable land, a sizable government owned parcel, agricultural and village community areas and social housing communities. The site is naturally defined by the topography and its surrounding wetlands and measures approx. 600 ha.

A shared GCK vision has been developed to align all the stakeholders to reach the project objectives. The GCK aims at incorporating the three dimensions of sustainable development in integrated proposals, namely the economic, the social and the environmental dimension. **Residents of Kinyinya Hill should be able to enjoy the social and economic benefits of urbanization while minimizing ecological footprints.** As opposed to current fragmented growth model of sprawl, the project follows a two-track process to urban growth for Kinyinya Hill by (i) planning 'new city extensions' (PCE) through improving the supply and affordability of serviced land and new housing opportunities and (ii) 'neighbourhood upgrading' through improving the conditions of the existing neighbourhoods on the Hill as well as 'densification' of existing neighbourhoods.

INTERNATIONAL STANDARDS

The 2030 Agenda for Sustainable Development forms the UN's global development framework and is a plan of action for people, planet and prosperity. The 2030 Agenda is anchored around 17 Sustainable Development Goals (SDGs). SDG 11 is a standalone goal on cities and human settlements namely "Make cities and human settlements inclusive, safe, resilient and sustainable". The New Urban Agenda (NUA) is the framework of the United Nations that that lays out how cities should be planned and managed to best promote sustainable urbanization. The New Urban Agenda now supports member states to implement the urban portions of their Nationally Determined Contributions (NDCs) into achieving of the long-term goals of the Paris Agreement on Climate Change.

URBAN ANALYSIS OF KINYINYA HILL SITE

Urban Planning Context - Rwanda (macro-level). Over the last 25 years there have been several framework and national policies developed to stream line the urban planning, development and implementation process with the goal of promoting socioeconomic and environmental sustainability. They include the Vision 2050: The Rwanda We Want and the National Strategy for Transformation NST 2018-24.

Urban Development Parameters have been supported by a toolkit of sustainable solutions which are explained in the Feasibility Study

Planning Context in Kigali (meso-level). The Kigali Master Plan is a comprehensive long-term plan intended to guide growth and development of Kigali City. It provides a road map for Kigali's future growth. Kigali´s Masterplan from 2013 underlines the principles of sustainable development, which shall also be followed by the Green City Pilot development. The Vision of the Masterplan is to make Kigali "The Centre of Urban Excellence in Africa", with the 5 goals to be a City of character, vibrant economy and diversity; City of green transport; City of affordable homes; City of enchanting nature and biodiversity; and City of sustainable resource management. The Masterplan adopts a structure of a "radial city", with decentralised growth nodes and development meant to intensify along transit corridors mainly directed east and south, and with the Central Business District (CBD) being the centre point of the development. The Kigali City Master plan is currently under revision with the draft version publicly displayed on the 21st of May 2019 for the public to provide comments.

Planning Context on Kinyinya Hill (micro-level). The Kigali City Sub-areas Planning Project translates the vision and recommendations set in the Master Plan. In Kinyinya sector there are two sub areas. The GCK project is located in the Sub Area Plan known as the "Residential Township in Kinyinya Sector, Murama Cell. According to the CoK Masterplan 2013, Kinyinya, where the GCK project is located, is among the 'Catalyst projects' chosen for the Masterplan implementation and project prioritisation strategy in Phase 1. Kinyinya is dedicated by the plan as a nodal development location.

URBAN DEVELOPMENT PARAMETERS

Urban development parameters have been defined as a basis for calculation of future capacities by the sectors and to prepare preliminary cost estimates. They are as follows:

Targeted population:

Excluding existing population	130 154
Including existing population	168 892

Urban uses (Gross Developable Area):

Residential & mixed use	362.5ha or 60.4%
Employment cluster	10ha or 1.7%
Sub urban centre park	7.5ha or 1.3%
Unsuitable for development	220ha or 36.6%

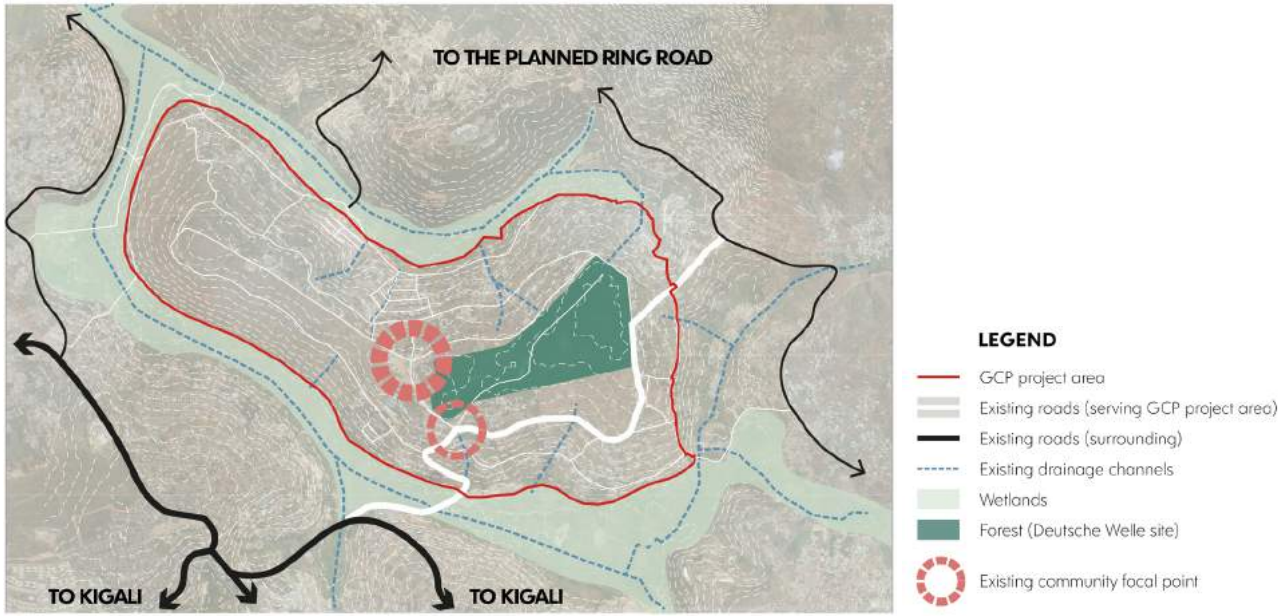
URBAN ANALYSIS OF KINYINYA HILL SITE

The first plan to the right summarizes the existing situation on the site on a synthesis map that highlights the existing roads, community focal points and blue/ green structure.

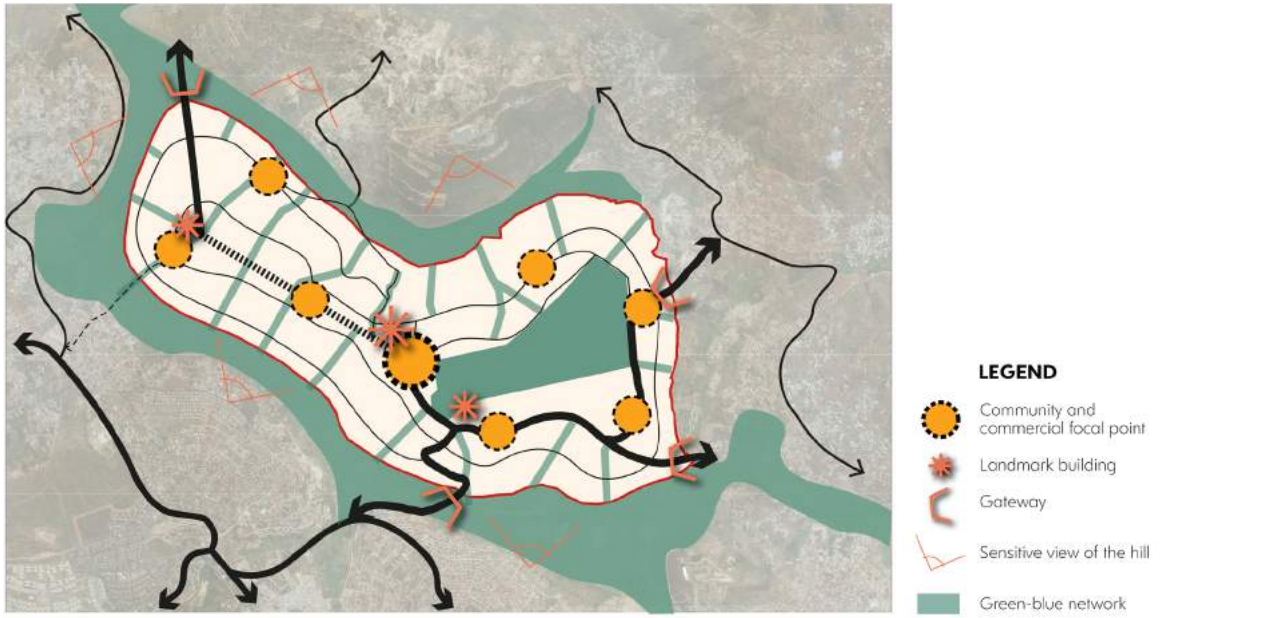
The second plan gives a view of one possible structure plan scenario for the site with a focus on placemaking, economic networks, community building, ecological performance, way finding and the urban image.

The Gross Residential Developable Area (GDA) is defined as those parts of the overall GCK study area that remain after discounting: i) the areas that are unsuitable for development ii) the areas that are allocated for non-residential clusters.The table below summarises all the areas that are discounted from the overall GCK study area to arrive at a Gross Residential Development Area (GDA).

Overall GCK study area	600 ha
Areas unsuitable for development	220 ha
Proposed employment cluster	10 ha
Sub urban centre park	7.5 ha
Gross Resi. Developable Area (GDA)	362.5 ha



Existing situation on the site



Possible structure plan scenario

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List of Acronyms and Abbreviations

CoK	City of Kigali
EDPRS2	Second Economic Development and Poverty Reduction Strategy
EMIP	Environmental Management and Implementation Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
FORNERWA	Rwanda Environment and Climate Change Fund / Rwanda Green Fund
FS	Feasibility Study
GCK	Green City Pilot
GDA	Gross Developable Area
GFA	Gross Floor Area
HH	Household
IFC	International Finance Corporation
JV	Joint Venture
KfW	Kreditanstalt für Wiederaufbau
LGI	Local Government Institute
MINALOC	Ministry of Local Government
MINECOFIN	Ministry of Finance and Economic Planning
MININFRA	Ministry of Infrastructure
MoE	Ministry of Environment
NDA	Net Developable Area
NST	National Strategy for Transformation
PCE	Planned City Extensions
PSUP	UN-Habitat's Participatory Slum Upgrading Programme (PSUP)
REMA	Rwanda Environment Management Authority
RHA	Rwanda Housing Authority
ROWs	Public Rights of Way (Public Domain)
RSSB site	Project site on Kinyinya Hill owned by Rwanda Social Security Board
RwaGBO	Rwanda Green Building Organization
SWM	Solid Waste Management
UPC	Rwanda Urban Planning Code

Terminology

GDA	Gross Developable Area is determined by taking the Total Area for a given Local Area Plan and subtracting all "non-developable" land.
NDA	Net Developable Area is defined by reductions from and additions to the GDA to allow for public rights of way (public land).
ROWs	Public Rights of Way or Public Domain/ Land including roads and footpaths, parks, green & blue network, public spaces and other public areas that will usually be adopted as public areas by City of Kigali
Placemaking	Refers to a collaborative process of shaping the public realm in order to maximize shared value. More than promoting better urban design, placemaking facilitates use, paying particular attention to the physical, cultural, and social identities that define a place.
Public goods	A good that is both non-excludable and non-rivalrous in that individuals cannot be excluded from use of could be enjoyed without paying for it.
Commons	Traditionally defined as elements of the environment – forests, atmosphere, rivers, fisheries or grazing land – that were shared, used and enjoyed by all. Today, the commons also include public goods, such as public space, marketplaces, public education, health and infrastructure that allow society to function

Chapter I - Introduction

Introduction

A dynamic and growing economy that looks to its people and its environment as key resources - Rwanda faces future challenges and opportunities that the Green City Pilot project has determined to meet head on.

1.1 PROJECT BACKGROUND AND CONTEXT

Background

Rwanda has seen significant economic development in recent years. Agricultural production has doubled since 2007 and industry and services are expanding. Development is supported by increasing access to electricity and fibre optic across the country. Ten years after joining the East Africa Community, Rwanda is contributing positively to development in the region.

Rwanda's future socio-economic development is uncertain as its population grows and the climate changes, causing pressure on land, water, food and energy resources. Rwanda has the highest population density in Africa, and the population is growing at 2.8% per year. Urbanisation is increasing, at 4.4% per year, with over 1 million people living in the capital city, Kigali. If the rapid urbanisation is properly managed and coupled with industry and services, it can be an instrument for wealth creation. Alternatively, there is a risk of urban slums developing and creating associated health and social problems. Job creation, education, health care and social protection are all needed to address population growth, while urban areas must be high density and resource efficient to support a growing skilled workforce.

According to the National Strategy on Climate Change and Low Carbon Development (Green Growth and Climate Resilience 2011) there are a few 'big wins' that if implemented, will make a significant impact on adaptation, mitigation and economic development. High density walkable cities have been identified as one of the three big wins. If this is not achieved Rwanda will face unprecedented levels of urban sprawl, partly due to hilly terrain. This forces people to travel greater distances than necessary, with motorised transport resulting in greater transport costs for the population and GHG emissions and air pollution. Reduced urban sprawl limits the development of housing on steep slopes which are vulnerable to flooding and landslides. Environmentally sustainable, climate resilient and green economic growth is an established development priority of the Government of Rwanda.

The overall development objective of the Green City Pilot (GCK) is as indicated in the Terms of Reference ToR is, "increased resilience against the consequences of climate change and ensured sustainable socio-economic development of Rwanda". The Green City Pilot Project should contribute to the development of a model community in Kinyinya Hill to showcase sustainable urban development. Linking affordable housing with climate change adaptation and mitigation measures and to set standards for sustainable urban development in Rwanda and in the wider region.

The overall expected project outputs are: (i) a Master Plan for site of the 600ha Kinyinya Hill, (ii) four sub-area plans drafted, (iii) a development plan and detailed designs for a 18ha mixed housing development ready to be tendered and (iv) a proposal submitted to the Green Climate Fund.

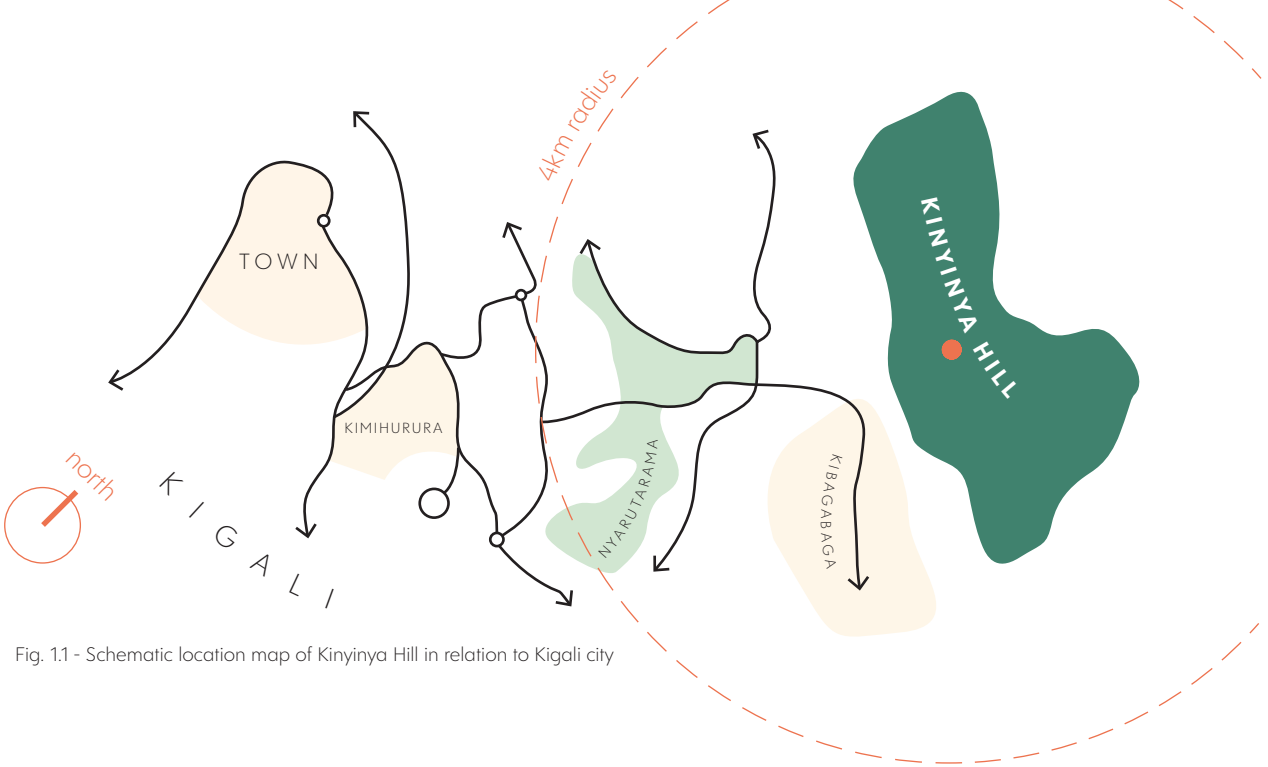


Fig. 1.1 - Schematic location map of Kinyinya Hill in relation to Kigali city

Context

The project site is known as 'Kinyinya Hill' in Kigali which is situated approx. 6.5 km or a 15-minute drive to the north-east of the central business district. The site is characterised by readily developable land, a sizable government owned parcel, agricultural and village community areas and social housing communities. The site is naturally defined by the topography and its surrounding wetlands and measures approx. 600 ha. Main access from the city to the site is from the south through the districts of Nyarutarama and Remera.

Handbook Objective

This Handbook summarizes the urban planning context of the GCK, including the rules and requirements contained in the Kigali City Master Plan 2013 and its subdocuments for the Kinyinya Hill site and it defines the design framework for the urban and architectural design competition under this project. The Handbook has defined the urban planning framework for the Mid-term Feasibility Study Report and it will be included in the competition brief.

View of Kinyinya Hill from the west, showing farmland and wetlands in the foreground and existing settlements on the hillside

Chapter 2 - Project Vision

Project Vision

The vision for the Green City Kigali project is to combine social, economic and environmental targets with strong governance to create a livable and resilient urban community - a shining example of the future sustainable urban community in the region.

2.1 GCK OVERALL VISION

A shared GCK vision was developed to align all the stakeholders to reach the project objectives. The GCK aims at incorporating the three dimensions of sustainable development in integrated proposals[1]. "Residents of Kinyinya Hill should be able to enjoy the social and economic benefits of urbanization while minimizing ecological footprints".

The social dimension of sustainable urban development promotes eradicating poverty in all its forms and dimensions, including extreme poverty and the number of slum and informal-settlement dwellers. The spatial organization, accessibility and design of urban space, as well as the infrastructure and basic services provision, together with development policies, can promote social cohesion, equality and inclusion.

The economic dimension of sustainable urban development promotes sustained and inclusive economic growth, with full and productive employment and decent work for all. Cities and human settlements should be places of equal opportunities, allowing people to live healthy, productive, prosperous and fulfilling lives.

Environmentally sustainable and resilient urban development recognizes that cities and human settlements face unprecedented threats from unsustainable consumption and production patterns. This in turn creates a loss of biodiversity, pressure on ecosystems, pollution, aggravated natural and human-made disasters, and climate change and its related risks. This undermines the efforts to end poverty and to achieve sustainable development.

The GCK vision is implemented through a number of concepts that include: 1. Housing and Climate Change as Entry Point. The project focus is on affordable housing and on how to integrate housing with climate change adaptation and mitigating measures. 2. Two-Track Approach to Urban Growth. The project as opposed to the current fragmented model of sprawl. It (i) plans 'new city extensions' through improving the supply and affordability of serviced land and new housing opportunities and (ii) 'upgrades neighbourhoods' through improving the conditions of the existing neighbourhoods on the Hill as well as 'densifying' them. 3. Starting Point of Innovation. The Project serves as a 'pilot' to draw lessons that will serve as a development model for secondary cities in Rwanda and the region. Developed models will include (i) access to sustainable public services, (ii) a road map to allow for adequate living standards (iii) control and reduction of GHG emissions, (iii) promotion of good governance standards and (iv) multi-stakeholder engagement. 4. Orientation towards Implementation. The chosen designs will be buildable and affordable. To achieve his, the project guards over on a number of success factors namely (i) deliver quality, (ii) good investment prospects, (iii) spatial focus and (iv) high project visibility.

The full GCK Vision can be found in PART I of the MT Feasibility Study.

1 UN-Habitat (2016), New Urban Agenda.


SOCIAL
ENVIRONMENTAL
ECONOMIC
IMPLEMENTATION
HOUSING AND CLIMATE CHANGE
ACCESS TO SERVIVES
CONTROLLING EMISSIONS
SPATIAL FOCUS
PROJECT VISIBILITY
INVESMENT
POINT FOR INNOVATION
MANAGING URBAN GROWTH
RAISE LIVING STANDARDS
GOOD GOVERNANCE
STAKEHOLDER ENGAGEMENT
DELIVER QUALITY
STARTING

2.2 VISION FOR URBAN GROWTH

As opposed to current fragmented growth model of sprawl, GCK proposes an urbanization process that is well-planned in the long-term. It aims at supplying land for development in orderly patterns of expansion as a basis for future economic and social growth and to preserve the environment. To this effect, the Project follows a two-track process to urban growth for Kinyinya Hill by (i) planning 'new city extensions' (PCE) through improving the supply and affordability of serviced land and new housing opportunities and (ii) 'neighbourhood upgrading' through improving the conditions of the existing neighbourhoods on the Hill as well as 'densification' of existing neighbourhoods.

These principles are designed to ensure that socioeconomic and environmental sustainability is protected and promoted as urban growth occurs through controlled expansion and upgrading/densification of existing and future areas. Learning from previous projects and paired with a site-specific understanding of the context the goal is to create customized solutions that draw upon many years of research, implementation and management. On one hand it is envisioned that the RSSB site and other large semi open space will follow the PCE and in the areas consisting of existing settlements the principles of Neighborhood Upgrading and/or Densification will be applied as appropriate.

This approach to urban growth is particularly relevant to the Kinyinya Hill site since it is in a central and desirable location within the city and has varying degrees of quality in its existing infrastructure and built housing stock. The existing road network is fragmented with varying degrees of surface finish and several areas of poor connectivity and heavy erosion. There are a significant number of informal settlements of varying degrees of quality and poor connectivity to existing services and much of the social infrastructure is located far from such settlements. Several formal projects have been completed and several are in the process of being planned however these seem to have been done in isolation of each other and there does not seem to be an overall vision or understanding of the site from both a socioeconomic and environmental point of view. As a result, GCK will be valuable in addressing these issues and promoting solutions to assist in healthy urban growth.

2.2.1 Planned City Extension (PCE)

The PCE is an urban planning tool that can promote socioeconomic and environmental sustainability by promoting controlled growth and densification of an area.

It seeks to address urban issues related to urban sprawl, poor connectivity, singular urban functions, poor allocation of social infrastructure, lack of socioeconomic mix and poor connectivity of movement, infrastructure and ecological networks. It does so by promoting densification with a socio-economic mix, promoting walkable neighborhoods, providing an interconnected network of streets, social infrastructure and green/blue systems to name a few. In addition, the promotion of a local economy via local production, employment and consumption is a key area of development within the PCE principles [2].

For more information regarding PCE please refer to the following documents:

1) UN-Habitat (2014), A New Strategy of Sustainable Neighbourhood Planning: Five Principles. https://unhabitat.org/wp-content/uploads/2014/05/5-Principles_web.pdf

This provides a summary of the UN-Habitat's five key principles for promoting healthy and sustainable urban development, albeit generalized and non-site specific. The key principles are:

i) Adequate Space for Streets and an Efficient Street Network

A well-connected hierarchy of street networks is important to establish a clear urban structure and promote efficient traffic, sustainable accessibility, social interaction, public safety and access to amenities. The principles of a walkable city are to be promoted where navigation of the urban environment is intuitive, and the experience of the pedestrian is rich and varied as they pass through or occupy the site. Additionally, public transport and cycling is encouraged and should have the supporting infrastructure to make as efficient and accessible as possible. Streets need to be well-ventilated taking the usual wind direction into account.

ii) High Density

This approach to density has several socioeconomic and environmental benefits that occur where there is a concentration of population. From a footprint perspective it limits the occurrence of urban sprawl and the

2 Un-Habitat (2015), Planned City Extensions- Analysis Of Historic Examples.

associated strains created on society and the environment. It creates economies of scale in public service catchment areas reducing the cost of such services and can help foster a more vibrant community through better services and quality of public open space. In addition, it can create a more energy efficiency on several scales from public transport, to building energy use etc when there is a higher population density. There are limits to how much high density should be applied to a site therefore this needs to be analysed on at a site-specific basis.

iii) Mixed Land Use

To ensure a vibrant and supportive community it is important that the principles of mixed land use are integrated into the development. As a result, it is envisioned that socioeconomic sustainability will be addressed through job creation, strengthening of the local economy, reduced land fragmentation, close proximity of public services and the encouragement of mixed socio-economic groups. Uses should be compatible with each other therefore caution should be taken with the levels of noise and pollution levels some uses create.

iv) Social Mix

The creation of a social mix aims to create rich and diverse urban areas and promote social equality in the sense that there is inclusivity and acceptance throughout the development to all income brackets. This is closely related to the previous principle of mixed land use and can provide many similar socioeconomic benefits. Regarding allocation, a significant percentage of residential use should be set aside for affordable housing. These ratios will vary depending on the context of the site but it is important an allowance is made for it.

v) Limited Land Use Specialization:

To assist in creating mixed use the allocation of large areas of land for specialized zoning should be limited. The occurrence of land use specialization can have negative consequences such as city congestion, segregation and car dependency especially in regards to single function neighbourhoods. As a result, to mitigate this it is recommended to combine compatible land uses into one block/ neighbourhood and to introduce mixed land use zoning whilst respecting market demand and urban regulations.

In addition to the above five principles it is recommended that the green blue network plays a major part in any development and the utilization of the existing buildings and infrastructure on the site is done where appropriate.

vi) In regard to the green blue network any existing structure should be enhanced and any new interventions should provide a clear hierarchy of connectivity so as to improve the sites ecological performance.

vii) In regard to working with the existing buildings and infrastructure care should be taken to improve and promote the existing structures where appropriate so as to respect the cultural and social memory of the site whilst also benefiting from economic and environmental savings.

2) UN-Habitat (2015), Planned City Extensions: Analysis of Historical Examples http://www.upv.es/contenidos/CAMUNISO/info/U0707319.pdf

This provides multiple examples of existing urban conditions that have experienced planned city extensions. These include cities in both the developed and developing world with a particular focus on the role of the: i) Grid ii) Street iii) Block iv) Open Space and Facilities vi) Regulation. Each case study has a strengths and weakness summary analysis.

2.2.2 Neighbourhood Upgrading

At the city scale the key driver for the creation and growth of Informal Settlements in Kigali is from migrants to the city in search of jobs and economic opportunity, many of which are willing to settle in inadequate less inexpensive conditions. This is magnified by the trend that large areas of low-quality housing on small plots are more convenient and profitable to landowners compared to more permanent housing solutions. This form of land usage creates a more competitive individualistic social context thus eroding the traditional social cohesion that is desirable to nurture within a community[3] .

At the national and municipal level various measures have been taken to reduce the impact of Informal Settlements. This includes the National Land Tenure Regularization Program (NLTRP). With many lands occupied by Informal Settlements and without a clear picture of who the ultimate land owners were due to political upheaval this was an attempt to create the country's first land registry. Indeed, within the City of Kigali the number of Informal Settlements

3 UN-Habitat (2019), City-wide unplanned and under-services settlements upgrading strategy for Kigali, Rwanda p.8

have dropped to a low in 2010 however, in recent years it has started to increase again to around 79% of the population thus raising cause for concern[4] .

As a result, UN-Habitat and the City of Kigali have tried to address this growth by issuing guidance as to how informal settlements can be improved. Primarily via two approaches i) Upgrading and ii) Land Readjustment (densification).

It is important to highlight the difference between Upgrading and Urban Renewal in the sense that the later runs the risk of creating gentrification through increased land values thus pricing out certain brackets of the existing socioeconomic spectrum.

With Upgrading the goal is to include and retain the existing communities thus creating a more inclusive and diverse end result. Within the Rwandan context the possibility creating citizen engagement via scheduled community work days could be explored.

In addition to the Upgrading and Land Readjustment definitions, the UN-Habitat and CoK have also categorized the informal settlements into seven different categories. Several of which consider the risks related to a settlement's topographical context, for example in a flood plain or steep slope. An area of key concern given related to risks involved with soil erosion, flooding, accessibility and the cost of building or upgrading infrastructure and homes.

4 MININFRA (2015) National Informal Settlement Upgrading Strategy p.9.

Fig 2.1 - Key reference documents

The seven categories are: i) Uphill sloped settlements ii) Downhill settlements iii) Inaccessible areas iv) Small-pocket settlements v) Central overcrowded areas vi) Peri-urban areas vii) Settlements located in high risk areas (i.e. steep slope and flood prone areas)[5] .

Kinyinya Hill

In relation to the 600ha site a significant portion of the site is occupied by informal settlements of varying degrees of built quality, density and topographic context. The majority of informal settlements come under the Peri-Urban category and could benefit from both an Upgrading and Land Readjustment strategy dependent on the specific area in question. (see fig 2.4)

In addition, the Urban Planning Code (UPC) sets out conditions for the formalization of informal settlements aligned to its minimum infrastructure standards and shares many of the principles promoted by UN-Habitat [6].

Below is a summary of the approaches to Upgrading and Land Readjustment.

i) Upgrading

Upgrading occurs on denser established settlements and aims to improve upon the existing foot print with an emphasis on community engagement at an early stage. The main interventions proposed are i) clustering and densification ii) the improvement of basic urban service provisions iii) creation and enhancement of public and green areas. (see fig 2.3).

5 UN-Habitat (2019), City-wide unplanned and under-services settlements upgrading strategy for Kigali, Rwanda p.16.

6 MININFRA (2015), Rwanda Urban Planning Code p.34

These can come in several forms, dependent on the site and type of settlement in question. Generally, within most informal settlements on the site interventions that focus on the following improvements would be of benefit: i) environmental restoration by achieving a balance between human and natural activity ii) Using public transport to reconnect segregated areas into the local network iii) Provision of quality social services.

In regards to the site the majority of the Informal Settlements have been classified as Peri-urban. These often function as 'buffer zones' between urban and rural land uses and therefore have additional opportunities to be utilized in their upgrading including irrigation strategies, security of tenure, agri business and small industry opportunities amongst other interventions. Please refer to the UN-Habitat (2019), Kigali Upgrading Strategy Document for more detail.

ii) Land Readjustment (densification)

Land readjustment can be a preferred strategy in a scenario where there is low density and the units are dispersed within the site in an inefficient manner. The goals is to reassess the layout of the plots and adjust into a configuration that has more efficient land use and legibility in regards to infrastructure, circulation and community enhancement. There are several informal settlements on the site that fall into this category and could benefit from the principles promoted via land readjustment. This approach promotes bringing a group of adjacent landowners into a partnership of land

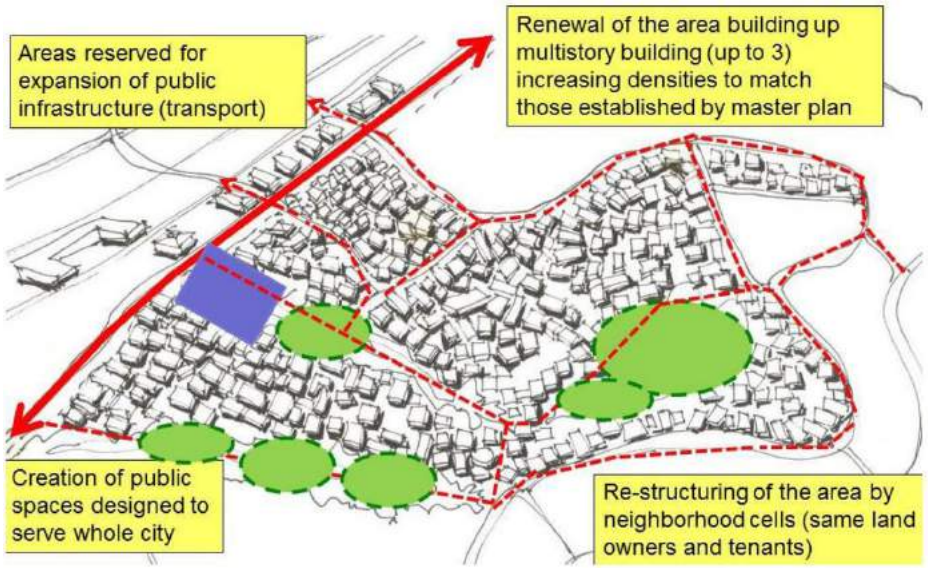


Fig 2.2 - Neighborhood Upgrading. Source: UN-Habitat (2019)

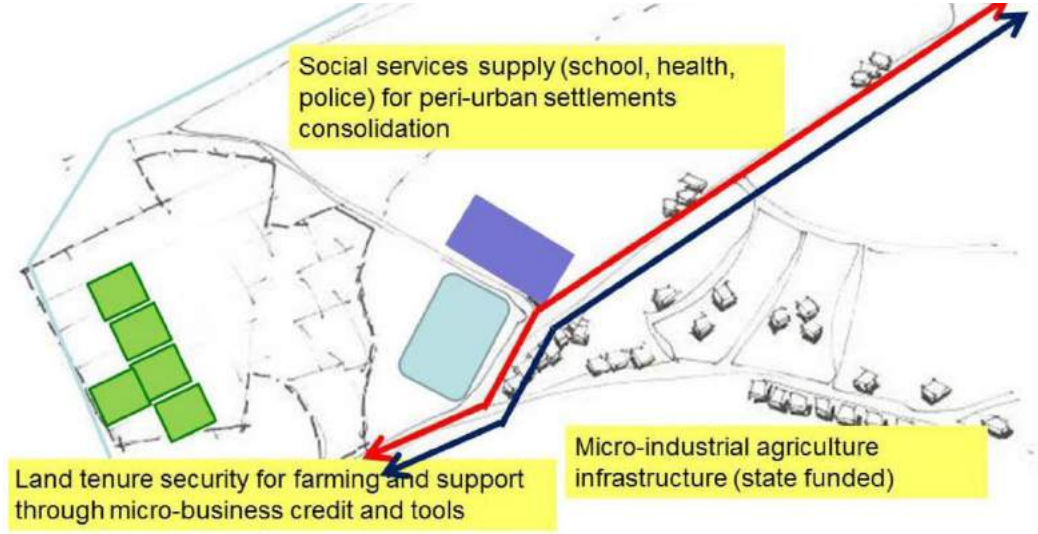


Fig 2.3 - Peri- Urban Informal Settlement Upgrading Strategy. Source: UN-Habitat (2019)

contribution or an agreement of joint planning and servicing of their adjoining plots. Commonly this requires the selling or surrendering of land to finance infrastructure costs and public space requirements. In addition to land owners and local government stakeholders it is essential to encourage the local community's input at an early stage to foster a sense of joint ownership and responsibility over the long term[7].

In support of the Neighbourhood upgrading process the UN-Habitat's Participatory Slum Upgrading Programme (PSUP) promotes principles that assist in the design of good urbanism within informal and slum settlements. It distils the process into 3 distinct stages from initial assessment to the implementation of pilot projects. It is worth noting that Rwanda is already part of this programme albeit at the initial stage of Phase 1: Urban Profiling.

For more detailed information relating to Upgrading and Land Readjustment please refer to the following documents.

i) UN-Habitat (), PSUP Halving the Number of Slum Dwellers by 2020.

ii) UN-Habitat (), Participatory and Inclusive Land Readjustment

iii) UN-Habitat (2019), City-Wide Uplanned and Underservices Settlements Upgrading Strategy for Kigali, Rwanda

iv) MININFRA (2015), Rwanda Urban Planning Code (UPC).

7 UN-HABITAT Participatory and Inclusive Land Readjustment.

2.2.3 Financing and SPVs.

There are several ways implement and set up a finance mechanism for the upgrading process.

In regard to implementation four general approaches are highlighted: i) Fully subsidized housing and infrastructure development ii) Targeted subsidies to cover basic needs or initial investments iii) Establishment of public-private partnerships for infrastructure development iv) Privatisation.

Of the four it is option ii) that is generally preferred since it engages to local community and allows for the community to assist financially or via labour/materials once the initial investment has been made[8].

In regard to a financing mechanism several options are promoted however it is important to ensure that there is a framework to ensure suitable measures keep the local communities' interests within the process. This could be via a Special Purpose Vehicle (SPV) run in conjunction with a Special Purpose Public Corporation to ensure the local communities' interests are protected[9].

8 UN-Habitat (2019), City-wide unplanned and under-services settlements upgrading strategy for Kigali, Rwanda p.46.

9 UN-Habitat (2019), City-wide unplanned and under-services settlements upgrading strategy for Kigali, Rwanda p.46.

Fig 2.4 - Land Readjustment Before and After. Source: UN-Habitat (2019)

Chapter 3 - International Standards

International Standards

The key references contained in this chapter are global benchmarks of best practice sustainable urban planning and they form a frame of reference for the Green City Pilot project.

3.1 INTERNATIONAL STANDARDS

2030 Agenda for sustainable development:

The 2030 Agenda for Sustainable Development forms the global development framework and is a plan of action for people, planet and prosperity. The 2030 Agenda is anchored around 17 Sustainable Development Goals (SDGs) adopted on 17 September 2015. The SDGs promise to address the growing challenges in the interlinked economic, social and environmental dimensions of sustainable development. Agenda 2030 now gives a prominent role to urbanization and cities as SDG 11 is a standalone goal on cities and human settlements namely "Make cities and human settlements inclusive, safe, resilient and sustainable".[1]

The Paris Agreement on climate change, addresses crucial areas necessary to combat climate change. It is an agreement within the United Nations Framework Convention on Climate Change dealing with greenhouse-gas-emissions mitigation, adaptation, and finance.[2]

The New Urban Agenda is the framework of the United Nations that that lays out how cities should be planned and managed to best promote sustainable urbanization.[3]

The adoption of the New Urban Agenda on 20 October 2016, and the entry into force of the Paris Agreement on Climate Change two weeks later, on 4 November 2016, are a strong first step toward the immediate implementation of Agenda 2030 for Sustainable Development, in urban- and climate change related matters. The New Urban Agenda now supports member states to implement the urban portions of their Nationally Determined Contributions (NDCs) into achieving of the long-term goals of the Paris Agreement.

The New Urban Agenda

(a) Readdresses the way we plan, finance, develop, govern and manage cities and human settlements, recognizing sustainable urban and territorial development as essential to the achievement of sustainable development and prosperity for all;

(b) Recognizes the leading role of national Governments, as appropriate, in the definition and implementation of inclusive and effective urban policies and legislation for sustainable urban development, and the equally important contributions of subnational and local governments, as well as civil society and other relevant stakeholders, in a transparent and accountable manner;

(c) Adopts sustainable, people-centred, age-and gender-responsive and integrated approaches to urban and territorial development by implementing policies, strategies, capacity development and actions at all levels, based on fundamental drivers of change. Rwanda is a signatory and has ratified the Paris Agreement and it follows the targets of reducing greenhouse gas emissions. Its vision for 2050 is based on the Green Growth and Climate Resilience Strategy envisages Rwanda as a developed climate-resilient, low carbon economy, with a strong services sector, low unemployment and low levels of poverty.

1 UN-Habitat (2018), SDG 11 Synthesis Report.
2 UN-Habitat (2017), Sustainable Urbanisation in the Paris Agreement.
3 United Nations (2016), GA Resolution 71½56. New Urban Agenda

The GCK's project vision is in line with SDG11 and it follows the general approach of interlinking the economic, social and environmental dimensions of sustainable development.

3.2 SDGS AND THE NEW URBAN AGENDA PRINCIPLES

The adoption by the international community of both the SDGs and the New Urban Agenda, positions urbanization at the forefront of international development policy. The GCK aims at exploiting the possibilities posed by urbanization as follows:

Housing at the Centre: the GCK aims at advising housing practitioners to shape housing policies that are inclusive and that target low-income groups and people in vulnerable situations.

Leaving No One Behind: people are the very essence of cities and reducing inequality is key to ensuring that opportunities offered by the city are accessible to all.

Risk Reduction and Resilience in Cities: cities are vulnerable to impacts from a range of shocks and stresses and the GCK examines tools and approaches to strengthen local administrations and empower citizens, while building their capacity to face new challenges and better protect human, economic and natural assets.

Planning our Cities: the dynamic of urbanization provides a huge opportunity to harness the wealth and creativity of a city's boom to maximize quality of life for as many citizens as possible; the GCK aims at tackling rapid urbanization and sprawl through planned city extensions.

Rules and Regulations: laws should match the city's prevailing urban reality and they should be enforced to encouraging investment and allow service provision; GCK aims at proposing improvements in rules and regulations should this be required.

Generating Finance: the GCK aims at developing strategies to implement public-private partnerships and innovative financing mechanisms to assist affordable housing construction.

Urban Poverty: the GCK aims at improving access to water and sanitation, energy, solid waste management and mobility and at creating sustainable livelihoods and employment; it works on neighbourhood upgrading.

Learning, Capacity Building, Monitoring and Reporting: the GCK includes capacity building components to strengthen the capacity of technical staff and decision makers in sustainable urban development.

Partnering towards the New Urban Agenda: the GCK aims at partnering with government institutions, communities and other stakeholders.

Chapter 4 - Urban Analysis

Urban Analysis

This chapter provides a contextual planning framework for the project, including local and national policy, development targets and major opportunities and constraints.

4.1 URBAN PLANNING: CONTEXT IN RWANDA

Over the last 25 years there have been several framework and national policies developed so as to stream line the urban planning, development and implementation process with the goal of promoting socioeconomic and environmental sustainability. In the following sections the existing policy and planning framework is briefly reviewed at three levels: The international, regional and national.

4.1.1 Regional and National Framework and Policies (Macro Level)

International

Rwanda has ratified the Doha Amendment (2012) to the Kyoto Protocol (1997). The Kyoto Protocol is an international treaty which extends the 1992 United Nations Framework Convention on Climate Change that commits state parties to reduce greenhouse gas emissions. Rwanda is further a signatory to and has ratified the Paris Agreement (2016) and follows the targets of reducing greenhouse gas emissions.

Regional

EAC Vision 2050

The Vision 2050 of the East African Community pursues the promotion of a Green Growth and a Green/Blue Economy, with the goal of contributing to low carbon development, reducing poverty as well as achieving sustained economic growth, enhancing social inclusion and improving human welfare.

Agenda 2063

The Agenda 2063 is a strategic framework for the socio-economic transformation of the African continent envisioned for the next 50 years. Among the objectives are the sustainability of economies and to develop strategies to grow the African blue/ocean and green economies.

National

The Vision 2020

The vision 2020 emphasises the positive side of urbanisation and its contribution to economic growth and the well planned and efficiently laid out and serviced rural settlement. Its 4th pillar is related to infrastructure management and focuses broadly on the interaction between urbanisation, the environment and sustainable natural resource management. Concerning urban planning, it stipulates each town to have an updated urban master plan with coordinated implementation of the plans by 2020, with the aim that the proportion of those living in towns and cities will increase from 10%in 2000 to 35% in 2020.

The Vision 2050: The Rwanda We Want

The blueprint has five main areas, one of which refers to modern infrastructure and livelihoods, including Green/Eco-friendly cities and neighbourhoods powered by renewable energy and featuring recycling.

EDPRS2 2013-18

As part of the priority to pursue a 'green economy' approach to economic transformation the EDPRS2 introduced efforts to locate a green city pilot to build a case for green urbanisation in Rwanda. Analytical work on potential design options for developing green urban areas, policy and incentive mechanisms in the sector and the proposal of potential institutional structures for implementing green urbanisation were included. The EDPRS2 also identified MININFRA as the lead ministry to develop a

conducive regulatory environment to support green urban development. With EDPRS2, the Urbanisation and Human Settlement Sector was founded. The overarching goal of EDPRS 2 is "Accelerating progress to middle income status and better quality of life for all Rwandans through sustained average GDP growth of 11.5% and accelerated reduction of poverty to less than 30% of the population". Urbanisation is a fundamental part of the EDPRS2. The aim of priority areas 4 and 5 of the economic transformation pillar is to "transform the economic geography of Rwanda by facilitating urbanisation and promoting secondary cities" as centres of non-agricultural economic activities, and to pursue a "green economy" approach to economic transformation by favouring the development of sustainable cities and villages.

National Strategy for Transformation NST 2018-24

The NST is the successor document to the EDPRS2.

National Investment Strategy 2004:

The National Investment Strategy emphasizes the support of the private sector in infrastructure development. The consolidation of efforts of the Government and various development partners ensure the realization of sector programs. The activities include: the development of urban Master Plans and the construction of basic infrastructure in planned human settlements, support commercial and industrial investment, investment into touristic and recreational activities and in Economic Development Zones.

National Land Policy (2004)

The National Land Policy from 2004 aims at establishing a land tenure system that guarantees tenure security for all Rwandans and giving guidance to the necessary land reforms with a view to good management and rational use of national land resources. A revision process has begun for the update of this policy.

National Land Use and Development Master Plan (2011)

It provides general directives for sustainable land use development and presents guiding principles for the future development of the country with regard to socioeconomics, infrastructure, environment and land administration. Based on its provisions, District Land Use and Development Plans were developed in 2014/15.

The Urbanisation and Rural Settlement Sector Strategic Plan (2013-18)

The Sector Strategic Plan of the Urbanisation and Rural Settlement Sector develops the objectives of good development management and of spatial distribution of growth, and translates them into two high level priorities to develop a good urban and rural settlement management cross-cutting all development sectors and to create a hierarchical network of urban and urbanizing centres providing services and attracting economic activities countrywide.

National Urbanization Policy (NUP, 2015)

The policy guides harmonious collaboration between all development sectors and actors in the urbanization sector for a holistic and sustainable development approach manifested in human settlement and the built environment. The National Urbanisation Policy was adopted in December 2015 and sets the framework for the governmental, non-governmental and private interaction in the country's urbanisation process in support of sustainable development. It sets the principles for coordinated strategies and actions supported by urban planning documents, development of urban areas at high density, inclusive urban areas providing quality of life and conditions for economic growth.

National Housing Policy (2015)

Adopted in March 2015, this policy has a vision of enabling everyone independent of income, base of subsistence, and location to access adequate housing in sustainably planned and developed areas reserved for habitation in Rwanda. It enables the private sector to satisfy the current and growing demand for housing in terms of quantity and access costs offered to clients and supports the purchasing power among population through savings, pooling of individual resources and support to financing models accessible to the full range of residents including low income levels. It combines land use and urban planning principles in order to achieve the efficient use of land and resources when developing housing.

National - Sector Strategies

National Policy and Strategy for Water Supply and Sanitation Services (2010)

This policy aims to ensure sustainable and affordable access to safe water supply, sanitation and waste management services as a contribution to poverty reduction, public health, economic development and environmental. It includes solid waste and storm water management.

National Policy on Water Resources Management (2011)

The policy aims at ensuring conservation of water resources, and their sustainable management and development applying an Integrated Water Resources Management approach.

Public Transport Policy & Strategy of Rwanda (2012)

The policy recognizes the need to ensure economic growth by providing adequate transport services and aims for universal public transport services for all citizens, accessibility,

4.1.2 Planning Context in Kigali (Meso Level)

Kigali City Master Plans (General)

The Master Plan is a comprehensive long-term plan intended to guide growth and development of Kigali City. It understands Kigali's existing conditions and issues to provide recommendations and proposals for Kigali's bright and progressive future. Through comprehensive studies it determines the City's growing needs, and provides clear goals and strategies to direct future growth of Kigali City. The planning process involves working through four basic questions, which will be answered with the Kigali City Master Plan:

The most important aspect of the Kigali Master Plan is to provide a road map for Kigali's future growth. The Masterplan: Guides changes in the City over long term and gives physical form to its strategic vision and values. Addresses all aspects of the City's physical environment such as; existing conditions and proposed projects, open space and circulation. Helps the City understand options for growth and its implications so that informed decisions and choices by are made by City Leaders and Stakeholders.

Kigali City Council Master Plan (KCMP) 2007

The key objective of the Kigali Conceptual Master Plan 2007 was to move forward from the National Strategic Plan proposed in Vision 2020, and to develop a long range plan for the Capital City that would guide the key infrastructure and systems required for the future growth of Kigali. The key proposals of Kigali Conceptual Master Plan 2007 were:

i) City development direction

Kigali City was to develop towards the south (Gahanga), and east towards Masaka with a new centre proposed at Masaka. Kinyinya

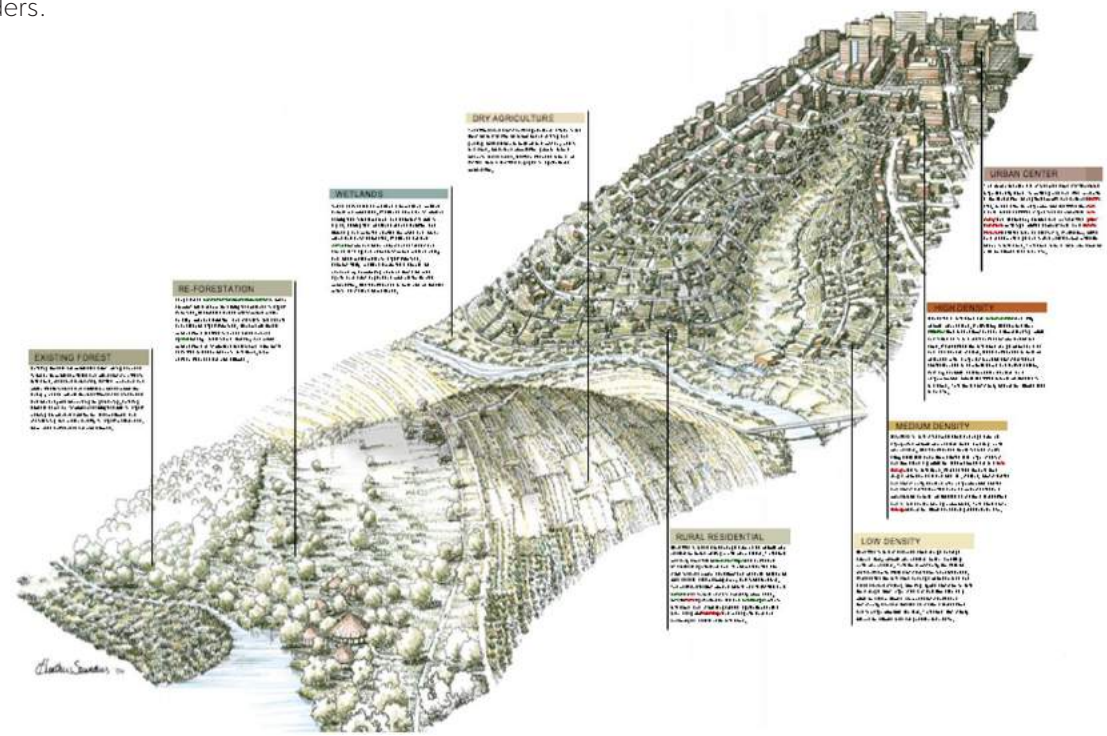


Fig 4.1 - Kigali Transect Model. Source: Kigali Conceptual Master Plan Report 2008

would be another such growth area. A large Industrial area was also proposed at Ndera.

ii) Development density & environmental considerations

The plan focuses on preservation of naturally sensitive areas and it projects a total population of 3.3 million for Kigali by 2030. This translates into a low density eco development for Kigali.

iii). Transect model

Developing from existing land value, where the land on the hilltop is preferred over those in the valley, transect model was proposed as the development model for Kigali.

iv) New City Centre and the Sub-Centres

The concept plan proposed a new city centre, considering that the existing city centre is aged and need to be preserved. It also proposed a range of sub centres to serve the surrounding population.

Kigali grew much higher than the KCMP anticipated with a population of 1.3 million being realized in 2013. This Rapid urban Growth created development pressure as well as social issues. With this in mind, the other Master Plans had to address some of these unforeseen issues.

Existing Kigali City Master Plan and the Status

Kigali´s Masterplan from 2013 underlines the principles of sustainable development, which shall also be followed by the Green City Pilot development. The Vision of the Masterplan is to make Kigali "The Centre of Urban Excellence in Africa", with the 5 goals to be a City of character, vibrant economy and diversity; City of green transport; City of affordable homes; City of enchanting nature and biodiversity; and City of sustainable resource management. The Masterplan adopts a structure of a "radial city", with decentralised growth nodes and development meant to intensify along transit corridors mainly directed east and south, and with the Central Business District (CBD) being the centre point of the development.

The Kigali Master Plan 2013 can be accessed online at http://www.masterplan2013.kigalicity.gov.rw

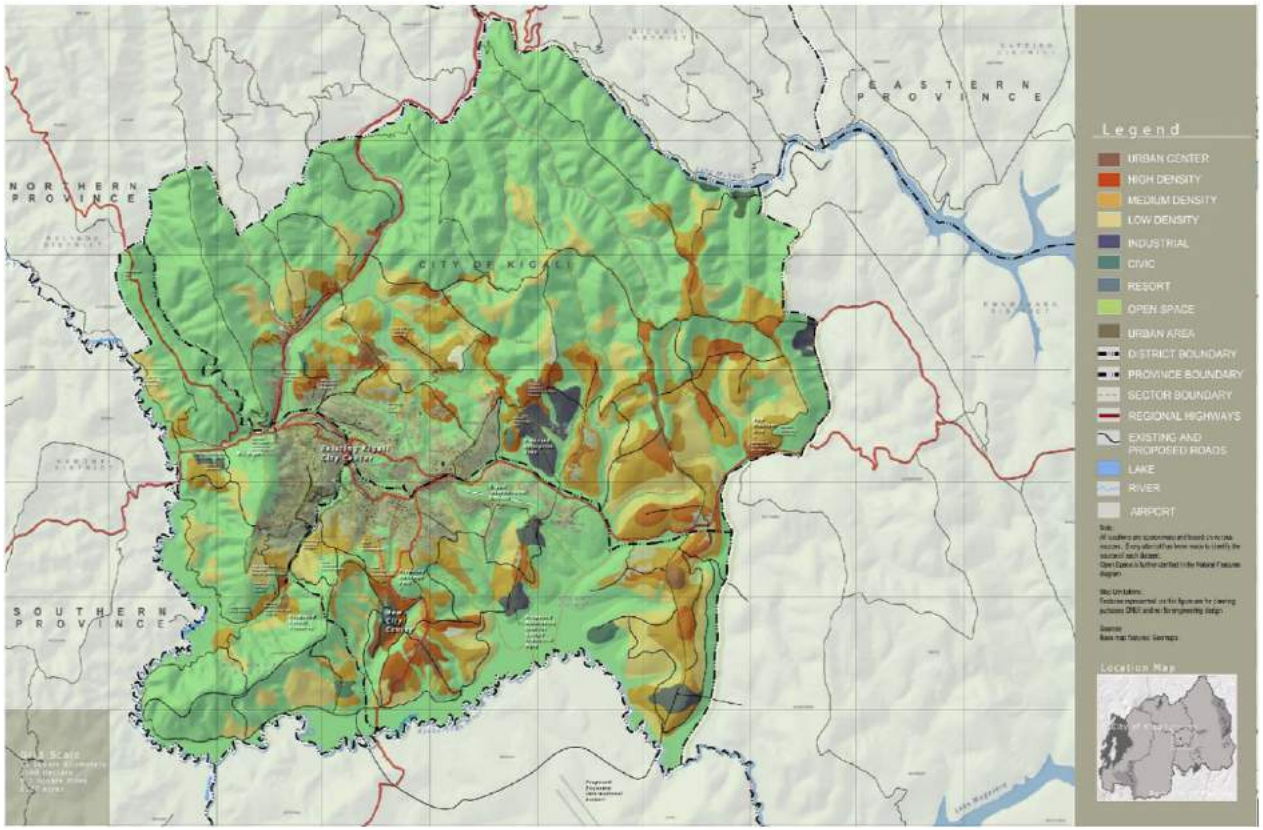


Fig 4.2 - City of Kigali Map. Source: Basemap Features GeoMaps

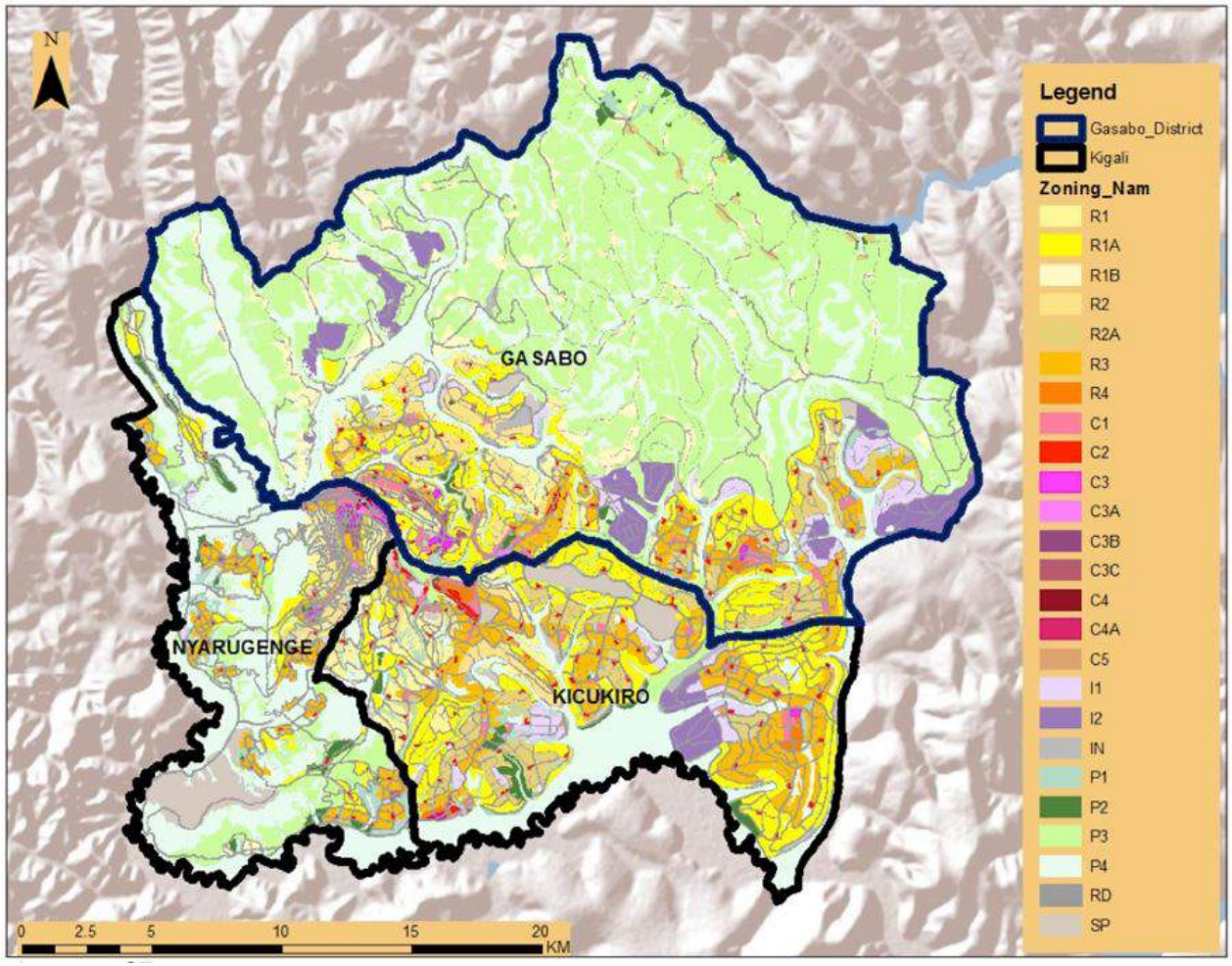


Fig 4.3 - Kigali City Zoning Plan 2013. Source: Kigali City Zoning Plan GIS Data

Residential
- o Single Family Residential District (R1)
- o Mixed Single Family Residential District (R1A)
- o Rural Residential District (R1B)
- o Low Rise Residential District (R2)
- o Low Rise Residential District (R2A)
- o Medium Rise Residential District (R3)
- o High Rise Residential District (R4)

Commercial
- o Mixed Use Commercial District (C1)
- o Neighbourhood Level Commercial District (C2)
- o City Level Commercial District (C3)
- o City Level Commercial District (C3A)
- o City Level Commercial District (C3B)
- o City Level Commercial District (C3C)
- o Regional Level Commercial District (C4)
- o Regional Level Commercial District (C4A)
- o Retail Warehouse District (C5)

Industrial
- o Light Industrial District (I1)
- o General Industrial District (I2)

Parks and Open Space
- o Passive Recreational District (P1)
- o Active Recreational District (P2)
- o Agricultural Area(P3)
- o Protected Area (P4)

4 types of Zones:

- **4 Residential District**
  R1-R4
- **5 Commercial Districts**
  C1-C5
- **2 Industrial District**
  I1 -I2
- **4 Parks and Open Space District**
  P1 –P4

Figure 4.4 Kigali City Master Plan Zones.Source: Kigali City Master Plan 2013

Revision of the Current Kigali City Master Plan 2013 and the Status

The Kigali City Master plan is currently under revision with the Draft Version publicly displayed on the 21st of May 2019 for the public to provide comments. The project team has the opportunity to remain closely involved and informed about the revision process through direct information exchange and collaborative approaches with the revision team. The GCK Deputy Team Leader is part of the advisory team to the Master plan revision process.

Local Detailed Plans

All 30 District have Local Urban Development Plans for portions of their main urban areas, and detailed physical plans are under finalization to support urban land management. Rural settlement layout plans are also being formulated as a prerequisite for new planned rural settlements.

Rwanda Building Code

The Rwanda Building Code is published as Annex 2 of the Ministerial Order N° 04/Cab. M/015 of 18/05/2015 Determining Urban Planning and Building Regulations. It is a performance-based code, integrating any technology and material for use in construction when fulfilling minimum performance requirements. It establishes such minimum requirements to safeguard the public health, safety and general welfare by regulating and controlling the design, construction, quality of materials, sanitation, lighting and ventilation, energy conservation, and safety to life and property from fire and other hazards attributed to the built environment, use and occupancy, location and maintenance of all buildings and structures in Rwanda. The Building Code makes reference to requisite national, regional and/or international standards and/or code of practice.

Urban Planning Code

The Urban Planning Code of the Ministerial Order N° 04/Cab. M/015 of 18th May 2015 determine urban planning and building regulations. It lays out the principles for the sustainable development and management of land used for human settlement. It is binding for all categories of land within urban areas for any development and investment project, public institutions, tourist, public spaces, urban renewal and infrastructure servicing. It provides a basis for forward planning, development management and plan implementation.

Implementation Orders of the Law Governing Urban Planning and Building in Rwanda

The orders in their co-existence support cross-sectoral coordination and integrate different types of planning and framework for the integration of civil concerns. They regulate local development based on clear procedures to support sustainable, integral and inclusive development, clear institutional framework and decentralization, local economic development, citizen participation and accountability mechanisms, which are all principles supported by government policy. Available orders include:

- Presidential Order N°46/01 of 30/06/2015 determining procedures for formulation, approval, revision and publication of the master plan for land use management and urban planning

- Prime Minister's Order N° 104/03 of 06/05/2015 determining procedures for formulation, approval, publication and revision of the local land development plan

- Prime Minister's Order N° 114/03 of 19/06/2015 determining conditions for authorization to carry out real estate development operations

Ministerial Order determining procedures for formulation, approval, publication and revision of the Specific Land development plan (Adopted but not yet gazetted)

- Ministerial Order N° 05/Cab.M/015 of 21/05/2015 determining the contents of urban planning documents and procedures for investigation, initiation, organization and issuance of authorization to carry out urban planning operations

The Prime Minister's instructions No 004/03 of 13/1½015 determining the conditions and procedures for obtaining government support for affordable housing projects. These instructions specify government support for affordable housing development and the conditions for such support. It refers to eligibility criteria, beneficiary profiles and public infrastructure standards. A National Affordable Housing Support Approval Committee is established to examine and decide about financial support in a defined procedure.

The Prime Minister's instructions No 002/03 of 05/05/2015 determining procedures for eradication of asbestos materials. These instructions require owners of building containing asbestos materials to remove such, and those who own otherwise situated asbestos materials to wrap them appropriately and wait for burial of the material. The instructions provide for procedures for eradication of asbestos materials, the burial site locations. Responsible for the management of asbestos burial is the Rwanda Housing Authority in collaboration with the concerned District.

Prime Minister Instructions Nº001/03 of 11/07/2014 relating to the fire prevention in Rwanda. The purpose of these instructions is to enforce fire safety and security measures aimed at protecting people and their property from fire outbreak.

Annexes to the above are:

Ministerial Order N° 03/CAB.M/019 of 15/04/2019 determining urban planning and building regulations annexed with the Urban Planning Code, Rwanda Building Code, Rwanda Green Building Minimum System and Building Faults and Sanctions. MO_No_003_of_16_04_2019.pdf

Annex I: Urban Planning Code. The Urban Planning Code is Annex 1 of the Ministerial Order N° 03/Cab.M/019 of 15/04/2019 Determining Urban Planning and Building Regulations. It lays out the principles for the sustainable development and management of land used for human settlement. It is binding for all categories of land within urban areas for any development and investment project, public institutions, tourist, public spaces, urban renewal and infrastructure servicing. It provides a basis for forward planning, development management and plan implementation. Annex_I.pdf

Annex II: Rwanda Building Code. The Rwanda Building Code is published as Annex 2 of the Ministerial Order 03/Cab.M/019 of 15/04/2019 Determining Urban Planning and Building Regulations. It is a performance based code, integrating any technology and material for use in construction when fulfilling minimum performance requirements. It establishes such minimum requirements to safeguard the public health, safety and general welfare by regulating and controlling the design, construction, quality of materials, sanitation, lighting and ventilation, energy conservation, and safety to life and property from fire and other hazards attributed to the built environment, use and occupancy, location and maintenance of all buildings and structures in Rwanda. The Building Code makes reference to requisite national, regional and/or international standards and/or code of practice. Annex_II.pdf

Annex III: Rwanda Green Building Minimum System. The Rwanda Green Building Minimum System is Annex 3 of the Ministerial Order N° 03/Cab.M/019 of 15/04/2019 Determining Urban Planning and Building Regulations. The Green Building Minimum Compliance is a point-based system to help building owners and developers choose indicators based on the applicability to the building type, usage and the benefits associated. It is composed of green building indicators that address the basic green features any building should possess such as appropriate orientation, day lighting, natural ventilation, rainwater harvesting, efficient plumbing fixtures, low-impact refrigerants, greenery protection, paints not harmful to the occupants; to name a few. Annex_III.pdf

Figure Policy and Legal Framework at a Glance

Source: Ministry of Infrastructure of Rwanda Website

Link: http://www.mininfra.gov.rw/index.php?id=183

4.1.3 Planning Context in Kinyinya Hill (Micro Level)

Existing Sub Area Plans for Kinyinya and Their Status

Since the development and preparation of the KCMP 2007, many new sub area plans and projects have been approved in Kigali. A review and integration of all the master plans was critical in the preparation of the Kigali City Master Plan 2013 to regularize, optimize and streamline the implementation and planning approval process.

The key objective of the Kigali City Sub-areas Planning Project was to translate the vision and recommendations set in the KCMP, as well as the aspiration of the City into detailed master plans, which would serve as the physical development blueprint for the City's sub-areas over the next 10-20 years.

The Master Plan for the Residential Township in Kinyinya (Murama Cell) envisioned developing it as an exemplary modern residential community in Kigali City. The total Area covered was 386.86 Hectares.

The Sub Area Plans, which included the Kinyinya Sub Area Plan where the GCK Project falls, were altered only with respect to the Slopes, Approved Projects by CoK & Cadastral Parcel Information This included the integration of the Kinyinya Sub area plan into the Kigali City master Plan 2013.

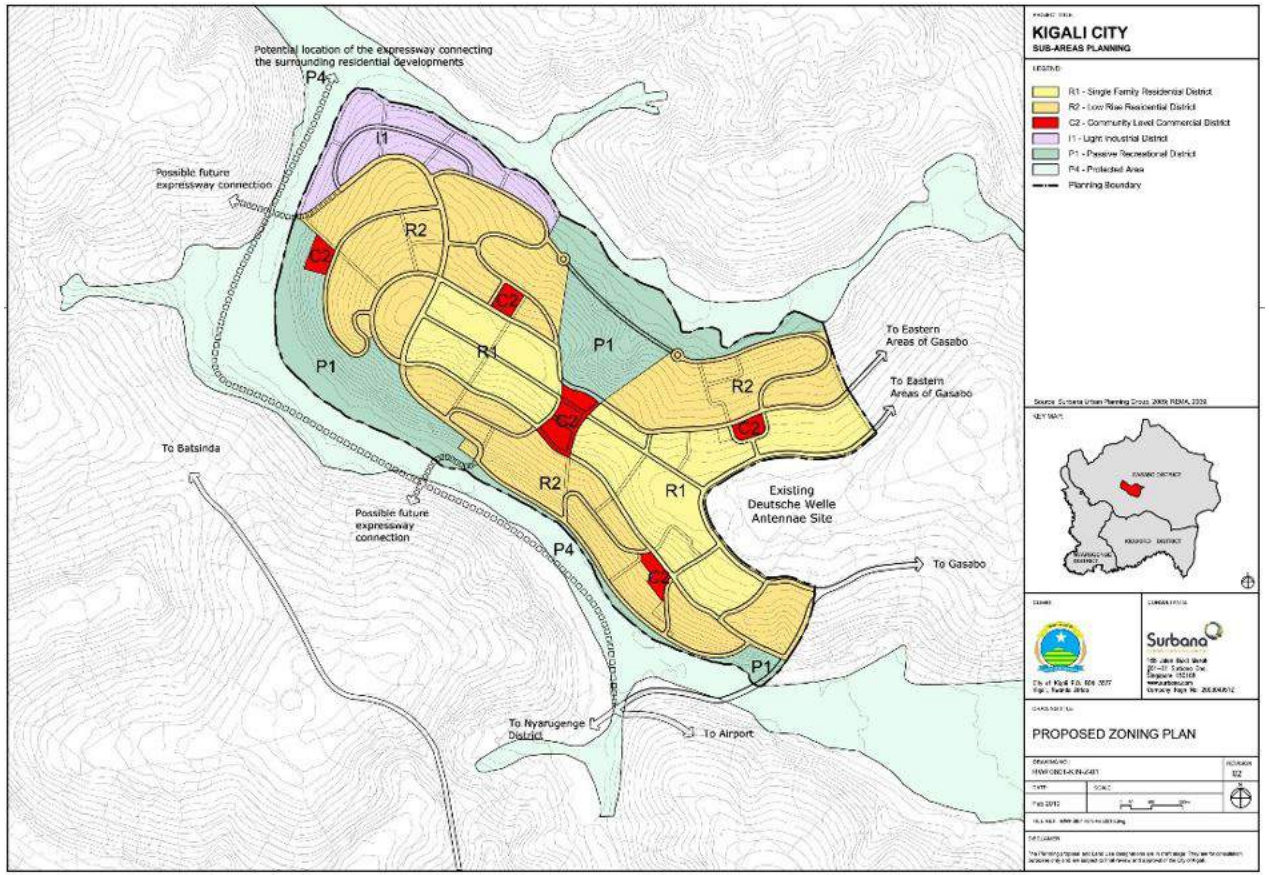


Fig 4.5 - Kinyinya Zoning Plan. Source: Kinyinya Zoning Report 2010

GCK Study Area Master Plan Interpretation

According to the CoK Masterplan 2013, Kinyinya where the GCK project is located,is among the 'Catalyst projects' chosen for the Masterplan implementation and project prioritisation strategy in Phase 1. Kinyinya is dedicated by the plan as a nodal development location.

The GCK Project is situated in Gasabo District, Kinyinya Sector, Murama Cell having a total area of 600ha (note that the GCK project area boundary line is still under review and will require further consideration).

Fig 4.6 - Map of Existing Situation of Study area and surroundings

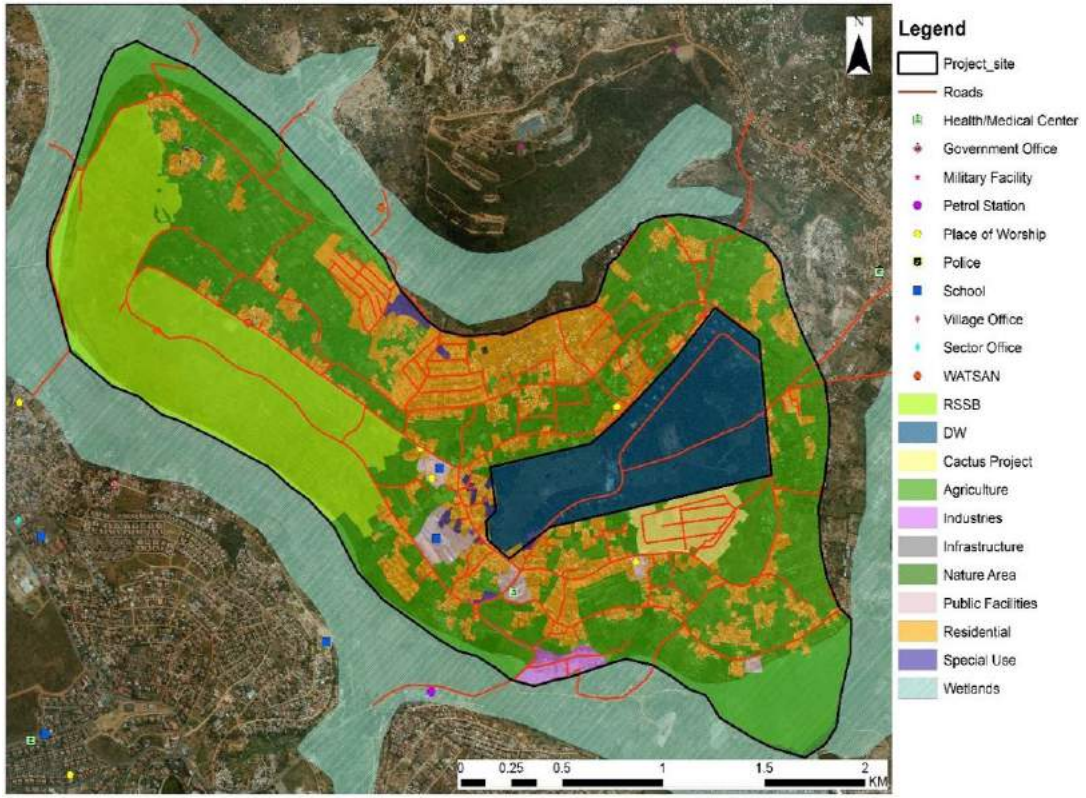


Fig 4.7: land use of study area based on the Kigali City Master Plan 2013

Broad Land use	Area (Ha)
Residential	101.82
Agriculture	264.67
Industries	4.34
Public Facilities	8.66
Special Use	5.41
RSSB	102.8
Infrastructure	68.87
Nature Area	1.75
DW	69.8
Cactus Project	13.7
TOTAL	641.75

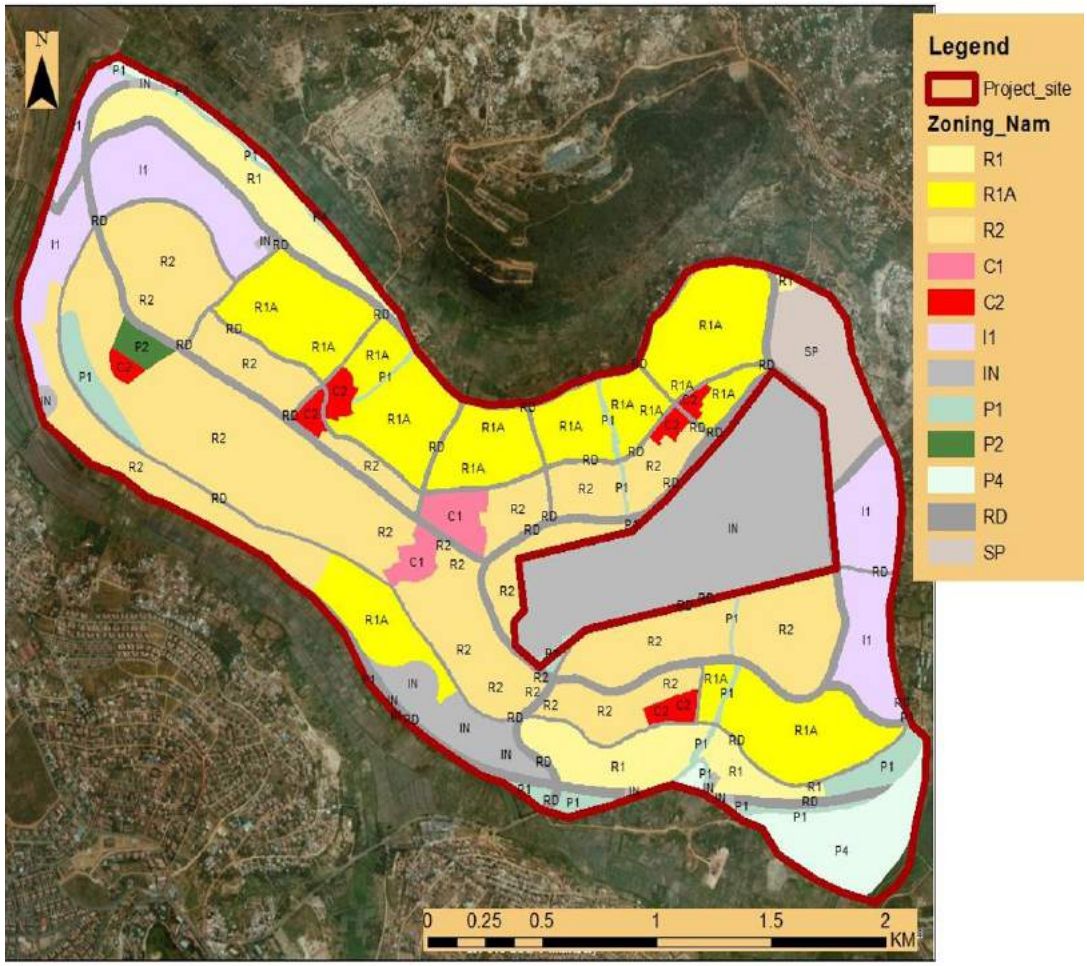


Fig 4.8: zoning of study area based on the Kigali City Master Plan 2013

Zoning	Area (Ha)
IN - Infrastructure	81.503
R1 - Single Family Residential District	38.508
R2 - Low Rise Residential District	192.191
C2 - Community Level Commercial District	9.176
P2 - Active Recreational District	2.717
P1 - Passive Recreational District	21.806
I1 - Light Industrial District	54.887
R1A - Mixed Single Family Residential District	118.733
SP - Special Use	18.41
RD- Road	72.026
C1 - Mixed Use Commercial District	8.163
P4 - Protected Area District	22.255
TOTAL AREA	640.375

4.1.4 Existing Informal Settlements on Site

Existing Sub Area Plans for Kinyinya and Their Status

The Site has a couple of informal settlements that have been categorised as part of a joint partnership between the City of Kigali and UNHabitat as part of the yet to be validated "City-wide unplanned and underserviced settlements upgrading strategy for Kigali, Rwanda" Study. The Informal settlement categories identified in Kigali are shown in the table below which also gives a break down by District.

As shown in the Fig 4.9 , with in the GCK Study area, there are four informal settlement categories with the main informal settlement category that occupies a larger area being the peri-urban category.

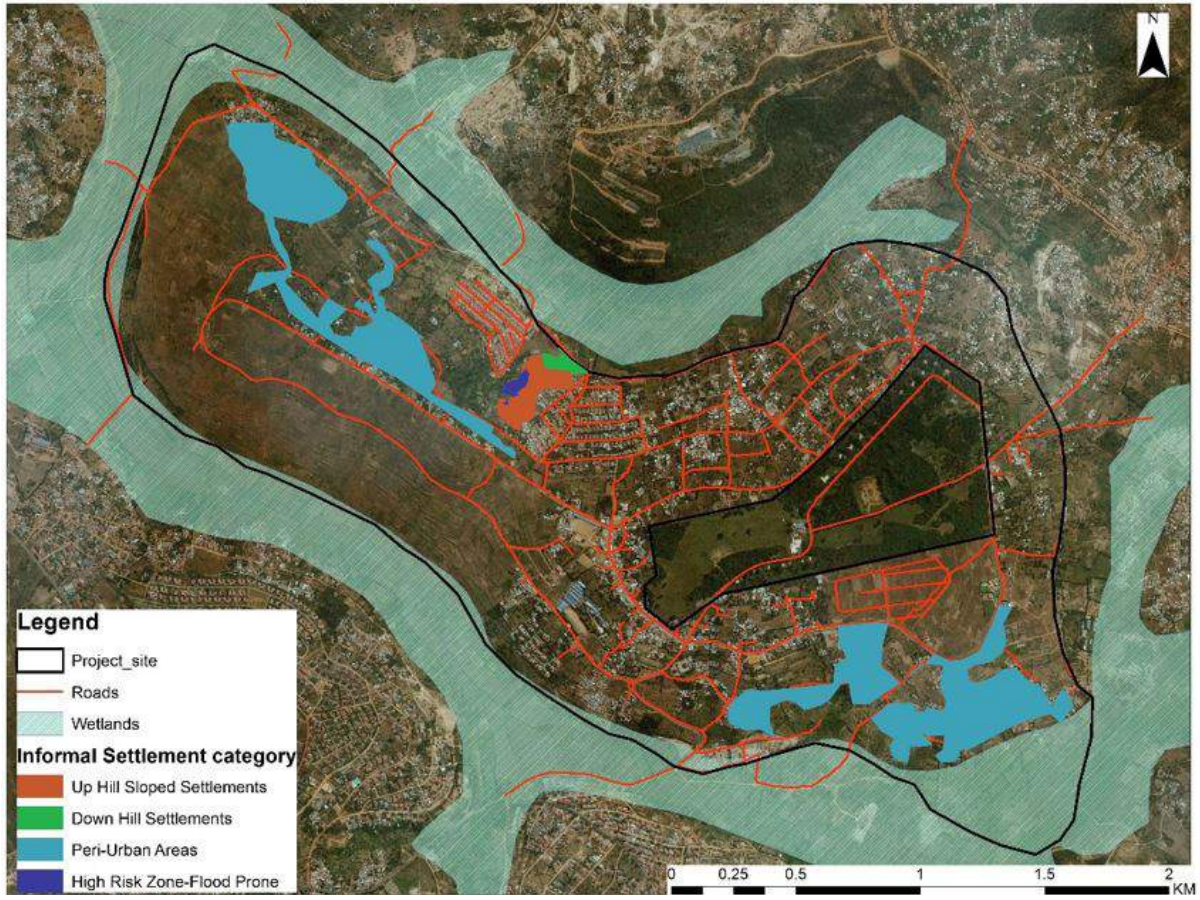


Fig 4.9 - Informal Settlement Categories

Informal Settlement Category	Average Size	Main Location	Rounded-up Percentage	Predominance by District
1. Uphill sloped settlements	Large (more than 10 Ha)	Central/Fringe	19%	Nyarugenge: 13.9% Gasabo: 4.0% Kicukiro: 1.2%
2. Downhill settlements	Medium (1 to 10 Ha)	Central/Fringe	11%	Nyarugenge: 4.8% Gasabo: 2.6% Kicukiro: 3.7%
3. Inaccessible areas	Medium to Large (1 to more than 10 Ha)	Central/Fringe	13%	Nyarugenge: 0% Gasabo: 1.5% Kicukiro: 9.9%
4. Small-pocket settlements	Small (1 to 2 Ha)	Fringe	2%	Nyarugenge: 0% Gasabo: 0.4% Kicukiro: 1.1%
5. Central overcrowded areas	Large (more than 10 Ha)	Central	34%	Nyarugenge: 20.6% Gasabo: 8.5% Kicukiro: 5.1%
6. Peri-urban areas	Medium (1 to 10 Ha)	Peri-urban	9%	Nyarugenge: 1.5% Gasabo: 5.4% Kicukiro: 1.8%
7.1. Settlements located in high risk areas - highly steep slopes	Different sizes	Central/Fringe	9%	Nyarugenge: 6.0% Gasabo: 1.5% Kicukiro: 1.0%
7.2. Settlements located in high risk areas - flood prone areas	Different sizes	Central/Fringe	4%	Nyarugenge: 2.3% Gasabo: 1.4% Kicukiro: 0.1%

The people living in the peri-Urban category of informal settlements are those that have previously been resettled by the Government because they were previously settled on high risk areas prone to landslides and flooding and those who cannot afford to live near the CBD.

The Peri-Urban Category of Informal Settlements mainly face the following issues;

- Lack of affordable transport means, making access to employment and access to services difficult.

- A high risk of losing fertile Agricultural land due to Urban sprawl

The City-wide unplanned and underserviced settlements upgrading strategy for Kigali, Rwanda Report goes on to discuss and illustrate different proposals, interventions and strategies to upgrade the unplanned settlements in Kigali City as highlighted in the summary table fig 4.10

In order to address the above strategies, the report goes on to suggest Guidelines to implement the said strategies by proposing four Alternatives.

- Alternative A: Fully subsidised housing and infrastructure development

With this Alternative, Government subsidises the provision of affordable housing and infrastructure in informal settlements

- Alternative B: Targeted subsidies to cover basic needs or initial investments

In this alternative, Land owners and Tenants contribute to the urban upgrading process either through pulling finances, offering themselves as a labour force, while the Government subsidises to provide basic needs or initial investments.

- Alternative C: Establishment of public-private partnerships for infrastructure development.

This Alternative is mainly centred on the provision of infrastructure such as roads or pathways for access, Drainage and Water and Electricity provision. And to do this, Government together with the private sector establish a public private partnership (PPP). However, this alternative does not fully involve the communities.

- Alternative D: Privatisation

This final Alternative involves Government privatising the land informal settlements occupy and providing it to the private sector/individuals to upgrade and their sole purpose is profit oriented.

Of all the above alternatives, the most preferred one is Alternative B: Targeted subsidies to cover basic needs or initial investments.

Causes of unplanned and underserviced settlements	Main strategies
1. **Expansion** of rental housing market	I. Increase the supply of **rental housing** (higher density)
2. **Speculative** land markets	II. Encourage **land banking** (public/private)
3. Infrastructure **shortage**	III. Supply of **key missing infrastructure** to ensure full connectivity
4. **Unaffordable** housing	IV. Increase **cooperative housing** and upgrade the existing stock
5. **Lack of** social cohesion	IV. Encourage **community associations**
6. **Low density sprawl**, creating new underserviced areas	VI. Harmonise the **master plan and settlement standards**, making them more flexible and/or incremental

Fig 4.10 - Upgrade strategies for unplanned settlements

4.1.5 Description of Existing Plans and Projects in the Pipeline and in the Area

Cactus Project by Horizon Limited

The Cactus Green Park is a project being developed by Horizon group which has a partnership with FONERWA mainly in line with the green elements of the project.

The Project covers an area of 13.7 hectares and consists of the following;

3 typologies: i) Villas- large detached 4-bedroom (160+ m2) ii) Courtyard Houses- 4 bedroom family 120 - 140m2 iii) Blocks of maisonettes

It also considered including: a small primary school, a neighborhood Centre, a Smaller community and retail facilities within a short walk

The Cactus Green Park Project with the support of FONERWA in the design phase insured that there was a reasonable level of Green incorporated in the plan to ensure sustainable designs.

Some of the Green elements considered in this project include:

i) Constructional strategies - to promote a low Carbon 'home grown' approach to building.

ii) Passive design measures - simple, common sense moves related to the organization, form, orientation and construction of the dwellings to avoid unnecessary heating and cooling – or compromise to the comfort of the inhabitants

iii) Water conservation - cutting demand combined with roof rainwater harvesting in line with a wider strategy (all within the Water section) to use the local pure ground water for domestic and potable needs. All dwellings are also considered as part of a functioning landscape 'storm water' infrastructure

iv) Energy generation was also key - with solar hot water and Photovoltaic powered net metering pioneered at a large domestic scale for the first time.

v) Structured space design - the placement of buildings and landscape to create quality well defined external spaces -streets, squares and parkland. A walkable neighborhood with amenity and variety.

The Current Status of the Cactus green Project is that the detailed designs are complete, Business plan is also available but they are still sourcing potential partners to implement the project.

RSSB/IFC Housing Project

Rwanda Social Security Board (RSSB) in Partnership International Finance Corporation (IFC), Development Bank of Rwanda (BRD) and Broad Rwanda have engaged in a project to construct ten thousand (10,000) Affordable housing units.

The percentage share of the project is RSSB 23%, IFC 20%, BRD 6% and Broad Rwanda 51%. The project is meant to be implemented in Four (4) Phases, with the first phase providing three thousand (3000) affordable housing Units.

Currently, the project is still under a feasibility study, which initially had been completed but did not meet the certification of the IFC Standards and therefore had to be revised with completion expected in June 2019.

4.2 EXISTING SOCIO-ECONOMIC-ENVIRONMENTAL SITE CONDITION

The map below provides an over view of the existing situation on the site highlighting existing roads, community focal points and blue/green structure. (note that the GCK project area boundary line is still under review and will require further consideration).

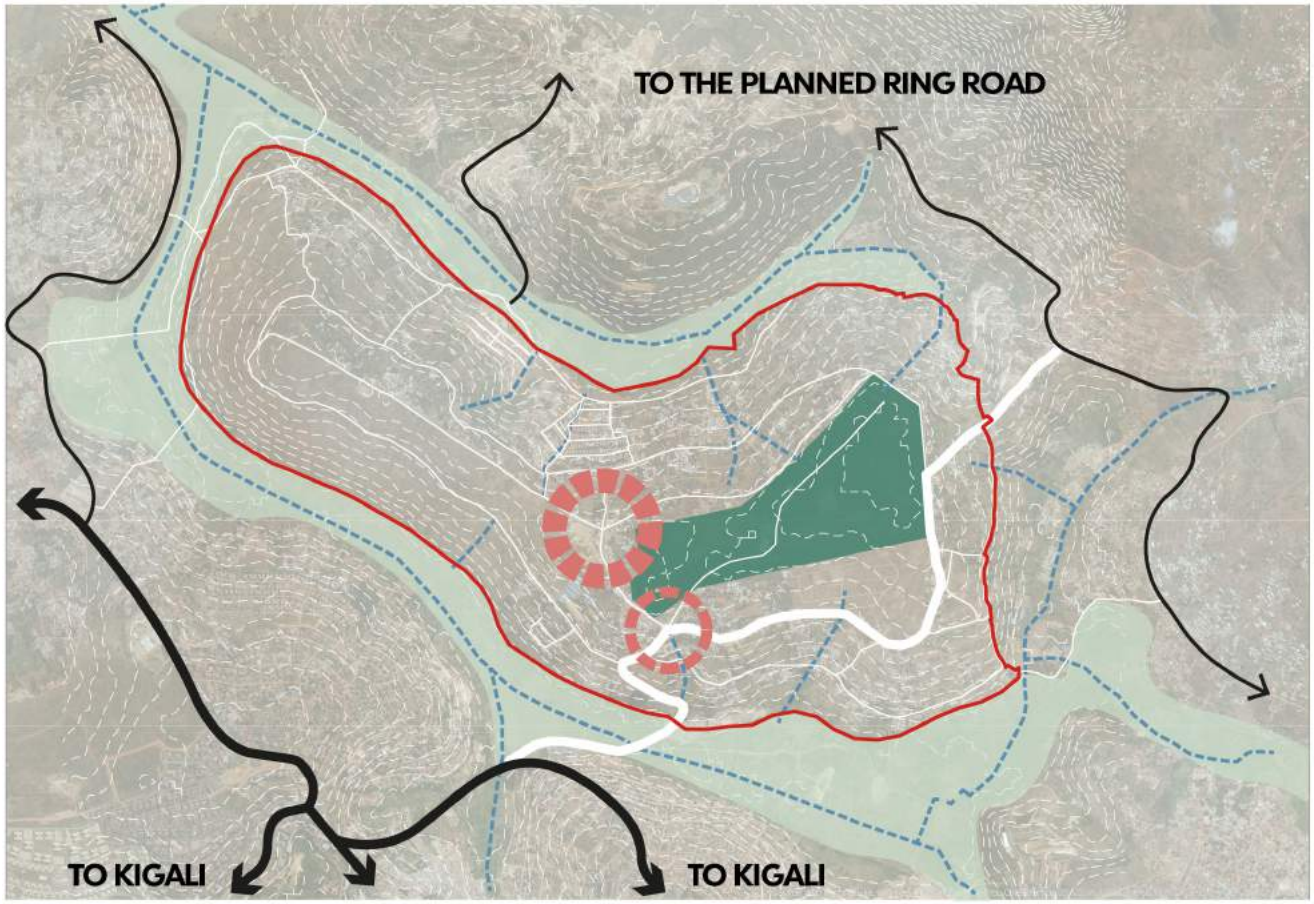


Fig 4.11 - Existing situation on the site. Source: SWECO AB

4.3 GIS MAPPING DATA

For further information regarding the existing site condition refer to the compilation of GIS maps in the Annexes.

Chapter 5 - Urban Development Parameters

Urban Development Parameters

Urban development parameters have been defined as a basis for calculation of future carrying capacity and to prepare preliminary cost estimates of a possible scenario for the Hill. The Parameters are upheld by a spatial planning approach that is committed to placemaking and sustainable systems, which are detailed further in the Feasibility Study and summarised in Chapter 6.

5.1 URBAN DESIGN PRINCIPLES

The following high level principles should be used to guide urban design decisions for GCK. These should be used in conjunction with GCK's sustainability standards and targets.

SITE PLANNING

S1 Plan the site according to Transit Oriented Development principles

S2 Respect, protect, and enhance the natural features of the site so that they make a positive contribution to sense of place

S3 Create a legible urban structure and skyline which promotes character, identity and orientation

S4 Respect and reflect Kigali's culture and traditions in terms of urban morphology and building design

S5 Boldly celebrate green infrastructure and sustainable systems through urban design

S6 Prioritize walking and cycling, then public transport and sustainable alternative modes over private cars in the urban structure

S7 Maximise connectivity, accessibility and local permeability for these modes on the Hill and to adjacent areas, with particular focus on links to local centres

S8 Create a safe and inclusive walking, cycling and public transport environment for all genders, ages and abilities.

PUBLIC SPACE

P1 Combine community functions with public spaces to enliven the public space and create opportunities for social interaction. To design vibrant public spaces to present an opportunity for social interaction

P2 Create a safe and inclusive public realm environment for all genders, ages and abilities.

P3 Design spaces to be visible and active to protect users against street crime and violence

P4 Alleviate the intrusion of traffic into public spaces as much as possible

P5 Create continual shaded walking and cycling routes by using tree canopies, shade from buildings and other structures.

P6 Encourage spaces for creative expression and community art in line with the city's vibrant arts scene.

P7 Propose durable and maintenance free street furniture in public spaces

BUILDINGS

B1 Conserve and protect the natural form of site in the new construction process

B2 Create a mix of densities and scales which highlight local centres and creates engaging places at a human scale

B3 Use massing and scale to create a skyline which contributes positively to the wider Kigali Skyline

B4 Deploy width-height ratios in street sections that maximise shaded pedestrian routes

B5 Use ground level non-residential uses in buildings to create active, permeable street frontages and passive surveillance of streets and public spaces

Public parks programmed with activities

Respecting and enhancing the Kigali skyline

LANDSCAPE

L1 Create a continual, accessible and permeable green network across GCK with ecological links to surrounding natural features

L2 Programme a sequence of activities and destinations in the green-blue network

L3 Boldly celebrate the sustainable infrastructure into the green-blue network

L4 Encourage interaction and learning between the residents of GCK and the environment which reflects and respects Rwandan rural and farming traditions

L5 Encourage the greening of building facades and roofs where appropriate

L6 Use vernacular species wherever possible

The images express how sustainability and local culture, character and identity are key aspects that should be reflected through urban design.

A network of green public spaces

Public spaces for play & recreation

Native species and sustainable drainage

Use of vernacular materials such as wood and brick

Spaces for communtiy art and creativity

Commercial areas as community hubs

Recycling and repurposing for street furniture

5.2 DEVELOPABLE AREAS

5.2.1 The Gross Residential Development Area (GRDA)

The Gross Residential Development Area (GRDA) is defined as those parts of the overall GCK study area that remain after discounting:

- The areas that are unsuitable for development, and
- The areas that are allocated for non-residential clusters (such as employment clusters or large public open spaces).

Figure 5.1 shows the areas within the GCK study area that are considered unsuitable for development. The constraints that define what is unsuitable along with the sources of this data are listed in figure 5.2.

Fig. 5.1 - Plan showing the areas that are unsuitable for development within the overall GCK study area

Constraint	Source
Slope constraints (<20% grade)	City of Kigali
Wetland areas including buffers within the overall area boundary	ESRI / City of Kigali
Planned & committed projects	ESRI / City of Kigali
Existing formal settlements and major social infrastructure	ESRI / City of Kigali
Polluted areas	ESRI / City of Kigali

Fig 5.2 – Summary of site constraints and data which constitute areas unsuitable for development

In addition to the unsuitable land, areas have also been discounted for a proposed employment cluster and urban park. (These are defined more fully in section 5.3 below.) Figure 5.3 therefore summarises all the areas that are discounted from the overall GCK study area to arrive at a Gross Residential Development Area (GDA).

Overall GCK study area	600 ha
Areas unsuitable for development	220 ha
Proposed employment cluster	10 ha
Urban park	7.5 ha
Gross Residential Development Area (GRDA)	**362.5 ha**
Gross Development Area (GDA)	380 ha

Fig 5.3 - Summary of Gross Development Areas

5.2.2 The Net Residential Development Area (NRDA)

The Net Residential Development Area (NRDA) is defined by reductions from and additions to the Gross Residential Development Area (GRDA) to allow for public rights of way (public land) and special conditions on the site. These are defined below in figure 5.4 and further explained in the following sections.

Name	Description	Reduction or Addition to GRDA
Public Rights of Way (ROWs)	Roads and footpaths, parks, green & blue network, public spaces and other public areas that will usually be adopted as public areas by City of Kigali	Reduction to GRDA
Informal settlements	Existing informal settlements lying inside the GDA, which will be subject to densification and upgrading but not wholesale redevelopment	Reduction to GRDA
Sub Urban Centre	The focal point of the community and which lies outside of the GDA, but which will require densification and upgrading	Addition to GRDA

Fig 5.4 – Defining Net Residential Development Area

5.2.3 Public rights of way (ROWs) and the green / blue public space network

The alignments for the primary ROW network have been planned to take account of significant wider urban connectivity, topography constraints on the site and overall level of service for the GCK study area. They are shown in figures 5.5 and 5.6.

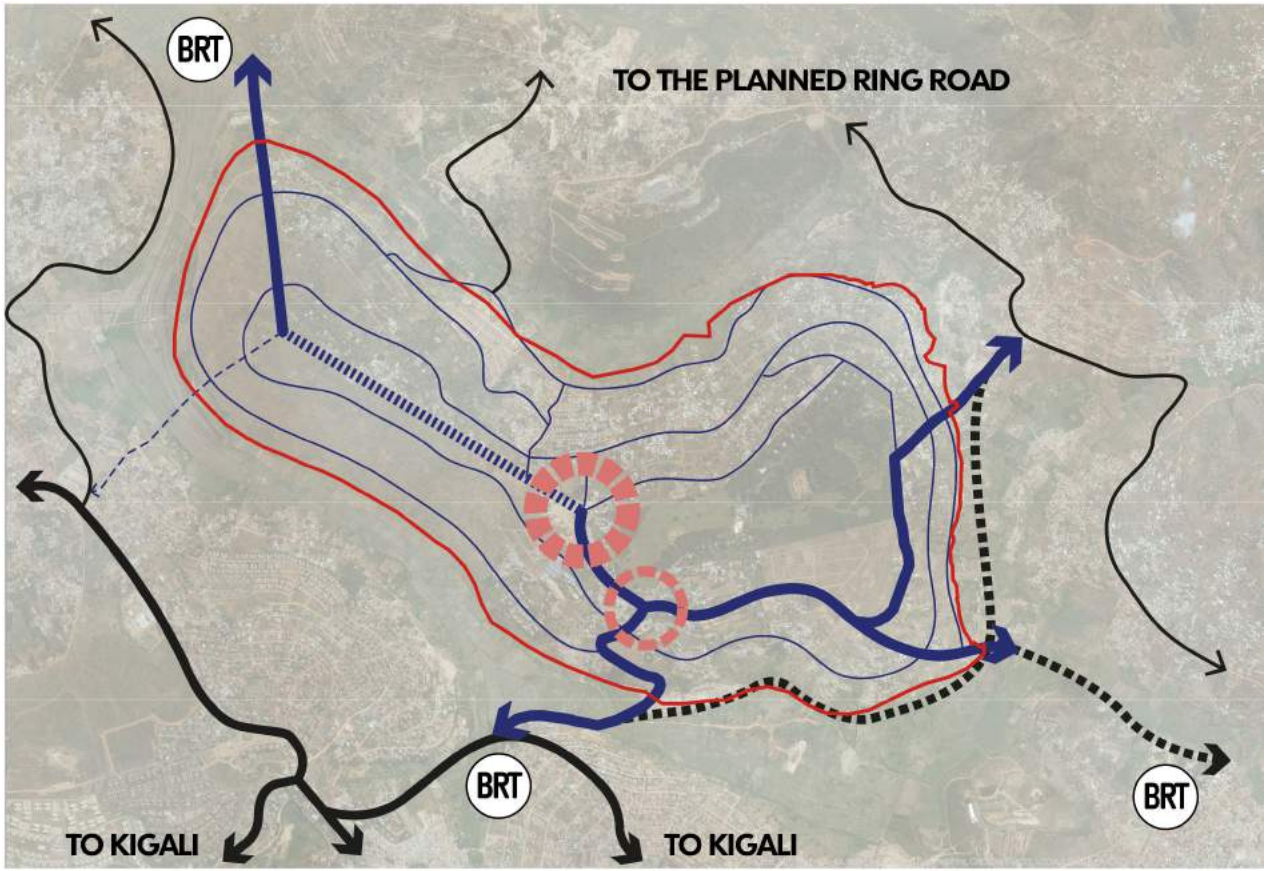


Fig 5.5 – Primary connectivity network

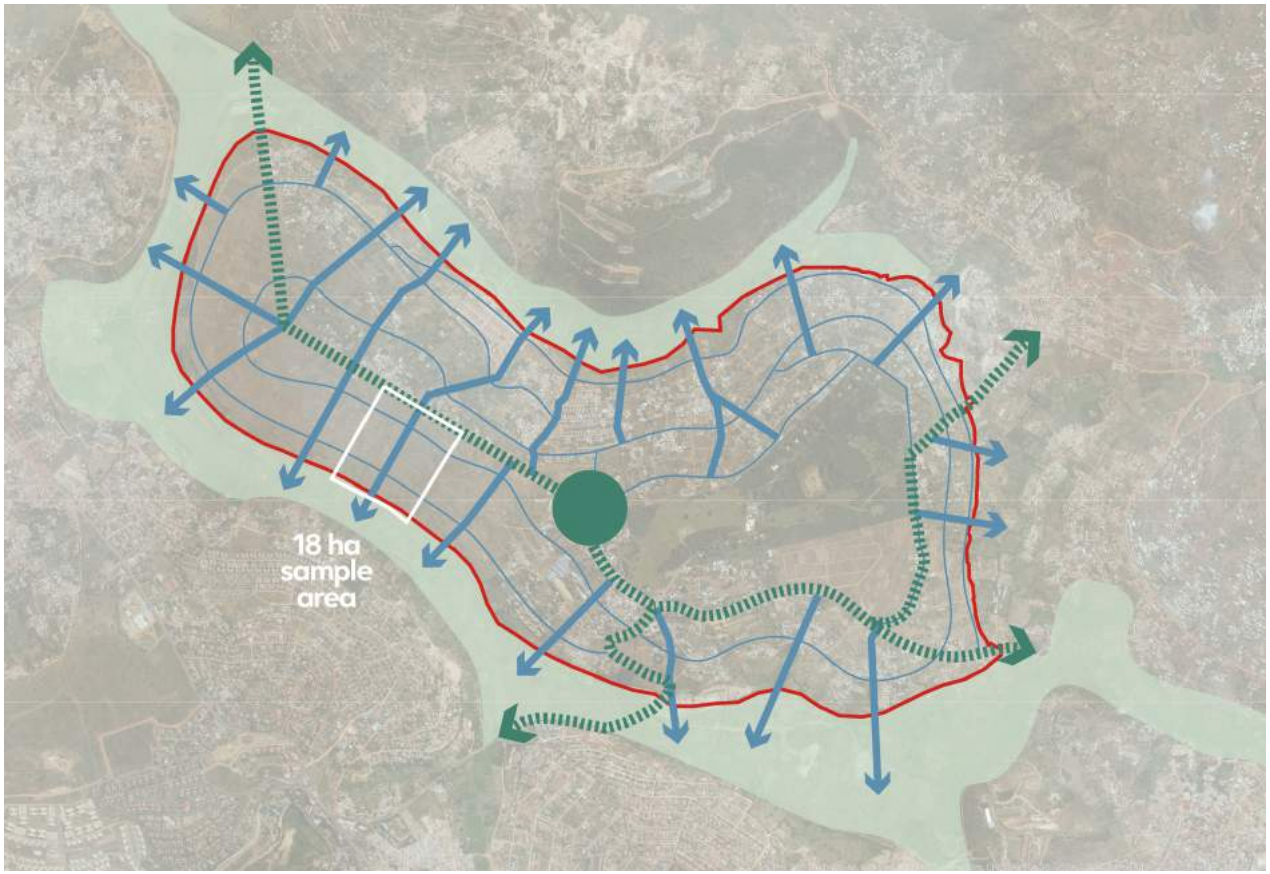


Fig 5.6 – Primary green / blue and public space network

The specific alignments for the secondary ROWs have not been decided. Instead, the level of service has been defined through an 18ha sample area which is shown in figure 5.7. The total area required for the ROWs has therefore been defined by applying the percentage rates in the sample area pro-rata across the whole GRDA. These calculations are shown in figure 5.9.

LEGEND

- GCP project area
- Urban Boulevard
- Green-blue corridor
- Drainage swales
- Wetlands
- Sub urban centre park (general location)

Conceptual street sections have been designed as the part of these calculations. These are advisory only but would provide the correct level of service for the site whilst promoting a walking / cycling environment and an efficient layout. They are shown in figure 5.8 to figure 5.14. Further details of the transport strategy for the site are contained in the Feasibility Study.

Secondary Network	Ha	% Rate applied to GRDA
Highways & footpaths	2.8	16%
Sustainable transport routes	0.2	1%
Green & blue network	2.4	13%
Net Residential Developable Area (NRDA)	**12.6**	**70%**

Fig 5.9 – Summary of area requirement rates for Public Rights of Way across the 18ha sample area

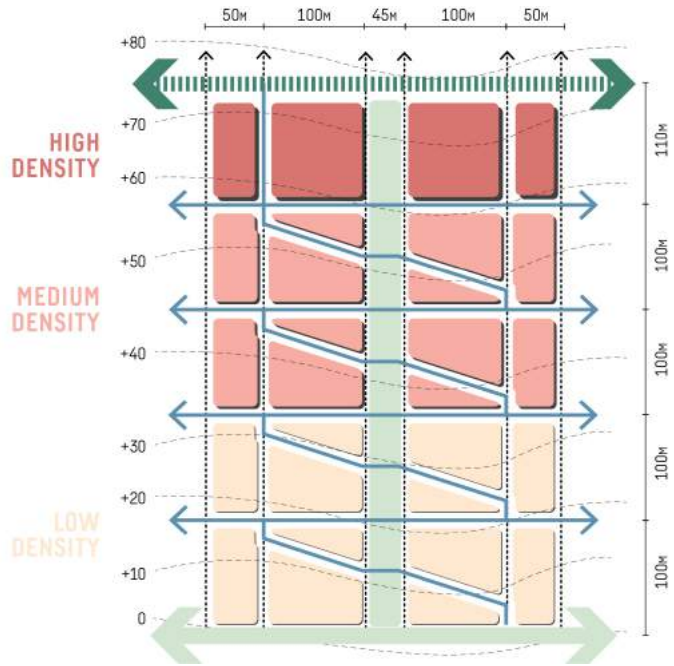


Fig 5.7 – 18ha sample area. Access lanes to blocks are contained within the NDA blocks.

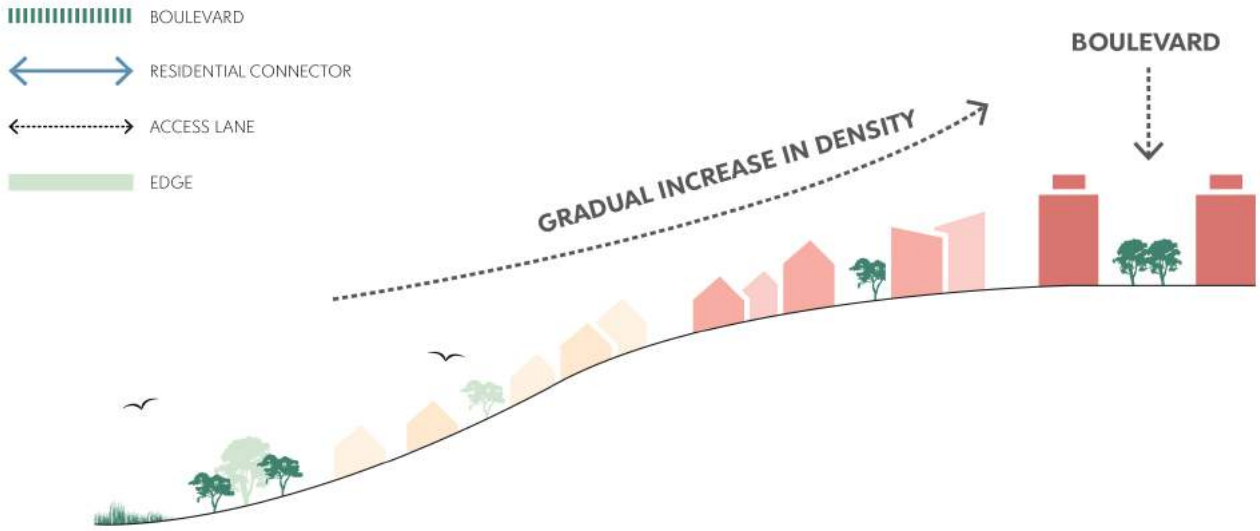


Fig 5.8 – Conceptual site section – 18 ha sample area

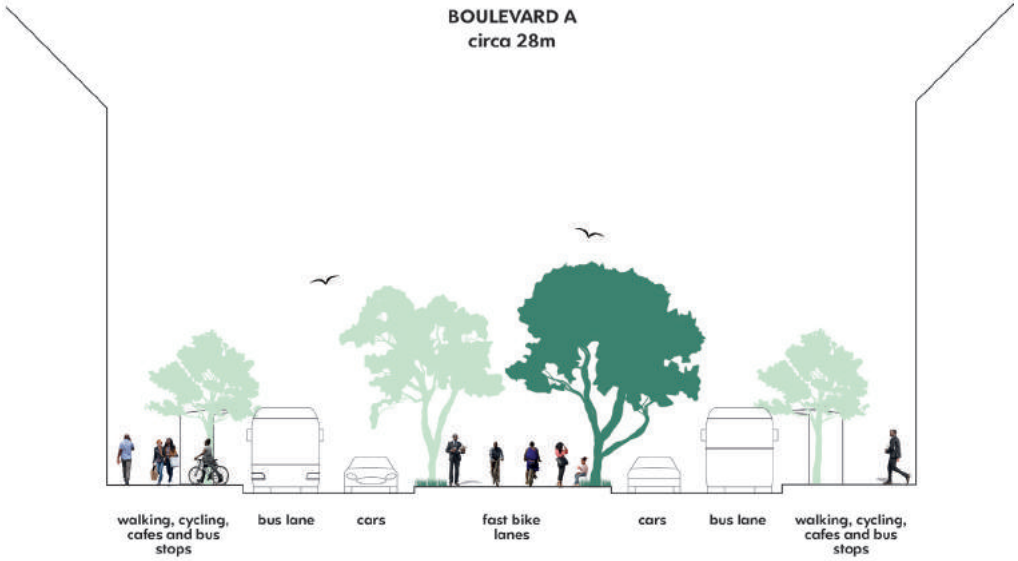


Fig 5.10 - Boulevard A Source: Sweco AB

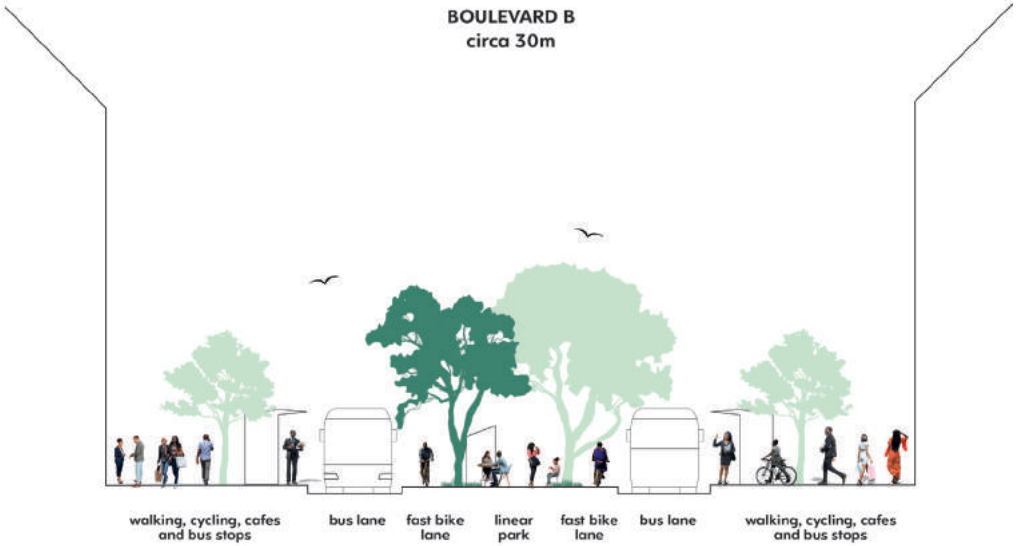


Fig 5.11 - Boulevard B Source: Sweco AB

Fig 5.12 - Residential Collector Source: Sweco AB

Fig 5.13 - Access Lane Source: Sweco AB

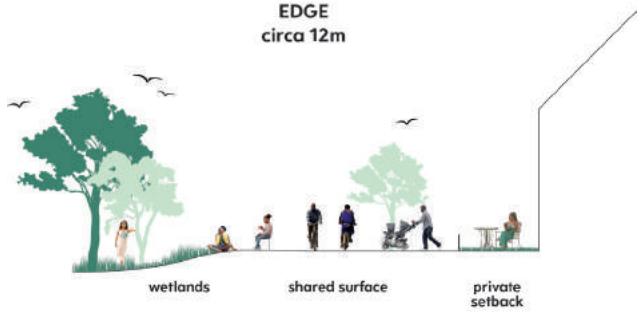


Fig 5.14 - Edge Condition Source: Sweco AB

5.2.4 Informal Settlements

The informal settlements on the site lie within the GRDA and will be subject to densification and upgrading but not total redevelopment. An inefficiency factor must therefore be applied to these areas. Refer to Chapter 7 Annexes Maps for the location of informal settlements on the site.

Total area of informal settlements	168 ha
Inefficiency factor	50%
Reduction to GRDA	84 ha

Fig 5.15 – Reduction to GDA to account for Informal settlements densification and upgrading

5.2.5 Existing Sub Urban Centre

The location of the sub urban centre is shown in figure 5.6. This area lies outside the GRDA due to amount of important social infrastructure and land uses that exist there today. However, as this area lies at the heart of the community and will be a major focal point, it is appropriate that the density in this area is increased significantly. Refer to Chapter 7 Annexes Maps for the location of sub urban centers.

Total area of Sub Urban Centre	30 ha
Densification factor	100%
Addition to GRDA	30 ha

Fig 5.16 – Addition to GDA to account for densification and upgrading in the Sub Urban Centre

Summary of Net Developable Area

Gross Residential Development Area (GRDA)	**362.5 ha**
Less inefficiency factor for informal settlements …	84 ha
Plus densification factor for Sub Urban Centre …	30 ha
Sub total GRDA	**308.5 ha**
Of which…	
Highways & footpaths	16%
Sustainable transport routes	1%
Green & blue network	13%
Net Residential Developable Area	70%
Final Net Residential Development Area (NRDA)	**216 ha**

Fig 5.17 - Summary of Net Residential Development Area

5.3 POPULATION, DENSITIES AND HOUSING TYPES

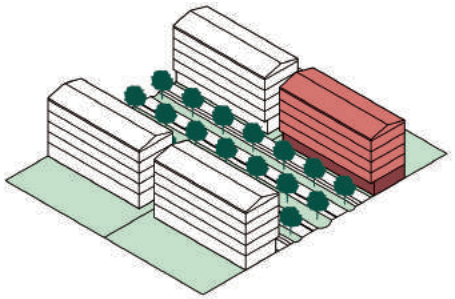
Fig 5.18 shows the breakdown of housing types distributed across the 216 ha Net Residential Development Area (NRDA), followed by the projected population.

The different house typologies referred to above are illustrated in figure 5.19.

In addition, there is also an existing and future population which reside in areas lying the Gross Residential Development Area. These must be included in the calculations in order to create an accurate picture of the demands for social infrastructure which follow - in other words, the whole community and not just the new developments. These are set out in figure 5.20.

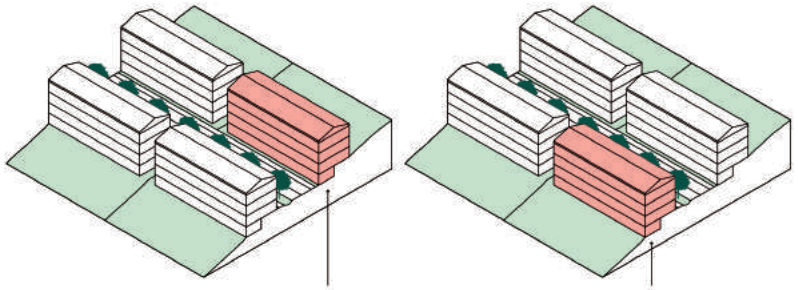
Typology		Parameters					Population	
Unit type	Building type	Typ. area (sqm)	Typ. FAR	Density category	Pers / Household	Units / ha	% mix	Population
Basic standard	Apts	45	1.75	High	4	160	5	15 011
Affordable 1BR	Apts	45	1.75	High	3	160	21.7	48 861
Affordable 2BR	Apts	60	1.4	Med	4	90	21.7	39 089
Affordable 3BR	Apts / rowhouses	90	1.2	Med	5	90	21.7	27 921
Market Villas	Villas	150	1	Low	4	40	30	15 440
Total Population (NDA)								**130 154**

Fig 5.18 – Breakdown of housing types, densities and projected population across 193 ha NRDA



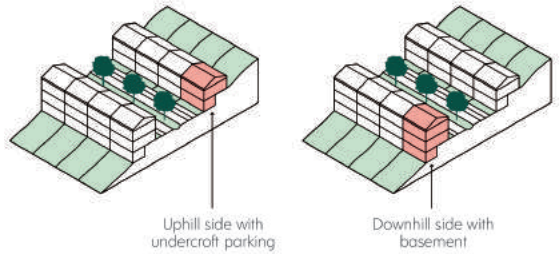
MEDIUM RISE APARTMENTS

Density	High
FAR	1.75
Unit types	Basic standard Affordable 1 BR Affordable 2 BR Affordable 3 BR
Unit density	160-210 units/ha
Urban uses	Residential, retail, community, employment
Street types	Boulevards



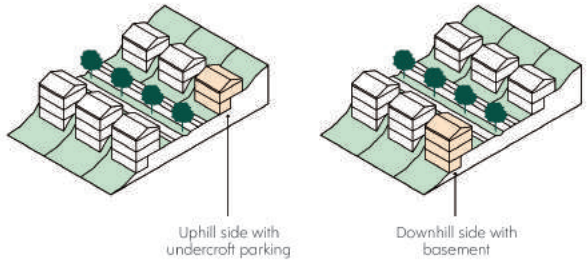
LOW RISE APARTMENTS

Density	Medium
FAR	1.2 - 1.4
Unit types	Affordable 1 BR Affordable 2 BR Affordable 3 BR
Unit density	80-180 units/ha
Urban uses	Residential, retail, community
Street types	Residential collectors Access lanes



TOWNHOUSES

Density	Low
FAR	1.2
Unit types	Affordable 3 BR Market housing
Unit density	80 units/ha
Urban uses	Residential
Street types	Residential collectors Access lanes



VILLAS

Density	Low
FAR	1
Unit types	Affordable 3 BR Market housing
Unit density	50 units/ha
Urban uses	Residential
Street types	Residential collectors Access lanes

Fig 5.19 – Housing typologies

EXISTING / PLANNED HOUSING AREA	NO. UNITS	HOUSE HOLD SIZE (2)	POPULATION
Cactus project	349	4.3	1500
Dubai site west	110 (estimated)*	4.3	473
Central Site	150 (estimated)*	4.3	645
Informal settlements	8 400 (estimated)#	4.3	36 120
Total population within the NRDA			130 154
Total population within the overall GCK study area			**168 892**

Fig 5.20 – Summary of population figures for existing and future housing areas outside the GRDA

* Formal development data is unavailable. Consequently, counts have been made using satellite imagery.
# Calculation based on total area of informal settlements by 50 dwellings per ha

The sources for the rates applied in the population build-up are summarized in figure 5.21.

FACTOR	SOURCE
Typical Unit Sizes (sqm)	Altair
Target Floor Area Ration (FAR)	Baseline from the Kigali 2013 Masterplan / suggested best practice
Persons per household (1)	Baseline from the Kigali 2013 Masterplan / suggested best practice
Persons per household (2)	City of Kigali Census Data
Units per hectare	Baseline from the Kigali 2013 Masterplan / suggested best practice
% mix of house types	Altair

Fig 5.21 – Summary of sources for population build-up rates

5.4 NON-RESIDENTIAL LAND USES

5.4.1 Employment Generating Land Uses

Employment generating land uses should make up an additional 10% of new Gross Residential Floor Area in accordance with the Kigali Urban Development Code. The employment sectors that are planned for this area in the 2013 Kigali Masterplan are; light manufacturing, agribusinesses, wholesale trading and warehousing. These land uses will be located in special employment clusters. It is assumed that around half of the employment generating land uses fall into this category – so 5% of total residential GFA. The location for this employment cluster is shown on figure 5.22.

Gross Resi Floor Area (GRFA)*	1 942 480 sqm
Industrial GFA (5% of GRFA)	97 124 sqm
Built up area (50% Indust. GFA)	48 562 sqm
Land take based on 60% plot coverage (Urban Development Code)	80 936 sqm (or 8 ha)
Supporting Infrastructure and services (estimated)	2 ha
Total cluster area	**10 ha**

Fig 5.22 – Establishing area requirements for employment generating clusters. * refer to Mid Term Feasibility Study

In addition to the employment cluster, employment opportunities will be found in local retailing and community services, which will be integrated within mixed use buildings and neighbourhood centres (see section 5.3.2 below). It is assumed that this will make up the remaining 5% of total GFA.

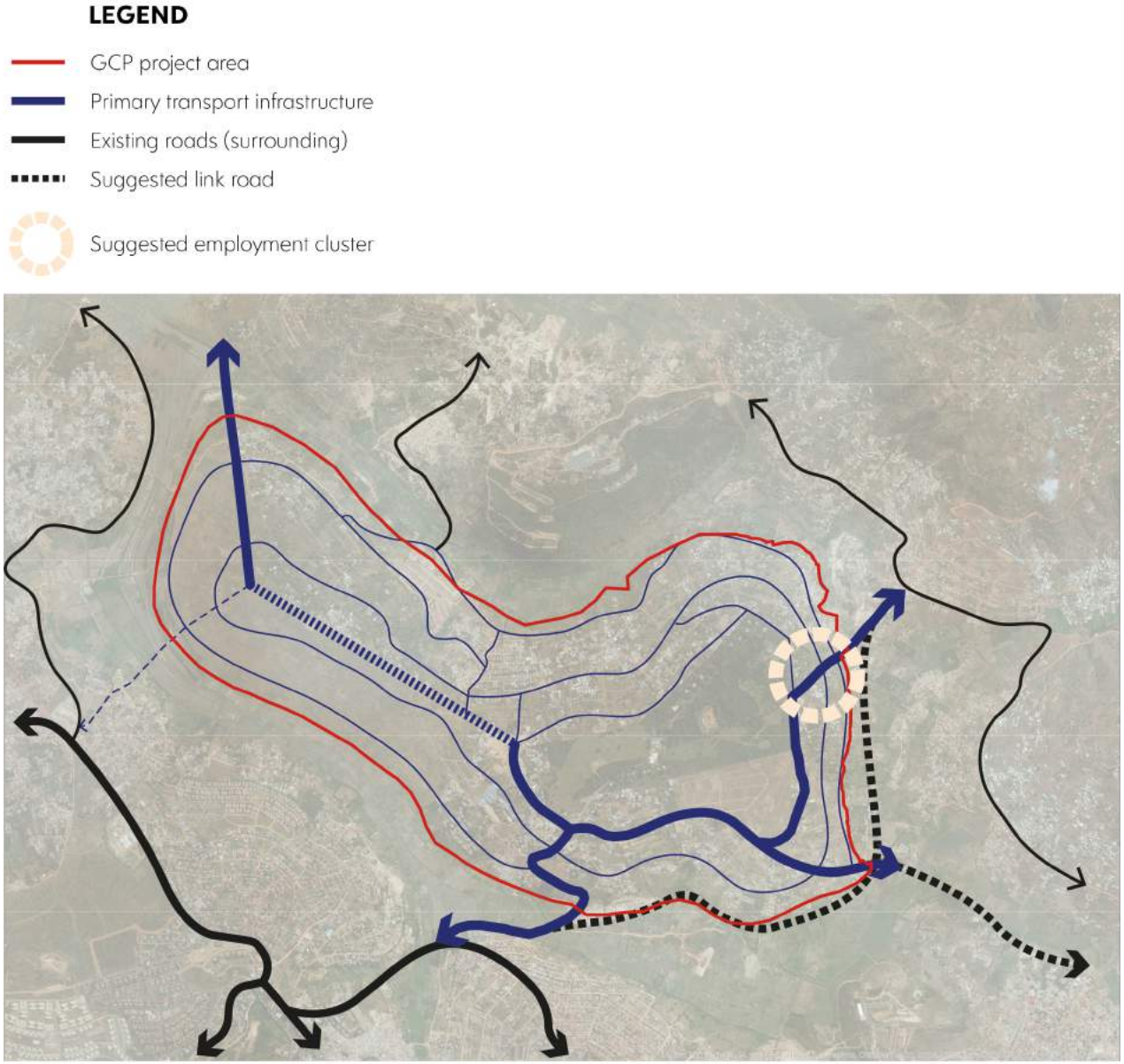


Fig 5.22 – Plan showing location of employment clusters

5.4.2 Social Infrastructure

The City of Kigali Masterplan 2019 sets out the minimum requirements for social infrastructure provision in urban areas. The Masterplan provides guidance on level of service based on population catchment and maximum travel distance as well as GFA and plot requirements.

The guidelines (see figure 5.24) would suggest that GCK therefore requires,

- 1 x Precinct Centre
- 6-7 x Neighbourhood Centres

It is a key principle for sustainable, walkable mixed-use communities that these are within walking distnace of every home, and as many community facilities as possible be integrated within mixed use buildings and not within separate land use zones

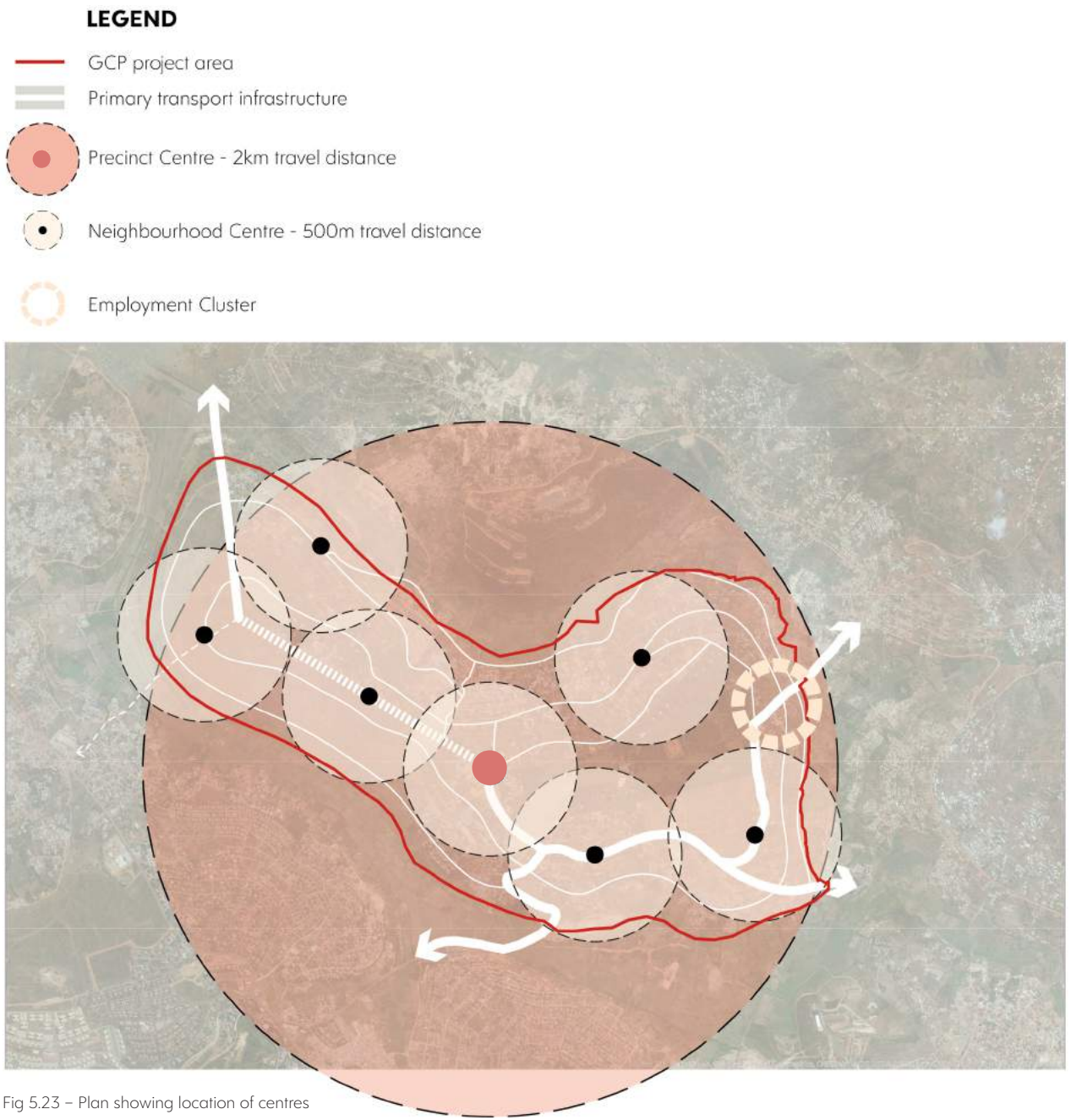


Fig 5.23 – Plan showing location of centres

Fig 5.25 – Hierarchy of centres and programme of urban uses (City of Kigali Masterplan 2019)

TYPE	PUBLIC FACILITIES	PORPOSED FOR KIGALI
COMMERCIAL	Neighborhood Centre	1 per neighborhood; 1.2 ha site.
	Town Centre	1 per precinct; 12.0 ha site.
	Regional Centre	1 per 0.5 million, 50 ha site.
EDUCATIONAL FACILITIES	Primary School	1 per neighborhood (15,000-20000 population). 1.5 ha site.
	Secondary School	1 per 20,000 - 25,000 population. 2.4 ha site.
	Primary + Secondary School (Combined)	2.8 ha site. (Based on existing school sites)
	Vocational / ICT Institute	1 per precinct. 5.0 ha site.
	Higher Education Institute	1 per 500,000 population. 6.0 ha site
SOCIO-CULTURAL FACILITIES	Community Hall*	1 per 5,000 population. 0.5 ha site.
	Regional Library	1 per 500,000 population. 0.5 ha site.
	Religious Facility	1 per neighborhood (15,000- 20000 population). 0.5 ha site.
	Cemeteries	1 per precinct 20 ha over 20 years
	Museums/ Cultural Centre etc.	1 per precinct. 1.5 ha site.
HEALTH FACILITES	Health Clinic *	1 per neighborhood (15,000-20000 population). 0.5 ha site.
	Polyclinic	1 per precinct. 5.0 ha site. Max travel time of 30 mins.
	Regional Hospital	1 per 500,000 population. 5.0 ha site
PARKS & OPEN SPACES	Neighborhood Park	1 per neighborhood (15,000-20000 population). 1.0 ha site
	Town Park	1 per precinct. 6.0 ha site
	Sports Field	1 per precinct. 1.5 ha site. (Near to schools or community centres or combine with parks.)
SPORTS & RECREATION	Sports Centre (with swimming pool and stadium)	1 for every 500,000 population. 6.0 ha site.
CIVIC FACILITIES	Fire Station	5 minutes response time. 0.5 ha site.
	Government/ Municipal Offices	1 Sector office per Sector. 1 District office per District.
*(as part of neighborhood centre)		

Chapter 6 - Sustainable Systems and Placemaking

Sustainable Systems and Placemaking

The Development Parameters derive from a spatial planning approach to the site that invloves integrating sustainable systems with placemaking. This raises the overall social economic and environmental value of the community and ultimately creates a higher quality of life for residents. Further details of sustainable systems are contained in the Feasibility Study.

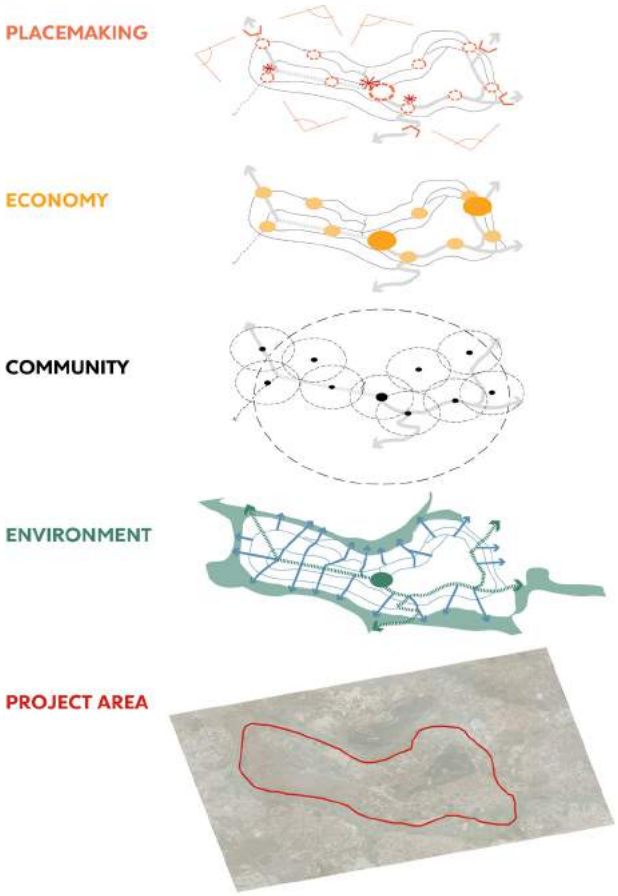


Fig 6.1 – Synthesis plan of one possible scenario

6.1 SYNTHESIS MAP: STRUCTURAL SKETCH OF POSSIBLE FUTURE SCENARIO

Fig 6.1 provides the vision for one possible structure plan scenario for the site. The purpose of presenting this plan is to demonstrate and visualise the viability of the Development Parameters. The plan creates an economically, environmentally and socially sustainable community on the hill; and demonstrates synergies between these complex urban systems to enhance quality of life for residents and enhance overall social, environmental and economic value.

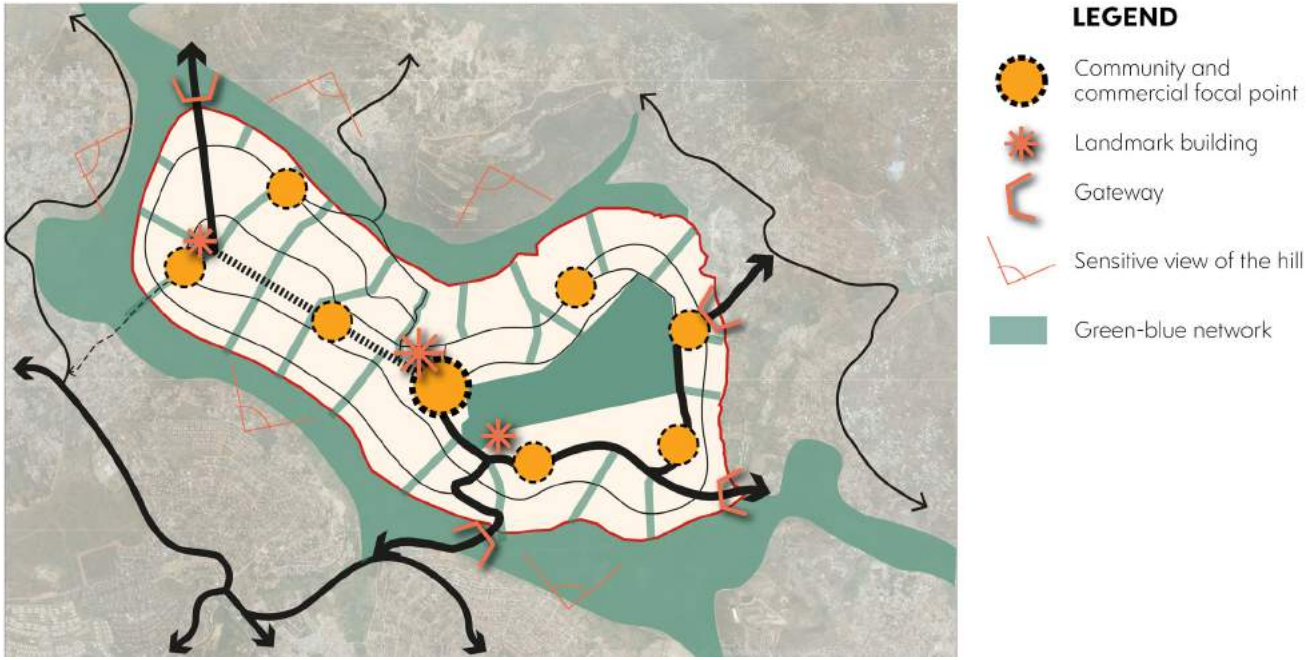


Fig 6.2 - Synergies between human and natural systems are enhanced through a placemaking approach.

6.2 PLACEMAKING

The placemaking approach places strong focus on finding synergies between social, economic and environmental systems and enhancing them through urban design. For example, landmark buildings and gateways give presence and distinct identity to commercial / service / community / employments centres. Key views are integrated with the green and blue network and higher density focal points to enhance orientation, sense of place and create a characteristic skyline on the hill. Public open spaces are located at commercial centres to promote community cohesion, safe streets and a dynamic and vibrant urban life.

6.3 ENVIRONMENTAL SUSTAINABILITY

An integrated green and blue network permeates the site, connecting to and utilizing the existing local natural systems and ecosystem services. This network follows natural contours and interlinks with new programmed green and blue spaces such as local parks, green streets and green and blue corridors. See figure 6.2. Sustainable systems are also planned into the synergies between building and street typologies. See figure 6.3.

SUSTAINABLE SYSTEMS IN BUILDING AND STREET TYPOLOGIES

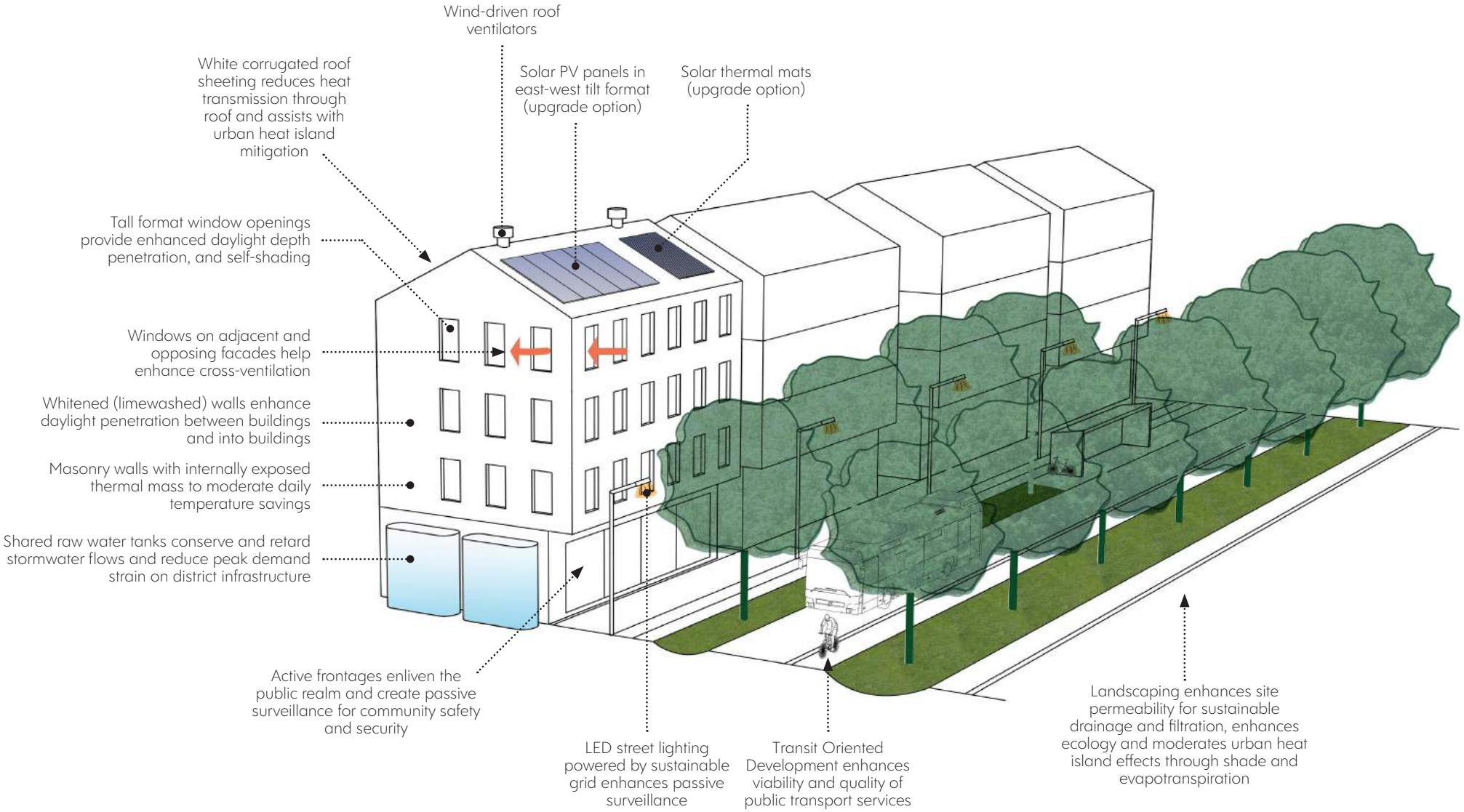


Fig 6.3 - Summary diagramme of sustainable systems within building & street typologies.

Fig 6.4 - The economic benefits of Transit Oriented Development are enhanced through a placemaking approach.

6.4 ECONOMIC ENVIRONMENT

Two employment clusters act as the main economic drivers for the district – the Sub Urban Centre and the industrial employment cluster. These are complemented by additional employment opportunities in each neighbourhood centre (specifically in retail and services) . These drivers and local centres are hard-wired into the urban transportation system of both Kigali and the wider district and employment opportunities are easily accessible by walking, cycling and public transport. See fig ure 6.4.

6.5 SOCIAL SUSTAINABILITY

The scenario is structured around 10 walkable neighbourhoods which share a common sub urban centre - located around the existing commercial centre on the hill. Within each neighbourhood a commercial and service centre provides all day to day needs within a maximum 500m travel distance. These centres are upheld by the highest density residential development and a high level of transport service which helps to ensure the viability of service infrastructure. See figure 6.5.

Fig 6.5 - Urban livability is enhanced through a placemaking approach.

Chapter 7 - Annexes

7.1 ANNEX 1: Bibliography

Government of Rwanda (), Rwanda Urban Planning Code

MININFRA (2015) National Informal Upgrading Strategy

MININFRA (2015) Rwanda Urban Planning Code (UPC)

UN-Habitat ,Participatory and Inclusive Land Readjustment

UN-Habitat (2011), Green Economy Series

UN-Habitat (2015), Global Public Space Toolkit

UN-Habitat (2015), Planned City Extensions- Analysis of Historic Examples

UN-Habitat (2017), New Urban Agenda

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UN-Habitat (2019), City-wide unplanned and underservices settlements upgrading strategy for Kigali, Rwanda

UN-Habitat (2019), Green City Toolkit Rwanda

UN-Habitat (2019), Sustainable Cities and Communities

UN-Habitat (2108), SDG 11 Synthesis Report

UN-Habitat, PSUP Halving the Number of Slum Dwellers by 2020

World Bank Group (2017), Reshaping Urbanization in Rwanda, Economic and Spatial Trends and Proposals

7.2 ANNEX 2: List of Persons Interviewed

DICKSON A., Horizon Construction, , Horizon Group Ltd.

GAHAMANYI Jean-Claude Eng., General Manager GreenRock Iwacu, Horizon Group Ltd.

KALISA Catherine, National Technical Advisor on Urbanisation in Rwanda, UN-Habitat

KASIRYE Dan, Resident Representative Rwanda, International Finance Corporation (IFC)

KYAZZE Eddie, Manager of the Urbanization and Human Settlements Division, MININFRA

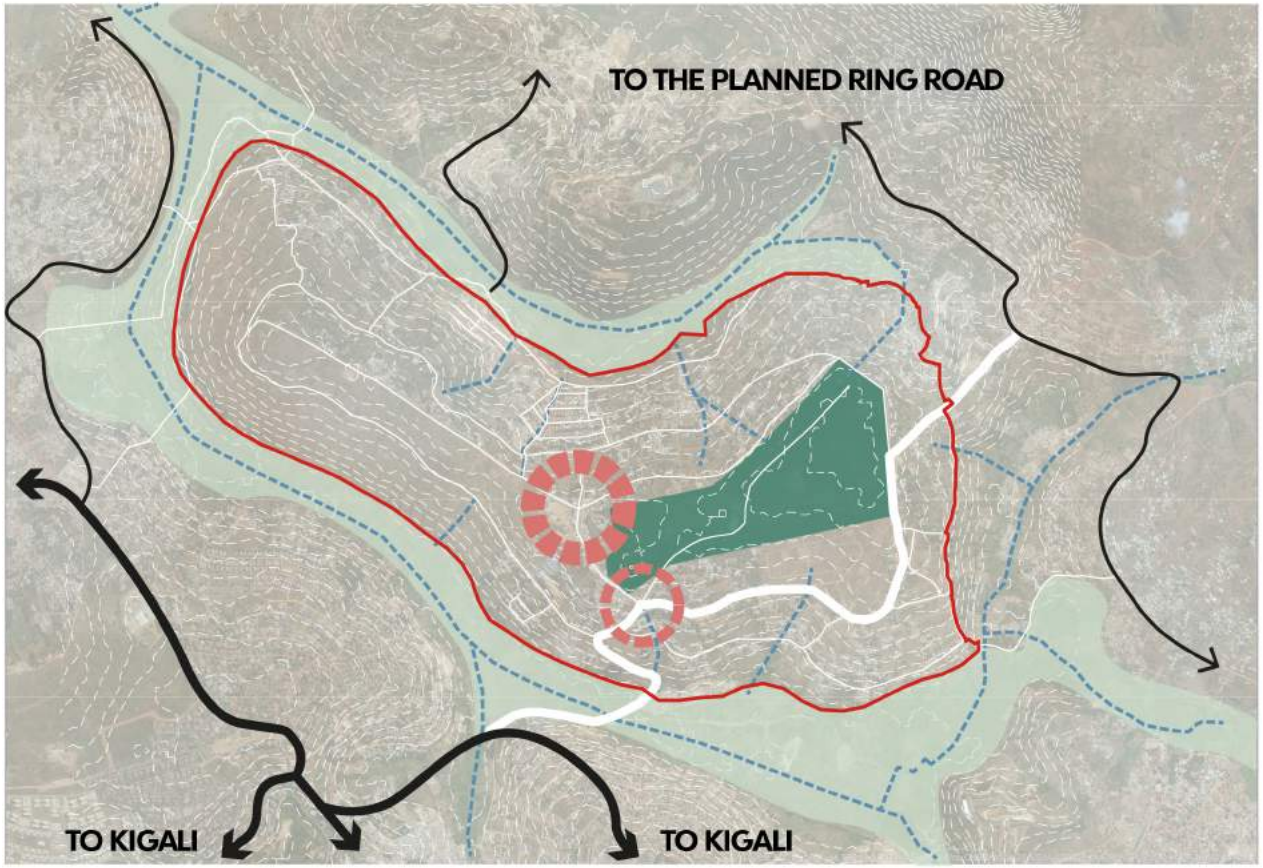
MUGISHA Fred, Director of Urban Planning & Construction, City of Kigali

SORGO Hamidou, Senior Private Sector Specialist Rwanda, International Finance Corporation (IFC)

SPALIVIERO Mathias, Senior Human Settlements Officer, Regional Office for Africa, UN-Habitat

7.3 ANNEX 3: Existing and New Scenario Maps

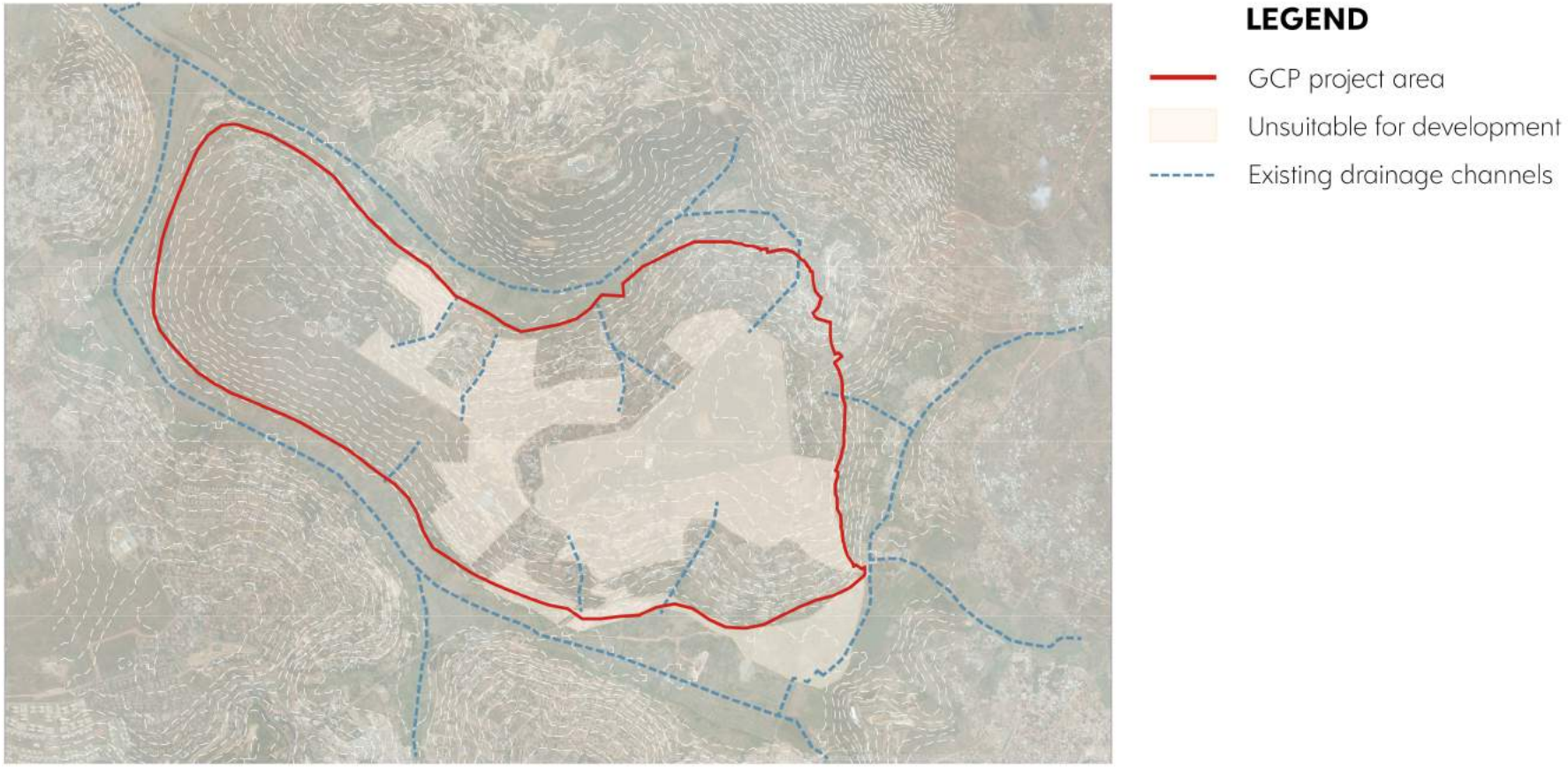
7.3.1 existing situation



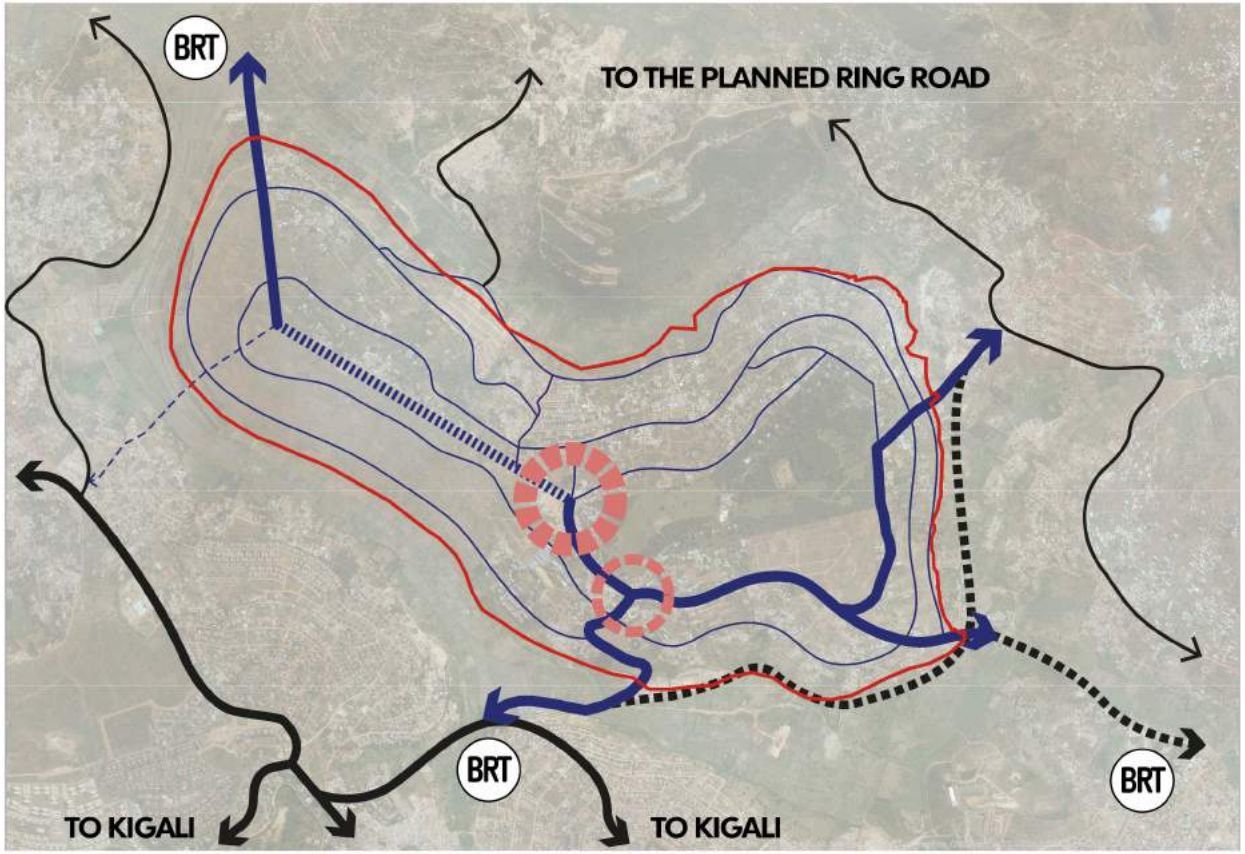
LEGEND

- GCP project area
- Existing roads (serving GCP project area)
- Existing roads (surrounding)
- Existing drainage channels
- Wetlands
- Forest (Deutsche Welle site)
- Existing community focal point

7.3.2 suitability



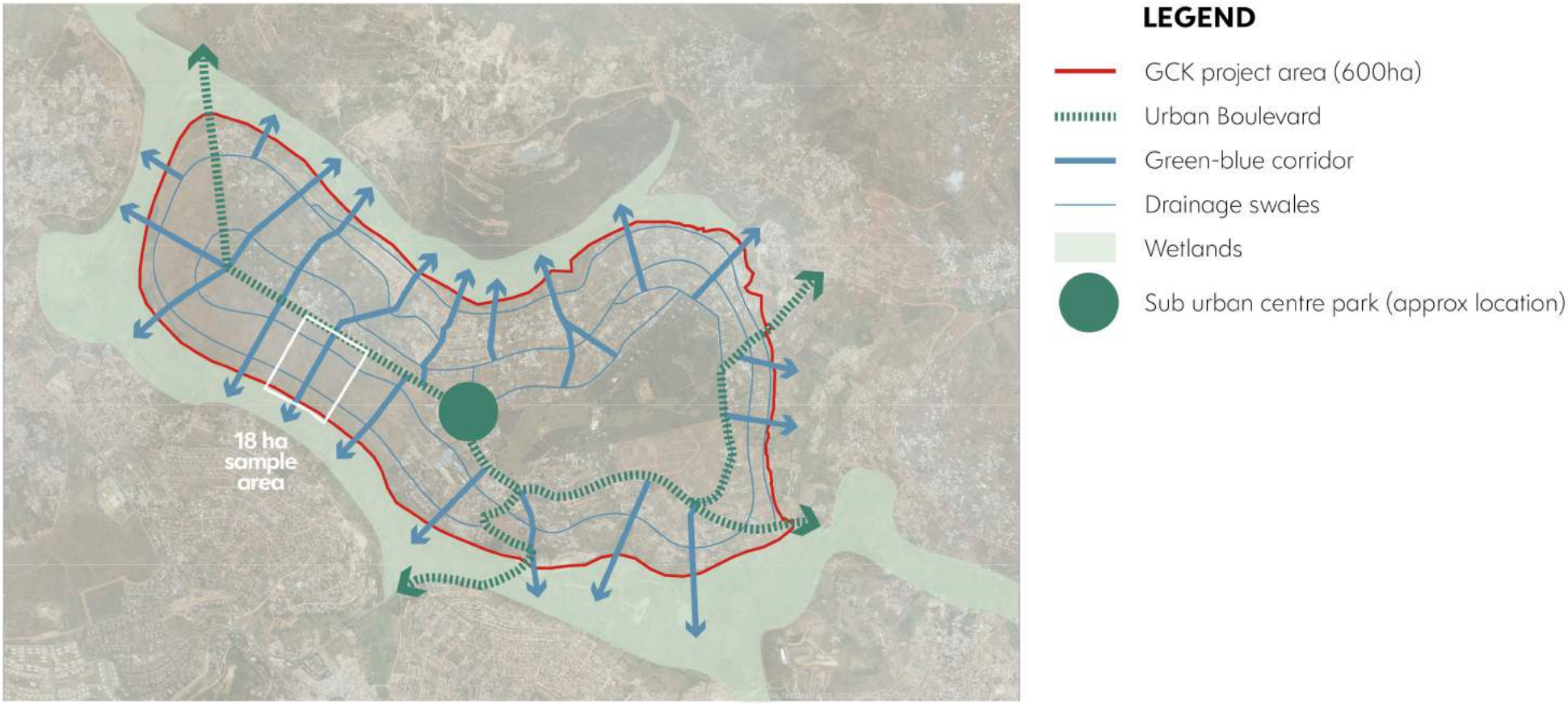
7.3.3 proposed primary transport



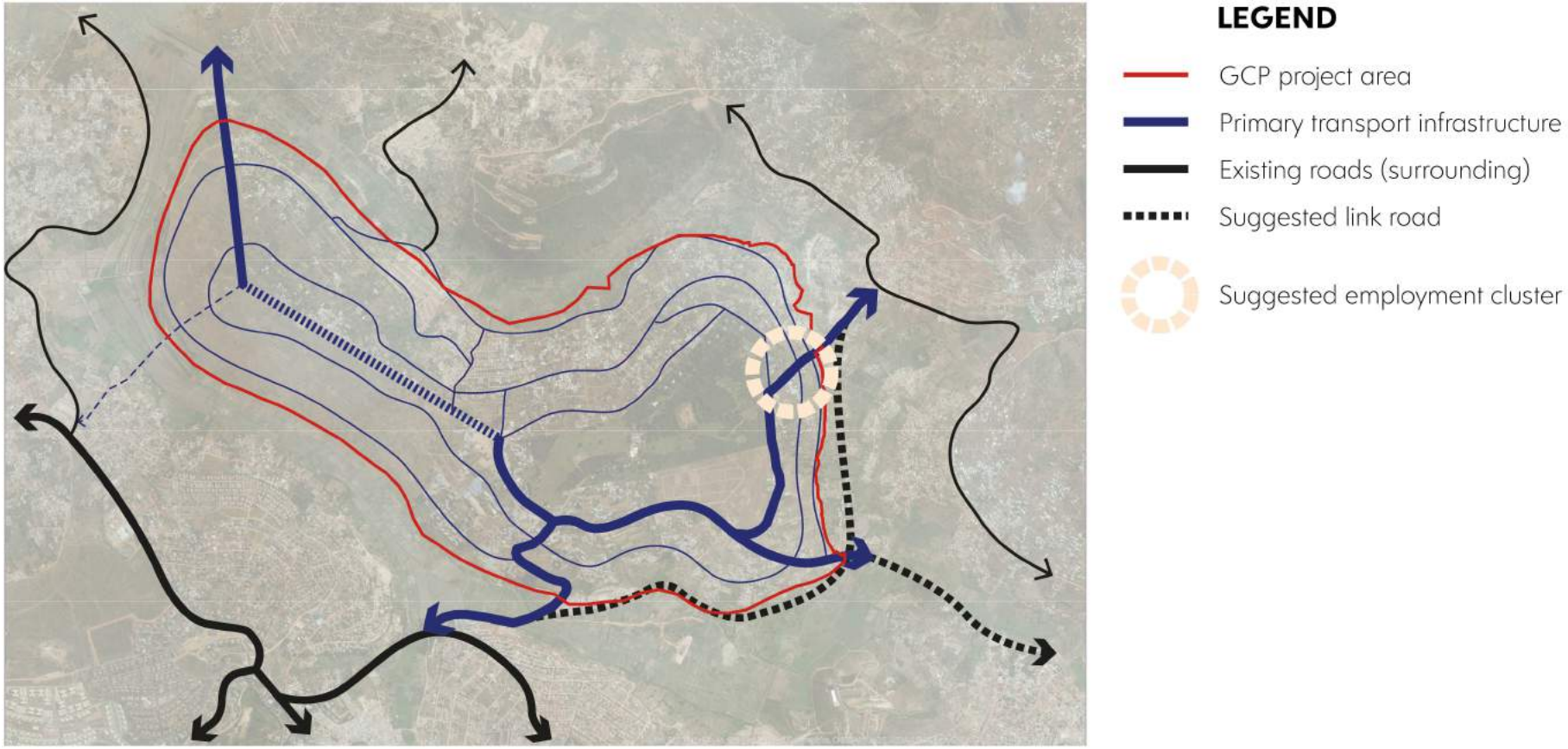
LEGEND

- GCP project area
- Urban Boulevard (with private cars)
- Urban Boulevard (no private cars)
- Residential Collector (suggested alignment)
- Existing roads
- Suggested link road
- Existing community focal point

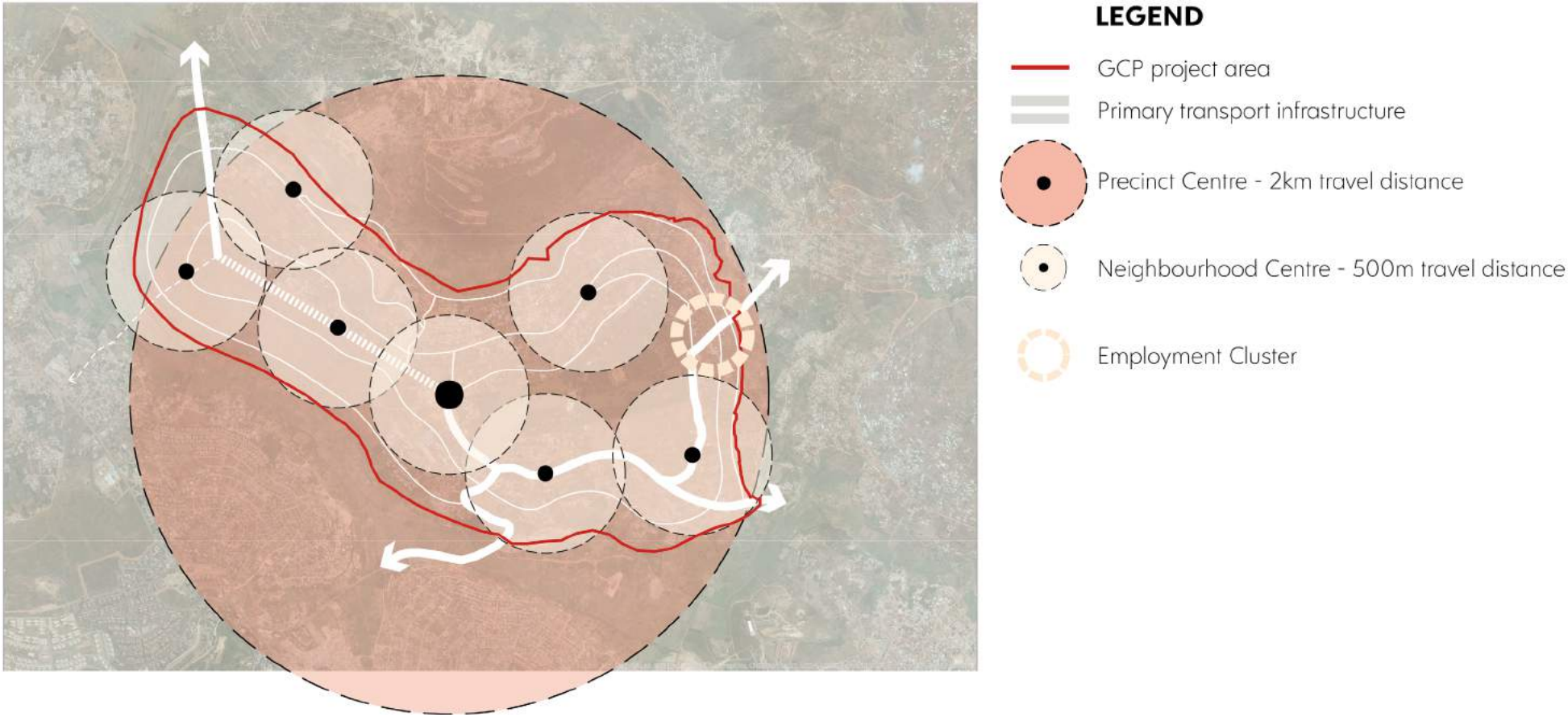
7.3.4 proposed green blue structure



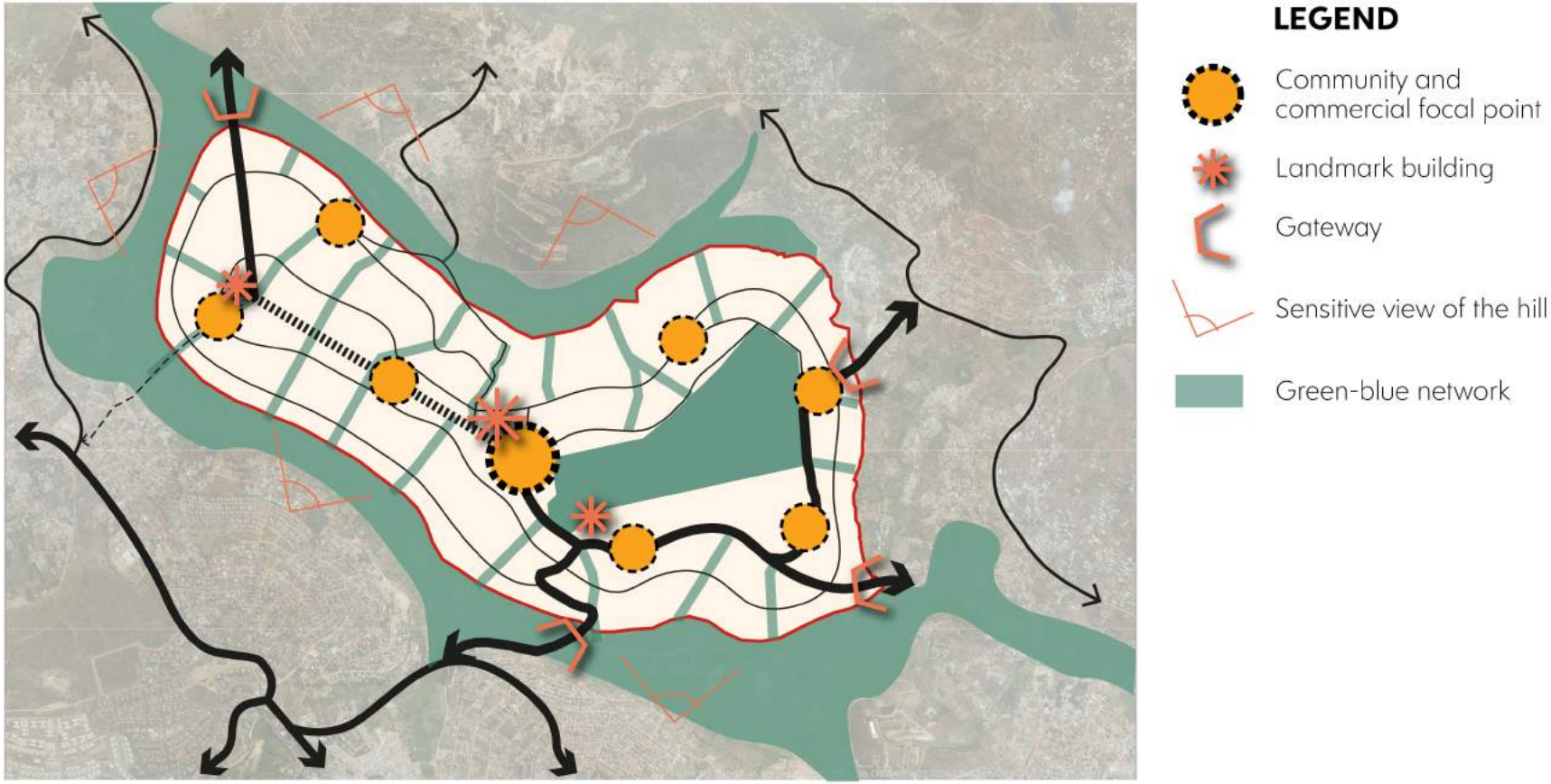
7.3.5 proposed employment clusters



7.3.6 proposed centres



7.3.7 proposed new scenario



7.4 ANNEX 4: ESRI GIS Maps of Existing

7.4.1 Demarcation of the 600ha

7.4.2 Demarcation of the Deutsche Welle Site (70ha))

7.4.3 Demarcation of the RSSB site (130ha)

7.4.4 Map with rivers

7.4.5 Map with Soil

7.4.6 Local Streets in the respective available classifications

7.4.7 Regional Streets in the respective available classifications

7.4.8 Other Infrastructure: (MV Lines and Station)

7.4.9 Existing village demarcated and named:

7.4.10 Type of neighbourhoods

7.4.11 Urban uses (schools, health care, retail, commercial, industry etc)

7.4.12 Drainage map

7.4.13 Existing Schools

7.4.14 Existing Point of Interest

7.4.15 Existing Informal Settlements

7.4.1 Demarcation of the 600ha

7.4.2 Demarcation of the Deutsche Welle Site (70ha)

GCP_StudyArea

1:25,000

0 0.2 0.4 0.8 mi

0 0.33 0.65 1.3 km

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Web AppBuilder for ArcGIS

DigitalGlobe | Sources: Esri, USGS, NOAA | January 2019: Esri Rwanda Ltd, Kaspar Kundert | MINAGRI | RLMUA | Rwanda Transport Development Agency (RTDA) | Rwanda Energy Group, Daniel Ntawumenya | Rwanda Energy Group (REG) |

7.4.3 Demarcation of the RSSB site (130ha)

RSSB_Site_130ha

1:25,000

0 0.2 0.4 0.8 mi

0 0.33 0.65 1.3 km

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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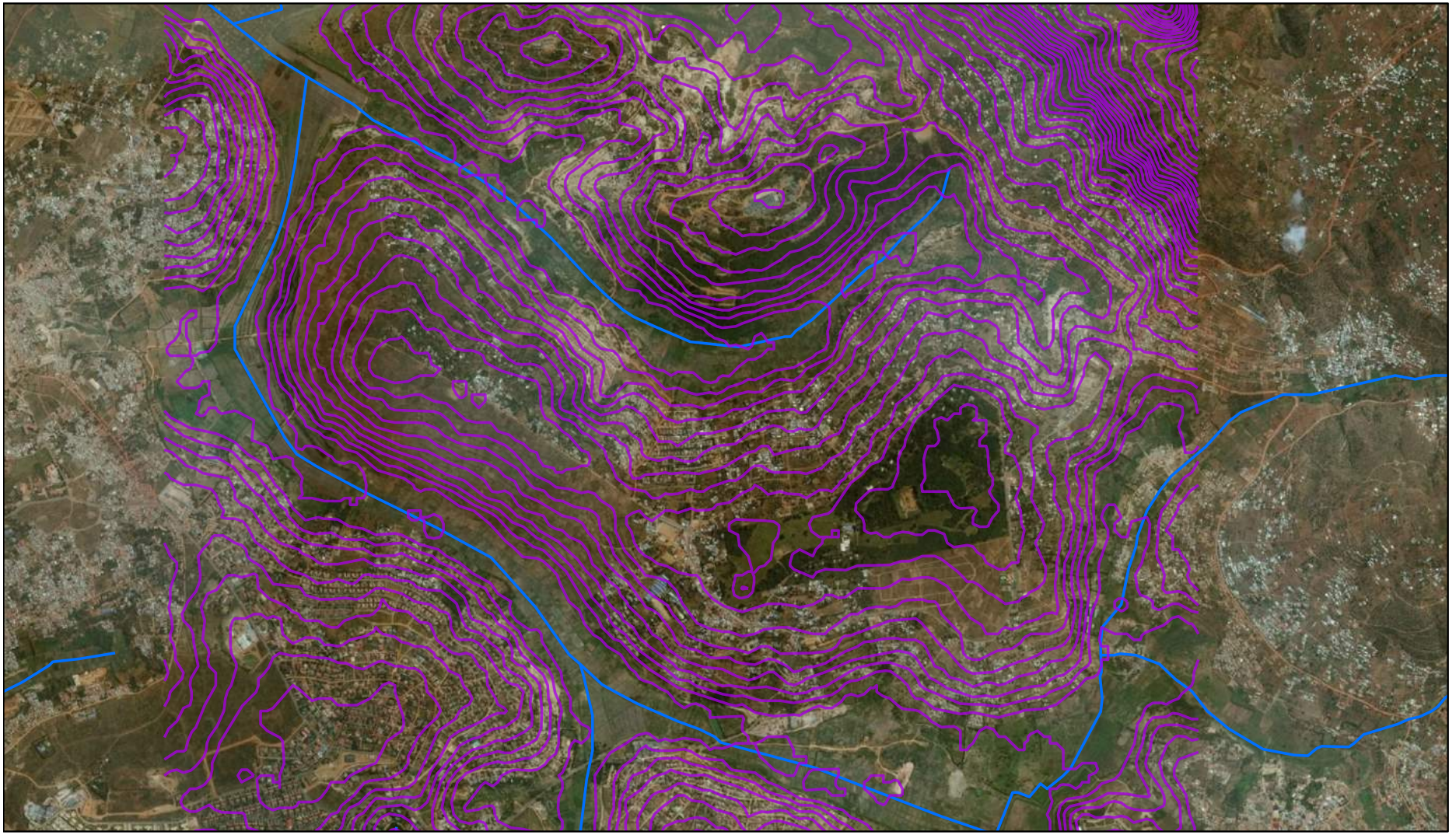
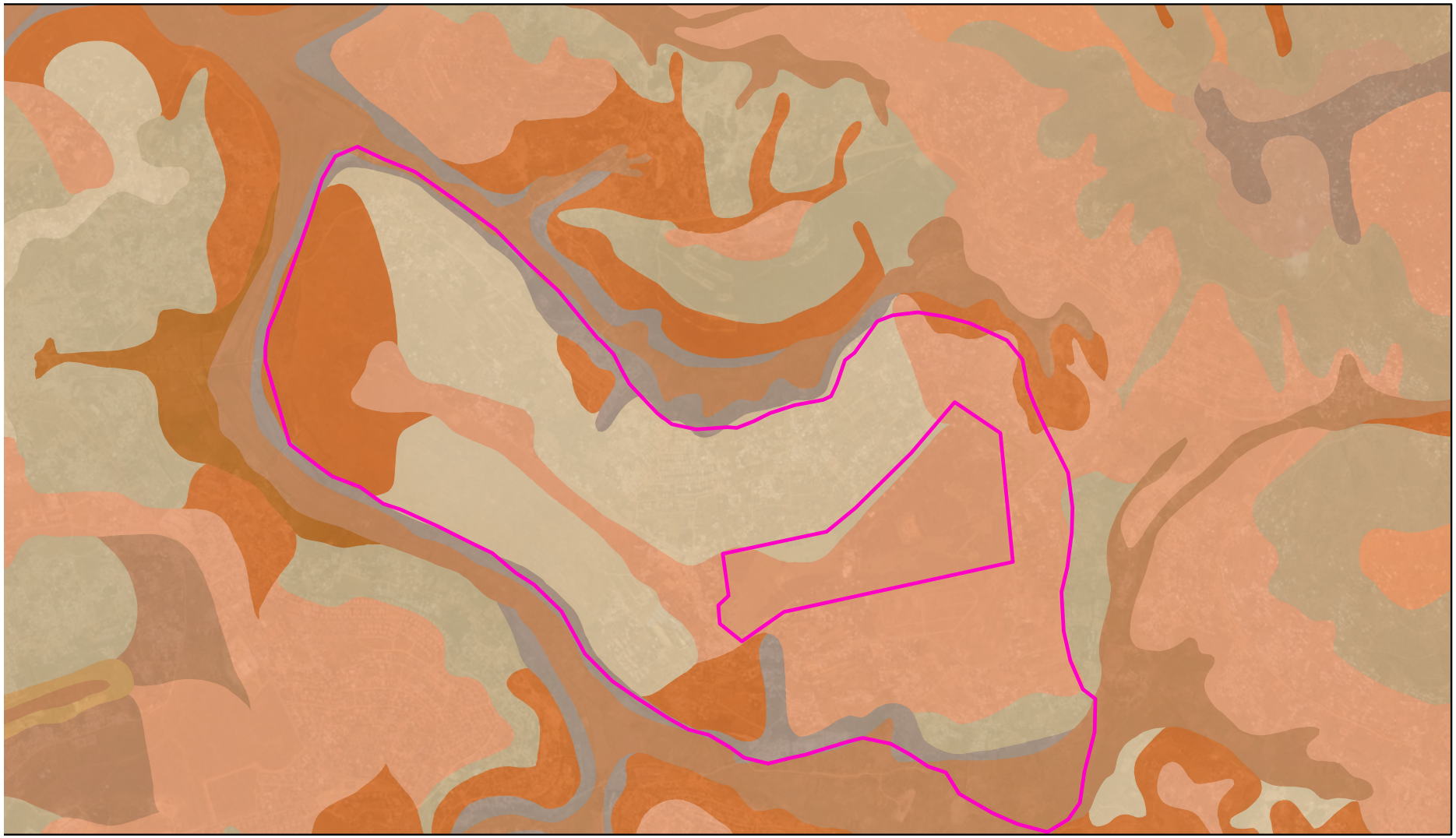
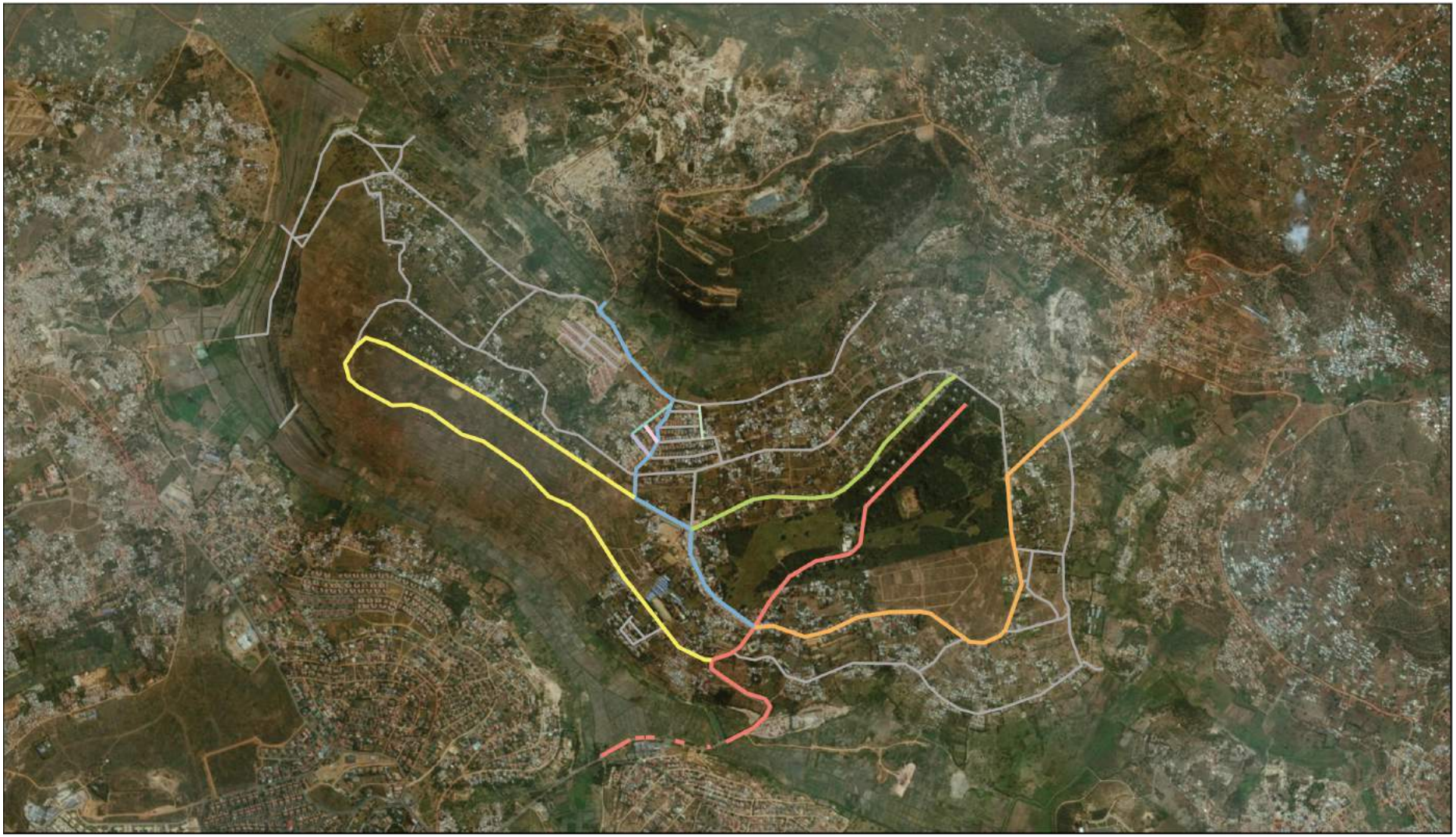
7.4.4 Map with rivers



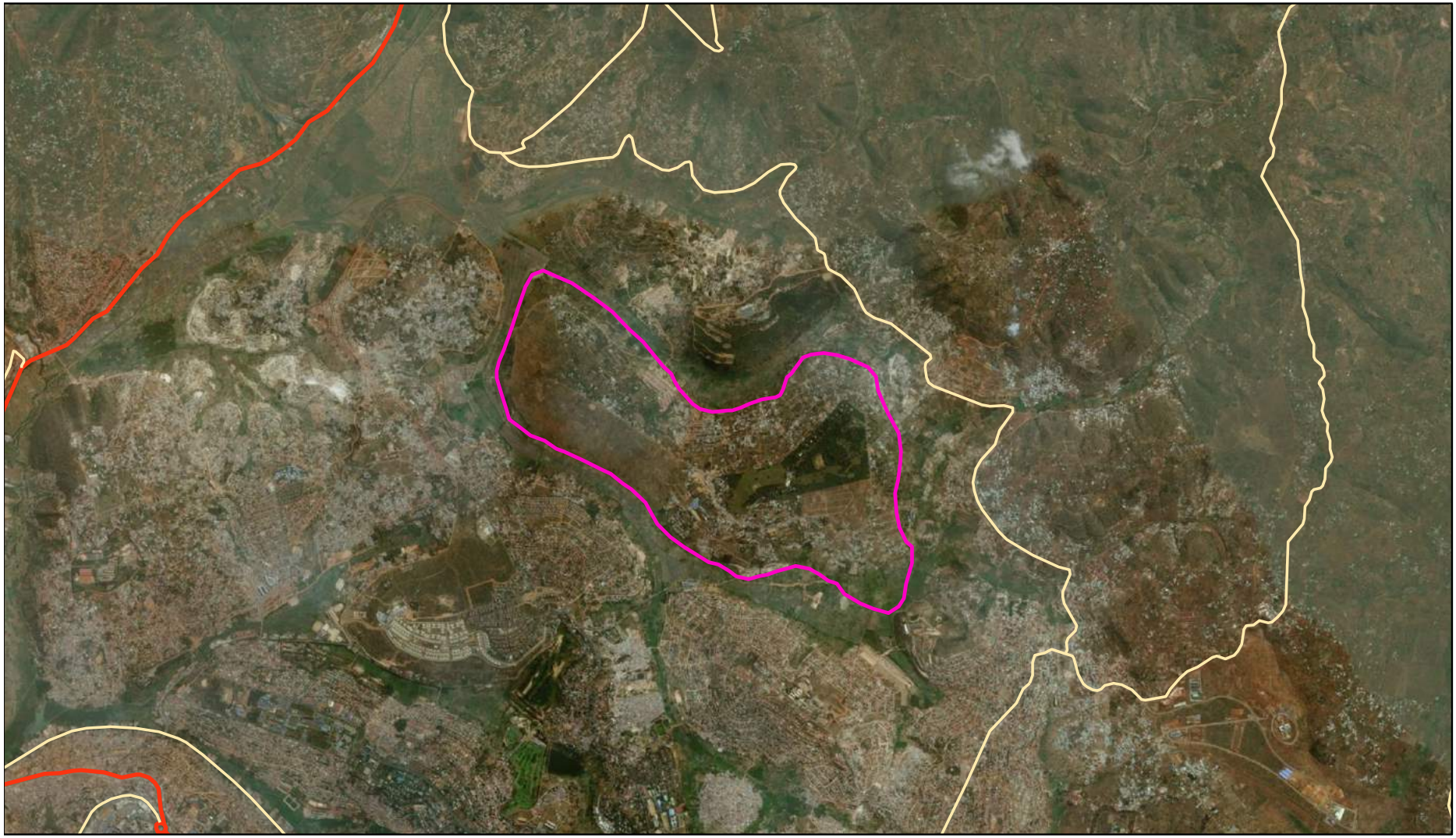
7.4.5 Map with Soil



7.4.6 Local Streets in the respective available classifications



7.4.7 Regional Streets in the respective available classifications



7.4.8 Other Infrastructure: (MV Lines and Station)

MV Transformers

MV Lines

1:25,000

0 0.2 0.4 0.8 mi

0 0.33 0.65 1.3 km

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Web AppBuilder for ArcGIS

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7.4.9 Existing village demarcated and named:

Villages_GCP

1:25,000

0 0.2 0.4 0.8 mi

0 0.33 0.65 1.3 km

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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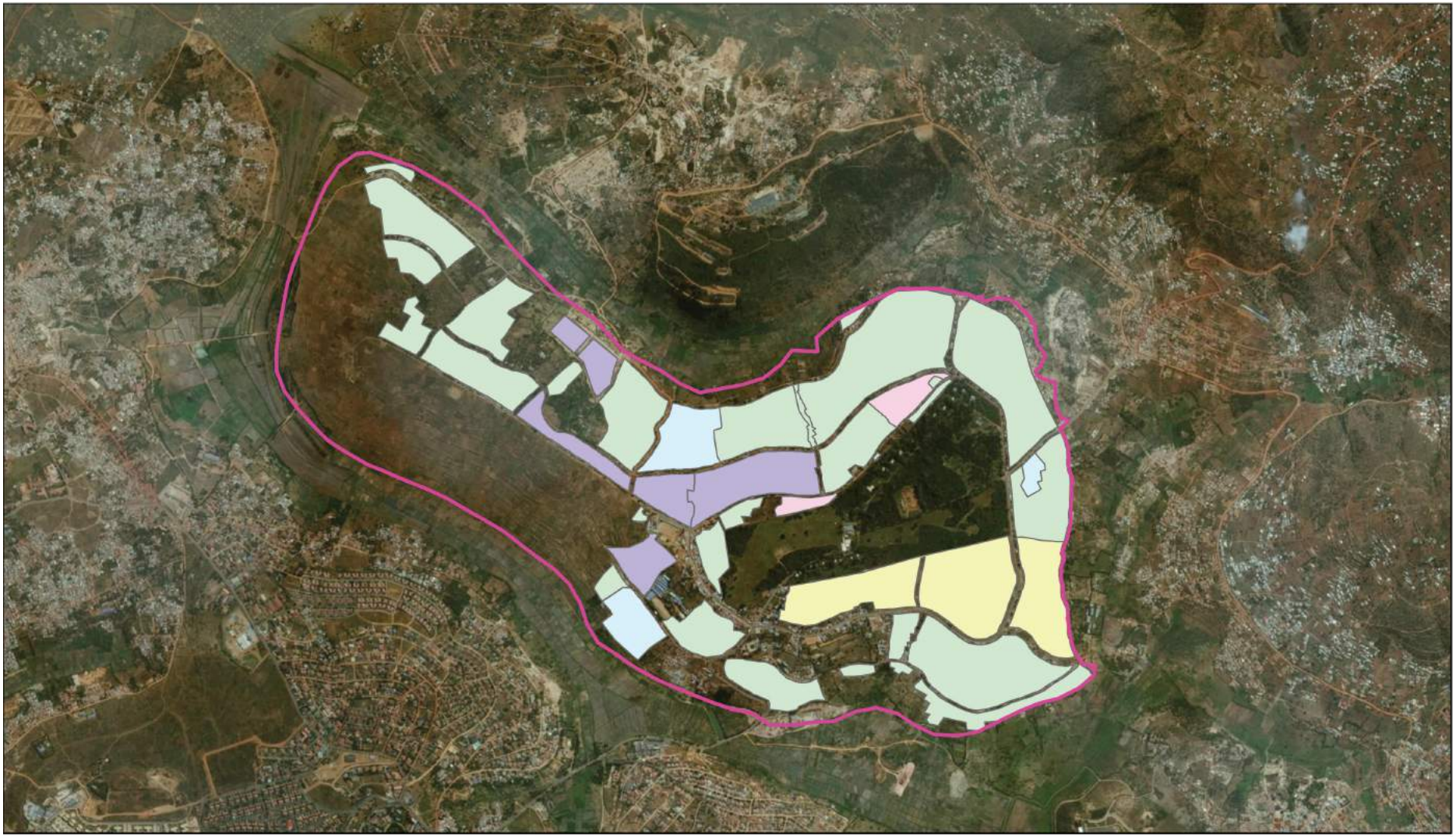
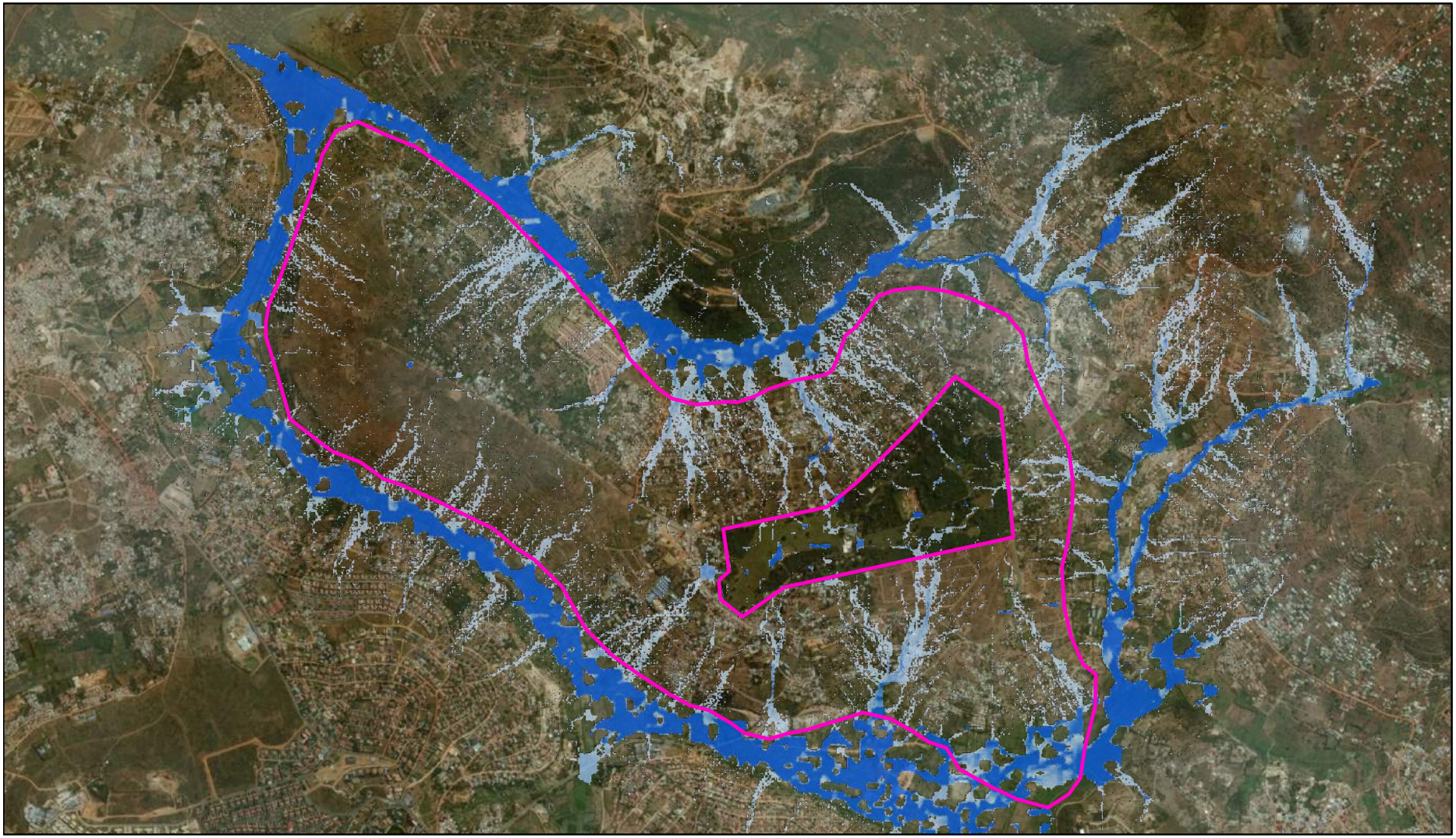
7.4.10 Type of neighbourhoods



7.4.11 Urban uses (schools, health care, retail, commercial, industry etc)

7.4.12 Drainage map



SUPERCEDED

1:25,000

0 0.2 0.4 0.8 mi

0 0.33 0.65 1.3 km

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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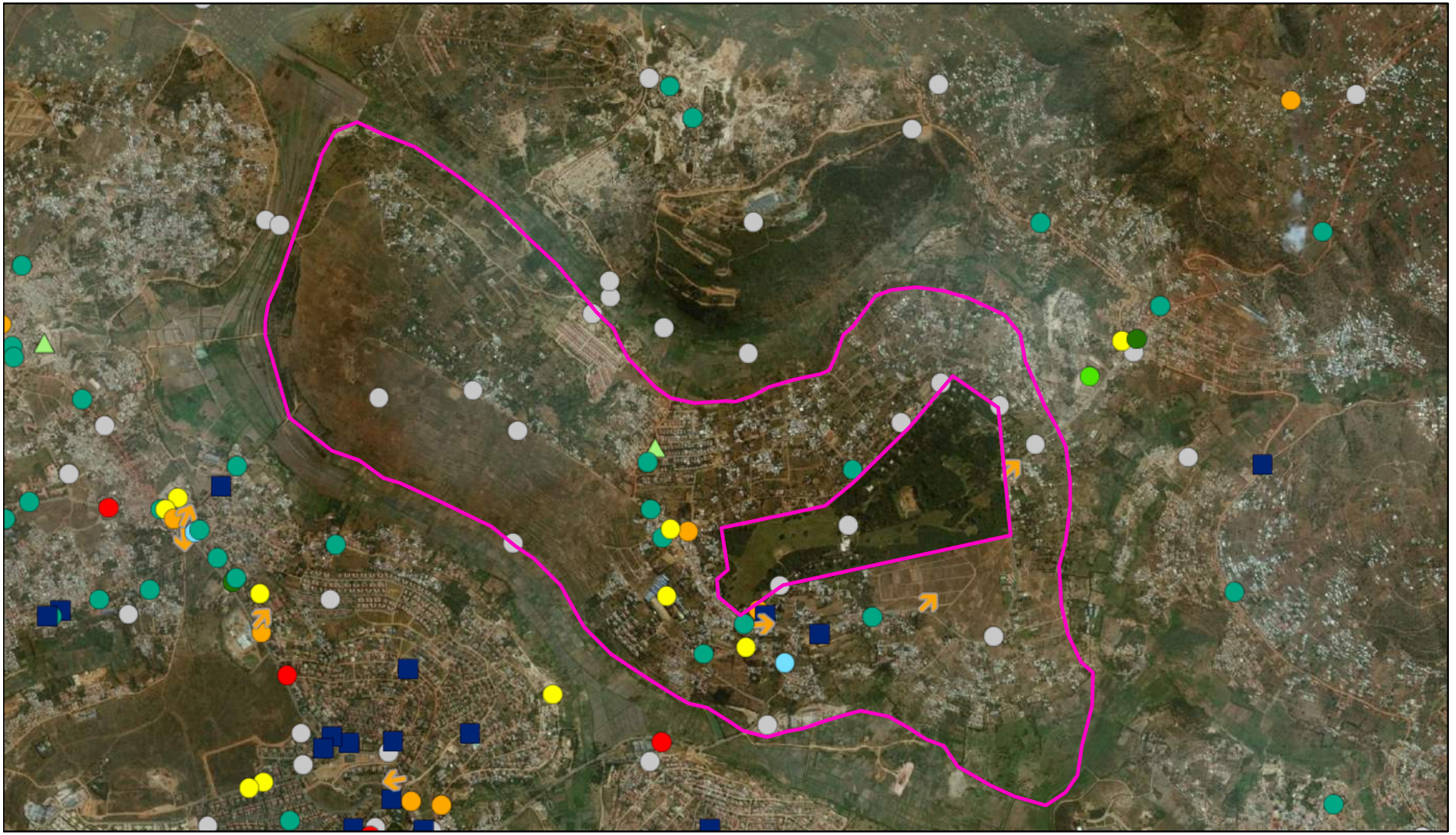
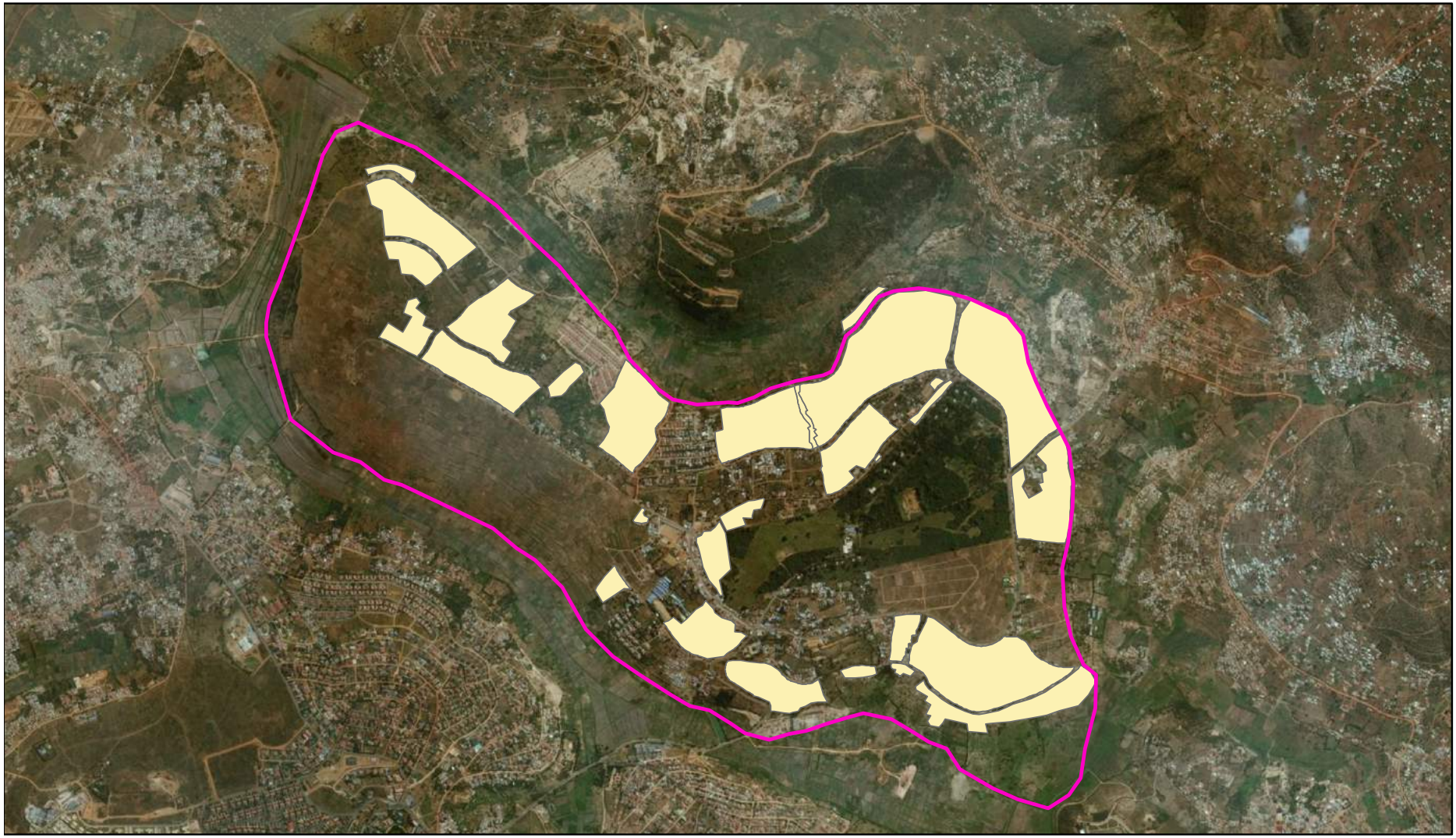
7.4.13 Existing Schools

7.4.14 Existing Point of Interest



7.4.15 Existing Informal Settlements



SUPERCEDED

SettlementTypes

Residential informal

1:25,000

0 0.2 0.4 0.8 mi

0 0.33 0.65 1.3 km

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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