

DETAILED DISTRICT PHYSICAL PLANS
FOR KICUKIRO & GASABO
KIGALI, RWANDA

GASABO DISTRICT
DETAILED MASTER PLAN REPORT

MAY 2013

TASK ORDER 4: SCHEMATIC PLANS



DOCUMENT INFORMATION

REPORT TITLE:	GASABO DISTRICT - DETAILED MASTER PLAN REPORT
PROJECT TITLE:	DETAILED PHYSICAL PLAN FOR GASABO AND KICUKIRO, KIGALI
PROJECT REF NO.:	310-02-01-0002
CLIENT:	CITY OF KIGALI
SUBMISSION DATE:	31-05-2013
FILE NAME:	RWF1101_GASABO DISTRICT_DETAILED MASTER PLAN REPORT_03062013

APPROVALS	NAME	DESIGNATION	DATE
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Number of copies issued: 2

DOCUMENT STATUS

VERSION NO.	DATE ISSUED	DETAILS	APPROVAL FOR ISSUE
1	10-12-2012	DRAFT 1	DJOKO PRIHANTO
2	27-05-2013	FINAL	DJOKO PRIHANTO
3			
4			
5			

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ACKNOWLEDGEMENTS

We would like to acknowledge and thank the following individuals and organizations for their invaluable insights and contributions towards the preparation of the “Detailed Physical Plan of Kicukiro and Gasabo.”

GOVERNMENT AUTHORITIES

HE Prof. Silas Lwakabamba- Minister of Infrastructure MININFRA
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GASABO “DIVERSE EMPLOYMENT HUB AND CULTURAL HEARTLAND OF KIGALI”

The vision for Kigali is to be “The Centre of Urban Excellence in Africa”. The Detailed master Plan (DMP) translates and sharpens this broad planning directive set at the regional level (Regional Concept Plan) into a detailed master plan for the Districts. This broad vision for the entire city identifies the focus for each of its three districts.

The roles set for the three districts are:

NYARUGENGE:

“Green Financial Hub and Vibrant Growth Centre of Kigali”

GASABO:

“Diverse Employment Hub and Cultural Heartland of Kigali”

KICUKIRO:

“Progressive Knowledge Hub and Green Gateway of Kigali”

With many of the government and administration institutes located within the district, Gasabo has been identified as Rwanda’s Administration Hub. This unique identity helps to position Gasabo as the “Administrative Metropolis”. Guided by the direction set by the concept plan, the DMP for the Districts elaborates on the proposed planning intention for Gasabo. It elaborates the district’s Land Uses and explains how the various uses such as employment, living areas and facilities as well as the institutes are distributed and organized. The DMP is an integrated Land Use Plan which ties in with the overall transportation, transit, open spaces and infrastructure networks.

The DMP for Gasabo looks at how the district could be best planned in relation

to the regional concept plan of Kigali City. The DMP is a detailed Land Use Plan which illustrates all the potential areas for the variety of Land Uses. As such, it provides the necessary base plan for the establishment of Zoning Plan, which is the gazetted plan.

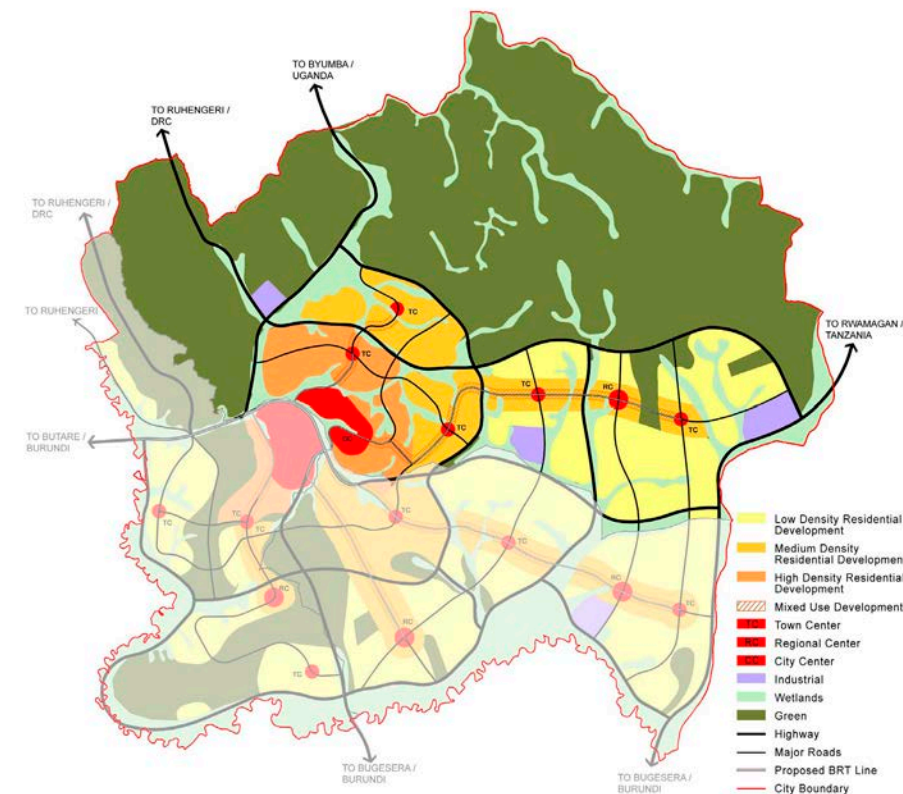
The Zoning Plan will be the legal regulatory plan which ensures land reservation for public facilities and infrastructure development. It also regulates how each land parcel could be developed, in term of density (FAR), building height, setback, allowable uses subject to compliance to various planning requirements. The DMP establishes the basis to develop the and the Zoning Plan.

STRATEGIES FOR TRANSFORMATION...

- To establish a hierarchy of well connected employment centres, focusing on rejuvenation of existing commercial and new growth areas.
- To conserve and promote Gasabo’s rich nature, culture and heritage areas.
- To reinforce the role of Gasabo as the administrative centre of Rwanda.
- To create affordable housing with quality living environments and sustainable infrastructure in both urban and rural areas.
- To promote value added and sustainable agricultural areas.



“The Administrative Metropolis”



Gasabo in the Proposed Radial City - Conceptual Structure Plan

GOALS

To achieve the medium and long term visions for Kigali, a set of goals covering 6 critical sectors of development is proposed. These key goals will guide the physical planning for the City as well as the districts

1

CITY OF VIBRANT ECONOMY AND DIVERSITY

2

CITY OF GREEN TRANSPORT

3

CITY OF AFFORDABLE HOMES

4

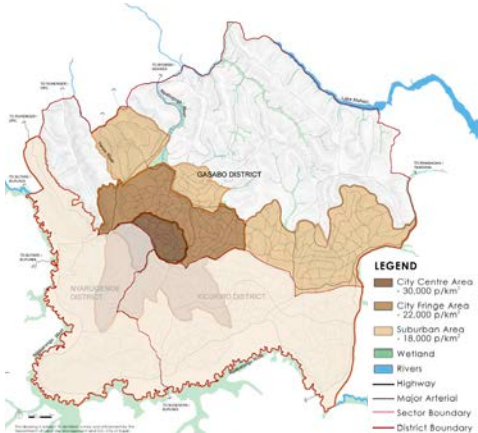
CITY OF ENCHANTING NATURE & BIODIVERSITY

5

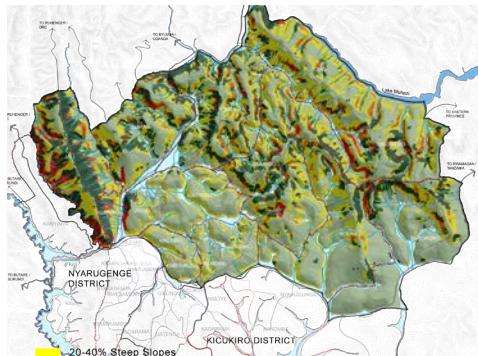
CITY OF ENDEARING CHARACTER AND UNIQUE LOCAL IDENTITY

6

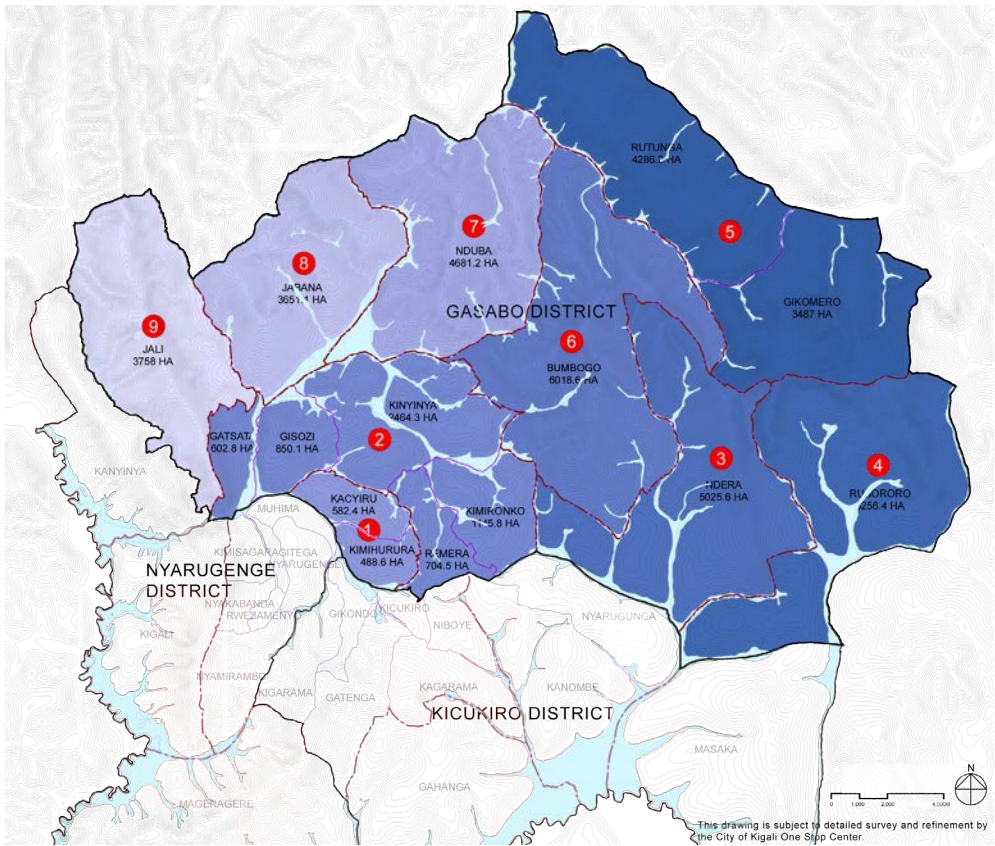
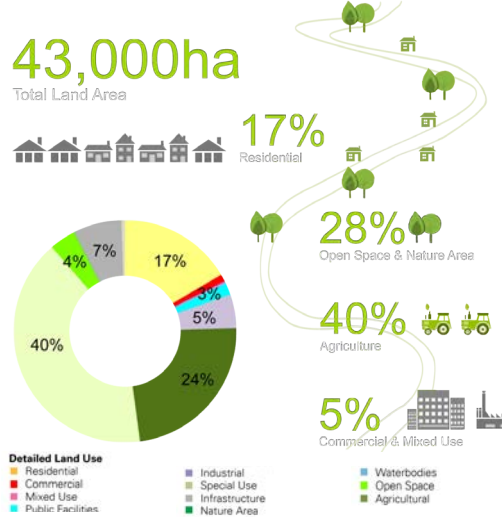
CITY OF SUSTAINABLE RESOURCE MANAGEMENT



Proposed Density Distribution for Gasabo



Natural Constraints: Slopes, Forest and Wetlands



Proposed Planning Area Boundary

PROPOSED LAND UTILIZATION STRATEGY

The proposed land utilization strategy focuses on the following key aspects:

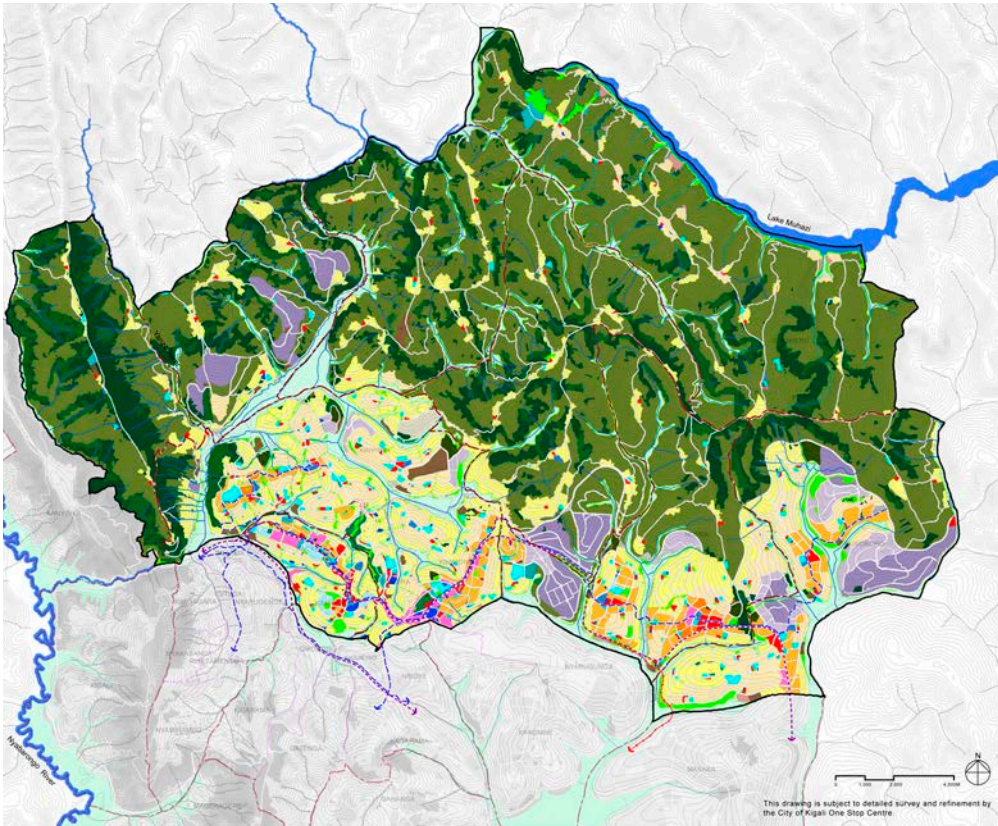
- Identifying & organizing City Fringe Areas.
- Defining the urbanizable new growth areas & organizing these as the Suburban Areas.
- Develop two new regional centres creating commercial and employment centres
- Develop New Townships in Sub-urban Areas
- Conserve existing nature areas and develop a variety of Open Spaces inclusive of recreation and tourism areas

PROPOSED PLANNING AREAS

The district is divided into nine geographical areas for planning purposes. These planning areas are developed by grouping administrative sectors. Sectors in proximity to each other and sharing similar urban and geographic character have been combined to create the planning areas. Distinct role and identity is proposed for each of the planning areas.

The 9 planning areas in Gasabo are:

- Special Planning Area: 1600 ha
- Central Planning Area: 5770.7 ha
- South Eastern Planning Area: 5025.6 ha
- Eastern Planning Area: 5300 ha



Proposed Land Use Plan Year X

- Western planning Area: 3758
- North Central Planning Area: 6018.5 ha
- Northern Planning Area: 4681 ha
- North Western Planning Area: 3651 ha
- North Eastern Planning Area: 7773 ha

“DIVERSE EMPLOYMENT HUB AND CULTURAL HEARTLAND OF KIGALI”:

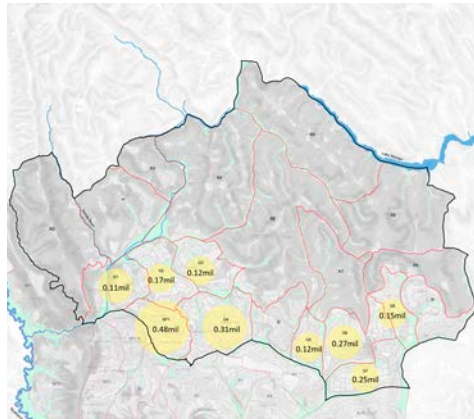
PROPOSED LAND USE PLAN YEAR X

A broad Land Use Plan is prepared for Year X showing the ultimate development envisioned for Gasabo District. The key Land Use proposals are:

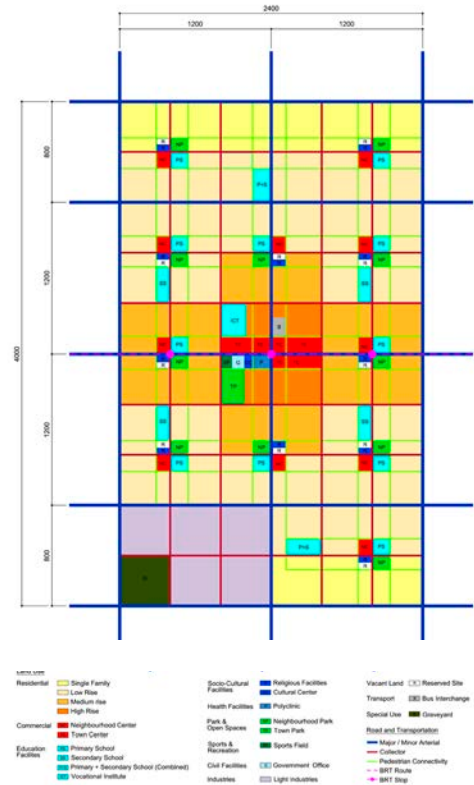
- To introduce regional level commercial

areas in Fringe and suburban areas.

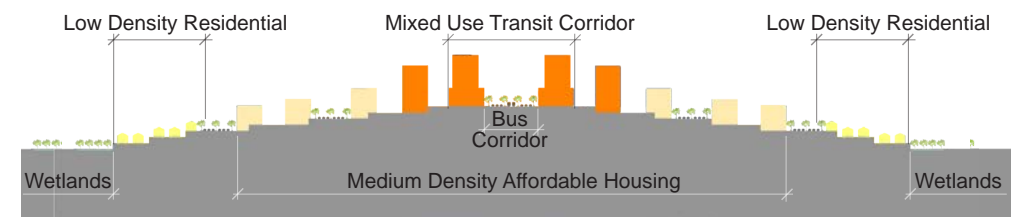
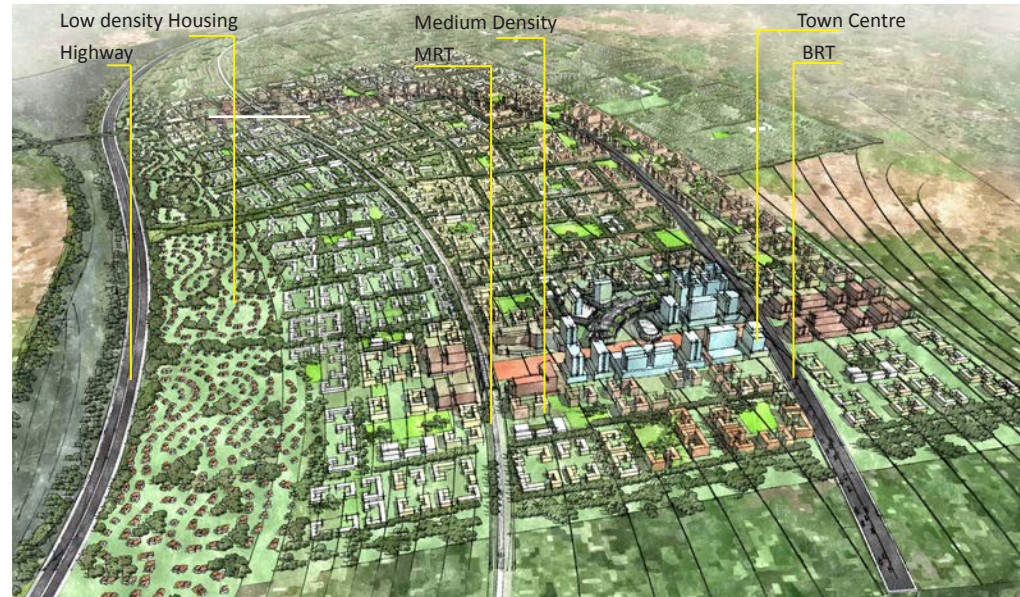
- To safeguard land for consolidated Industrial Estates.
- To establish an efficient highway grid and arterial system ensuring long-term regional and local connectivity.
- To redevelop existing unplanned settlements into higher density residential developments.
- To develop new integrated suburban townships with facilities and light industries for local employment
- To conserve nature areas such as forests, wetlands and to protect steep slopes, and develop new town and neighborhood parks for the residents.
- To introduce iconic regional recreation and tourism destinations.



8 Townships in Gasabo District



Proposed Township Model



Proposed township sketch

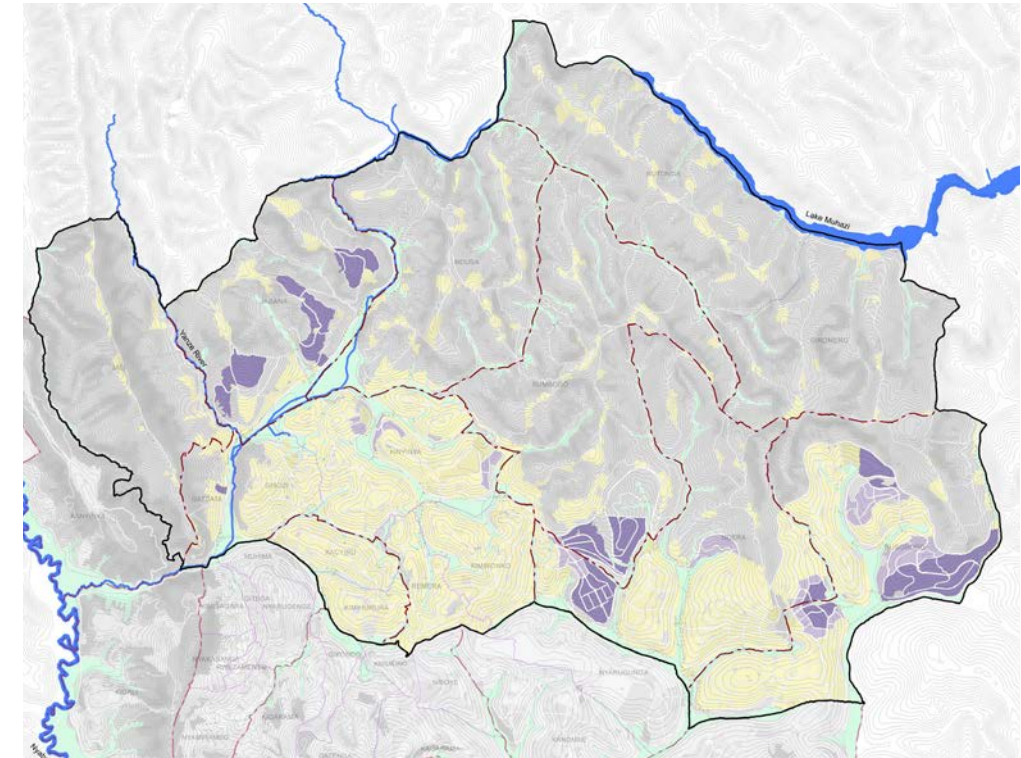
INTEGRATED TOWNSHIPS:

PROPOSED TOWNSHIPS IN GASABO

8 self sufficient townships are proposed for Gasabo. The townships are proposed to be developed as integrated developments along the transit corridor.

- The features of the township are as follows:
- High density development along the transit corridor along the ridges
 - Town centre with town park and other facilities located at the transit corridor.
 - Compact neighborhoods, with a population of 15000-18000 people with neighborhood centre, & neighborhood parks

- Light Industries at the periphery close to the highways.
- Primary Schools located at walking distance from the neighborhoods.
- The Average size of townships: 900 ha
- The Township population range from 80000-200,000
- Future MRT line located at lower slopes, with stations at an average interval of 1km.



Proposed Commercial and Industrial plan Year X

CITY OF VIBRANT ECONOMY & DIVERSITY:

PROPOSED COMMERCIAL USE PLAN YEAR X

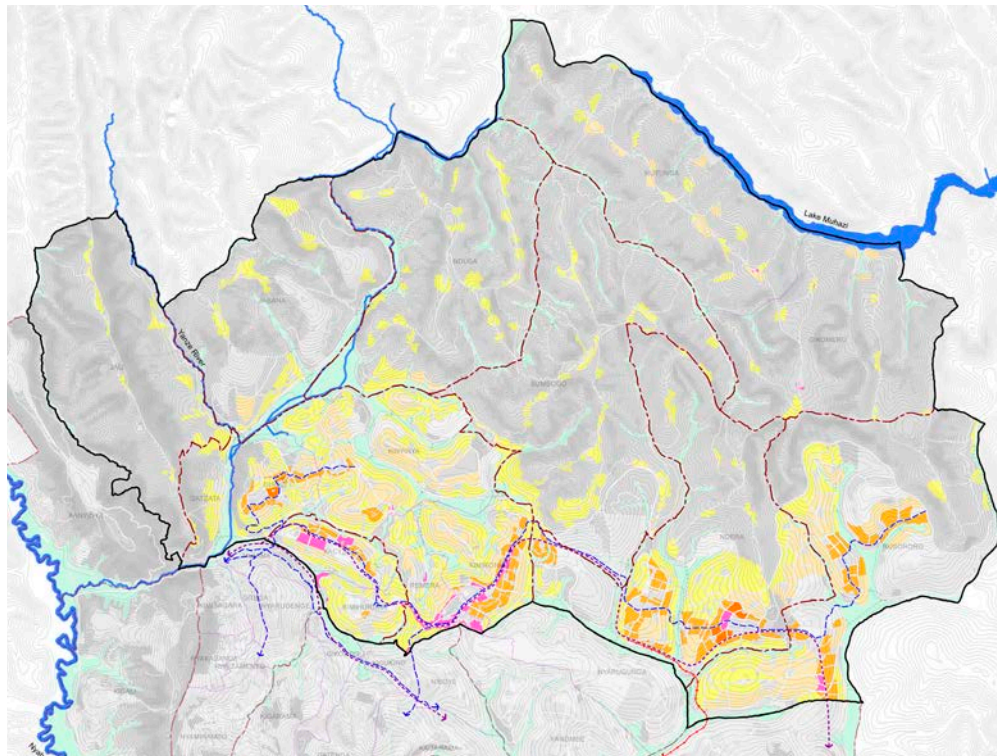
The Commercial Plan Year X for Gasabo focuses on creating 2.4 mil sqm of commercial space for 1.6 mil service sector jobs. It focuses on creating a hierarchy of commercial centres distributed in Gasabo so as to bring jobs closer to homes which are:

- A new Regional Centres at Ndera
- Fringe Centres at Kimironko & Kinyinya
- 5 Town Centres
- Neighborhood Centres & Cell Centres
- Other Commercial

PROPOSED INDUSTRIAL PLAN YEAR X

The Industrial Plan Year X proposes to provide 2000 Ha of industrial space which will provide working space for 0.2 mil people in the industrial sector. The industrial plan proposes:

- 1700 ha of land distributed as heavy industrial zone in Rusuroro, Jali, including the extension of the current FTZ.
- 300 ha of light industries lands within townships.
- The industrial areas to be located away from dense urban settlements.



Proposed Residential Plan Year X

CITY OF AFFORDABLE HOMES:

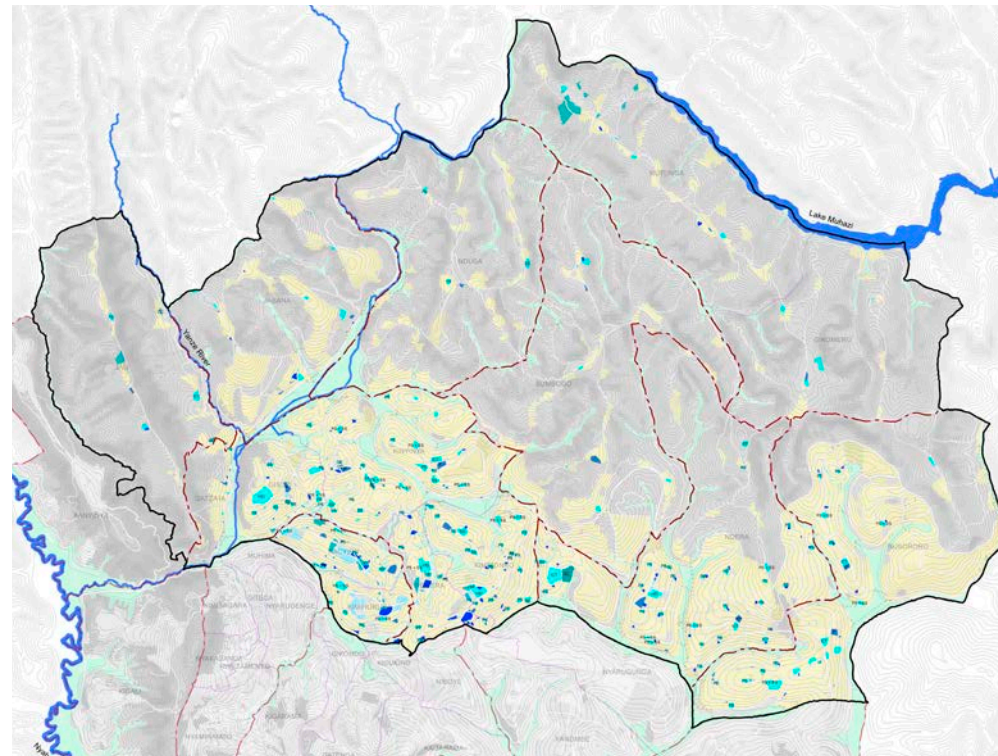
PROPOSED RESIDENTIAL USE PLAN YEAR X

The Residential Plan Year X proposes to provide affordable homes & public facilities for 2 million people by Year X and 1.3 mil by 2025. Its focuses on :

- Rehabilitation and regeneration of unplanned areas in the District to create a slum free Kigali in Year X.
- Easy access to quality, affordable facilities within all residential areas
- To Develop integrated transit oriented townships.
- A Variety of residential choices: Single Family residential, Low Density Residential, Medium Density

residential and High Density Residential.

- Higher density residential development along the key transit corridors of Gasabo district. Recommended density for high density residential areas is 30000 - 50000 persons/ sq km.
- Medium density residential developments are proposed around key commercial developments. Recommended density for medium density residential areas is 10000 persons/ sq km. This residential Use comprises of 16.5 % of the land area within Gasabo district.
- Low density and Single Family residential in areas with steep slopes. Recommended density for Low Residential is 10000 persons/ sq km.



Proposed Facilities Plan Year X

PROPOSED FACILITIES PLAN-YEAR X

The Facilities Plan Year X proposes various facilities distributed across the District. The provision will make the townships more self sufficient. The variety of facilities are grouped in the following hierarchy.

- District Level Facilities
 - District Hospital
 - University
 - Sports Hub
 - Museum/Library
 - Cultural Centre
- Township Level Facilities
 - ICT/ Vocational Colleges
 - Polyclinic
 - Sports Field
 - Library/ Cultural Centre
- Neighborhood Level Facilities
 - Health Centres
 - Post Offices
 - Religious Institutes
 - Library
- Education Facilities
 - Primary Schools at 500m radius
 - Secondary Schools
- Other Facilities
 - Police & Fire Stations, Courts etc. These facilities are provided as per requirements of the population. The plan also promotes the sharing of facilities of the government schools such as fields and halls with local community to use during non-school hours.



Education Facilities at walking distance



Quality Health Facilities



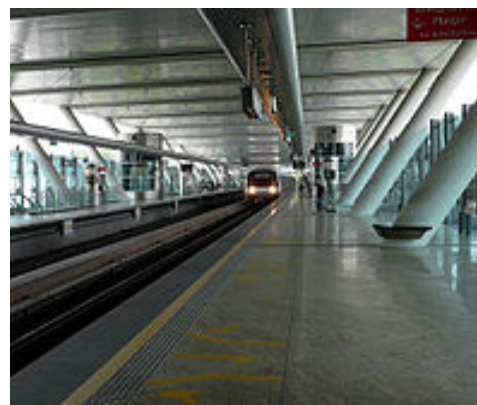
Sports Facilities in the townships



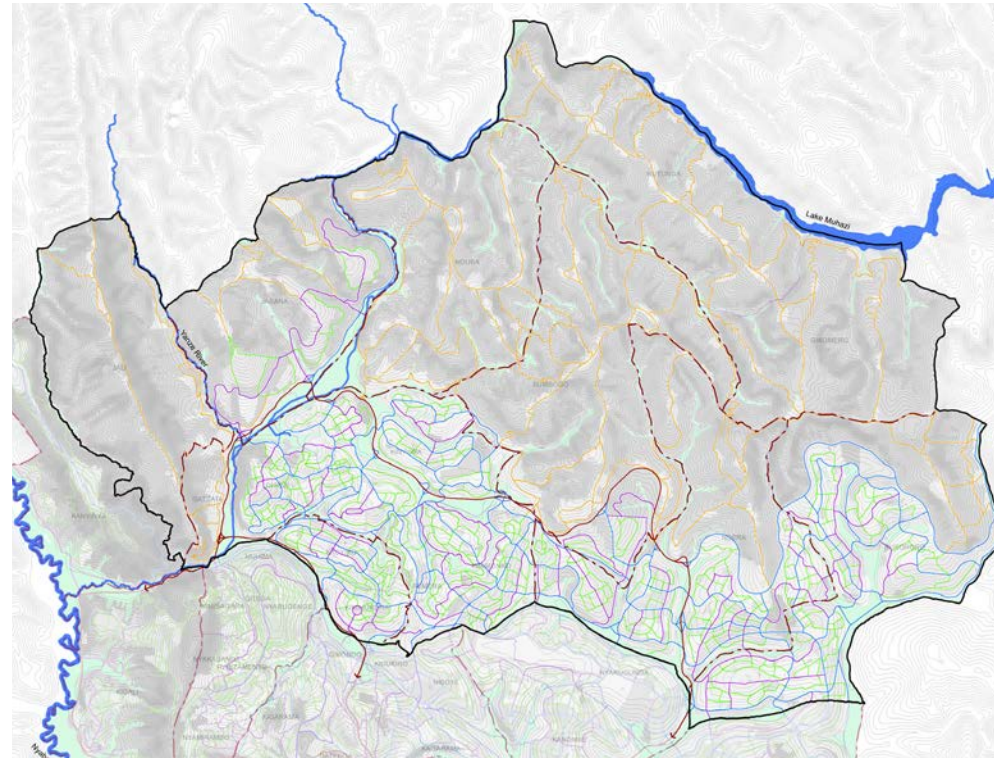
Quality Roads



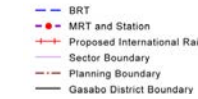
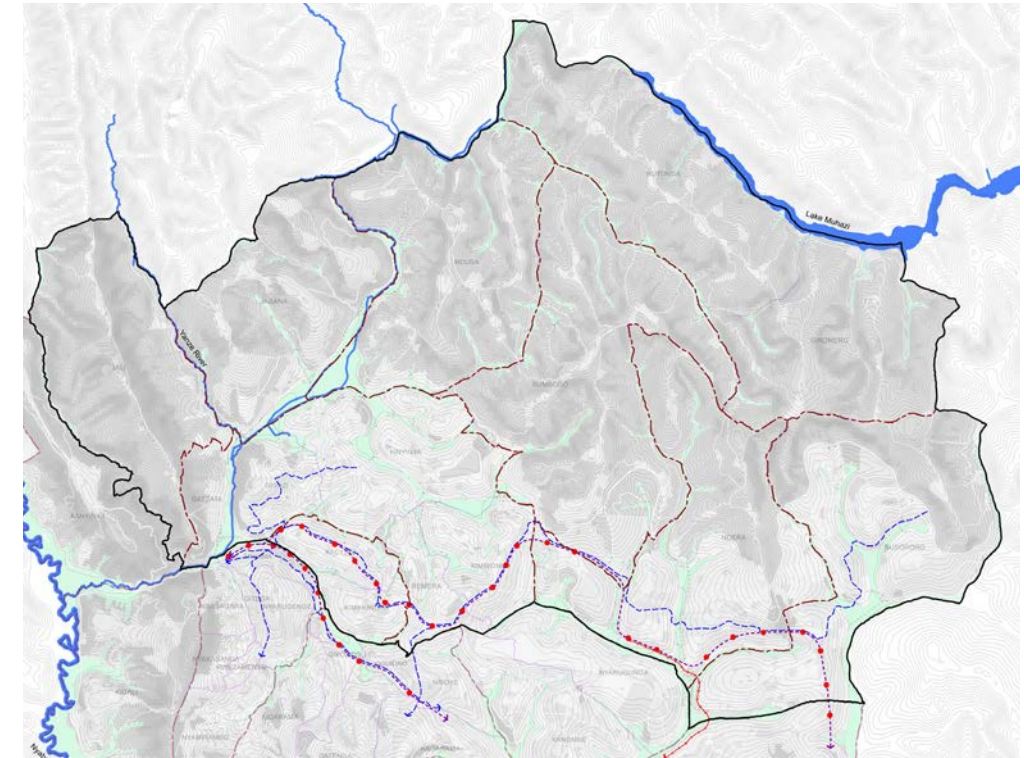
Bus Rapid Transit (BRT)



Mass Rapid Transit (MRT)



Proposed Road Network Plan - Year X



Proposed Public Transportation Plan - Year X

CITY OF GREEN TRANSPORT:

PROPOSED TRANSPORTATION PLAN -YEAR X

The Transportation Plan Year X proposes an extensive new road network to cater to a population of 2.0 mil people.

The plan proposes to:

- Existing Road Network is identified and developed
- New proposed roads uses the existing alignments
- 70:30 modal share of public transit.
- Efficient management of private transport & parking.
- Quick connectivity to current & future airport.



Non Motorized Transit (NMT)

- Bypass roads for inter-state goods vehicles.
- The district has 92.5 km of Expressways, 182 km of Arterial Roads.
- Total 685 km of roads in the Gasabo District

PROPOSED PUBLIC TRANSPORTATION PLAN -YEAR X

The Transit Plan proposes extensive BRT and MRT lines in the district. All townships are oriented along the BRT transit corridor. The plan proposes :

- Public transit based City organization to connect to employment nodes & regional facilities (Max 1 hr. travel time)

- 2 BRT lines in the district, 39 km in length with stations at average interval of 600m.
- 2 Future MRT lines, 26 kms in length with stations at an average interval of 1.2 km.
- A system of feeder buses to support the BRT and MRT Network.

NON MOTORIZED TRANSIT

Townships are proposed as compact and walkable developments. Non motorized travelling within townships for local needs and access of local facilities is enhanced by the provision of pedestrian and park connectors. Cycling is also promoted as a mode of transport through provisions of dedicated as well as shared bicycle pathways.



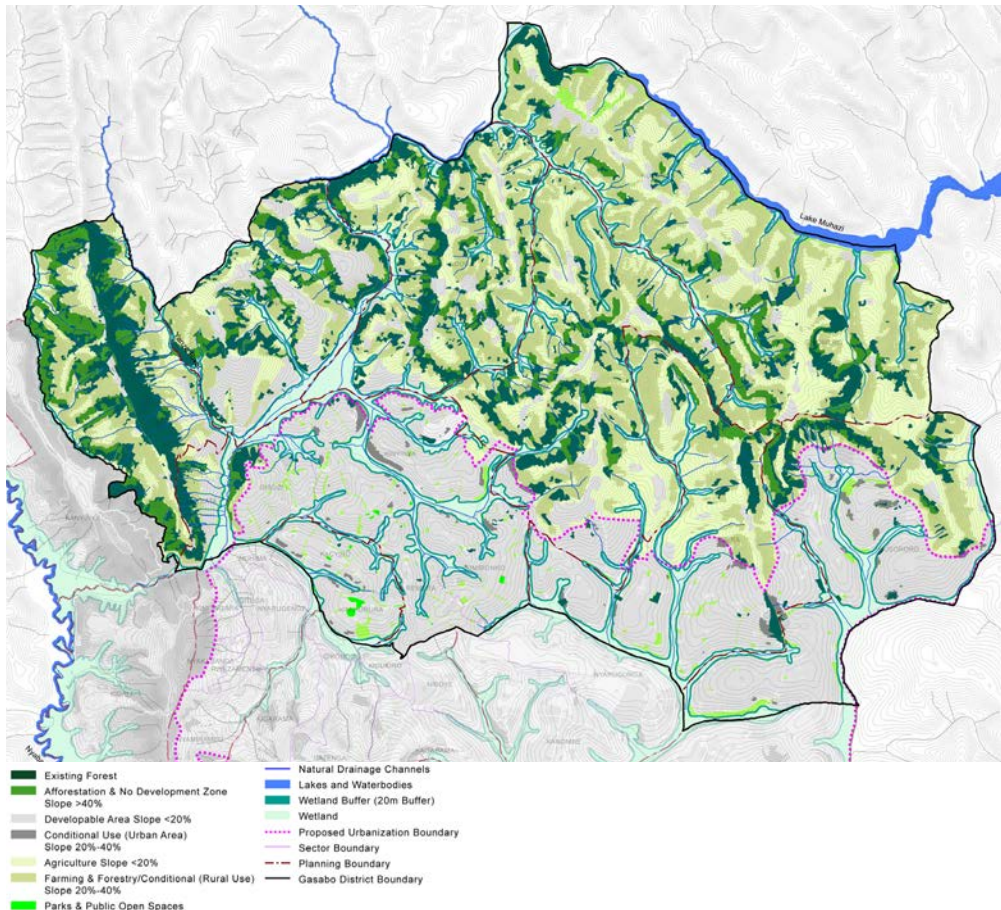
Protecting the wetlands: our natural assets



Safeguarding the natural drainage



New Open Spaces in the City: Town Parks



Proposed Green and Blue Plan Year X

CITY OF ENCHANTING NATURE AND BIODIVERSITY:

PROPOSED GREEN & BLUE PLAN -YEAR X

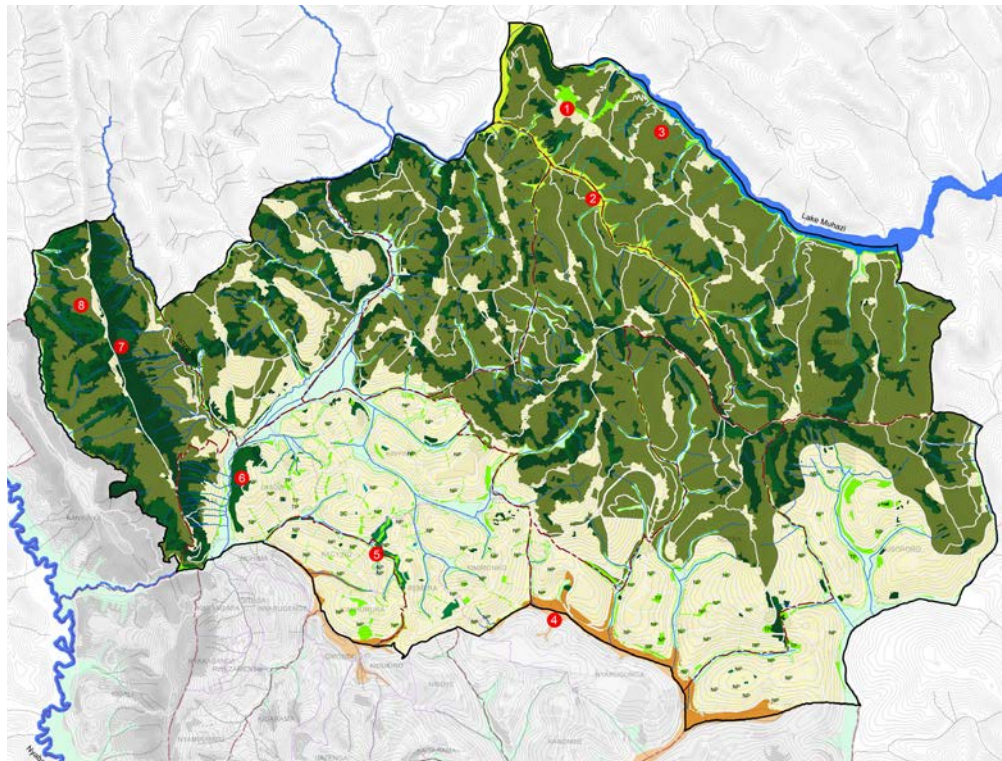
The Green & Blue Plan proposes specific environment strategies and a range of open spaces that bank on the various wetlands and terrain.

The plan proposes to:

- Strengthen the existing natural drainage systems and wetland networks to improve the quality of the downstream water.
- Allow agriculture in arable land along

wetlands and un-buildable zones.

- Encourage afforestation in steep slopes more than 40%
- Manage watersheds and slopes.
- Provide a variety of public parks and open spaces; classified as Regional Parks, City Parks, Town Parks, Local Parks and Park Connector Network.
- Develop a variety of attractive parks and recreational features such as themed botanic gardens, bio-diversity parks, an eco -bird park, horticulture park, etc.



Proposed Key Features Plan

CITY OF ENDEARING CHARACTER AND UNIQUE LOCAL IDENTITY

PROPOSED KEY FEATURES PLAN -YEAR X

The district of Gasabo is proposed to have variety of features to give it unique destinations and many places to visit and enjoy. These features will help create a distinct identity for Gasabo and help fulfill its role as the “Diverse Employment Hub and Cultural Heartland Of Kigali”.

The key features are also attractive tourist destinations for both local and regional visitors. The key features consist of natural

as well as new developments. These are also the magnets for new investments in the district.

PREFACE

PROJECT BACKGROUND

The City of Kigali (CoK), one of the most active and progressive City Councils of Africa, aspires to see Kigali develop as a competitive, safe and modern city. In the recent past, the Government of Rwanda has undertaken the preparation of several urban development plans as well as other studies related to transport, infrastructure, housing and environment for Kigali. Having completed the Kigali Conceptual Master Plan (2008) and Detailed Master Plans for Nyarugenge District (2010) the City now intends to develop Detailed Physical Plans for the other two Districts, namely, Gasabo and Kicukiro, so as to have an integrated detailed plan for the entire City.

PROJECT COMMISSIONING AND SCOPE

In early 2010, Surbana International Consultants, Singapore (Surbana) completed the Detailed Planning of Nyarugenge District, which included Detailed Urban Design for Kigali's CBD. In October 2011, through a public tender, the City of Kigali awarded the 'Design of Detailed District Physical Plans for Kicukiro & Gasabo' to Surbana.

This Master Planning project, in addition to the detailed planning of the two districts, has the following objectives:

- To review the planning direction and strategies for the entire City of Kigali, while integrating all the past planning and development initiatives undertaken.
- To prepare detailed Master Plan, urban design (for key areas) and development control guidelines for the two districts of Kigali, namely Gasabo & Kicukiro. This would also include the review and revision of the Detailed Master Plan for Nyarugenge District,
- To establish a GIS database for the entire City which has a coordinated base map,

proposed Land Use plan & development control information for all areas of the City of Kigali. This GIS system would form a part of the MIS system being put in place by the Government.

- To ensure participation of the various stakeholders in the development of the Master Plan so as to develop a plan that reflects the needs and aspirations of the City's residents.
- To conduct capacity building of the CoK staff through training programmes in Singapore and Kigali.

PROJECT ORGANIZATION & SCHEDULE

The project is spread over one year and comprises of the following 6 task orders, each with a duration of 2-4 months:

- Task Order 1: Inception & Base-mapping**
- Task Order 2: Analysis & Visioning**
- Task Order 3: Concept Planning**
- Task Order 4: Schematic Plans**
- Task Order 5: Urban Design**
- Task Order 6: Implementation Plan**

PROJECT PROCESS

In line with the project scope discussed above, the process to be adopted for this project is as elaborated below:

- Establishment of a proper working base map which incorporates all Land Use related information for developing the Master Plan.
- In-depth analysis of various issues facing the City and stock-taking of previous Master Plans and infrastructure planning initiative in the City in order to develop an integrated Master Plan.
- Establishing the strategic Urban Sustainability Framework for Kigali, that will become the overarching framework, guiding the City to address its key economic, social & environmental issues.

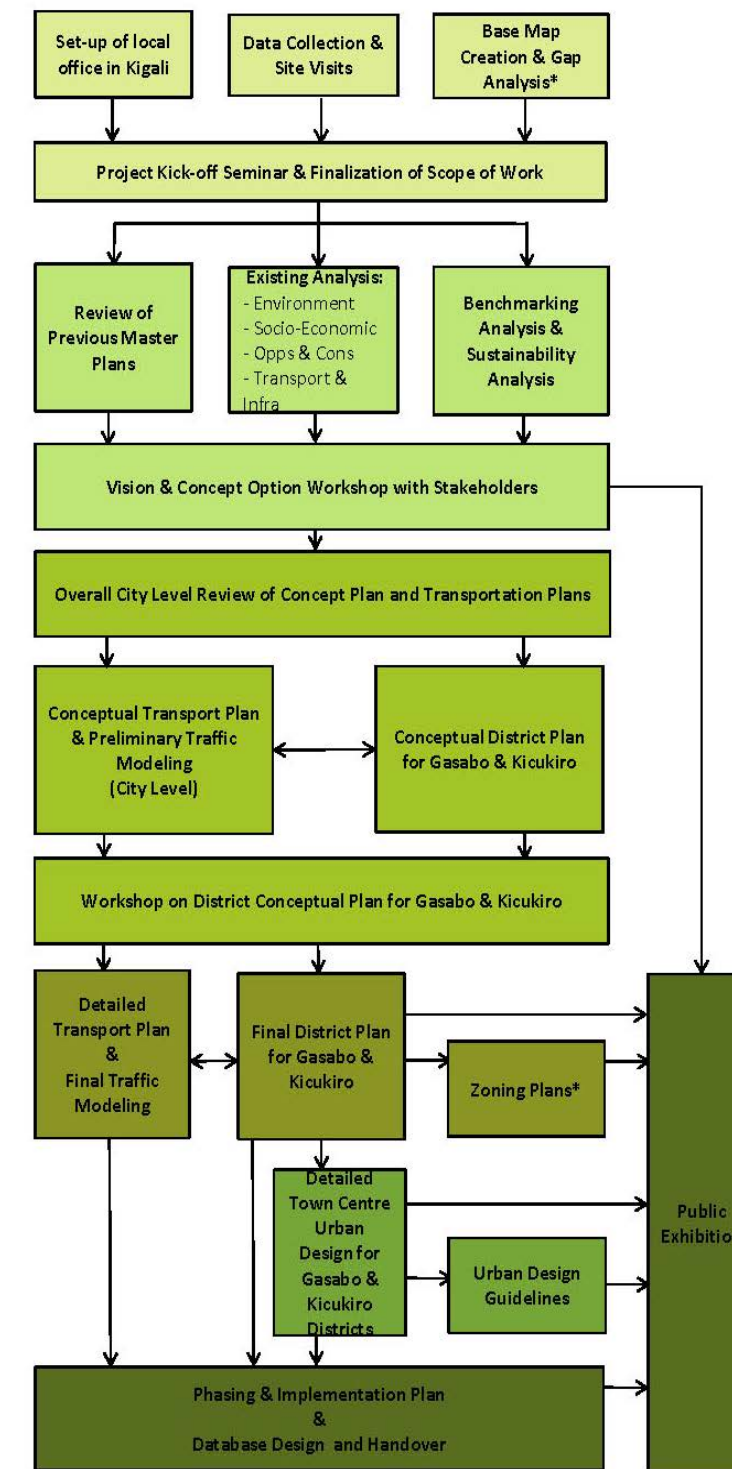
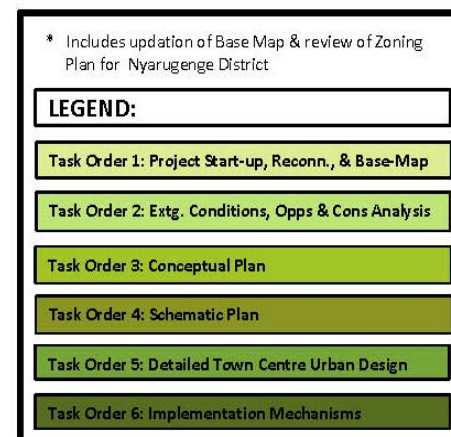
- Benchmarking with international best practices in city planning and management, determining the future growth scenario, and setting the development vision and the strategic growth direction for the city.
- Development of a conceptual transportation Master Plan, infrastructure plan & environmental management strategy for the entire city.
- Mapping out implementation process to direct the implementation process.
- Putting in place an integrated Land Use data management system which incorporates the base map, the Master Plan and planning approval process.

The planning process adopted for this project is further illustrated in the following chart:

PROJECT DELIVERABLES

Various reports, corresponding to the various task orders are to be submitted, which include:

- Task Order 1:
- Inception Report
- Task Order 2:
- Analysis, benchmarking and Visioning Report
- Task Order 3:
- Conceptual Transportation Plan report



- Task Order 4:
- Final Transportation Plan report
 - Final Gasabo Master Plan report
 - Final Kicukiro Master Plan report
 - Gasabo Zoning booklet
 - Kicukiro Zoning booklet
- Task Order 5:
- Gasabo Town Centre Urban Design report
 - Kicukiro Town Centre Urban Design Report
 - Gasabo Town Centre Zoning booklet
 - Kicukiro Town Centre Zoning booklet
- Task Order 6:
- Implementation report

In addition to the above reports, various marketing and promotional materials to illustrate the Master Plan would also be prepared for the public exhibition. A Geodatabase, incorporating the existing Land Use map, the proposed Land Use plan & the development control information would be submitted at the completion of the project.

STAKEHOLDERS’ PARTICIPATION & CAPACITY BUILDING

A key component of the project would be to ensure adequate participation in the planning process from various stakeholders such as decision-makers from public and private sectors, focus groups, community organizations and various public interest groups. Accordingly numerous meetings, seminars and workshops are to be conducted at all stages of the project. A public exhibition of the Master Plan will be undertaken at the end of the project with an objective to launch the Master Plan.

In addition a communication plan, executed through various print, broadcasting & online media would ensure participation and feedback from the wider public.

This comprehensive city wide plan, incorporating the detailed physical plans of the two districts as well as all the past planning initiatives would become the long term development framework for Kigali City, guiding it into an era of progressive and holistic city development.

1

INTRODUCTION

REPORT BACKGROUND AND PURPOSE

Previously in Task Order 3, the vision and goals for Kigali were established and the Broad Land Use for the city was developed.

This current report, Task Order 4, covers the development of the detailed Land Use plans, and zoning plans for the two districts. Detailed Master Plan for both Gasabo and Kicukiro Districts and the zoning plan are integrated into this 4th task order report.

The purpose of this report involves further development of the Concept Plan and Broad Land Use by defining the detailed Land Use distribution, developing the urban node hierarchy, rationalizing the transportation and infrastructure systems as well as identifying the environmental management strategies for the Gasabo District. A detailed zoning plan is also prepared for the district.

METHODOLOGY

The Detailed Master Plan Report translates the Concept Plan, the Transportation and Infrastructure plans into detailed physical plans for the District as well as for individual planning areas. The Detailed physical plans are based on the following considerations:

DETAILED SITE ANALYSIS:

- In order to do a detailed site analysis, the District was divided into planning areas. The planning areas are formed based on sector boundaries, existing development trends, & geographical affinity. At planning area level analysis of existing Land Use was conducted to ensure no downsizing of existing developments pattern and to protect developments of historical and cultural importance, environment
- Constraints and opportunities analysis is conducted at individual planning area level to understand current development

patterns and trends, and identify opportunities for holistic and sustainable developments.

CONSIDERATION OF EXISTING PLANS:

- Apart from existing site analysis, existing plans for the area such as sub-area plans, transportation and infrastructure plan are studied and adapted into the detail physical plans. Similarly, all approved and on-going projects were captured and incorporated in the plan.

APPLICATION OF TOWNSHIP MODEL:

- The proposed township model has been adapted based on local conditions of each individual planning area.
- The principles of the township development such as road hierarchy and spacing, residential density, commercial corridors and facilities distribution have been applied in the detail physical planning. Regardless of how the model will be modified or adapted.

CADASTRAL LEVEL PLANNING:

- The final consideration of detailed physical plan is the cadastral level planning where existing alignments are identified, existing site features preserved, and infrastructure is planned, so as to minimize impacts on private properties.

ORGANIZATION OF THE REPORT

In addition to the Introduction chapter, the report consists of the following chapters:

CHAPTER 2: GASABO DISTRICT - CONTEXT OPPORTUNITIES & CONSTRAINTS

The key objectives of this section are to present an in-depth analysis of the existing Land Use of the district, the socioeconomic and historic context and also identify the major constraints and opportunities that the district has to offer. Detailed planning

area boundaries are also explained.

CHAPTER 3: GASABO DISTRICT - PROPOSE MASTER PLAN

The chapter further summarizes the future outlook for the district through projected economic and socio-demographic growth. It focuses on the role for Gasabo Districts according to the overall city vision. The proposed conceptual structure plan and broad Land Use strategies along with the key features and connectivity are elaborated in detail for this district.

This section highlights the strategies adopted to maximise the development potential on the very limited buildable land in the district. A detailed Land Use Plan for the horizon of 2025 and Year X are presented here. The percentage of land allotted for each development type is shown in a table.

The density distribution plan recommends different urban densities to address current structural differences in the density distribution. Further to this, proposed organized typical township model with comprehensive facilities are explained in detail in context to the district. These townships aim to not only accommodate the high case projected population but also infuse better quality of life. The total number of townships, area, population and employment distribution in each town is discussed in detail. The Planning areas defined for the purpose of planning is also explained in detail.

The subsequent sections presents the various detailed plans explaining the key sectors:

- **Commercial Plan**
- **Residential Plan**
- **Industrial Plan**
- **Facilities Plan & Education Plan**

- **Green & Blue Plan**
- **Transportation Plan**
- **Infrastructure Plan**

The Chapter explains strategies to develop a vibrant and prosperous district that consolidates business and provides industrial services. It takes a closer look at the existing service sector and the established commercial nodes and upcoming commercial areas. In order to expand the employment and commercial base according to the future economic outlook, a decentralized Commercial Plan is proposed with a hierarchy of commercial centres distributed around the district. The Strategic locations of each commercial centre, the employment scale, supportive facilities like retail, recreation and residential layouts are discussed in detail.

The proposed Commercial plan 2025 illustrates phasing of commercial nodes in order to strengthen existing commercial centres in the district and propose new potential areas for commercial growth as well as redevelopment.

The chapter also focuses on the industrial sector which is expected to be a major employer in the overall city. In line with the Concept Plan positioning for the district, the proposed Industrial Plan allocates and safeguards land for this sectoral growth. Detailed industrial types and employment generated is discussed in detail.

The proposed Residential Plan Year X, clearly lists housing typologies, their density distribution and location. For the intermediate 2025 Housing Plan, various upcoming residential developments and new proposed residential developments are highlighted. The Structure Plan presents basic and specialized facilities that are necessary to achieve quality life.

The chapter also examines the existing environmental issues and challenges, natural wetlands and the diminishing forest cover in particular. The Various environment conservation strategies to protect waterways, wetlands, forests and slope management are enunciated in detail. The district's green and blue plan clearly defines the City's ambitious plan to mark itself as tourist and adventure friendly city. It describes the various destinations, attractions and parks as per the structured hierarchy and the phasing of these landscape projects as per the intermediate 2025 green and blue plan.

In addition to the Transportation Master Plan Report for the city which provides an in-depth transportation analysis and proposal for the city, a summary of the proposed Transport Plan for the year 2025 and Year X for the district is explained. It underlines the transportation proposal addressing the following:

- Road Network Plan
- Public Transit Plan
- Non Motorized Transit Plan
- Typical Road Sections

It also identifies water and energy resources for the city and develops infrastructure facilities for each district. The chapter discusses the existing condition of water supply, sewer, storm water and power supply in detail. It further explains the key issues that arise from expanding the current infrastructure network for the projected population by the Year X.

Topography and natural constraints make service distribution and planning unique to the district. The existing supply and network is inadequate, hence the district has to prepare extensively to cater for the projected population. Different strategies approached for water demand management, distribution and potential

water resources are defined clearly within the chapter. Sustainable approaches to sewer treatment and storm water management are also discussed in detail. Due to increasing demand for energy, the chapter explains alternative power supply and ways to reducing demand e.g. through efficient grid systems. The chapter provides a detailed network plans for the various infrastructures to be developed in the district.

CHAPTER 4-12: DETAILED MASTER PLAN FOR THE PLANNING AREAS

This chapter takes a focused look into each planning area consisting of a few administrative sectors for each district. An in-depth analysis of the existing context of each planning area is carried out, and detailed constraints and opportunities for each area are identified.

Development proposals capturing stakeholder's opinions for each Planning Area have been prepared. These approved projects are incorporated in the new proposed plan. The detailed plan is developed based on the existing cadastral parcels of the city as well as the existing road layout.

Key features for each planning area are identified to create a distinct identity for each area.

CHAPTER 13 : WAY FORWARD

This chapter discusses the upcoming steps and explains subsequent deliverables of the project.

2

GASABO DISTRICT - CONTEXT, OPPORTUNITIES AND CONSTRAINTS

This chapter presents an overview of the context, existing conditions as well as the opportunities and constraints for Gasabo District; which form the basis for the detailed Master Plan.

The detailed context, opportunities and constraints for Individual planning areas of the District will be discussed in Chapters 4-12.

2.1 Existing Context

In 2005 the City of Kigali expanded its municipal limits by about 10 times to 731.24 sq km. This led to the inclusion of large rural and agrarian land¹. Kigali city comprises of three Districts Nyarugenge, Kicukiro and Gasabo. Gasabo is the largest of all of the Districts, divided into 15 sectors with a total area covering 429.3 sq km, this is approximately 60% of the total area of Kigali city.

Refer to Table 2.1 to for sector wise land area and existing population² distribution for the Gasabo District.

2.1.1 LOCATION AND CONNECTIVITY

The Gasabo District forms the northern region of the city of Kigali. It is bounded by Lake Muhazi, Gicumbi and Rulindo Districts to the north. Kicukiro and Nyarugenge District border it to the south. To the east and west side it is bounded by Rwamagana and Rulindo Districts respectively.

The existing international airport lies to the south of the Gasabo District, in Kicukiro District. The proposed international airport at Bugesera is approximately 30 Km south of the Gasabo District.

The urban sectors of Gasabo i.e., Kacyiru,

Kimihurura and Kimironko sector have an extensive road network of both paved and unpaved roads. The rest of District is largely rural and has mostly unpaved roads which are sparsely connected.

Major connections to Gasabo includes Vers Kibungo, which provides east west connectivity at the southern edge of Gasabo. The connection further extends to the neighboring cities of Rwamagana to the east and Butare to the west. This also connects the District to the neighboring countries of Tanzania to the east and DRC/Burundi to the west. Another important highway along the Nyabugogo river runs north-south in the District a connecting the District to the CBD in Muhima to the south and further north to the neighboring city of Byumba. The highway also connects the District to the neighboring country of Uganda.

Gasabo District's location and connectivity are illustrated in Fig.2.1

Table 2.1 Gasabo District - Sector Size and Population

SR NO.	SECTOR NAME	AREA (HA)	POPULATION (2012)
1	BUMBOGO	477.60	29,000
2	GATSATA	120.98	34,000
3	GIKOMERO	106.67	44,000
4	GISOZI	342.30	40,000
5	JABANA	307.17	33,000
6	JALI	158.17	30,000
7	KACYIRU	239.65	54,000
8	KIMIHURURA	232.83	37,000
9	KIMIRONKO	668.00	65,000
10	KINYINYA	1166.50	41,000
11	NDERA	1290.49	37,000
12	NDUBA	300.50	25,000
13	REMERA	320.54	43,000
14	RUSORORO	1275.57	43,000
15	RUTUNGA	222.06	22,000

Source: KCMP Report, 2007

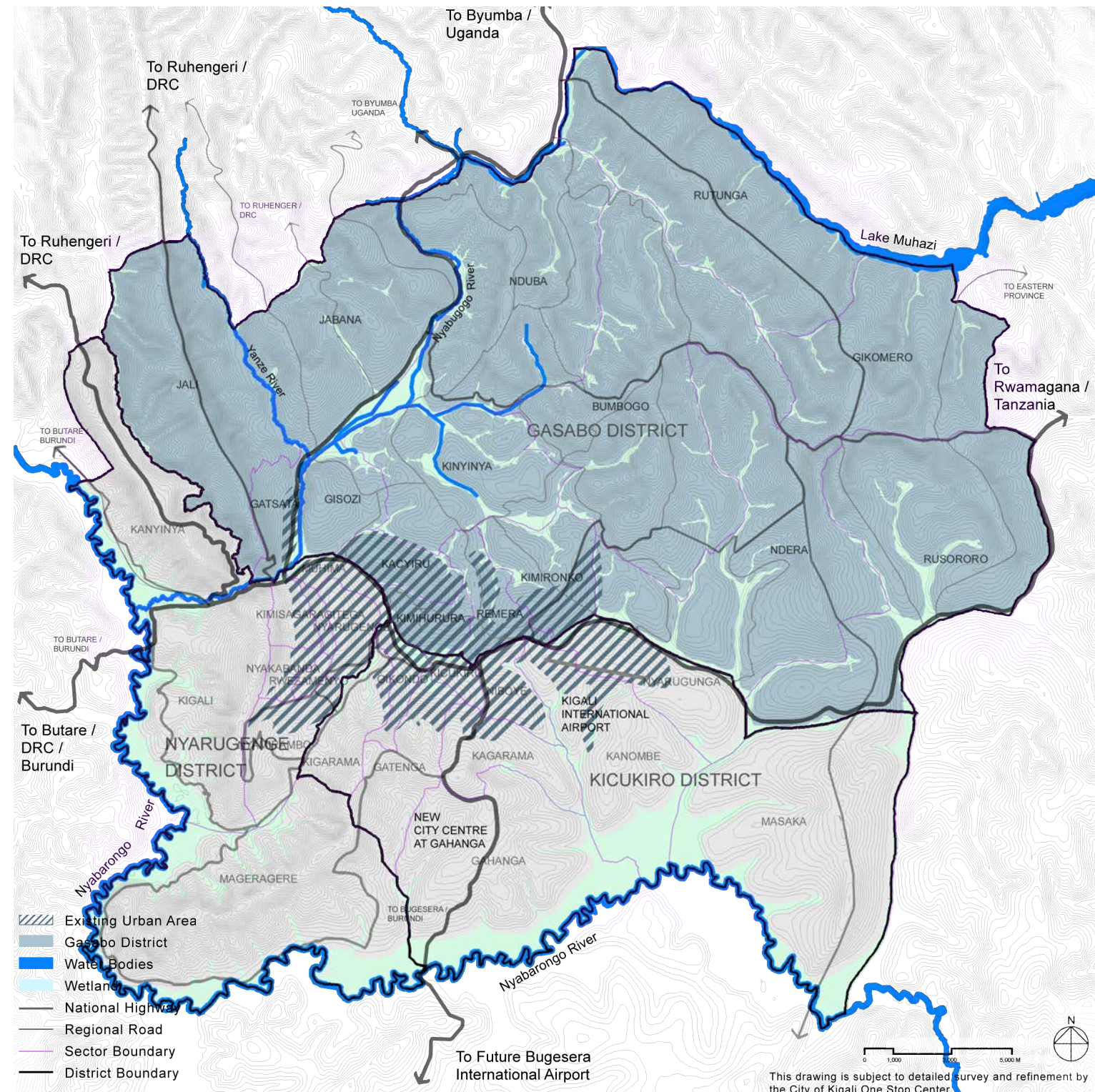


Fig.2.1 Gasabo District- Location and Connectivity

2.1.2 HISTORICAL CONTEXT

Initially founded as a colonial German settlement, Kigali has grown from a modest population of 6000 people to become a major city with a population of more than 1.6 mill people¹. While the historic centre of Nyarugenge remains its commercial centre, Gasabo has developed into the administrative centre for the whole nation. Kacyiru and Kimihurura sector of Gasabo house the Parliament of Rwanda and most of the important ministries in the country. The key diplomatic areas and embassies are also located in Gasabo. The presence of the administrative areas has fueled development in surrounding sectors of Remera and Kimironko.

The existing land utilisation map is illustrated in Fig.2.2

2.1.3 EXISTING SITE CONDITIONS

Approximately 40% of the total population of Kigali City today resides in the urban and rural areas of the Gasabo District. Large, Urbanized areas of Kigali City lie within the Gasabo District.

The District has an overall population of approximately 500,000 people² with 40% of the people living in urban areas of the District. A large number of residents living in urban areas live in low density unplanned areas. As urbanization becomes more rapid, demand for good quality residential and commercial developments is also increasing in the Gasabo District. Urban sectors of Gasabo like Remera and Kimironko, located around the traditional core of the city are facing relatively higher development pressure due to their good connectivity and existing facilities. Similarly the neighboring sectors of Kinyinya, Gatsata and Gisozi

1 KCMP, 2007

2 Kigali city development plan, 2008

are also witnessing development pressure with a number of residential projects in the pipeline.

With new projects like Free Trade Zone, development is also spreading to Ndera and Rusuroro sectors. The rural sectors of Gasabo are largely dominated by agricultural activity and small clusters of residential developments.

The key approved projects in Gasabo District are as follows:

- Muhazi lake front project, Rutunga-Gikomero.
- Mixed use development, Gisozi.
- Kinyinya sub area plan, Kinyinya.
- Kinyinya Master Plan, Kinyinya.
- Vision City Master Plan, Kinyinya
- Century park residential project.
- Kimihurura sub area plan, Kimihurura.
- Free trade zone phase 1&2, Ndera and Bumbogo.
- Cyaruzinge housing project, Ndera.
- Nyagahinga Housing project, Rusuroro.

With limited area for development, the infrastructure and development must be carefully planned and implemented as to achieve the necessary density.

The existing Land Use and context Plan are illustrated in Fig.2.3 and Table 2.2

2.1.4 Socio - ECONOMIC CONTEXT

Assuming a 5.45 %growth rate per annum³, the population of Gasabo District is projected to be approximately 0.57 million people in the year 2013.

The population density of each sector varies considerably, Kacyiru and Kimihurura have the highest population density of approximately 390 people/ha. The ratio of males to females is 1.03 males/female in Gasabo District. However under the age

3 KCMP, 2007

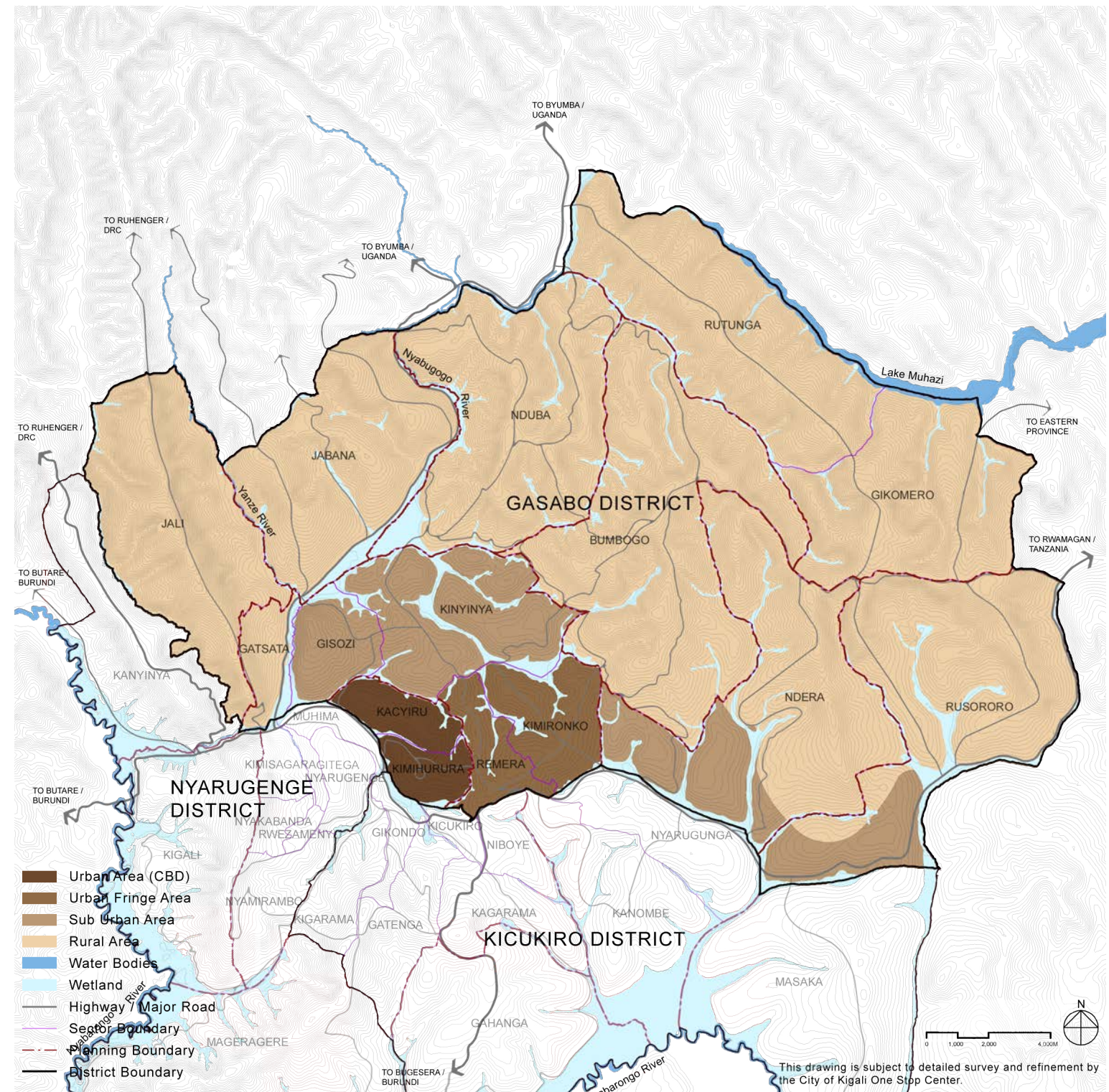


Fig.2.2 Gasabo District - Existing Land Urbanization Map

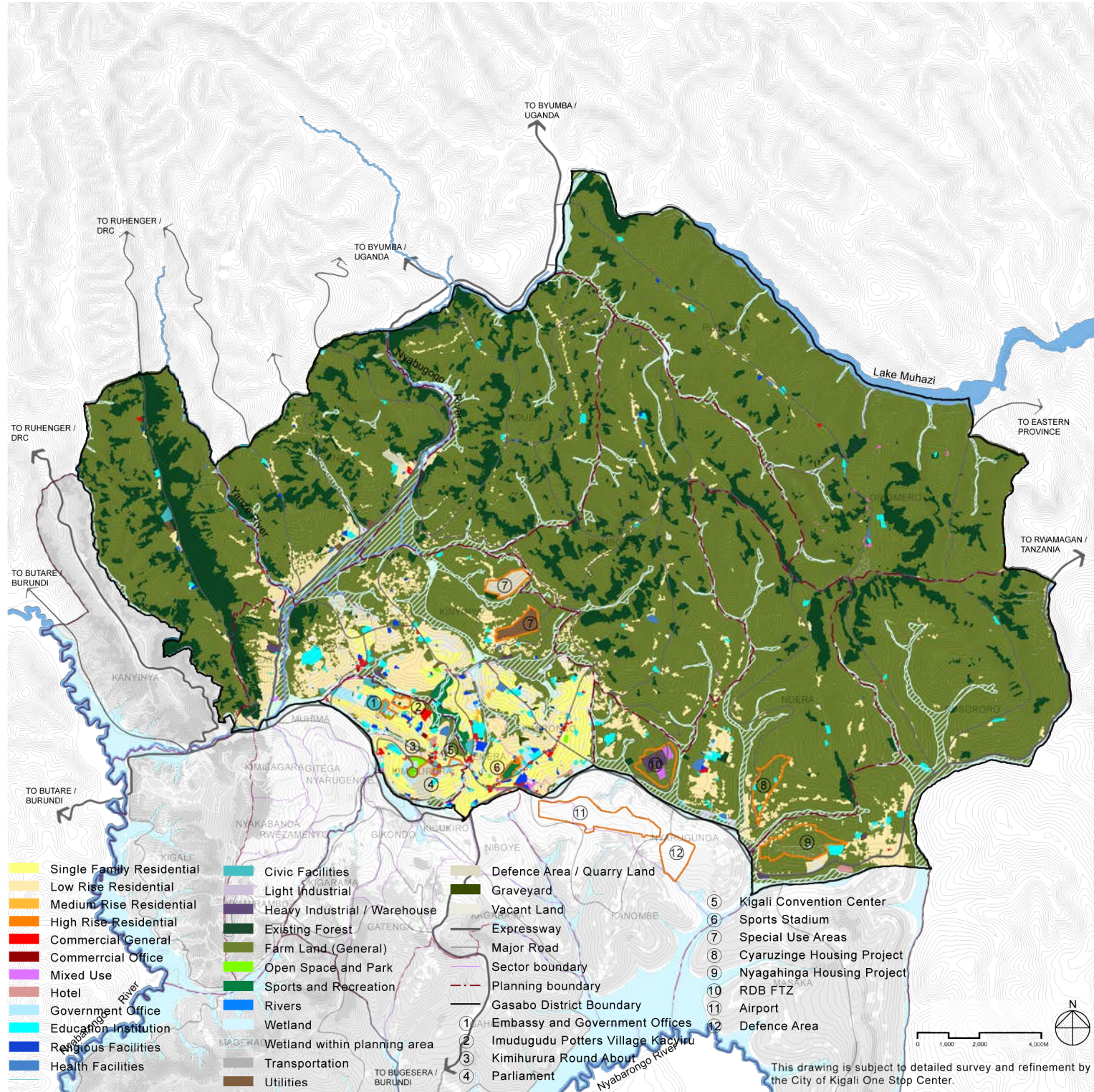


Fig.2.3 Gasabo District- Existing Land Use and Context Map

Table 2.2 Gasabo District- Existing Land Use Distribution

BROAD LAND USE	DETAIL LAND USE	AREA(HA)	TOTAL AREA (HA)
RESIDENTIAL	SINGLE FAMILY RESIDENTIAL	908	3110
	LOW RISE RESIDENTIAL	2187	
	MEDIUM RISE RESIDENTIAL	15	
COMMERCIAL	COMMERCIAL OFFICE	6	110
	COMMERCIAL GENERAL	76	
	HOTEL	28	
MIXED USE	MIXED USE	13	13
PUBLIC FACILITIES	GOVERNMENT OFFICE	85	614
	EDUCATIONAL	322	
	RELIGIOUS FACILITIES	72	
	HEALTH FACILITIES	61	
	CIVIC FACILITIES	74	
INDUSTRIES	LIGHT INDUSTRIAL	31	138
	HEAVY INDUSTRIAL	107	
NATURE AREA	EXISTING FOREST	4890	5382
	WETLAND	492	
AGRICULTURE	FARMLAND	28188	31683
	PLANTATION	3495	
OPEN SPACE	OPEN SPACE AND PARK	31	151
	SPORTS AND RECREATION	120	
WATER BODIES	RIVERS	32	32
INFRASTRUCTURE	TRANSPORTATION	900	992
	UTILITIES	92	
SPECIAL USE/RESTRICTED AREA/ UNCLASSIFIED	DEFENCE AREA	131	669
	QUARRY LAND	81	
	GRAVEYARD	7	
	VACANT LAND	450	
	TOTAL	43000	43000

- Expressway
- Major Road
- Sector boundary
- Planning boundary
- Gasabo District Boundary
- Embassy and Government Offices
- Imudugudu Potters Village Kacyiru
- Kimihurura Round About
- Kigali Convention Center
- Sports Stadium
- Special Use Areas
- Cyaruzinge Housing Project
- Nyagahinga Housing Project
- RDB FTZ
- Airport
- Defence Area

of 15, females dominate males in terms of population. This is mainly due to the rural to urban migration. Overall 70% of the residents of Gasabo District are below the age of 45¹.

The working population of District is between 10 years old and 65 years old.

Approximately 90% of the working population of Gasabo is engaged in rural agriculture and the majority of the urban population is involved in the service sector². The distribution of primary education facilities is relatively good in urban areas, however there is shortage of secondary and tertiary education facilities. The provision of education facilities are lacking in the rural areas. 60 primary and 21 secondary education facilities are present in the District as compared to only 5 higher education facilities and only 2 vocational institutions.

1 CDP, Gasabo District, 2006

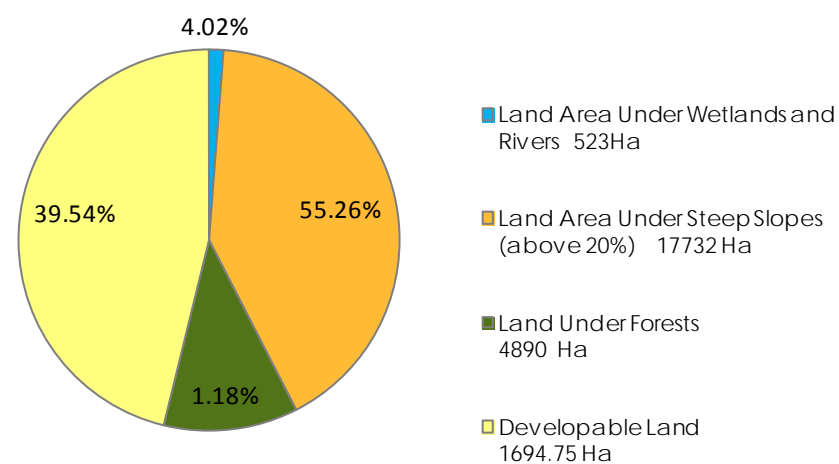


Fig.2.4 Gasabo District - natural context

2.1.5 NATURAL CONTEXT

Gasabo District is the largest of all the Districts of Kigali City. The Northern part of the Gasabo District has steep undulating terrain, 40% of the land has slopes above 20%. Approximately 6% of the land has steep slopes above 40% .

The Southern sectors of the District offer relatively flatter terrain which is more suitable for large scale urban development. 7% of land within the District is delineated as wetlands by Rwanda Environmental Management Authority (REMA). The wetlands divide the land into smaller parcels suitable for developments. Provisions of sustainable and an efficient road and infrastructure network across the wetlands and steep slopes is challenging.

Apart from the wetlands there is a large network of natural storm water drainage channels, which also need to be protected. Additional drainage channels need to be

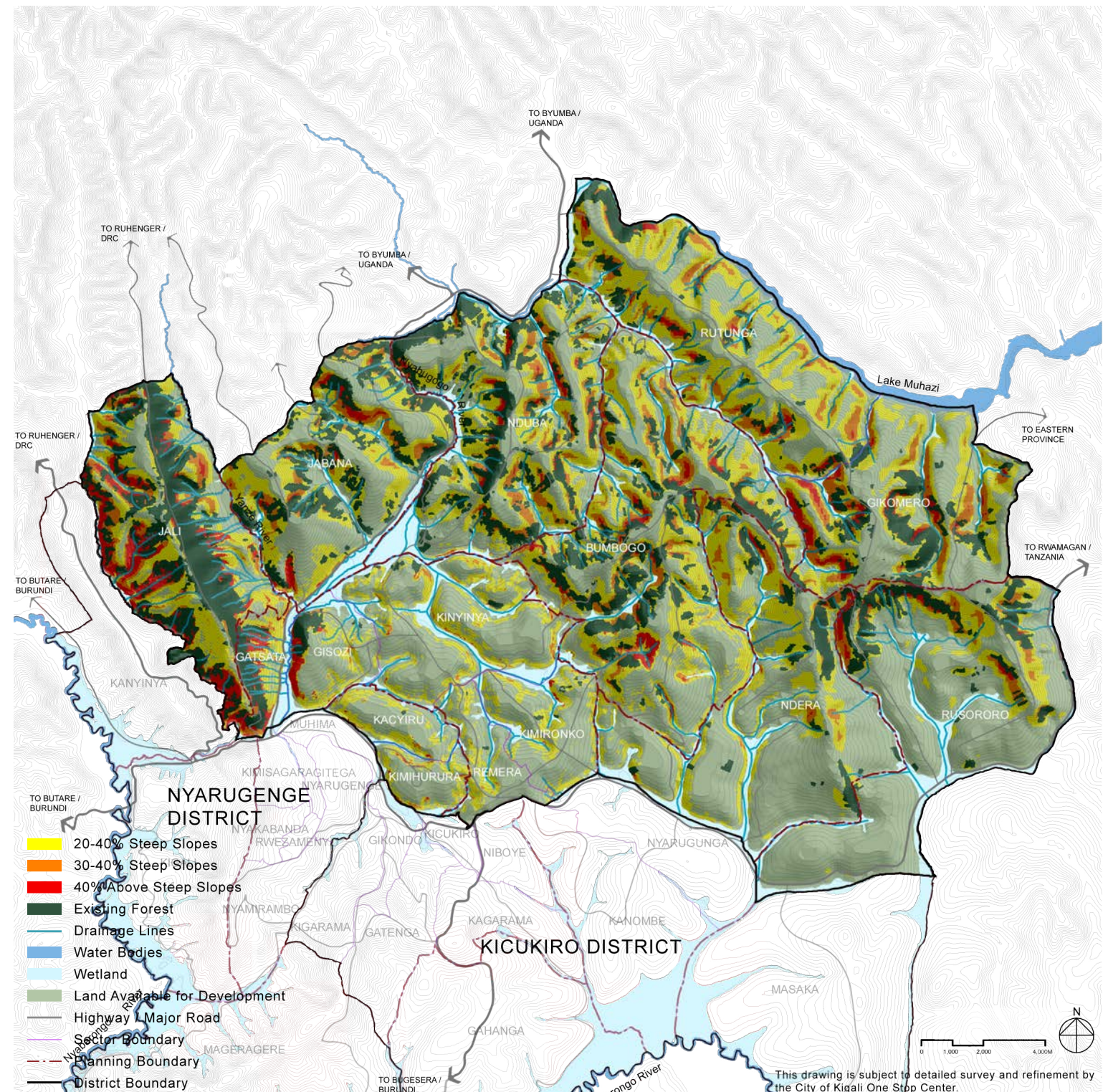


Fig.2.5 Gasabo District- Land Under Natural Constraints

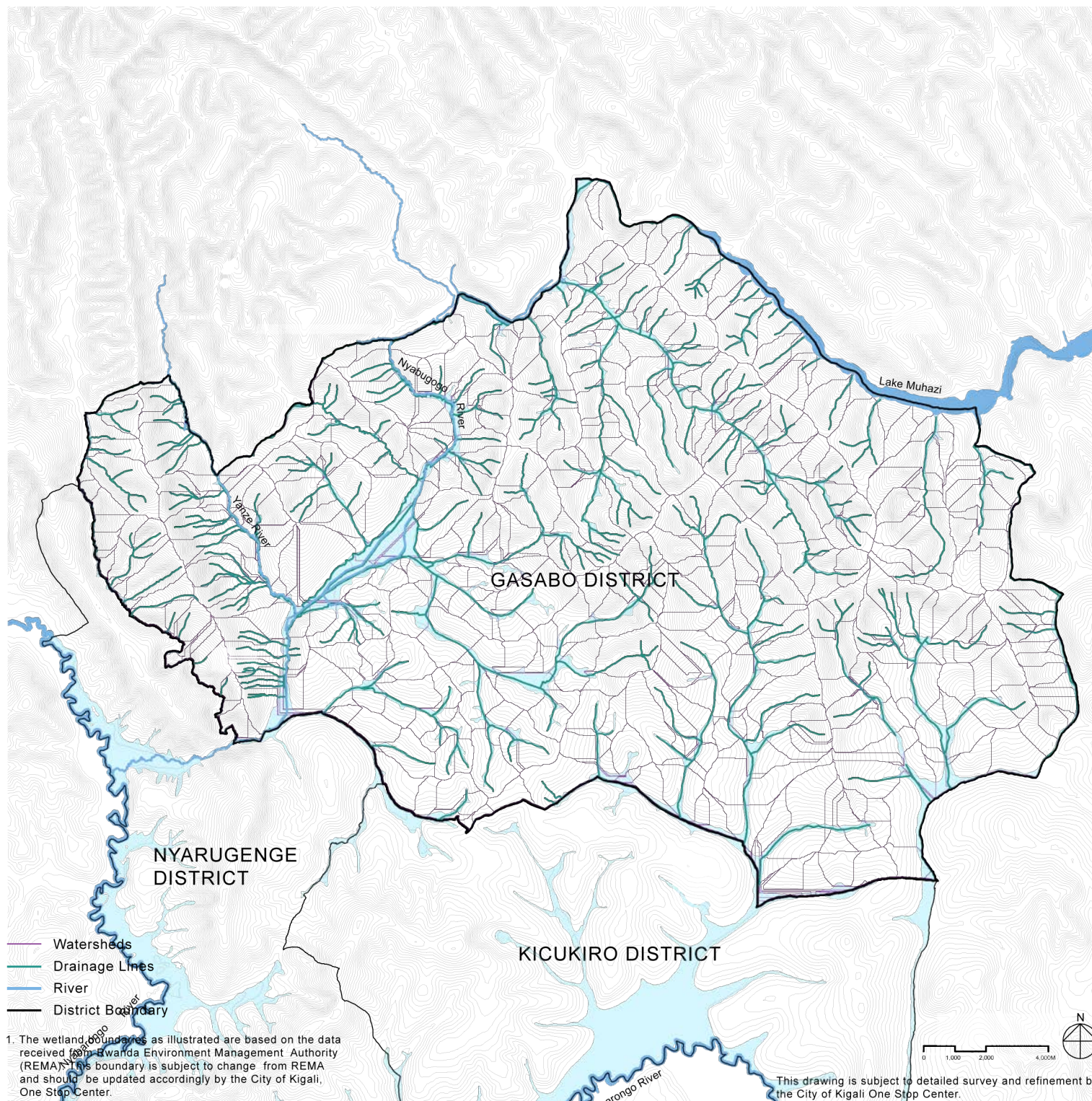


Fig.2.6 Gasabo District- Water Shed, Drainage Network, Wetlands, Rivers and Lakes.

provided to effectively manage the storm water in the District. Other Water bodies like Lake Muhazi also need to be protected against encroachment so as to protect the quality of water in the lake from population.

About 46% of the steep slopes in the District are covered with forests. Large areas of land with steep slopes above 40 % also need to be protected against environmental degradation and development.

The land under natural constraints is illustrated in Fig.2.4

2.1.6 ENVIRONMENTAL CONTEXT

Large parts of Gasabo are not developed and have many natural features such as hills, forests, wetlands and watershed. However these areas are also being utilized for agricultural purposes. A constant balance between agricultural land and nature areas needs to be established.

Some of the key issues regarding the environment management for Gasabo District are as follows:

- Loss of flora and fauna.
- Soil erosion.
- Wetland encroachment.
- Watershed protection.

Lack of management of the natural features compounded with the Rapid urbanization could lead to environmental degradation of Gasabo. These key issues need urgent and timely review.

The water shed, drainage lines, Wetlands, rivers and lakes for Gasabo District are illustrated in Fig.2.6

2.2 Review of Sub Area Plans from Kigali City Master Plan (2007)

The City has undertaken several local area specific planning studies in the last few years, most of which are completed and need to be integrated into the new City Concept Plan. The key proposals in Gasabo District include Sub Area proposals (2010) in Kinyinya and Kimihurura as indicated in Fig.2.7.

2.2.1 KINYINYA SUB AREA PROPOSAL

Kinyinya Sub Area Proposal has the following key aspects:

- **DEVELOPMENT DIRECTION:** It is one of the two urban centers in the fastest growing areas proposed in Gasabo District, as a model of future Town Center development in the District.
- **DEVELOPMENT DENSITY & ENVIRONMENTAL CONSIDERATIONS** - The Plan consolidates a strong District town center focal point and sense of place for proposed development of almost 180,000 population in the immediate area and close to 400,000 population in the market area. Ten additional residential/mixed use neighborhoods house up to 30,000 residents. Kinyinya becomes part of the larger City-wide system of open space, allowing residents to navigate across the wetland of the region and ensuring that nature is an inherent element of the Sub Area.
- **ORGANIZING ELEMENT FOR SURROUNDING NEIGHBOURHOODS:** There are 11 Neighborhoods in Kinyinya: 9 basic ones, and 2 Urban Neighborhoods. Each Neighborhood is centered around its own core, the Neighborhood Center

The Kinyinya development program includes the following development zones:

- High Density Mixed-Use Commercial/Retail/Office/Residential- Retail includes both Class A and Production Retail, Office includes both Class A and Cooperative/Multi Tenant
- High Density Residential
- Medium-High Density Residential
- Medium-Low Density Residential
- Neighborhood Centers
- Civic Uses - Schools (Primary, Secondary, Higher Education), Government and Non Governmental Agencies (NGOs), District Library, Museum, Performing Arts Center, Recreation Center, Transit Centres.

ISSUES TO BE REVIEWED AND INCORPORATED IN THE NEW CONCEPT PLAN

- **POPULATION GROWTH AND DENSITY** - Growth is faster than projected. Considering the Rwanda population projection and urbanization scenarios, the population projection for Kigali has been revised to be able to accommodate 5 million instead of 3 million projected earlier. There is a need to redefine high and medium densities. The development potential of the site needs to be capitalized for much higher density.
- **EXISTING CADASTRAL** - There is a need to contextualize the proposal based on existing road and cadastral alignments.
- **SINGLE FAMILY RESIDENTIAL** - Allow for single family residential developments keeping in mind current development trends.
- **WETLAND PROTECTION** - Relocate facilities and developments from the area delineated as wetlands (REMA)
- **TRANSIT SYSTEM AND TRANSIT CORRIDOR:** Kinyinya needs to be supported with good transit system in the future to ensure that majority of the population will be served by public transit that will minimize the traffic volume on the road.
- Civic uses such as Government and Non government agencies could be strengthened around existing civic nodes at Kimihurura and Kacyiru.



Fig.2.8 Kinyinya Township & Town Centre - Views

Source: Kigali Sub Area Plans, Schematic Planning; Oz architecture.era.edaw.tetrattech.winston associates-December 2010

Mixed Use Zones	Residential Zones	Hotel Zones
High Density	High Density	High Density/Conference Centre
Medium Density	Medium Density	Medium Density
Neighbourhood Centre	Medium Low Density	Low Density (Eco-Tourism/)

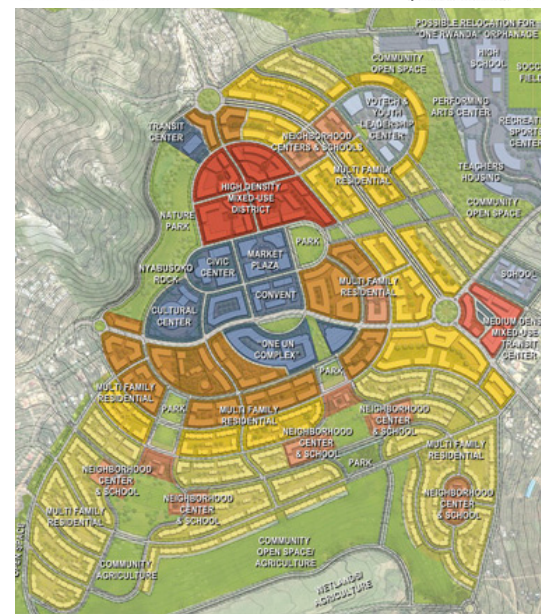


Fig.2.9 Kinyinya Township & Town Centre (205 Ha)

Source: Kigali Sub Area Plans, Schematic Planning; Oz architecture.era.edaw.tetrattech.winston associates-December 2010

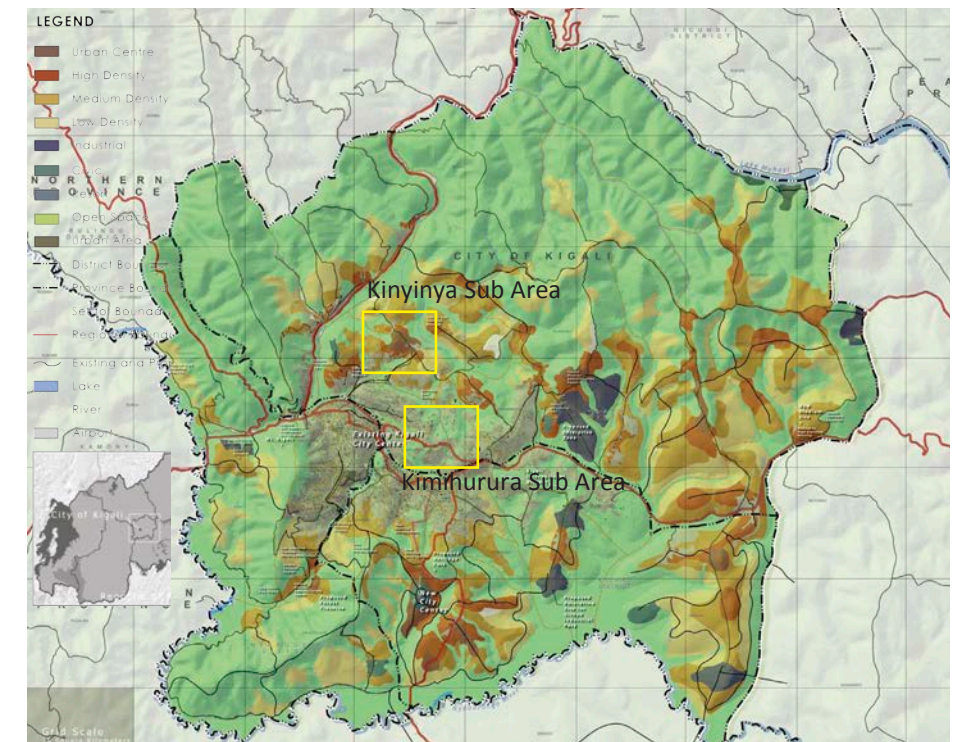


Fig.2.7 Kigali City Master Plan, Rwanda - November 2007



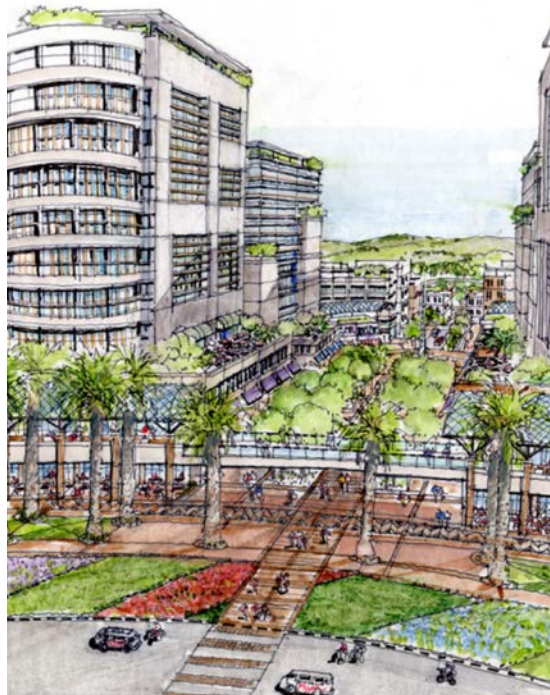


Fig.2.10 Kimihurura Sub Area Views

Source: Kigali Sub Area Plans, Schematic Planning; Oz architecture.era.edaw.tetrattech.winston associates-December 2010



Mixed Use Zones	Residential Zones	Hotel Zones	
High Density	High Density	High Density/Conference Centre	Civic
Medium Density	Medium Density	Medium Density	Educational
Neighbourhood Centre	Medium Low Density	Low Density (Eco-Tourism/)	Open Space



Fig.2.11 Kimihurura Sub Area (89 Ha)

Source: Kigali Sub Area Plans, Schematic Planning; Oz architecture.era.edaw.tetrattech.winston associates-December 2010



2.2.2 KIMIHURURA SUB AREA PROPOSAL

Kimihurura Sub Area Proposal has the following key aspects:

- **DEVELOPMENT DIRECTION :** The Sub Area is envisioned to be a Gateway to the City from the Kigali International Airport and an extremely important symbolic urban space for the “new Rwanda” The Kimihurura Sub Area is centrally located within one of the most highly developed areas of Kigali and is surrounded by important existing and proposed urban elements. These include Government of Rwanda Ministries, Parliament and Agencies. In addition, the new Kigali Conference Center and Hotel, located adjacent to the Sub Area site, will anchor Kimihurura development and position it as an iconic Kigali location
- **BUILDING ON IMPORTANT EXISTING FABRIC :** It comprises intensive development that balances and strengthens the existing fabric of the area
- The Kimihurura Roundabout is featured in the plan as a celebratory space, reflecting its heritage as a key location in Kigali
- **Open Space and Greenway Zone-** In Kimihurura, the Open space/ Greenway Zone includes the Kimihurura Roundabout, two major circular parks, the linear park in the Hotel zone, a smaller residential park, a small urban park in the mixed-use commercial zone and school play yards. These are all linked in a seamless network by pedestrian/ bikeways adjacent to roads through the Sub Area. In addition, the internal Greenway links to the north and south to Kigali wetlands which shall also be preserved as Open Space

The Kimihurura development Framework includes the following uses in the Sub Area:

- Open Space/Greenway Zone
- Mixed Use High Density Commercial/ Retail/Office
- Medium High Density Residential

- Medium Low Density Residential
- Medium Density Hotel
- Low Density Hotel
- Primary School

ISSUES TO BE REVIEWED AND INCORPORATED IN THE NEW CONCEPT PLAN

- **POPULATION GROWTH AND DENSITY :** The population projection for Kigali has been revised to accommodate 5 million instead of 3 million projected earlier. High and medium densities need to be redefined and untapped “Location Potential” needs to be capitalized for much higher density (i.e. 15 – 20 Stories or more)
- **REDEVELOPMENT OF EXISTING URBAN AREA:** There is a need to provide for additional commercial keeping in the mind the strategic location of the site.
- **TRANSIT SYSTEM AND TRANSIT CORRIDOR:** Kimiruhura needs to be supported with good transit system in the future to ensure that majority of the population will be served by public transit that will minimize the traffic volume on the road.
- **EXISTING CADASTRAL** - There is a need to contextualize the proposal based on existing road alignments.

These plans will be integrated in the City Master Plan and adjusted to comply with the existing cadastral data, the slopes and other existing constraints. There are also many developments and projects that have been approved for development which will be captured and accommodated in line the new city Master Plan.

2.3 Gasabo District- Constraints and Opportunities

2.3.1 CONSTRAINTS

Constraints identified within Gasabo District are based on existing context analysis. The key constraints are as follows:

- Existing developments in urban areas are low density, resulting in under utilization of the city's infrastructure provisions.
- Existing good quality single family residential developments, need to be retained. This constrain's higher density residential developments in core areas of the District.
- Low density approved projects occupy large areas of relatively flat developable land. This constrain's high density developments in key areas of the District.
- Large areas of relatively flat developable lands are being utilized for special uses in the District which need to be retained.
- Northern sectors of the District have large quantum of relatively steep undulating terrain (slopes above 20%), a constrain for provisions of large scale residential and commercial developments.
- The wetlands divide the District into

smaller areas surrounded by steep slopes. The steep slopes along the wetlands are a constrain for the provision of a sustainable and efficient infrastructure and transport network..

- Large areas of the wetlands are currently being utilized for residential, industrial, agriculture and other uses, and need to be relocated to safeguard the wetlands and safeguard a clear passage for the storm water drainage.
- The steep slopes (slope above 20%) in the urban areas of the District restrict high density developments.
- Steep slopes (slope above 40%) in both urban and rural areas need to be protected, (approximately 7% of the total land area of the District).

The above constraints are illustrated in Fig.2.122

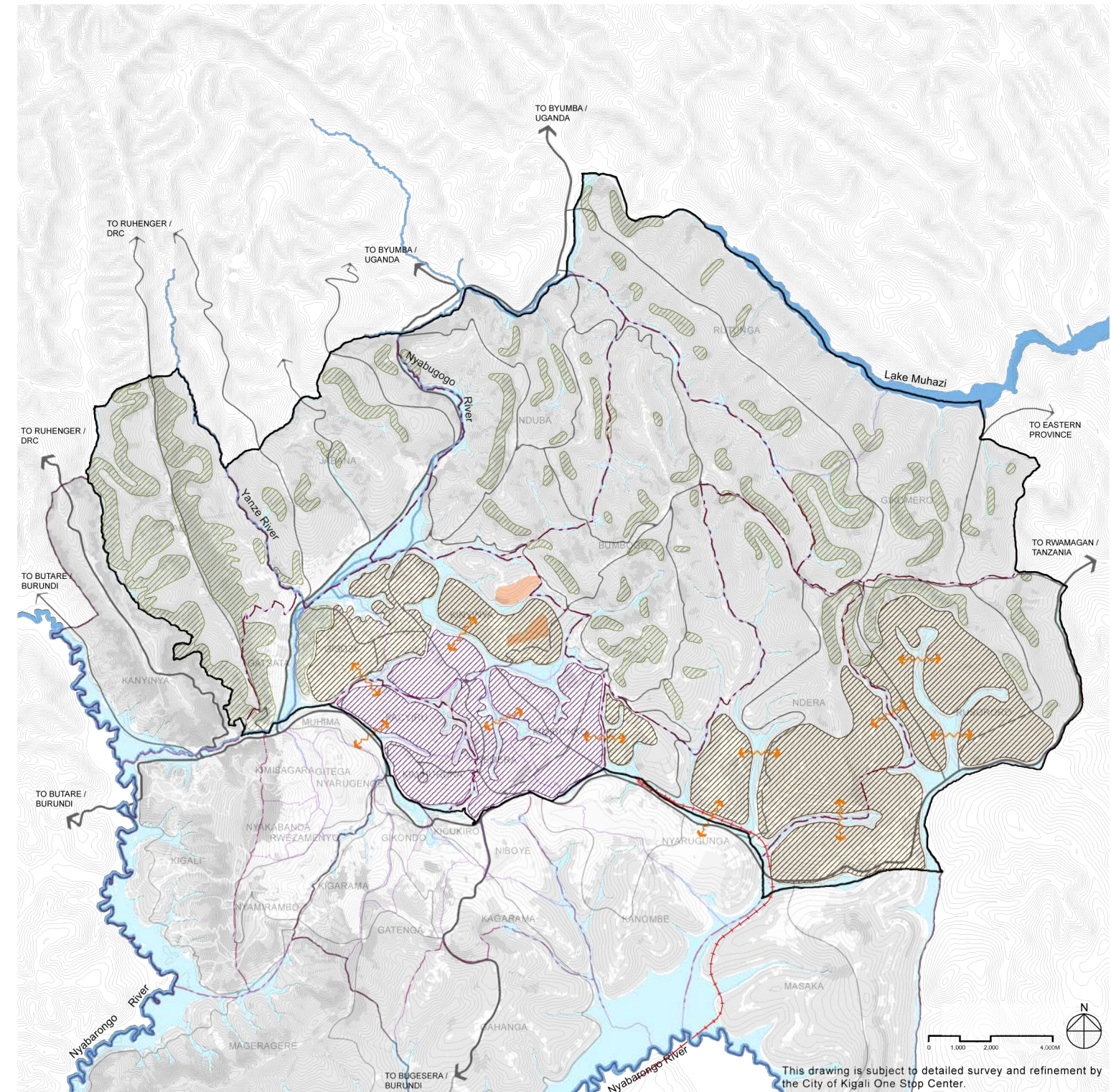
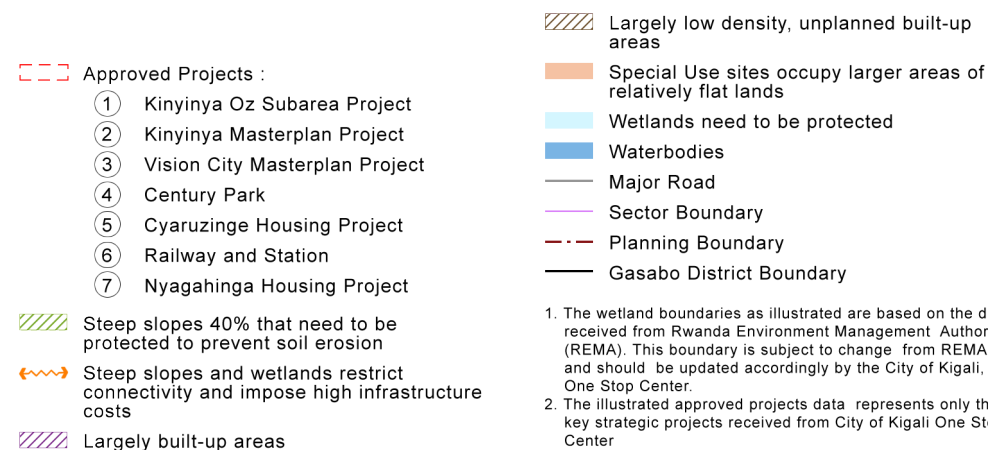


Fig.2.12 Gasabo District- Constraints Map

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3

GASABO DISTRICT - PROPOSED MASTER PLAN

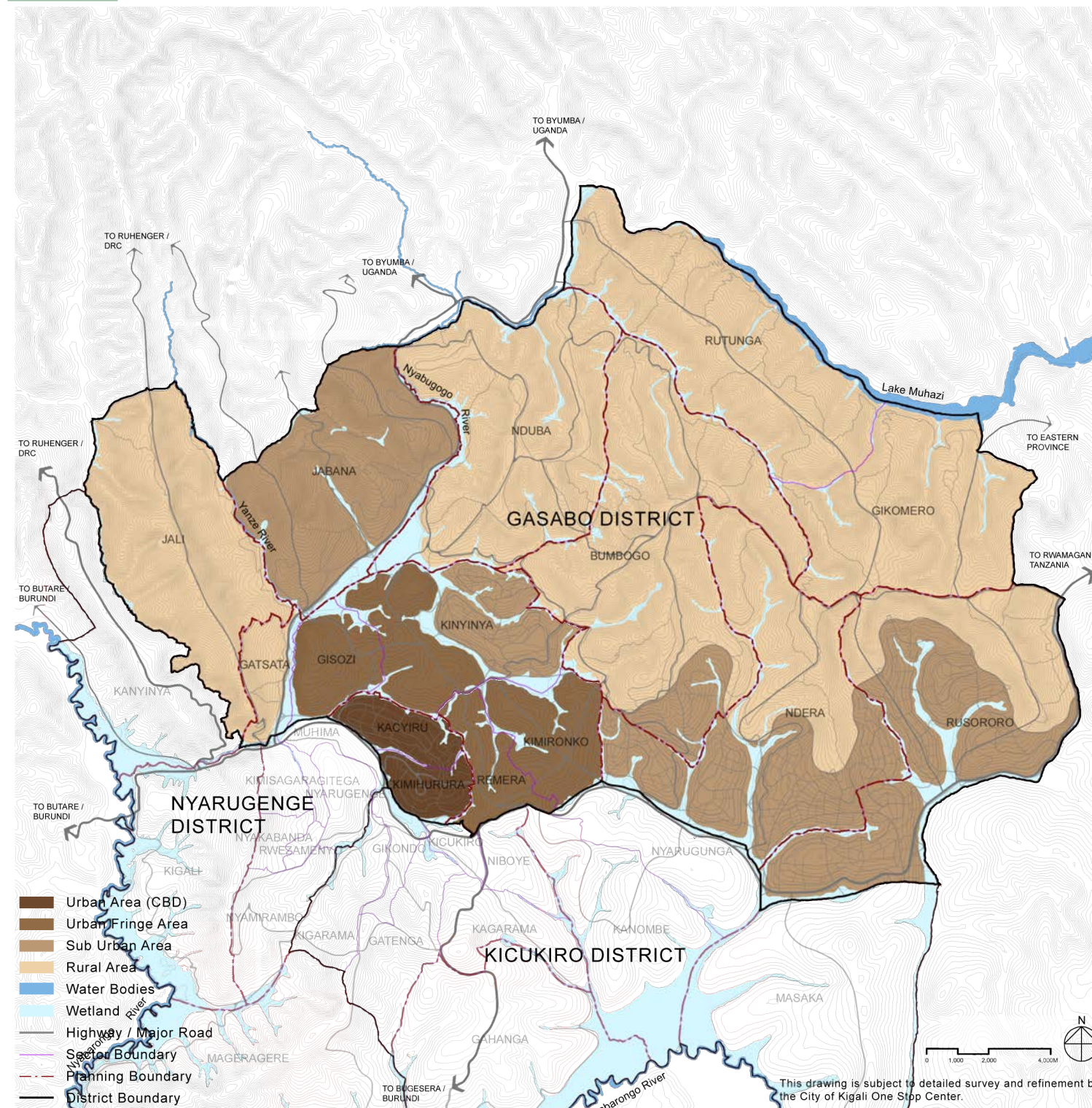


Fig.3.1 Kigali City - Proposed Land Utilisation Strategy

Based on the existing site context analysis, a land utilisation strategy has been proposed for the Gasabo District. It determines the broad development directions of different sectors of the district. This strategy is applied to the physical ground conditions of the district to form a Development Structure Plan. The development structure plan is further refined to form proposed Land Use Plans for the Gasabo District.

3.1 Proposed Land Utilisation Strategy

The Master Plan acknowledges the broad national vision for City of Kigali as “The Centre for Urban Excellence in Africa” It further envisions the city to be a leading model of a new, economically thriving, democratic, progressive African city that is redeveloped with integrated infrastructure and services; is economically sound; ensures personal safety and security; celebrates the country’s rural/agricultural heritage; and becomes a regionally and internationally integrated commercial and administrative hub. With many of the government and

administration institutes located within the district, Gasabo has been identified as Rwanda’s Administrative Centre. Gasabo will play the role of a “Diverse Employment Hub and Cultural Heartland of Kigali” The key elements of the land utilisation strategy are:

- Identifying an urban boundary for the City Centre Area and, strengthening and organizing of the existing City Centre.
- Identifying the existing urban areas that are adjacent to City Centre and organizing these areas as City Fringe Areas.
- Defining the existing urban areas and urbanise able new growth areas in the urban periphery and organizing these areas as the Suburban Areas.
- Defining the unbuildable areas in the outskirts as Rural Area and developing relevant strategies for various rural uses.

The proposed land utilisation strategy for the Gasabo district is illustrated Fig.3.1.

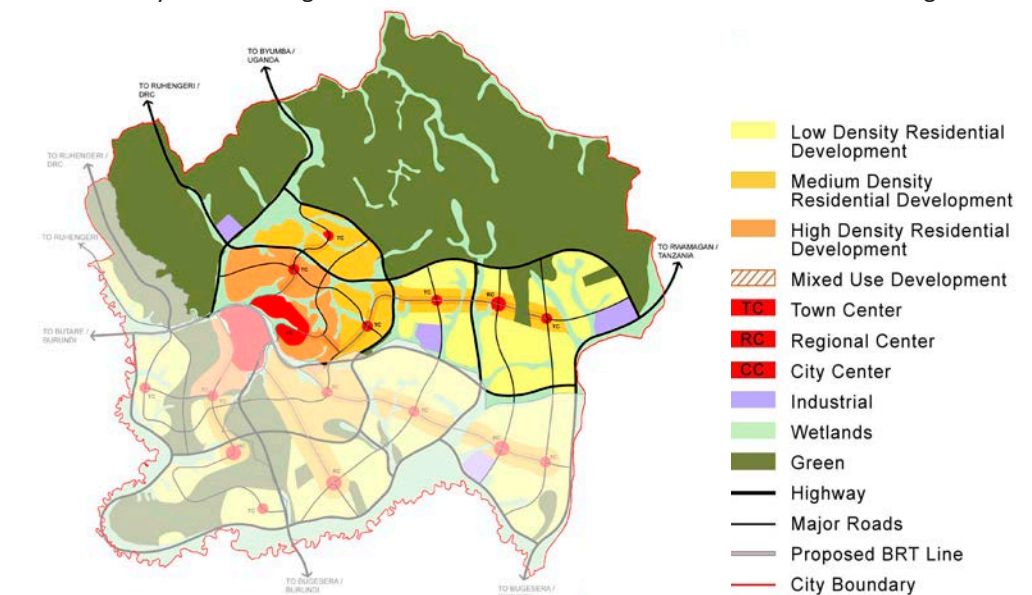


Fig.3.2 Radial city concept plan - Kigali City

3.2 Proposed Planning Area Boundary for Gasabo District

Gasabo District is made up of 15 sectors, these sector vary considerably in size from each other. The smallest sector, Kacyiru is 582.40 ha and the largest being Bumbogo is 6018 ha. For physical planning purposes, the sectors have been combined to form 9 planning areas, based on their geographical affinity, and by combining administrative boundaries. By keeping the areas consistent it will to create a holistic and well integrated plan for each planning area. They are thus defined to create distinct and clear strategies for different parts of the district. The incorporation of all these planning areas will provide a complete holistic Land Use strategy for the Gasabo District. Refer to chapters 4-14 for detail Land Use Plan for each planning area.

The key strategies for the 9 planning areas in Gasabo are as follows:

1. Special Planning Area comprises of the following sectors - Kacyiru and Kimihurura. This planning area plays the role of an administrative district of Kigali and is to be

organized to strengthen the existing city centre.

2. Central Planning Area comprises of the following sectors - Gatsata, Gisozi, Kinyinya, Kimironko and Remera. This planning area is further densified and reorganized to create an urban fringe area in the District.

3. South Eastern Planning Area comprises of Ndera sector. This planning area consists of the new growth areas east of the FTZ.

4. Eastern Planning Area comprises of Rusuroro sector. This planning is proposed to be the industrial and trade hub of the Gasabo District due to its proximity to highways.

5. North Eastern Planning Area comprises of the Rutunga and Gikomero sectors. This planning area will be an important tourist destination as it is located next to lake Muhazi and houses a number of important heritage sites.

6. North Central Planning Area comprises of the Bumbogo sector. This planning area is largely rural but will also house the future phase of the FTZ.

Table 3.1 Gasabo District - Proposed Planning Area Land Area Distribution

PLANNING AREA	SECTORS	AREA (HA)
Special Planning Area	Kacyiru and Kimihurura	1071.00
Central Planning Area	Gatsata, Gisozi, Kinyinya, Kimironko and Remera	5767.50
South Eastern Planning Area	Ndera	5025.60
Eastern Planning Area	Rusuroro	5256.40
North Eastern Planning Area	Rutunga and Gikomero	7753.20
North Central Planning Area	Bumbogo	6018.60
Northern Planning Area	Nduba	4681.20
North Western Planning Area	Jabana	3651.10
Western Planning Area	Jali	3758.00

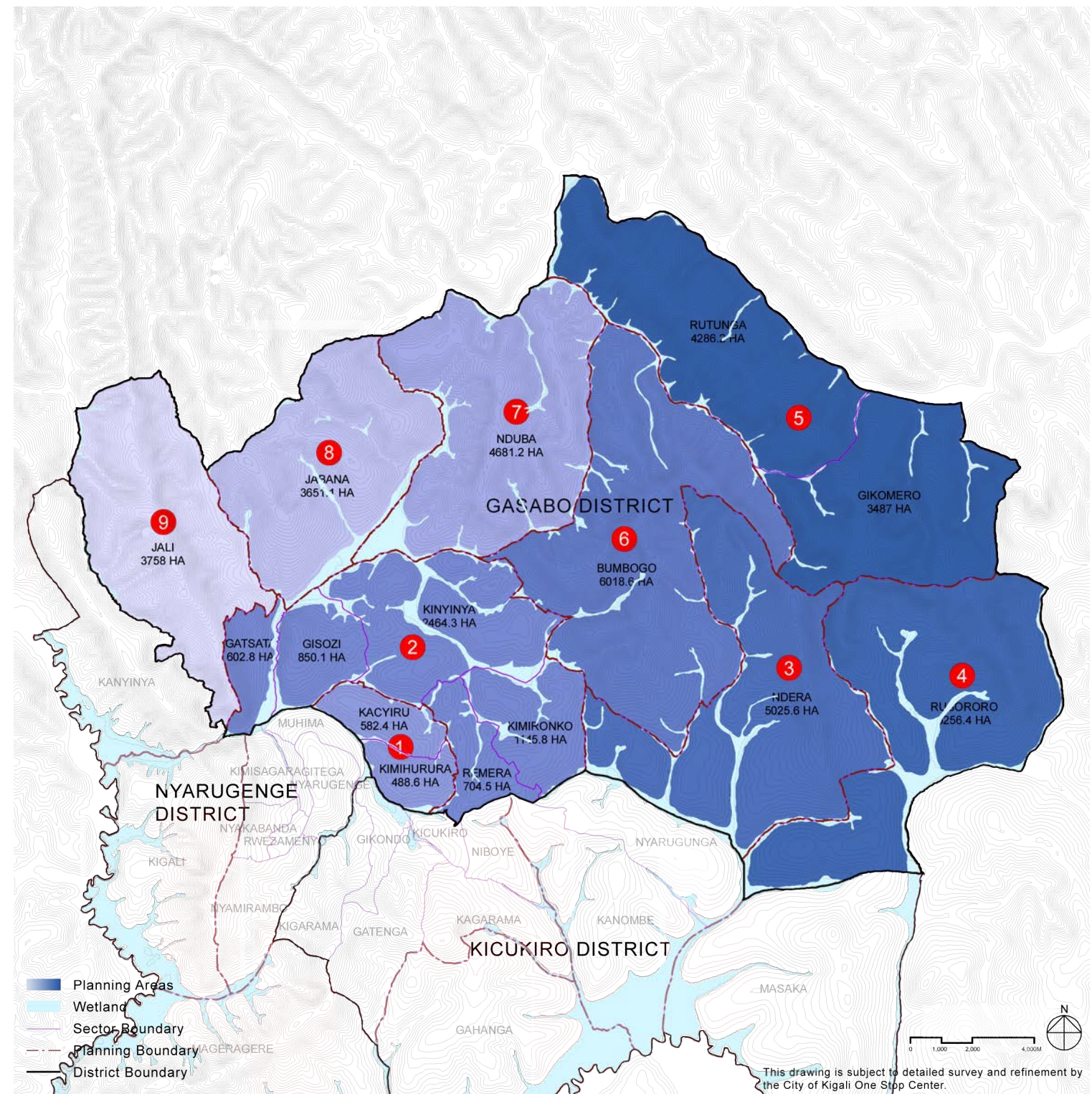


Fig.3.3 Gasabo District - Proposed Planning Area

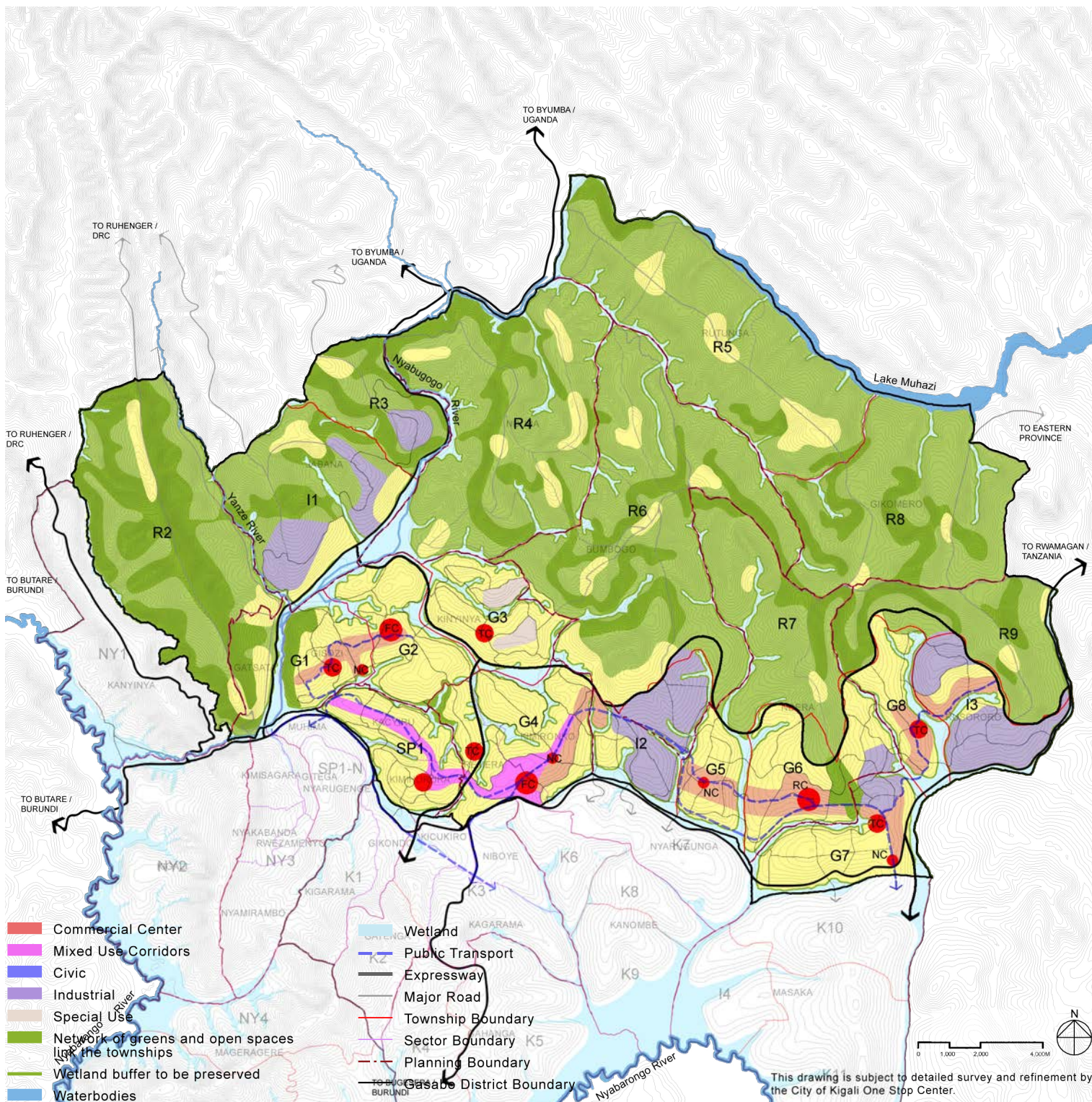


Fig.3.4 Gasabo District- Proposed Structure Plan

7. Northern Planning Area comprises of the Nduba Sector. This planning area is largely rural with imudugudu and some key infrastructure facilities.

8. North Western Planning Area comprises of the Jabana sector. This planning area is strategically located besides the highway leading to the CBD area, and is proposed to have large industrial and logistics areas which will provide employment opportunities.

9. North Western Planning Area comprises of the Jali Sector. This planning area is to be the recreational gateway of Gasabo district. The proposed planning areas are illustrated in Fig.3.3

3.3 Proposed Structure Plan

“Diverse Employment Hub and Cultural Heartland of Kigali”

Based on the role, key strategies for transformation of Gasabo are as follow:

- To establish a hierarchy of well connected employment centres.
- To conserve and promote Gasabo’s rich nature , culture and heritage areas.
- To reinforce the role of Gasabo as the administrative centre of Rwanda.
- To create affordable housing with quality living environments and sustainable infrastructure in both urban and rural areas.
- To promote value added and sustainable agriculture areas.

Guided by the key strategies for transformation a structure plan is proposed for the Gasabo District.

The key features of the structure plan are as follows:

- To expand and strengthen the City Centre by allowing high density commercial and vibrant mixed use developments supporting existing administrative areas.

- To introduce regional level commercial developments in fringe and suburban areas, to provide well distributed employment centres.
- To safeguard land for consolidated Industrial Estates at strategic locations.
- To establish an efficient highway grid and arterial system which ensures long-term regional and local connectivity and to ensure smooth flow of traffic.
- To redevelop existing unplanned settlements into higher density residential developments.
- To develop five new, compact suburban townships with integrated facilities and light industries.
- To develop small clusters of consolidated housing clusters in the rural areas.
- To conserve nature areas such as forests, wetlands and water bodies. Also protect steep slopes (above 20%) in both urban and rural areas.
- To protect and promote key sites of cultural and historic importance.
- To introduce a variety of iconic regional recreation and tourism destinations, which will be key attractions in Kigali
- To provide land for value added farming in un-buildable areas so as to ensure continuity of agricultural identity and heritage .
- To develop key infrastructure like BRT and MRT and to integrate them with commercial and residential developments.

The Structure Plan will form the basis for the development of the Detailed Master Plan, which includes the proposed Land Use Plans, the proposed Transportation and Infrastructure Plans. It will also form the basis for the Master Plan implementation, land acquisition and public facilities provision. The proposed structure plan for the Gasabo District is illustrated in Fig.3.4. This structure Plan is further developed as District Concept Plan. Refer to Appendix 3 for Gasabo District- Concept Plan

3.4 Proposed Land Use Plan

The proposed Land Use Plan for The Gasabo District will provide the development plan for the intermediate term till the year 2025 and the long term till the year X. These plans are developed based on existing context analysis. They also capture the approved projects and development trends in Gasabo. A detailed transportation Master Plan and modelling is done concurrently to ensure that the proposed Land Use is well integrated with the transportation plan and the public transit strategy.

The proposed Land Use Plan is a guide plan which charts the development direction for the city.

3.4.1 GASABO DISTRICT- PROPOSED LAND USE PLAN YEAR X

The Land Use Plan Year X shows the ultimate development envisioned for the district by the year X and beyond. The Land Use Plan caters for the ultimate projected population of 2.0 mil people.

The key proposals of the Year X Land Use Plan are as follows:

- The city centre is further strengthened by allowing for high density residential, commercial and vibrant mixed used developments along the transit corridors. It will also serve as the administrative hub of Rwanda.
- Variety of commercial centres have been proposed to cater to various levels of commercial activity depending on their location; two fringe centres, one regional centre and six town centres have been proposed in the District. These would also help to consolidate and strengthen the existing commercial activity in the district.
- Neighborhood Centres have also been proposed within each residential

neighborhood for the day to day needs of the community, at a comfortable walking distance of no more than 400 m from the residential areas.

- 3 industrial estates have been proposed in the Gasabo District in the following sectors: Jabana, Ndera and Rusuroro. These would help to consolidate scattered industrial sites and also provide new land for industrial developments and employment opportunities for people.
- An efficient grid of trunk roads and arterial roads has been established to ensure long term regional and local connectivity.
- Existing unplanned settlements in the city centre and fringe areas are proposed to developed into higher density residential developments, with adequate infrastructure provisions.
- Four new suburban townships have been proposed in Ndera and Rusuroro sectors. Each township to have adequate facilities. Light industries have also been proposed, these would provide employment opportunities for the residents closer to their homes.
- Provision of adequate facilities such as schools, health centres, civic institutions are well distributed as per catchment and density.
- Nature areas such as forests, wetlands and steep slopes above 20% (conditional use has been provided in the urban areas) have been protected in the Gasabo district.
- Regional level recreation facilities like urban parks and cultural centres have been introduced, along with major tourist attractions like the Muhazi lake front development and the flower valley along the wetlands in southern Gasabo.
- Land has been secured for farming in rural areas. In rural areas, land with a slope gradient below 40% slope has been allocated for agricultural activities.

The proposed Land Use distribution Year X for Gasabo district is illustrated in Table 3.2

The proposed Land Use Plan Year X for Gasabo district is illustrated in Fig.3.5

3.4.2 GASABO DISTRICT- PROPOSED LAND USE PLAN YEAR 2025

The proposed Land Use Plan 2025 is an intermediate plan for Gasabo District . the key features of the 2025 plan are:

- Focus development in the city centre, city fringe and selected key suburban areas like parts of Ndera sector around the proposed FTZ.
- Focus on development of commercial nodes in the city fringe areas such as Kimironko market and the fringe centre at Kinyinya.
- Develop townships G1, G2, G3, G4 and G5 in Central and South Eastern Planning Areas.
- Develop two BRT corridors; one connecting the CBD in Muhima to the Kimironko Fringe Centre and the second connecting the CBD to the Kinyinya Fringe Centre.
- Focus on developing industries in and around the FTZ.
- Develop the Horticulture park, Nature park at Jali and the Wetland Flower Valley to become new nature attractions in the District.
- Focus on developing the key transport corridors and upgrading the existing roads, as well as acquiring land for the new proposed roads.

The proposed Land Use Plan 2025 for Gasabo district is illustrated in Fig.3.6

Table 3.2 Gasabo District-Proposed Land Use Distribution Year X

LAND USE	DETAIL LAND USE	AREA(HA)	TOTAL AREA (HA)
Residential	Single family Residential	4594	7401
	Low Rise Residential	1797	
	Medium Rise Residential	955	
	High Rise Residential	55	512
Commercial	Commercial Office	4	
	Commercial General	346	
	Hotel	62	168
Mixed Use	Mixed use	168	
Public facilities	Government Office	94	
	Educational	407	792
	Religious Facilities	88	
	Health Facilities	88	
	Civic Facilities	115	1995
Industries	Light Industrial	584	
	Heavy Industrial	1411	
Nature Area	Existing Forest	4714	10104
	Afforestation	2212	
	Wetland	3178	
Agriculture	Farmland	17323	1801
Open Space	Open Space and Park	1689	
	Sports and Recreation	112	
Water Bodies	Rivers	197	197
Infrastructure	Transportation	2071	2484
	Transportation(open Space)	162	
	Utilities	251	
Special Use/Restricted Area/ Unclassified	Defence Area	73	210
	Graveyard	137	
Reserve Site	Reserve Site	33	33
	Total	42920	

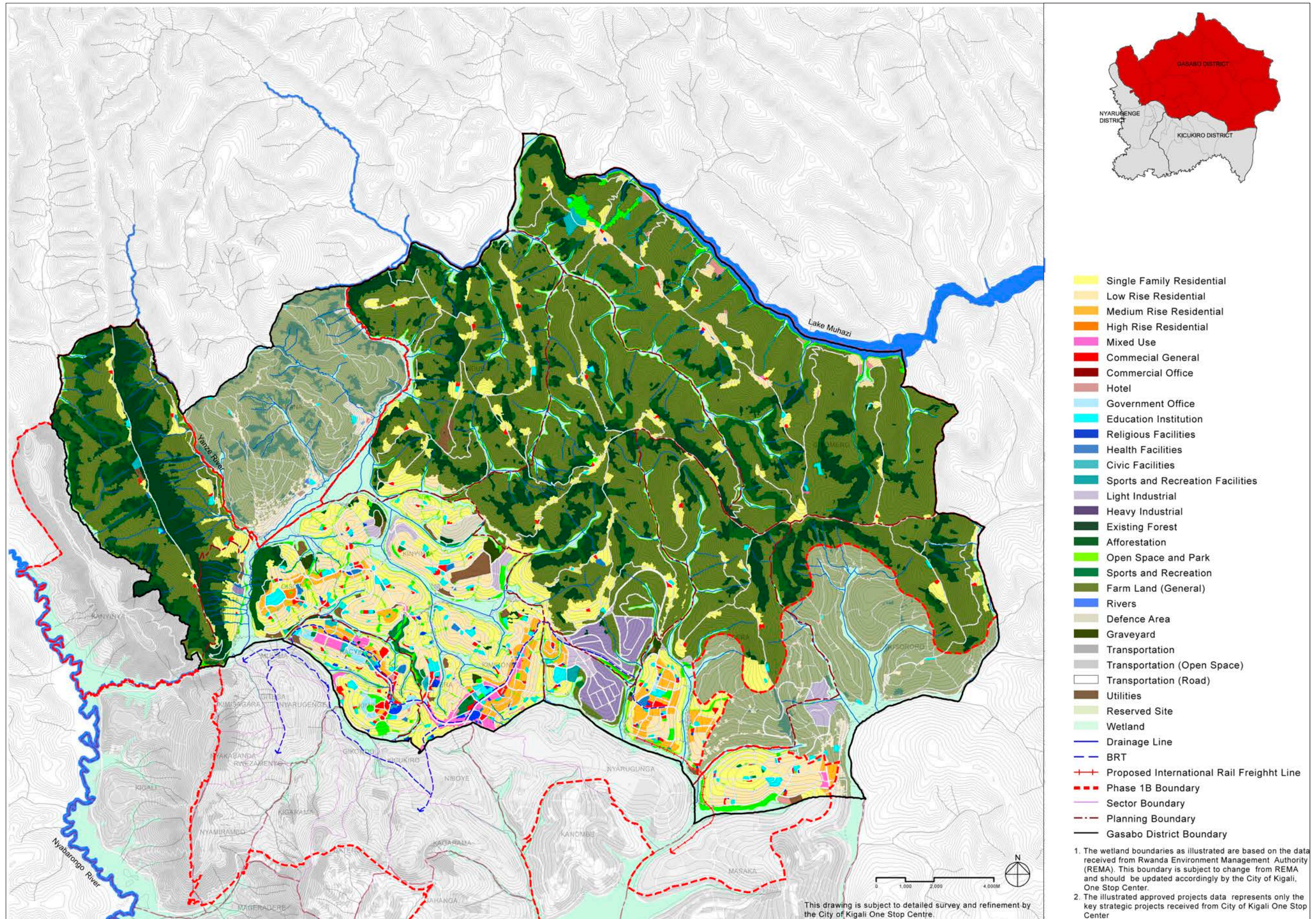


Fig.3.6 Gasabo District - Proposed Land Use Plan 2025

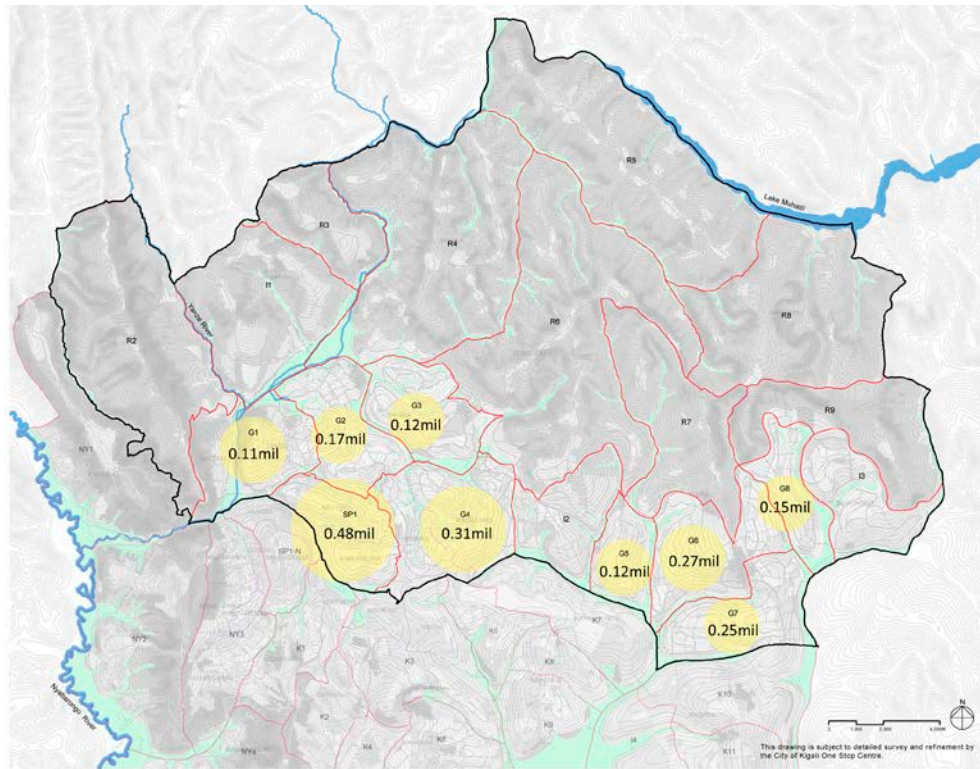


Fig.3.7 Gasabo District - Proposed Township Boundaries



Fig.3.9 Gasabo District - Illustration of Township Model Along a Slope

3.5 Integrated Townships in Gasabo District

Kigali City is proposed to be restructured into 24 self-sufficient townships. The district of Gasabo is distributed into 8 residential townships (G1-G8), 3 (I1-I3) industrial estate and 8 (R2-R9) rural areas. Majority of these townships are proposed to be served by a public transit corridor. Public transit is the main structuring element of the proposed townships. The townships are organized keeping in mind the terrain of the site and are spread across one or two hills. The main central spine of a township constitutes of the BRT running along a major arterial. The central spine along the BRT comprises of commercial use, civic facilities and high/medium density residential.

PROPOSED TOWNSHIP BOUNDARIES

The Township boundaries are determined based on the following criteria:

- The township boundaries are based on the natural boundaries and geographically

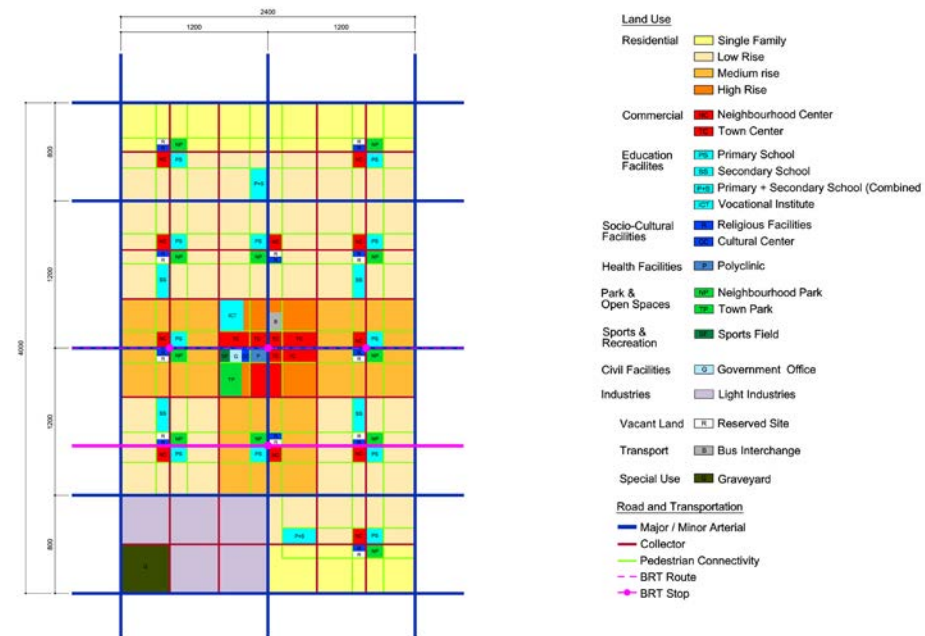


Fig.3.8 Proposed Township Model for Kigali City

conglomerated urban areas.

- The township boundaries follow the respective sector boundaries where possible.
- The developable urban areas are divided by the highway grids of 3-6 kilometers and major arterial roads spaced at 800 to 1200 meters. The township boundaries at some areas are influenced by these road networks.

PROPOSED DISTRIBUTION OF POPULATION IN GASABO DISTRICT

Kigali City is currently witnessing a growth of 6.2% p.a. SPHD, 2006 Population growth projections were created for three scenarios for the future population. A high growth, medium growth, and low growth scenario are projected by taking EICV3 2011 as the base year. The natural growth as well as migration is factored into the various scenarios. The population of Kigali City is projected to grow from the current population of 1.3 million to be 5 million as per the high case scenario and 3.6 million as

per the low case scenario. Provision of land and reserves for infrastructure, housing and facilities need to be safeguarded for the ultimate population (high case scenario). However, this ultimate population may or may not be reached by the Year 2040. 'Year X' represents the stage where Kigali would have reached its ultimate population of 5 million, based on the current development parameters. The Master Plan should be reviewed every five years in line with the census and development trends. The proposed ultimate township population distribution and employment is illustrated in Fig.3.7

PROPOSED EMPLOYMENT DISTRIBUTION IN GASABO DISTRICT

Kigali City currently offers a total of 0.50 mil Jobs in services, industrial and other sector employments. Majority of these jobs are around the City Centre with some employment in other scattered industrial and commercial areas.

The proposed Land Use Plan would offer approximately 0.80 mil jobs in various sectors in the Gasabo District.

- The Land Use Plan for Gasabo proposes to decentralize the employment centres in the Gasabo.
- The Regional Centre in Ndera is expected to create approximately 15% of the total service sector jobs in Kigali city.
- The proposed industrial estates in Gasabo District are expected to create approximately 0.30 mil jobs in manufacturing and logistic industries.
- The proposed townships in the suburban areas are proposed to expected to create 10% of the City's jobs, thus supporting the goal of decentralized job distribution and ensuring significant local employment to the residents of each township.

3.6 Proposed Commercial Use Plan

The services sector accounts for 62% of Kigali's GDP and has witnessed growth of 5.1% p.a. In the last five years¹. The existing services sector employ's approximately 0.30 mil people in Kigali¹.

Key commercial areas are located in Kacyiru, Kimihurura, Remera and Gisementi Sector. The existing commercial developments are fragmented and spread unevenly through out the urban sectors of Gasabo District. Retail and local level commercial nodes are also present in the rural sectors of the district which need to be recognized in the Commercial Use Plan. There is a need to consolidate the existing commercial activity and also create new areas with vibrant commercial activity in the Gasabo District.

The key strategies for allocation of different commercial centres are:

- The existing commercial areas are redeveloped into neighborhood/town centres wherever possible.
- In new growth areas, new commercial centres are proposed along the proposed public transit corridors.
- Commercial centres are further supported by religious, cultural, health and civic facilities including parks. Commercial developments together with the above mentioned facilities would form urban nodes for the township's residents

3.6.1 PROPOSED COMMERCIAL USE PLAN YEAR X

The service sector is projected to provide approximately 1,620,000 jobs by Year X in Kigali City. The proposed Commercial Plan addresses the strategic distribution of these jobs in the Gasabo District. The plan proposes new commercial centres

in Gasabo, these include 1 Regional Centre, 2 Fringe Centres, 6 Town centres, 90 Neighborhood Centres and Mixed used Areas and special use commercial developments. The proposed Commercial Use Plan Year X for the Gasabo district is illustrated in Fig.3.10

The proposed hierarchy of commercial centres in Gasabo consists of:

CITY CENTRE COMMERCIAL

- Gasabo District to provide approximately 1.2 mil m² of commercial space and create approximately 0.14 mil jobs by Year X.
- City Centre Commercial refers to commercial developments in Kacyiru and Kimihurura sectors.
- These would offer a mix of offices, retail and entertainment facilities, these would cater to a wider population set of Kigali.
- These would provide 25% of retail commercial space available in the district. 40% of the total space available for hotels is provided in the city centre commercial area.

FRINGE CENTRE COMMERCIAL

- As per the Commercial Use Plan a total of approximately 24 ha of land is allocated for the development of 2 Fringe Centres.
- These are located in Kimihurura and Kinyinya sectors.
- These are distinctive commercial areas, developed around major transit node at close proximity to the City centre, typically about three to five kilometers away from the Downtown.
- The main role of a Fringe centres to provide commercial spaces for business that do not need presence in the CBD area of Kigali city
- The Kimironko Fringe Centre would help to reorganize the existing Kimironko market.

REGIONAL CENTRE COMMERCIAL

- Approximately 40 ha of land is allocated for the development of 1 Regional Centre in Ndera Sector.
- It is the largest commercial development outside the central areas of the city.
- The main role of the Regional Centre is to decentralize the commercial activity within the district and bring jobs and facilities to the suburban areas of the district.
- It would offer commercial space for offices, retail and entertainment. Reducing the necessity for the people to travel to the city centre for basic facilities.
- Regional centre will cater to a population catchment of about 1 mil people and is well integrated with the BRT and MRT network.
- It is projected to create approximately 0.20 mil jobs by Year X.

TOWN CENTRE COMMERCIAL

- Approximately 30 ha of land is allocated for the development of 6 Town Centres in the District.
- These are located in Gisozi, Remera, Kinyinya, Ndera and Rusuroro sectors.
- The main role of the Town Centre is to provide area for consolidated commercial development along public transit corridors in each township.
- Where possible existing commercial areas are incorporated into Town Centre developments.
- These are projected to create approximately 0.10 mil jobs by Year X.

NEIGHBORHOOD CENTRE COMMERCIAL

- Approximately 115 ha of land is allocated for the development of 90 Neighborhood Centres in the Gasabo District.
- These are located at a 400m walking distance each neighborhood.
- The main role of the Neighborhood Centre is to provide commercial facilities

such as provisions shops at close proximity to the homes.

- Each Neighborhood Centre is integrated with a health centre, community hall, religious facility and neighborhood park.
- Each neighborhood centre caters to a catchment population of approximately 15,000- 18,000 people.
- Where possible, these are redeveloped from existing commercial developments.
- Each Neighborhood Centre would provide approximately 3000 m² of retail space.

MIXED USED COMMERCIAL

- As per the Commercial Use Plan approximately 110 ha of land has been allocated for Mixed Use developments.
- These are located in Kimihurura, Kacyiru and Kinyinya sectors and are provided along major roads and public transit corridors.
- The main aim of these developments is to create vibrant and well utilized spaces, with a mix of residential and commercial activity.
- These would provide retail and office space on the first 2 levels and the rest of the levels could be utilized for providing homes.
- Mixed Use Commercial are typically 80% residential and 20% commercial use, but can vary according to the individual development.

OTHER COMMERCIAL

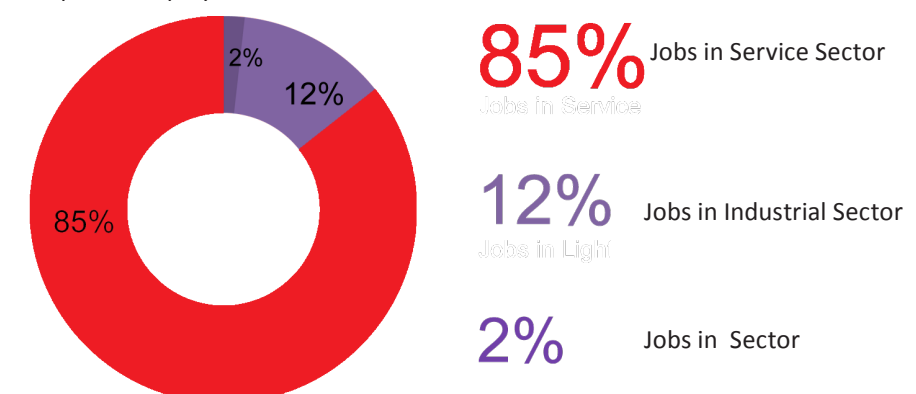
- Areas with existing commercial developments in the District are to be retained.
- These include, Urukondo Potters Village, Gisozi; Handicraft Market, Gisozi; Kabuga Commercial Centre, Rusuroro.
- These commercials would be promoted as special cultural and heritage areas.
- These commercial areas help to provide a unique identity to Gasabo District and also preserve the history of the district.
- Special commercial like convention centres have also been proposed in the Gasabo District.

3.6.2 PROPOSED COMMERCIAL USE PLAN 2025

As per the proposed Commercial Use Plan 2025, approximately 0.20 mil jobs are to be created in the service and retail sector. The main focus will be to fully develop the commercial with the city centre areas of Kacyiru, Kimihurura, Kinyinya and Kimironko sectors. The commercial developments in the areas of the District are also expected to be completed by the Year 2015. Neighborhood Centres and Town centres will also be developed for the townships proposed for the year 2025.

The proposed Commercial Use Plan Year 2025 is illustrated in Fig.3.11

Proposed Employment Distribution



1. National Institute of Statistics, GDP estimates 2010/2011.

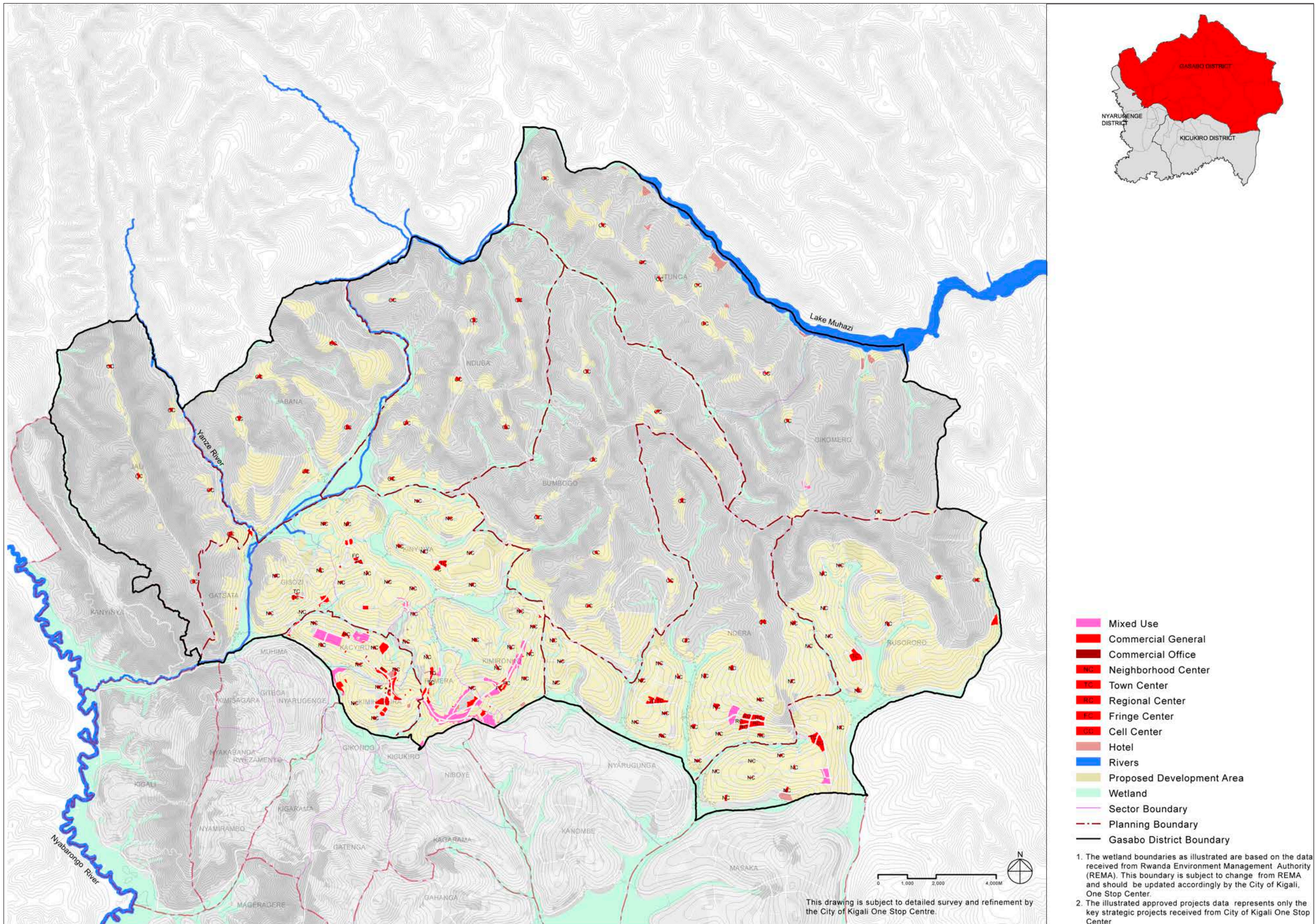


Fig.3.10 Gasabo District - Proposed Commercial Use Plan Year X

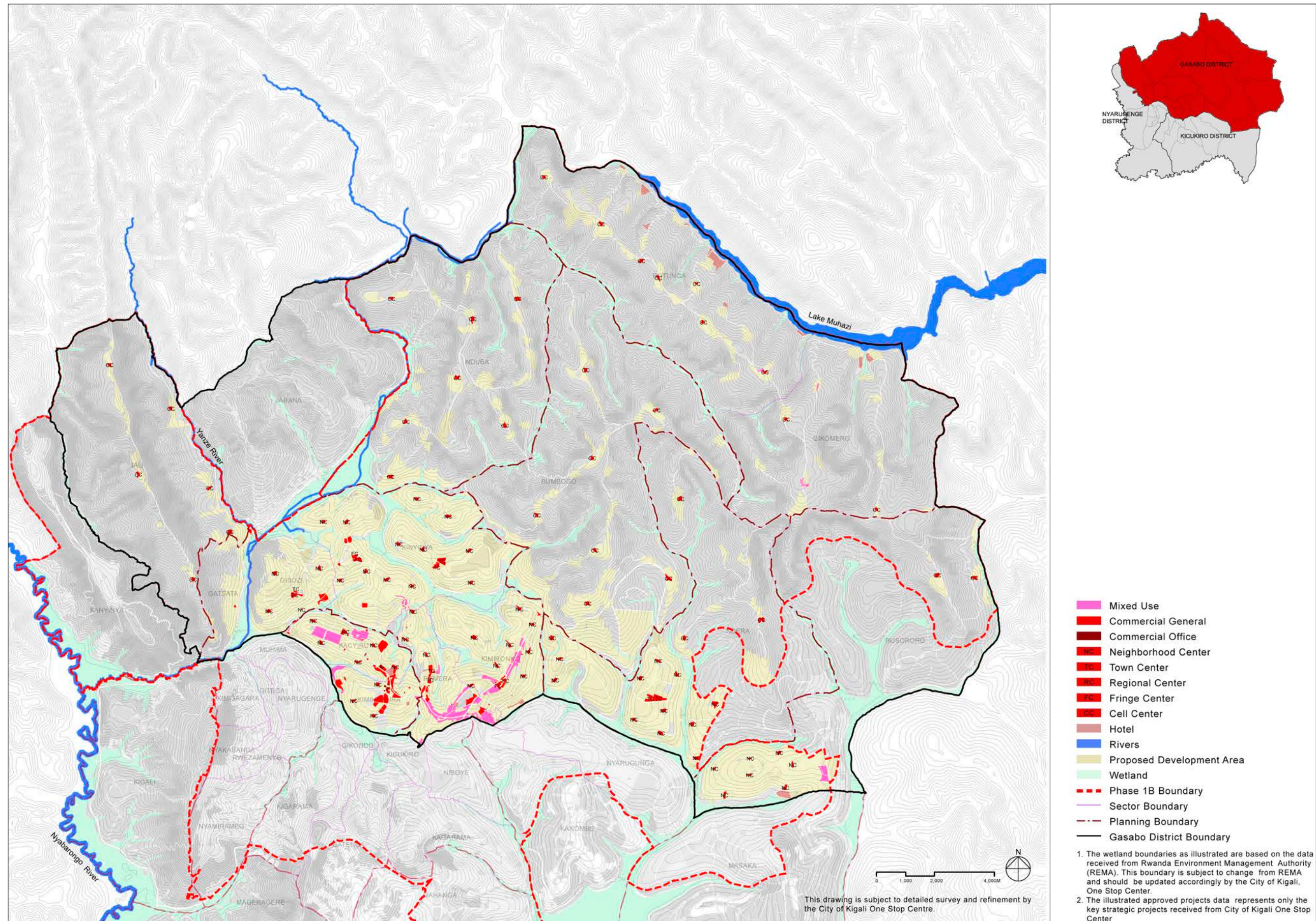


Fig.3.11 Gasabo District - Proposed commercial Use Plan 2025



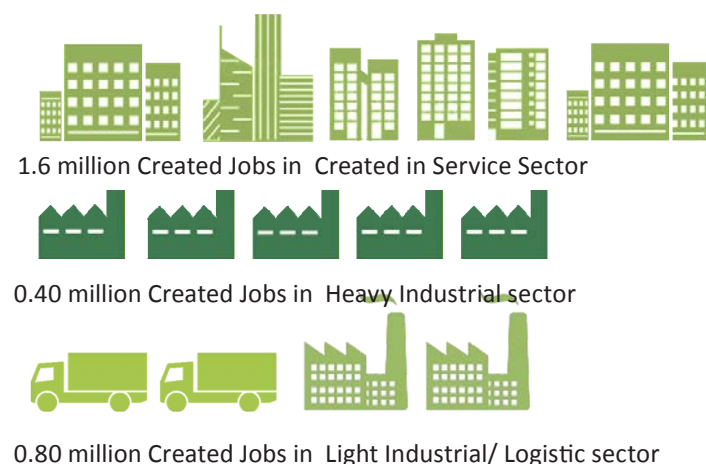
Imagery: Small Factory and Dry Port



Imagery: Large Scale Manufacturing Industries



Imagery: Agro based Industry and Small Factory



3.7 Proposed Industrial Use Plan

The industrial sector accounts for 33% of Kigali's GDP and has witnessed growth of 9.7% p.a. in the last five years. The existing industrial sector employee's approximately 0.07 mil people in Kigali.¹ This sector consists of quarrying, manufacturing, utilities, and construction. Construction is a major employer, and will continue to be so as the country develops.

Key issues of the current industrial developments are as follow:

- Some of the industries in the district especially in the northern sectors are located within the wetlands (REMA boundary) and need to be relocated.
- Unevenly distributed industrial developments need to be relocated and consolidated within industrial estates. This would ensure growth of the industrial sector and also provide easily accessible infrastructure to existing and proposed industries.

NATIONAL INDUSTRIAL POLICY OF KIGALI

The industrial policy proposes to consolidated and priorities clusters through selection exercises.

Phasing up to 2020 as per the Industrial Policy²:

- Short Term: Agro-processing (including pyrethrum, dairy, vegetable oil, soaps and detergents); ICT; high-end tourism; textiles (including silk& leather goods); minerals processing;
- Medium Term: Construction materials (including cement); Pharmaceuticals; chemical products (including fertilizers);
- Long Term: Building materials (metal parts and structures); bio plastics; other high tech Industries.

¹ National Institute of Statistics, GDP Estimates 2010/11, 2005 prices

² National Industrial Policy

3.7.1 PROPOSED INDUSTRIAL USE PLAN YEAR X

The industrial development is proposed to focus on labor and skill intensive jobs in the short term and capital & technology intensive jobs in the long term. Focus will also be provided in giving space for developing the identified SME (small and medium enterprises) clusters in the immediate term.

Approximately 2000 ha of land has been set aside for industrial use and would help to create 0.40 mil jobs in the Gasabo District. This includes both Heavy and light industries in Gasabo. The plan also incorporates the Free Trade Zone in Ndera sector of Gasabo District.

The proposed Industrial Use Plan Year X is illustrated in Fig.3.12

The following are the various types of industrial Land Use proposed in Gasabo district:

HEAVY INDUSTRIES

- Approximately 1400 ha of land has been safeguarded for heavy Industries in Gasabo.
- The proposed Free Trade Zone has been retained, is further expanded making it a key inner city industrial area.
- In Addition to the FTZ in Ndera two new Heavy industrial estates are proposed in Rusuroro and in Jabana sectors. Adequate buffer between the industrial and residential developments is to be provided.
- These industries will provide space for larger industrial clusters such as Agro-processing, electronics, construction materials, plastics & pharmaceuticals timber & metals products, textile, garments etc.
- Industrial estates located in the suburban areas, away from residential developemnts, would provide space for pollutive industries such as petroleum depot and chemical industries.

- Other factor like proposed RTDA rail line from the south, proposed oil line from the north and proposed trunk roads also lay a key role in deciding the locations of the industrial areas.
- Heavy Industries are projected to create approximately 0.32 mil jobs by Year X.

LIGHT INDUSTRIES

- Approximately 600 ha of land has been safeguarded for light industries in Gasabo.
- In each township approximately 20 ha of land has been set aside for light industries.
- These have also been provided in the industrial estates.
- Light industries could provide for space for uses such as motor workshop, printing companies, light building services and warehouses, and other small clusters .
- Light Industries typically have less environmental impact and are less polluting. Hence may be located closer to residential area.
- Light Industires are projected to create approximately 0.08 mil jobs by Year X.

3.7.2 PROPOSED INDUSTRIAL USE PLAN 2025

The proposed Industrial Use Plan 2025 focuses on further development of the current Kigali Free Trade Zone. It proposes the completion of all three phases of the Kigali FTZ and also extending industries further in parts of Ndera and Bumbogo sectors. The plan proposes the development of several light industrial estates within the FTZ as well as in Kininya, and Gisozi sectors which will provide more jobs centres closer to living areas. It will also help foster SME clusters in line with the industrial policy.

The proposed Industrial Use Plan Year X is illustrated in Fig.3.13

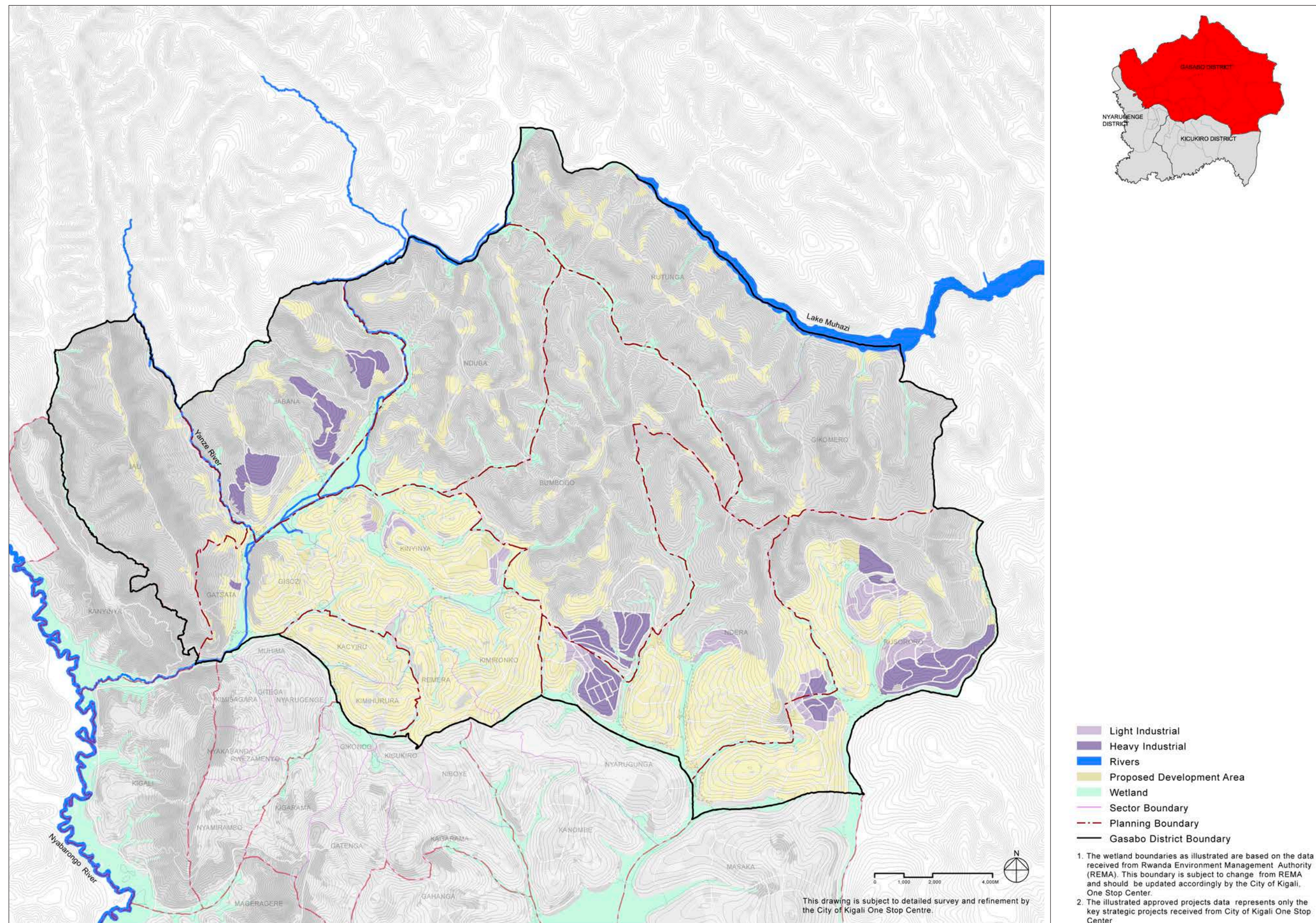


Fig.3.12 Gasabo District - Proposed Industrial Use Plan Year X

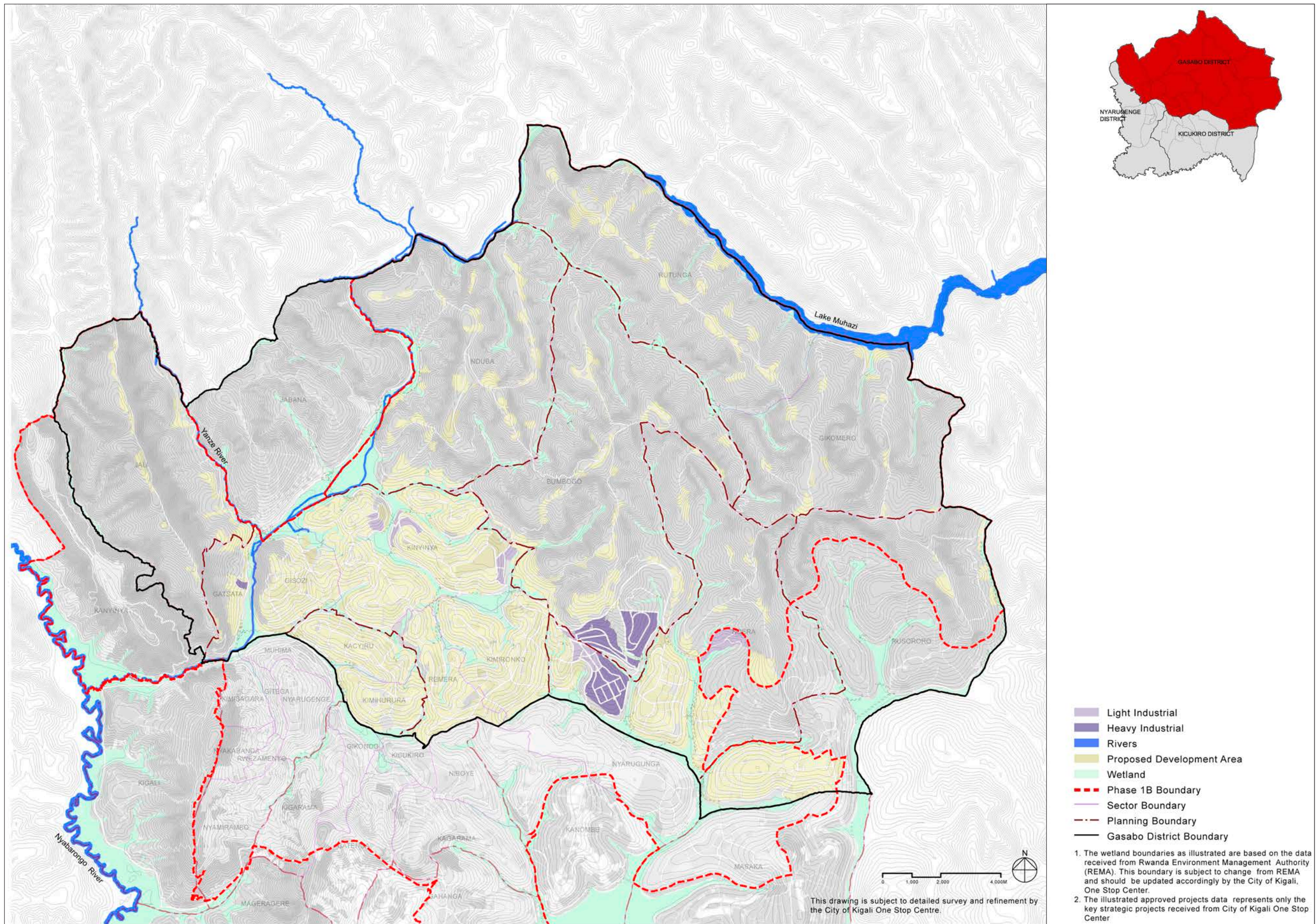


Fig.3.13 Gasabo District - Proposed Industrial Use Plan 2025

3.8 Proposed Residential Use Plan

The current population of the Gasabo District is expected to grow to approximately 2.0 mil people from the current 0.5 mil people by Year X. The average household size in the District is estimated to be 3.85 P/Dus from the current 4.7 P/DUs by Year X³. These would have significant impact on the current housing trends in Gasabo. There are four types of housing in the Gasabo District: well developed urban areas, urban closely built areas, villages (imidugudu) in rural areas and lastly, scattered housing in rural areas⁴.

Presently, about 8% of Gasabo district is residential of which 62 % comprises of low density, unplanned residential developments². The rest of them are mostly single family residential homes. Good quality single family residential are located in Kacyiru, Kimihurura, Remera and Kimironko sectors.

The key issues evident in the housing sector are as follows:

- Acute shortage of affordable, formal housing in the market has generated large unplanned settlements.
- There is a need to check the growing unplanned, low density sprawl in urban sectors close to existing Industrial areas.
- Developments are piecemeal, fragmented and not integrated with infrastructure development.
- There is need for clear development policies, direction and guidelines to manage and foster growth.
- There is a need to provide a variety of housing typologies, catering to various income groups of the city.

³ EICV3, 2011

⁴ Development Plan for the City of Kigali 2008

3.8.1 PROPOSED RESIDENTIAL USE PLAN YEAR X

The proposed Residential Use Plan Year X exhibits the development of higher density residential developments along key transit corridors in the District. Residential use comprises of about 16% of Land Use in the District by Year X.

The key principles and strategies adopted in planning the residential use are as follows:

- Restructuring Gasabo District into 8 integrated townships with homes, jobs, social infrastructure, recreational spaces and amenities.
- Four types of residential developments are proposed in the District.
- New developments to respect the topography and context by allowing higher density development along the relatively parts of the hills, which gradually becomes less dense as they approach the low lying wetlands.
- A Comprehensive approach to unplanned area rehabilitation in Special and Central Planning Areas.
- The removal of unplanned developments and Industries from steep slopes and wetlands (which are prone to landslides and are hazardous) in Gisozi, Gatsata and Kimironko sectors.
- Strategic land acquisition for the new proposed township facilities along key transit corridors.
- Identifying key government owned land suitable to kick start affordable housing projects which can be further emulated.

The proposed Residential Use Plan Year X for Gasabo district is illustrated in Fig.3.14

The proposed residential types are as follows:

SINGLE FAMILY RESIDENTIAL

Single family residential development is the most prevalent Land Use type in the

District. It is classified as good quality landed housing with detached and semi detached units. It occupies 17% of the District's land area. It will accommodate about 55% of the total residential population of the District. The key features of the Land Use are as follows:

- Single family residential is characterized by a dwelling unit density of 40 du/ha.
- The existing good class Single Family residencies in Kacyiru, Kimihurura and Kinyinya sectors are to be retained.
- Land along wetlands and natural features, are proposed to be developed as single family residential developments. These developments would have minimum impact on the natural features.
- Land with Steep slopes (20-40% slope gradient), in urban areas are allowed to be developed as single family residential developments, upon conditional approval from the city.

Table 3.4 and Table 3.5 illustrate the housing typology breakdown.

LOW-RISE RESIDENTIAL

This housing typology is similar to single family residential developments but is more compact, including a mix of low rise apartments. It occupies about 18% of the District's land area. It will accommodate about 24% of the total residential population of the District. The key features of the Land Use are as follows:

- Low-rise residential is characterized by a dwelling unit density of 90 du/ha
- The existing residential development close to the proposed fringe centre of Kinyinya and Kimironko in Gasabo are zoned under this housing development. This would help to stimulate regeneration and allow incremental redevelopment in these housing areas.
- Low rise residential developments are generally cited close to public transport network.

Table 3.4 Gasabo District - Housing Density Distribution, with average household size 3.85

HOUSING TYPE	HOUSING AREA (HA)	PERCENTAGE OF LAND WITHIN RESIDENTIAL DEVELOPMENT	RESIDENT POPULATION (MIL)	PERCENTAGE SHARE OF POPULATION WITHIN RESIDENTIAL DEVELOPMENT
Single Family	4594	61%	0.70	32
Low Rise	1797	24%	0.65	33
Medium Rise	955	13%	0.60	28
High Rise	55	1%	0.04	2
Mixed Use	168	2%	0.08	1
Total	7570	100%	2.12	100

Table 3.3 Gasabo District - Proposed population distribution (Year X)

PLANNING AREA	TOWNSHIP	POPULATION (YEAR X)	DWELLING UNITS
Special	SP1	126,000	32623
Central	G1	126,000	31035
	G2	173,000	44133
	G3	118,000	32146
	G4	321,000	79531
South Eastern	G5	134,000	33046
	G6	283,000	71917
	I2	35,000	7877
	R7	13,000	2793
Eastern	G7	212,000	67051
	G8	149,000	40686
North Eastern	R9	16,000	3230
	R5	37,000	9015
North Central	R8	18,000	5231
Northern	R6	76,000	17208
North Western	R4	53,000	10818
	I1	25,000	8154
Western	R3	13,000	2904
	R2	22,000	5694

MEDIUM-RISE RESIDENTIAL

Medium rise residences are proposed to accommodate increasing urban population of the District. It occupies about 2% of the District's land. It will accommodate about 33% of the total residential population of the District. The key features of the Land Use are as follows:

- Medium-rise residential is characterized by a dwelling unit density of 160 du/ha.
- These residential developments are proposed along major transport corridors. This is to ensure easy accessibility to public transport for large population set.
- Medium-rise residential have been proposed along relatively flat areas in the district.
- Medium-rise residential have also been proposed around major commercial nodes like town centres and regional centres, so as to make efficient use of the facilities available in these centres.

HIGH RISE RESIDENTIAL

High rise residential are proposed only at key locations in the district. This type of development provides high density living for those who desire an urban lifestyle with easy access to regional facilities and services. It occupies less than 1% of the

Districts land. It will accommodate about 2% of the total residential population of the District. The key features of the Land Use are as follows:

- High rise residential is characterized by a dwelling unit density of 160 du/ha.
- These developments are proposed around the Regional Centre in Ndera.
- The proposed employment and Commercial centres, recreational and public facilities in the Regional Centre would attract young aspiring individuals to this development.

MIXED USE DEVELOPMENT

Mixed use developments are proposed so as to create vibrant and active areas in city centres. This type occupies less than 1% of the District's land. It will accommodate about 4% of the total residential population of the District. The Key features of the Land Use are as follow:

- This type of development allows both commercial and residential use. The typical distribution of commercial to residential is 20:80.
- The lower two floors are developed for commercial use with cafes and commercial with window displays.
- The floors above the Commercial are

developed as residential apartments in prime areas.

- About 100 ha of land has been allocated, in and around the Regional and Fringe Centre for mixed use development.

3.8.2 PROPOSED RESIDENTIAL USE PLAN-2025

The proposed Residential Use Plan 2025 exhibits the initial phase of residential development (caters to approximately 1.3 mil people). The average household size is estimated to be 4.15p/Du's. Growth is focused around the Fringe areas at Gatsata, Gisozi, Kinyinya and Kimironko sectors. Unplanned areas are to be redeveloped into low density residential developments. In the suburban areas, the existing imudugudu shall be retained and provided with necessary public facilities. All proposed imudugudu in rural sectors of the District are projected to be fully developed by the year 2025

The proposed Residential Use Plan 2025 for Gasabo district is illustrated in Fig.3.15

Table 3.5 Gasabo District - Residential Development density and development character

TYPE OF DEVELOPMENT	STOREYS	DWELLING UNIT DENSITY
Single family residential	Single family housing - villas, cluster housing, townhouses	40 DU/HA
Low density residential developments	2-4 storey apart ments / estates	90 DU/HA
Medium density develop-ments	4-8 storey apartments / estates	160 DU/HA
High density developments	>8 storey apartments / estates	>200 DU/HA

2,280,000

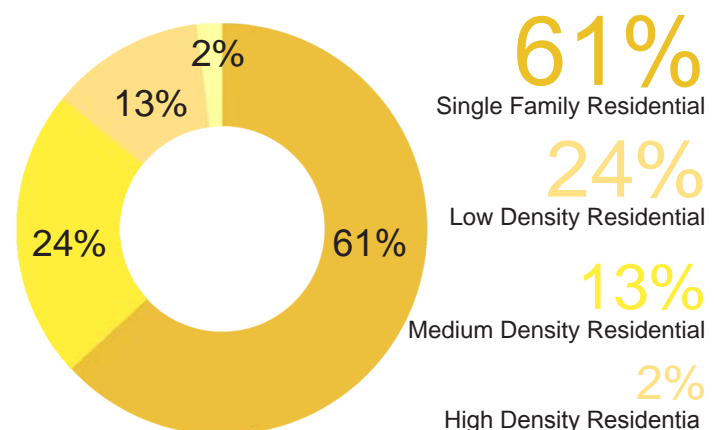
Gasabo Projected Population by year X

15

Self Sufficient Townships (600ha-900ha)

65,000

Affordable Homes by year X



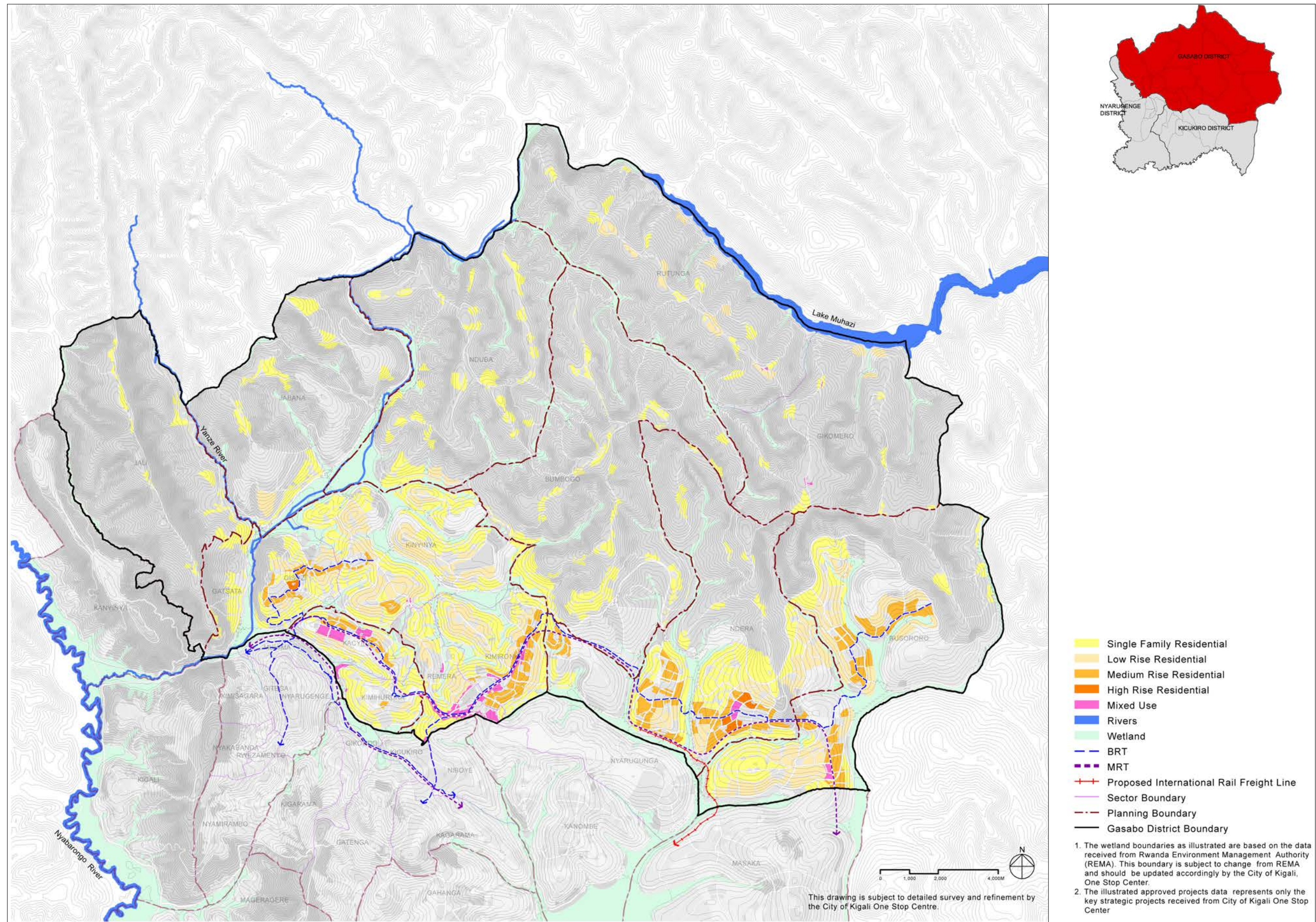


Fig.3.14 Gasabo District - Proposed Residential Use Plan Year X

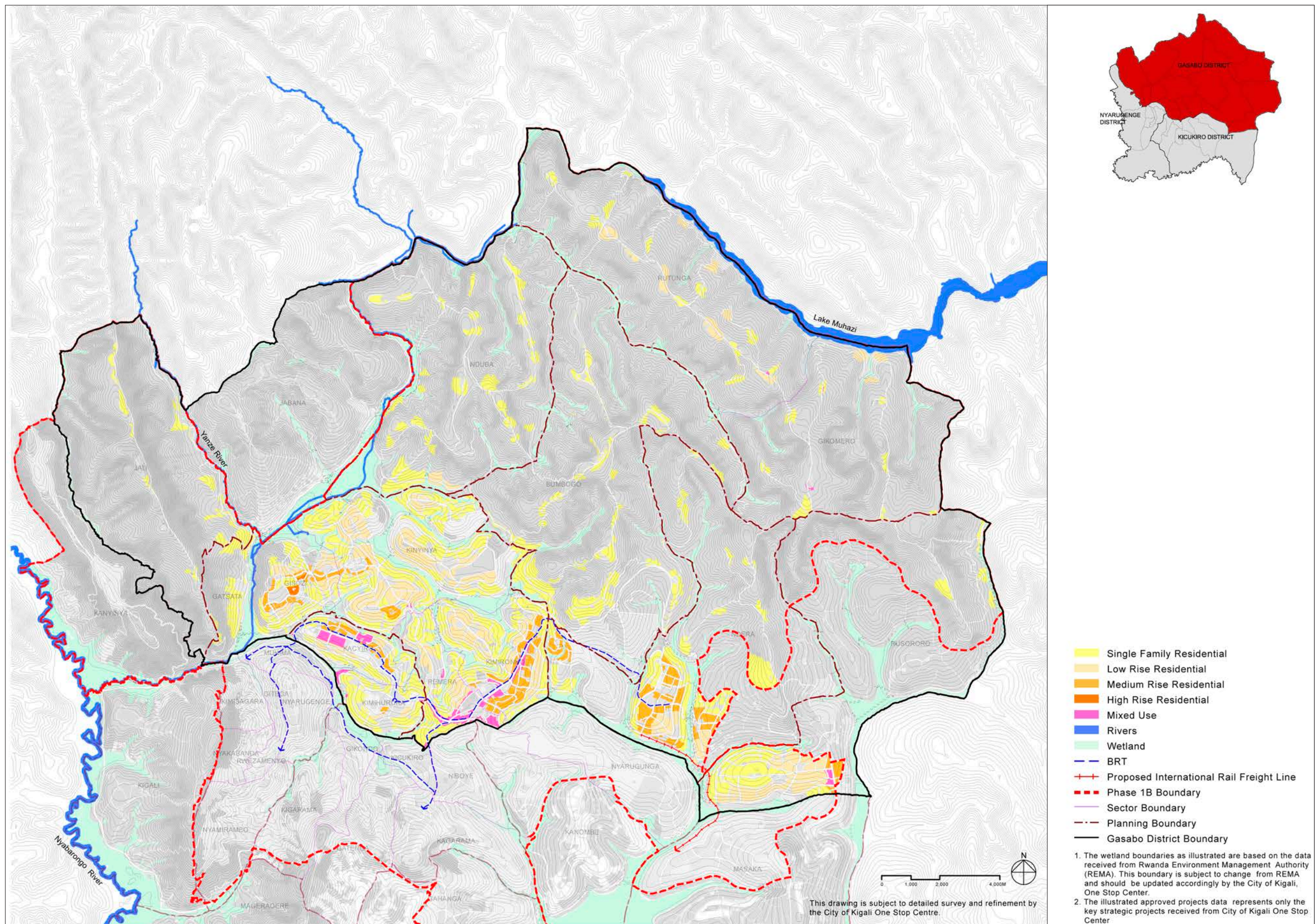


Fig.3.15 Gasabo District - Proposed Residential Use Plan 2025

3.9 Proposed Facilities Plan

Adequate facilities like schools, medical centres, post offices, religious centres, parlours, etc., are provided within each townships. These facilities are distributed as per the density and population catchment of the individual township.

With growing trends, such as a broader distribution of wealth, more leisure time, higher standards of education and greater public awareness of the importance of improving the quality of urban life, the demand for variety of outlets for social activities will be high. While deriving new standards and location for the facilities the following were the key considerations:

- Issues of finance.
- Land ownership.
- Practical limitations.
- Ease of accessibility through public transport.

3.9.1 PROPOSED FACILITIES PLAN YEAR X

DISTRICT LEVEL FACILITIES

District level facilities are the facilities that cater to needs of the residents of the entire district. These are provided keep in mind, existing facilities, approved projects and the immediate catchment population.

It includes facilities such as District Hospitals, Higher Education Institutes, Cultural Centres, Religious Centres, Regional Parks, Sports Facilities, Regional Library, Bus Interchange, Police Station, Fire Station, Post Office, Government Offices etc.

Some of the important public facilities include:

- All government offices in Kacyiru and Kimihurura sector have been retained
- Amahoro stadium with the Kigali Institute of education are proposed to be redeveloped into an Edutainment hub for the District.

- Kimironko market is proposed to become an important urban node and major tourist destination.
- Public library and museums have also been proposed in Kimironko sector.
- Universities have been proposed in Gisozi and Ndera sector.
- A regional level hospital is also proposed in Ndera Sector.
- New stadium and sports facilities are proposed in Ndera Sector.
- Religious and heritage facilities in the Rutunga sector have been retained and proposed to be developed into a tourist destination outside the city.

Refer to Appendix 2 for standard allocation of facilities in Gasabo District.

TOWNSHIP LEVEL FACILITIES

Township level facilities are the one's that cater to the needs of the residents of each township. A wide variety of commercial developments, industrial estates and public facilities have been proposed within each township. These facilities help to minimize the time need to travel beyond the township for local facilities. The Town centre comprises of an ICT institute, polyclinic, town park, cultural and religious facility, along with retail and offices. All these facilities are located close to public transport for ease of accessibility. Other facilities such as schools, sports fields and cemeteries are also provided in each township. The standard space provisions for each facility is laid out in Appendix 2. The proposed Facilities Use Plan Year X for Gasabo district is illustrated in Fig.3.17

NEIGHBORHOOD FACILITIES

Neighborhood facilities cater to approximately 15,000-20,000 people. Everyday facilities such as neighborhood centres, primary schools and local parks are provided for walking distance to residents. Special care is taken to revitalise existing

health, civic and commercial facilities and integrate further with new facilities forming urban social nodes. These facilities include

- Neighborhood park with neighborhood centre.
- Health care centre with neighborhood centre.
- Community centre with neighborhood centre.
- Primary schools.
- Secondary schools.

These facilities are made accessible by a non motorized transport network. Also, these facilities are sited as per the township model within catchment areas and are close to arterial and collector roads.

3.9.2 PROPOSED FACILITIES PLAN 2025

The 2025 plan focuses on strengthening the existing facilities and developing new facilities along with the proposed new infrastructure. New facilities would be provided in the City fringe area of Kimironko and Remera sectors. The district hospital and Sports and recreational Centre would be some of the first few projects to be developed. Access to facilities and infrastructure in unplanned areas of the district would be increased by reorganizing and rejuvenating these areas.

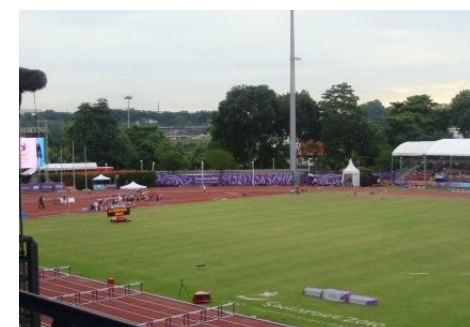
The proposed Facilities Use Plan 2025 for Gasabo District are illustrated in Fig.3.18



Imagery: Public Library and Neighborhood Parks



Imagery: Urban Recreational features



Imagery: Sports Facilities and Health Centres



118

Schools by year X



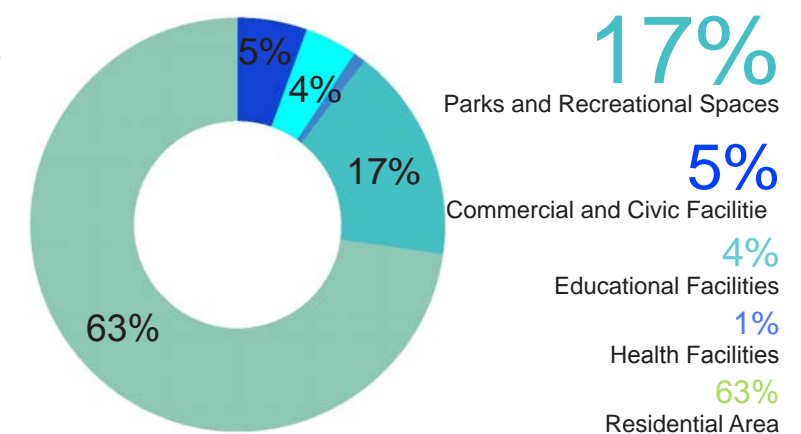
69

Neighborhood Centres by year X



66

Health Facilities by year X



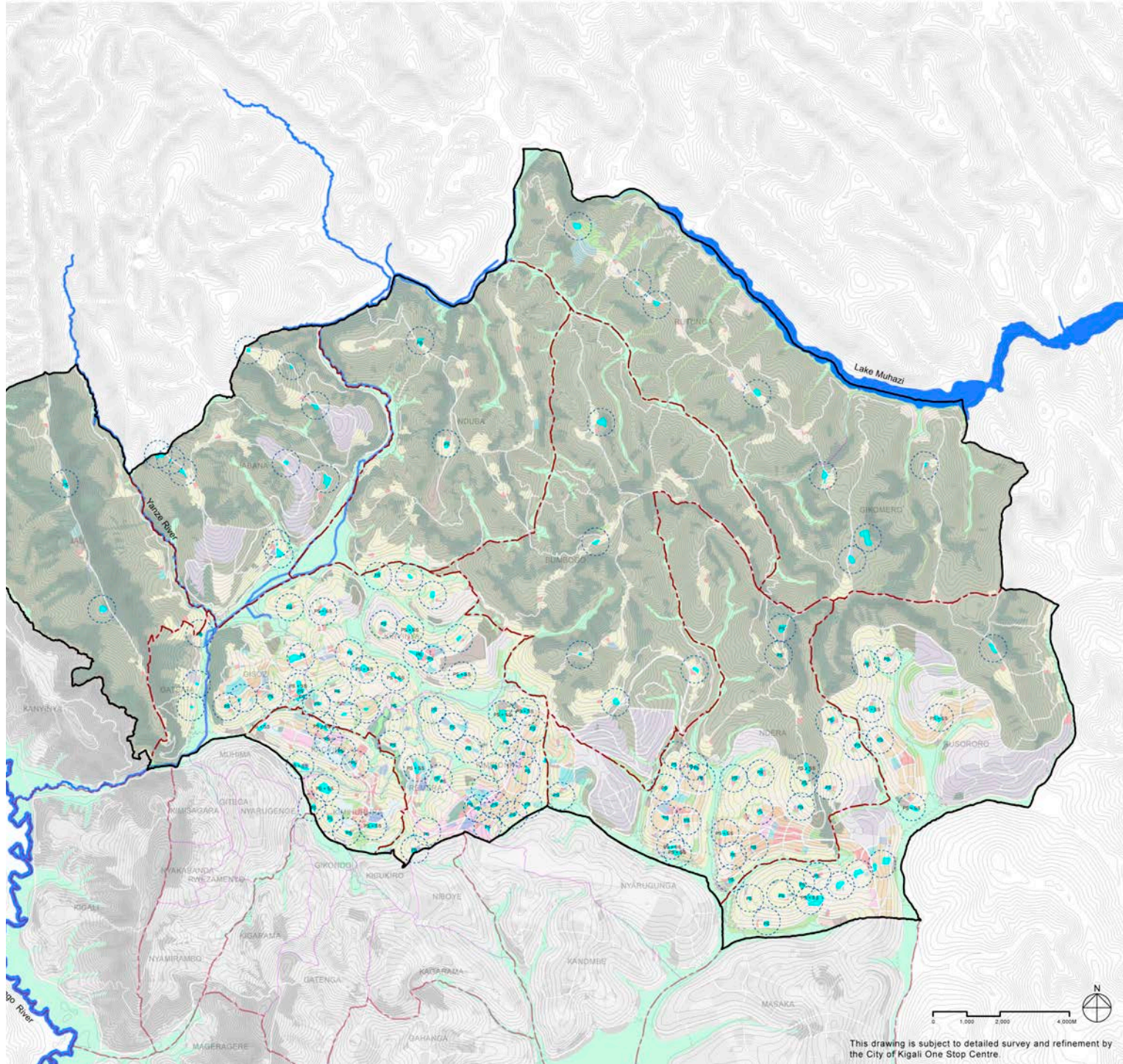


Fig.3.16 Gasabo District - Proposed Primary schools within 400m of walking distance

3.9.3 PROPOSED EDUCATION FACILITIES PLAN

With an average literacy rate of 48% in Gasabo District¹, one of the key priority areas for development is Education. The Development Guideline Plan prioritizes the provision of standard primary, secondary and tertiary education facilities across the whole city in the light of long-term education policies, demographic changes and future manpower demand.

As per the proposed Township model, a few key aspects for siting Educational facilities are as follows:

- Existing primary schools have been recognized in the Master Plan.
- Primary schools are sited within 400m of walking distance in each neighborhood.
- There is a shared use of facilities with the Community in view of the shortage of school sites. In the urban areas, consideration is given for schools to share the use of adjacent community and recreation facilities (the neighborhood parks, assembly grounds, community halls etc). Where appropriate, government schools should be made available for use by the community.
- At some instances there is a clustering of primary and secondary schools. This is done in either pairs or in clusters. This

would help to better utilise land and other resources.

- Facilities for technical education and vocational training are sited close to the town centre in the township.
- All existing schools in the rural areas would be retained and rejuvenated. Based on the catchment population additional schools have also been introduced in the rural areas.
- Approximately 77 primary schools and 17 secondary schools have been provided in Gasabo District. Additional 21 schools with shared primary and secondary schools have also been provided.

The proposed primary and secondary schools are illustrated in Fig.3.16

1 Gasabo District Development Plan 2006,

PS Primary School
PS+SS Primary + Secondary School
400m Radius Catchment
Rivers
Wetland
Sector Boundary
Planning Boundary
Gasabo District Boundary

1. The wetland boundaries as illustrated are based on the data received from Rwanda Environment Management Authority (REMA). This boundary is subject to change from REMA and should be updated accordingly by the City of Kigali, One Stop Center.
2. The illustrated approved projects data represents only the key strategic projects received from City of Kigali One Stop Center

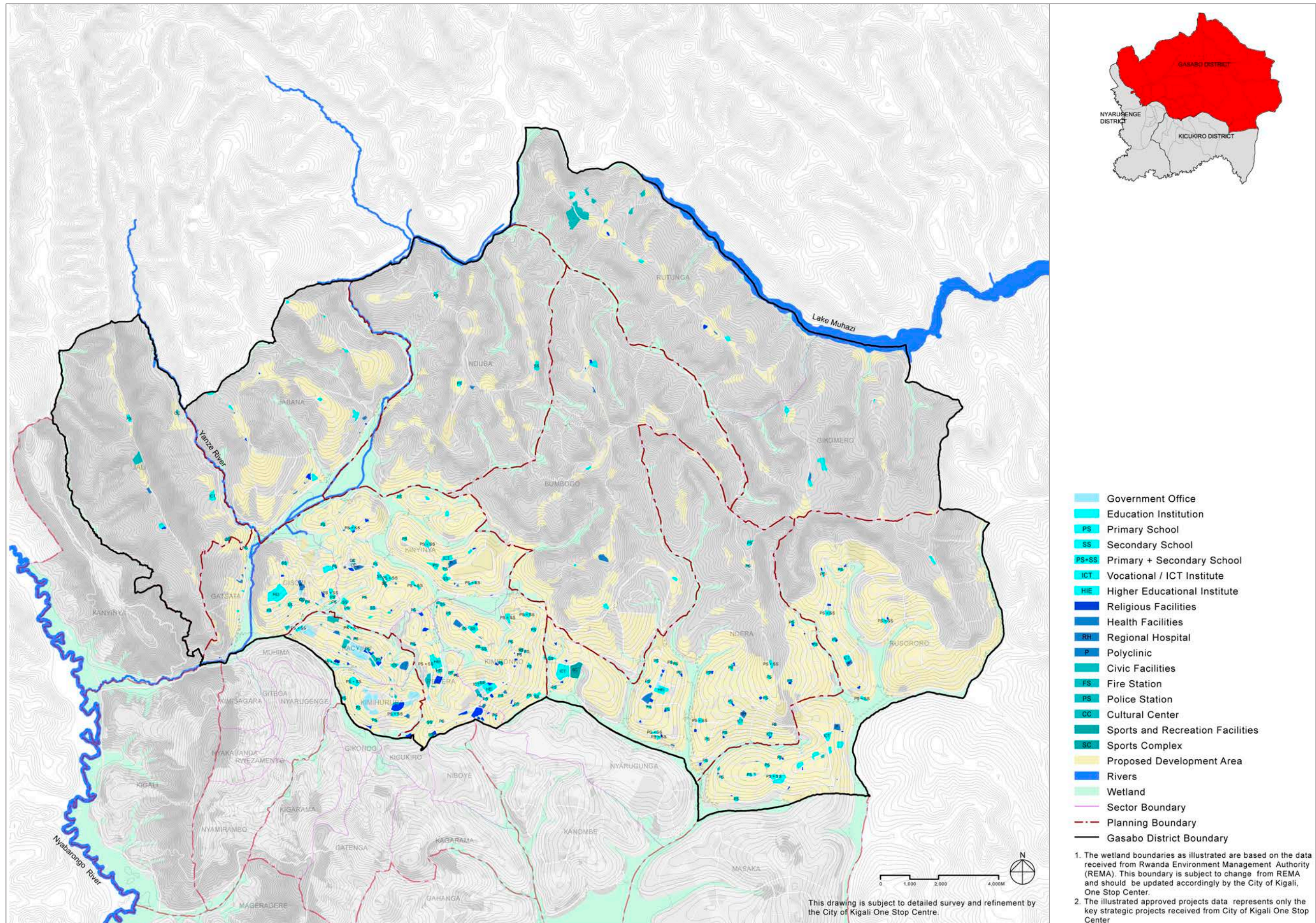


Fig.3.17 Gasabo District - Proposed Facilities Use Plan Year X

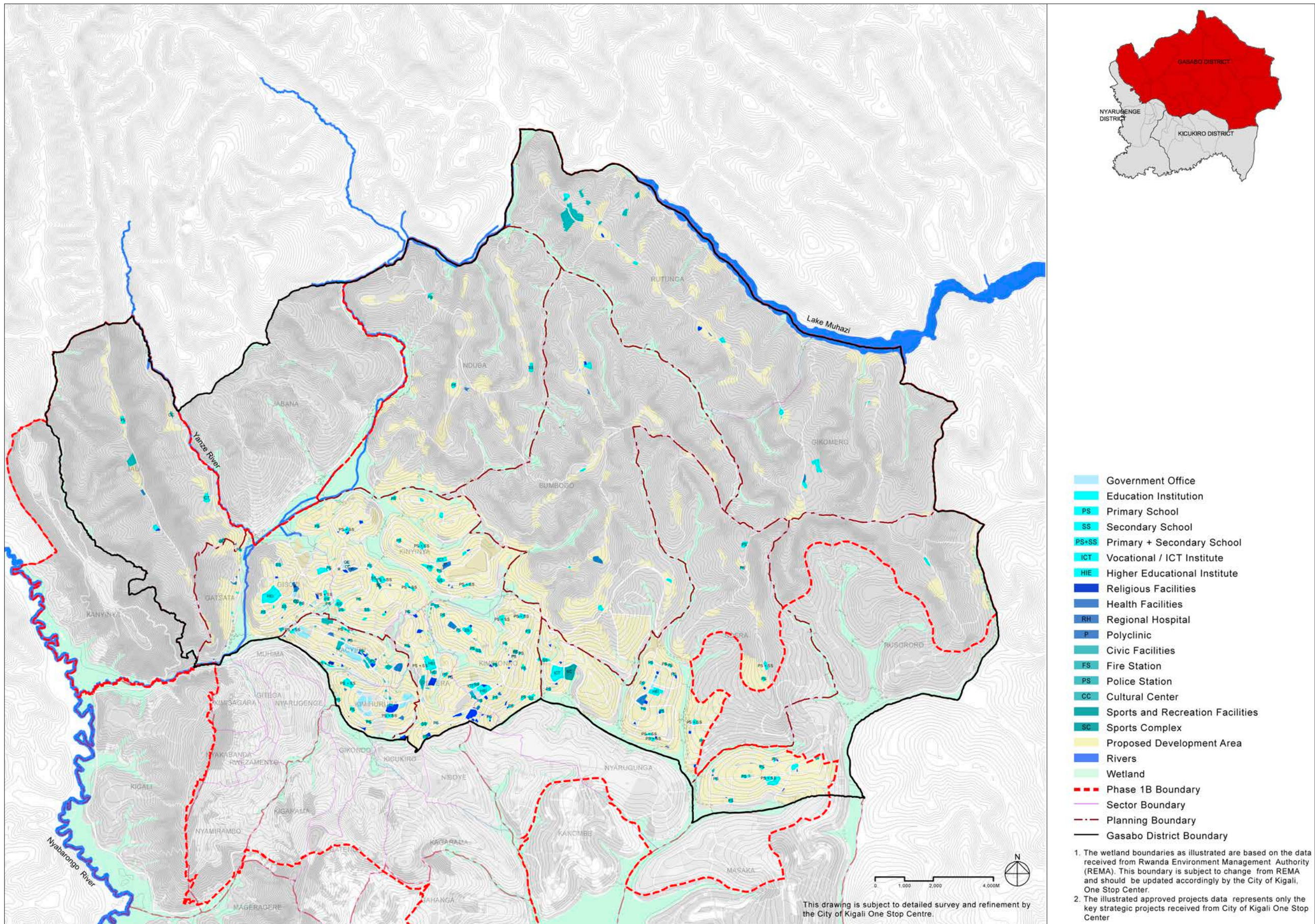


Fig.3.18 Gasabo District - Proposed Facilities Use Plan 2025

3.10 Proposed Environmental Strategies Plan

The City of Kigali is endowed with natural features like lake, rivers, streams, wetlands, forests and steep slopes combined with the existing agriculture areas that constitutes 83% of the City's land area. In The Gasabo District, 60% of the land is under natural features.

3.10.1 PROPOSED ENVIRONMENTAL STRATEGIES PLAN -YEAR X

The key objective for environmental conservation in the Gasabo District is to protect existing forests, steep slopes, watersheds and wetlands. In line with the recommendations from the Regional Concept Plan and the Detailed Master Plan proposes the following environmental management measures:

- **Slope Protection-** In Gasabo District, 34.5% of the land categorised as steep slopes, greater than 20% slope gradient. These areas with steep slopes need to be managed by using appropriate development strategies.
- **Forest Conservation** - In Gasabo District

Fig.3.19 presents the existing slope analysis map of Gasabo District. Table 3.6 illustrates the type of development allowed in urban and rural areas.

URBAN AREA DEVELOPMENT	SLOPE
any development	<20%
Conditional Use	20-40%
afforestation and no development zone	>40%
RURAL AREA DEVELOPMENT	SLOPE
Agriculture/ development	<20%
farming and forestry/ conditional	20-40%
Afforestation and no development zone	>40%

11.5 % of the land is occupied by existing forests. These forests are conserved by zoning them as protected areas. Further plantation, agriculture, and agro-based activities are proposed on moderate slopes to increase vegetation and also help mitigate soil erosion.

- **Improve Surface Run Off** - Eliminate the risk of landslides and improve surface run-off quality by adopting appropriate slope protection measures in areas categorised as moderate slopes (20%-40%).
- **Restore Natural Drain Channels** - Restore and protect the watershed by reclaiming natural drainage courses and wetlands from developments. Introduce riparian buffers along wetlands and river streams.
- **Wetland Protection-** Implement a 20m environmental buffer for wetlands, 10m for rivers and 50m for lakes¹. Use natural vegetation along these buffers.
- **Open Space Strategy** - Scattered forests and open spaces around wetlands and waterways in urban area are to be developed as nature parks which can be used for passive recreation. Large open areas with slope > 20% which cater to township recreation are to be developed as community parks within each township.

The Proposed Environmental Strategies Plan- Year X for Gasabo District is illustrated in Fig.3.21

3.10.2 PROPOSED ENVIRONMENTAL STRATEGIES PLAN -2025

Land categorised as urban areas in Ndera and Rusuroro sectors can be utilised for agriculture upto the year 2025. In the

1 Kigali City, organic Law



Imagery: Agriculture on steep slopes



Imagery: Water drain and Steep Slopes



Imagery: Existing Wetlands



Imagery: Existing Forests

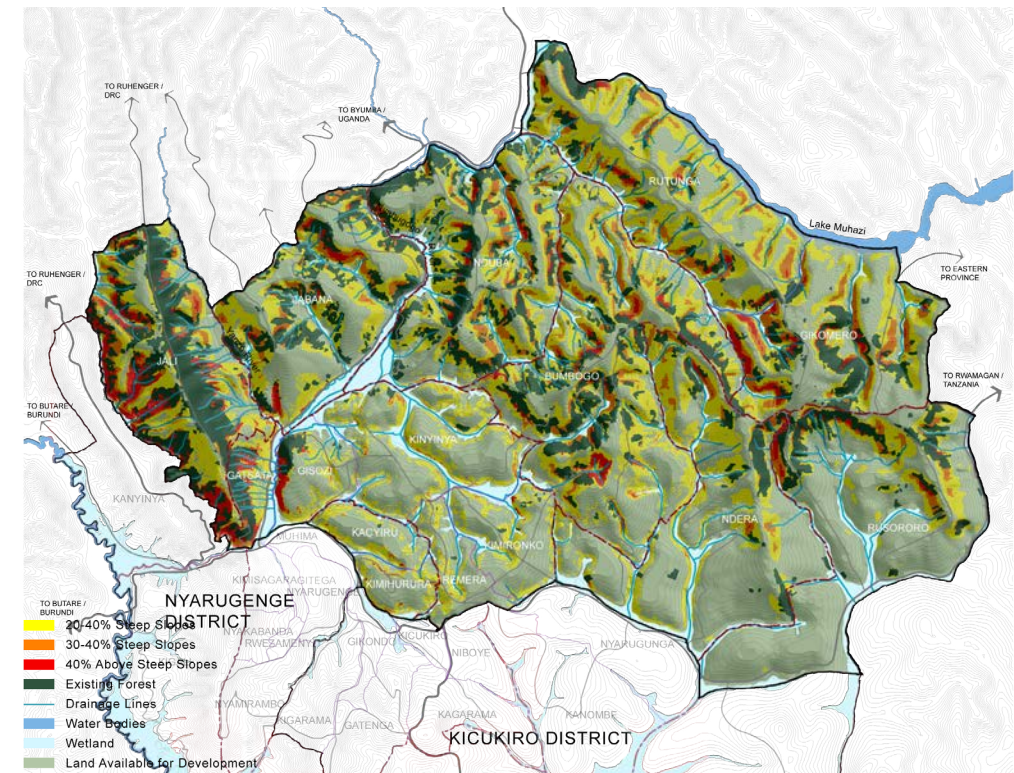


Fig.3.19 Gasabo District -Existing Slope Analysis map

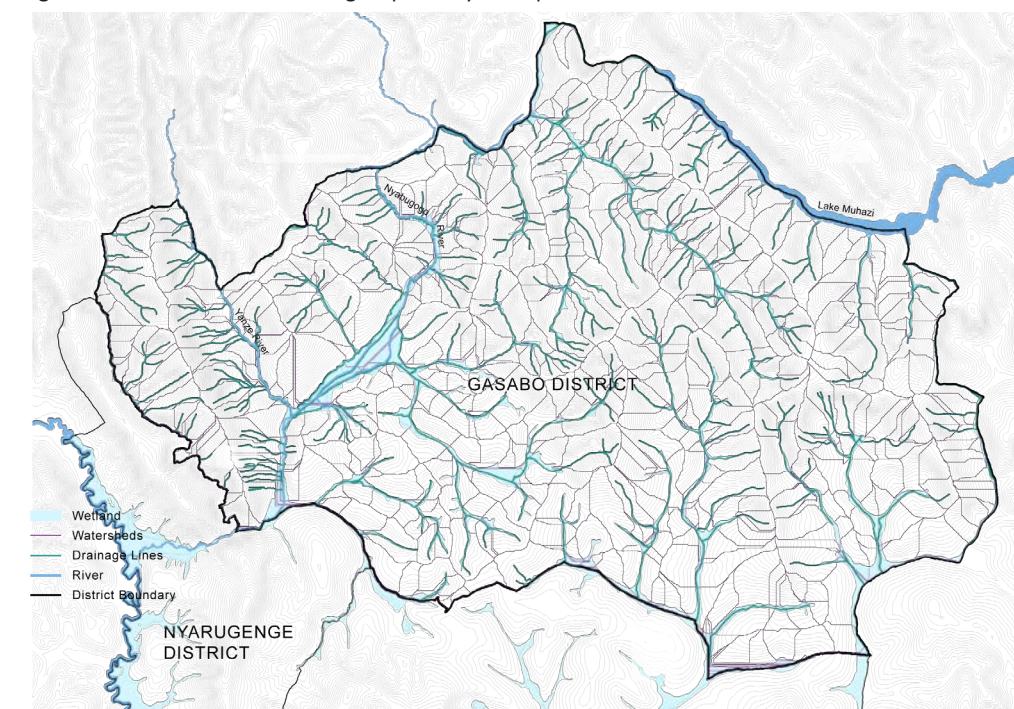
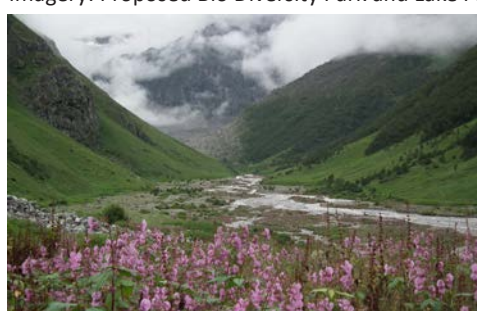


Fig.3.20 Gasabo District - Existing Watershed and Natural water drainage channels



Imagery: Proposed Bio Diversity Park and Lake Park



Imagery: Proposed Flower Valley and Sports Hub



Imagery Proposed Golf Course and Local Park



3.11 Proposed Green and Blue Plan

The City is endowed with many hills and wetlands. These natural assets are identified and protected to ensure that the residents can enjoy them today as well as secure them for the future generations. These features are utilized to generate the economy and also become special attractions of the city. The three different districts in the City are developed according to three key themes taking advantage of the existing traditional developments:

Gasabo- 'The Land of Origins' - Raw Natural Character

Development Theme - **NATURE AND AGRO BASED TOURISM**

3.11.1 PROPOSED GREEN AND BLUE ATTRACTION PLAN - YEAR X

Rural areas of the Gasabo District have relatively steep undulating terrain. Approximately 60% of the district Land area is delineated as wetlands, steep slopes and forests. Large areas of the district have been demarcated as rural. This limits developments in these areas to imudugudu

and agricultural use. The Green and Blue Plan capitalizes on existing natural features of the urban and rural areas of the District to create new parks and recreational features.

The key nature areas identified in the District are as follows:

NATURE BASED TOURISM ATTRACTIONS

- A Heritage Park in Rutunga is to become one of the major tourist attractions in the Gasabo district. It is one of the largest nature areas connecting important sites in Rutunga sector. These sites are of important cultural and heritage value to the nation.
- Agro Tourism Valley in Nduba and Rutunga is proposed along the wetlands dividing the two sectors. It will introduce tourists to the village life in Rwanda.
- Other tourism attractions include the Mount Jali Ridge Park and the Eco Energy farms at Gihogwe.

PARKS & RECREATION ATTRACTIONS

- A Water park and resort at Lake Muhazi is part of the tourism plan to attract tourists to Lake Muhazi. In order to conserve the sensitive ecology of the lake, a buffer of 50 m is proposed around the Lake.
- The southern wetland stretch along Kacyiru, Ndera and Rusuroro, to be developed as a Flower Valley promoting the City's horticulture industry. The proposed Flower Valley creates value added agriculture, while creating an attractive feature in the city.
- Horticulture Park at Gisozi, will be one of the largest urban parks in the Gasabo District, at close proximity to the central areas.
- A new, central green is proposed around the Amohoro stadium and Kigali Institute of Education. This would be a vibrant urban park in the city.

Apart from these, a variety of other open green spaces are proposed at the town and

neighborhood level.

A hierarchy of open spaces are proposed to cater to various need such as:

REGIONAL PARKS - These parks are large open spaces which utilise the natural topography and wetlands that are unique to the district.

- **NATURE PARKS**- Major natural water drainage channels within in each sector, steep slopes in the district are revitalized and converted to nature parks.
- **WETLAND PARK**- Wetland Parks are developed around the existing wetlands and proposed wetland buffers. These collect and recycle surface runoff coming from surrounding areas. These also feature indigenous plants and allow passive recreation use.
- **EDGE PARKS** - The wetland buffer is developed in to edge parks. These would offer a continuous pedestrian and cycling network.

TOWN PARKS - supports recreational and leisure activities while offering a unique identity to the township. Town park is proposed with each town centre. Town Parks of approximately 5 ha have been provided in each township.

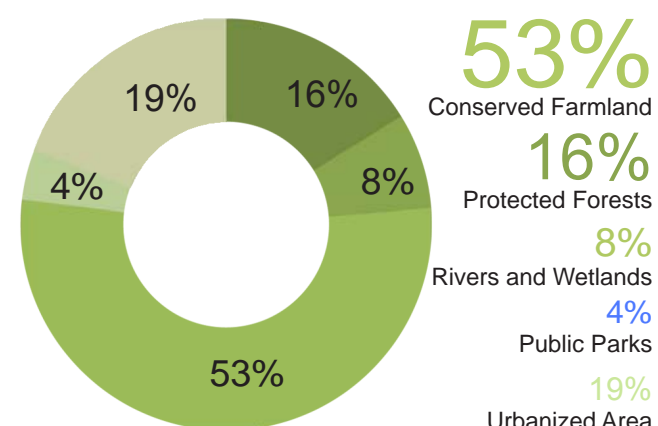
LOCAL PARKS - cater to the neighborhoods. They are approximately 1.5 ha each, and are programmed for active and passive recreation. A neighborhood park is provided within each neighborhood centre. These are located near residential developments for easy accessibility and help to promote a sense of community.

The proposed key nature attractions plan for Gasabo District are illustrated in Fig.3.22

35,000 Ha
Green Area in Gasabo Dist

80%
Open Space in Gasabo District

17,00 Ha
Proposed Public Parks



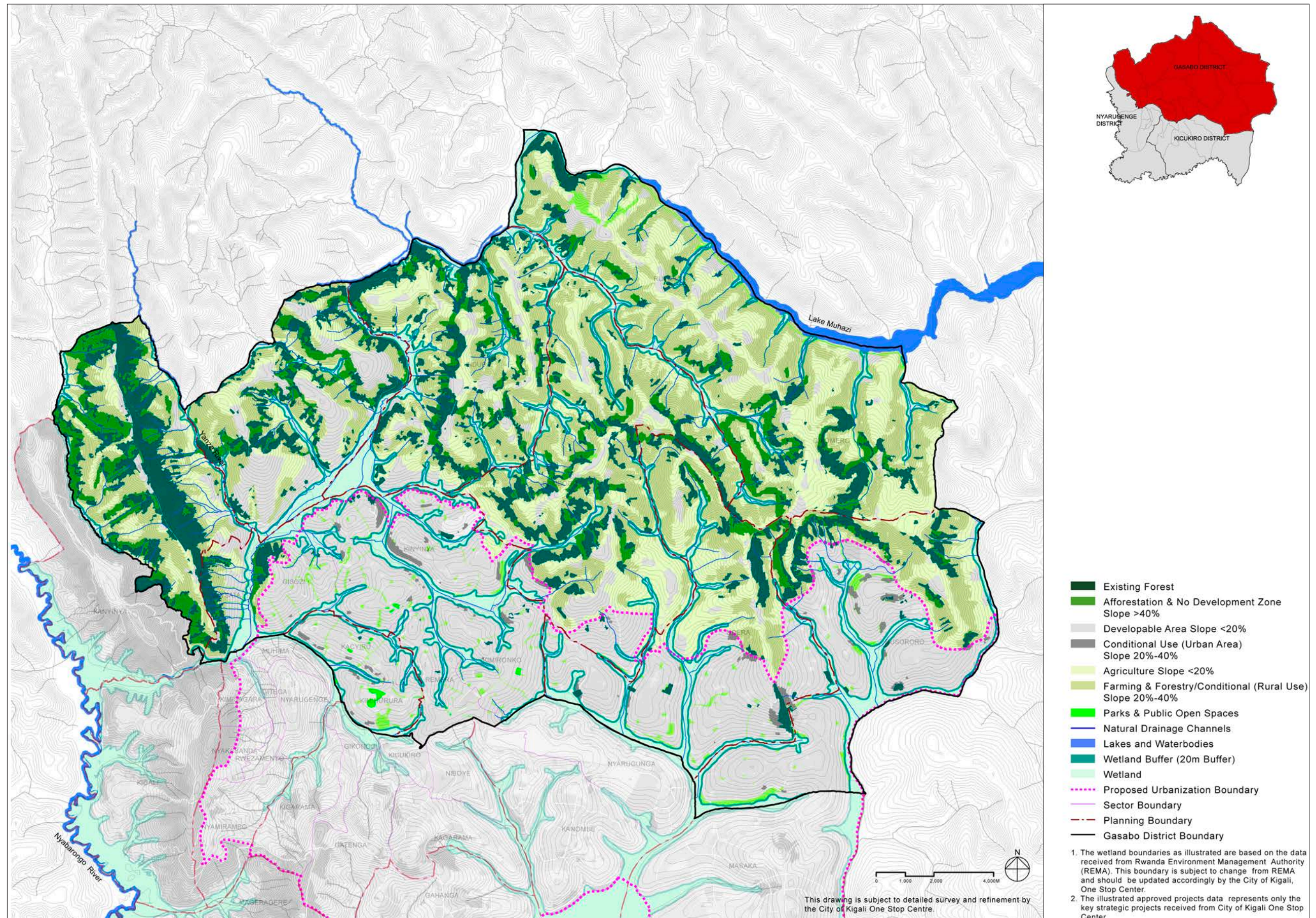


Fig.3.21 Gasabo District - Environmental Strategies Plan

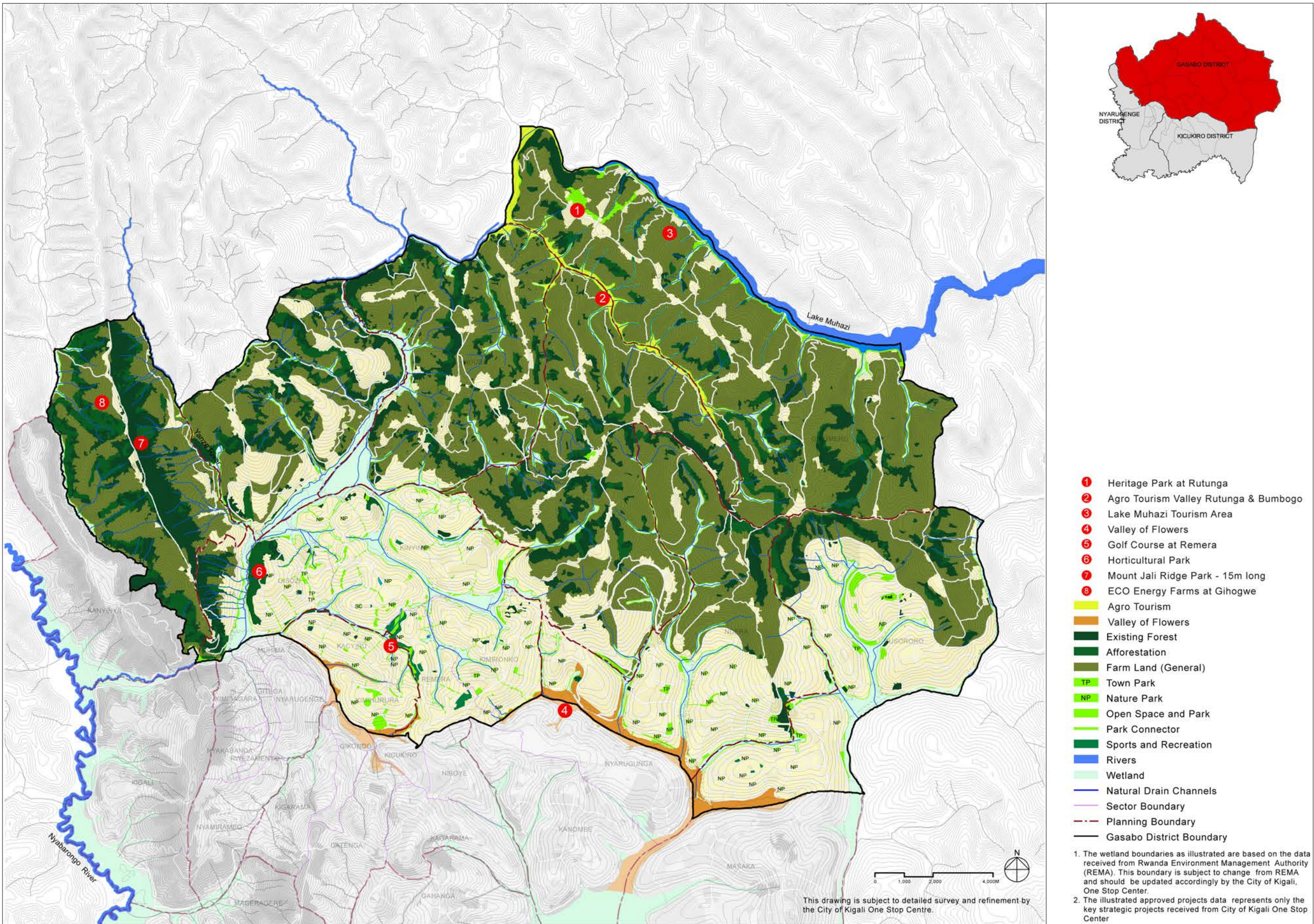


Fig.3.22 Gasabo District - Proposed Green and Blue Plan

3.12 Proposed Transportation Plan

The City of Kigali is well connected to other parts of Rwanda and beyond by a network of National Roads. The paved roads are mainly concentrated within the urban area and the road network is not so extensive beyond these areas. Many of the major roads outside the main urban area follow natural topography and are located primarily on ridges or in valleys. The unpaved roads are mostly single carriage way, without any uniform side table. Public transport is limited to mini buses, motor taxis and cycle taxis.

INTEGRATING TRANSPORT AND LAND USE PLANNING

Transport and land-use are related to each other. Planning a compact city, served by public transport provides viable alternatives to using cars. Hence, land-use planning is critical in managing travel demand through activity areas and providing for alternative transport choices. The planning of transportation for the City of Kigali are guided by the following planning considerations:

- Township organization- to achieve compact, walkable neighborhoods with easy access to daily necessities, schools, health care & recreation to achieve a high mode share of non-motorised transport (NMT).
- City organization- To Promote green transport through Public Transportation. Public Transit is run along high density corridors to connect to employment nodes & regional facilities and achieve a maximum 1 hour travel time within the City.
- To maintain high modal share of public transit in the City.
- To have efficient management of private transport & parking in the City through

clear hierarchy of road networks.

3.12.1 GASABO DISTRICT - ROAD NETWORK PLAN - YEAR X

The Road Network Plan Year X is an extensive city-road network connecting the District as well as the City. It caters to projected economic development while integrating the Land Use for a ultimate projected population of approximately 5 mil by Year X.

The plan proposes the following:

- To utilize and upgrade existing roads and alignments.
- To expand the existing network and create a hierarchy of roads.

A clear hierarchy within the City’s road network ensures smooth distribution of traffic and efficient connectivity. The Structure Plan proposes a ring and radial system of highways with an inner ring containing the City Fringe areas & other rings for heavy vehicle movement between industrial clusters.

The proposed Road Network Plan Year X is illustrated in Fig.3.24

The City is proposed to be served by the following major road types:

EXPRESSWAY

Expressways connects the three districts of the city and also serve as bypass roads. These help to bypass the city traffic when travelling long distances. They are generally located along the low lying areas (outside the wetland buffer)at 3 km to 4 km spacing. Approximately 92 km long network of expressways are to be developed in the Gasabo district by Year X.

MAJOR ARTERIAL AND MINOR ARTERIAL

A network of Arterials is proposed to

facilitate travel between the various sectors of the District. Most of the public transport system are proposed to run along the major and minor arterials. These are mostly provided at spacing of 800-1000 m, forming a grid of roads in the district. A network of approximately 310 km in length of major and minor arterials are proposed to be developed in Gasabo District by Year X.

COLLECTOR

Developments are not allowed to take direct access from arterial roads. Access is to be filtered in from collector roads. Collector roads are mostly provided in residential areas within the district. A network of approximately 260km length of collector roads is to be developed in the Gasabo District by Year X.

Refer to the proposed road type and classification illustrated in Fig.3.23.

3.12.2 GASABO DISTRICT - ROAD NETWORK PLAN 2025

The key strategies for the Road Network Plan 2025, are as follows:

- To continue expanding and upgrading the existing road network
- To Secure road reserves for future roads
- To Identify and develop key road linkages

The proposed road network for the year 2025 is illustrated in Fig.3.25

3.12.3 PUBLIC TRANSPORTATION PLAN

Majority of the population in Gasabo District is dependent on private vehicles or moves from one place to another on foot. The goal for the District is to provide an efficient public transport network which will ferry current and future populations from one place to another. This would help to reduce the people’s dependency on

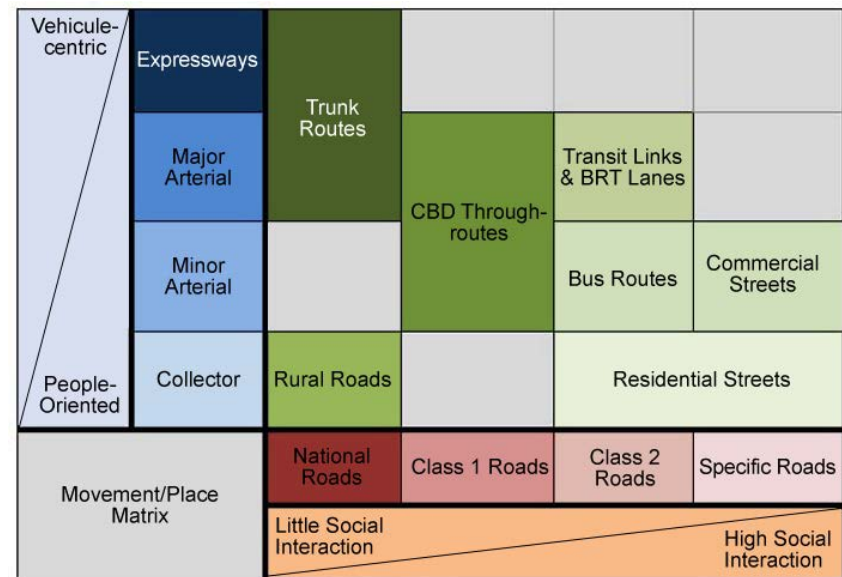


Fig.3.23 Road Type and Classification

private vehicles. The aim is to achieve 70:30 ratio for Public: Private Transport. Two major modes of Public transport proposed are as follow:

BUS RAPID TRANSIT (BRT)

The proposed BRT network connects the townships with the CBD and employment nodes. It runs along the major arterial connecting important commercial centres and Industrial estates. The key proposals for BRT are as follows:

- Two BRT routes have been proposed in the District. One will connect the CBD in Muhima to the proposed Fringe centre in Kinyinya. The second will connect the CBD in muhima to the proposed Industrial estate in the Rusuroro sector.
- The second BRT route is to be built in two phases. First phase will run from the CBD to the proposed Town Centre in Ndera, connecting the Free Trade Zone along the route by year 2025. It the second phase it will further connect to and terminate at the Rusuroro Industrial Estate by Year X.
- The BRT network will have stops approximately every 600m.

- The BRT will cover a distance of approximately 40 Km by Year X.

MASS RAPID TRANSIT (MRT)

The proposed MRT connects the major commercial, employment and industrial nodes to the CBD. The MRT network poses a great challenge due to the district’s hilly terrain with steep slopes along the wetlands. Hence, the proposed MRT will run along the wetlands connecting the major commercial nodes. The district needs to build the required catchment population for the construction of MRT. The decision for MRT construction initiation rests on the economic and population growth achieved by the year 2025. The key proposals for MRT are as follow:

- One MRT route is proposed in Gasabo District. It starts at the CBD in Muhima and runs all the way to the Ndera Regional Centre and further ahead to Kicukiro district.
- MRT stops are proposed at a distance of approximately 1 km from each other.
- The MRT network will cover a distance of approximately 25 km by Year X

The Proposed BRT and MRT network Year X and 2025 for Gasabo District are illustrated in Fig.3.26 and Fig.3.27

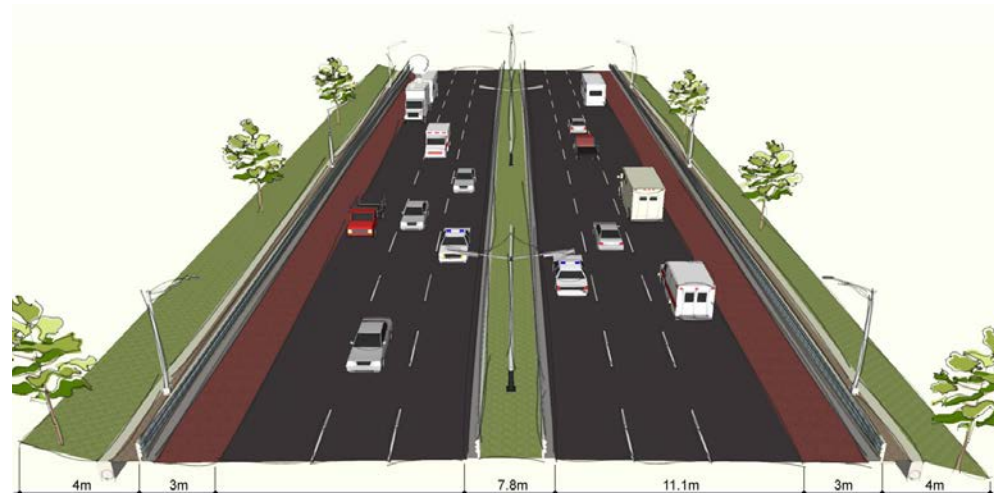
Non-Motorized Transport (NMT)

Non-motorized transport will be an important part of the District's infrastructure in order to promote a sustainable transport network. This will also be part of recreational spaces in the District. The Non motorized transport is promoted at three levels.:

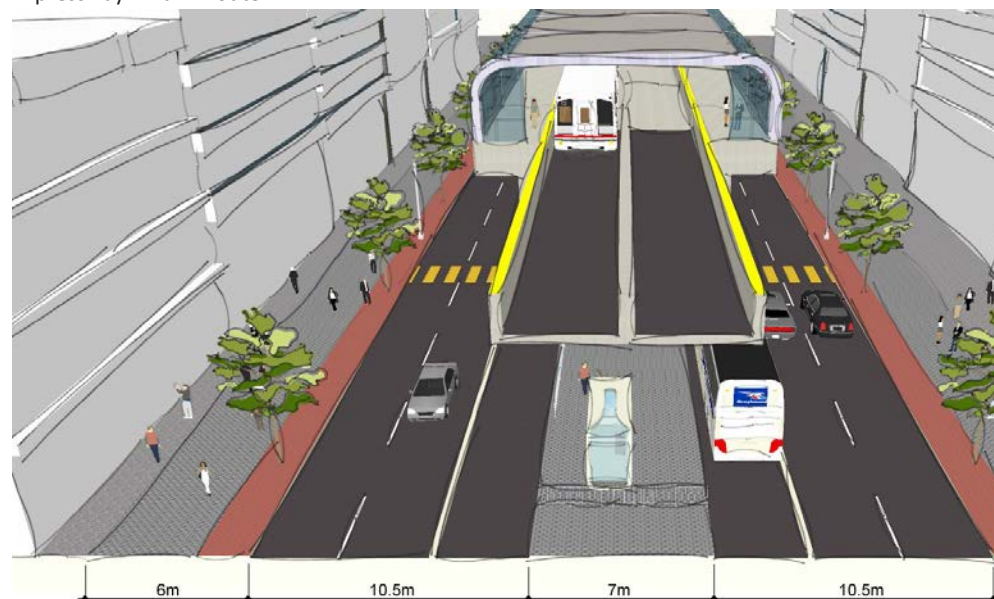
- City level: Effort is made to provide a seamless green network of pathways, cycle lanes and green connectors along some of the most scenic parts of the city. Originating from the CBD at Muhima, the green network connects the Regional Centres, the Fringe centres and key Civic nodes in the city via the green network.
- Planning Area level: Similar to the city level green network a second layer of green network has also been provided which help to connects the commercial nodes, civic facilities and townships. This green network is to promote a non-motorized transport network through which people travel within the townships using sustainable transport options like bicycles.
- Additional linkages along wetlands in the form of wetland parks and promenades promote bicycle and pedestrian connectivity. The proposed wetland buffer further creates a continuous protected green network.

Strategies to promote NMT are as follows:

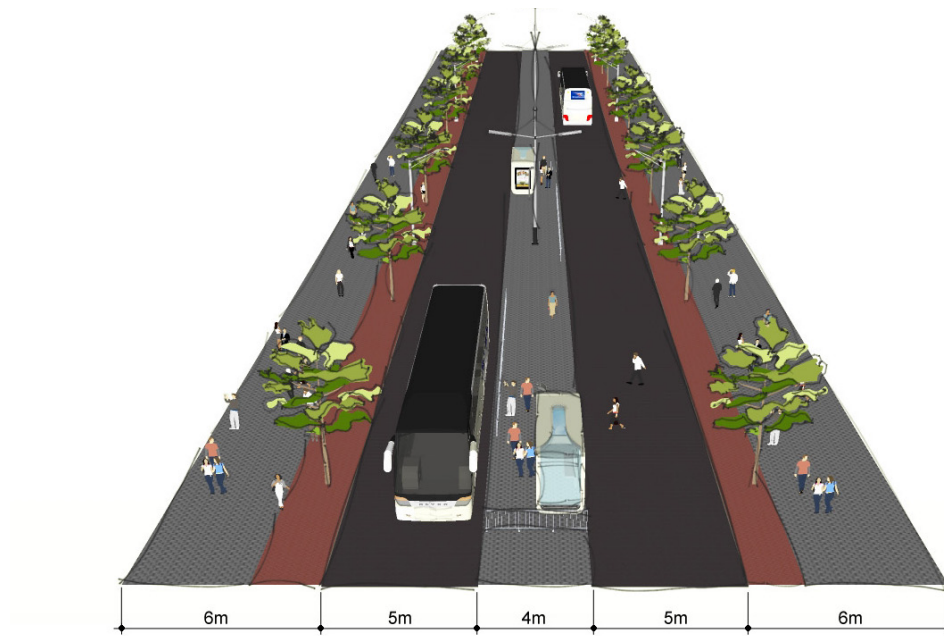
- To construct a network of pedestrian pathways in the green space which link to roads in the District.
- To promote the use of bicycles by providing dedicated cycle lanes along major roads.
- Dedicated cycle lanes are also part of the BRT and MRT network.
- To promote the use non-motorized transports for travel within the townships and neighborhood commercial. This is done by locating neighborhood centres at a walking distance of no more than 500m.
- To provide for road side planation along all roads including local roads to make walking and cycling comfortable within the neighborhoods.



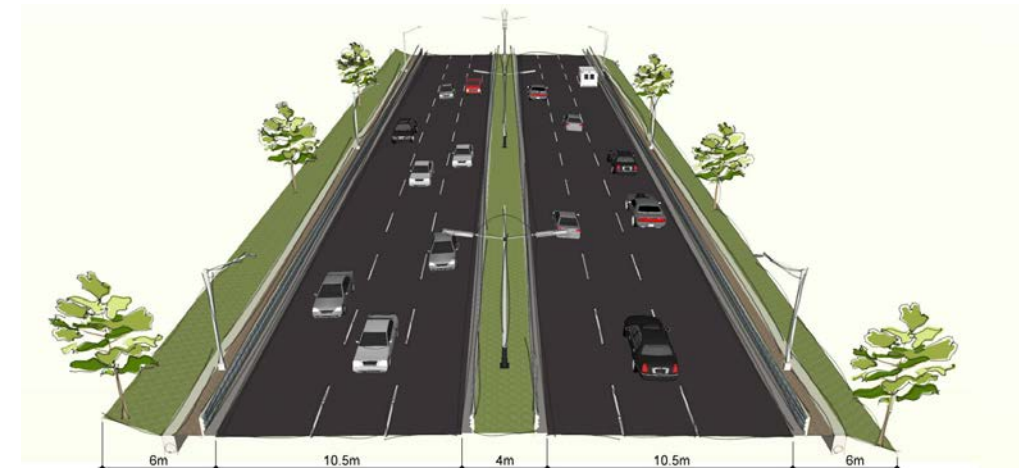
Expressway - Trunk Route



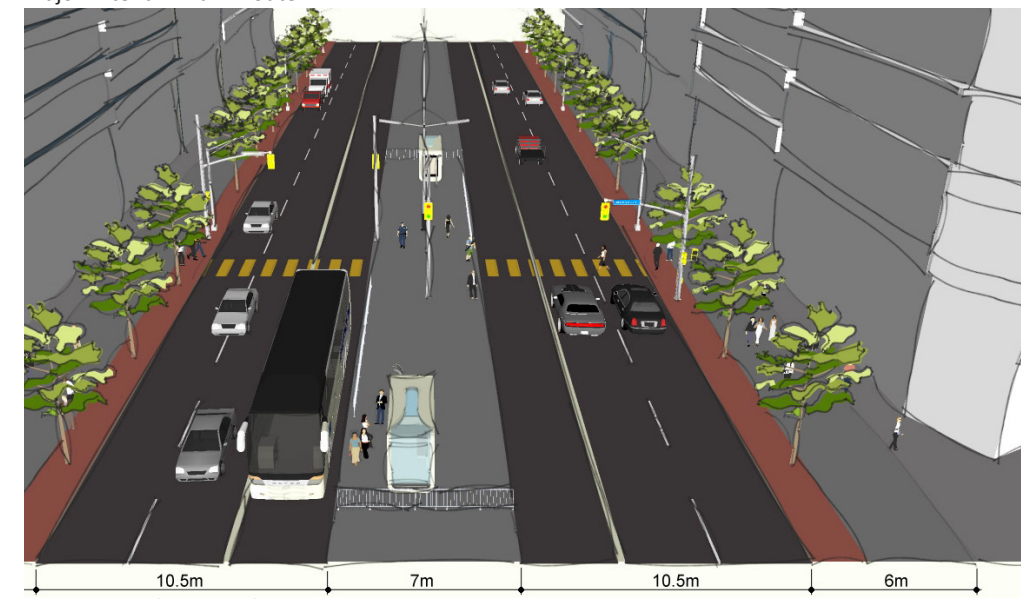
Major Arterial - MRT+ 2 lane



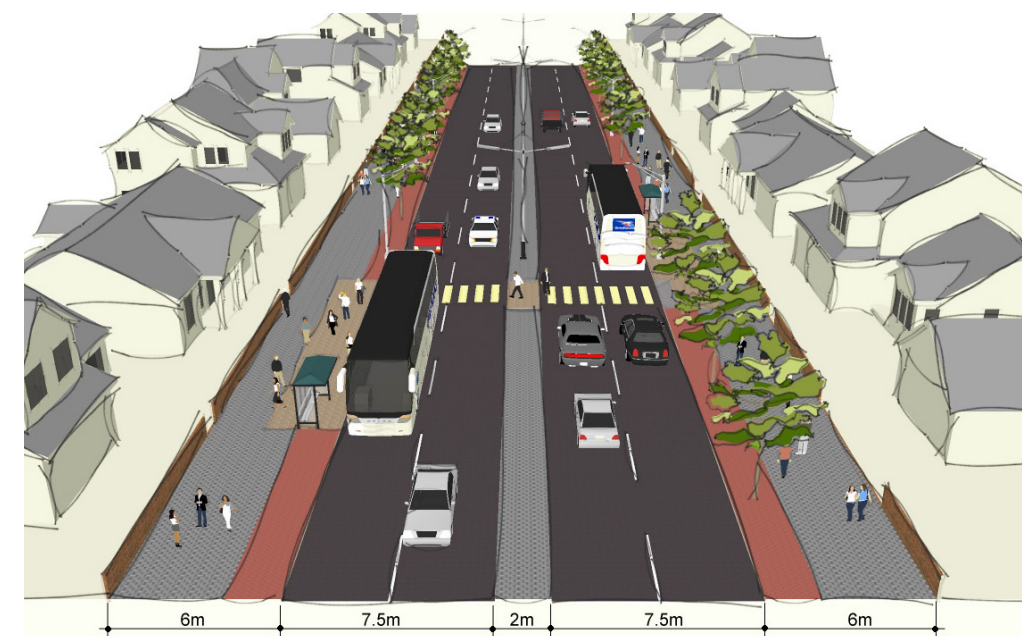
Minor Arterial - BRT only



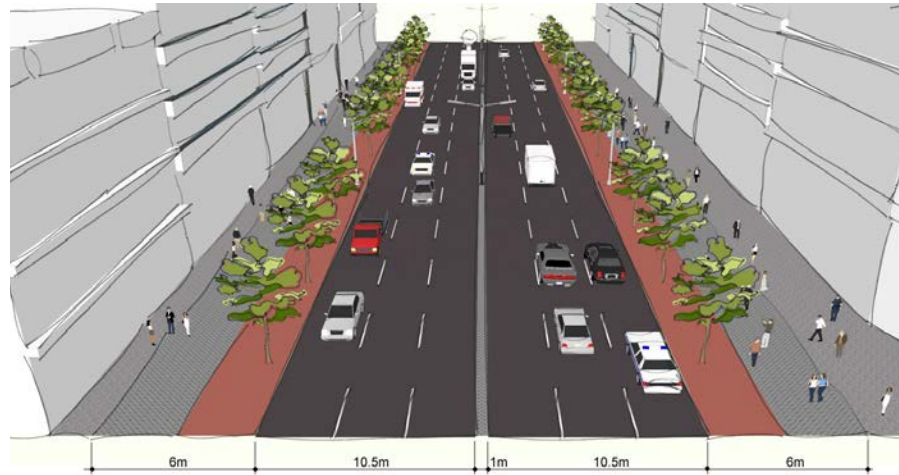
Major Arterial - Trunk Route



Major Arterial - BRT+ 2 lane



Minor Arterial - Bus Routes



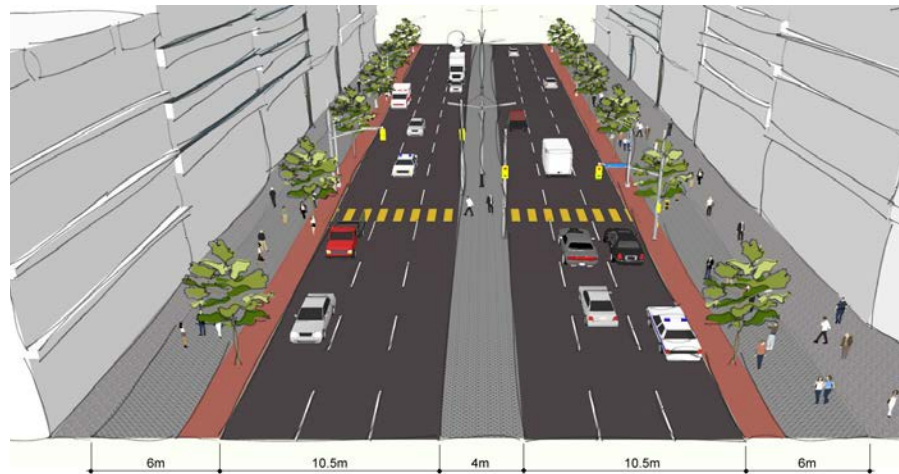
Major Arterial - CBD



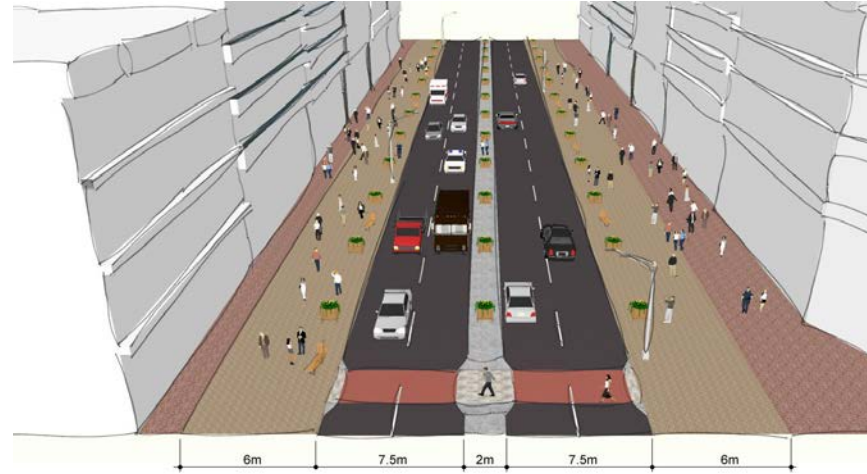
Minor Arterial - CBD



Typical Split Road Section in City Area along Steep slopes



Major Arterial - 3 lane



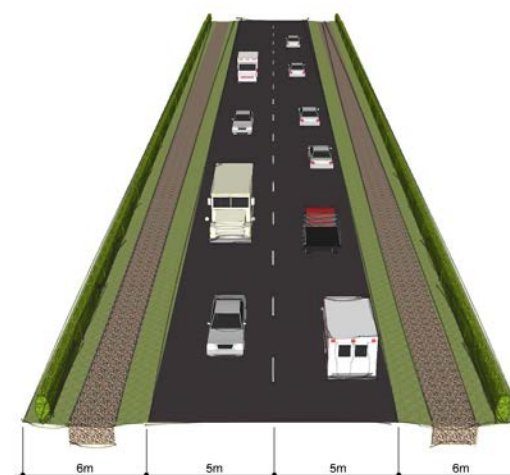
Minor Arterial - Commercial Road



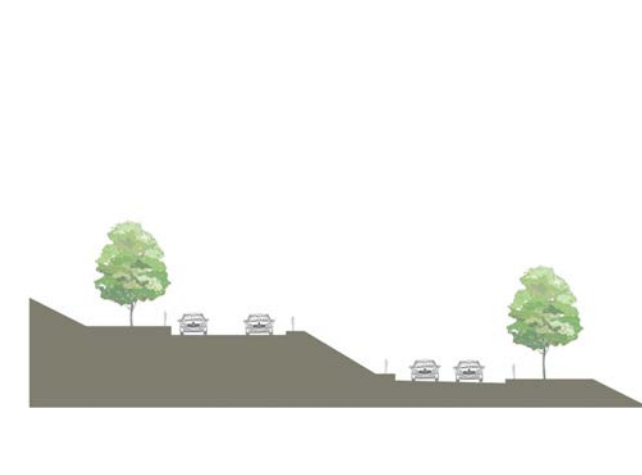
Typical MRT corridor in City Area



Collector Road - Residential Street



Collector Road - Rural Road



Typical Split Road Section in Rural Areas

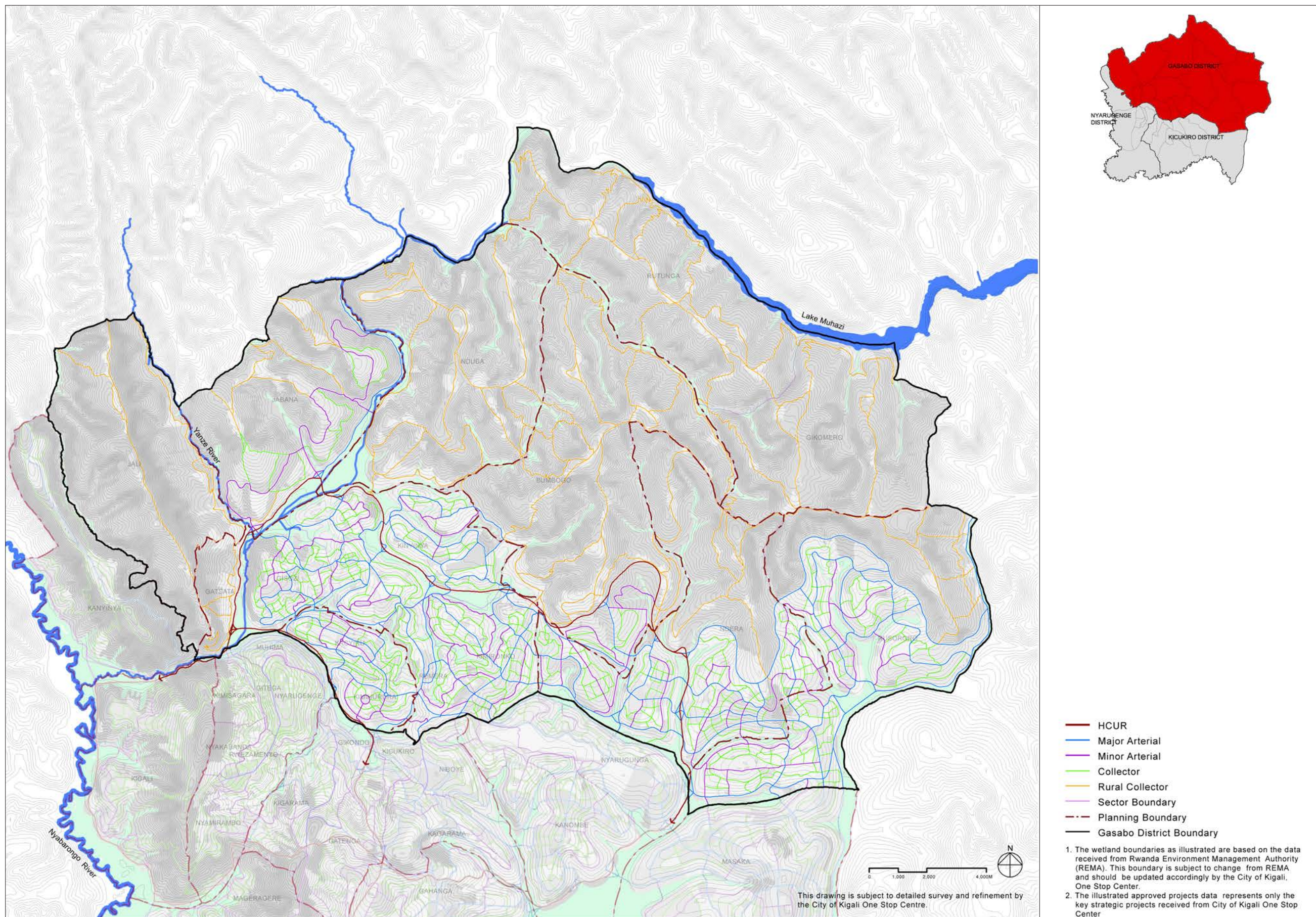


Fig.3.24 Gasabo District - Proposed Road Network Year X

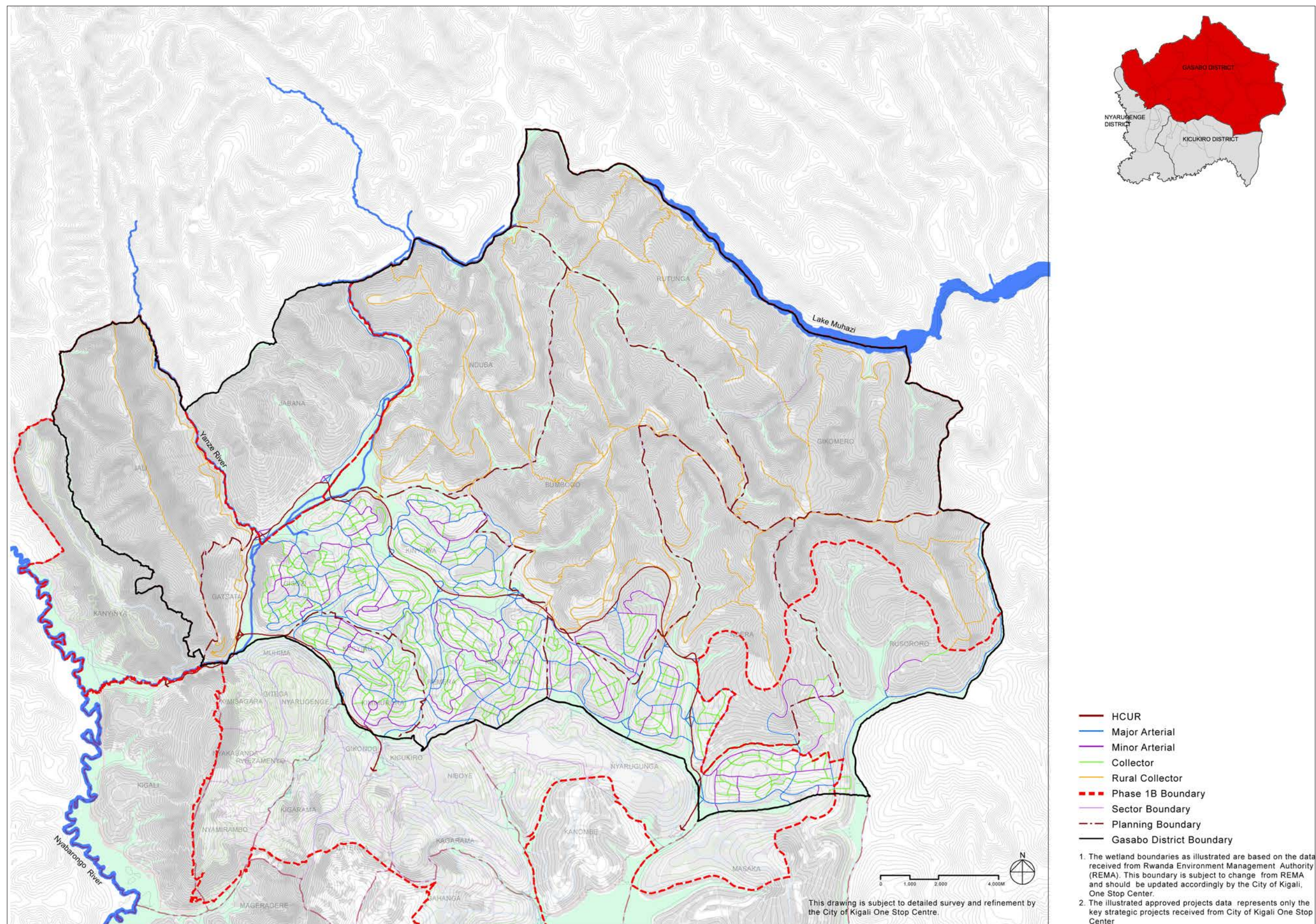


Fig.3.25 Gasabo District - Proposed Road Network 2025

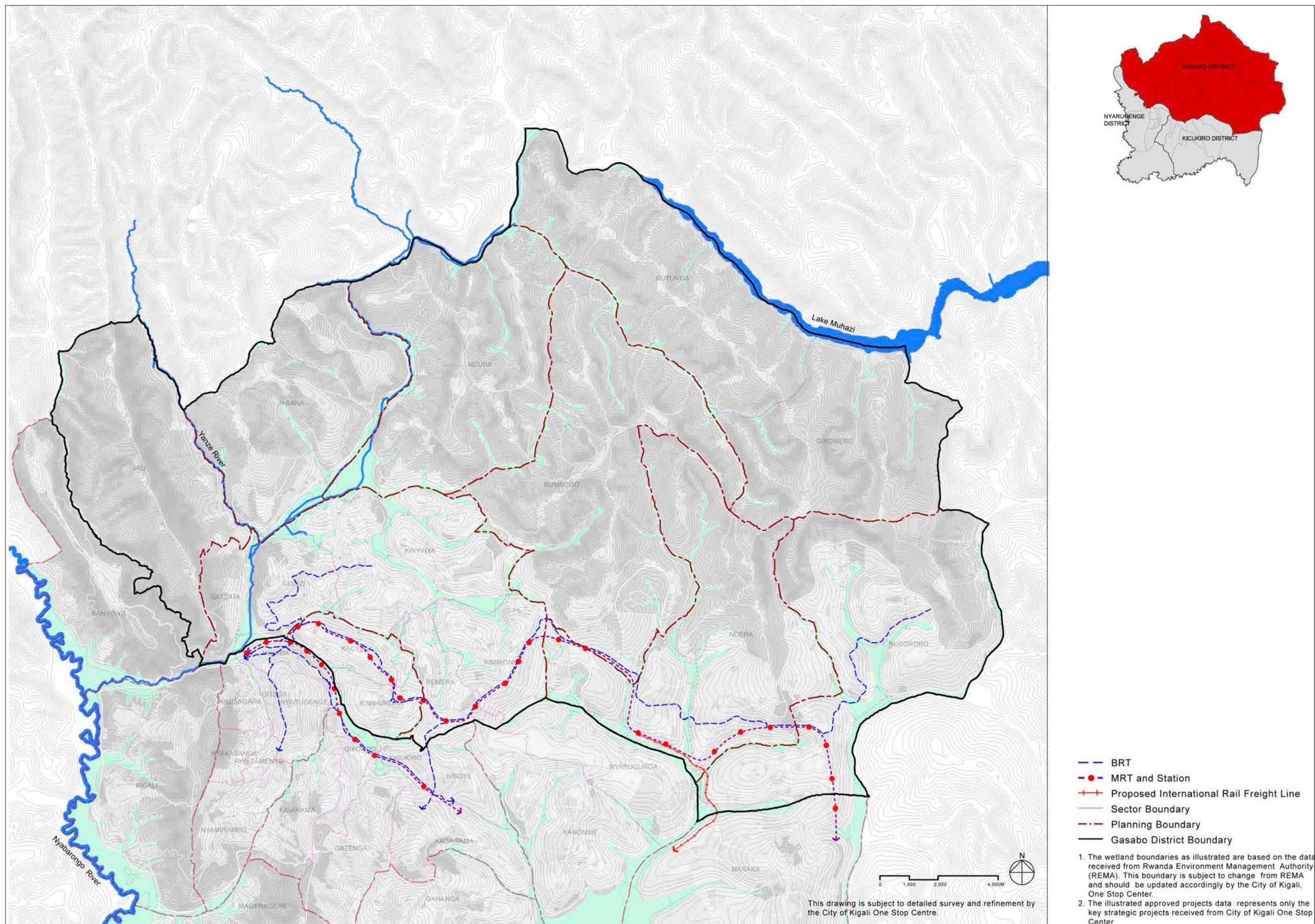


Fig.3.26 Gasabo District - Proposed Public Transport - Year X

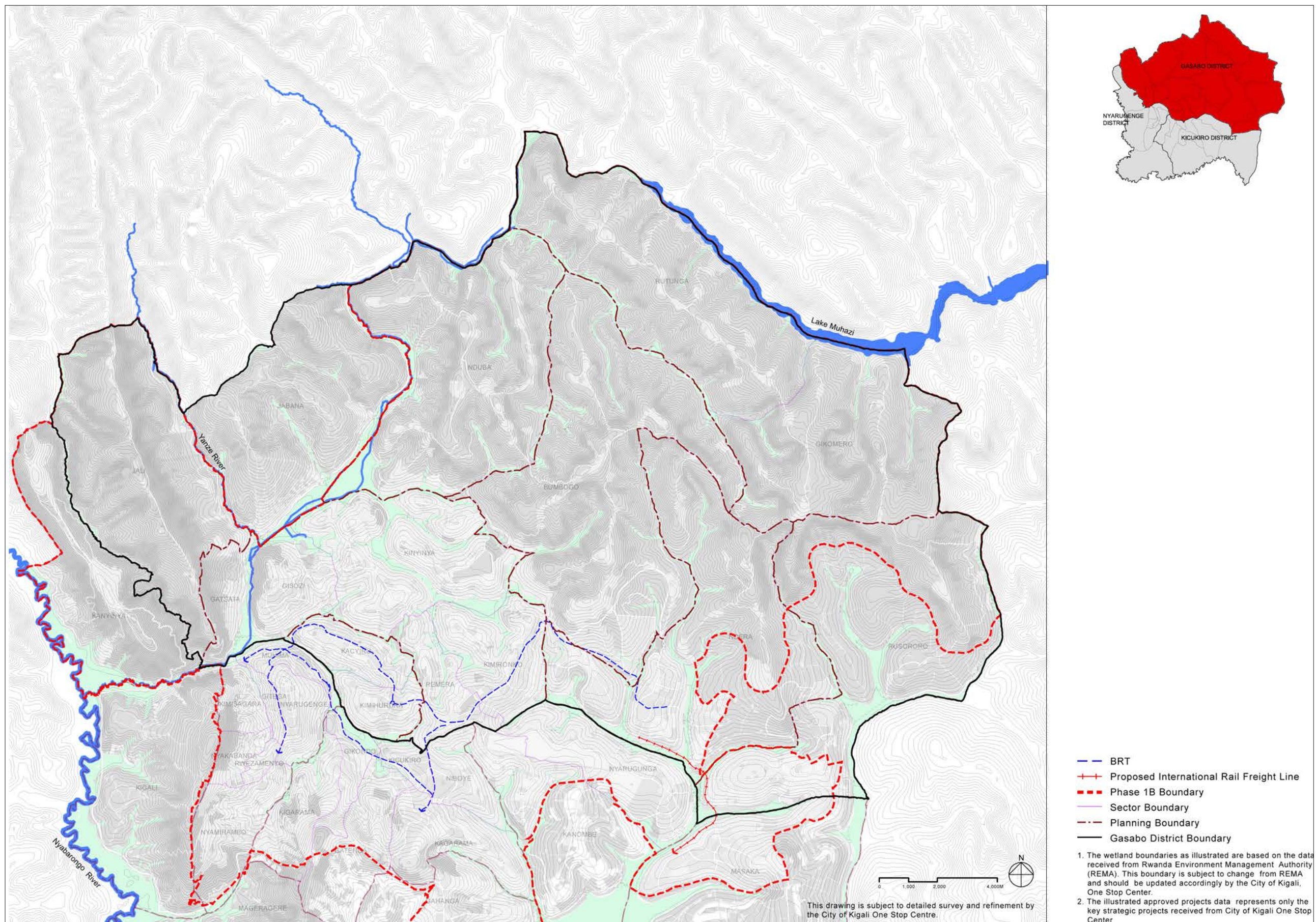


Fig.3.27 Gasabo District - Proposed Public Transport 2025

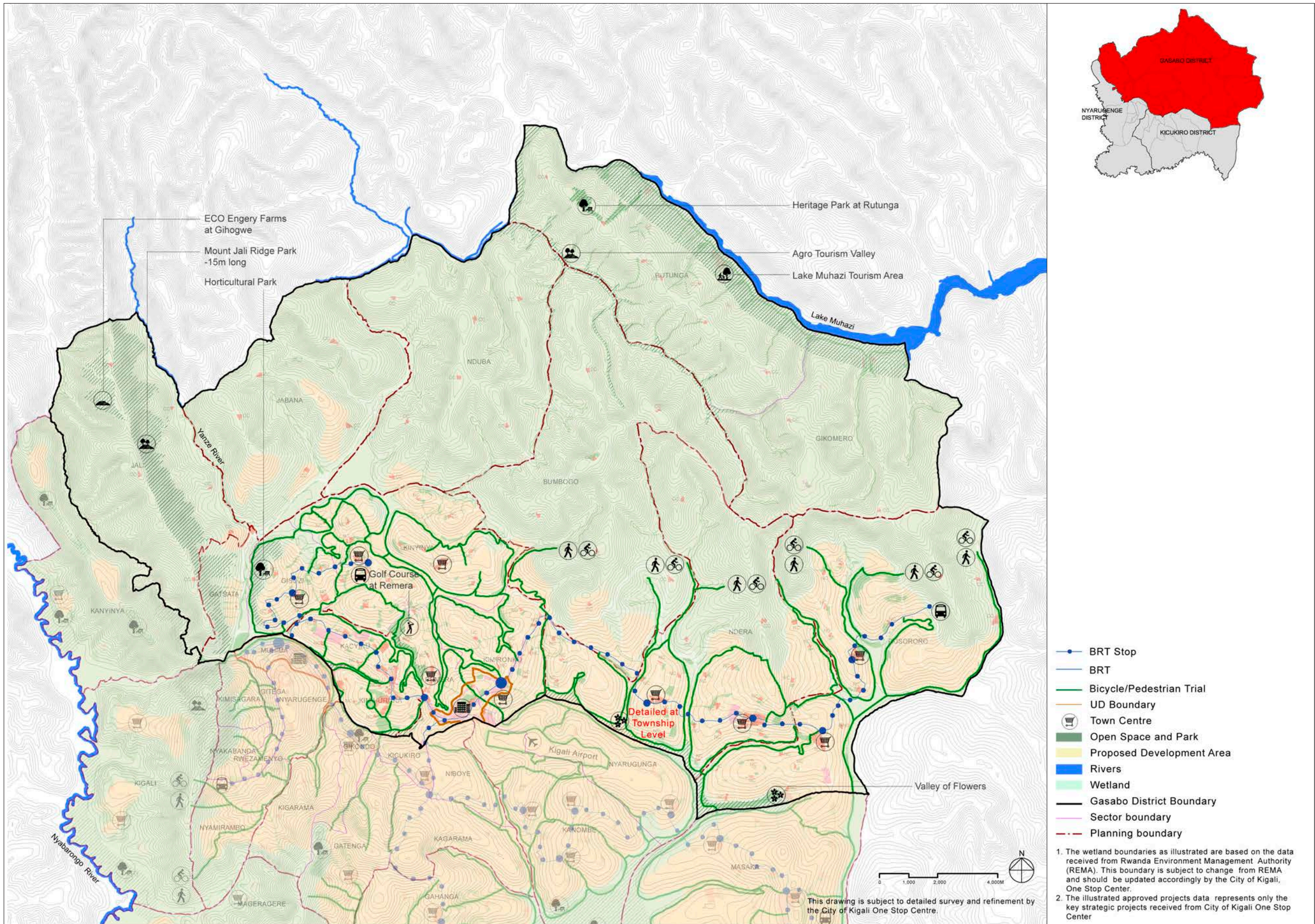


Fig.3.28 Gasabo District - Proposed Non Motorized Transport



Fig.3.29 Existing Water Source Map

The Proposed non motorized transport for Gasabo District is illustrated in Fig.3.28

3.13 Water Supply Plan

3.13.1 EXISTING CONDITION

WATER SOURCE

Water supply for Gasabo District comes from three Water Treatment Plants (WTP). They are Nyabarongo, Kimisagara and Karengwe WTP. Raw water sources, includes Nyabarongo River, Yanze River and Lake Mugesera respectively (refer to Fig.3.29). The three WTPs have a combined daily treatment capacity of 59,000 m³ that is shared among three districts in City of Kigali.

WATER DISTRIBUTION SYSTEM

The western side of the District is serviced by Nyabarongo and Kimisagara WTP while the eastern side of the District is serviced by the Karengwe WTP.

Potable water supply from the 3 WTPs is stored at various water storage facilities within the District. It is distributed through EWSA's piped water network to residents. Pumping stations are in place to maintain optimum pressure within the water network.

Water supply network expansion is planned and carried out by EWSA based on the demand from the users. New users will have to apply and pay for water connection directly to EWSA.

The existing piped water network covers most of the built-up area in southern side of the District such as Kacyiru, Nyarutama and Kimironko. Connections to households are available for residents in these areas. At the northern side, residents get water from public tap stands and spring water.

WATER CONSUMPTION

The extensive water network and the existence of public facilities and newer residential developments in the urban area encourage higher water consumption. Water consumption in larger homes, office buildings and tourism facilities could reach as high as 200 lpcd (litre per capita per day). Residents at informal neighborhoods with no access to indoor plumbing have lower water consumption that ranges from 15 - 25 lpcd.

The average distance from the residential area to the public stands is about 280m. The city-wide goal is to increase the number of tap stands so as to shorten the walking distance to 250m.

3.13.2 ESTIMATED WATER DEMAND

The planning horizon for water supply was split into two following the Land Use plan, year 2025 and Year X. Different water demand unit rate was used for rural, urban and industrial areas.

The water demand for rural areas is proposed to be in line with City-wide goal to supply 80 lpcd of potable water to the residents.

The water demand for the urban areas is significantly higher to cater to the District's projected growth in the future. In the long run, as the District develops into various townships, standard of living is expected to rise significantly. Water demand was assumed to rise to 120 lpcd. This is still relatively lower than the average water consumption of other urban cities such as Singapore, Cape Town, Amsterdam and Melbourne (refer to Table 3.7). This relatively lower rate is adopted based on the assumption that substantial water demand management strategies will be implemented as the District develops.

For planning purposes, water demand for the industrial areas is proposed to be 10 m³/ha.d as a general guide. The Water demand unit rate in Table 3.8 was used to estimate the District future water demand in Year 2025 and Year X (refer to Table 3.9).

3.13.3 PROPOSED WATER SUPPLY PLAN

POTENTIAL WATER SOURCE

The combined capacity of the WTPs of 59,000 m³/d is far behind the District's future demand of 158,467 and 241,724 m³/d. To overcome this deficit, new water resources must be identified and existing WTPs have to be expanded to augment the water supply.

The City of Kigali is currently planning to abstract 120,000 m³ of spring water daily from Mutobo, Muzanse District by 2017. Beside this, There have been plan to upgrade the daily treatment capacity of Nyabarongo WTP to 40,000 m³. While the combined future supply would be able to meet the City's future water demand in the short term, it would not be sufficient to meet the future water demand of the Gasabo District. It is also not recommended to continue depending on Nyabarongo WTP for future water supply as Nyarugenge District would also be heavily dependent on it.

Taking into account the Mutobo spring water abstraction plan and Nyabarongo WTP expansion plan, there would be 194,000 m³/d of potable water supplied to the City by 2025 (refer to Table 3.10).

While new water resource is usually decided on at a national level, the District could start working with the City or service provider to explore the nearest big water bodies to the District, which is Lake Muhazi.

The 10m deep lake has surface area of 33km², which provides potential of 330 million m³ of raw water. At the moment the water from Lake Muhazi is not being abstracted for potable use due to the reportedly high organic content.

More detailed yield and feasibility study on Lake Muhazi has to be carried out immediately to catch up with the growing demand for water

If proven feasible, a new WTP would be proposed to abstract and treat raw water from Lake Muhazi. The new WTP would supply potable water for the District except to SP1, G1, G2 and I1 township. These will continue to be supplied from the existing water network (Nyabarongo WTP or future Mutobo spring water) as they are within the coverage of the existing water network. Excluding SP1, G1, G2 and I1, the new WTP would require additional capacity of 120,000 and 205,000 m³/d by 2025 and Year X (after taking into consideration 10% unaccounted-for-water).

WATER DISTRIBUTION SYSTEM

The District would expect the growth of nine townships and three industrial zone by Year X. It is expected to be highly urbanized therefore 100% access to piped water is very crucial to support the growth. Currently the District is not entirely connected to the existing water supply network due to low demand. Only the west of Gasabo is connected to the existing water supply network as it is in the current growth area. The new townships could still tap water from the existing water supply network while the study for Lake Muhazi or

new water resource is being carried out.

New water pipelines have been laid by EWSA within the future industrial area I2 therefore no water pipelines would be proposed there. The water source comes from Karengge WTP.

A water transmission line from future Muhazi WTP would be proposed to distribute water to future service reservoirs in the District, except for SP1, G1, G4 and I1. The four areas would be connected to the existing water network from Nyabarongo WTP or the future water supply from Mutobo instead.

All the service reservoirs need to be sized for 1-day demand to ensure that there would be water supply for the townships ever if there is any disruption to the network. The service reservoirs would be built on high ground within each township to provide minimum water pressure of 3-4 bars to supply to the household.

Various plots within the townships shall be reserved for construction of future service reservoirs. It is assumed that each service reservoir would have maximum capacity of 5,000 m³/d, each township would be served

Table 3.7 Water Demand Unit Rate Comparison

CITY	SINGAPORE	CAPE TOWN	AMSTERDAM	MELBOURNE	KIGALI
WATER DEMAND (LPCD)	155	225	147	142	120

Table 3.8 Water Demand Unit Rate

LAND USE	WATER DEMAND UNIT RATE
RURAL AREA	80 LPCD
TOWNSHIP	120 LPCD
INDUSTRIAL	10 M³/HA.D

Table 3.9 Projected Water Demand for Year 2025 and Year X

LAND USE	YEAR 2025 (M³/D)			YEAR X (M³/D)		
	TOWNSHIP	RURAL	INDUSTRIAL	TOWNSHIP	RURAL	INDUSTRIAL
SP1	15,063	-	-	15,981	-	-
G1	12,719	-	-	14,338	-	-
G2	18,088	-	-	20,390	-	-
G3	13,176	-	-	14,852	-	-
G4	32,598	-	-	36,743	-	-
G5	13,546	-	-	15,267	-	-
G6	5,867	-	-	33,226	-	-
G7	20,834	-	-	30,978	-	-
G8	265	-	-	18,797	-	-
I1	-	-	4,414	-	-	7,492
I2	-	-	6,799	-	-	7,072
I3	-	-	593	-	-	9,066
RURAL	-	14,507	-	-	17,523	-
TOTAL	132,155	14,507	11,805	200,571	17,523	23,630
GRAND TOTAL	158,467			241,724		

Table 3.10 Planned Water Supply for City of Kigali

WTP	WATER SOURCE	EXISTING SUPPLY (M³/D)	PLANNED SUPPLY BY 2025 (M³/D)
KIMISAGARA	YANZE RIVER	22,000	-
NYABARONGO	NYABARONGO RIVER	25,000	15,000 (ADDITIONAL)
KARENGE	LAKE MUGESERA	12,000	-
-	MUTOBO SPRING	-	120,000
TOTAL		59,000	135,000
GRAND TOTAL		194,000	

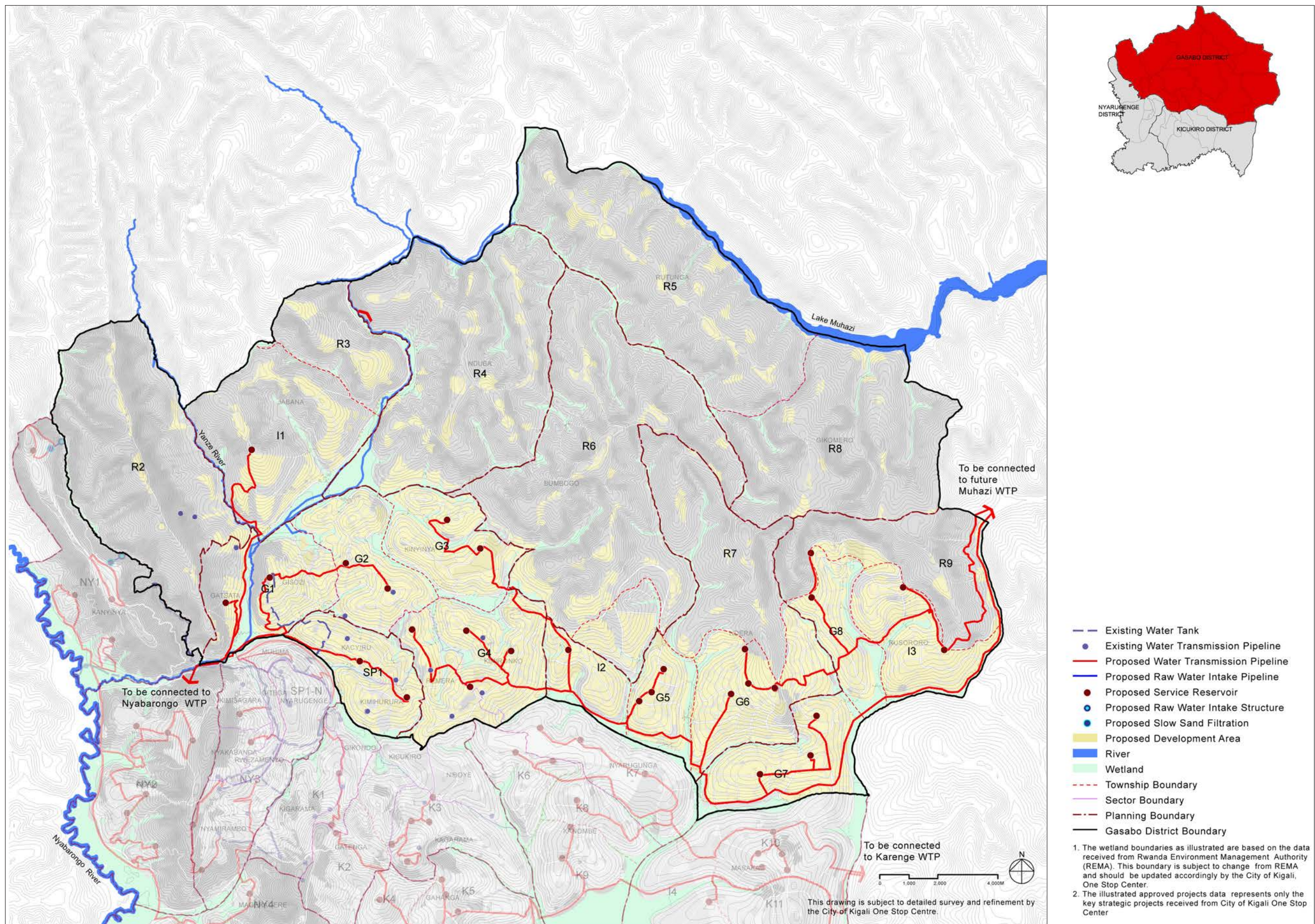


Fig.3.30 Gasabo District - Proposed Water Supply Plan Year x

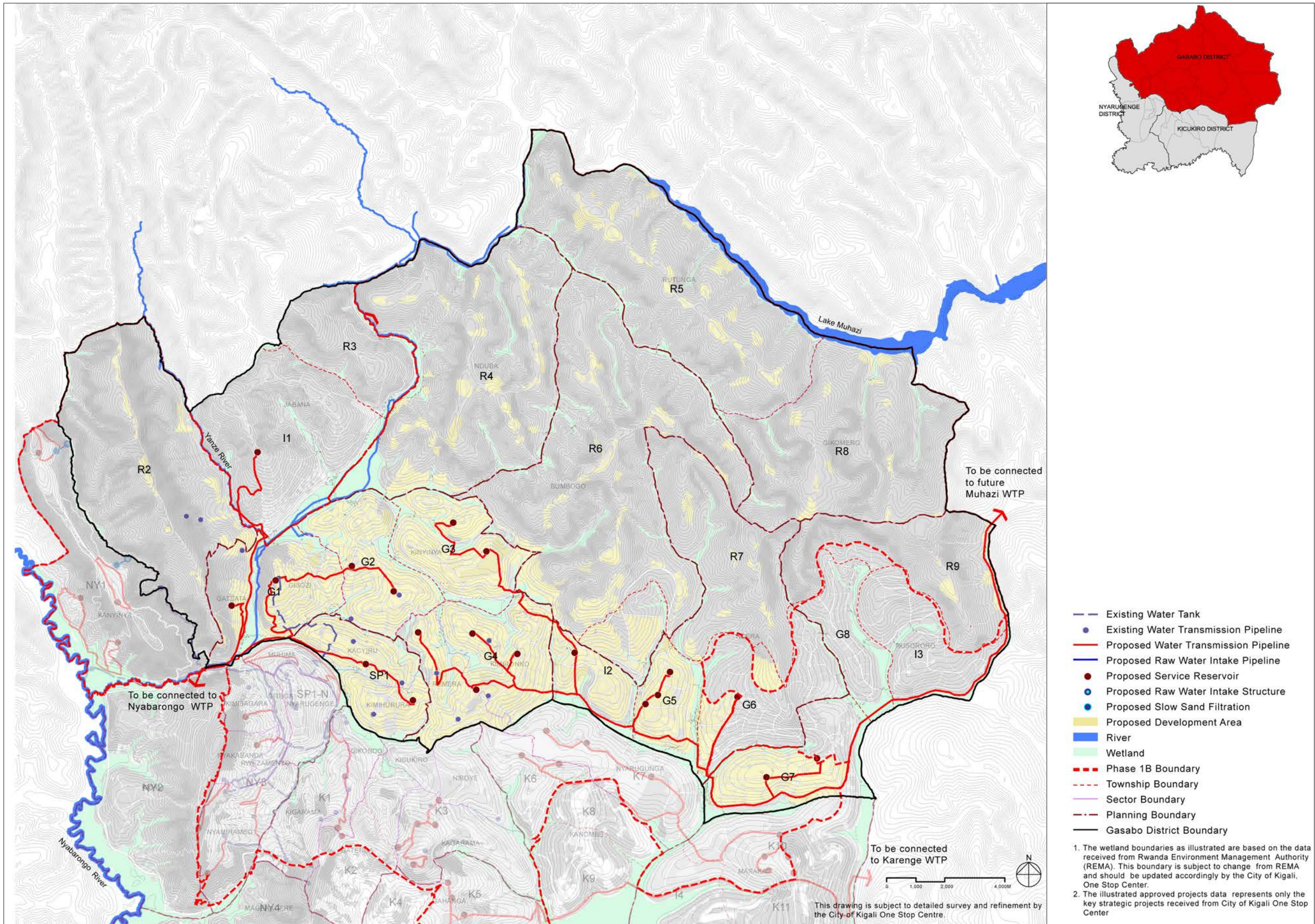


Fig.3.31 Gasabo District - Proposed Water Supply Plan Year X

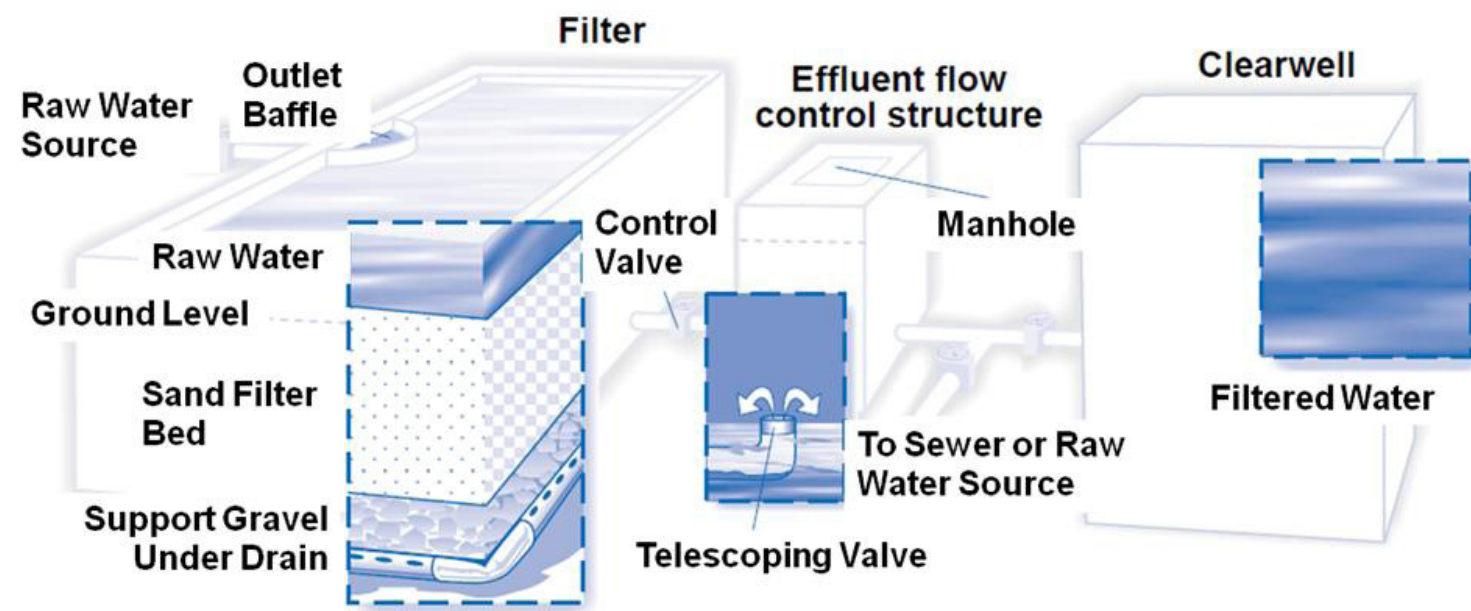


Fig.3.32 Slow Sand Filtration Diagram

Source: On Tap Volume 4, Issue 3 [1995]



Fig.3.33 Water Saving Device

Source: Envirogadget, Plumbing4home, Ecobuilder



Fig.3.34 Rainwater Harvesting Tank

Source: The Innovation Diaries

by 2-7 service reservoirs.

3.13.4 RURAL WATER SUPPLY

In rural areas, it is recommended to utilise local sources such as spring water or groundwater. It is not economical to extend the water supply network due to the scattered development and lower water demand.

For rural areas that are near water bodies such as rivers, small scale onsite WTP such as slow sand filtration plant could be considered (refer to Fig.3.32).

A slow Sand Filtration system is proposed for rural areas based on the following considerations:

- **LOW CAPITAL, OPERATIONAL AND MAINTENANCE COST** – It does not require sophisticated technology to build and can be constructed using locally available materials. The filtration process does not require electricity or chemicals hence lowering the operation cost.
- **SIMPLE OPERATION AND MAINTENANCE PROCESS** – It does not require a technically skilled operator to operate and maintain the filters.
- **GOOD QUALITY OF TREATED WATER** – The combined physical and biological treatment process can remove turbidity, odour, colour and pathogen as efficiently as other systems at a much lower cost.
- **LAND SPACE REQUIREMENT** – The drawback of slow sand filtration system is that it requires a lot of space due to its slow filtration rate. It is suitable for rural areas

where water demands are not high and land is easily available.

WATER DEMAND MANAGEMENT

Besides augmenting the water supply, it is advisable to manage the water demand from a household level to township level. At the household level, installing water saving devices would help reduce the water use (refer to Fig.3.33). To encourage citizens to install water saving devices, the District could subsidize the cost of water saving devices or give water bill rebates.

At township level, the District should examine the use of alternative water sources such as rainwater harvesting (refer to Fig.3.34) or treat effluents from STP for non-potable use such as irrigation, cleaning or other industrial uses.

These strategies, if implemented properly, would be able to reduce the dependence on the potable water by 10 – 20%.

3.14 Sewerage Plan

3.14.1 EXISTING CONDITIONS

Currently, there is no sanitary sewer network or centralized sewage treatment plant (STP) in Gasabo District. 2 main domestic sanitation systems that are widely used are:

- **Septic Tanks** – Septic tanks are widely used in the urban areas. Effluents from the septic tank are directed into the leech field. The City operates 3 pumpers to handle and dispose of sludge from the septic tanks in the landfill at Nyanza.
- **Pit latrines** – Traditional soak away pit latrines and ventilated pit latrines are the most common types. Pit latrines are commonly used in informal settlements and rural areas without piped water supply. In some areas with high ground water table, the use of pit latrines has been found to contaminate the ground water.

EcoSan (Ecological Sanitation) toilet has been implemented in several public schools in the District (refer to Fig.3.35). It provides an economical and hygienically safe system that separates and recycle the urine and faeces back into the environment through agriculture.

The funding for the EcoSan construction comes from the NGO (Non Government Organization) while the District Office provides the man power required. The long term goal is to equip all the public school in the City with EcoSan.

3.14.2 PROJECTED SEWAGE GENERATION

Future sewage flow is estimated based on the assumption that 80% of the water consumption will be collected as sewage. Table 3.11 lists the projected sewage flow for Gasabo District in Year 2025 and Year X.

3.14.3 PROPOSED SEWERAGE PLAN

PHASING OUT OF PIT LATRINES

The use of pit latrines is to be phased out gradually by 2025 from both urban and rural area in the District. Continual usage of pit latrines may cause groundwater contamination if not properly maintained especially in areas with high water table.

SEWAGE TREATMENT PLANT

The sewerage network would be connected to the individual houses to collect the sewage and convey it to designated Sewage Treatment Plant (STP) for treatment. Treated sewage effluent would be further refined in the constructed wetland before finally discharge into the receiving water bodies in order to maintain the water quality of the water bodies.

Decentralised STP will be proposed for townships in Gasabo District due to its undulating topography. Numerous hills and mountains that separate the proposed townships make it uneconomical to collect all the sewage and channel to a centralized STP as extensive pumping will be required.

The number of STP within each township would depend on the terrain, Land Use and estimated sewage flow. In general, each township would be served by at 1-3 STPs.

Various treatment methods, such as membrane bioreactors, activated sludge system, constructed wetland can be employed depending on the requirements.

Treated sewage effluent from the STP shall be discharged into constructed wetland for further refinement before final discharge into the water bodies or wetlands. The effluent from constructed wetlands could be reused for non-potable use such as irrigation, washing, industrial use, etc. It would help to reduce the potable water demand from the municipal water network.

ENVIRONMENTAL TREATMENT ZONE

Each decentralised STP would be housed inside an Environmental Treatment Zone (ETZ). ETZ is an integrated waste management concept adapted from the Kigali City Master Plan (KCMP) report. It would have an STP, a constructed wetland and a solid waste management facility (refer to Fig.3.36). The concept of ETZ is to isolate and treat all the unwanted waste in the same remote location so as to minimize contact between the residents and waste.

Every ETZ does not necessarily have to include all the above mentioned elements. However STP and constructed wetland are the basic elements which will be present within each ETZ. Decision on what solid waste facility, if any, to be included in each ETZ will depend on the actual type of waste generated by the area contributing to it.

All the township within the District are partially surrounded by wetlands with road



Fig.3.35 Compartment to Separate Human Waste in EcoSan

Table 3.11 Projected Sewage Flow for Year 2025 and Year X

LAND USE	YEAR 2025 (M ³ /D)			YEAR X (M ³ /D)		
	TOWNSHIP	RURAL	INDUSTRIAL	TOWNSHIP	RURAL	INDUSTRIAL
SP1	12,050	-	-	12,785	-	-
G1	10,175	-	-	11,471	-	-
G2	14,470	-	-	16,312	-	-
G3	10,540	-	-	11,881	-	-
G4	26,078	-	-	29,395	-	-
G5	10,837	-	-	12,214	-	-
G6	4,693	-	-	26,581	-	-
G7	16,667	-	-	24,782	-	-
G8	212	-	-	15,038	-	-
I1	-	-	3,531	-	-	5,993
I2	-	-	5,439	-	-	5,658
I3	-	-	474	-	-	7,253
RURAL	-	11,606	-	-	14,018	-
TOTAL	105,724	11,606	9,444	160,457	14,018	18,904
GRAND TOTAL	126,774			193,379		

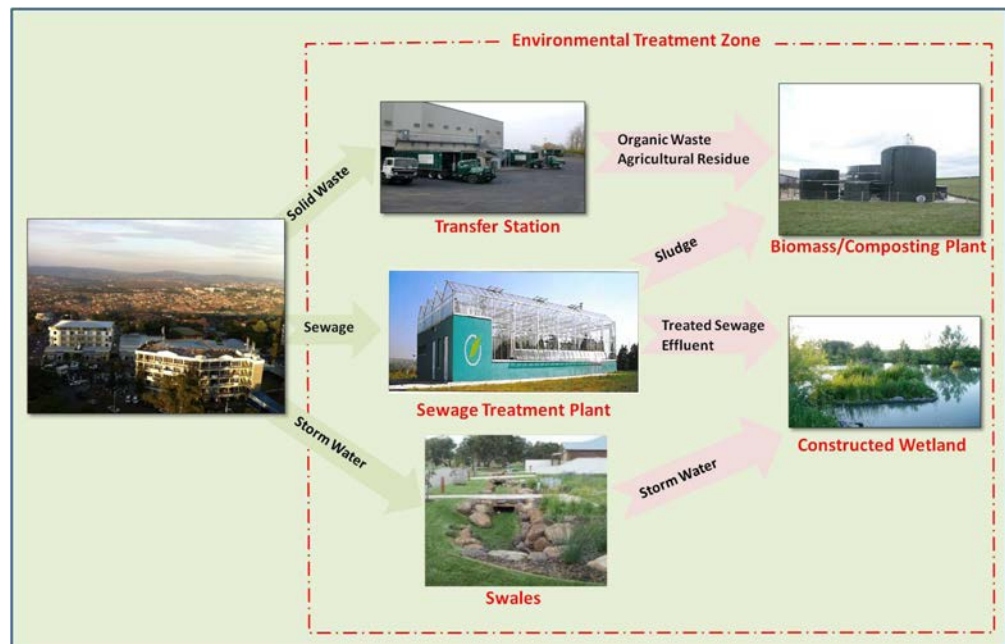


Fig.3.36 ETZ Process Flow Diagram



Fig.3.37 Areas that Require Pumping

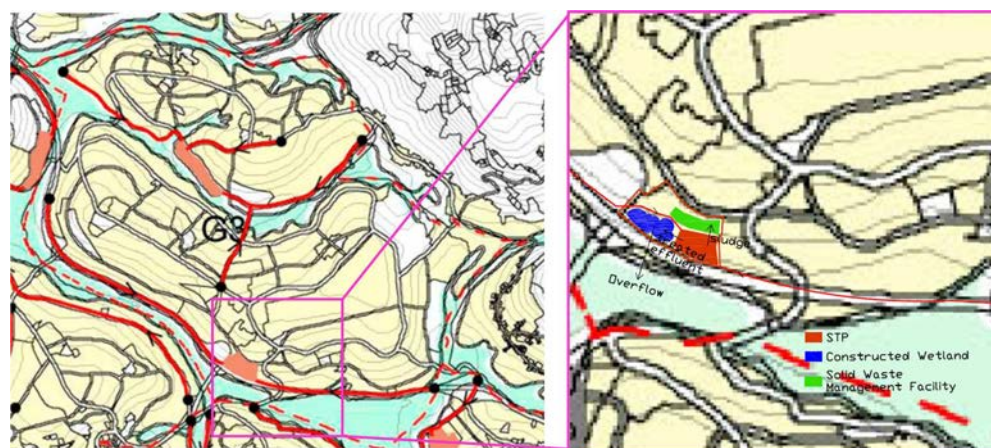


Fig.3.38 Typical ETZ Configuration

access and sufficient green buffer which provides suitable environment to build an ETZ.

PROPOSED SEWERAGE NETWORK

Refer to Fig.3.39 and Fig.3.40 for the proposed main sewer alignment and ETZ location for Gasabo District in Year 2025 and Year X.

The ETZ construction would be split based on two time frame, year 2025 and Year X. Most of the townships would be developed by 2025 while the industrial zone would

be developed at the later stage by Year X. As the population grow gradually, the proposed facilities within the ETZ, such as STP and constructed wetland, can be constructed in phases. However sufficient land areas need to be reserved to cater for future demands.

A total of 13 ETZ would be built across the District by 2025 except in G8 and SP1. The ETZ for G8 would only be built after 2025.. SP1 is part of the sewerage catchment of Waste Water Master Plan. The Master Plan was done for the City of Kigali by EWSA. Based on the proposal mentioned in the Waste Water Master Plan, sewage from SP1 would be discharged and treated at the future Gitikinyoni STP. It would be located at Nyabugogo River bed along the road going from Kigali to Gitarama. One ETZ site has been reserved within SP1 to serve SP1 temporarily if there is any delay in completion of Gitikinyoni STP.

Two townships may share one STP depending on the existing topography, the amount of sewage flow and the proximity of the neighbouring township's ETZ. An example of such arrangement is the STP at the south of G6. It is treating sewage flow from half of G6 in 2025. It will also be treating additional sewage flow from southern G5. Sufficient land must be reserved within the G6 ETZ for future STP expansion to serve the other half of G6 in Year X.

Localised sewage pumping station may be required for developments that are located at low lying areas that are lower than the public sewer line (refer to Fig.3.39 and Fig.3.40). Example of these areas are small residential pockets at G4 and I2 (refer to Fig.3.37).

To get a clearer idea of how the various components within an ETZ could be arranged, township G3 is selected as an

example. ETZ location depends mainly on the required STP location..

There are two sewerage catchments within G3. It is projected to generate 10,540 and 11,881 m³/d of sewage in 2025 and Year X. One ETZ would be proposed for each catchment area.

The blow up configuration of one ETZ in the south is shown in Fig.3.38. Constructed wetland is located at lower elevation of the STP and nearer to the wetlands for final discharge. The location is chosen due to its gentle slope. Solid waste facility is proposed next to the STP as it is nearer the main road for waste collection vehicle access.

No ETZ is proposed for I1, I2 and I3. These areas are generally marked as light industry zone. It is not recommended to mix and treat all the industrial waste water in one STP as every industry would generate waste water with specific characteristics. It is proposed that every future industrial user to construct and operate its own onsite industrial waste water treatment plant within its plot of land before discharging it into the water bodies.

For rural areas, it will not be economical to build ETZ due to the low sewage flow and

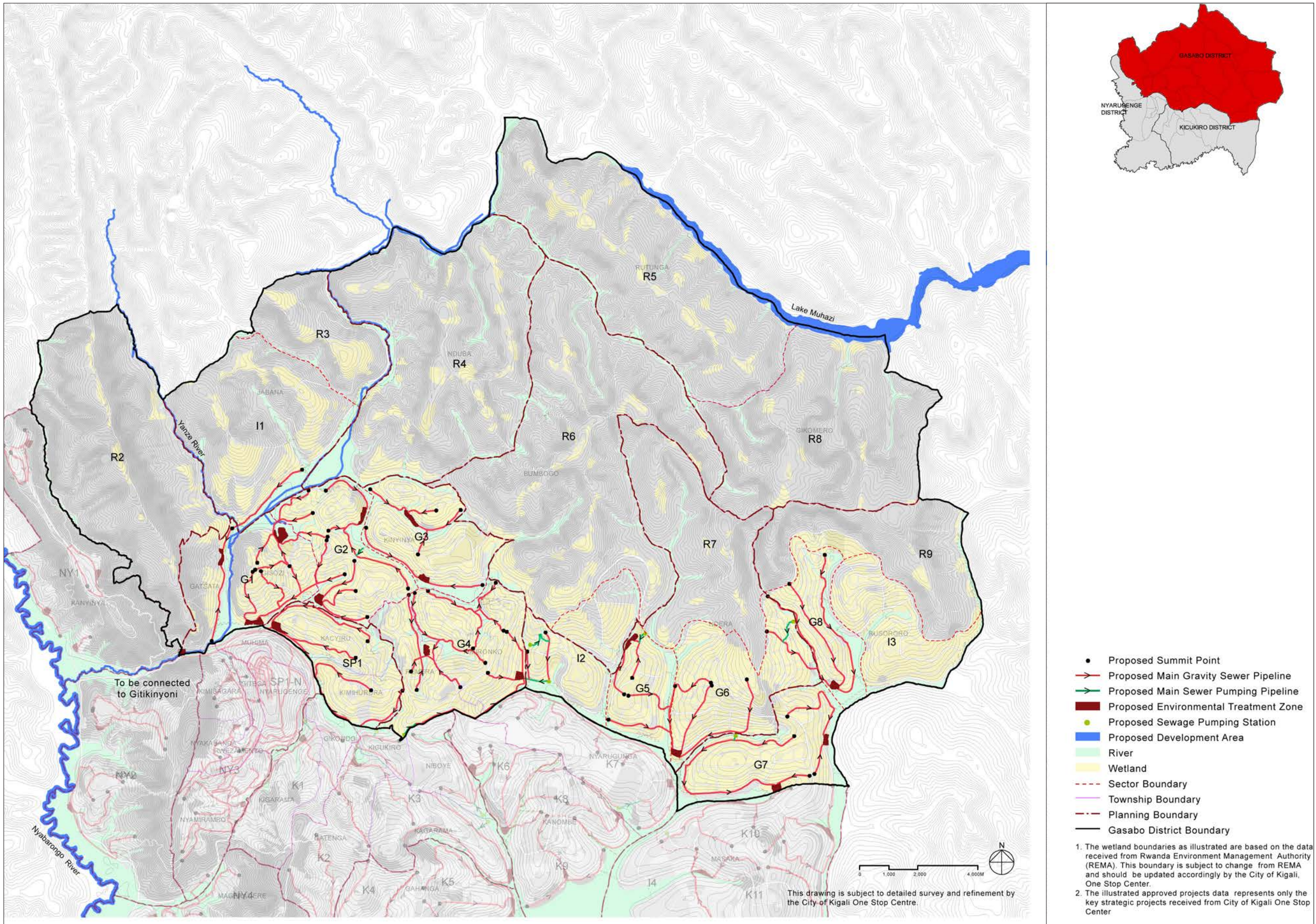


Fig.3.39 Gasabo District - Proposed Sewerage Plan Year X

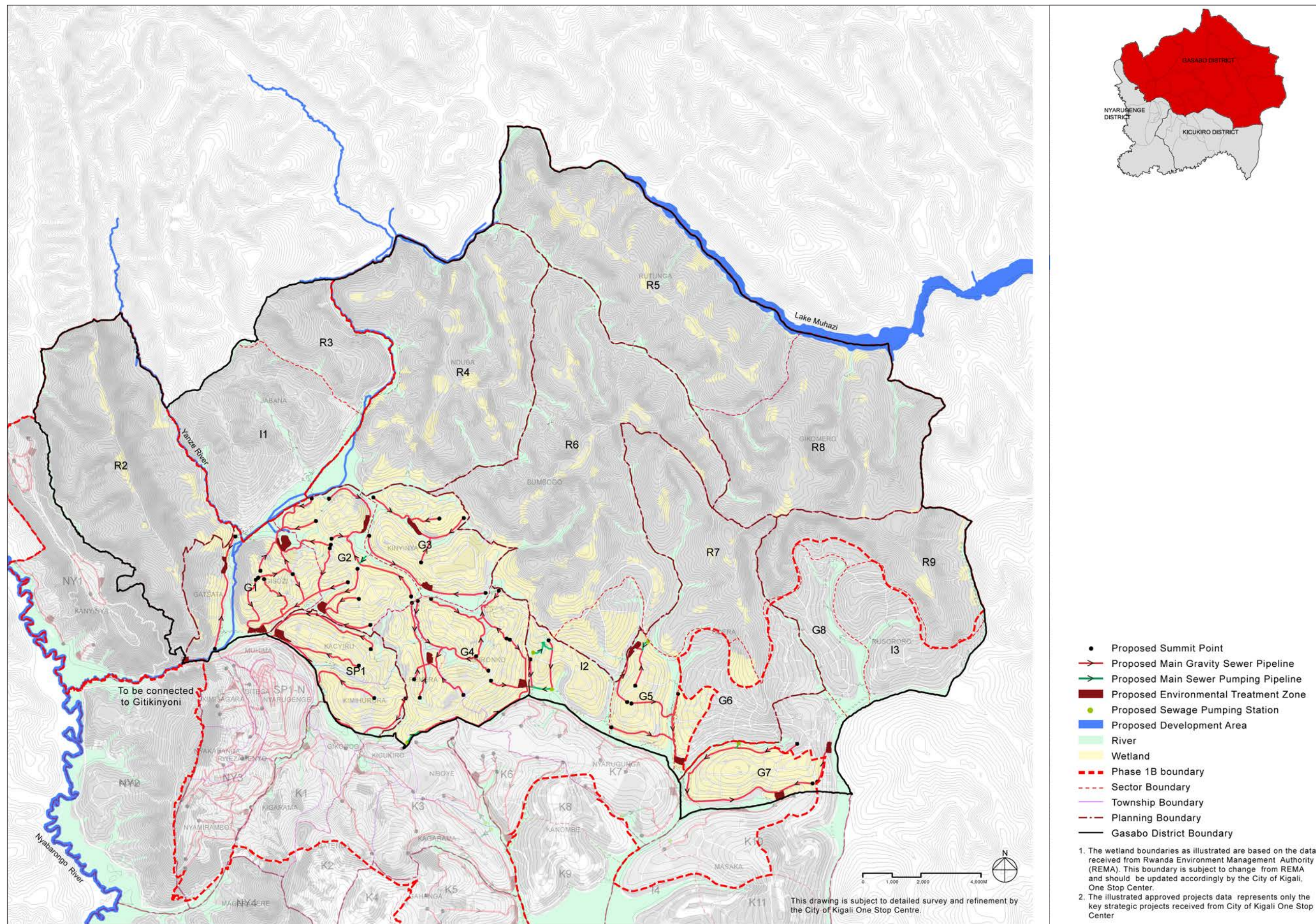


Fig.3.40 Gasabo District - Proposed Sewerage Plan Year 2025

sparse development within the area. Simple and low cost onsite sewage treatment system such septic tanks, EcoSan or smaller scale STP would be proposed.

3.15 Drainage Plan

3.15.1 EXISTING CONDITIONS

The City of Kigali has an annual rainfall of 1,000mm with April being the wettest month and July the driest.

The existing drains in Gasabo District are usually constructed on one side of the road and the ones in the urban area are mostly covered. Most of the existing structured channels are well constructed and have adequate drainage capacities. In general, the existing drainage network in the District consists of 3 types of drain structure:

- Open masonry storm channels;
- Covered masonry storm channels;
- Unlined natural channels.

There are still drains that are not covered in the District. It allows residents to dispose of their waste water and solid waste directly into the drains. During a storm event, the naturally steep drains may cause all the waste materials to be washed down and accumulated at the receiving water bodies.

The absence of sewerage network and proper on-site treatment has prompted the discharge of sewage into public drains. This in turn reduces the capacity of the drains and creates health problem to the residents.

At areas where there is no proper drainage system, temporary ditches are constructed by the residents to prevent storm water from flowing into their homes.

3.15.2 RUNOFF CHARACTERISTICS

Most of the stormwater runoff from Gasabo District will drain into Nyabugogo River then eventually flow into Nyabarongo River at the western boundary of the District. Generally this catchment has high percentage of steep slope (gradient of more than 20%). Catchments from South Eastern and Eastern Planning Area in Ndera and Rusuroro, will drain southwards into Nyabarongo River at the southern boundary of Kicukiro District.

3.15.3 STORM WATER MANAGEMENT

Due to its steep undulating terrain, only less than half of Gasabo District is suitable for urban development. The urban areas will be concentrated at the southern part of the District such as Kinyinya, Kimironko, Ndera, Kacyiru while the rural areas at the northern part of the District would be reserved for agriculture and nature reserve.

When the District is fully developed by 2040, the urbanised sectors in the South would generate more storm water runoff due to the lesser previous surfaces for water infiltration the the ground. The steep topography of the District would also increase the velocity of storm water runoff and increase flooding risk if there is no proper channel to drain the runoff into the water bodies.

Despite its flooding risk, the urban storm water runoff should be seen as a valuable resource. As the District has a considerable amount of annual rainfall, it could be harvested for non potable use such as landscape irrigation and general areas washing.

The proposed storm water management for the District is a combination of conventional drainage system (i.e. concrete drain and canals) and sustainable storm water features while preserving the existing streams and channels. The objectives are:

- to provide a clear pathway for storm water runoff into the waterbodies;
- to minimize the flood risk through on site retention;
- to improve the water quality to be discharged into the existing water bodies and
- to integrate the storm water infrastructure into the urban setting.

3.15.4 SUSTAINABLE STORM WATER FEATURES

The following sustainable storm water management features shall be proposed for the urban areas in Gasabo District. These features are more suitable in areas with gentler slope and slower running runoff. They are not suitable for Gasabo's rural areas which is dominated with steep slopes (more than 20% gradient).

VEGETATED SWALES

Vegetated swale is an open-channel drainage way used to convey storm water runoff that can be used as replacement for conventional drainage system (refer to Fig.3.41). It has both conveyance and pre-treatment function to remove soil particles and gross pollutants from storm water runoff. It will not only beautify the surrounding landscape but also aid in the spreading and slowing the runoff velocity. Vegetated swale is usually installed upstream at a gentler slope (1% to 4%) to maintain its conveyance function and prevent ponding during low flows. It is suitable to be constructed within individual development in the District's urban area where slopes are generally less than 20%. Possible place for swale installations are residential plot, commercial plot, recreational parks, car parks, etc. It can also be utilised to replace the road side drain for local street with gentler slope and wide utility reserve.

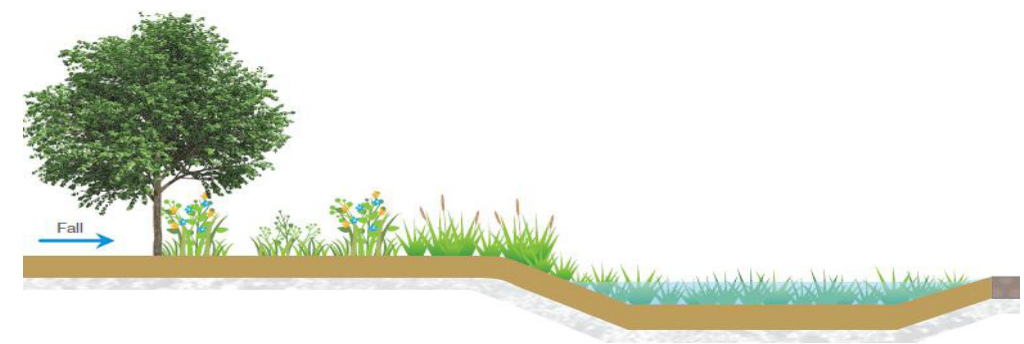


Fig.3.41 Vegetated Swale
Source: ABC Water Guideline

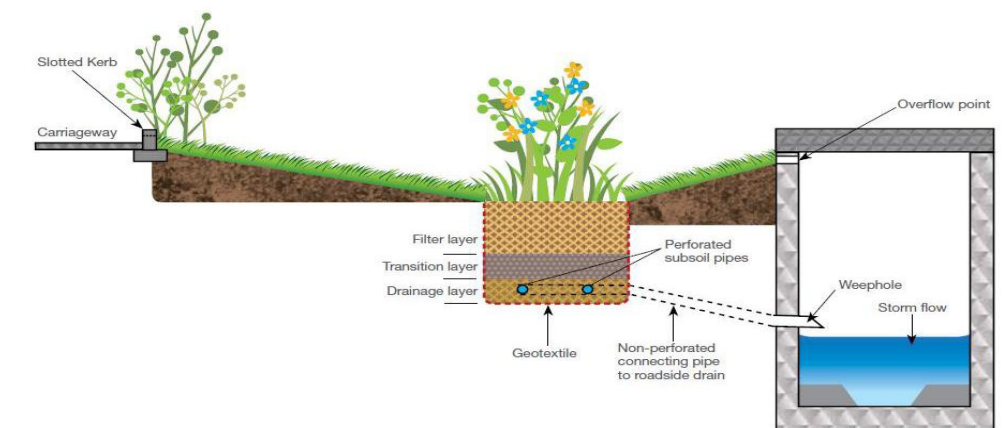


Fig.3.42 Bioretention Swales
Source: ABC Water Guideline

BIORETENTION SWALE

Bioretention swale is a vegetated swale with additional bio-treatment system at the base (refer to Fig.3.42). In addition to the conveyance and sediment removal function, it provides further treatment by allowing the runoff to percolate through the filter. The cleansed water would be collected by the perforated pipe at the drainage layer and conveyed to the water bodies at the downstream. Similar to vegetated swales, it can be installed within individual development in the District's urban area. Due to its

treatment capability, it will be very suitable for areas that generate more polluted runoff such as industrial areas I1, I2 and I3, future landfill at Nduba, roads, carparks, etc.

BIORETENTION BASIN

Bioretention basin is a landscaped depressions or a shallow vegetated basin that is designed to slow down and treat the storm water runoff on-site (refer to Fig.3.43). It lets the runoff percolates through the filtration media. It does not have conveyance functions like swale.

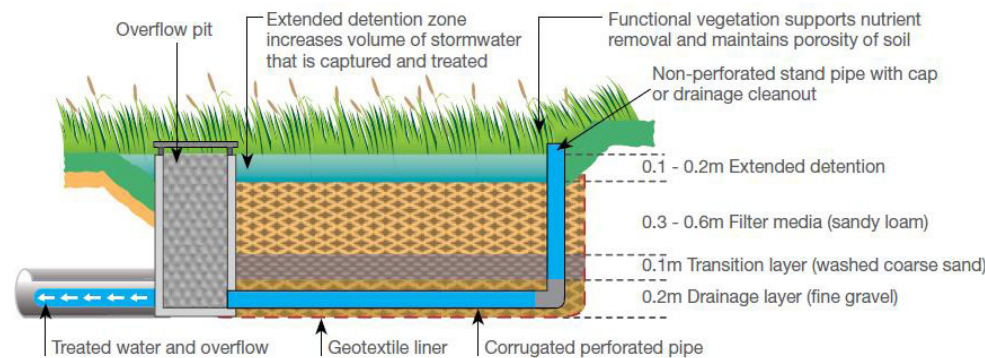


Fig.3.43 Bioretention Basin
Source: ABC Water Guideline

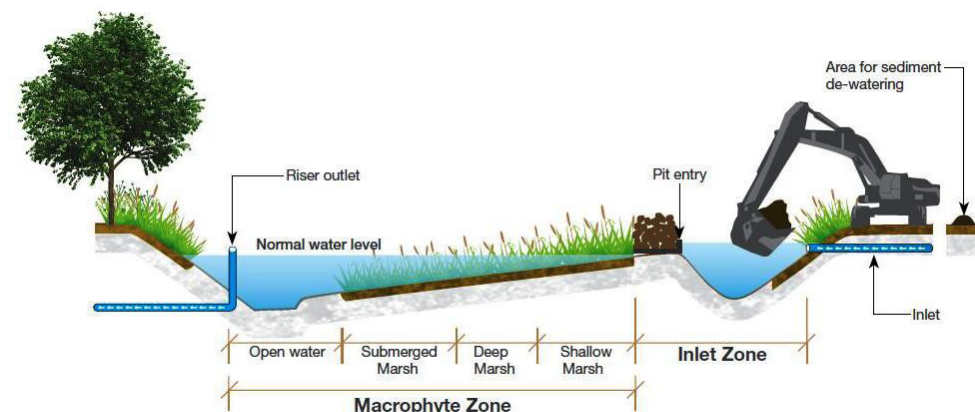


Fig.3.44 Constructed Wetland
Source: ABC Water Guideline

Bioretention basins can be installed anywhere within the District's urban area at various scale and shapes such as planter box, roof top, car parks, garden, etc.

CONSTRUCTED WETLAND

Constructed wetland is a shallow and extensively vegetated water bodies (refer to Fig.3.44). It is usually constructed at the downstream to further treat the pre-treated runoff from swales, rain gardens or public drains. It is designed to remove finer

and dissolved particles. It consists of three treatment zones:

- Inlet zone (sedimentation basin), to let the larger to medium size pollutants settle down. It also acts as energy dissipaters and prevents scouring;
- Macrophyte zone (shallow heavily vegetated pond), to remove the fine particles;
- High flow bypass channel, to discharge the

excess runoff and protect the macrophyte zone during heavy storm event. Most of the runoff from Gasabo District would drain into Nyabugogo River through the existing wetland network. Constructed wetlands shall be constructed before these wetlands to improve the water quality flowing into Nyabugogo River. Critical locations would be along the boundary of the western townships/industrial zone (G1, G2, G3, I1, R2 and R3) and the wetlands.

The constructed wetlands could be part of the 16 proposed Environmental Treatment Zone (ETZ) in the District. In addition to treating the runoff, it could be designed to improve the quality of the treated effluent from the Sewage Treatment Plant (STP).

Smaller scale constructed wetlands would be suitable for polishing of treated industrial effluent from I1, I2 and I3 and treated leachate from the future landfill in Nduba.

The treated water from the constructed wetland can be slowly released to the existing wetlands and waterbodies or reused for non-potable use such as irrigation.

SLOPE PROTECTION

In Gasabo District, the northern rural areas are characterised by steep slopes with gradients that could reach up to 40%. The steep areas are reserved for agriculture while the sparsely located gentler areas are reserved for residential development.

Hilly terrains pose landslide threats to the farm and people living around them. To reduce the runoff velocity and erosion risk, terraced farming technique shall be applied for the agricultural development.

There are a lot of existing natural streams

in the rural areas that convey the runoff directly to the nearest wetlands and waterbodies. These natural streams should be preserved as much as possible so as not to disturb the natural runoff path. They could also be harvested for irrigation of the farmland, resulting in runoff reduction.

Slope protection techniques can be applied around the rural residential areas, roads and localised steep slopes in the urban areas. They are:

- Green Retaining Wall - green alternative to conventional block and concrete retaining walls. It helps to reduce storm water runoff and offers greater aesthetic appeal.
- Geogrids - geosynthetic material that is commonly used to reinforce soils, subsoils, retaining wall, etc. They are usually laid on top of the steep soil layer.

MAINTENANCE AND OPERATION

Vegetation plays an important role in every sustainable storm water management features. The selected plants should be available locally and have fibrous root system to keep the soil porous, good nutrient removal capabilities and ability to withstand dry and wet environment.

Maintenance of these features will be concerned with:

- Weed removal;
- Removal of debris;
- Maintenance of the features profile;
- Maintenance of the vegetation by irrigation, mowing, pruning;
- Cleaning of the inlet and outlet to prevent clogging;
- Flushing of the perforated pipe.

3.15.5 PROPOSED DRAINAGE NETWORK

Refer to Fig.3.46 and Fig.3.45 for the

proposed drainage network in Year 2025 and 2040. Existing streams and proposed primary drain lines are indicated on both plans.

As the District would be densely built up, there are instances where the streams would be surrounded by residential or commercial development. It is recommended to construct the new development around them. However stream diversion is possible if it is located upstream and small enough to be diverted.

To preserve the water quality and conveying capacity of these streams, the District may enforce the following preventive measures:

- No developments shall be carried within the flood plain of the streams. If there is a need for redevelopment, the District has to ensure proper redirection of the streams;
- Treat the runoff pollutants at source using one of the sustainable water features;
- Install pollutants trap at the outlet of the drains feeding into the streams.

Main drainage channels would be proposed along the road to discharge the storm water runoff into the existing wetlands.

For a typical township, the storm water runoff from the household would be channelled to the sustainable water features such as swales or bioretention basins before flowing into the road side

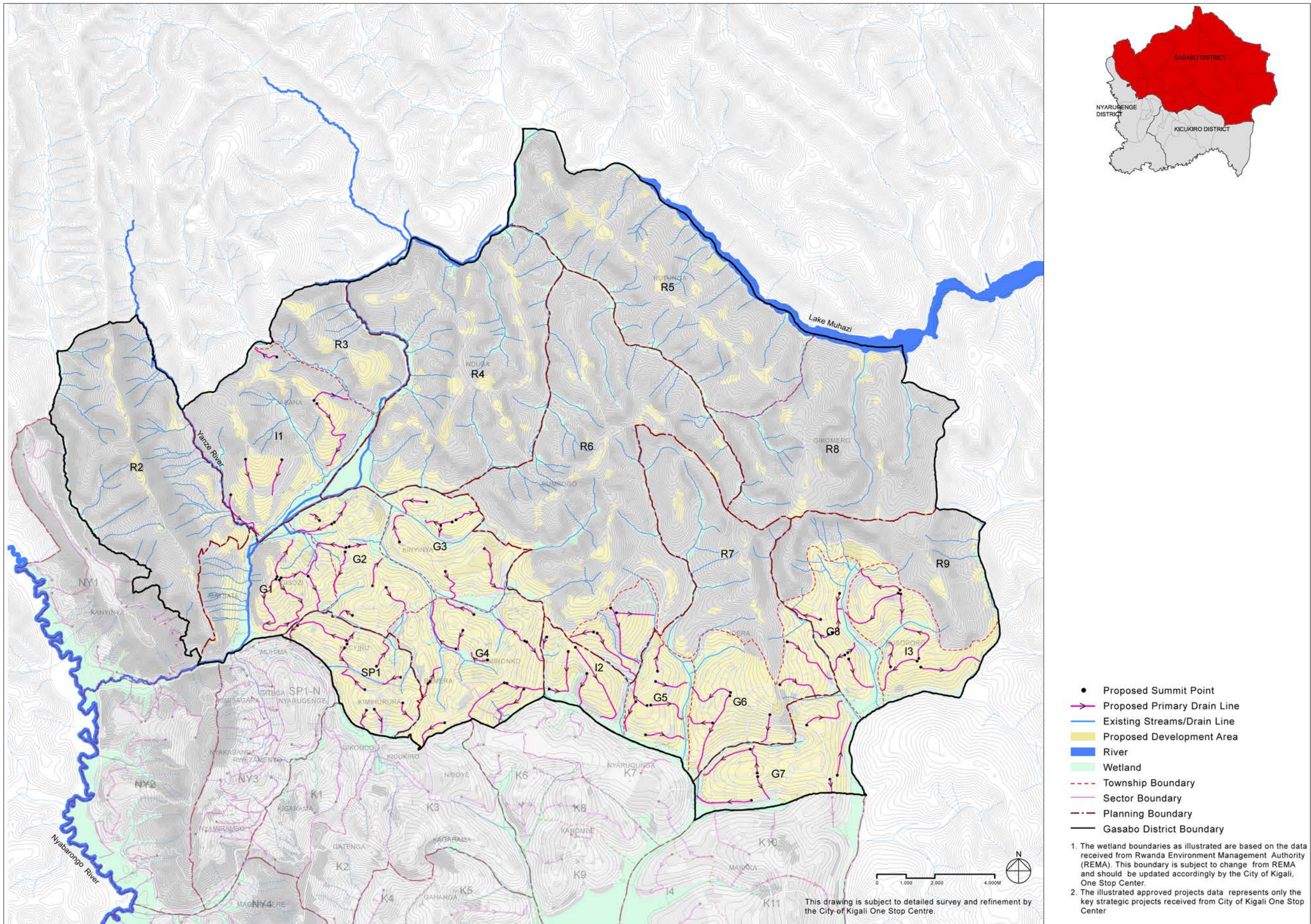


Fig.3.45 Gasabo District - Proposed Drainage Plan Year X

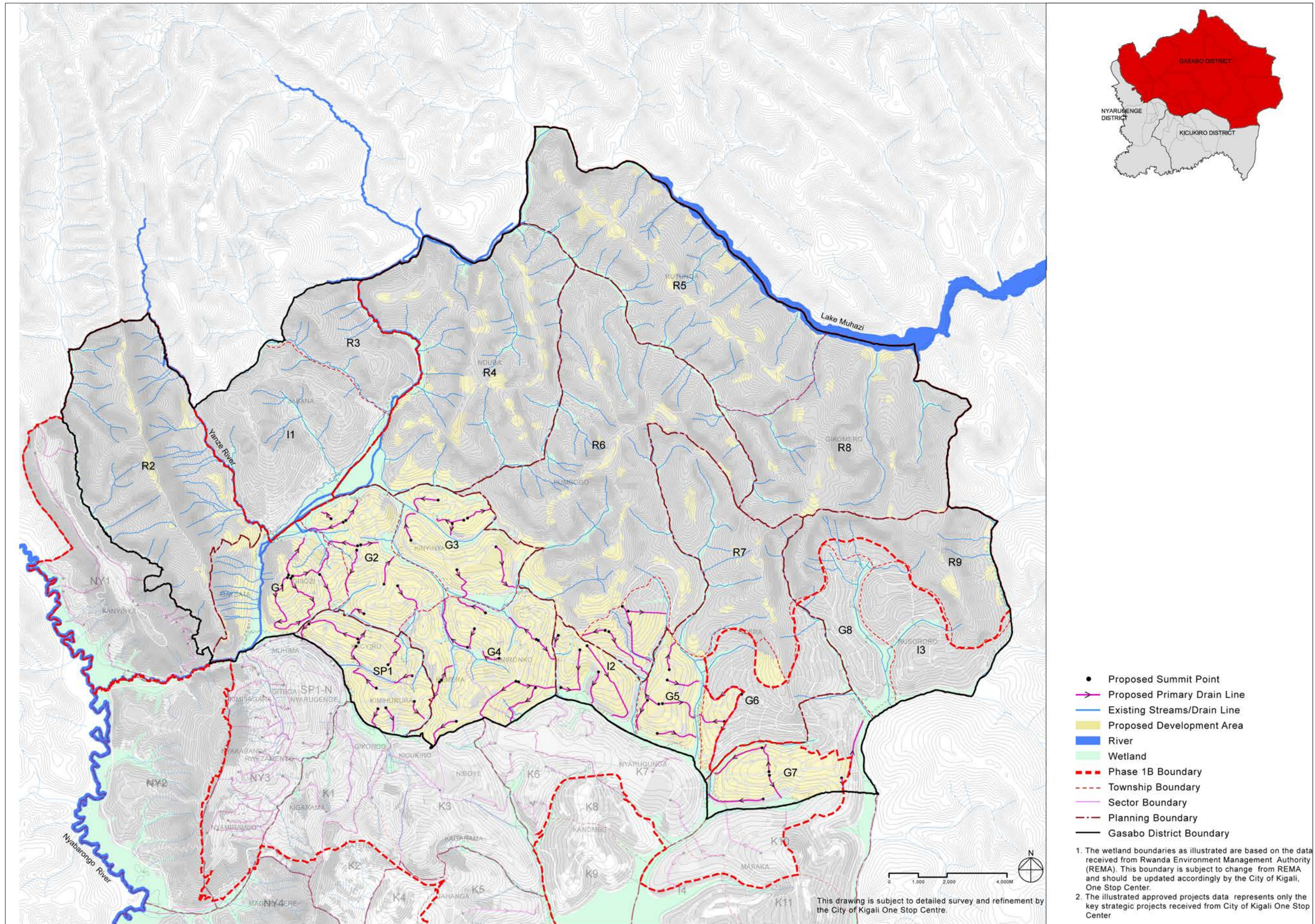


Fig.3.46 Gasabo District - Proposed Drainage Plan Year 2025

Table 3.12 Type of Substations

TYPE OF SUBSTATION	TRANSFORMER SIZE, MVA	LAND AREA,
220kV / 110kV ESS	100 – 250 MVA	150 x 150
110kV / 70kV ESS	60 – 90 MVA	150 x 150
70kV / 15kV ESS	20 – 40 MVA	50 x 50

Table 3.13 Electrical Load Density

LAND USE	ELECTRICITY DEMAND (VA/M²)	ELECTRICITY CONNECTED LOAD (KVA/DU)
RESIDENTIAL	10	1*
COMMERCIAL	20	
LIGHT INDUSTRY IN TOWN	35	
INDUSTRY - MANUFACTURING	50	
INDUSTRY - LOGISTIC	5	

Table 3.14 Electrical Load Diversity Factor

	DIVERSITY FACTOR	ACCUMULATIVE DIVERSITY FACTOR
AT MAXIMUM DEMAND AT USED LEVEL (MD) CONNECTED LOAD AT USER LEVEL X 0.85 = MAXIMUM DEMAND AT USER LEVEL	0.85	0.85
AT 15kV /0.4kV SUBSTATION MAXIMUM DEMAND AT USER LEVEL X 0.85 = DEMAND LOAD AT 15/0.4kV SUBSTATION	0.85	0.72
AT 70kV /15kV SUBSTATION DEMAND LOAD AT 15kV/0.4kV SUBSTATION X 0.85 = DEMAND LOAD AT 70kV/15kV SUBSTATION	0.85	0.62
AT 110kV /70kV SUBSTATION DEMAND LOAD AT 70kV/15kV SUBSTATION X 0.85 = DEMAND LOAD AT 110kV/70kV SUBSTATION	0.85	0.52
AT 220kV /110kV SUBSTATION DEMAND LOAD AT 110kV/70kV SUBSTATION X 0.85 = DEMAND LOAD AT 220kV/110kV SUBSTATION NOTE: WE ASSUME THE NEXT LEVEL OF VOLTAGE IS 220kV. LOCAL POWER SERVICE PROVIDER SHALL ADVISE WHICH IS THE NEXT LEVEL OF VOLTAGE SUCH AS 345kV OR 400kV TO SUIT THEIR LOCAL CONTEXT.	0.85	0.45

drain, main drain and eventually into the wetlands.

3.16 Power Supply Plan

3.16.1 EXISTING CONDITIONS

Currently, the nearest electrical substations to the Gasabo and Kicukiro District are the Gikondo and Jabana Substations. Gikondo Substation is located in central Kigali, southwest of the Gikondo Industrial Park. The major 110 kV transmission line from the hydroelectric plants in southwest Rwanda (Rusizi I and Rusizi II) joins the 110 kV transmission line from the north at the Gikondo substation. Step-down transformers then feed into 15 kV transmission lines serving central and east Kigali.

For Jabana Substation, the major 110 kV transmission line from the hydroelectric power plants (Mukungwa and Ntaruka) feeds into this substation and continues south through Kigali to the Gikondo Substation. The Jabana substation contains step down transformers to the 70 kV transmission line extending east of Kigali and to the 15 kV lines serving Kigali. In the absence of detail information, it is not possible to indicate the coverage of each HV/MV substation.

The electricity for the urban area within Gasabo and Kicukiro District are served by overhead power lines. Most of the resident’s electricity meters are prepaid type. The biggest challenges of the EWSA in expanding the power network are lack of utility reserve along the public road for laying the cable. For new future development, space for the utility corridor should be planned alongside the road in order to lay new cable and water pipes in addition to the land for new substation.

Gasabo district is part of the City of Kigali. However, the electrification rate at the district is believed to be quite low. High electricity cost is part of the reason why wood remains the main source of energy. Minister has aim to increase the public access to the electricity within the region. Therefore, heavy investment in the power supply sector is needed in order to expand the power plants, transmission system and distribution system.

3.16.2 ESTIMATED LOAD DEMAND

The Master Plan details the different planning parameters for year 2025 and Year X. The load estimates for the new developed area is calculated based on the built up areas of the different Land Used, and the electricity demand VA/m2 of each Land Used.

The proposed electrical load density for various Land Uses is depicted as table below. Assumption of 1kVA per DUs is based on ambient temperature of 18’c to 21’c at City of Kigali which generally eliminates the usage of the air conditioning.

As all type of installed loads (domestic, commercial, industrial, public lighting) never operates at the same time in practice, certain diversity factor had been taken in order to estimate the load. We are using the diversity factor shown in Table 3.14

The proposed electrical load density for various Land Uses is shown in Table 3.13

The total maximum demand for the Master Plan Gasabo district at Year X is 1493 MVA. Refer to Table 3.15

The estimated numbers of 220kV/110 kV substation, 110kV/70kV substation and 70kV/15kV substation at Year X are shown in Table 3.16

Refer to Fig.3.47 for the proposed substation location and transmission lines of Gasabo District Year X.

The total maximum demand for the Gasabo district for development planning of phase 1 ended year 2025 is 781 MVA. Refer toTable 3.17

The estimated nos of 220kV/110 kV substation, 110kV/70kV substation and 70kV/15kV substation at year 2025 are

shown inTable 3.18

Refer to Fig.3.48 for the proposed substation location and transmission lines of Gasabo District Year 2025

3.16.3 PROPOSED INSTALLATION FOR GASABO DISTRICT

According to the calculation, the total power demand for Gasabo district is 480MVA at year 2025 and will increase to 917MVA at Year X.

A new national grid of 220kV or higher is proposed for the Rwanda as the estimate load for whole country will be more than 720MVA at year 2025. All the power plants, either existing or new are proposed to connect to the new national grid to supply the electricity throughout the nation.

From outside the city, the 220kV overhead transmission line shall be connected to the proposed 220/110kV main substations at Gasabo district and also to other 220/110kV main substations at Kicukiro district and Narugenge district within in the City of Kigali.

The 220/110kV substation will step down the voltage level to 110kV before step down again to 70kV at 110/70kV substation. The transmission line, either overhead or underground cables are assumed to run along main express way. The underground cable can be lay together during the construction of the express way. The right of way will be the road itself if the cable is run beneath the driveway. For the overhead cable, the reserve land of 30 to 40m wide is required depending on the local authority requirement on different level of transmission line.

The 70/15kV substation is normally located at the load centre. The substation transmits

Table 3.15 Electrical Power supply for Gasabo District Year X

TOWNSHIP	ELECTRICAL LOAD, KVA AT 15/0.4kV SUBSTATION			
	TOTAL	CONNECTED LOAD	DIVERSITY FACTOR	ESTIMATED NOS OF ESS
SP1	154,537.56		0.85	131,356.92
G1	42,089.64		0.85	35,776.19
G2	60,895.24		0.85	51,760.95
G3	42,888.48		0.85	36,455.21
G4	113,635.32		0.85	96,590.02
G5	45,121.64		0.85	38,353.39
G6	101,941.64		0.85	86,650.40
G7	88,623.96		0.85	75,330.37
G8	54,565.80		0.85	46,380.93
I1	140,436.69		0.85	119,371.19
I2	430,213.11		0.85	365,681.15
I3	481,251.43		0.85	409,063.71
TOTAL	1,756,200.51			1,492,770.43

Table 3.16 The estimated numbers of substation at Year X

VOLTAGE LEVEL	LOAD ESTIMATE (MVA)	NOS OF SUBSTATION
70kV / 15 kV	1, 268.86	43
110kV / 70kV	1,078.53	16
220kV / 110kV	916.75	4

the power to the distribution transformer (15kV/400V transformer) which located at community centre. The distribution transformer has limited capacity and serving radius, normally about 250m from the further unit. All the outgoing cables from the 70/15kV substation are assumed to be underground.

Table 3.17 Electrical Power supply for Gasabo District Year 2025

TOWNSHIP	ELECTRICAL LOAD, KVA (AT 15/0.4kV SUBSTATION)			
	TOTAL	CONNECTED LOAD	DIVERSITY FACTOR	ESTIMATED NOS OF ESS
SP1	154,537.56		0.85	131,356.92
G1	42,089.64		0.85	35,776.19
G2	60,895.24		0.85	51,760.95
G3	42,888.48		0.85	36,455.21
G4	113,635.32		0.85	96,590.02
G5	45,121.64		0.85	38,353.39
G6	33,361.10		0.85	28,356.94
G7	19,407.41		0.85	16,496.30
G8	0.00		0.85	0.00
I1	71,022.25		0.85	60,368.91
I2	104,694.02		0.85	88,989.92
I3	231,000.69		0.85	196,350.59
TOTAL	918,653.35			780,855.34

Table 3.18 The estimated numbers of substation at Year 2025

VOLTAGE LEVEL	LOAD ESTIMATE (MVA)	NOS OF SUBSTATION
70kV / 15 kV	663.73	22
110kV / 70kV	564.17	9
220kV / 110kV	479.54	2

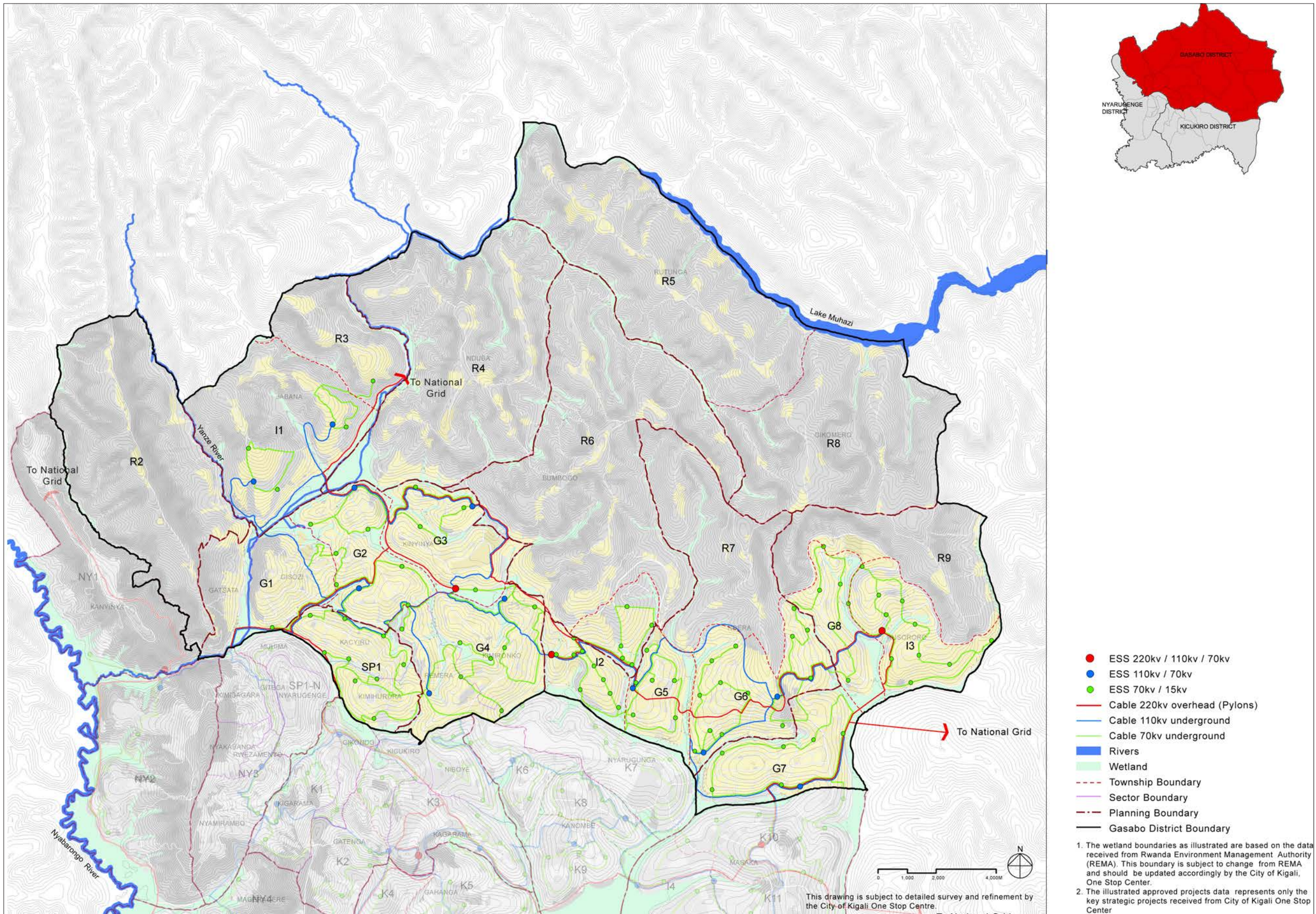


Fig.3.47 Gasabo District - Proposed Power Supply Plan Year X

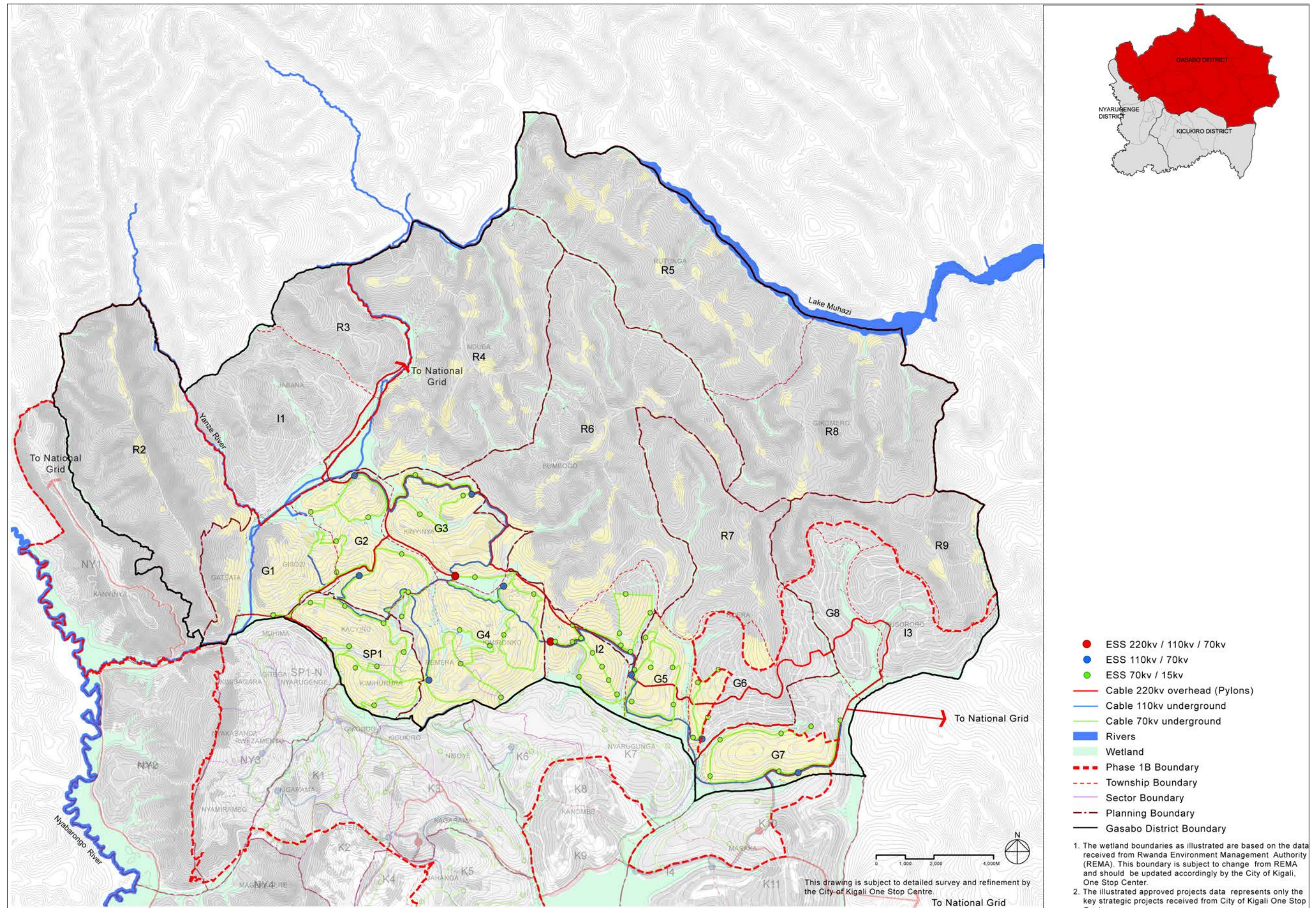


Fig.3.48 Gasabo District - Proposed Power Supply Plan Year 2025

ALTERNATIVE POWER SUPPLY

In Kigali, where most of the electrical power is attained from burning imported diesel fuel outside the Sub-Area, alternative renewable energy sources are important for sustainable & independent development within the Sub Area (township). While some of the new technologies may seem to be more expensive than fossil fuel electrical generation, fossil fuels have “external” costs that are not computed into up-front costs (such as environmental, political & health costs). These hidden costs have important implications for long term national security and environmental sustainability as well as medical costs. Hidden costs should be calculated into decisions relating to energy supply.

In addition, there is economic development potential for Rwanda through emphasizing green technologies. By using these technologies abundantly and developing prototypes, Rwanda can position itself as a leader in this arena and potentially develop a clean energy industry that can provide technology to the whole Central/East Africa

region. The range of new / green energy technologies is growing exponentially. Solar photovoltaic (PV) can be mounted to roof tops or banked together in generation plants within each township. PVs can be used as roof shelters, park shade structures, window shades and even facades.

Other renewable sources to be utilized within the township include: biogas & biomass generators from wet organic waste in the sewer system and dry organics (from such sources as market & produce processing waste) respectively. Gravity water flow from hilltop storage tanks in the township will generate electricity while reducing water pressure to appropriate levels.

PHOTOVOLTAIC

Photovoltaic (PV) cells should be incorporated where feasible into individual buildings, including civic buildings. Although this is not yet as cost effective as fossil fuel generation, it is expected that with increased development in the City

and the problems associated with electrical generation, PV's will provide a reliable source. In the future, PV's can be applied to any exterior surface exposed to direct sunlight.

As a rule of thumb, household energy needs can be met by reserving 9 sq m unit on a north or near north facing roof along with architectural design guidelines which will make the incorporation of solar energy more cost effective.

ELECTRICAL POWER “SMART” GRID

State of the art electrical power distribution flow is moving from the hierarchical large central power plant grid to a network grid for decentralized power generation sources. Integration of multiple renewable energy sources is changing the way distribution is achieved. The diversity of sources such as solar photovoltaic, wind, hydro and biofuels that may contribute inconsistent peaks in generation from different locations requires a “smart” grid to balance loads from many sources and distribute them to where they are needed.

Hydrogen generation is being tested as an energy storage medium to offset the highs and lows of wind power generation. This kind of power grid will allow anyone to contribute to it and be reimbursed through reverse metering.

REDUCING DEMAND:

ELECTRICAL ENERGY EFFICIENCY

Because of the rapidly increasing demand and cost for electrical power in Kigali, new developments in the township must be energy efficient and lighten new loads within the Sub Area. Multiple small savings at individual building and residential units in aggregate can make a very large difference in energy consumption and the sizing of the electrical distribution system.

Proper building design with respect to solar orientation, materials, shading configurations and passive cooling strategies will make mechanical cooling largely unnecessary. As more residents move to automated washing and drying

of clothing, laundromats should be conveniently located in the neighborhoods for centralized services utilizing high efficiency washers and dryers.

“EnergyStar” or similarly efficiency rated equipment and appliances are to be used throughout new developments, including especially water heaters (which may also be solar) and refrigerators.

Lamps for light fixtures should be LED or compact fluorescent where ever possible. Alternative briquette, gas, oil or solar cookers will greatly reduce electrical demand.

Thermal mass, radiant barriers, thermal insulation and vented skin technologies also serve to reduce requirements for cooling. Where some mechanical cooling is still desirable, low energy consumption techniques such as evaporative cooling, night time recharge, geothermal exchange, domestic water chill beam and other forms of radiant cooling are recommended.



Fig.3.49 Alternative Power Sources (Left to Right : Solar; Bio-gas; Hydrogen; Geothermal; Wind)

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4 DETAILED MASTER PLAN FOR SPECIAL PLANNING AREA

This chapter presents the detailed Master Plan for the Special Planning Area. Based on the analysis of the existing context, opportunities and constraints, a vision and concept have been derived, to guide the development of the Master Planning area.

4.1 Special Planning Area-Existing Condition

4.1.1 PLANNING AREA

The Special Planning Area comprises of two sectors; namely Kacyiru and Kimihurura. The total planning area is 107 2 ha.

4.1.2 LOCATION AND CONNECTIVITY

The Special Planning Area is located in the south west of the Gasabo District and is a part of the City Centre. The Special Planning Area is surrounded by Kinyinya to the north, Remera to the east and Gisozi to the west. The Kicukiro District is located to the south east and Nyarugenge district to the South west of the Special Planning Area.

As the planning area is centrally located, it is well connected to all the surrounding sectors of Kigali city. Avenue de la Gendarmerie connects the Special Planning Area to the CBD at Muhima. Avenue du lac Kivu connects the Special Planning Area to the Kinyinya and Remera Sector in the Gasabo District. Kigali International Airport Road and Vers Kibungo Road connects the planning area to the Kigali international airport and to the Kicukiro district.

4.1.3 EXISTING SITE CONDITIONS

The Special Planning Area is the smallest planning area in the Gasabo District. The planning area currently has a population of about 91,000 people (2013)¹. Almost all the of the land within the planning area has already been built upon. Large number of existing government offices, important ministries and the presence of a number

of embassies reinforces the importance of the Special Planning Area. A large number of commercial buildings and hotels are also present within the planning area. The area has good quality residential developments which create a distinct identity for the area. There are also unplanned low rise residential developments present within the planning area. Areas of cultural important like the Kimihurura Roundabout, National Library and the Urukundo Potter's Village are also present within the planning area. Approved projects like the Kimihurura sub area plan has been captured in the detail planning, keeping in mind the development potential of the area, relatively higher density residential and an increased quantum of commercial can be provided in these areas. Some of the other approved projects include:

- Police headquarters, Kacyiru sector.
- Turkish school, Kacyiru sector.
- Century park residential project.
- Kimihurura OZ sub area plan.
- Kimihurura convention centre.

The gross existing population density of the Special Planning Area is approximately 85 P/ha

The existing site conditions and context are illustrated in Fig.4.3.

4.1.4 NATURAL SITE CONDITIONS

Special Planning Area is surrounded by wetlands on three sides and is linked to Remera sector by Vers Kibungo. Only about 5 % of the land in the planning area is categorised under natural constrains such as steep slopes (20-40% slope gradient), existing forests and wetlands. Wetlands, steep slopes, existing forests and natural drainage channels within the planning area need to be protected.

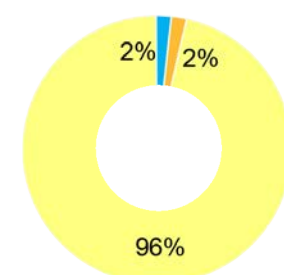
The slope analysis is illustrated in Fig.4.1.

The watershed areas and drainage lines are illustrated in Fig.4.2.

1,072ha
Total Planning Area



91,000
Population 2013



Natural Constraints

85p/ha
Existing Density



Fig.4.1 Special Planning Area - Slope Analysis

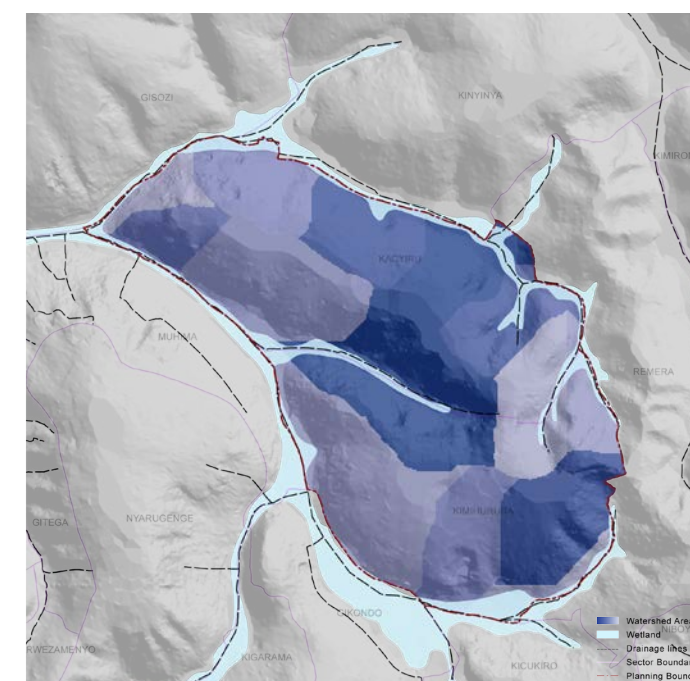


Fig.4.2 Special Planning Area - Watershed and Drainage Channels

¹ Assuming a growth rate of 5.45% from the year 2007, KCMP 2007

Table 4.1 Special Planning Area - Existing Land Use distribution

LAND USE	DETAIL LAND USE	AREA (HA)	TOTAL AREA (HA)
Residential	Single family Residential	249	432
	Low Rise Residential	180	
	Medium Rise Residential	3	
Commercial	Commercial Office	4.50	36
	Commercial General	25	
	Hotel	6.50	
Public facilities	Government Office	58	163
	Educational	37	
	Religious Facilities	10	
	Health Facilities	13	
	Civic Facilities	45	
Industries	Light Industrial	7	20
	Heavy Industrial	8	
	Warehousing	5	
Nature Area	Existing Forest	1	20
	Wetland	19	
Agriculture	Farmland	126	126
Open Space	Open Space and Park	21	49
	Sports and Recreation	28	
Infrastructure	Transportation	100	100
Special Use	Defence Area	55	55
	Vacant Land	67	67
	Total	472	

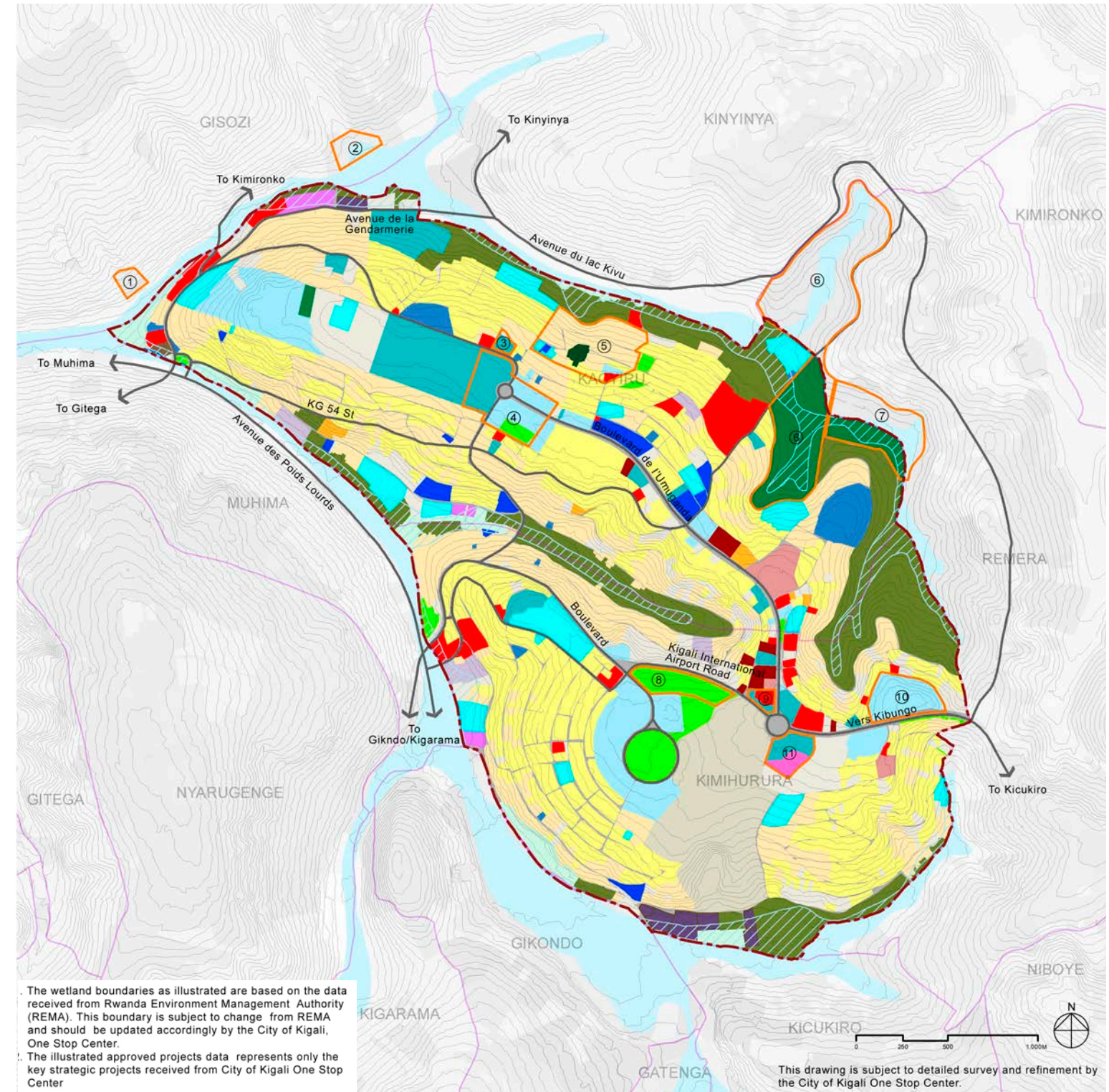


Fig.4.3 Special Planning Area - Existing Land Use and Context Map

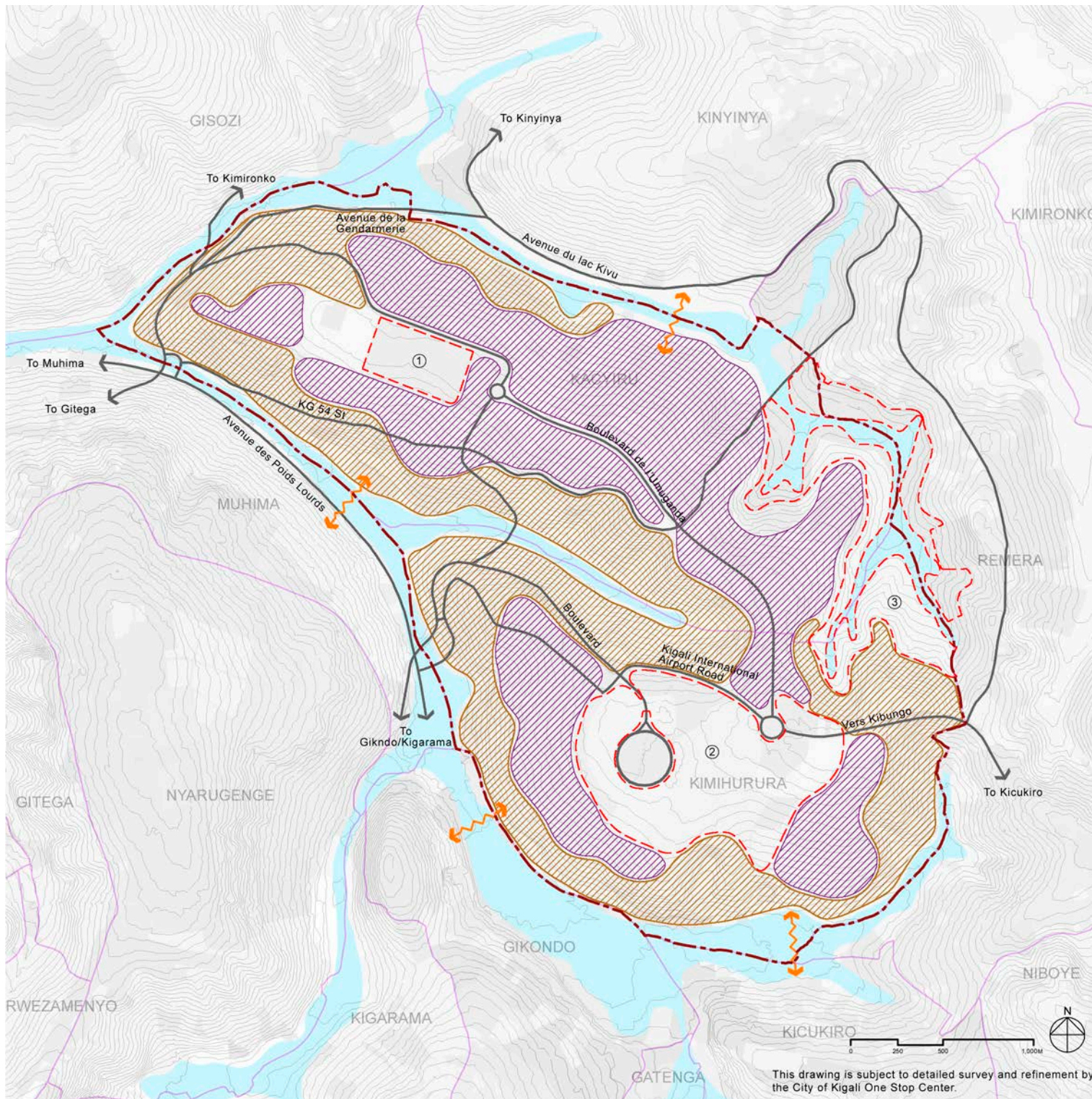


Fig.4.4 Special Planning Area - Constrains Map

4.2 Special Planning Area- Opportunities and Constraints

4.2.1 CONSTRAINTS

Constraints identified within Special Planning Area are based on existing context analysis.

The constraints are as follows:

- The built up nature of the planning area makes it difficult to provide a more flexible Land Use.
- Good quality, single family residencies restricts densification of future residential developments that can be proposed.
- The entire Kimihurura sector within the Special Planning Area has already been built upon.
- Special use sites such as the police headquarters are located in the planning area. It occupies key developable land on relative flatter regions.
- Many new residential developments, are encroaching into wetlands. These wetlands need to be protected as they are an important natural feature.
- Wetlands separate the planning area from other sectors and districts. The steep slopes along the wetlands are a constrain for provision of sustainable infrastructure and road network.

- High density residential developments and the number of road connections towards the CBD in muhima are restricted by steep slopes towards the south.
- Low density unplanned residential developments occupy approximately 180 Ha of land in the planning area.

The constraints are illustrated in Fig.4.4.

- Approved Projects :
- ① Police Headquarters Project
 - ② Kimihurura OZ Subarea Project
 - ③ Century Park Project
- Slopes between 20-40% that restrict high density development
 - Steep slopes and wetlands restrict connectivity and impose high infrastructure costs
 - Largely built-up areas

- Wetland
- Major road
- Sector Boundary
- Planning Boundary

1. The wetland boundaries as illustrated are based on the data received from Rwanda Environment Management Authority (REMA). This boundary is subject to change from REMA and should be updated accordingly by the City of Kigali, One Stop Center.
2. The illustrated approved projects data represents only the key strategic projects received from City of Kigali One Stop Center

4.2.2 OPPORTUNITIES

Opportunities identified within the Special Planning Area are based on the existing context analysis.

The opportunities are as follows:

- The planning area is centrally located in Kigali City. This presents the opportunity to develop the Special Planning Area as the Administrative Hub of Rwanda.
- Furthermore the presence of a number of important government offices, including the Rwanda Parliament strengthens its position as the Administrative Hub of Rwanda.
- There is a opportunity to redevelop the corridor along Avenue de le Gendarmerie and Vers Kibungo arterial connecting the Muhima CBD and the proposed Kimironko Fringe Centre. This corridor can be developed as a high density mixed used corridor along the proposed public transit network.
- Low-density, unplanned developments provide the opportunity for regeneration of this areas into affordable housing schemes in the City Centre.
- Urukundo Potters Village and Kimihurura Roundabout provide the opportunity

to conserve and rejuvenate important cultural and tourist attractions within the planning area. These can be tourist destinations and provide opportunity to conserve the historical urban fabric and unique local communities of the City of Kigali.

- Steep slopes along wetlands provide the opportunity to develop low impact, low density residential developments which overlook the wetlands.
- The wetland buffer provides the opportunity to develop seamless open space and recreational park around the Special Planning Area.
- A 10 m buffer is to be provided along natural drainage channels. These provide the opportunity to connect various open spaces within the planning area to wetland parks. They can also be use as open space within residential developments.

The Opportunities are illustrated in Fig.4.5.

- Heritage / Cultural sites
 - ① Urukundo Potters Village
 - ② Kimihurura Roundabout
- Important Civic Amenity
 - ③ Kigali Convention Center
 - ④ Rwanda Parliment
 - ⑤ US Embassy
 - ⑥ ⑦ ⑧ Important Ministries of Kigali
- Approved Projects
 - ⑨ Kimihurura OZ Subarea Project
- Existing prime commercial nodes
- Opportunity to develop a commercial corridor along the main central spine
- Good site views
- Continous wetland park connections
- Underutilized land, Potential for mixed use residential development

- Potential to develop a high density residential development
 - Opportunity to reorganize existing built-up area
 - Wetland
 - Major road
 - Sector Boundary
 - Planning Boundary
1. The wetland boundaries as illustrated are based on the data received from Rwanda Environment Management Authority (REMA). This boundary is subject to change from REMA and should be updated accordingly by the City of Kigali, One Stop Center.
2. The illustrated approved projects data represents only the key strategic projects received from City of Kigali One Stop Center

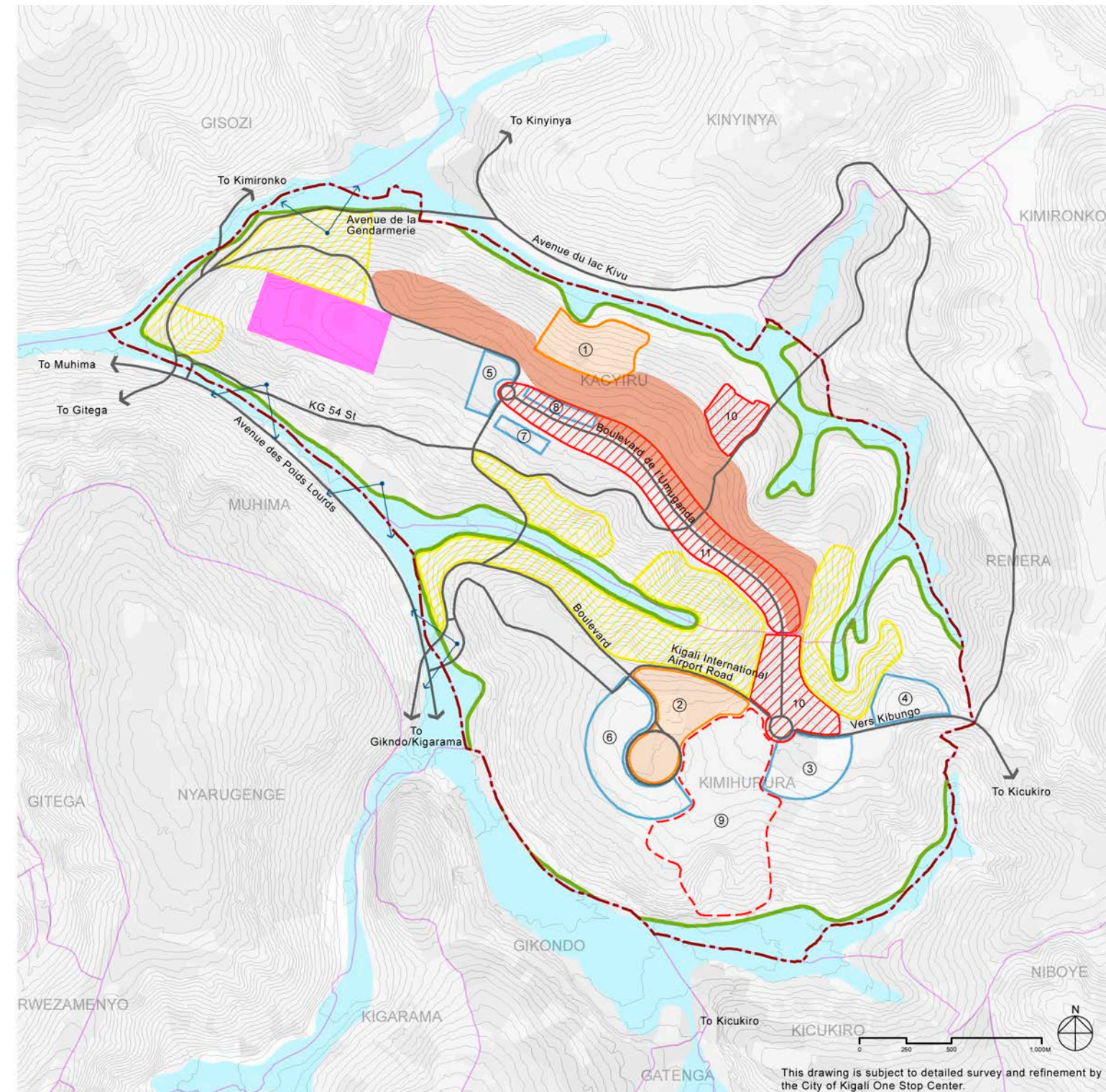
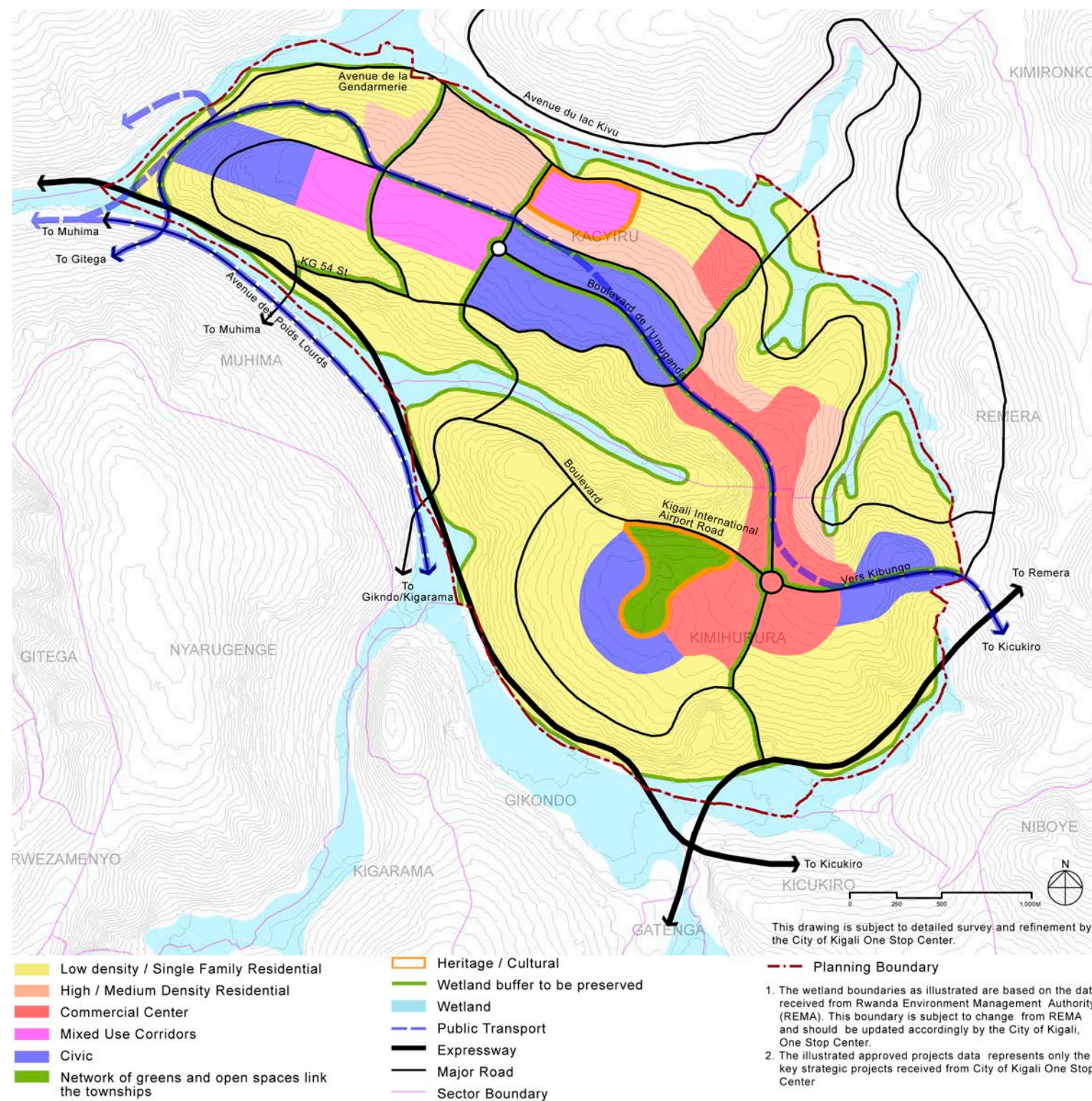


Fig.4.5 Special Planning Area - Opportunities Map



4.5 Special Planning Area- Proposed Land Use Plan

The Land Use Plan aims to build upon the physical opportunities and constraints of the planning ares and offers incentives for integrated township developments.

The key developments proposed in the Land Use Plan are as follows:

- To develop one fully integrated Special Use Area, with commercial and civic facilities.
- To develop city level and district level commercial and civic facilities .
- To retain all government offices and intensify the developments around them.
- To densify residential developments along the BRT and MRT network.
- To develop low density and low impact developments along the wetlands.
- To retain and revitalise the existing public facilities and provide new facilities required for the increased population based on the township model developed for Kigali.
- To promote the Kimihurura Roundabout as an important cultural centre for Kigali by providing a mix of retail and F&B commercial around it.
- To a develop a flower valley in the south of the planning area along the wetlands as a recreational feature.
- To integrate all developments with the proposed transit corridors.

The projected population for the Special Planning Area is approximately 0.13 mil people by Year X.

The gross projected population density of the Special Planning Area is approximately 117 P/ha

The proposed Land Uses are illustrated in Fig.4.7 and Table 4.2

4.5.1 SPECIAL PLANNING AREA- PROPOSED RESIDENTIAL USE PLAN

- The planning area will largely have single family residential developments providing about 50,000 dwelling units. To keep in line with the existing Land Use.
- Additional low-rise residential developments would provide about 22,000 dwelling units, through redevelopment of unplanned areas.
- Densification along the transit corridor is proposed to be achieved by providing medium rise residential development along the BRT and MRT. These developments are would provide about 32,000 dwelling units.
- Mixed used developments along Boulevard de l’Umuganda are projected to provide approximately 45,000 dwelling units in the Special Planning Area.

The Residential Use Plan is illustrated in Fig.4.8

4.5.2 SPECIAL PLANNING AREA- PROPOSED COMMERCIAL USE PLAN

- Commercial use has been proposed on about 70 ha of land in the Special Planning Area.
- These would also provide about 0.15 mil jobs in retail sector and service sector by the Year X.
- Most of the commercial uses like office and retail space are provided on the ridge along Boulevard de l’Umuganda. This would help strengthen the corridor between the US embassy and the Kigali Convention Centre.
- Commercial development has been proposed around the Kimihurura Roundabout to further emphasise the importance of the historical and cultural site.
- Redevelopment of the police headquarters along the Avenue de la Gendarmerie, for developing vibrant

mixed use developments.

- The Urukndo Potters Village along the wetlands in the north of the planning area is proposed to be rejuvenated as a mixed used precinct. Artisans will live and work within this village and also sell their products. The main aim is to maintain the urban fabric of this development and at the same time make it special tourist attraction.
- Six neighborhood centres have been proposed in the planning ares. These would take care of the daily needs of the residents and are located at a walking distance of no more than 500 m.

The Commercial Use Plan is illustrated in Fig.4.9

4.5.3 SPECIAL PLANNING AREA- PROPOSED PUBLIC FACILITIES PLAN

- Special Planning Area is proposed to developed as the administrative Centre of Kigali. Hence, all the embassies, ministerial offices, Rwanda Parliament and National courts are to be retained.
- The existing public facilities such as schools, government offices, health centres, sports and religious facilities in the Special Planning Area to be reattained and developed around.
- A number of city level civic faciltites like the Rwandan National Library and Kigali Convention Centre have been proposed in the Special Planning Area.
- 10 primary and 5 secondary schools have been provided in the Special Planning Area, based on catchment population, existing schools and walking distance of no more than 500 m.
- Neighborhood public facilities such as religious, health and community facilties, etc., are integrated within each neighborhood centre.

The Public Facilities Plan is illustrated in Fig.4.10

4.5.4 SPECIAL PLANNING AREA- PROPOSED GREEN AND OPEN SPACE PLAN

- With the aim to conserve and revitalize the existing open spaces, two urban parks have been retained in the Special Planning Area, namely Kigali Centenary Park and the Kimihurura Roundabout. These are important destinations for the locals and would become tourist attraction.
- A total of approximately 88 ha have been proposed to be developed as open space sand parks.
- Linear parks have been proposed along wetlands with the aim to protect the

wetlands, while providing recreational spaces for the residents.

- An attempt has been to made to connect the various open spaces using the natural water drainage channels.
- A Flower Valley has been proposed along the wetlands in the south of planning area. The flower valley is intended to be a major tourist attraction in the District.
- In line with the township model seven neighborhood parks of about 1.2ha each have been proposed in the Special Planning Area.

The Green and Open Spaces Use Plan is illustrated in Fig.4.11

Table 4.2 Special Planning Area- Proposed Land Use Distribution

BROAD LAND USE	DETAIL LAND USE	AREA (HA)	TOTAL AREA(HA)
Residential	Single family Residential	313	434
	Low Rise Residential	63	
	Medium Rise Residential	58	
Commercial	Commercial Office	4	72
	Commercial General	62	
	Hotel	6	
Mixed Use	Mixed use	39	39
Public facilities	Government Office	74	163
	Educational	29	
	Religious Facilities	18	
	Health Facilities	14	
	Civic Facilities	28	
Nature Area	Existing Forest	1	87
	Wetland	86	
Open Space	Open Space and Park	111	119
	Sports and Recreation	8	
Infrastructure	Transportation	124	142
	Transportation(open Space)	8	
	Utilities	10	
	Total	1072	

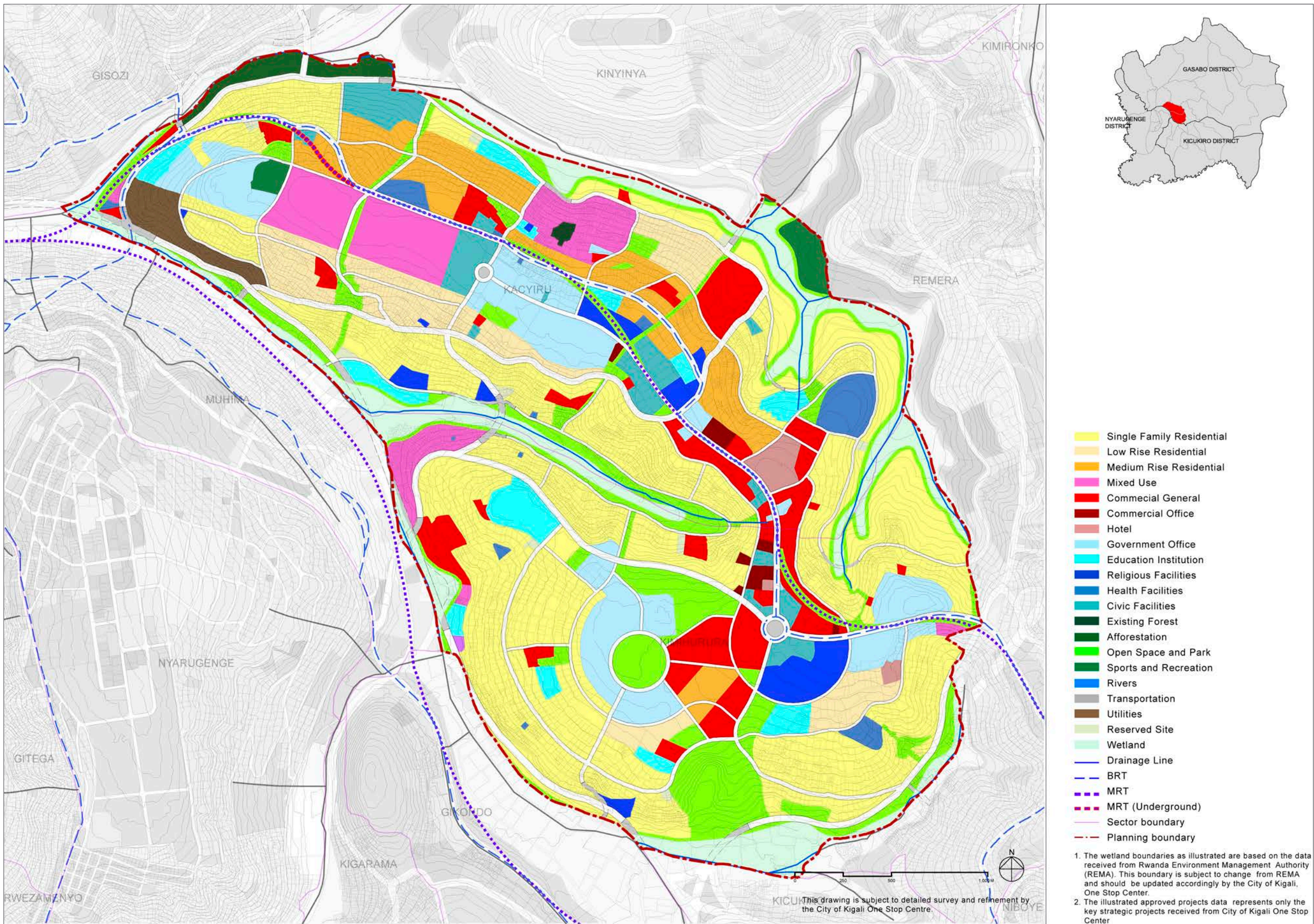


Fig.4.7 Special Planning Area- Proposed Land Use Plan

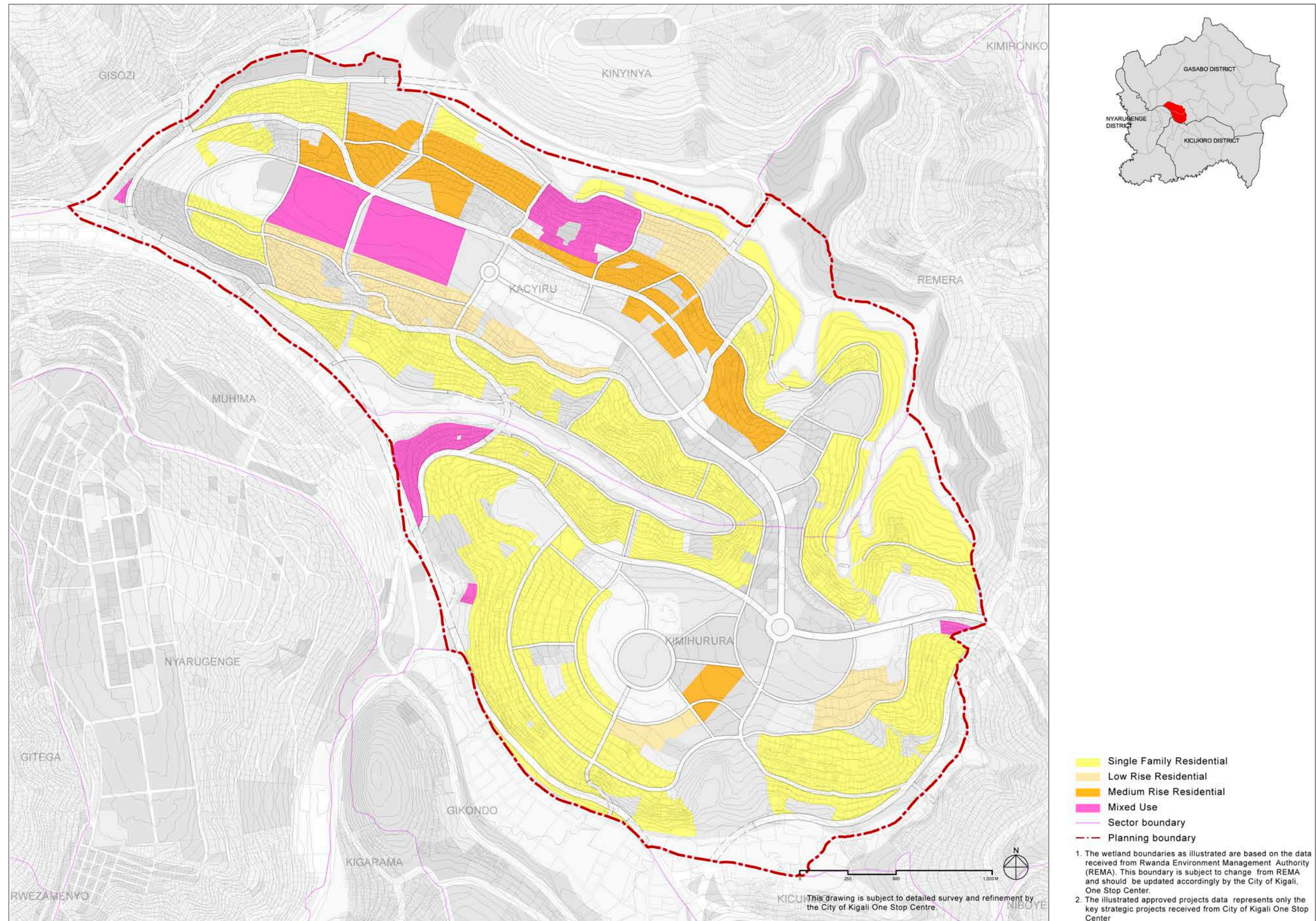


Fig.4.8 Special Planning Area-Proposed Residential Use Plan

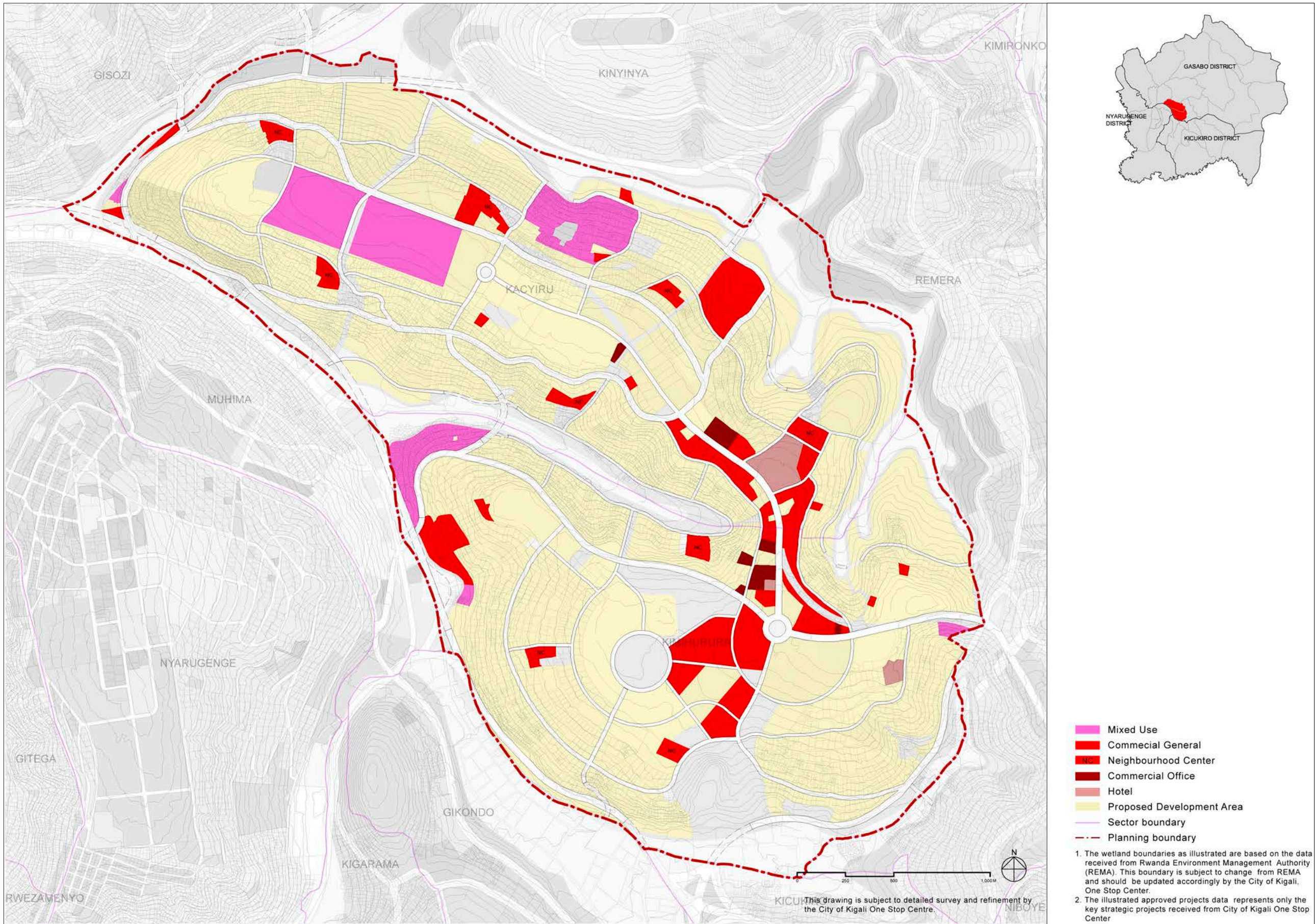


Fig.4.9 Special Planning Area- Proposed Commercial Use Plan

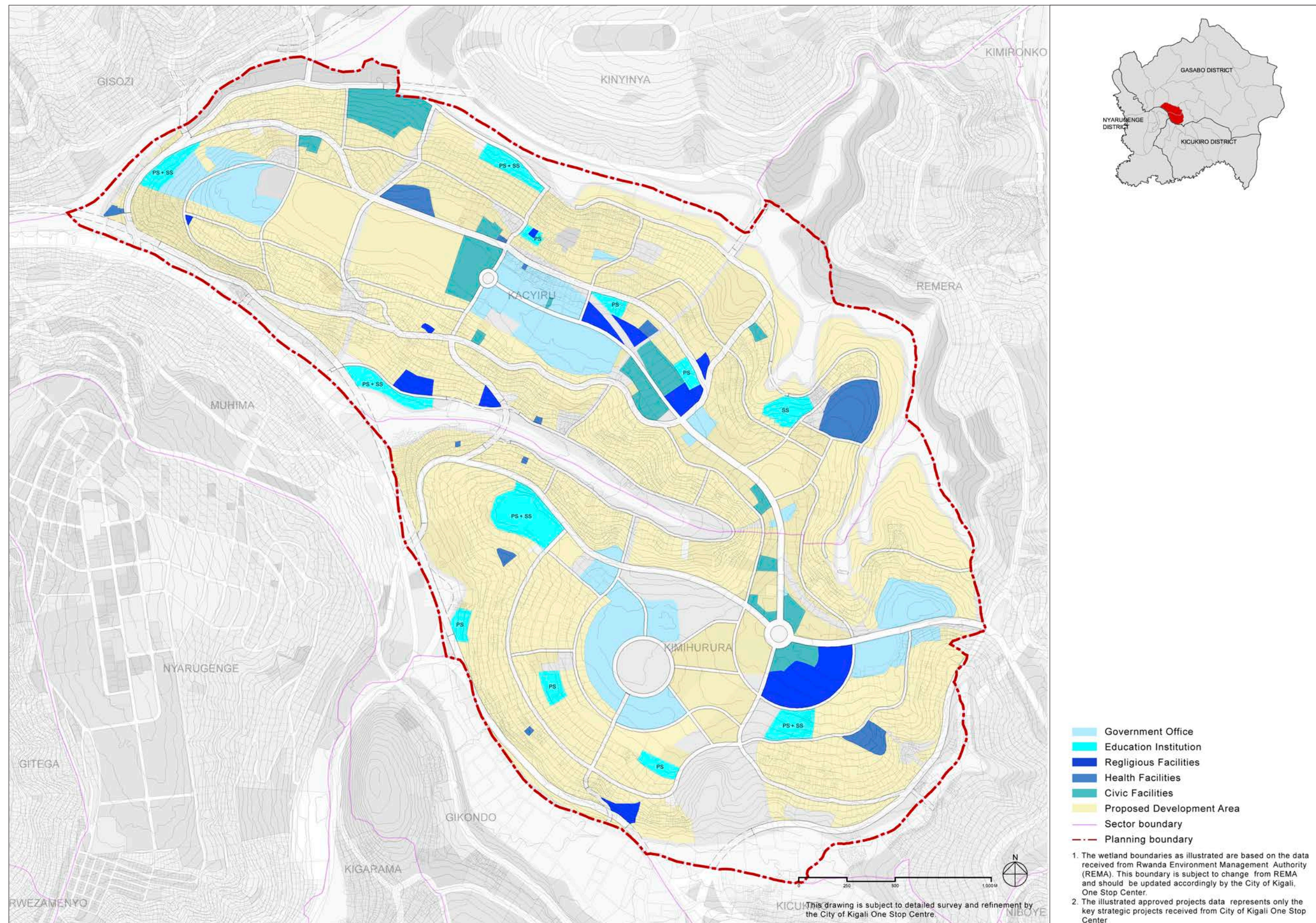


Fig.4.10 Special Planning Area- Proposed Public Facilities Plan

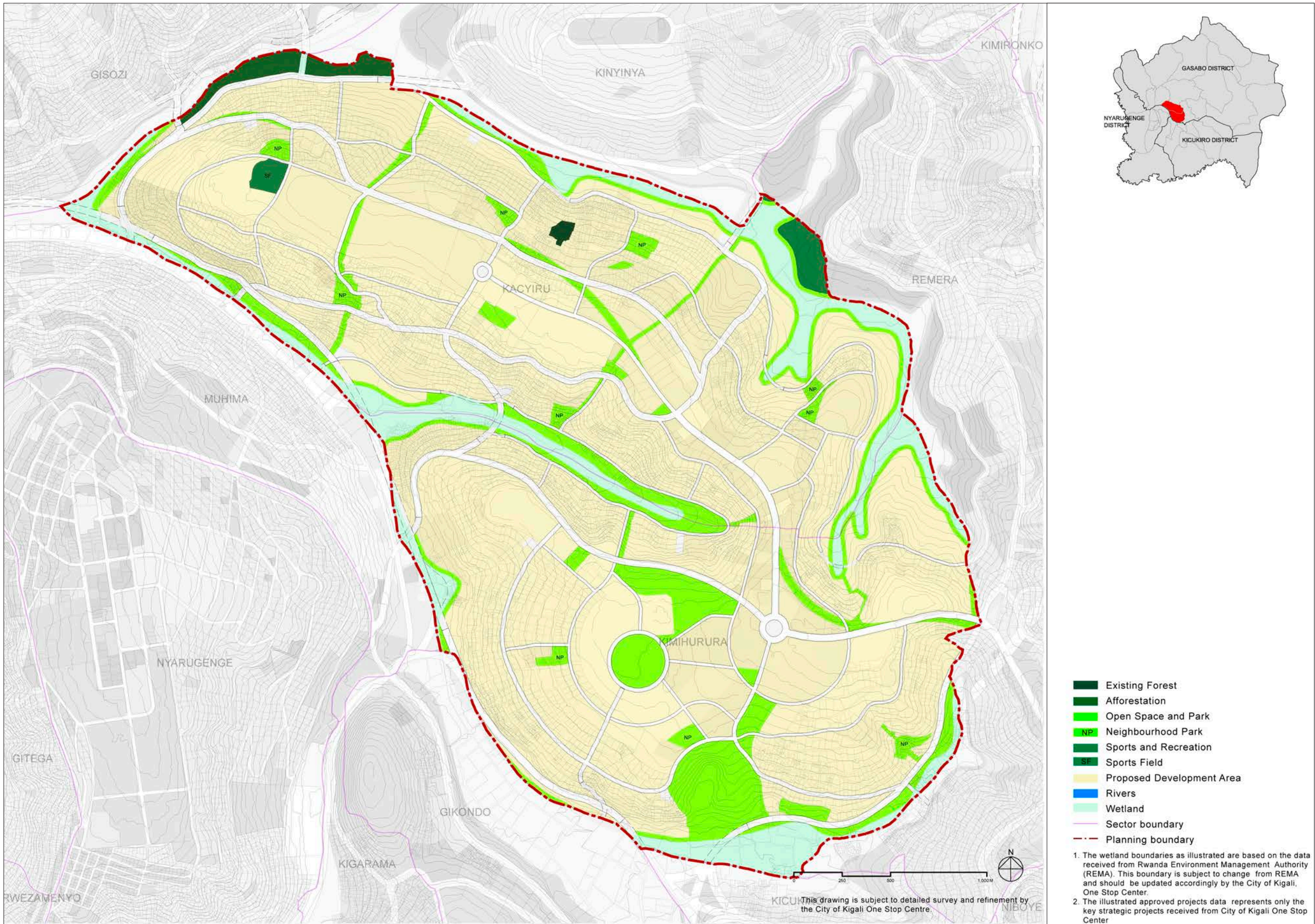


Fig.4.11 Special Planning Area - Proposed Open Space And Green Use Plan

4.6 Special Planning Area- Key Feature Developments

The Planning Area is envisioned as the Administrative Hub of Rwanda.

As part of the Proposed Land Use Plan, two areas are identified as key features for the planning area. Kimihurura Roundabout development and the Urukundo Potters Village.

1. KIMIHURURA ROUNDABOUT DEVELOPMENT

The Kimihurura Roundabout is one of the most culturally significant spaces in the city of Kigali. The Kimihurura Roundabout plan is built upon the OZ sub area plan. Within the Kimihurura roundabout Large urban parks and green promenades have been proposed. Kimihurura roundabout is one of the most visited place in Kigali, land around it has commercial potential. Thus commercial use has been proposed around it. Commercial use will mainly cater to retail and F&B . Kimihurura Roundabout Development would be a part of larger strategy to project Gasabo as the cultural heartland of Kigali. Thus it is important to retain such spaces and make them more attractive for business, tourists and citizens alike. It will also act as the termination of the commercial corridor along Boulevard de l'Umuganda.

2. URUKUNDO POTTERS VILLAGE

Urukundo potters is an important part of Kigali City's cultural heritage and further emphasise the role of Gasabo as the cultural heartland of Kigali. Urukundo potters village has been proposed to be conserved and rejuvenated as mixed used development. It has been envisioned as a place where the potters live and work. Urban fabric and architecture of the development will reflect the heritage of Kigali and help me the citizens maintain a sense of place and identity. One of the major part of the proposal will be to redevelop it in way that it will showcase the unique potters community and lifestyle.

The key features for the planning area are Illustrated in Fig.4.12

- ① Kimihurur aroundabout development
- ② Urukundo Potters Village

1. The wetland boundaries as illustrated are based on the data received from Rwanda Environment Management Authority (REMA). This boundary is subject to change from REMA and should be updated accordingly by the City of Kigali, One Stop Center.
2. The illustrated approved projects data represents only the key strategic projects received from City of Kigali One Stop Center

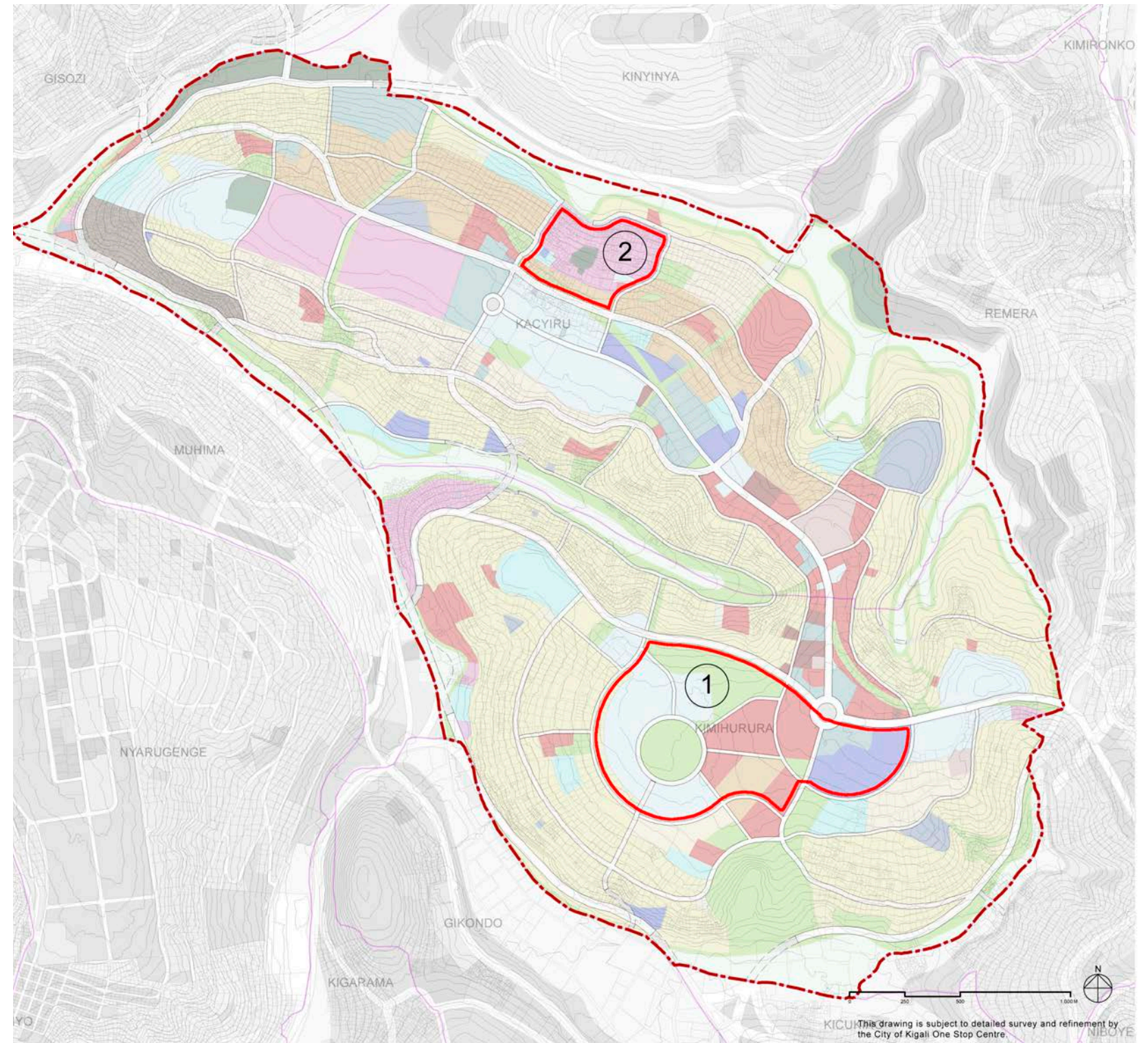


Fig.4.12 Special Planning Area - Proposed Key Features

5

DETAILED MASTER PLAN FOR CENTRAL PLANNING AREA

This chapter presents the detailed Master Plan for the Central Planning Area. Based on the analysis of the existing context, opportunities and constraints, a vision and concept have been derived, to guide the development of the Master Planning area.

5.1 Central Planning Area - Existing Condition

The Central Planning Area comprises of five sectors namely Gisozi, Gatsata, Kinyinya, Remera and Kimironko. The total planning area is 5770.7 ha.

5.1.3 LOCATION AND CONNECTIVITY

The Central Planning Area is located in the west of Gasabo District, which is considered an urban area. Central Planning Area is surrounded by the Kacyiru sector to the south, Ndera and Bumbogo sector to the East, Jali sector to the west and Jabana and Nduba sectors to the north. Kicukiro District lies to the south east of the planning area. The planning area is bounded by Avenue Du Lac Kivu in the south, which also separates it from Kacyiru sector. Avenue Du Lac Kivu connects the planning area to the CBD in Muhima. Vers Kibungo in the south east help to connect the planning area to the airport, Kicukiro District and to the rest of Kigali city.

5.1.4 EXISTING SITE CONDITIONS

The Central Planning Area is the largest planning area in Gasabo District. The area currently has a population of approximately 0.22 mil people (2013)¹. The development trends point towards low rise and single family residences in the planning area supported by scattered commercial developments.

Public facilities such as schools and religious facilities are spread evenly in the southern part of the planning area. Important civic facilities like the Amahoro Sports stadium

and Kigali Institute of Education are present in the planning area. A major recreational space i.e. Nyarutarama golf course is also present in the planning area. Approved projects like the Kinyinya sub area plan has been captured in the detail planning, as this area has also been identified as a fringe center an increased quantum of commercial and civic Land Uses can be provided in this areas. Some of the other approved projects include:

- Kinyinya OZ sub area plan
- Kinyinya Master Plan
- Vision City
- Gisozi mixed use project.
- Batsinda Master Plan.
- Affordable housing project, Gisozi sector.

The gross existing population density of the Central Planning Area is approximately 39 P/ha.

The existing Land Use and context map are illustrated in Fig.5.6.

5.1.5 NATURAL SITE CONDITIONS

The Central Planning Area lies between undulating terrain in the west and the north. About 80% land area is suitable for large scale urban developments development (0-20% slopes). Areas around the wetlands falls under steep slopes between 20-30% which are not suitable for high density developments. About 15% of the land area has been categories as wetlands and existing forests. The wetlands divide the planning area into 5 distinct land masses. The wetlands, existing forests and steep slopes are to be protected.

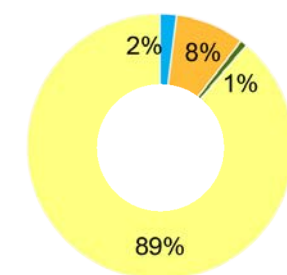
The slope analysis plan is illustrated in Fig.5.1.

The water shed and natural water drainage channels are illustrated in Fig.5.2.

5,770ha
Total Planning Area



223,000
Population 2013



Natural Constraints

39p/ha
Existing Density

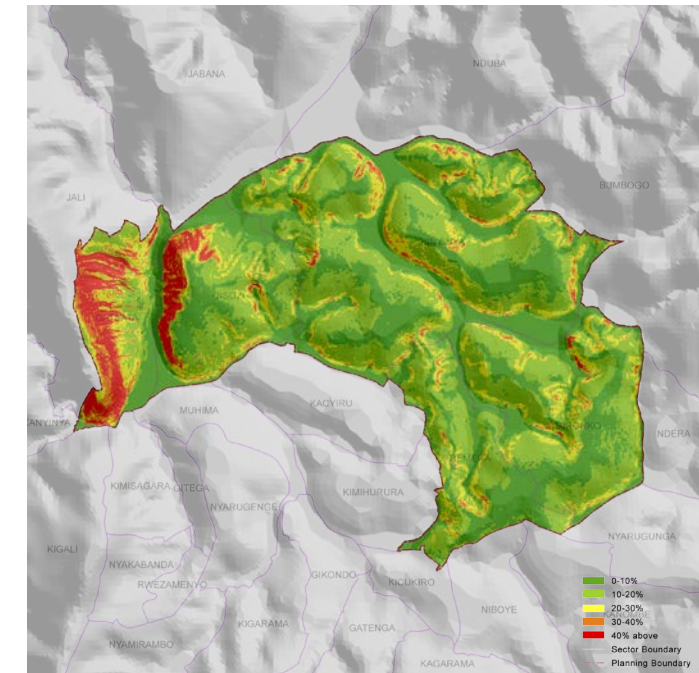


Fig.5.1 Central Planning Area - Slope Analysis

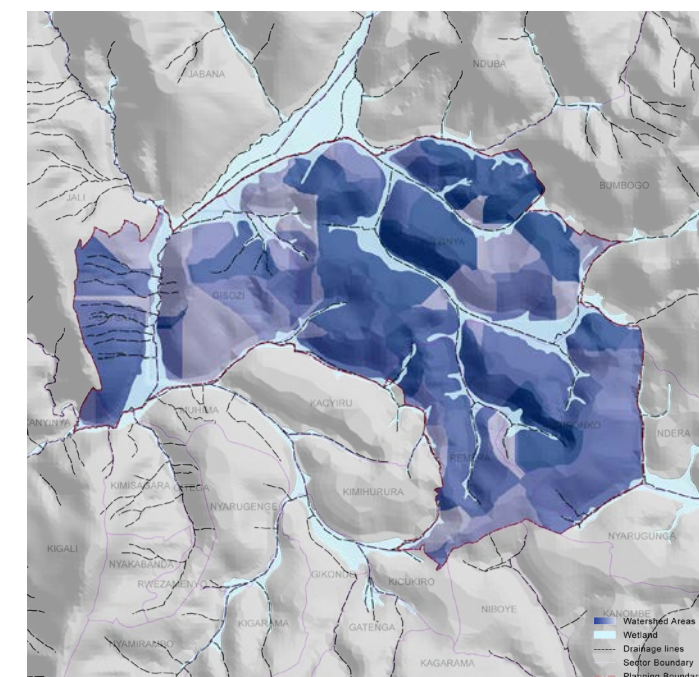


Fig.5.2 Central Planning Area - Watershed and Drainage Channels

¹ Assuming a 5.45% growth rate, KCMP, 2007

Table 5.1 Central Planning Area - Existing Land Use distribution

BROAD LAND USE	DETAIL LAND USE	AREA (HA)	TOTAL AREA (HA)
Residential	Single family Residential	658	1694
	Low Rise Residential	1024	
	Medium Rise Residential	12	
Commercial	Commercial Office	2	52
	Commercial General	40	
	Hotel	10	
Mixed Use	Mixed use	6	6
Public facilities	Government Office	20	331
	Educational	138	
	Religious Facilities	53	
	Health Facilities	15	
	Civic Facilities	16	
	Sports and Recreation facilities	89	
Industries	Light Industrial	8	51
	Heavy Industrial	36	
	Warehousing	7	
Nature Area	Existing Forest	221	336
	Wetland	115	
Agriculture	Farmland	1778	2463
	Plantation	685	
Open Space	Open Space and Park	10	99
	Sports and Recreation	89	
Water Bodies	Rivers	10	10
Infrastructure	Transportation	258	334
	Utilities	76	
Special Use	Defence Area	76	137
	Quarry Land	54	
	Graveyard	7	
	Vacant Land	336	
	Total	5770	

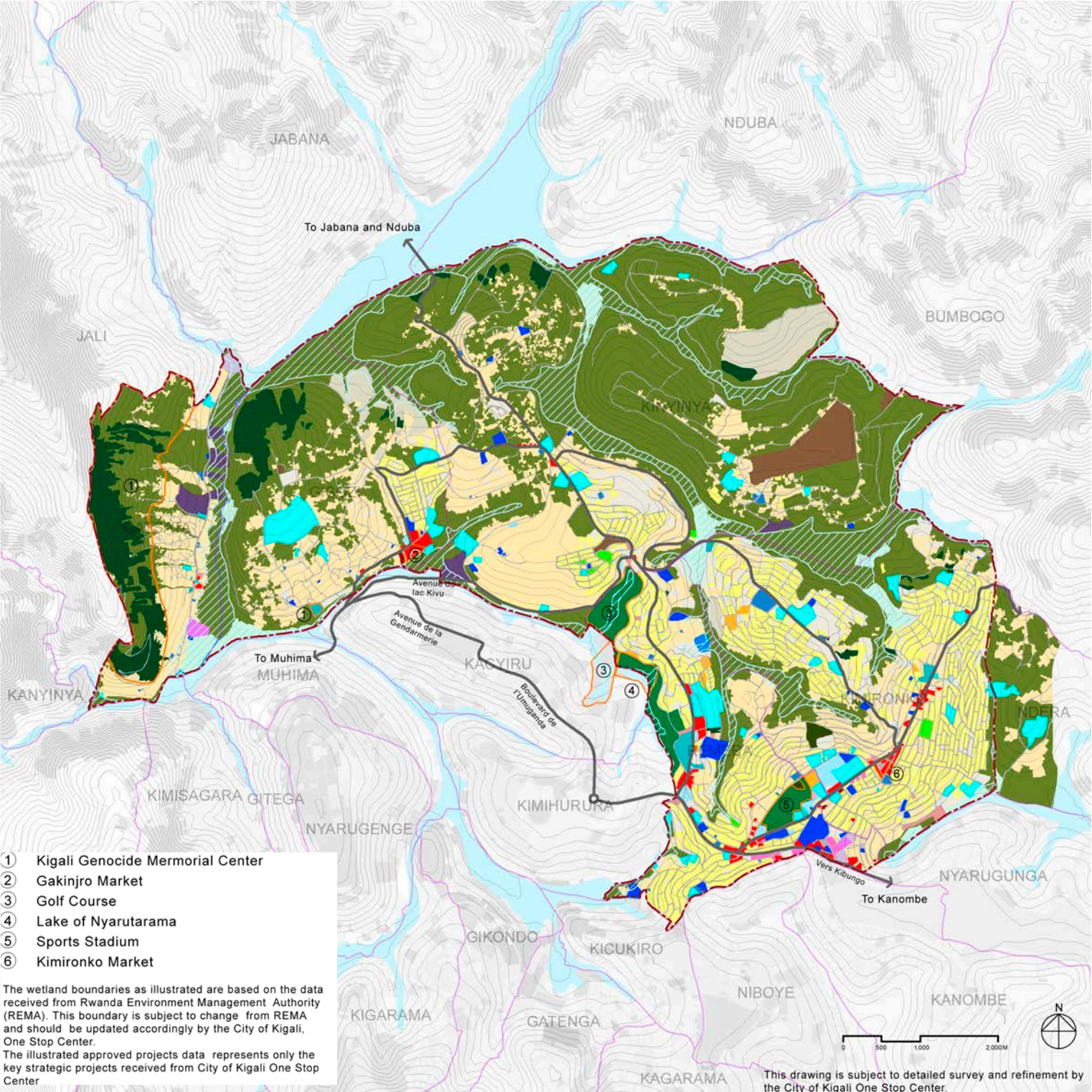


Fig.5.6 Central Planning Area - Existing Land Use And Context Map

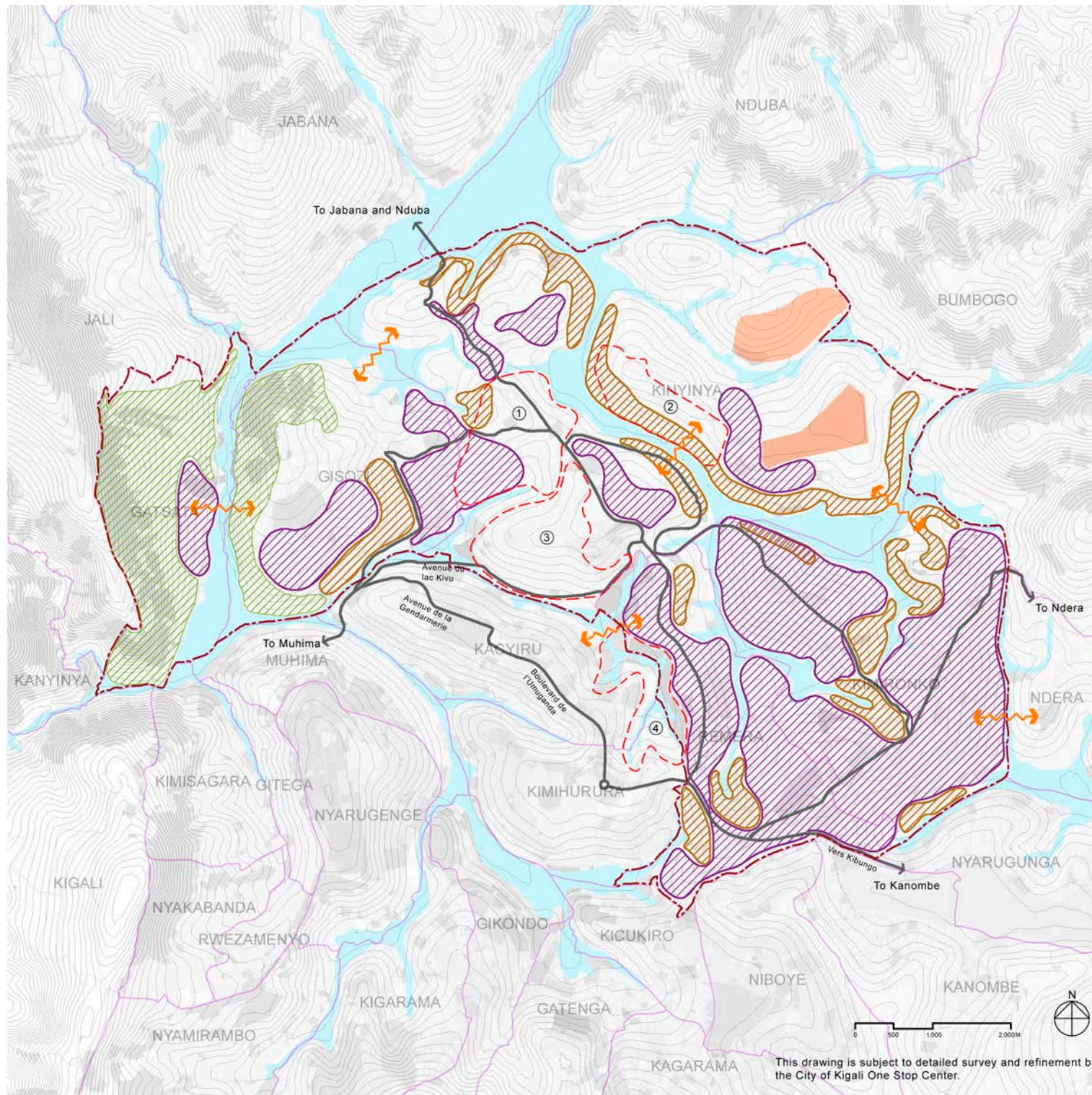


Fig.5.7 Central Planning Area - Constrains Map

5.2 Central Planning Area- Opportunities and Constraints

5.1.8 CONSTRAINTS

Constraints identified within Central Planning Area are based on the existing context analysis. The constraints are as follows:

- Large areas of land within the Central Planning Area comprise of low density developments, which need to be retained.
- The entire Kimironko sector within the Central Planning Area has been built upon, a constraint for providing a more flexible Land Use.
- A number of approved projects are present on strategic developable land like Kinyinya OZ Sub Area Plan, Kinyinya Master Plan and Vision city. Most of the approved projects are low density developments, a constraint for providing higher density developments in the urban areas of the district.
- Large special use sites are present on the developable land in the Central Planning Area like the Deutsche Welle Radio and Defence Area.

- Wetlands divide the planning area into island like profile. Steep slopes along the wetlands make it difficult to provide and efficient road network.
- Uneven profile of existing cadastral are a major constrain for the provision of an integrated and sustainable Land Use for the planning area.
- Some of the existing roads within the planning area are above the allowable gradient and need to be realigned.
- Steep slopes, existing forests, wetlands need to be protected.

The Constrains Map is illustrated in Fig.5.7

- Approved Projects :**
- ① Kinyinya Oz subarea Project
 - ② Kinyinya Masterplan Project
 - ③ Vision City Masterplan Project
 - ④ Century Park
- Steep slopes 40% that need to be protected to prevent soil erosion
 - Slopes between 20-40% that restrict high density development
 - Steep slopes and wetlands restrict connectivity and impose high infrastructure costs
 - Largely built-up areas

- Special Use areas
- Wetland
- Major road
- Sector Boundary
- Planning Boundary

1. The wetland boundaries as illustrated are based on the data received from Rwanda Environment Management Authority (REMA). This boundary is subject to change from REMA and should be updated accordingly by the City of Kigali, One Stop Center.
2. The illustrated approved projects data represents only the key strategic projects received from City of Kigali One Stop Center

5.1.10 OPPORTUNITIES

Opportunities identified within the Central Planning Area are based on existing context analysis. The opportunities are as follows:

- The Central Planning Area is strategically located with respect to the key administrative and commercial areas of Kigali City. This provides the opportunity to develop higher density residential development in the planning area as the residents have easy access to jobs and facilities.
- The ridge along Kimironko is strategically located along the major arterial connecting toward the administrative areas of the District. This provides the opportunity to develop a high density, vibrant mixed used corridor along the street.
- The existing Amahoro Sports Stadium and Kigali Institute of Education provide the opportunity to develop youth oriented mixed used development in the urban areas of the district.
- Low-density unplanned areas provide the opportunity to regenerate these areas into relatively higher density developments. These could be incremental developments while improving infrastructure provisions in these areas.

- Large areas of relatively flat land (slope gradient 0-20%) are present in the northern parts of the planning area. These provide opportunity to develop new growth areas for residential developments. These would also provide affordable homes in close proximity to employment centres of the city.
- Steep slopes along wetlands provide the opportunity to develop low impact, low density residential developments overlooking existing wetlands.
- The Gakinjira wood Crafts Market, provide the opportunity to be redeveloped as a unique precinct, and hence a good tourism and commercial centre.
- Existing steep forest slopes within The Central Planning Area, provide the opportunity to develop a nature sanctuary in close proximity to high density urban areas of Kigali city.

The opportunities map is illustrated in Fig.5.9

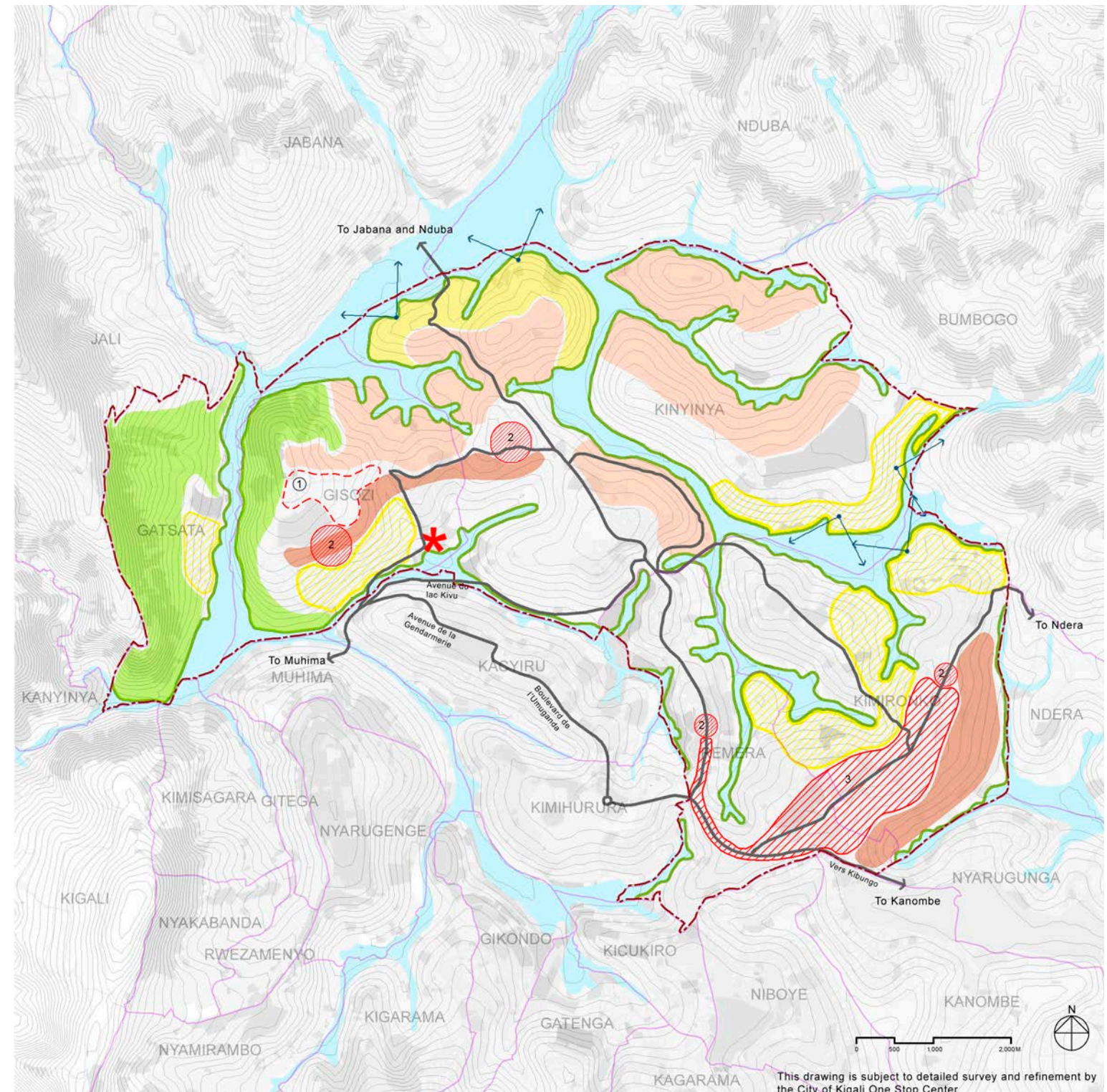
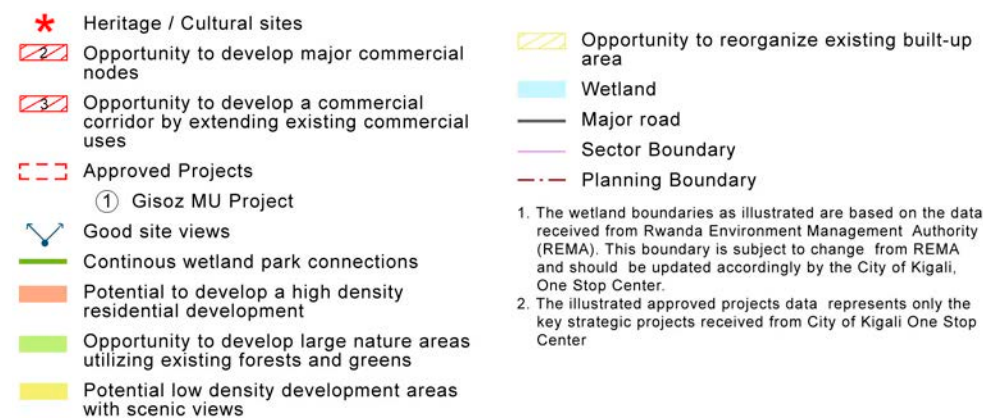


Fig.5.9 Central Planning Area - Opportunities Map

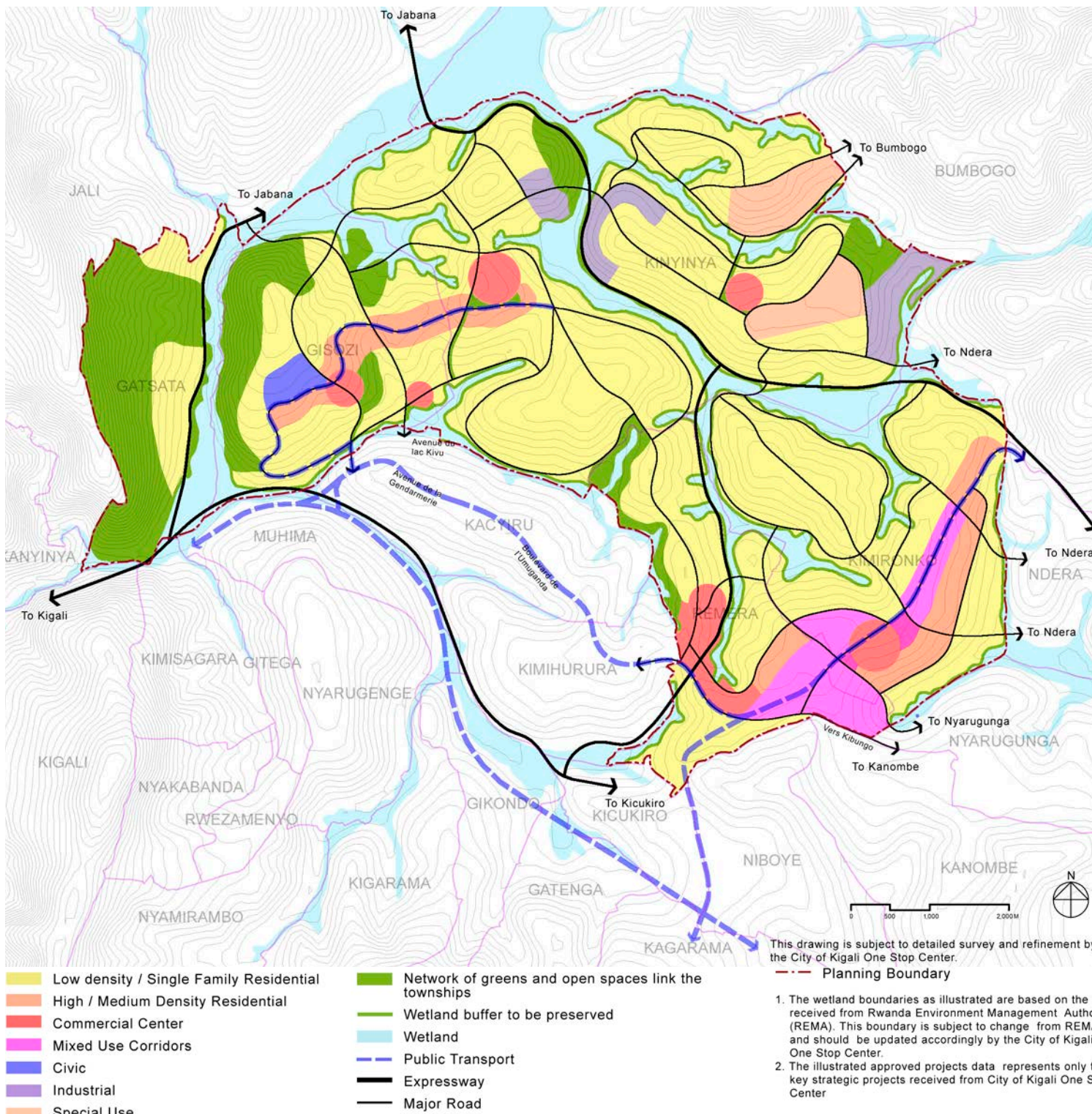


Fig.5.11 Special Planning Area - Proposed Concept Plan

5.3 Central Planning Area - Proposed Vision

'A New City Lifestyle'

Central Planning Area is located in the fringe area Kigali City. It is proposed to provide affordable homes and attractive recreational facilities for the people. It is projected to Support a population of about 0.80 mil people. It would also provide attractive investment opportunities for businesses to setup offices in commercial areas. The proposed Kimironko education hub would be a key recreational feature of the planning area and would provide the residents of the District with open space, recreational and civic facilities.

5.4 Central Planning Area - Proposed concept

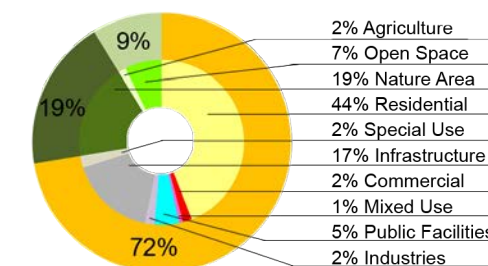
A development concept has been proposed for the Central Planning Area based on the existing context, the opportunities and constraints, as well as the proposed vision.

The key proposals of the concept plan are as follows:

- To develop a mixed use high density corridor along important arterial roads. These commercial areas would play a supportive role to the commercial activities in the main CBD.
- To build upon approved projects and use them strategically to reposition the commercial and residential distribution.
- To develop youth centric facilities like universities, sports hub and, commercial and retail spaces in Kimironko Sector.
- To retain existing commercial nodes and further develop them to become an important asset for the planning area, both economically and culturally.
- To establish good transport infrastructure, that will increase connectivity to the CBD and other important areas in Kigali City.
- To provide adequate open spaces and recreational facilities in the planning area.

The concept plan for Central Planning Area is illustrated in Fig.5.11

738,000 
Projected Population Year X



Proposed Land Distribution

179p/ha
Proposed Density

72%
Total Urbanized Area

19%
Total Nature Area

9%
Total Open Spaces



5.5 Central Planning Area - Proposed Land Use plan

The Land Use plan aims to build upon the physical opportunities and constraints of the sector and offers incentives for integrated township developments.

The key developments proposed in the Land Use plan are:

- To develop four fully integrated residential townships, three urban (G1, G3-4) and one suburban (G2),
- To develop key commercial and civic facilities like the edutainment hub, Kimironko Fringe Centre and mixed used developments around them.
- To develop higher density residential developments along the BRT and MRT networks.
- To develop clusters for light industrial use which would provide local employment opportunities within each township.
- To develop a Horticulture Park along the steep slopes in the west of the planning area. This would help to promote it as a recreation and tourism destination.
- To develop low density and low impact developments along the wetlands.
- To rejuvenate existing commercial such as Agakijoro handicraft market, with unique identity to become important cultural and heritage site. These could also be promoted as tourist destination within the district.
- To retain and revitalise the existing public facilities and provide new facilities required for the increased population

The projected population of the planning area is approximately 0.74 mil people by Year X.

The gross projected population density of the Central Planning Area is approximately 179 P/ha

The Land Use Plan is illustrated in Fig.5.16 and Table 5.2.

5.1.12 CENTRAL PLANNING AREA-PROPOSED RESIDENTIAL USE PLAN

- Townships G1, G2 and G3 are mostly dominated by low rise and single family residential developments. In these townships medium rise residential are to be provided along the BRT route.
 - Township G4 is dominated by medium rise residential and mixed used developments along the main ridge in Kimironko. These would provide homes for approximately 100,000 people by Year X.
 - The residential developments around town centres and Fringe Centres have been zoned as medium rise residential developments.
 - Low density unplanned developments will be redeveloped into relatively higher density residential developments. This would also help to improve infrastructure provisions in these areas.
 - The planning area is dominated by low rise residential developments with approximately 200,000 dwelling units proposed in the planning area.
- The Residential Use Plan is illustrated in Fig.5.17.

5.1.13 CENTRAL PLANNING AREA-PROPOSED COMMERCIAL USE PLAN

- The Central Planning Area is proposed to have three town and two fringe centres.
- The Gisozi Town Centre is proposed to complement the already existing commercial nodes at Agakijoro.
- About 25 ha of land has been demarcated for the development of each town centre. The town centres in Gisozi, Remera and Kinyinya are proposed to have retail, entertainment and office space.
- The fringe centre is positioned along an important arterial, which is well connected to the CBD.
- The Fringe Centre at Kimironko and surrounding commercial would

complement the ones in CBD. It is projected to provide approximately 75,000 jobs in retail and service sector.

- Commercial activity along the Vers Kibungo arterial, which connects the CBD and the airport have been retained. These have been further extended to the proposed Remera Town Centre.
- Three light industrial zones are to be developed in Kinyinya and Gisozi, these are projected to provide approximately 140,000 jobs.
- Handicraft market in Agakijoro is to be retained and revitalized to become an important tourist destination.
- 28 neighborhood centres have been provided in the Central Planning Area. To cater to the daily needs of residents.

The Commercial Use Plan is illustrated in Fig.5.18.

5.1.14 CENTRAL PLANNING AREA-PROPOSED PUBLIC FACILITIES PLAN

- The existing public facilities such as schools, government offices, health centres, sports and religious facilities in the Central Planning Area are to be retained and developed around.
- Three town centres and two fringe centres are to house important public facilities like a polyclinic and an ICT each.
- An Edutainment Hub proposed in the Kimironko Sector based on the existing Amahoro Sports Stadium and Kigali Institute of Education.
- A Bus Interchange/ Terminus is proposed to be integrated with the proposed Kimironko Fringe Centre.
- Public facilities such as Religious, health community facilities etc. are to be integrated with each neighborhood centre.
- 37 primary and 9 secondary schools have been provided, based on the catchment population, existing schools and walking distance of no more than 400 m.

The Public Facilities Use Plan is illustrated in Fig.5.19.

5.1.15 CENTRAL PLANNING AREA-PROPOSED GREEN AND OPEN SPACE PLAN.

- The Edutainment hub in the Central Planning Area would be a major recreational venue in the planning area.
- Existing steep slope forests in the West of the planning area are proposed to be converted into a horticulture park.
- A town park is proposed with each town centre.
- Mandatory buffer of 20 m along wetlands is to be utilized for the development of

linear parks and support non motorized transport.

- Existing forest, Wetlands and natural water drainage channels are to be retained and would form an important part of the conservation strategy of the Central Planning Area.
- Nyarutarama Golf Course in the Central planning along the wetlands has been retained.
- Approximately 167 Ha of steep slopes (slopes above 40%) are to be protected and replanted as forests.

The Green and open space are illustrated in Fig.5.20.

Table 5.2 Central Planning Area- Proposed Land Use Distribution

BROAD LAND USE	DETAIL LAND USE	AREA	TOTAL AREA (HA)
Residential	Single family Residential	1520	2577
	Low Rise Residential	804	
	Medium Rise Residential	253	
Commercial	Commercial General	96	105
	Hotel	9	
Mixed Use	Mixed use	98	98
Public facilities	Government Office	13	296
	Educational	184	
	Religious Facilities	42	
	Health Facilities	33	
Industries	Civic Facilities	22	103
	Light Industrial	94	
Nature Area	Heavy Industrial	9	1125
	Existing Forest	225	
	Afforestation	173	83
	Wetland	727	
Agriculture	Farmland	83	484
Open Space	Open Space and Park	411	
	Sports and Recreation	75	725
Infrastructure	Transportation	547	
	Transportation(open Space)	30	
	Utilities	148	72
	Defence Area	72	
	Graveyard	63	63
Total		5771	

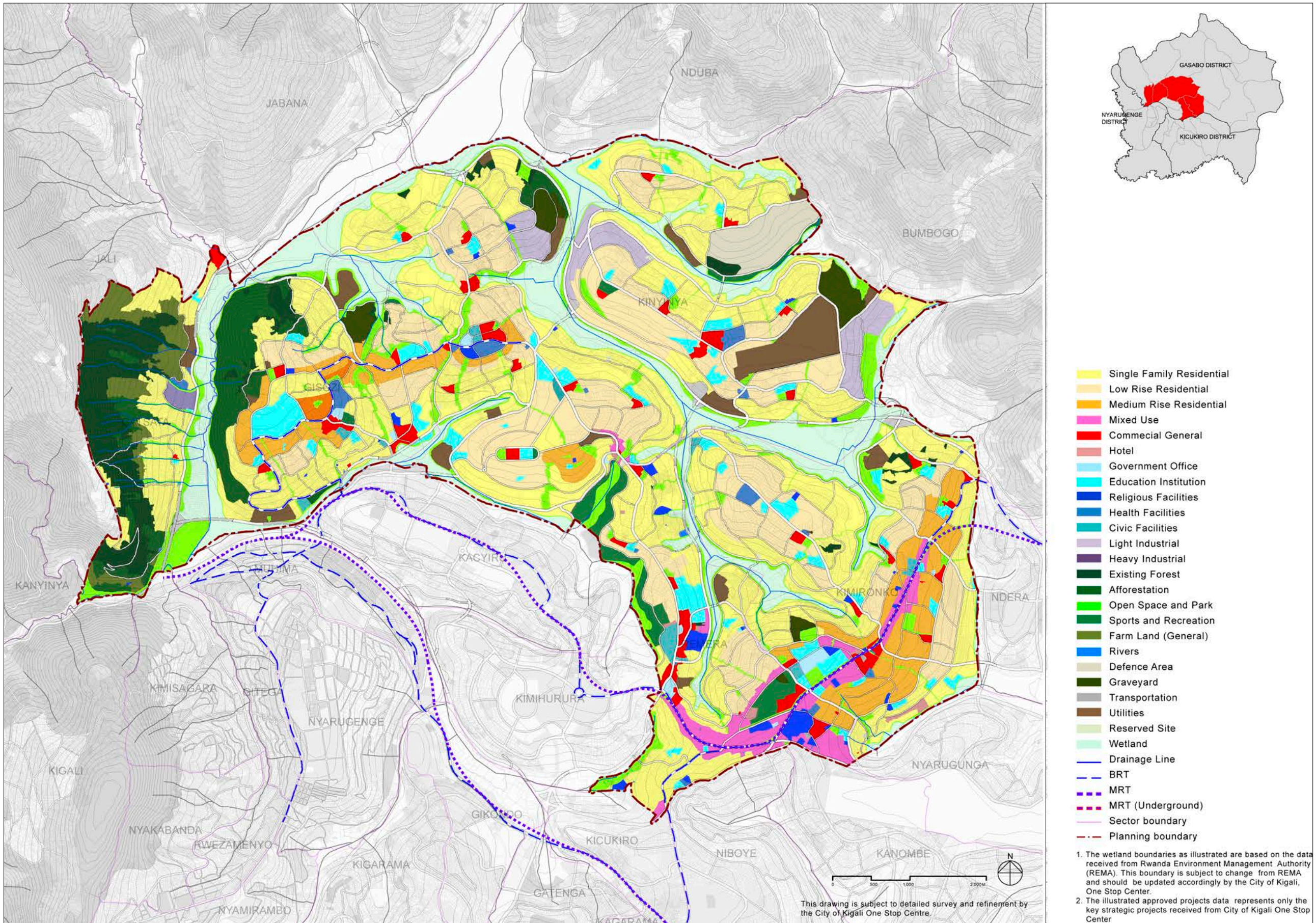


Fig.5.16 Central Planning Area- Proposed Land Use Plan

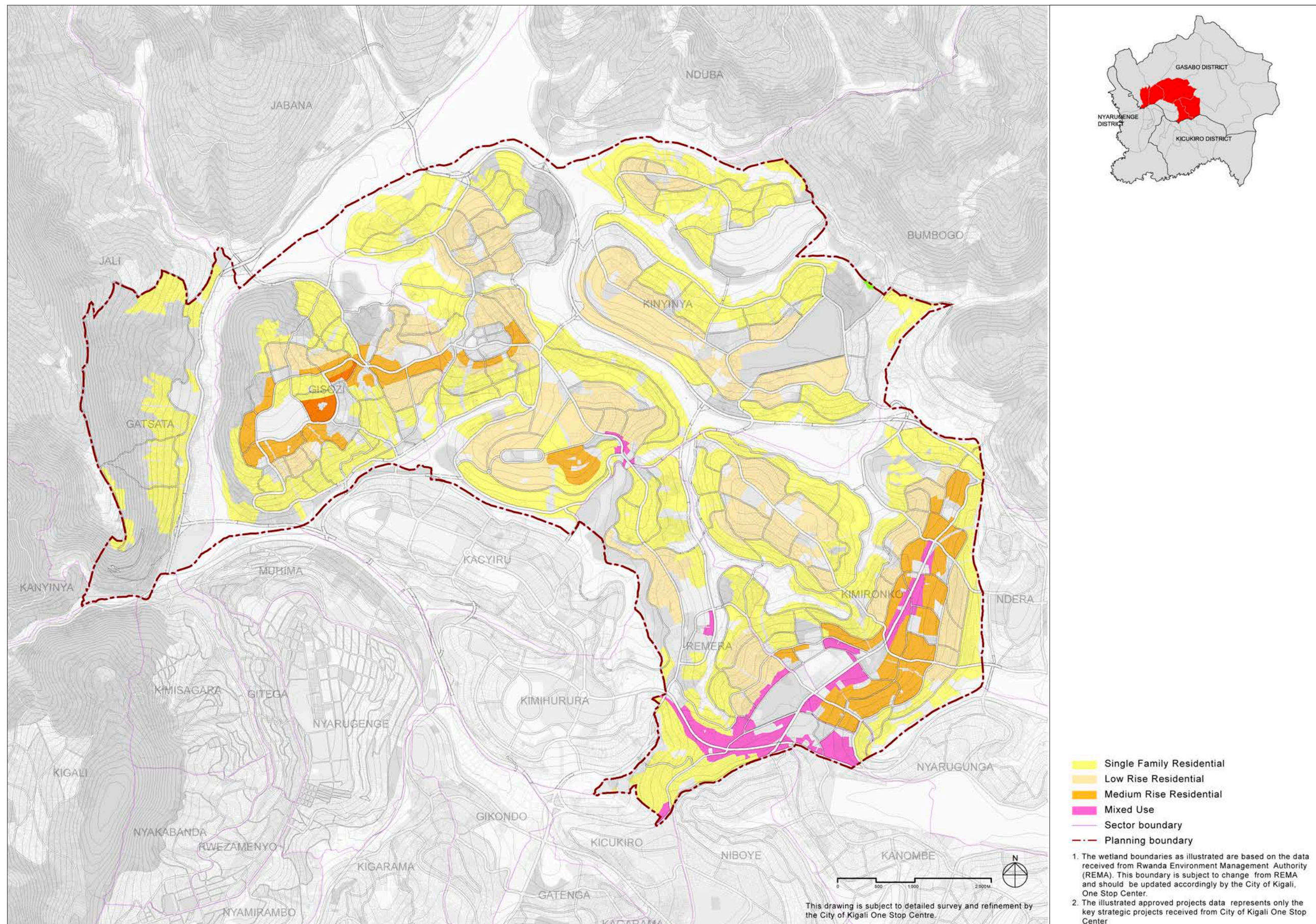


Fig.5.17 Central Planning Area- Proposed Residential Use Plan

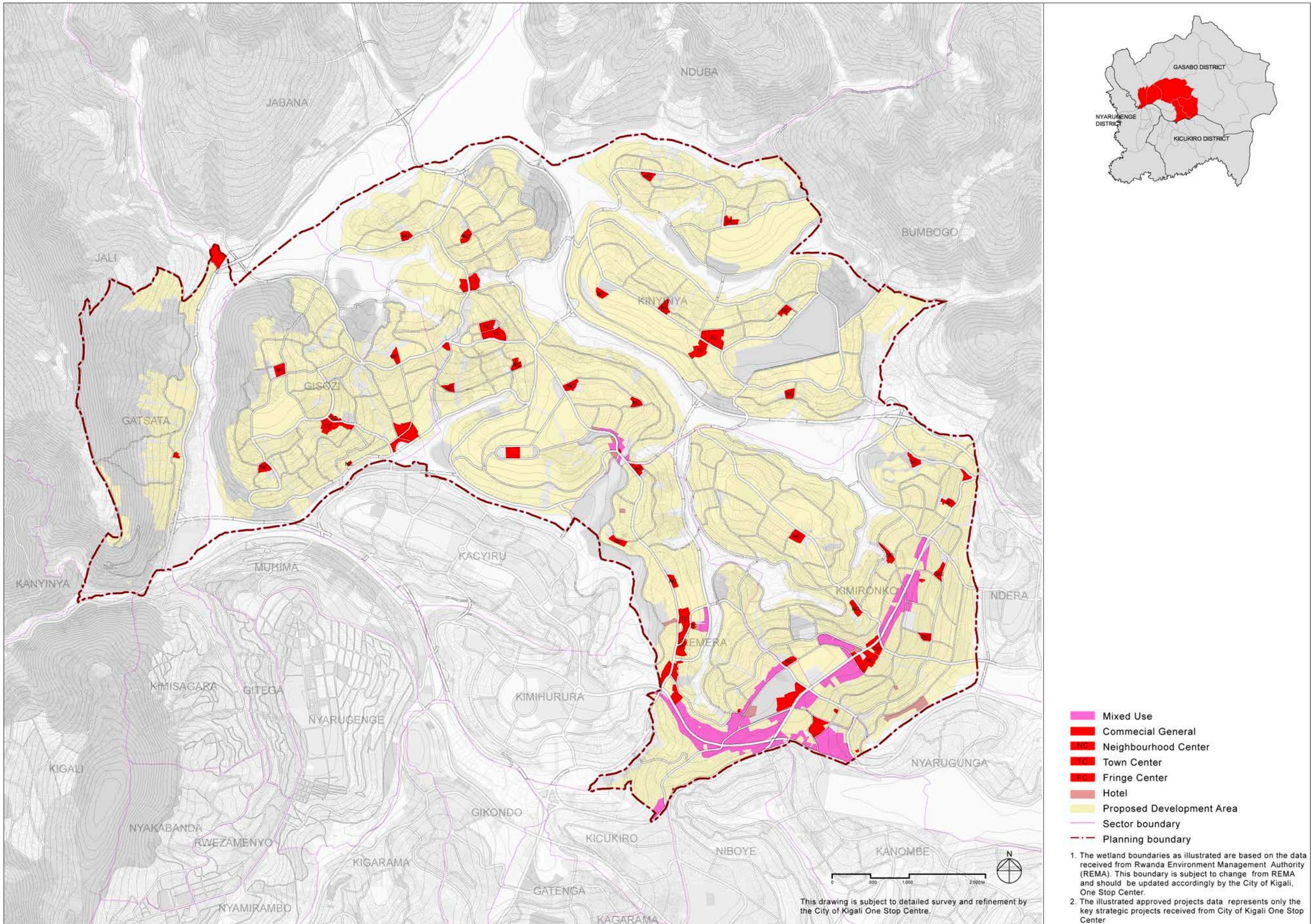


Fig.5.18 Central Planning Area- Proposed Commercial Use Plan

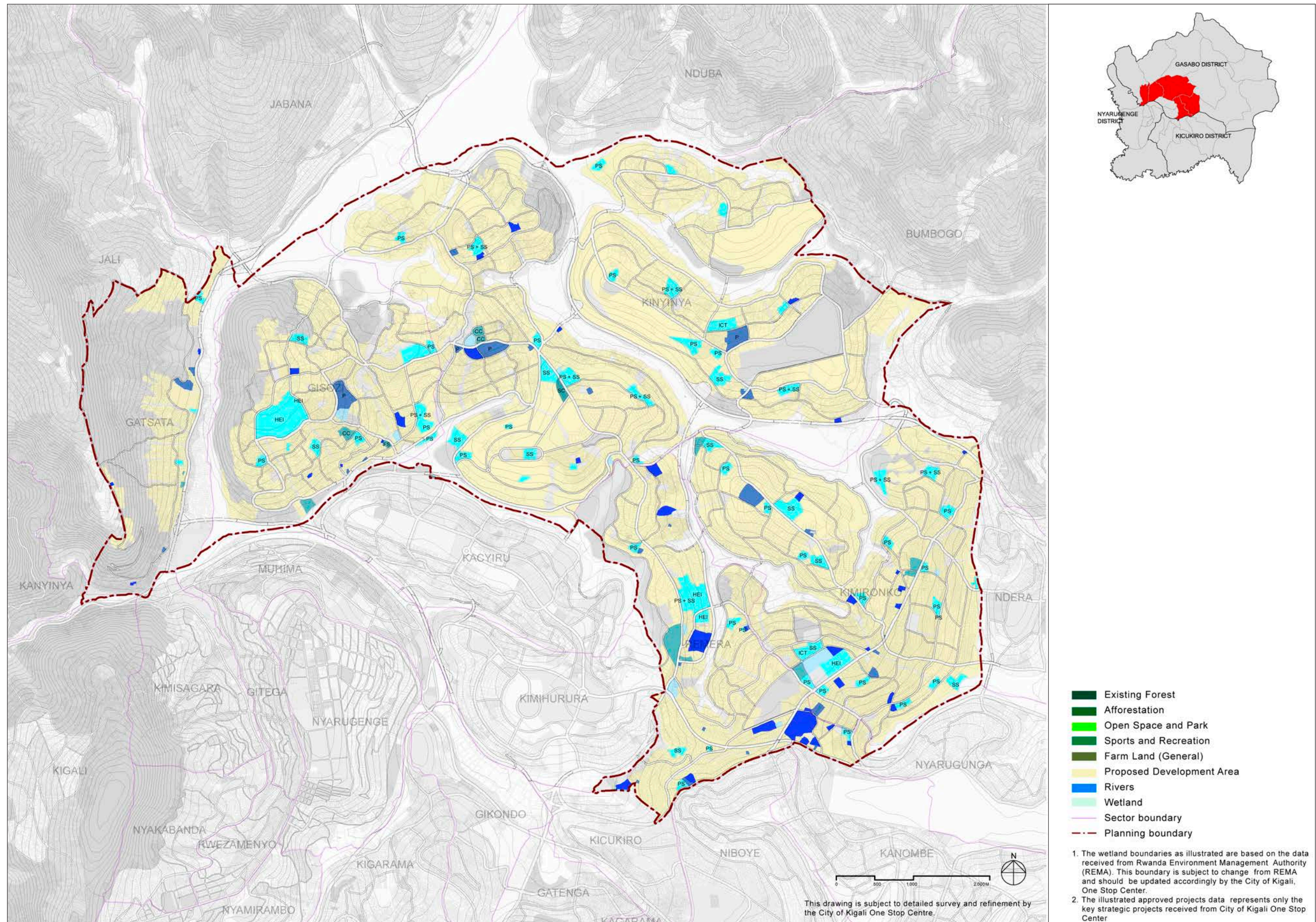


Fig.5.19 Central Planning Area- Proposed Public Facilities Plan

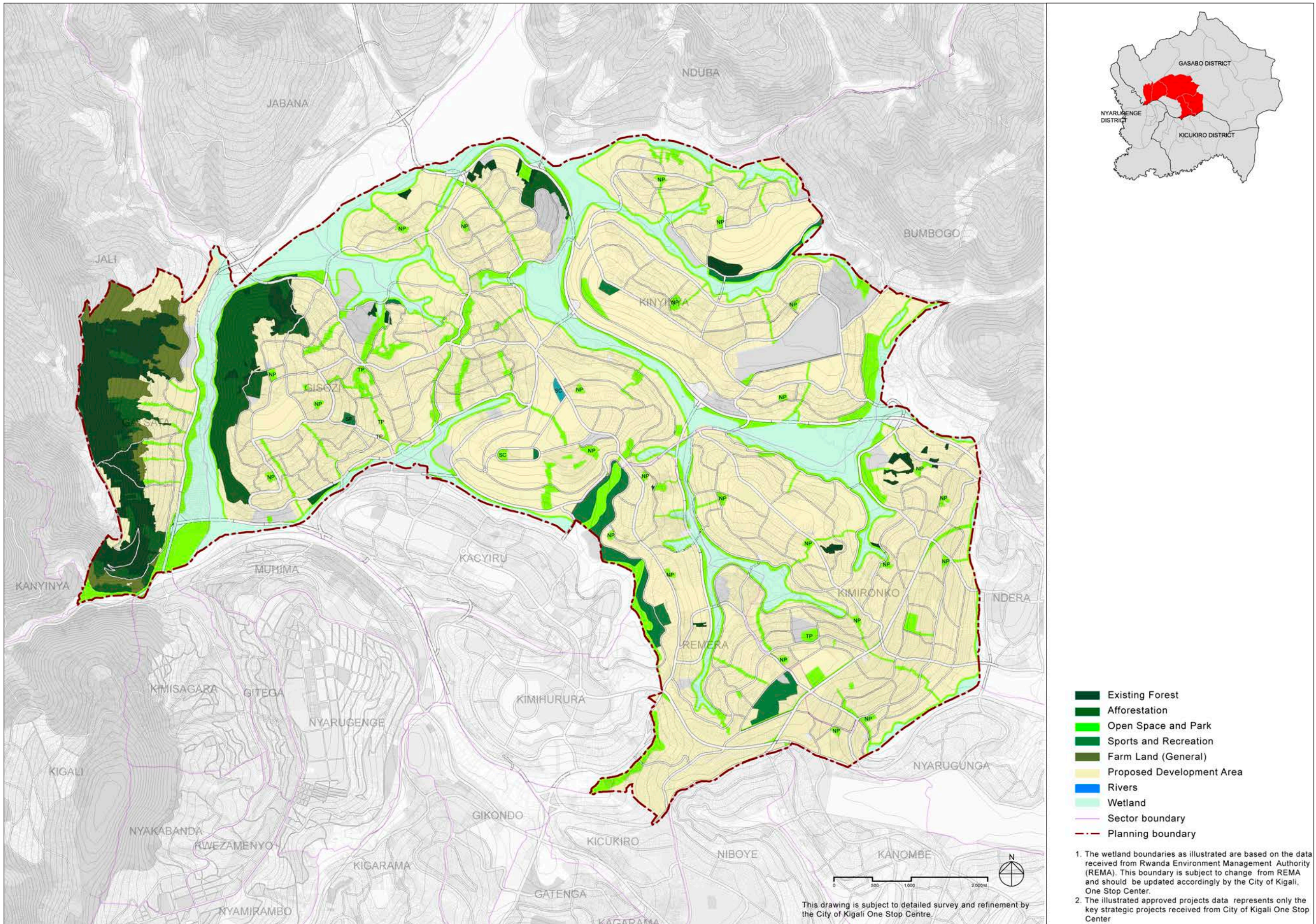


Fig.5.20 Central Planning Area - Proposed Open Space And Green Use Plan

5.6 Central Area- Key Planning Feature Developments.

The Planning Area is envisioned as the quality lifestyle- edutainment area in the city fringe.

As part of the Proposed Land Use Plan, three areas are identified as key features of the planning area. Kimironko Mixed used development. Gakinjiro Handicraft market and Kigali horticulture park.

1. EDUTAINMENT HUB, KIMIRONKO.

Located along the ridge in Kimironko Sector, this would be one of the most vibrant mixed used developments in all of Kigali City. It would be developed around existing Kimironko market, Amahoro Stadium and Kigali Institute of Education .It would offer a mix office, retail, civic and recreation facilities. Located along an important arterial that runs all the way from Muhima CBD to the administrative centres of Kigali through important Cultural centres, Edutainment Hub would be a youth oriented vibrant mixed use development in Kigali showcasing the street life and cultural heritage in Kigali city. The Edutainment hub which forms in integral part of this mixed used street will be brought forward for detailed urban design, to ensure a better integration of the various uses along the street.

The Urban Design of the Edutainment Hub is presented in detail in 'Kimironko Urban Design Report' - Task Order 5. And it's Implementation is presented in 'Kigali City -Implementation Report' - task order 6

2. GAKINJIRO CRAFT MARKET

Located in Gisozi Sector of the Central Planning area, the Gakinjiro market is an

existing handicraft market. The Gakinjiro handicraft market will be part of an important strategy to showcase the various art forms of Rwanda. It will be an important platform for the artisans to sell their products. Gakinjiro Handicraft Market will also be an important tourist destination in Rwanda, that will display the rich, cultural heritage of the country. The Gakinjiro will also support low rise affordable residential developments for artisans.

3. HORTICULTURE PARK

Located along existing forests and steep slopes in west of the Central Planning Area, the Horticulture park will be one of the biggest urban Parks in Kigali City. In order protect steep slopes and forests this area will be converted into a horticulture park showcasing the immense wealth of bio diversity of Kigali city. The park will also act as urban recreational park for the residents . The park will be part of the strategy to showcase new horticulture precinct and knowledge centres in Kigali.

The key features for the planning area are Illustrated in Fig.5.21.

- ① Kimironko Edu-tainment Hub
- ② Gakinjiro Handicraft Market
- ③ Kigali Horticulture Park

1. The wetland boundaries as illustrated are based on the data received from Rwanda Environment Management Authority (REMA). This boundary is subject to change from REMA and should be updated accordingly by the City of Kigali, One Stop Center.
2. The illustrated approved projects data represents only the key strategic projects received from City of Kigali One Stop Center

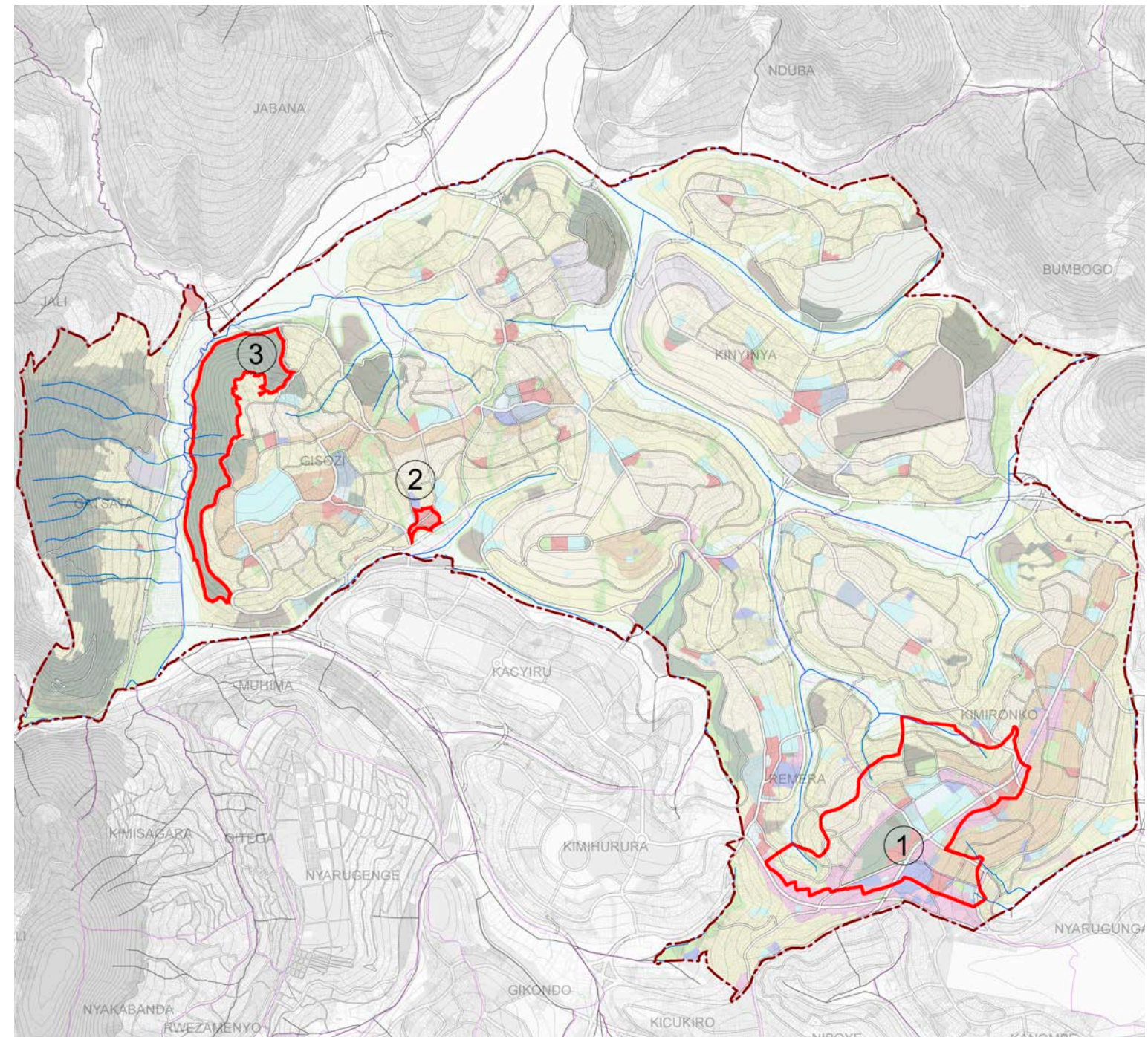


Fig.5.21 South Eastern Planning Area - Proposed Key Features

6

DETAILED MASTER PLAN FOR SOUTH EASTERN PLANNING AREA

This chapter presents the detailed Master Plan for South Eastern Planning Area. Based on the analysis of the existing context, opportunities and constraints. A vision and concept have been derived which guide the development of the Master Planning area.

6.1 South Eastern Planning Area - Existing Context

The South Eastern Planning Area comprises of the Ndera sector and has a total Planning area of 5025.64 Ha.

6.1.1 LOCATION AND CONNECTIVITY

The South Eastern Planning Area is a suburban area located in the south west of the Gasabo District. The Planning area lies close to the existing International Kigali Airport and Vers Kibungu arterial. The Planning Area is surrounded by the Kimironko Sector to the West, the Bumbogo Sector to the north and the Rusororo Sector to the east. Towards the south, the planning area is separated by the Vers Kibungu arterial road and the wetlands from the Nyarugunga sector of the Kicukiro district. The Vers Kibungu is the only majoe road that connects the Planning Area to the CBD at Muhima and the rest of the city.

6.1.2 EXISTING SITE CONDITIONS

The South Eastern Planning Area is one of the larger Planning areas of the Gasabo District. The area currently has a population of about 37,000 people (2013)¹. The area is largely rural and underdeveloped, with a gross population density of about 15 P/ha. Areas in the east close to Kimironko Sector are developed with adequate public facilities to support the current population. The developed areas within the planning area are relatively low density, residential developments. Work on Phase 1 of the

Free Trade Zone has already begun in the west of the planning area. Majority of the population lives in scattered, low density informal settlements.

It's close proximity to relatively developed urban areas of Kimironko has put the area under intense development pressure. The key approved projects include:

- Free Trade Zone phase 1
- Proposed RTDA rail line
- RCSF cricket stadium
- Cyaruzinge housing project

The Existing site conditions and site context for South Eastern Planning Area are shown in Fig.6.3.

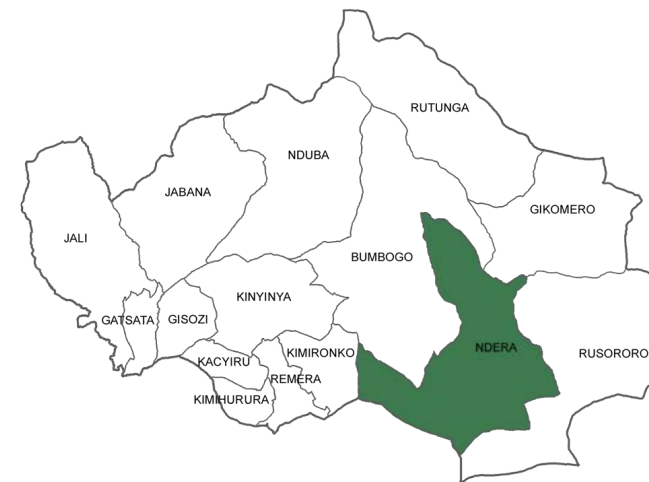
6.1.3 NATURAL SITE CONDITIONS

The South Eastern Planning area is bound by steep undulating terrain to the north and west. Wetlands bind the planning area in the south. Approximately 76% of the land area is suitable for development (slope gradient 0-20%). The vast wetland network results in fragmented land parcels in this region. The areas along these wetlands are generally steep slopes. Around 22% of the area falls under steep slopes (slope gradient above 20%) and 1.2 % of the area is covered by forests. The steep slopes, forests, wetlands and natural drain channels need to be protected.

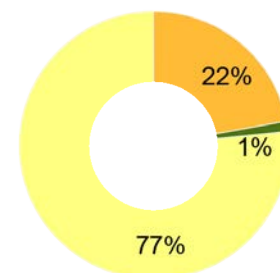
The slope analysis for South Eastern Planning Area are shown in Fig.6.1.

The watershed and drainage for South Eastern Planning Area are shown in Fig.6.2.

5,025ha
Total Planning Area



37,000
Population 2013



Natural Constraints

15p/ha
Existing Density



77%
Developable Land

22%
Steep Slopes Land

1%
Forest

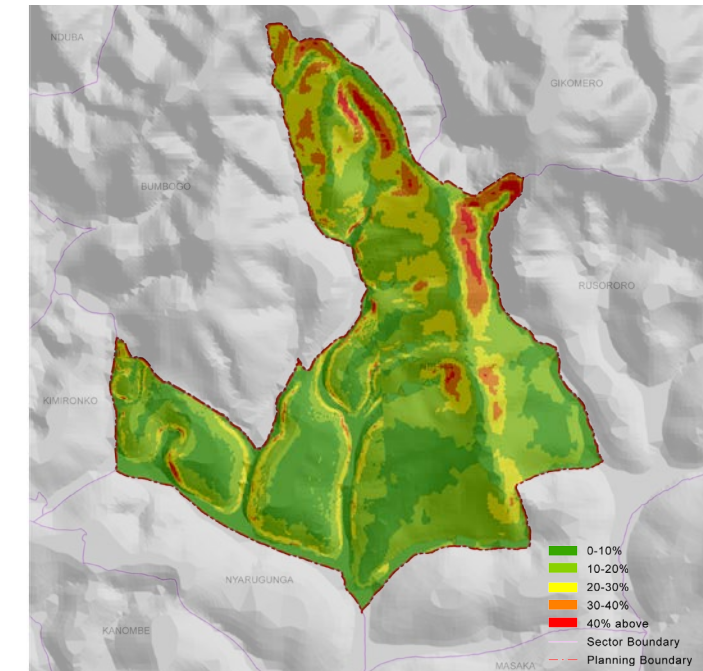


Fig.6.1 South Eastern Planning Area -Slope Analysis

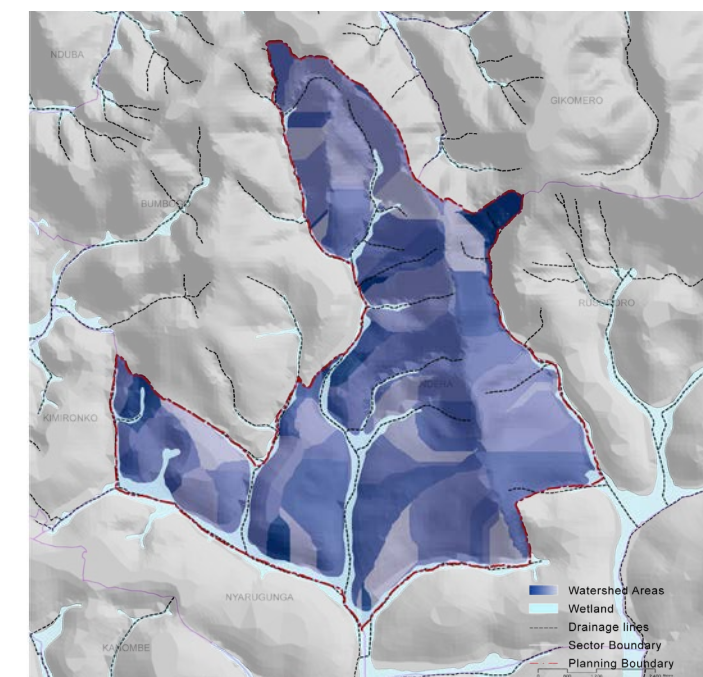


Fig.6.2 South Eastern Planning Area - Watershed

¹ Assuming a growth rate of 5.45% KCMP, 2007

Table 6.1 South Eastern Planning Area- Existing Land Distribution Table

BROAD LAND USE	DETAIL LAND USE	AREA (HA)	TOTAL AREA (HA)
Residential	Single family Residential	0.5	314.5
	Low Rise Residential	314	
Commercial	Commercial General	3	69
Public facilities	Government Office	3	
	Educational	47	
	Religious Facilities	2	
	Health Facilities	15	
	Civic Facilities	2	65
Industries	Light Industrial	15	
	Heavy Industrial	35	
	Warehousing	15	283
Nature Area	Existing Forest	281	
	Wetland	2	4191
Agriculture	Farmland	4191	
Infrastructure	Transportation	90	90
	Vacant Land	2	2
	Total	5025.5	

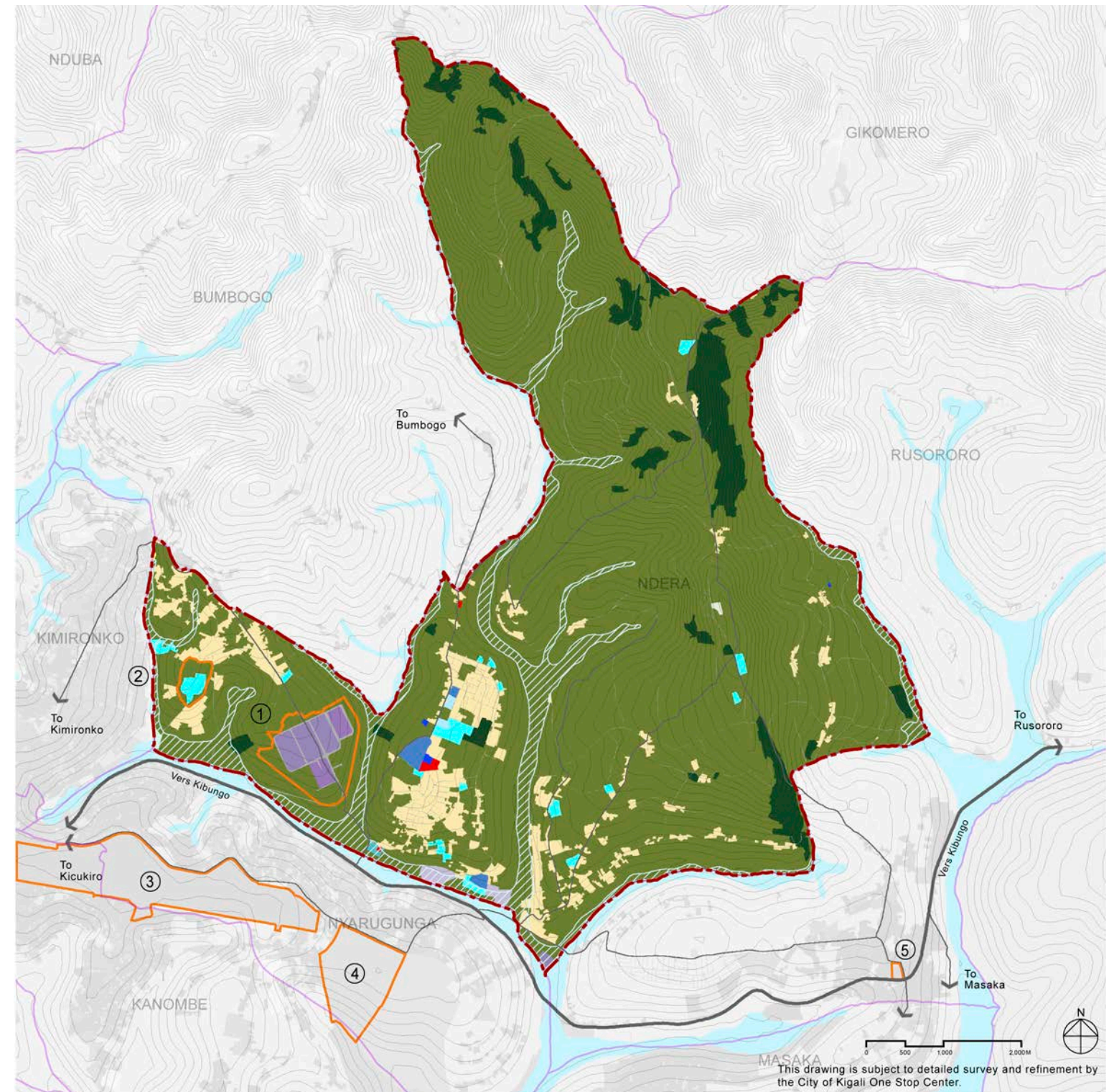
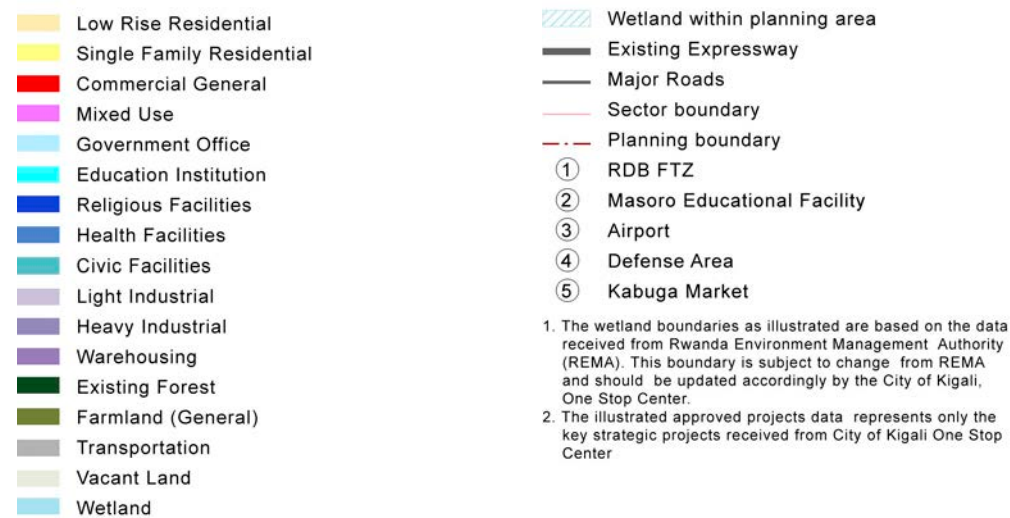


Fig.6.3 South Eastern Planning Area - Existing Land Use and Context Map

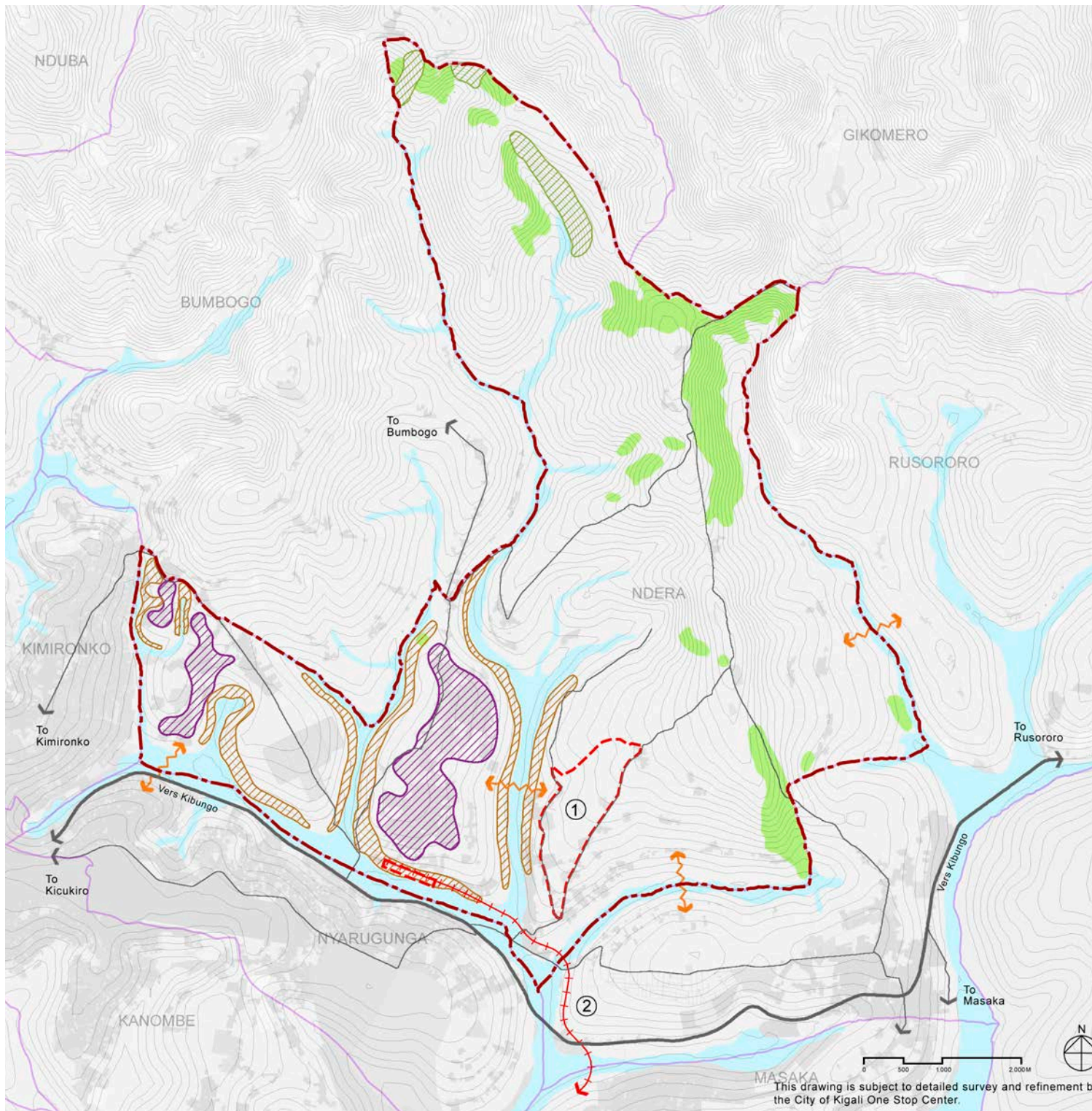


Fig.6.4 South Eastern Planning Area - Constrains Map

6.2 South Eastern Planning Area - Constraints

6.2.1 CONSTRAINTS

Constraints identified within South Eastern Planning Area are based on existing context analysis.

The constraints are as follows:

- Most of the built up area in the east, consists of low density unplanned developments.
- As the planning area is mostly rural, facilities and infrastructure provisions are limited to small parts of the planning area.
- A Free Trade Zone (Industrial area) is being developed in the planning area. This constrains the Land Use provisions in the planning area.
- Proposed Cyaruzinge Housing Project, is low density residential development. This constrains high density developments on strategic developable land.
- Wetlands divide the planning area into smaller areas. Steep slopes along the wetlands are constrain for a sustainable and efficient transport network.

- Steep Slopes (slope gradient 20-40%) along the wetlands in the urban areas of the planning area restrict high density developments. In order to protect the slopes low density, low impact developments will have to provided along them.
- Many existing roads in the South Eastern Planning Area are above the allowable gradient and will have to be realigned to achieve the minimum slope gradients..
- The proposed RTDA rail line forms a physical barrier on the south of the planning area. This is constrain for the provision of road connections to neighboring sectors in the south.

The Constrains are illustrated in Fig.6.4.



6.2.2 OPPORTUNITIES

Opportunities identified within the South Eastern Planning Area are based on existing context analysis.

The opportunities are as follows:

- Relatively flats areas in the east and south of the planning area provide the opportunity to be developed into new growth areas for Gasabo District.
- Existing builtup areas in the east have good facilities and infrastructure provisions. These could be used to reorganize these areas into a model township. Which utilizes exiting facilities and intensifies existing developments.
- Relatively gradual terrain in the south of the Sector provides the opportunity to develop high density, mixed use , Regional Centre.
- Proposed FTZ in the Ndera sector would provide immediate employment opportunities for residents of the planning area.
- Existing forests and wetlands provide

the opportunity to integrate nature with residential and civic developments.

- Rural and agricultural farm land sits on considerable area of the sector. This provides an opportunity to develop an Agro Research based industry close to the regional centre, promoting research in agriculture and opportunity to setup an Agro processing facilities.
- Mandatory buffer along the wetlands, provide the opportunity to develop a linear green surrounding major townships in the planning area.

The opportunities are illustrated in Fig.6.5.

- Approved Projects
 - ① RDB FTZ
 - ② RCSF New Cricket Stadium
 - ③ Masoro Educational Facility
- /// Opportunity to rejuvenate and intensify existing commercial nodes
- /// Opportunity to reorganize existing built-up areas
- /// Opportunity for new development around existing built-up areas
- Relatively flat areas, opportunity to be developed as new growth areas
- Good site views
- Potential areas for industrial development in Ndera in line with the proposed Broad Land Use
- Opportunity to develop large open spaces and nature area utilizing existing forests, steep slopes above 40% and wetland buffer

- ← Integrate nature into new development
- Opportunity to consolidate rural housing around existing residential developments
- Wetland
- Wetland buffer offers an opportunity to develop a continuous open public green network
- Existing major road
- Sector Boundary
- Planning Boundary

1. The wetland boundaries as illustrated are based on the data received from Rwanda Environment Management Authority (REMA). This boundary is subject to change from REMA and should be updated accordingly by the City of Kigali, One Stop Center.
2. The illustrated approved projects data represents only the key strategic projects received from City of Kigali One Stop Center

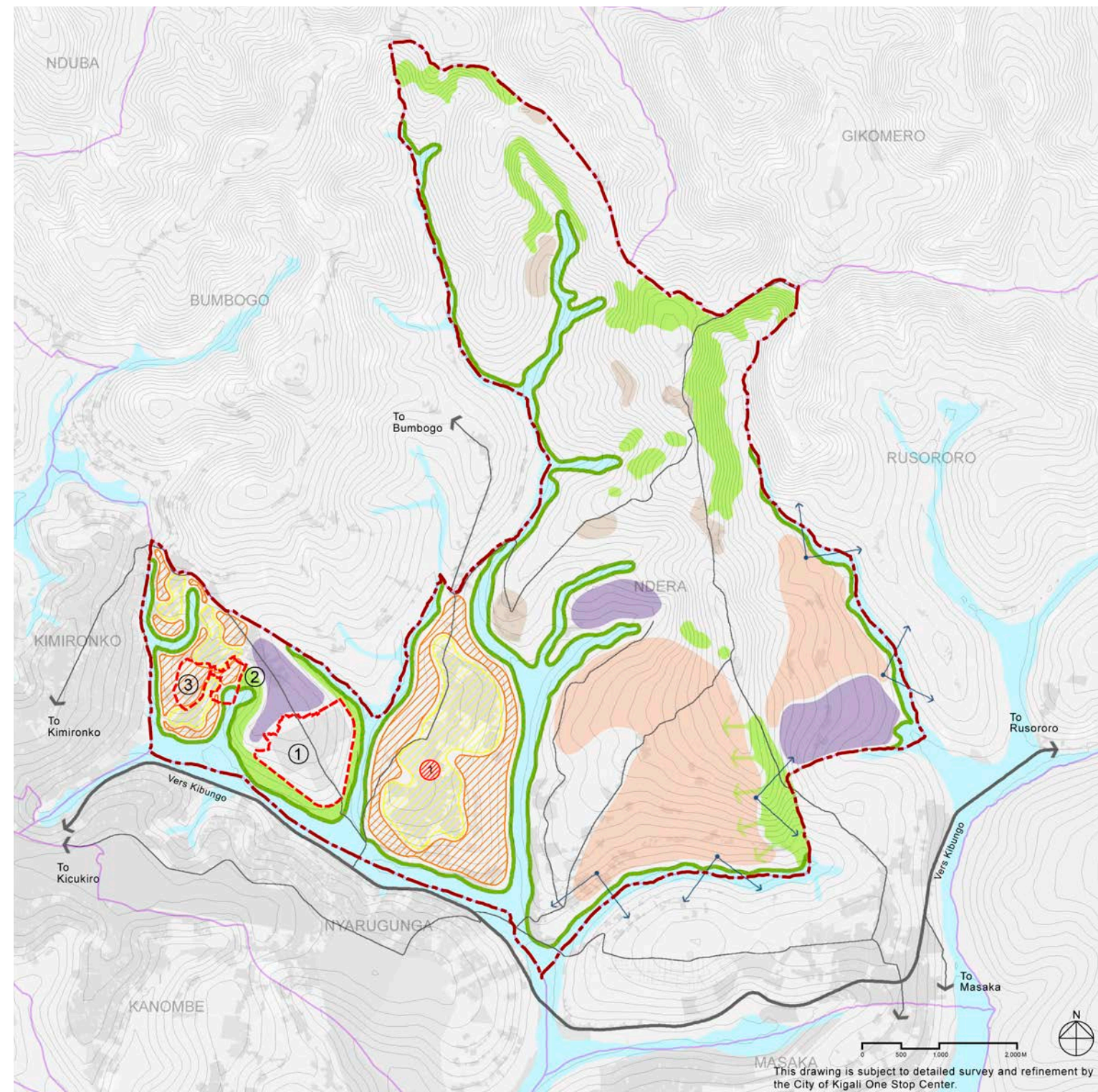


Fig.6.5 South Eastern Planning Area - Opportunities Plan

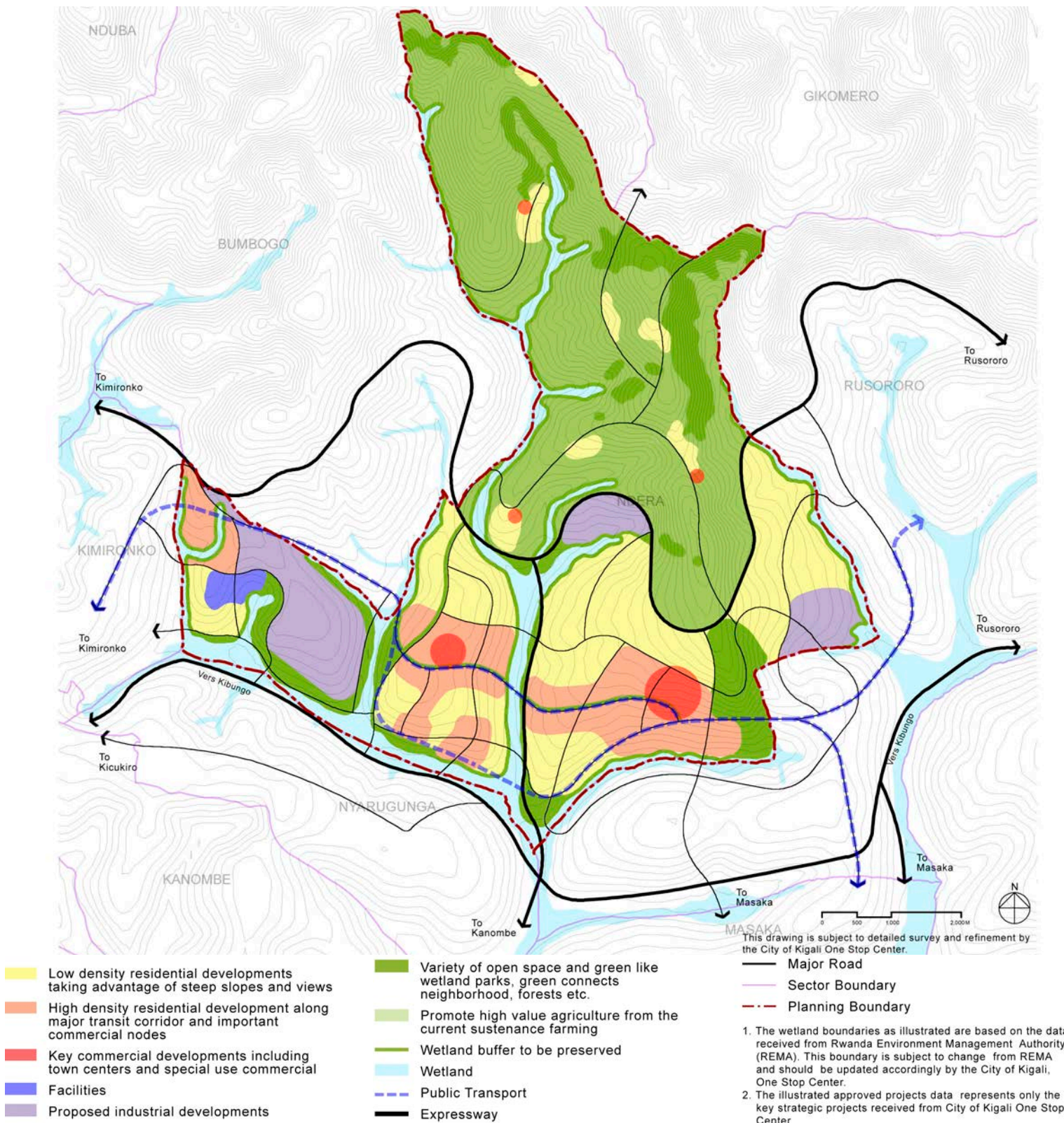


Fig.6.6 South Eastern Planning Area - Concept Plan

6.3 South Eastern Planning Area - Proposed Vision

'Quality Homes Near Employment Centres'

The South Eastern Planning Area is envisioned as the new Regional Hub of Gasabo District. The Planning Area has been divided into two urban townships, one rural area and one industrial estate. As per the population and employment projection. The Planning Area will provide homes for about 0.48 mil people and job for about 0.50 mil people. South Eastern Planning Area aims to establish itself as an important node between the suburban, rural and fringe areas of the Gasabo District.

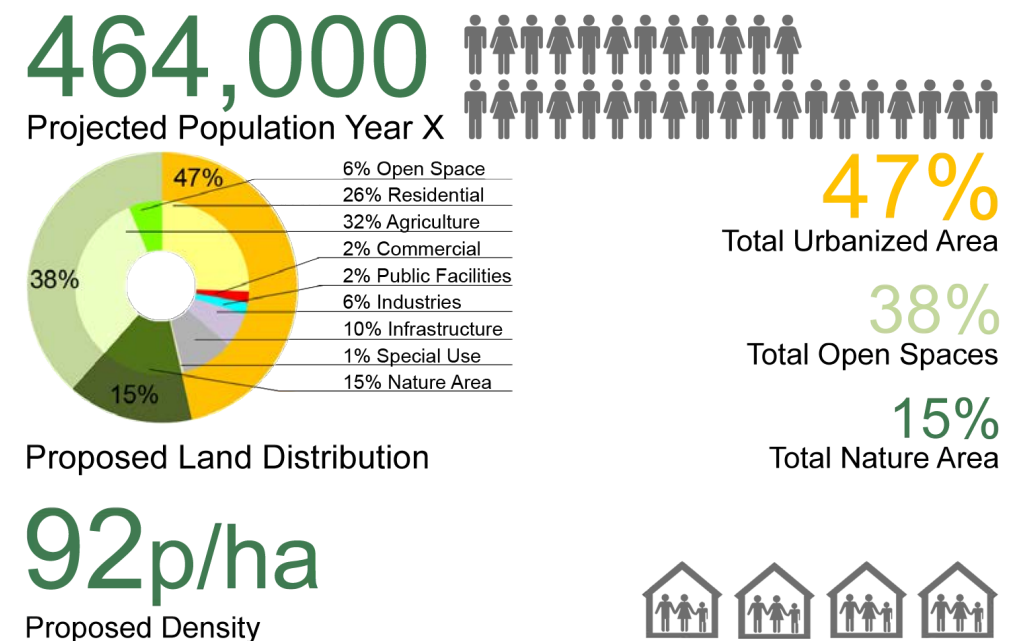
6.4 South Eastern Planning Area - Proposed Concept

A development concept has been proposed for the South-Eastern Planning Area based on the existing context, the opportunities and constraints, as well as the proposed vision. The key proposals of the concept plan are as follows:

The key proposals of the concept plan are as follows:

- To provide residential developments with well integrated neighborhood facilities in the townships of South Eastern planning area.
- To develop a model township in the east of the planning area.
- To consolidate rural housing into uniform clusters for better facilities and infrastructure provisions.
- To provide employment opportunities in sectors such as Retail, Service, Manufacturing and Agricultural industry.
- To integrate nature with the various civic and cultural developments within the township.
- To provide adequate number of public facilities to serve the population of proposed townships.
- To provide an efficient public transportation network to connect planning area to the other parts of the city.
- To conserve and promote all nature areas in the planning area.

The concept is illustrated in Fig.6.6.



6.5 South Eastern Planning Area- Proposed Land Use Plan

The Land Use Plan aims to build upon the physical opportunities and constraints of the planning area and offers incentives for integrated township developments.

The key developments proposed in the Land Use Plan are as follows:

- To develop 2 integrated residential townships with supporting commercial and civic facilities.
- To develop 1 industrial area to provide employment opportunities.
- To develop a regional centre, to provide large number of service and retail sector jobs in the suburban areas.
- To develop Agro Research and processing facilities to promote value added agricultural areas and which are easily accessible from the suburban areas.
- To integrate the public transportation network with the proposed civic and commercial developments.
- To develop medium to high density residential developments along the BRT and MRT network and at important nodes of public transportation corridors such as the MRT stations .
- To retain and revitalise the existing public facilities and provide new facilities to support the increased residential population.
- To protect the existing forests and wetlands and introduce new open spaces creating seamless connection across various recreational, residential and civic developments

The projected population for south eastern planning is 0.48 mil by Year X.

The gross existing population density of the South Eastern Planning Area is approximately 92 P/ha

The proposed Land Uses are illustrated in Fig.6.7 and Table 6.2.

6.5.1 SOUTH EASTERN PLANNING AREA- PROPOSED RESIDENTIAL USE PLAN

- The Planning Area will be divided into two compact townships G5 and G6. Supporting a population of approximately 0.15 mil and 0.30 mil people respectively.
- The Industrial area will support a an additional population of approximately 30,000 people.
- Medium to high density housing is provided along major transportation corridor to accommodate about 60% of projected population and to encourage the use of public transport.
- The areas around the Regional and Town centre will be developed into medium and high density mixed use residential developments.
- Area of proposed Cyaruzinge Housing through which the BRT is passes, are rezoned as medium rise residences.
- Keeping in line with the Current residential trends 40% of dwelling units have been zoned as single family residences and low rise residences.
- Low rise residential have been proposed along wetlands. This helps to maximize views along wetlands and other scenic nature areas.
- Proposed Imudugudu developments within urban areas have been integrated with the township developments.
- Imudugudu have been proposed in rural areas to consolidate the low density scattered residential developments, with better access to facilities. The rural areas will support of population of approximately 10,000 people by year X.

The Residential Use Plan is illustrated in Fig.6.8.

6.5.2 SOUTH EASTERN PLANNING AREA- PROPOSED COMMERCIAL USE PLAN

- The planning area is proposed to have 2 major commercial developments. A Regional and a Town Centre. An area of about 40 ha and 20 ha each respectively has been reserved for these developments.
- The Regional Centre is proposed to include retail spaces, hotels, entertainment centre, office space, cultural and recreational facilities. It would provide about 0.30 mil jobs by Year X.
- The Town Centre is developed in line with the existing commercial centre in the sector and is located close to the proposed Free Trade Zone.
- 23 Neighborhood centres have been proposed in South Easter Planning Area.
- 3 Cell centres have been proposed in the rural townships. The Cell Centres provide basic retail facilities for the residents of the rural area.

The Commercial Use plan is illustrated in Fig.6.9.

6.5.3 SOUTH EASTERN PLANNING AREA- PROPOSED PUBLIC FACILITIES PLAN

- The existing public facilities such as education, religious and health facilities are to be retained and revitalized.
- The proposed Regional Centre provides large scale public facilities. These include a higher education institutes, regional hospital, regional library and a cultural centre.
- Public facilities are located close to the public transport network for easy accessibility.
- 21 Primary and 4 Secondary schools are proposed based on the township model, keeping in mind ease of accessibility and a walking distance of less than 500m.
- Smaller public facilities such as health centres, religious facilities and community halls are integrated within the 24 Neighborhood Centres.

The Proposed Public Facilities Use Plan is

illustrated in Fig.6.10.

6.5.4 SOUTH EASTERN PLANNING AREA- PROPOSED GREEN AND OPEN SPACE PLAN

- The Regional Centre and the proposed Regional Park have integrated with the existing forests. These are further connected to the wetlands via a park connector proposed along the natural water drainage channel.
- A flower valley has been proposed along the wetlands in the south of the planning

area. This will be a major tourist attraction in the Planning Area.

- Existing forests, wetlands and natural water drainage channels are protected through buffer zones. The green buffers are also utilised for a non motorised mode of transport and recreational open space.
- Neighborhood parks are proposed in each neighborhood along with the Neighborhood Centres.
- 1600 ha of agriculture land is retained and will used for value added farming..

The proposed Greens and open space are illustrated in Fig.6.11.

Table 6.2 South Eastern Planning Area - Proposed Land Use Distribution Plan

BROAD LAND USE	DETAIL LAND USE	AREA (HA)	TOTAL AREA (HA)
Residential	Single family Residential	702	1374
	Low Rise Residential	286	
	Medium Rise Residential	344	
	High Rise Residential	42	
Commerical	Commercial General	77	77
Public facilities	Government Office	4	108
	Educational	75	
	Religious Facilities	14	
	Health Facilities	15	
Industries	Light Industrial	166	373
	Heavy Industrial	207	
Nature Area	Existing Forest	254	779
	Afforestation	104	
	Wetland	421	
Agriculture	Farmland	1609	1609
Open Space	Open Space and Park	200	222
	Sports and Recreation	22	
Infrastructure	Transportation	450	523
	Transportation(open Space)	54	
	Utilities	19	
Special Use	Graveyard	27	27
	TOTAL	5025	

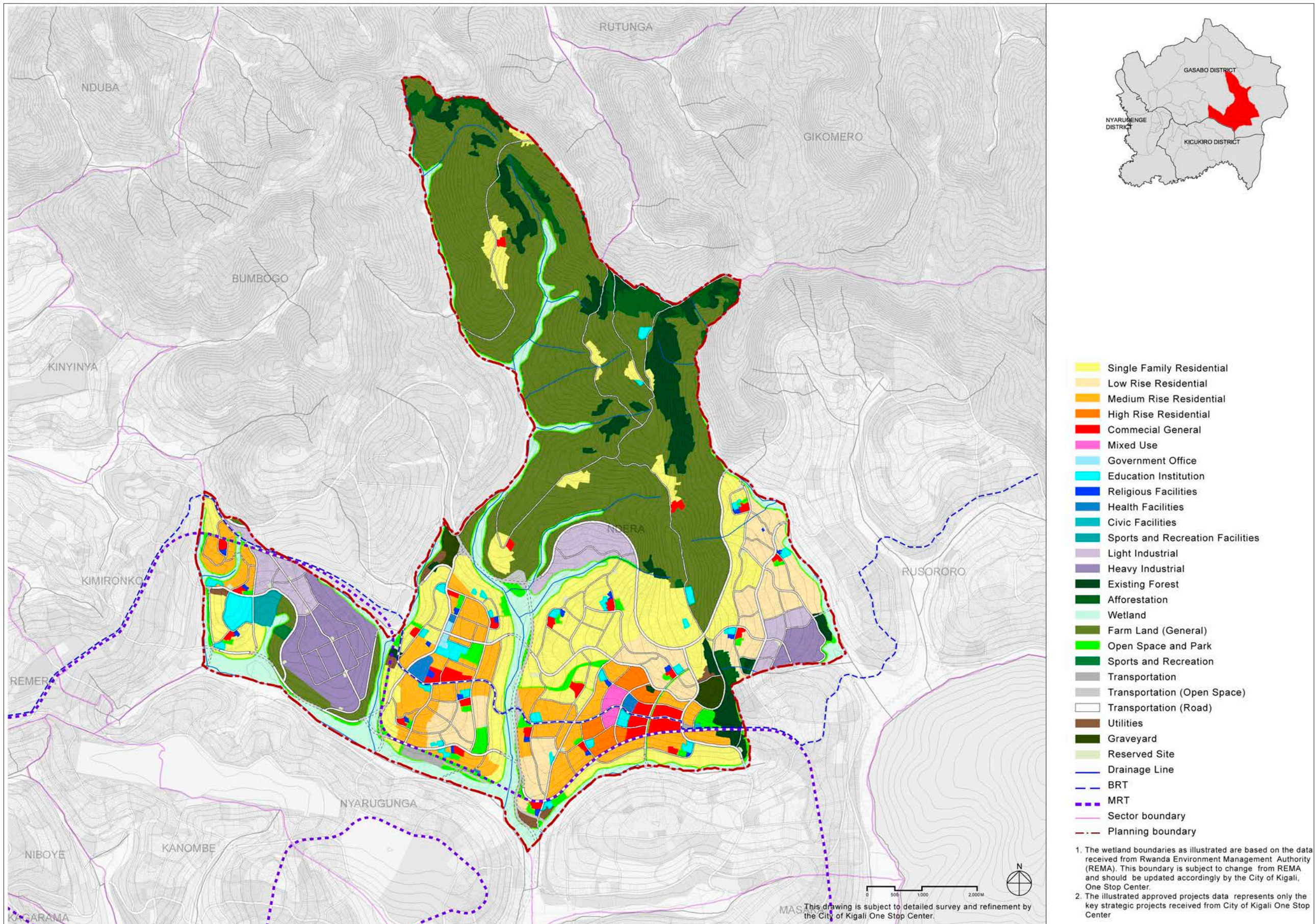


Fig.6.7 South Eastern Planning Area - Proposed Landuse Plan

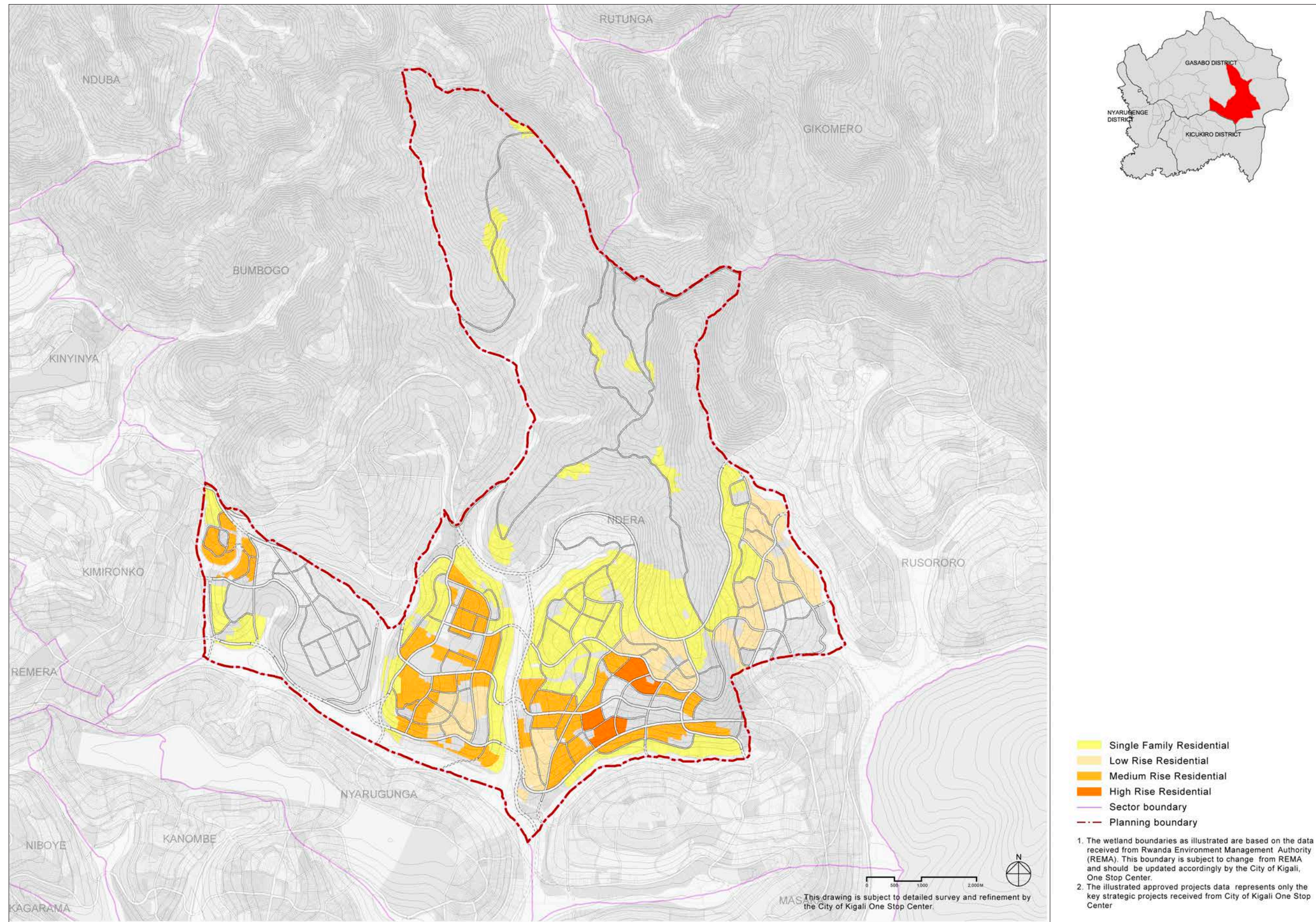


Fig.6.8 South Eastern Planning Area - Proposed Residential Use Plan

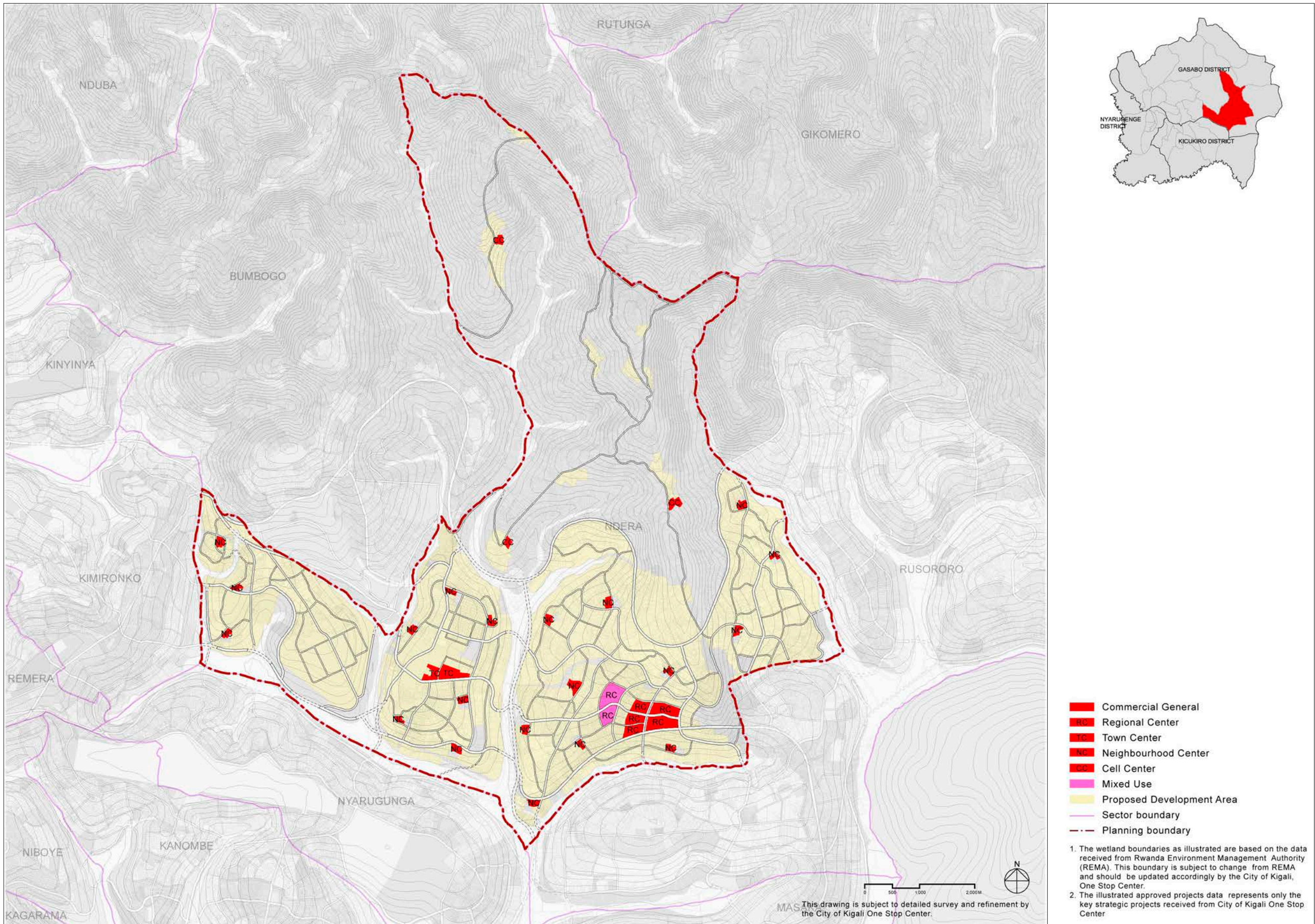


Fig.6.9 South Eastern Planning Area - Proposed Commercial Use Plan

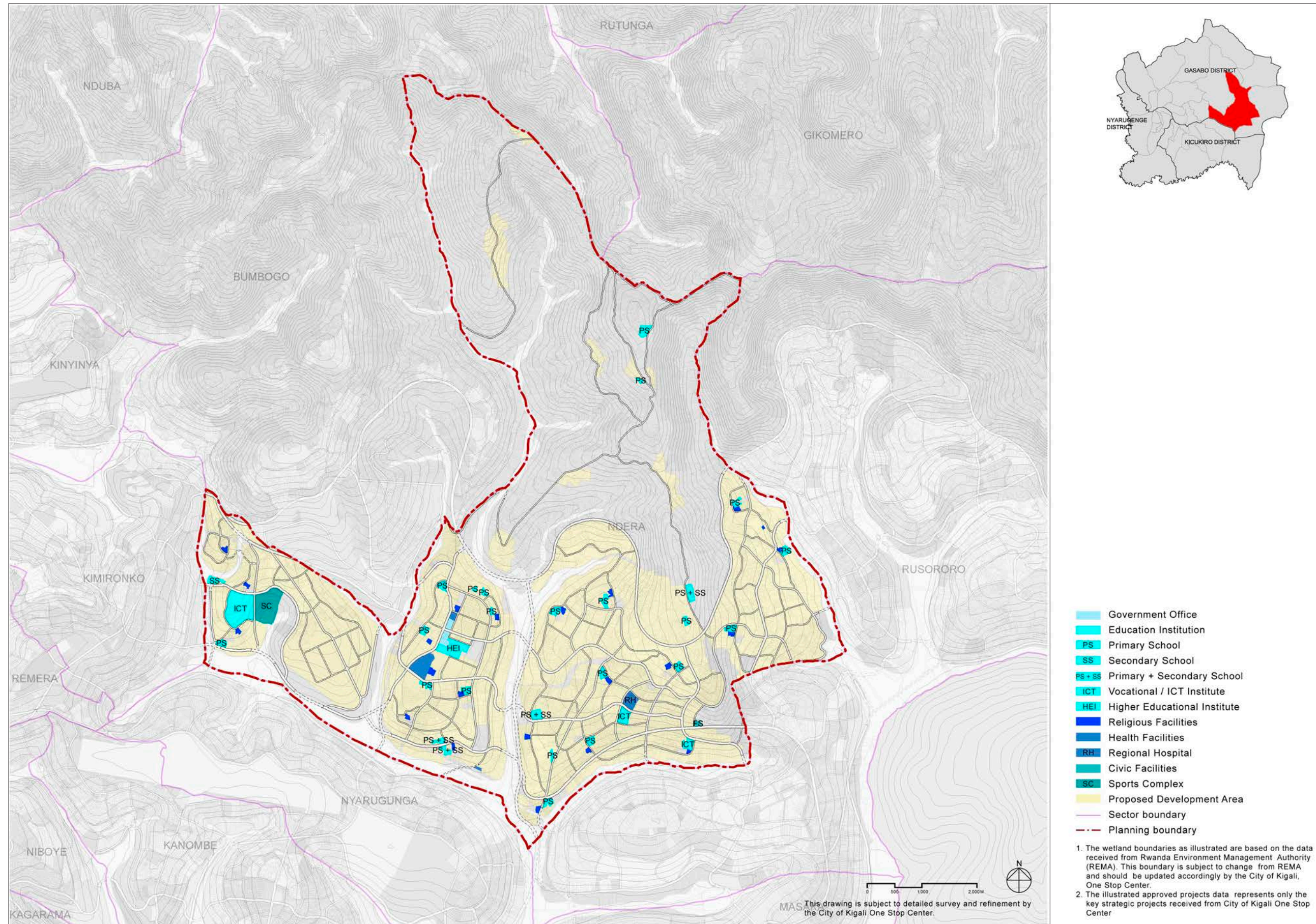


Fig.6.10 South Eastern Planning Area - Proposed Public Facilities Use Plan

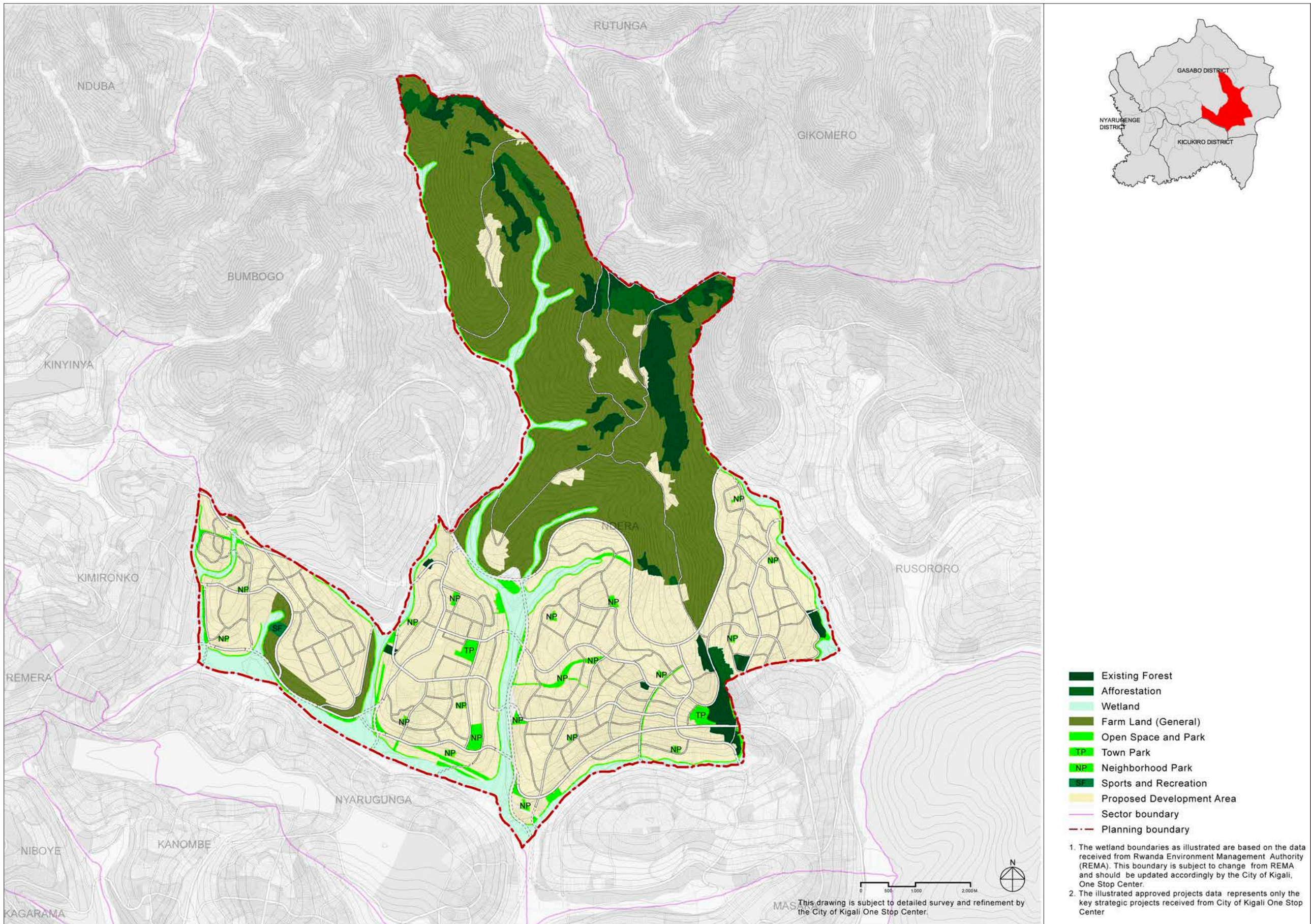


Fig.6.11 South Eastern Planning Area - Proposed Green and Open Space Use Plan

6.6 South Eastern Planning Area- Proposed Key Features

The Planning Area is envisioned as a Regional Centre for Gasabo District. As part of the Proposed Land Use Plan, two areas are identified as key features of the planning area. The Transit oriented Regional Centre and the Agro-Research and Processing facilities.

1. TRANSIT ORIENTED REGIONAL CENTRE

The Regional Centre is to be developed in the South-western part of South Eastern Planning Area. The Regional Centre will be the main Suburban node for The Gasabo District. It will provide a number of civic and commercial facilities for residents of suburban and rural areas of the Gasabo District.

The Regional Centre will provide service employment opportunities for the residents of the South Eastern Planning Area. This will also help to decentralize commercial activities in the Kigali City. To achieve all the above, the Regional Centre will be well integrated with all modes of public transportation i.e., BRT, MRT and road network.

The centre will be the interchange node for people moving in and out of Kigali. The Regional Centre will help to Catalyze the development towards the eastern areas of the Gasabo District.

2. AGRO - RESEARCH AND PROCESSING FACILITIES

The rural area occupies 2100 ha in South Eastern Planning Area. Agriculture is currently the primary form of employment in Rwanda. Most of the Agriculture which takes place in Rwanda is subsistence agriculture. There is a need to increase productivity of the agricultural activities

and increase profitability for the people. It is with this aim that an Agro Research and Processing Facility will be setup within the planning area. The rural areas of the South Eastern Planning Area have easy access to the urban areas within the District and further helps to justify the location of such a facility within the planning area. The Facility will help research ways to boost productivity and suggest sustainable forms agriculture which can applied in the long run. The Agricultural areas in the planning area will act as test bed for the research facilities. The facilities would also provide processing and packaging facilities for the farmers to help them market their produce and reap economic benefits.

The key features for the planning area are Illustrated in Fig.6.12.

- ① Transit integrated regional center
- ② Agro processing industries
- ③ Industrial Zone

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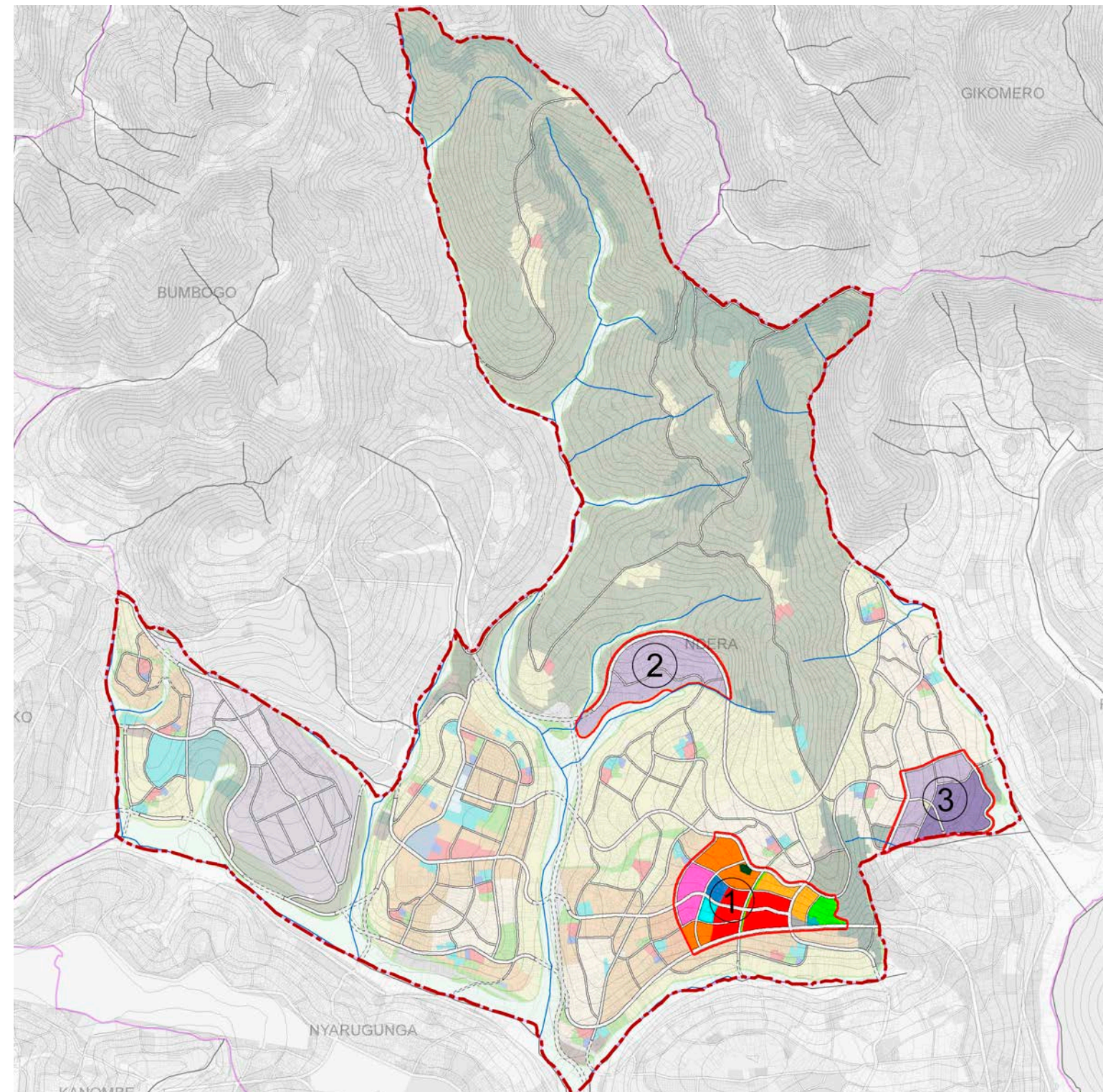


Fig.6.12 South Eastern Planning Area - Proposed Key Features

7

DETAILED MASTER PLAN FOR EASTERN PLANNING AREA

This chapter presents the detailed Master Plan for the Eastern Planning Area. Based on the analysis of the existing context, opportunities and constraints, a vision and concept have been derived, to guide the development of the Master Planning area.

7.1 Eastern Planning Area - Existing Context

The Eastern Planning Area comprises of the Rusuroro Sector and has a total planning area of 5300 ha.

7.1.1 LOCATION AND CONNECTIVITY

The Eastern Planning Area is located in the extreme south eastern corner of the Gasabo District and is bounded by Vers Kibungu Arterial Road to the south, which continues to border the planning area along the eastern boundary.

It is surrounded by the Ndera sector to the west and the Gikomero sector to the north. Vers Kibungu and the wetlands separate the planning area from Masaka sector of Kicukiro District to the south.

Vers Kibungu Arterial Road is the only major connection between the planning area and the CBD in Muhima, existing international airport. The arterial further connects the planning area to the neighboring city of Rwamagana to the east of the planning area.

7.1.1 EXISTING SITE CONDITIONS

Eastern planning area is one of the larger planning areas of Gasabo District. Majority of the planning area is rural and undeveloped. The area currently has a population of about 43,000 people (2013)¹. Areas around kabuga. Most developments are low density unplanned residences developments. The western edge of the planning area also has some clusters of

rural housing. A number of public facilities including the Gasabo Court, Kabuga Catholic Church and a few schools are present in the southern part of the planning area, which borders the Masaka sector. A commercial centre, Kabuga is located in the south of the planning area and is an important trade hub for the people living outside Kigali. There is one large scale, approved project that is present within the planning area:

- Nyagahinga residential project is located in south-west of the planning area close to the airport

The existing population density in the Eastern Planning Area, is about 8 p/ha.

The existing site conditions and site context for the Eastern Planning Area are shown in Fig.7.3.

7.1.1 NATURAL SITE CONDITIONS

The northern part of the planning area has a relatively more undulating terrain. (above 40% slope gradient). The rest of the planning area is relatively flat and suitable for development. Wetlands divide the planning area into three areas. The wetlands to the east form the boundary of the planning area and those to the west of the planning area separate it from the Ndera Sector.

Wetlands, natural water drainage channels, forests and steep slopes need to be protected are illustrated in Fig.7.1 and Fig.7.2.

5,256ha
Total Planning Area

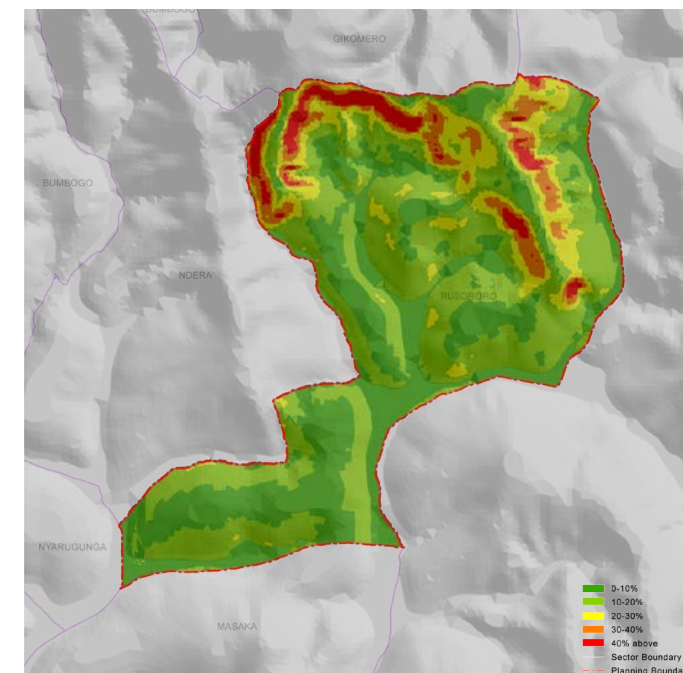
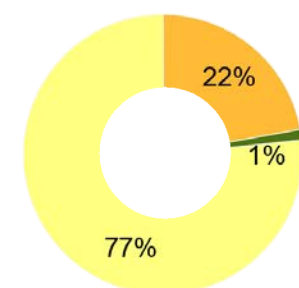


Fig.7.1 Eastern Planning Area - Slope Analysis

43,000
Population 2013



Natural Constraints

8p/ha
Existing Density



77%
Developable Land

22%
Steep Slopes Land

1%
Forest

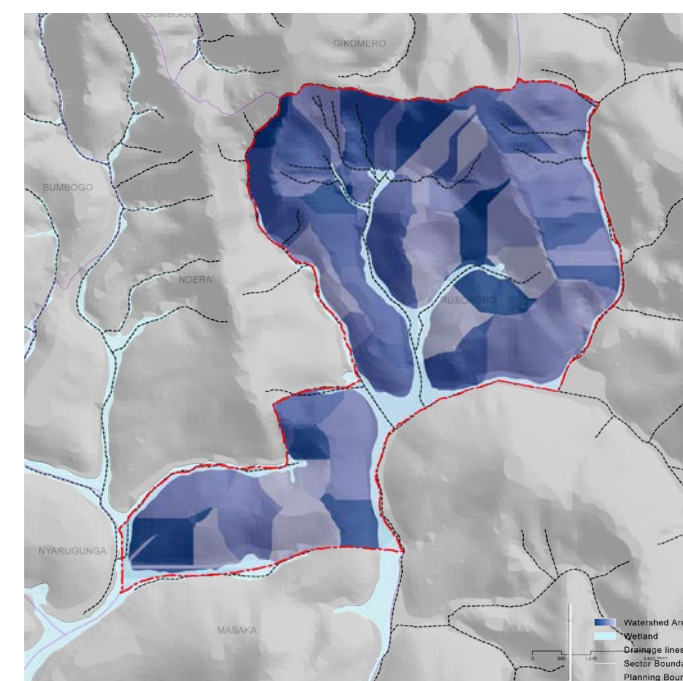


Fig.7.2 Eastern Planning Area - Watershed And Drainage

¹ Assuming 5.45 % annual growth rate, KCMP 2007

Table 7.1 Eastern Planning Area- Existing Land Use Distribution

BROAD LAND USE	DETAIL LAND USE	AREA (HA)	TOTAL AREA (HA)
Residential	Low Rise Residential	246	246
Commercial	Commercial General	52	63
	Hotel	11	
Public facilities	Government Office	1	41.5
	Educational	38	
	Health Facilities	0.5	
	Civic Facilities	2	
Industries	Heavy Industrial	10	10
Nature Area	Existing Forest	371	380
	Wetland	9	
Agriculture	Farmland	4400	4400
Water Bodies	Rivers	1	1
Infrastructure	Transportation	144	144
	Total	5283.5	

- Low Rise Residential
- Commercial General
- Hotel
- Government Office
- Education Institution
- Health Facilities
- Civic Facilities
- Heavy Industrial
- Existing Forest
- Farmland (General)
- Transportation
- Vacant Land
- Wetland
- Wetland within planning area

- Existing Expressway
- Major Roads
- Sector boundary
- Planning boundary
- ① Kabuga Market
- ② Nyagahinga Housing Project
- ③ Cyaruzinge Housing Project

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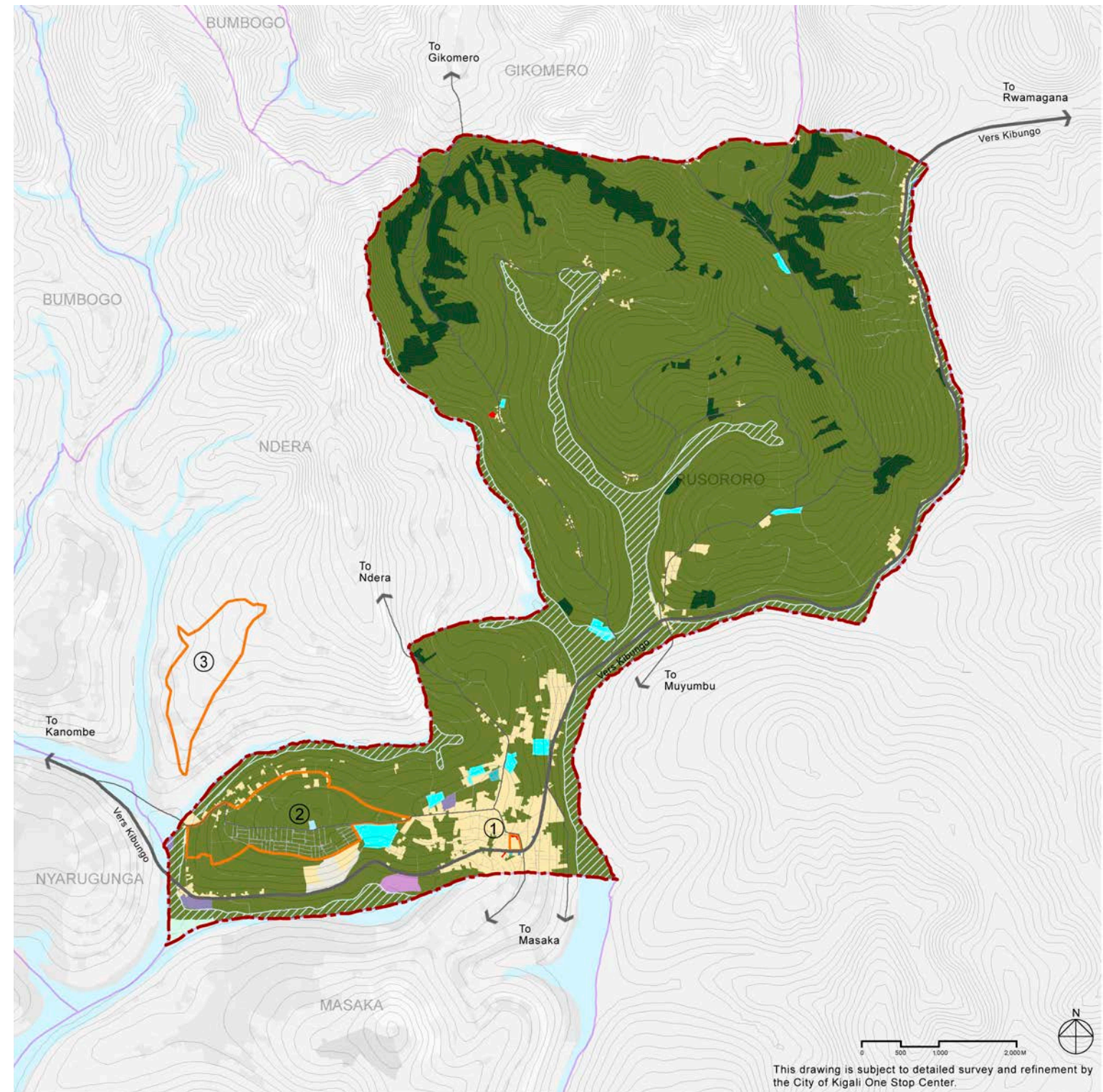


Fig.7.3 Eastern Planning Area - Existing Land Use and Context map

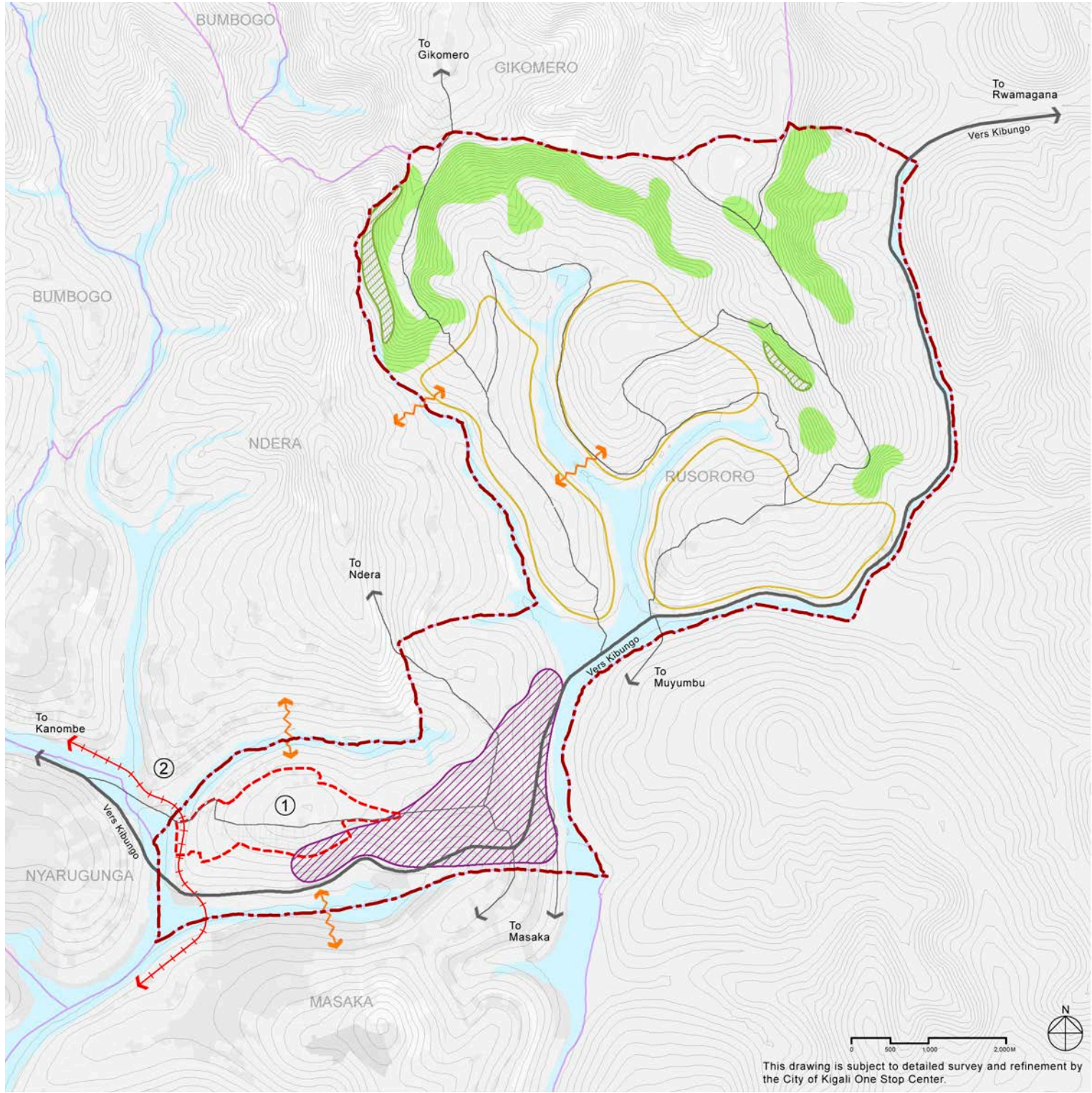


Fig.7.4 Eastern Planning Area - Constrains Map

7.2 Eastern Planning Area - Opportunities and Constraints

7.1.1 CONSTRAINTS

The constraints in Eastern Planning Area are based on existing context analysis.

The constraints are as follows:

- Large parcels of relatively flat land lack connections.
- The developed area within the planning area, comprises of mostly low density unplanned developments which are to be rezoned
- The approved projects are mostly low density residential development and do not utilize the full potential of there location and the relatively flat land they occupy.
- RTDA proposed rail line is located towards the extreme west of the planning area and restricts direct connections from the planning area to the airport.
- Steep slopes along the wetlands, are a constrain for efficient infrastructure and road network provisions.
- Steep slopes above 40% in the planning area , need to protected.

The Constraints for Eastern Planning Area are illustrated in Fig.7.4.



7.1.1 OPPORTUNITIES

The opportunities identified are based on existing context analysis.

The opportunities are as follows:

- Large areas of relatively flat land, are currently being utilized for agriculture. These provide the opportunity to new growth areas and townships in the District.
- Its Close proximity to the existing airport provide good opportunity to develop well connected residential developments.
- Kabuga is one of the furthest commercial node, located towards the extreme west of the city. This commercial area provides the opportunity to be developed into an important commercial node in the planning area.
- Large Pockets of flat lands towards the east of the planning area provide the opportunity to develop large scale industrial areas.
- Non residential developments would form an important part of the strategy to provide employment opportunities to a larger population set.
- Close proximity to the existing airport provide good opportunity to develop well connected residential developments.
- The Proximity to two proposed regional centre one in Ndera and the other in Masaka provide good employment and recreational facilities at close proximity

for the residents of Eastern Planning Area.

- Wetlands and natural water drainage channels could be developed into linear parks and open spaces for the residents.
- Wetlands in The south of the planning area provide the opportunity to develop tourist attractions and a recreational park. These would also contribute to the biodiversity in the planning area.

The Opportunities are illustrated in Fig.7.5

- Relatively flat areas, opportunity to be developed as new growth areas
- Good site views
- Potential areas for industrial development in Rosororo in line with the proposed Broad Land Use
- Opportunity to develop large open spaces and nature area utilizing existing forests, steep slopes above 40% and wetland buffer
- Opportunity to consolidate rural housing around existing residential developments
- Wetland

- Wetland
- Wetland buffer offers an opportunity to develop a continuous open public green network
- Existing major road
- Sector Boundary
- Planning Boundary

1. The wetland boundaries as illustrated are based on the data received from Rwanda Environment Management Authority (REMA). This boundary is subject to change from REMA and should be updated accordingly by the City of Kigali, One Stop Center.
2. The illustrated approved projects data represents only the key strategic projects received from City of Kigali One Stop Center

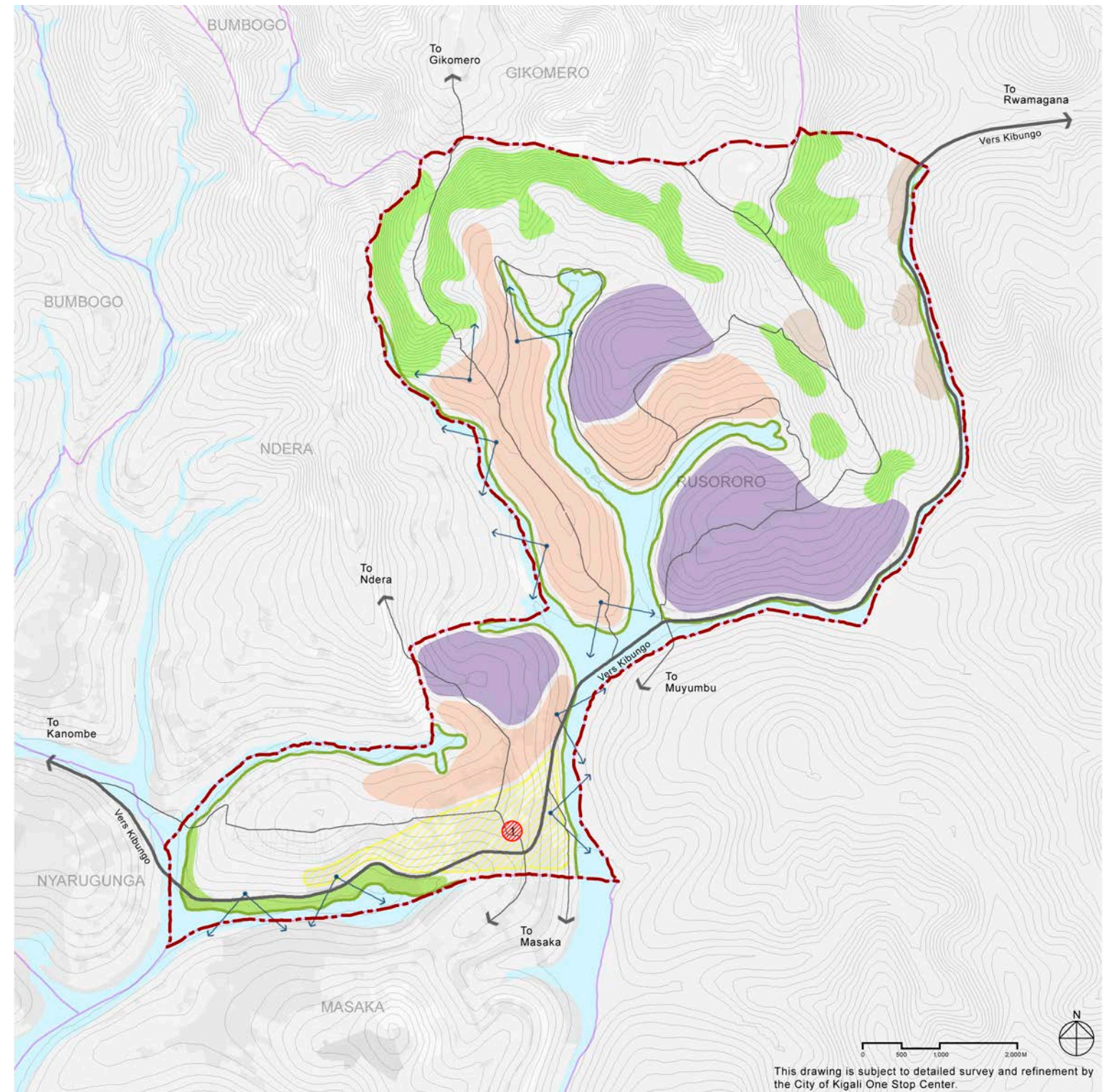


Fig.7.5 Eastern Planning Area - Opportunities Map

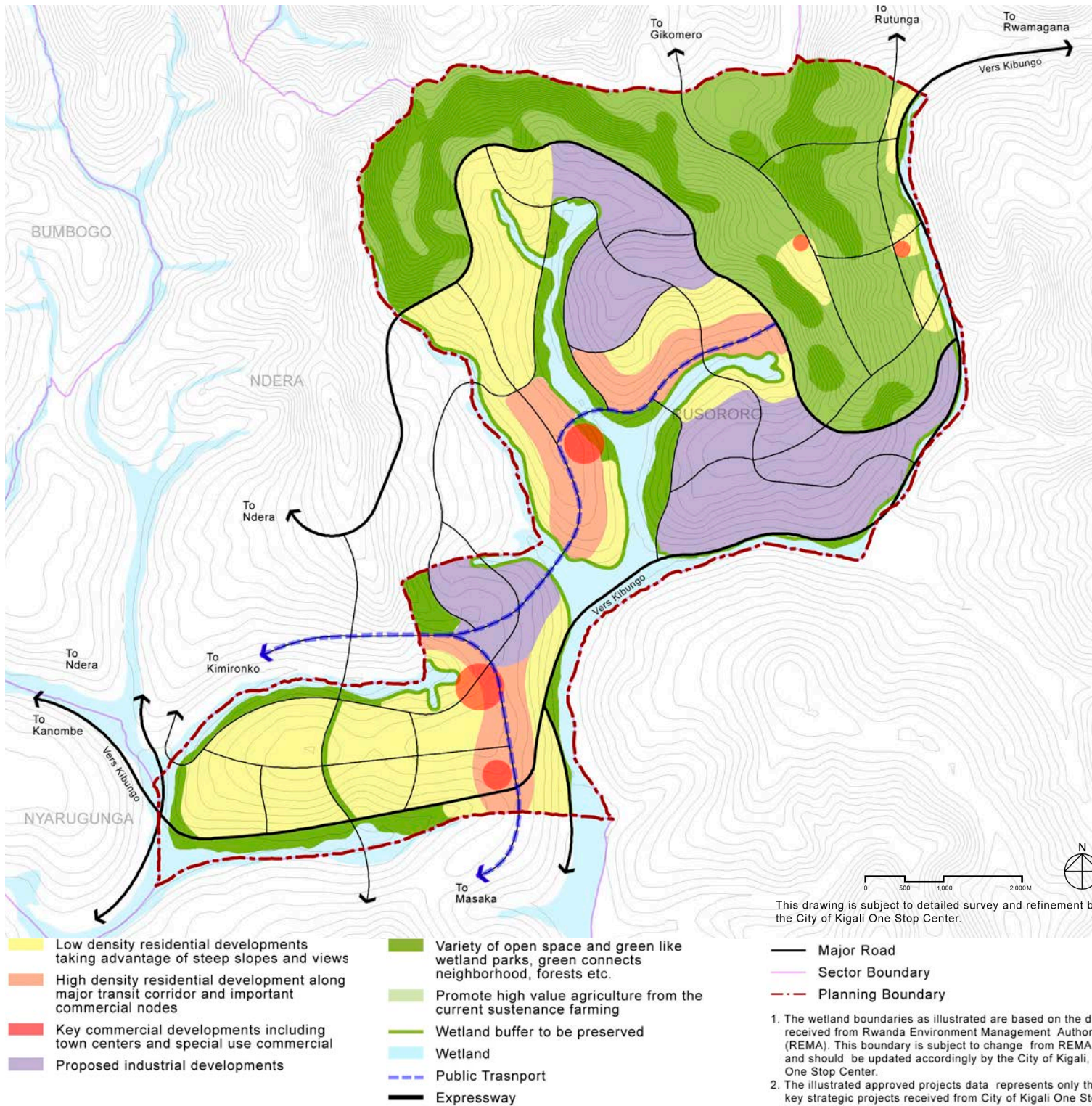


Fig.7.6 Eastern Planning Area - Concept Plan

7.3 Eastern Planning Area- Proposed Vision

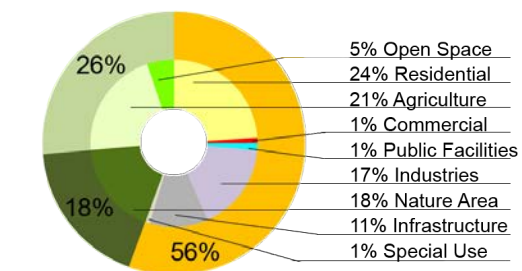
'Eastern Trade and Employment Hub'

Eastern Planning Area is envisioned as the industrial and employment hub of Gasabo District. It has been proposed to be developed into two residential township, one industrial area and one rural area. These would offer the maximum number of employment opportunities when compared to any other sector. According to population and employment projection, Eastern Planning Area will provide homes for about 0.48 mil people and provide jobs for about 0.15 mil people. The Eastern Planning Area aims to establish it self as the gateway for the District from the West.

7.4 Eastern Planning Area- Proposed concept

A development concept has been proposed for the Eastern Planning Area based on the

474,000 Projected Population Year X



Proposed Land Distribution

89p/ha

Proposed Density

existing context, the opportunities and constraints, as well as the proposed vision. The key proposals of the concept plan are as follows:

The key proposals of the concept plan are as follows:

- To provide for new growth areas for residential developments in the planning area.
- To provide large areas for industrial developments in the planning area
- To provide important commercial nodes within the planning area.
- To provide and fully integrate the public transportation system with commercial and high density residential developments.
- To provide various scales of public facilities to serve the residents of the proposed townships.

The Concept Plan for Eastern Planning Areas is illustrated in Fig.7.6.

56%
Total Urbanized Area

26%
Total Open Spaces

18%
Total Nature Area



7.5 Eastern Planning Area Proposed Land Use Plan

The Land Use plan aims to build upon the physical opportunities and constraints of the planning area, and offers incentives for industrial and residential developments.

The key Developments proposed in the Land Use plan are as follows:

- To develop two integrated residential townships.
- To develop commercial and civic facilities at important nodes along the public transportation networks.
- To develop higher density residential developments along the BRT and MRT network.
- To develop low density and low impact developments along the wetlands.
- To allow for the expansion and formalization of existing commercial centre in Kabuga.
- To retain and revitalise the existing public facilities and provide new facilities required for the increased population .
- To develop both light and heavy industries in the east of the planning area. It will be an important catalyst for the development in the planning area.
- To preserve existing forests and wetlands and integrate these with the various residential and civic developments in the planning area.

The projected population for the Planning Area is approximately 0.47 mil by Year X
The gross projected population density for the Planning Area is approximately 89 P/ha

The proposed Land Use Plan is illustrated in Fig.7.7 and Table 7.2

7.1.1 EASTERN PLANNING AREA- PROPOSED RESIDENTIAL USE PLAN

- The projected residential population for the Eastern Planning Area is 0.47 mil people by Year X.
- The residential population will be distributed into two self sufficient townships G7 and G8 with a population of approximately 0.25 mil and 0.17 mil people each respectively.
- 30,000 dwelling units have been zoned Medium rise residential developments.
- These are located around town centres and along important BRT and MRT network. Medium rise provide about 20% of the total dwelling units within the planning area.
- Single family and low rise residential developments form a major bulk of the residential developments providing almost 80% of the total dwelling units provided within the planning area.
- 300,000 people will live in low rise and single family residences. These developments will take advantage of the scenic views offered by the large network of wetlands and hills within the planning area
- Nyagahinga residential developments zoned as single family residential developments.
- Proposed Umudugudu developments within the urban area to be incorporated within the urban township developments by Year X.
- Scattered residential developments in the rural townships to be consolidated into four clusters of 300- 500 dwelling units, called umudugudu.

The Residential Use Plan is illustrated in Fig.7.8

7.1.1 EASTERN PLANNING AREA PROPOSED COMMERCIAL USE PLAN

- The Eastern Planning Area is proposed to have one Town Centre ,in for each of the proposed township.

- Town centres are proposed to become important commercial nodes, which would include a variety of commercial and civic facilities.
- The Eastern Planning Area would provide about 15,000 jobs in the service sector and 15,000 jobs in the retail and entertainment sector.
- The Town Centre is proposed to have hotels, retail, entertainment and a small quantum of office space.
- An Additional commercial node, Kabuga, is also recognized, formalized and promoted as an important trade centre in the Gasabo District.
- An industrial area is to be developed to the east of the Planning Area, it will act as a major employment generator for the planning area. It will provide jobs for about 140,000 people.
- 18 Neighborhood centres are to be developed, these will house small retail facilities for the daily needs of residents. At a walking distance of no more than 500m .
- 4 cell centres are to be developed along with the Umudugudu to provide for the daily needs to the residents of the rural townships.

The Commercial Use Plan is illustrated in Fig.7.9

7.1.1 EASTERN PLANNING AREA- PROPOSED PUBLIC FACILITIES PLAN

- The existing public facilities such as the gasabo court, government offices, health centres, schools and religious facilities in Eastern Planning Area are to be retained and developed around.
- The Town Centre is proposed to house important public facilities like a polyclinic and an ICT each.
- Public facilities also integrated with each neighborhood centres like, Religious facility, health centre, community halls.

- 15 primary and 4 secondary schools have been provided in Eastern Planning Area, based on the population, existing schools and a walking distance of 500 m.

The Public Facilities Plan is illustrated in Fig.7.10

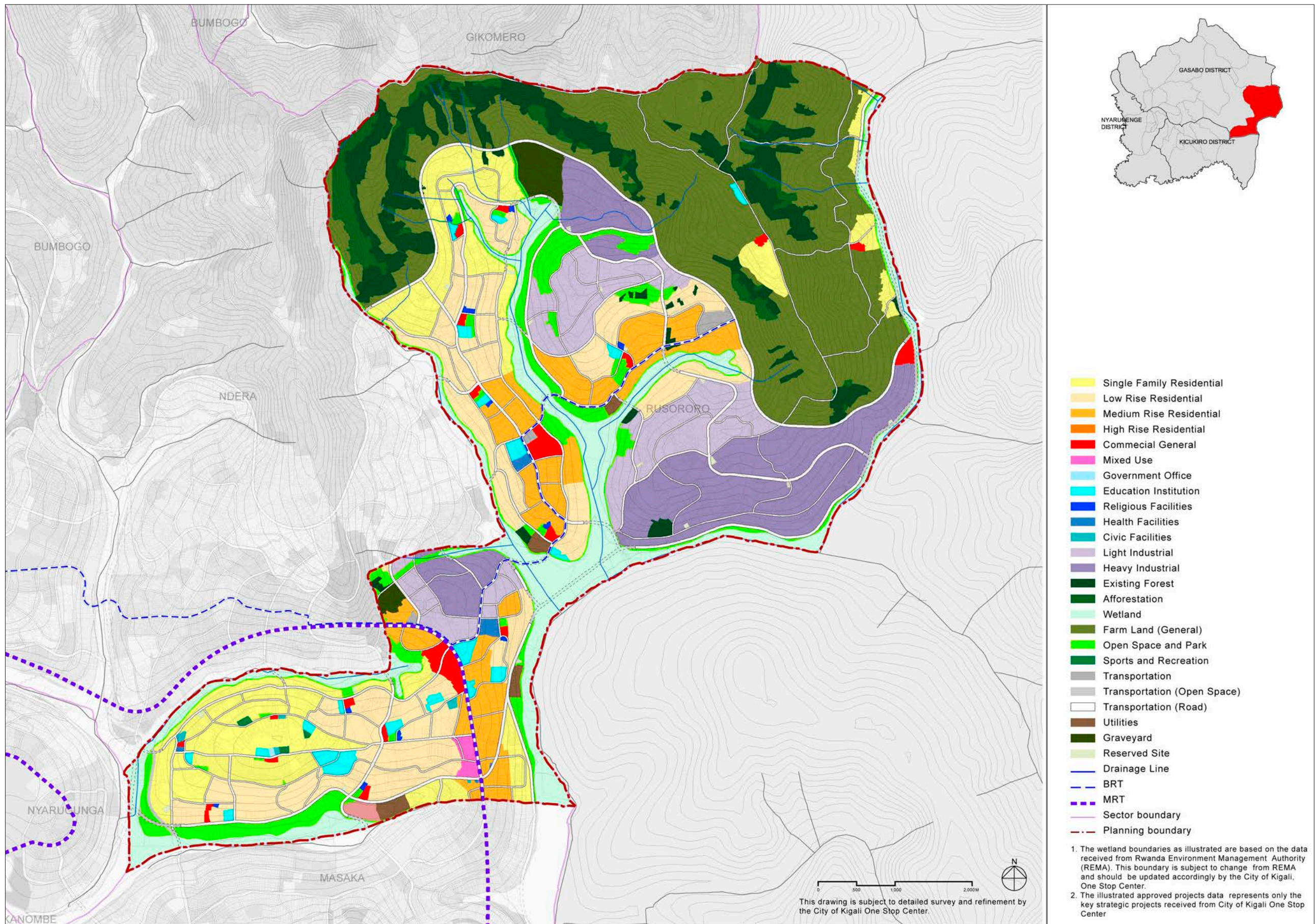
7.1.1 EASTERN PLANNING AREA- PROPOSED GREEN AND OPEN SPACE PLAN

- The Flower Valley from the Ndera sector would be further extended into Eastern Planning Area and will be a major tourism and recreational space in the planning area.
- The sports and recreation centre in Eastern Planning Area would be one of the recreational venues in the planning area.

- A 4 ha town park is to be integrated with each town centre and surrounding public facilities.
- Buffer of 20 m along wetlands is to be developed into linear parks surrounding townships.
- Existing forest, wetlands and natural water drainage channels would be retained. These could also be used as recreational spaces for the residents.
- Slopes above 40% in both urban and rural areas to be protected, and to be replanted as forests.

Table 7.2 Eastern Planning Area- Proposed Land Use Distribution

BROAD LAND USE	DETAIL LAND USE	AREA (HA)	TOTAL AREA (HA)
Residential	Single family Residential	512	1383
	Low Rise Residential	570	
	Medium Rise Residential	301	
Commercial	Commercial General	56	56
Public facilities	Government Office	1	77
	Educational	57	
	Religious Facilities	6	
	Health Facilities	9	
	Civic Facilities	4	
Industries	Light Industrial	312	803
	Heavy Industrial	491	
Nature Area	Existing Forest	367	984
	Afforestation	110	
	Wetland	507	
Agriculture	Farmland	1126	1126
Open Space	Open Space and Park	277	281
	Sports and Recreation	4	
Infrastructure	Transportation	407	507
	Transportation(open Space)	31	
	Utilities	22	
	Graveyard	47	
Total		5300	



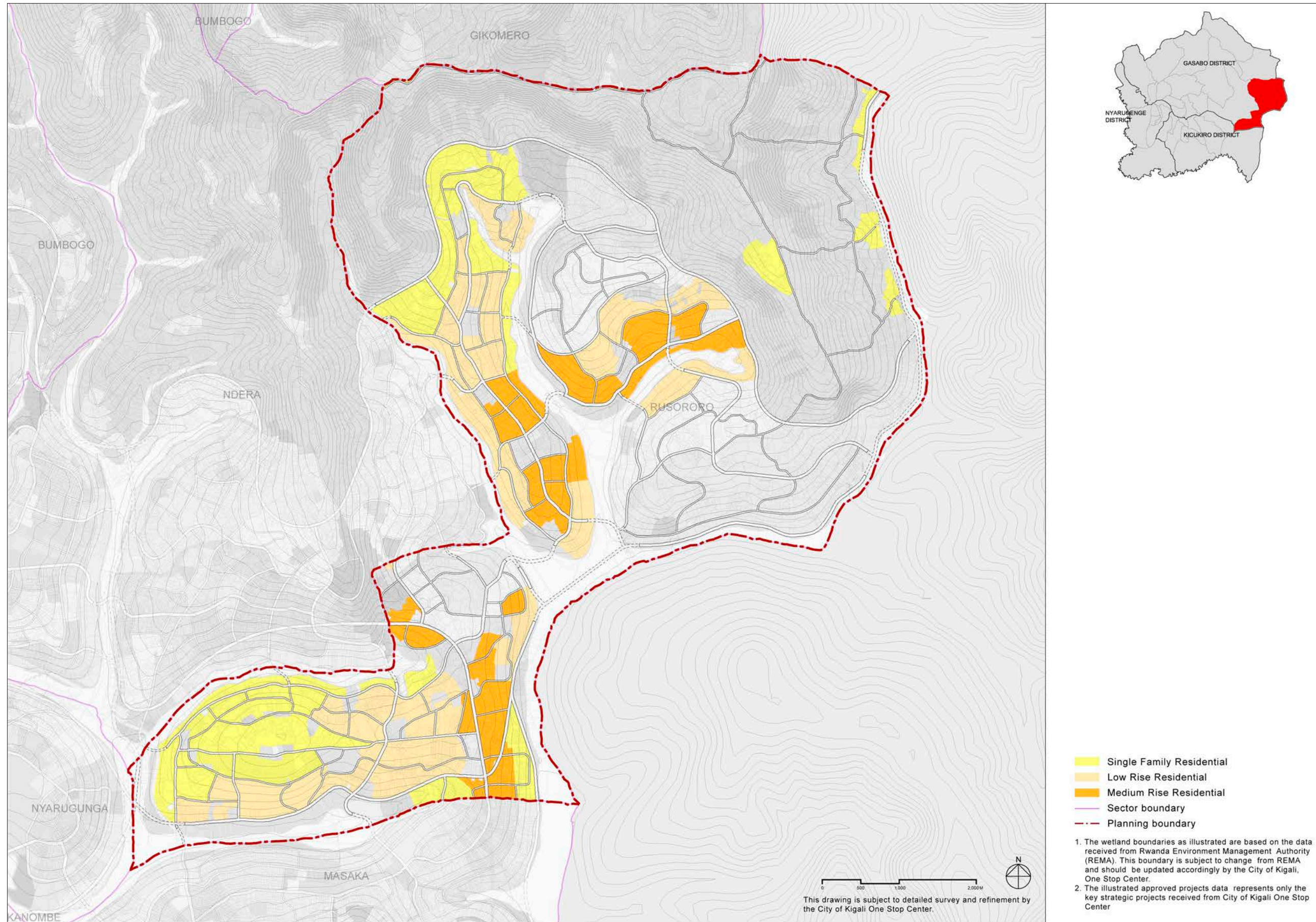


Fig.7.8 Eastern Planning Area - Proposed Residential Use Plan

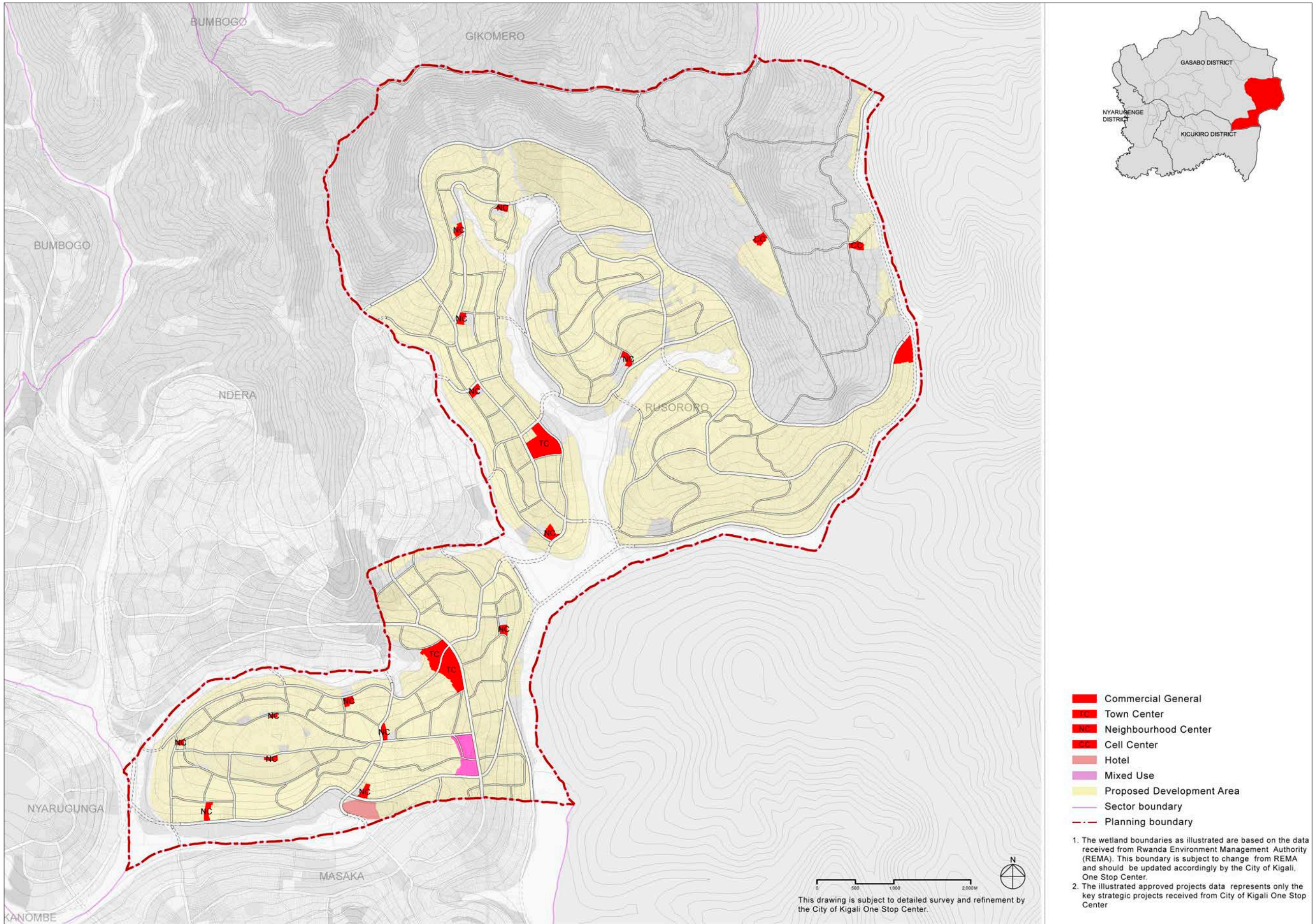


Fig.7.9 Eastern Planning Area - Proposed Commercial Use Plan

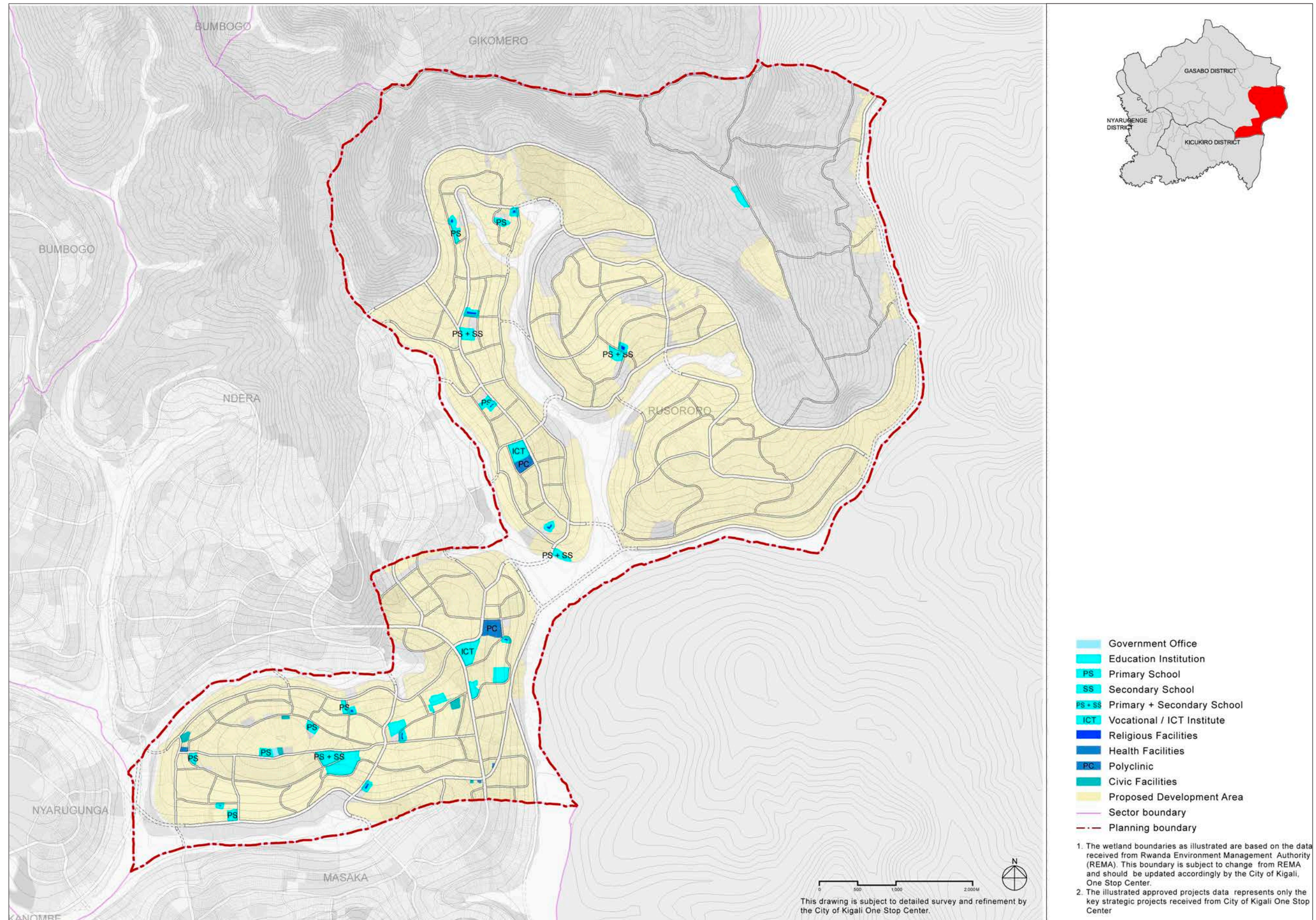
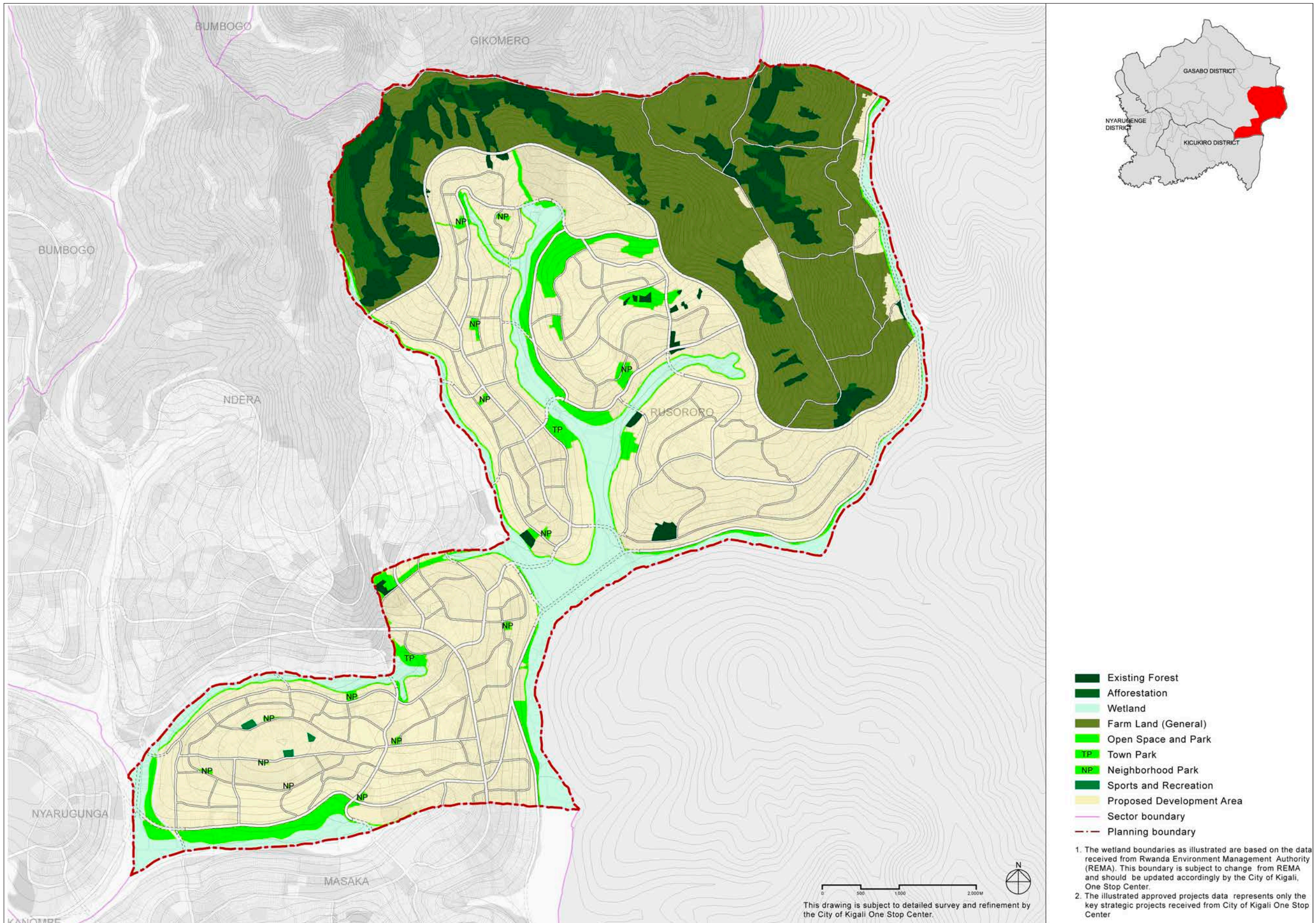


Fig.7.10 Eastern Planning Area - Proposed Public Facilities Use Plan



The Green and Open Space Plan is illustrated in Fig.7.11

7.6 Eastern Planning Area- Key Feature Developments.

The Planning Area is envisioned as An industrial hub for Gasabo District.

As part of the Proposed Land Use Plan, two areas are identified as key features of the planning area, Industrial Area and the Sports and Recreation Hub.

1. INDUSTRIAL AREA

The Eastern Planning Area provides approximately 900 ha of land to develop a industrial area. This industrial area would provide employment opportunities for more than 150,000 people. The industrial area and the employment opportunities it brings along with it will also help to catalyze the development around it and help to pull the development east wards in the District, which is currently concentrated to the west of the District.

Being the extreme east of the district it is an ideal location to develop heavy industries, as it is located on the eastern edge of the district. Light Industries and a open space belt has also been provided around the

industries to act as buffer for the residential developments.

2. SPORTS AND RECREATION HUB

A Sports and Recreation Hub of 5 Ha has been proposed in the Eastern Planning Area. It is located close to the proposed town centre in the planning area. The Sports Hub is also well connected through all modes public transport including the BRT and MRT. The Sports and Recreation hub is sited here to take advantage of natural views to the wetlands, It also take advantages of the existing forests located in the planning area.

The key features for the planning area are Illustrated in Fig.6.12.

- ① Industrial Zone
- ② Sports and Recreation Hub

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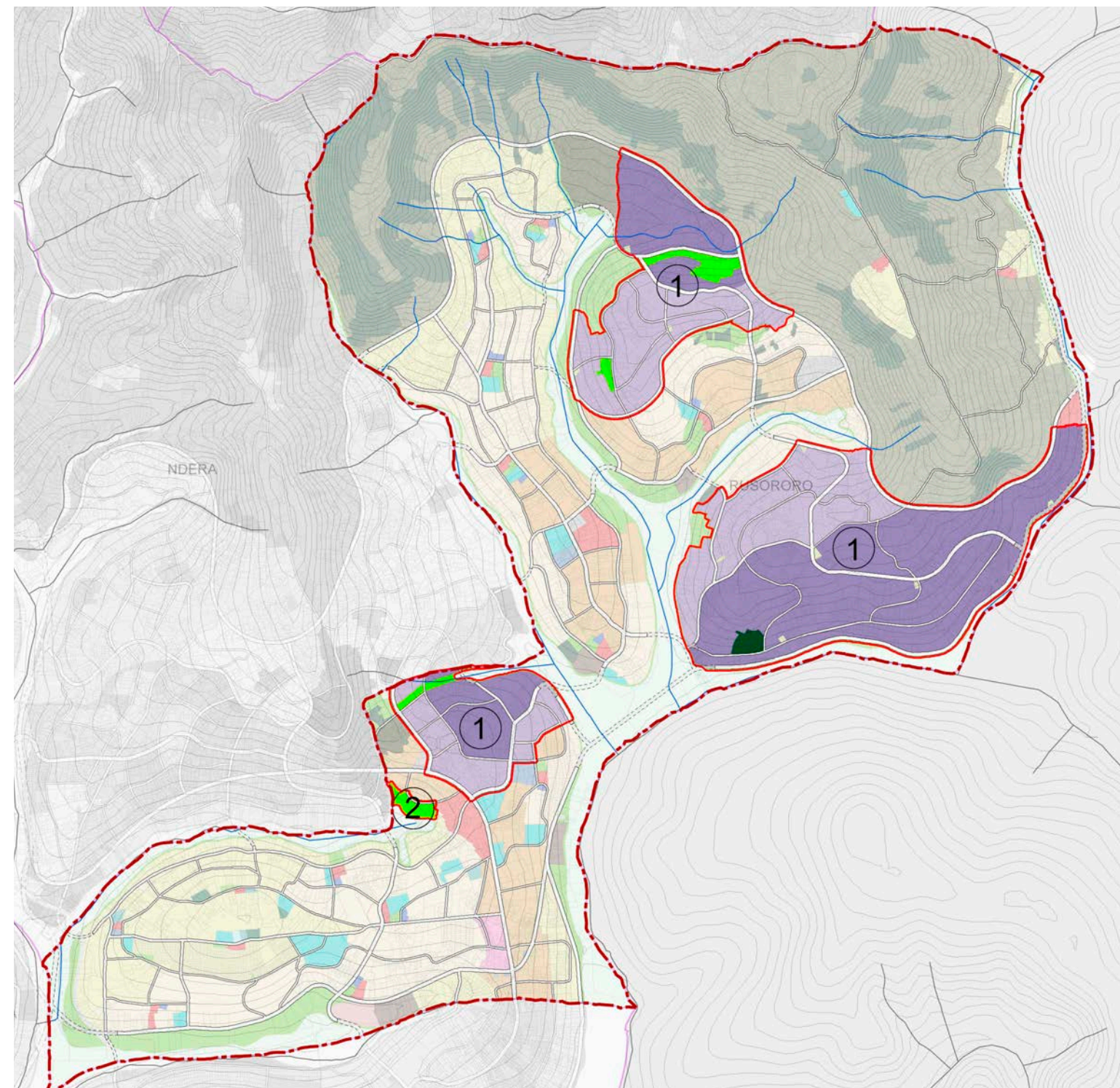


Fig.7.12 Eastern Planning Area - Proposed Key Features

8

DETAILED MASTER PLAN FOR WESTERN PLANNING AREA

This chapter presents the detailed master plan for the Western Planning Area. Based on the analysis of the existing context, opportunities and constraints, a vision and concept have been derived, to guide the development of the master planning area.

8.1 Western Planning Area - Existing Context

The Planning Area comprises of the Jali Sector alone. The total Planning area is 3758 Ha.

8.1.1 LOCATION AND CONNECTIVITY

Due to the slope constraints and less area for development, the Planning Area is considered as part of rural area. The Yanze River separates the Planning Area from the Jabana Sector in the west while the wetlands on the east separates Planning Area from the Kanyinya Sector of Nyarugenge district. The existing north-south road in the Planning area is the main connection to the southern sector of Gatsata and further to the new CBD. It extends further to the neighboring city of Ruhenger.

8.1.1 EXISTING SITE CONDITIONS

The Planning Area is largely unoccupied except for some sparse housing settlements and small public facilities along the ridge. Farming and cultivation occurs on almost 66% of the land. Majority of the farmland is utilized for subsistence agriculture. The existing population of the Planning Area of 22,000 people. The key developments in the Planning Area are two schools, a civic centre, a health facility, a few religious facilities, a commercial centre and scattered residential developments.

The gross existing population density for the Western Planning Area is approximately 5 P/ha
The Existing Context Map is illustrated in Fig.8.3 .

8.1.1 NATURAL CONTEXT

The Planning Area is surrounded by wetlands, with ridge running in the north-south direction dividing the area into two parts. The existing forest in the Planning area has dense vegetation as compared to other forests in Kigali City. Wetlands occupy 30% of the land.

The Planning Area is covered with steep slopes, 31% of area has 40% and above slope and 18.5% of the land area has slopes with 30-40% gradient. Thus about 49.5% of land needs to be protected. Most of this protected land is covered under the existing forest.

The Slope Analysis Map is illustrated in Fig.8.1.

The watershed area and drainage channels are illustrated in Fig.8.2.

3758ha
Total Planning Area

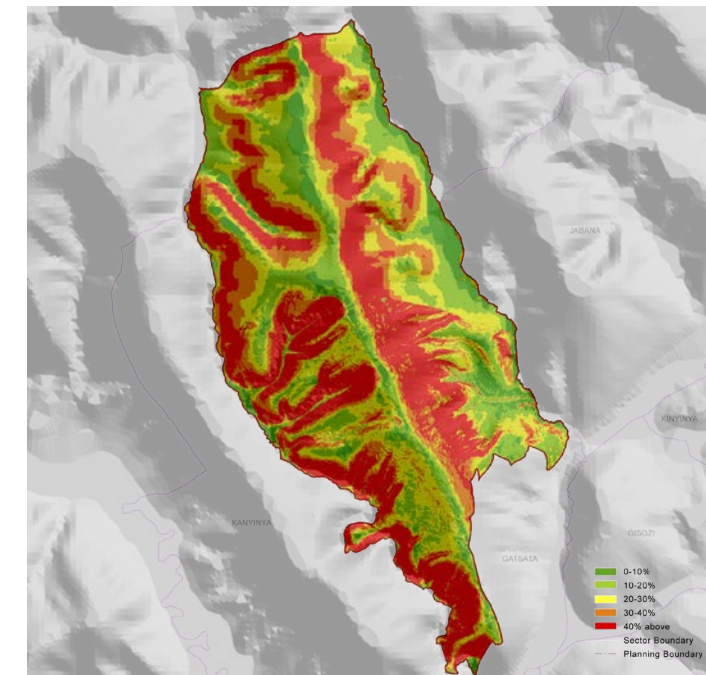
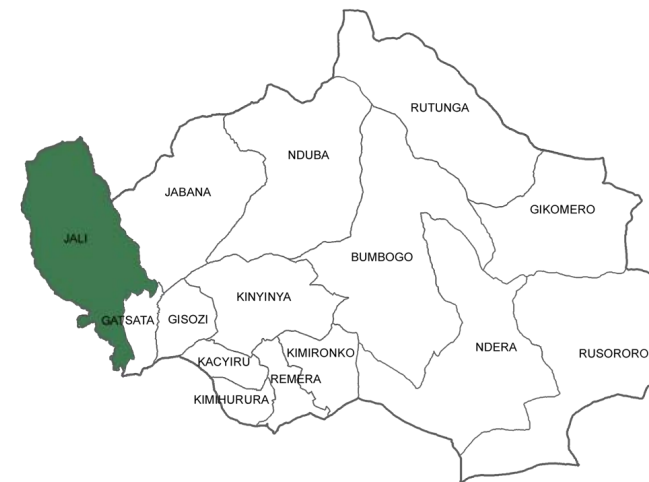
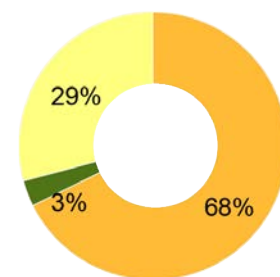


Fig.8.1 Western Planning Area - Slope Analysis

22,000
Population 2013



Natural Constraints

68%
Steep Slopes Land

29%
Developable Land

3%
Forest

5p/ha
Existing Density

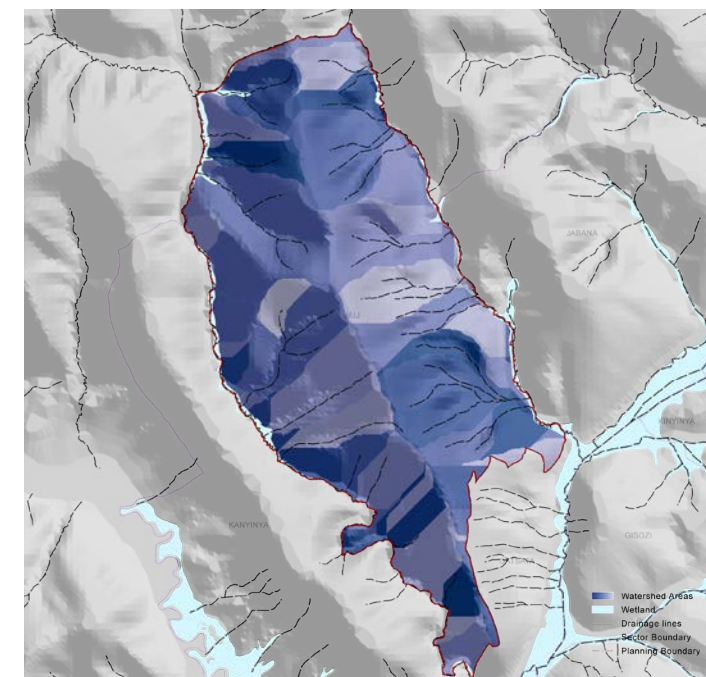


Fig.8.2 Western Planning Area - Watershed and Drainage

Table 8.1 Western Planning Area - Existing Land Use Distribution

LAND USE	DETAIL LAND USE	AREA (HA)	TOTAL AREA (HA)
Residential	Low Rise Residential	57	57
Commercial	Commercial General	3	3
Public Facilities	Educational	7	20
	Religious Facilities	1	
	Health Facilities	3	
	Civic Facilities	9	
Nature Area	Existing Forest	1128	1128
Agriculture	Farmland	1246	2374
	Plantation	1238	
Water Bodies	Rivers	6	6
Infrastructure	Transportation	41	47
	Utilities	6	
	Vacant Land	4	4
	Total	3750	

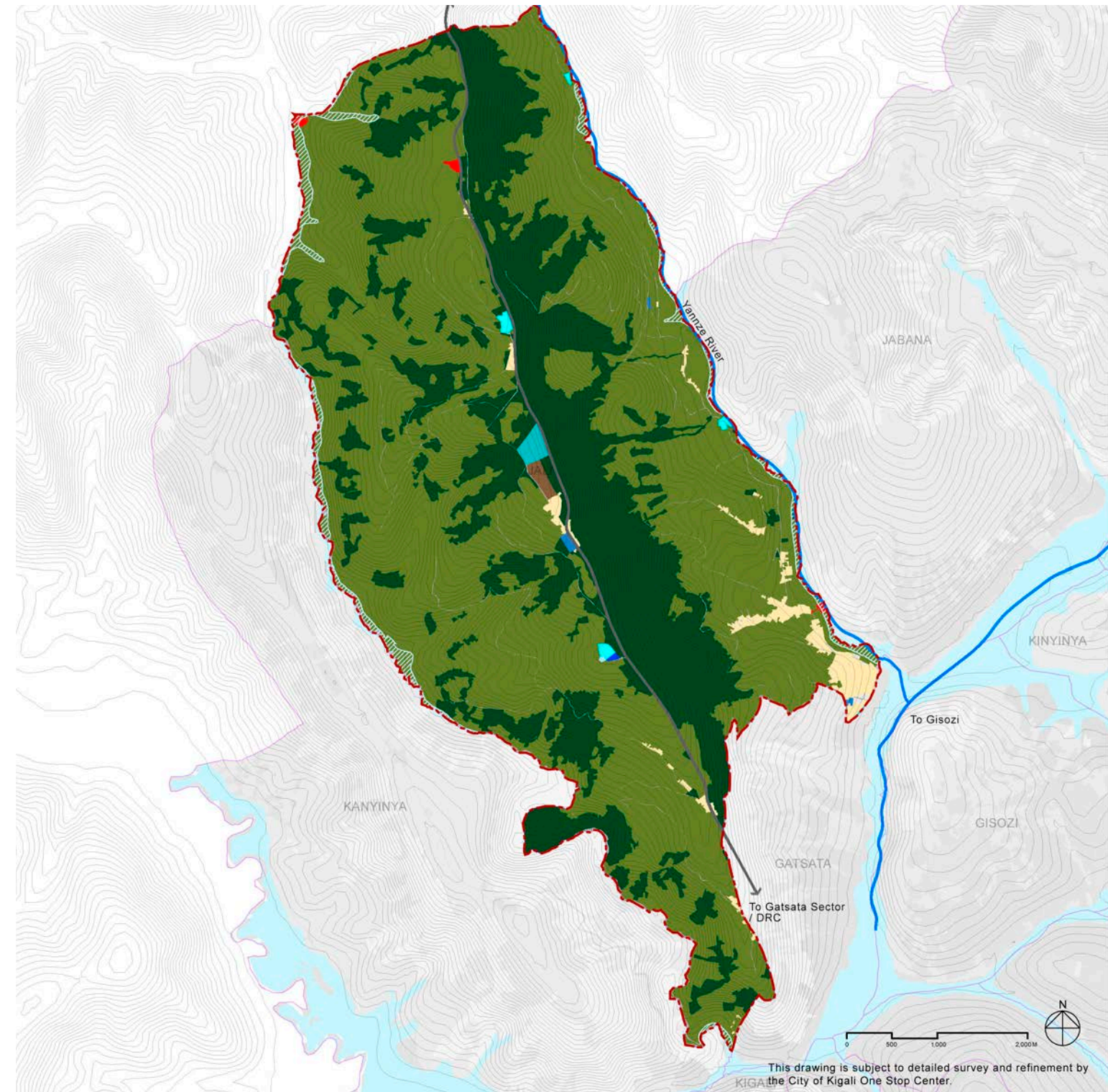
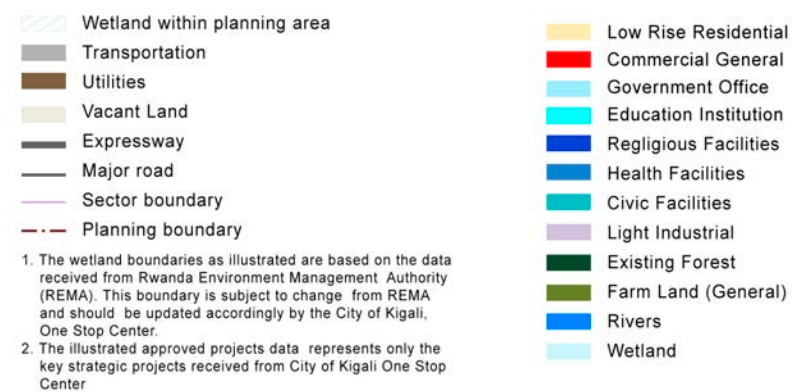


Fig.8.3 Western Planning Area - Existing Land Use and Context Map

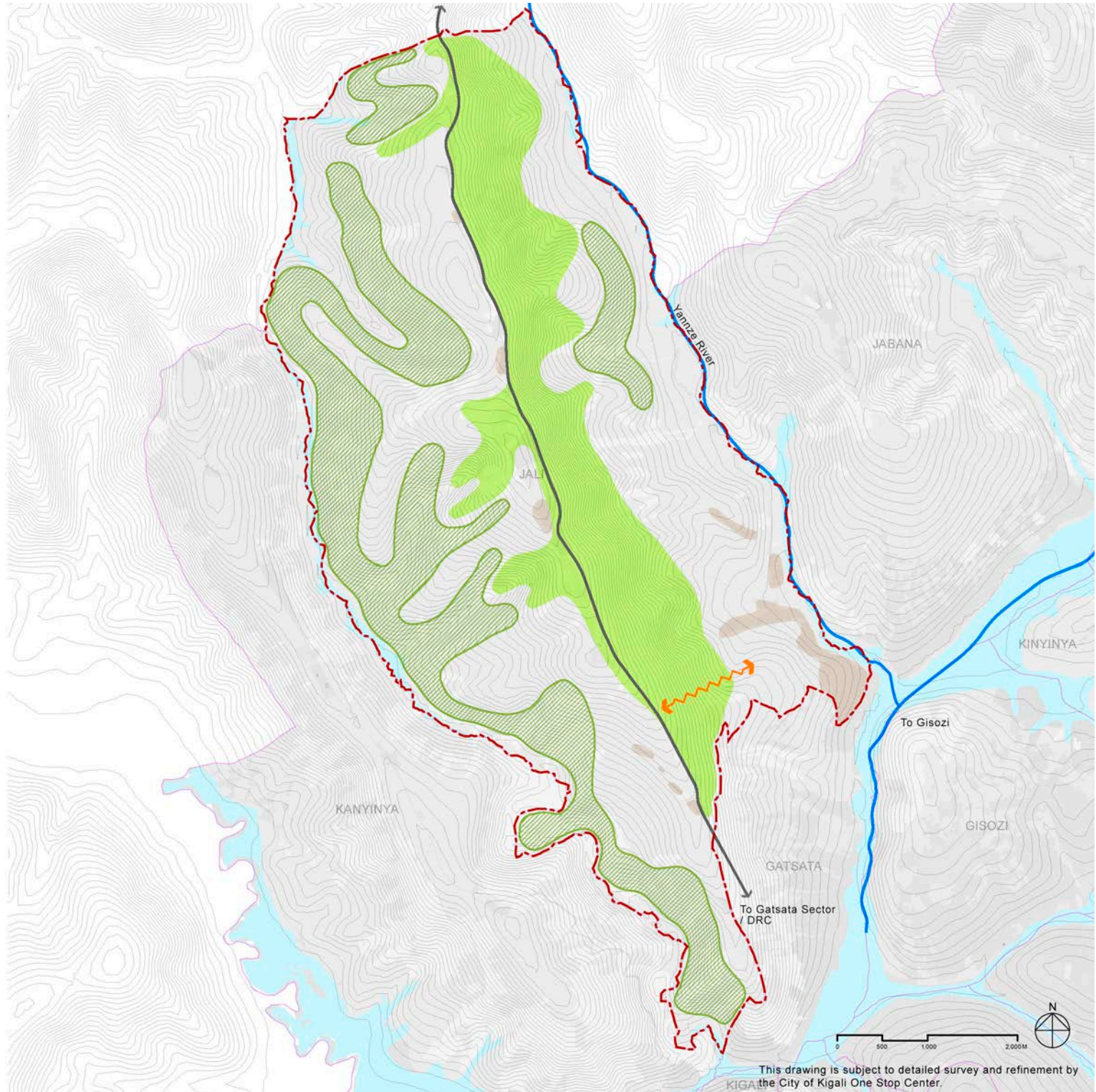


Fig.8.4 Western Planning Area - Constraints Map

8.2 Western Planning Area - Opportunities & Constraints

8.1.1 CONSTRAINTS

Constraints identified within the Planning area are based on existing context analysis.

The constraints are as follows:

- Almost half of the planning area is undevelopable due to natural constraints.
- Sparse residential development is a constrain for efficient infrastructure provision.
- There are few commercial centres within residential clusters.
- The only existing connection is a north-south connection, which creates the need for more connections such as connections to Kanyinya Sector as well as to Jabana Sector.
- Existing Forests need to be retained. This is a constrain for the provisions of Agricultural land in the Planning Area.

The constraints are illustrated in Fig.8.4.

8.1.1 OPPORTUNITIES

- Major road

Sector Boundary

Planning Boundary

Forest conservation

Steep slopes 40% that need to be protected to prevent soil erosion

Steep slopes and wetlands restrict connectivity and impose high infrastructure costs

Scattered residential development

Wetland

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Opportunities identified within the Planning Area are based on existing context analysis.

The opportunities are as follows:

- There is an opportunity to develop recreational activities on the 50% of the land that is protected due to natural constraints.
- There is an opportunity to develop compact clusters of residential developments on flatter areas of the ridge along the north-south rural collector which connects the planning area to the CBD.
- There is also an opportunity for residential development along flatter areas along the wetlands
- The Planning Area has the potential to develop value added agriculture and thus to capitalize on the land as 66% of area is categorised as agricultural use.
- There is an opportunity to develop tourist attractions within the Planning Area such as forest resorts, adventure forest sports, etc which could be complementary to the proposed tourist destinations of Kanyinya Sector within Nyarugenge District. It will also create new employment opportunities.
- There is an opportunity to develop existing public facilities in order to support

the future residential development.

- There is an opportunity to develop, new parks and open spaces, utilizing the drainage and steep slopes to create a continuous green network.

These opportunities are illustrated in Fig.8.5.

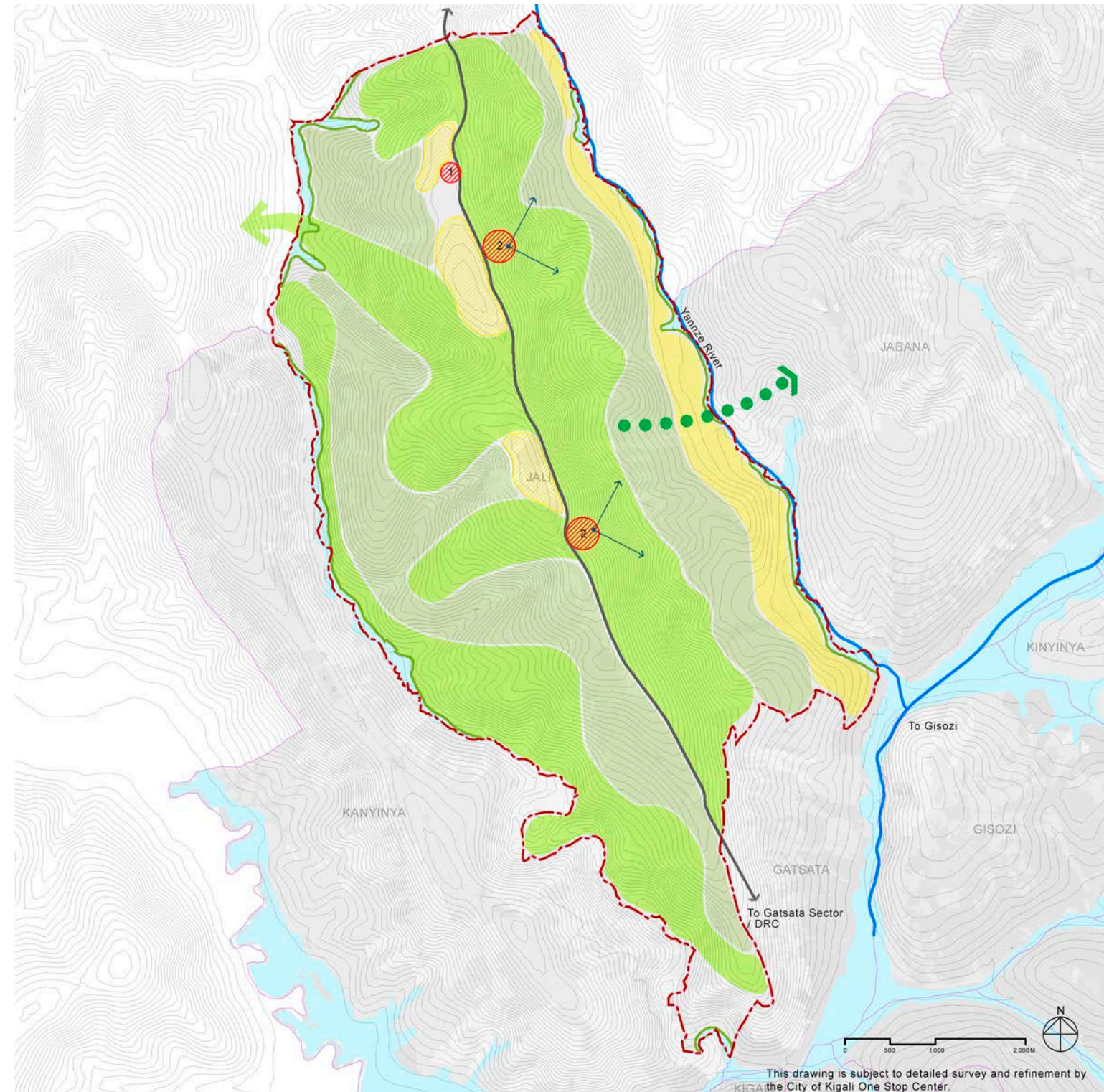
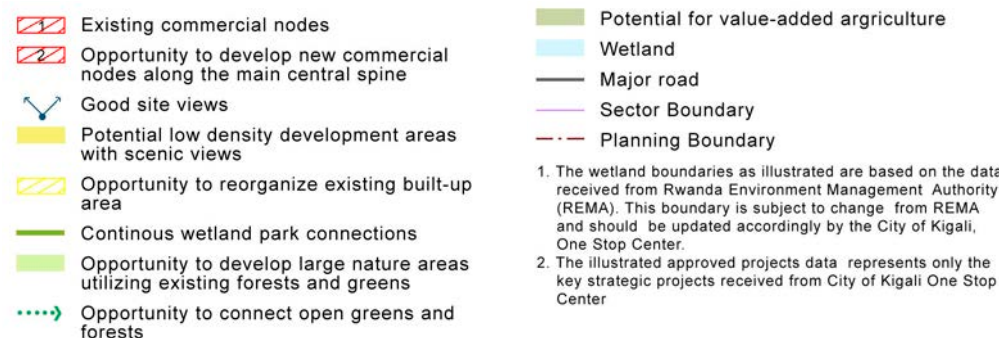


Fig.8.5 Western Planning Area - Opportunities Map

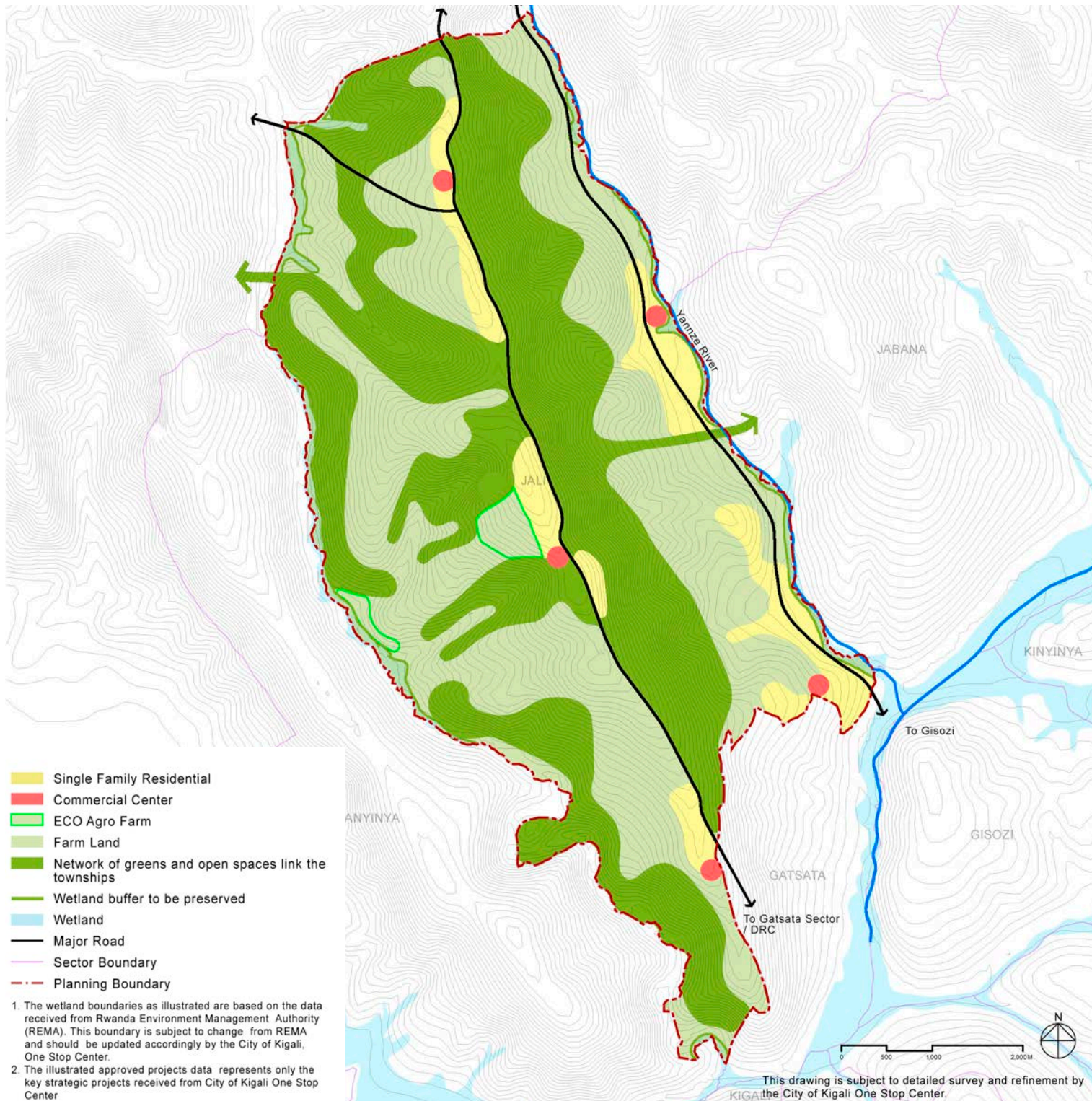


Fig.8.6 Western Planning Area - Concept Plan

8.3 Western Planning Area-Proposed Vision

'An Adventure Get-Away'

The Planning Area is envisioned as a scenic natural area which will act as a recreational getaway from the dense urban development of the city. It would also become a tourist attraction offering resort and adventure sports activities which leverage on its location as well as scenic views and pleasant climate.

The Area would also offer residential opportunities to live within natural settings.

8.4 Western Planning Area -Proposed Concept

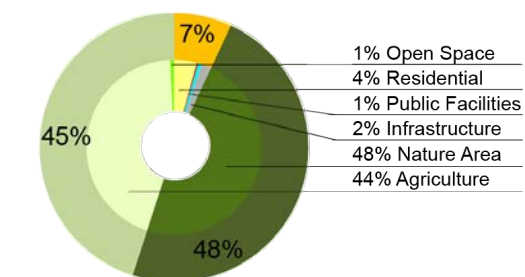
Based on the existing context, opportunities and constraints as well as the proposed vision, a development concept has been proposed for the Planning Area.

The key proposals of the concept plan are as follows:

- To develop forest land as well as the non-developable steep slopes along the ridge into a continuous linear park.
- To develop an ECO energy agro farm, which will be an opportunity for the City to explore with the various renewable energy methods.
- Development of tourist related activities within compact residential clusters along ridge. It will also provide a base for trekkers.
- To encourage value-added an high yield agriculture.

The concept is illustrated in Fig.8.6.

24,000
Projected Population Year X



Proposed Land Distribution

6p/ha
Proposed Density

48%
Total Nature Area

45%
Total Open Spaces

7%
Total Urbanized Area



8.5 Western Planning Area-Proposed Land Use Plan

The Land Use Plan aims to provide the information on the location, distribution and character of the future Land Uses within the Planning Area.

The key strategies proposed in the Land Use Plan are:

- To strengthen the existing north-south corridor by developing residential clusters as well as commercial uses such as hotels and resorts along it.
- To redevelop and rejuvenate along the edge of the city, single family residential neighborhoods are proposed
- To propose cell centres that integrate the existing public facilities which supports the increased residential population.
- To allow for recreational development within protected areas of the Planning Area. Thus Mount Jali Ridge Park along the ridge is proposed. Low impact developments related to tourism activities such as resort and active recreation facilities are proposed within the Ridge Park.
- To safeguard the areas of natural drainage courses as ecological corridors.

The projected population for the western planning area is approximately 30,000 people by Year X.

The proposed Land uses are illustrated in Fig.8.7 and Table 8.2.

8.1.6 WESTERN PLANNING AREA-PROPOSED RESIDENTIAL USE PLAN

- The proposed residential plan for Jali intends to reinforce the concept of imudugudu. Thus in the plan the existing residential development are consolidated into residential clusters. This facilitates the infrastructure development.

- The areas of relatively gentler slopes within a slope gradient of 0- 30%, along the ridges and wetlands have been zoned for single family low rise developments.
- These new residential clusters, some of which are proposed to be developed by rezoning the imudugudu sites are proposed to provide approximately 5,500 dwelling units.

The Residential Use Plan is illustrated in Fig.8.8.

8.1.6 WESTERN PLANNING AREA-PROPOSED COMMERCIAL USE PLAN

- Approximately 44.3% of land is proposed as farmland, which will be the main employment generator in the Planning Area.
- Commercial sites in the Imudugudu are proposed to be re-utilized for the development of the new cell centres.
- 6 new cell centres of approximately 1.2 ha each are located within walking distance of 500 m from the surrounding residential development.
- These centres comprise of cell office and small scale retail shops that meet the daily needs of the residents as well act as a health post.
- Hotel and resorts are proposed along the ridge supporting the Mount Jali Ridge Park activities. The resorts and with the necessary support facilities will help generate employment and new business within the Planning Area.

The Commercial Use Plan is illustrated in Fig.8.9

8.1.6 WESTERN PLANNING AREA-PROPOSED PUBLIC FACILITIES

- The existing public facilities in the Planning Area have been retained and additional facilities catering the proposed population have been added.

- Public facilities such as health centres, community halls and churches, etc are integrated with the cell centre.
- An existing area of approximately 9ha is maintained for the infrastructure and utilities.

The Public Facilities Plan is illustrated in Fig.8.10.

8.1.6 WESTERN PLANNING AREA-PROPOSED GREEN AND OPEN SPACES PLAN

- The Mount Jali Ridge park is proposed along the ridge and steep slopes as a location for resort, camping and adventure sport activities
- An ECO energy farm is proposed in the north of Jali along the ridge. These farmlands could be utilized for solar installation, wind farms, waste for biogas production, etc. and other renewable resources.
- Areas along the natural drains and along wetlands are protected as ecological corridors. These corridors are a part of the storm water management system and are part of the larger green connector network proposed for the Gasabo District.

The Green and Open Spaces Plan is illustrated in Fig.8.11

Table 8.2 Western Planning Area - Proposed Land use Distribution

BROAD LAND USE	DETAIL LAND USE	AREA (HA)	TOTAL AREA (HA)
Residential	Single family Residential	142	142
Commercial	Commercial General	9	9
Public facilities	Government Office	1	27
	Educational	10	
	Religious Facilities	1	
	Health Facilities	3	
	Civic Facilities	12	1796
Nature Area	Existing Forest	1119	
	Afforestation	593	
	Wetland	84	
Agriculture	Farmland	1681	1681
Open Space	Open Space and Park	33	33
Infrastructure	Transportation	51	57
	Utilities	6	
	Total	3750	

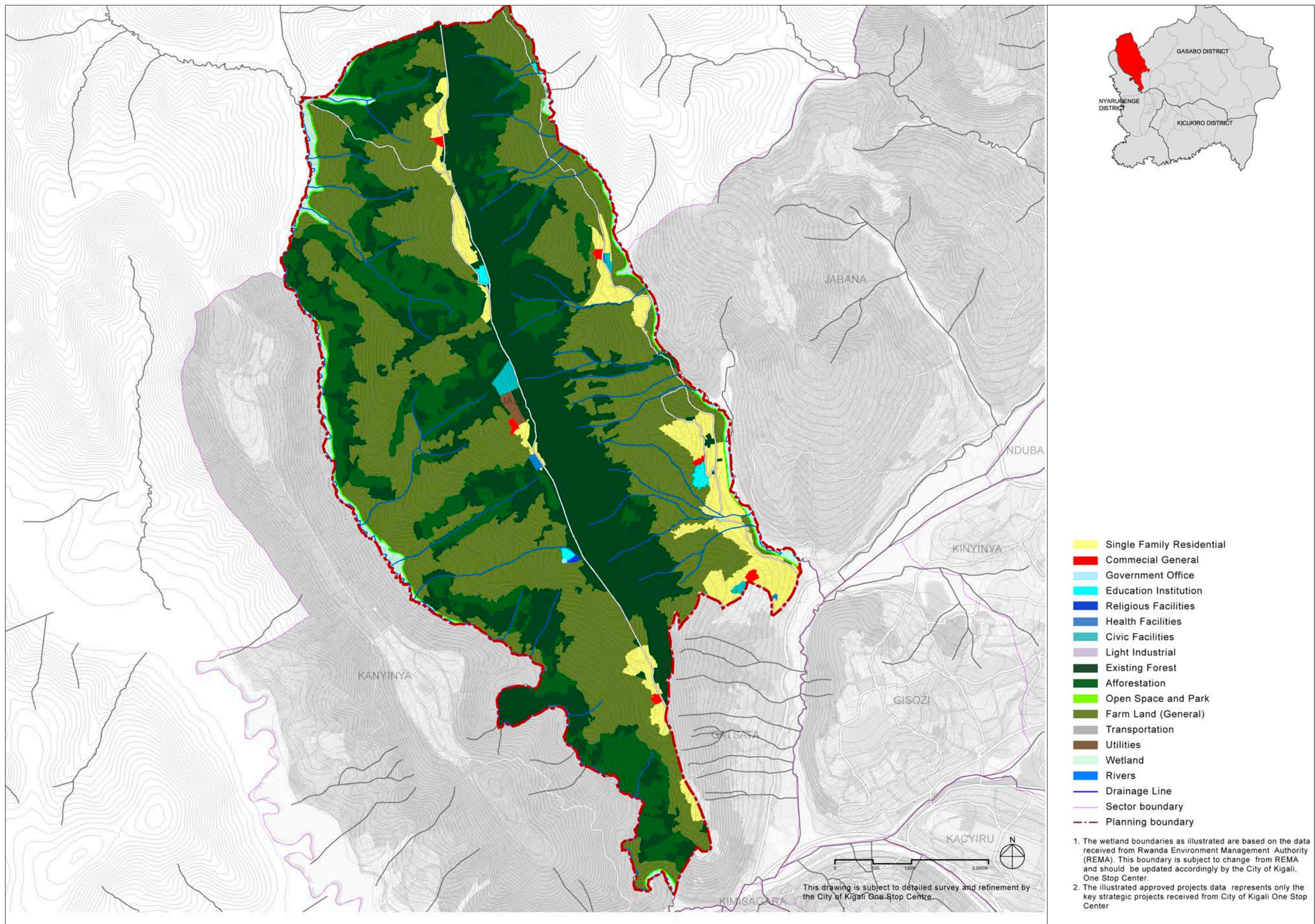


Fig.8.7 Western Planning Area- Proposed Land Use Plan

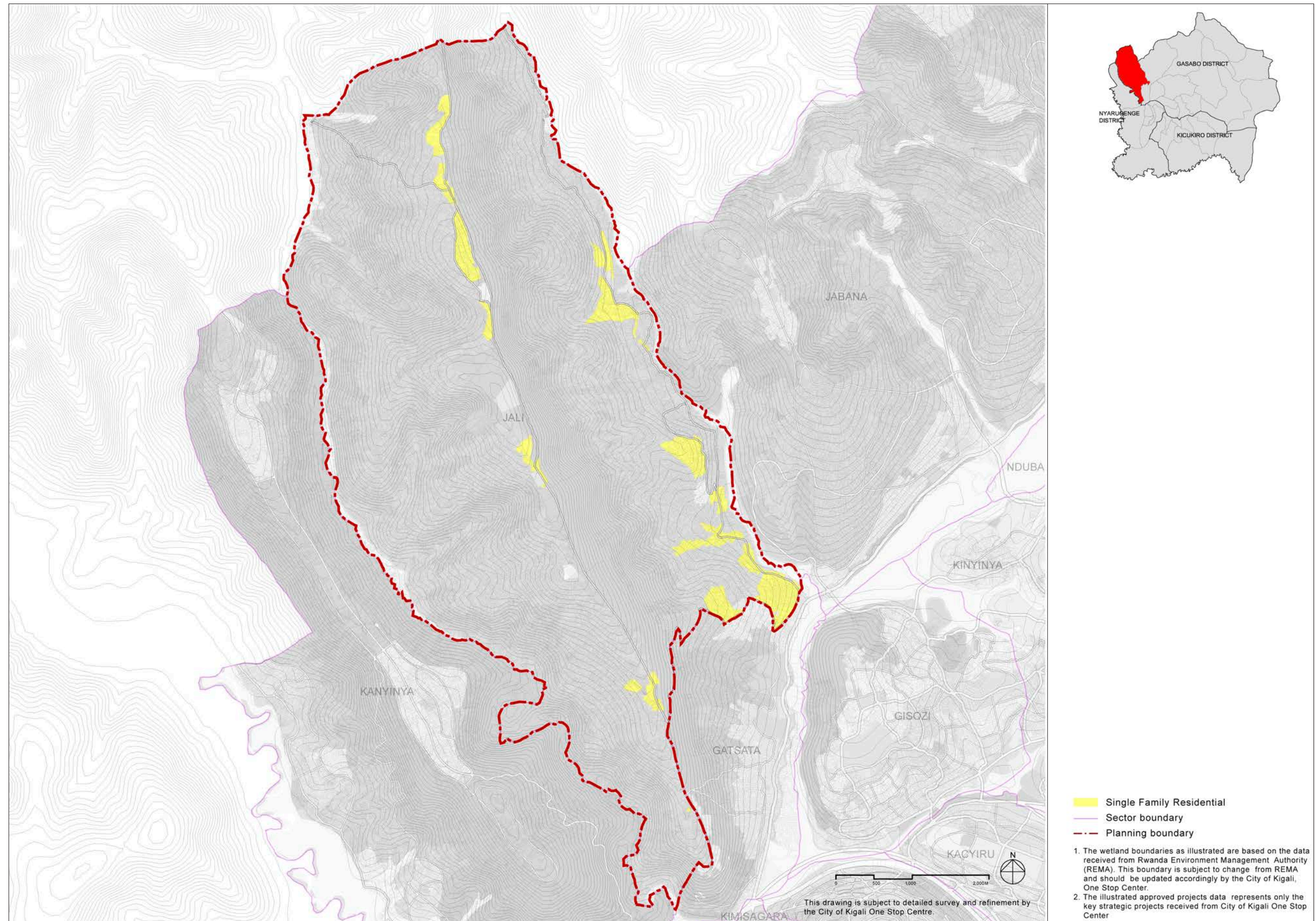


Fig.8.8 Western Planning Area- Proposed Residential Use Plan

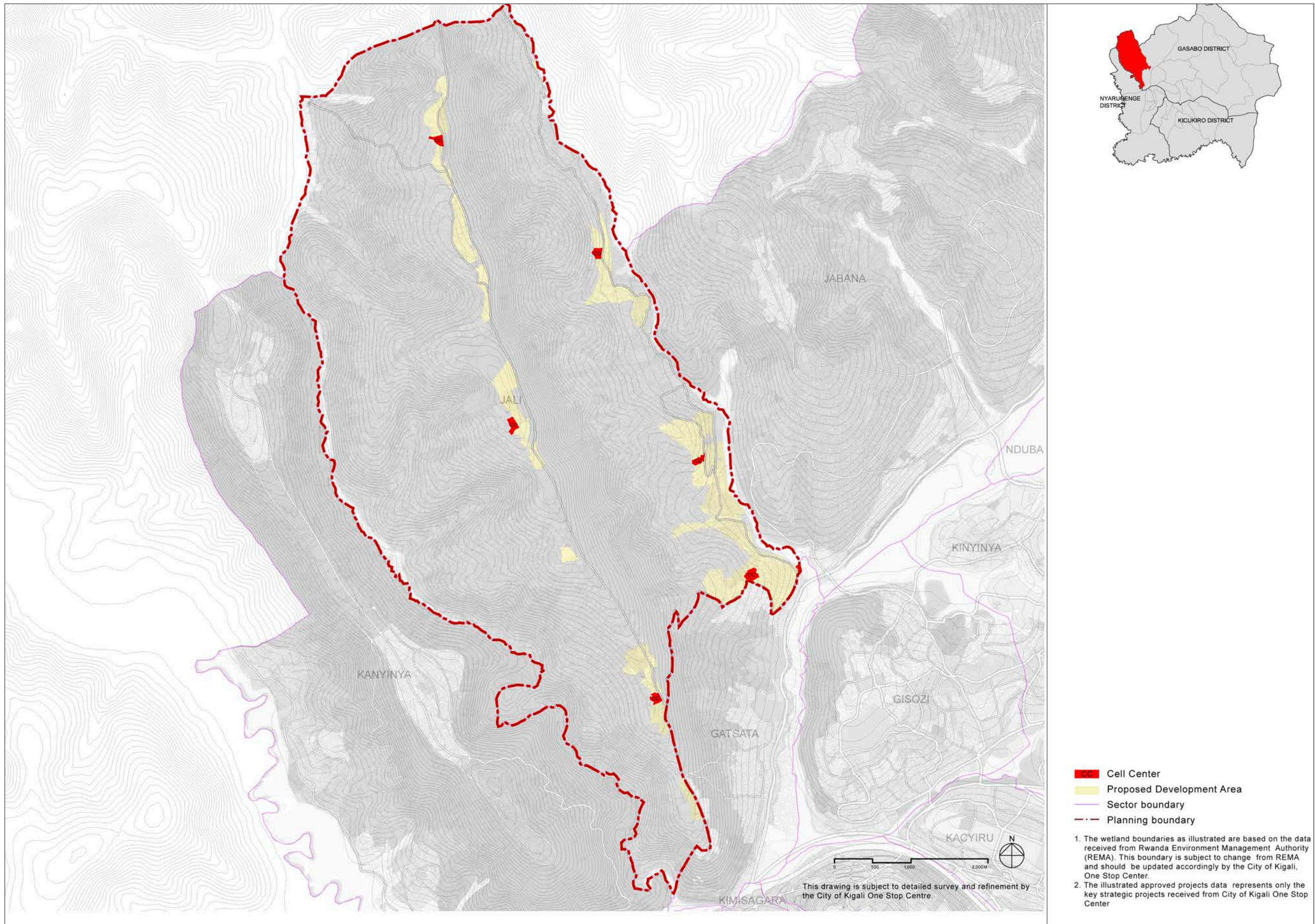


Fig.8.9 Western Planning Area- Proposed Commercial Use Plan

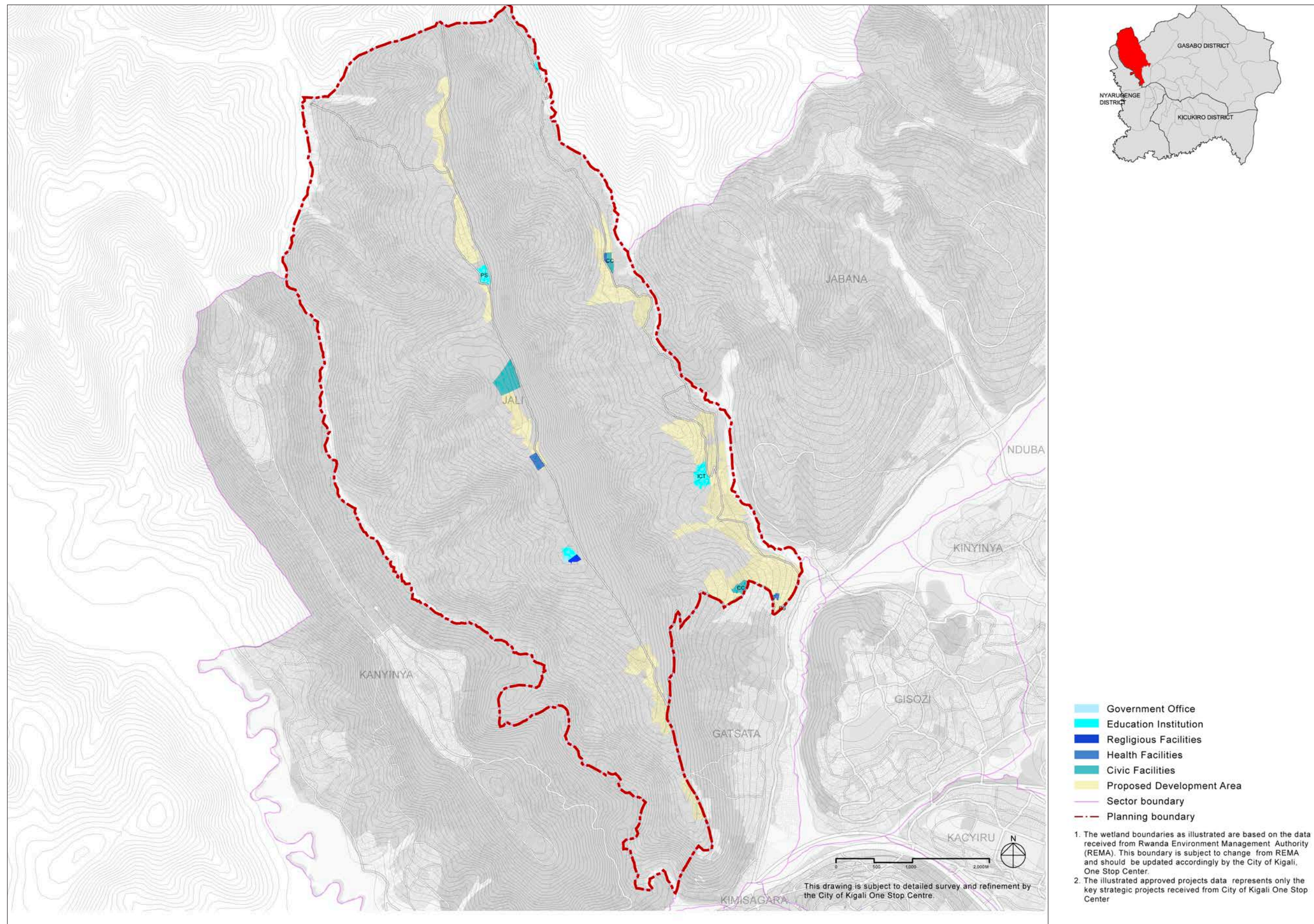


Fig.8.10 Western Planning Area- Proposed Public Facilities Plan

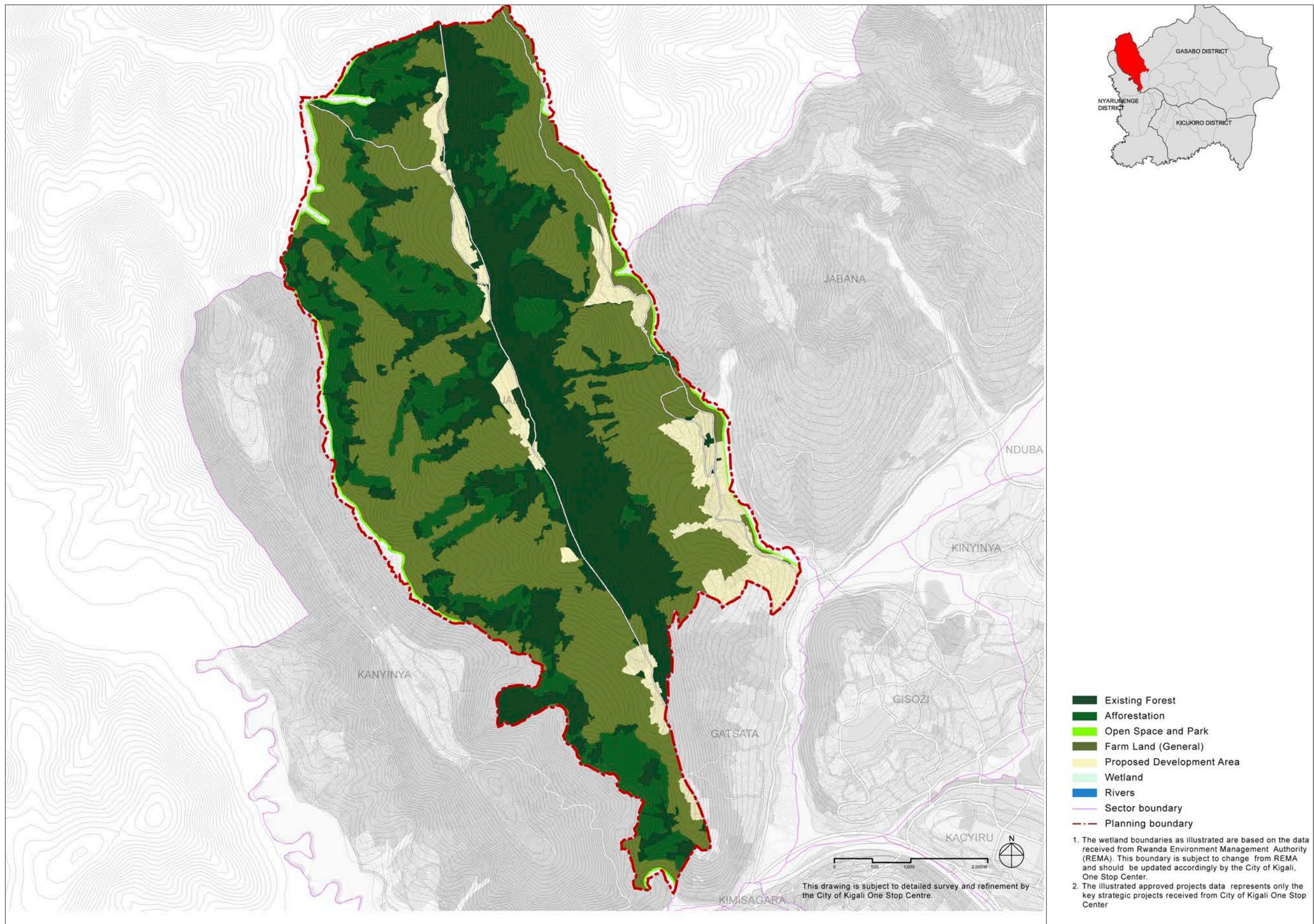


Fig.8.11 Western Planning Area- Proposed Green and Open Space Plan

8.6 Western Planning Area-Proposed Key Features plan

The Planning Area is envisioned as a recreational get-away from the dense urban areas of Kigali City.

As part of the Proposed Land Use Plan, two areas are identified as key features of the planning area. Mount Jali Ridge Park and the ECO energy farms are the recreational retreats of the Planning Area.

1. MOUNT JALI RIDGE PARK

The Ridge Park is a linear park along the main north-south access of the Planning Area and along the ridge. Activities like woodland walks, climbing, bike-rides, horse rides, camping would bring people closer to nature. It would also provide an opportunity for eco-learning through the proposed Nature Interpretation Centre within the park.

As the new nature touristic destination, Mount Jali would offer jobs to the residents through creating the need for tourist accommodation, food and entertainment. Thus the residential clusters adjoining the park would act as 'park villages'. These developments would be the ideal base for the trekkers and other tourists.

2. ECO ENERGY FARM

The ECO energy farm would be a new opportunity for the City to explore various renewable energy methods.

Solar cells, wind farms, growing of fuel-crops, etc could be some of the renewable energy source activities within the ECO farm.

Multi-use of the same land in terms of food production as well as energy production is also a part of the eco-energy farm project. Wind Farming and Solar Cell installations could increase efficiency. For example, wind turbines could be installed alongside crops or even on animal grazing land. Turbines could generate enough energy to power the farm, and even produce extra energy to supply to the imudugudu.

Presently, there is a solar panel installation on the ridge. Additional solar panels could be floated on marshy areas, or placed on the land which is unfit for cultivation.

Thus, the ECO energy farm would be an innovation bed for the City of Kigali. The intention of the ECO farm is to motivate better utilization of the farmlands which form major percentage of City.

The key features are illustrated in Fig.8.12

- ① Mount Jali Ridge Park
- ② ECO Energy Farm

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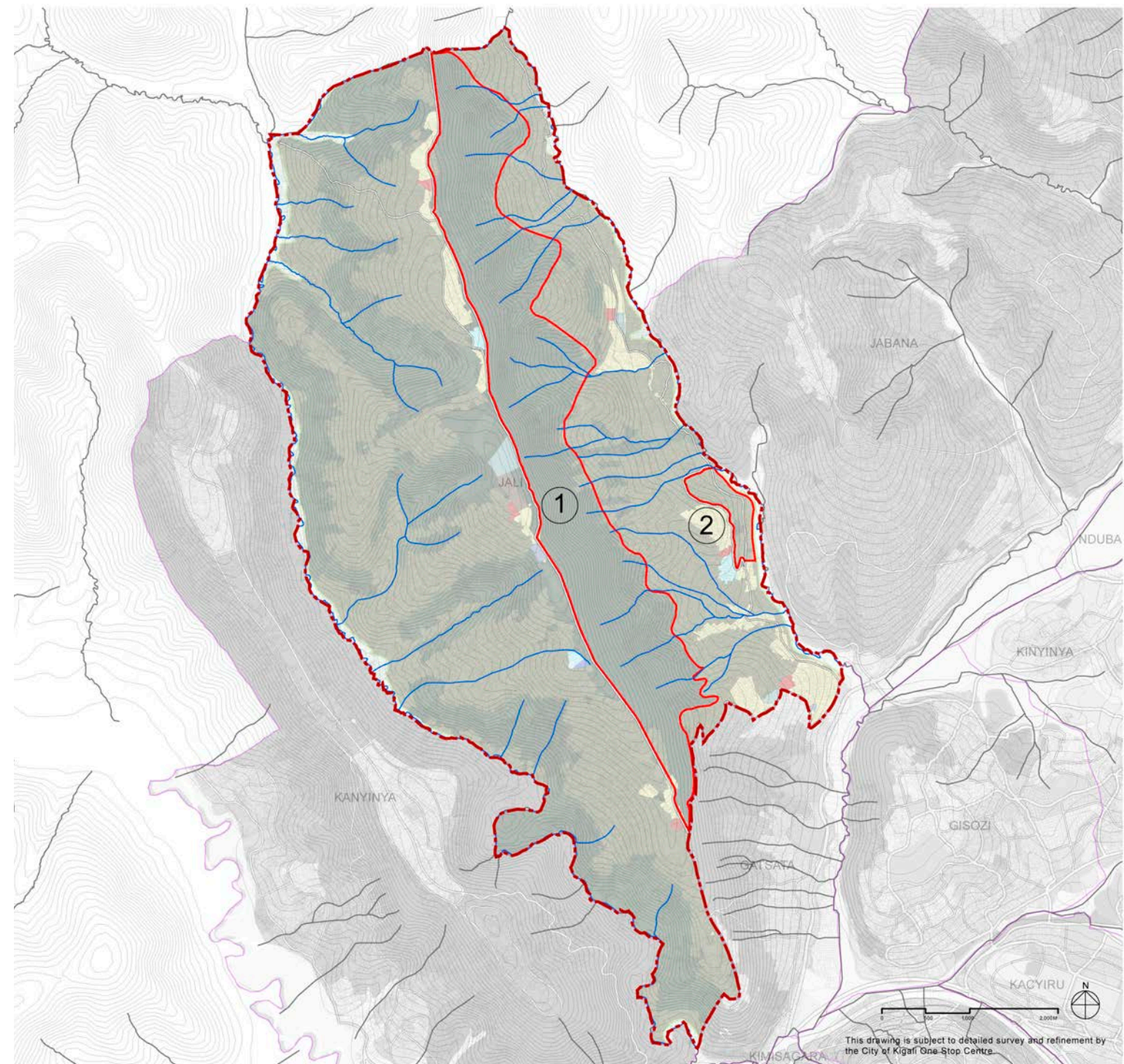


Fig.8.12 Western Planning Area- Key Feature Plan

9

DETAILED MASTER PLAN FOR NORTH WESTERN PLANNING AREA

This chapter presents the detailed Master Plan for the North-Western Planning Area. Based on the analysis of the existing context, opportunities and constraints, a vision and concept have been derived, to guide the development of the Master Planning area.

9.1 North Western Planning Area - Existing Context

The North Western Planning Area comprises of Jabana Sector alone. The total planning area is 3651 ha.

9.1.1 LOCATION AND CONNECTIVITY

The Planning Area is considered part of the rural areas of the Gasabo District. North Western Planning Area has an island-like setting as it is separated by wetlands on three sides and its fourth edge being the Kigali City limit. The Yanze River separates Planning Area from the Jali Sector in the west while the Nyabugogo River separates the Planning Area from Nduba Kinyinya and Gisozi Sectors of Gasabo District.

The existing north-south road at the edge of Planning Area forms an important connection to Byumba city and the CBD at Muhima. There are two important junctions, one connecting Nduba and other connecting the Kinyinya Sector. These southern connections help Planning Area to be well connected to rest of the City.

9.1.2 EXISTING SITE CONDITIONS

The development in Planning area is mostly concentrated at the southern edge along the wetland. This development occurs close to Nduba and Kinyinya Planning area. Farming and cultivation occurs on almost 73% of the land. Majority of the farmland is utilized for subsistence agriculture. The existing population of the planning area is about 33,00 people (2013).

The gross existing population density for the Planning Area is approximately 9 P/ha. The key developments in Planning Area are a few heavy and light industries, a fuel truck depot, a quarry and a commercial centre. The other development includes public facilities such as schools, health centres and religious facilities.

The existing context is illustrated in Fig.9.3

9.1.3 NATURAL CONSTRAINTS

The existing forests is spread over the planning area in clusters occupying 16% of the land. The Planning Area has maximum of flatter surface, thus providing almost 82% of land as developable. Only 17% of the planning area is covered with steep slopes and is protected.

As mentioned, the planning area is surrounded by the wetland on three edges. Presently many industries are located in the southern wetlands which will need to be relocated.

The slope analysis is illustrated in Fig.9.1.

The watershed map and drainage channels are illustrated in Fig.9.2.

3,651ha
Total Planning Area

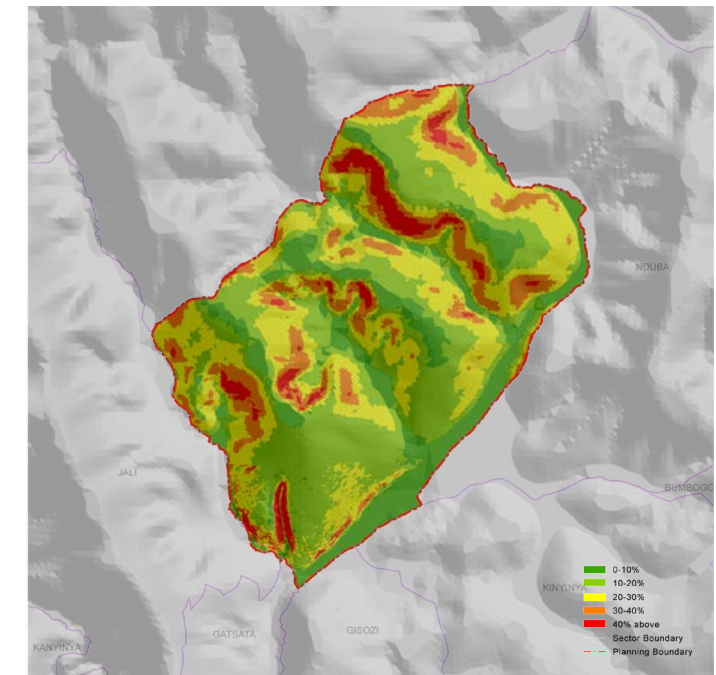
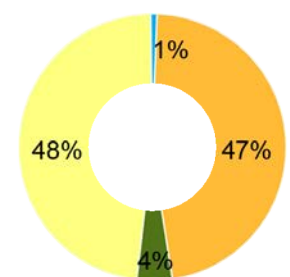


Fig.9.1 North Western Planning Area - Slope Analysis

33,000
Population 2013



Natural Constraints

9p/ha
Existing Density

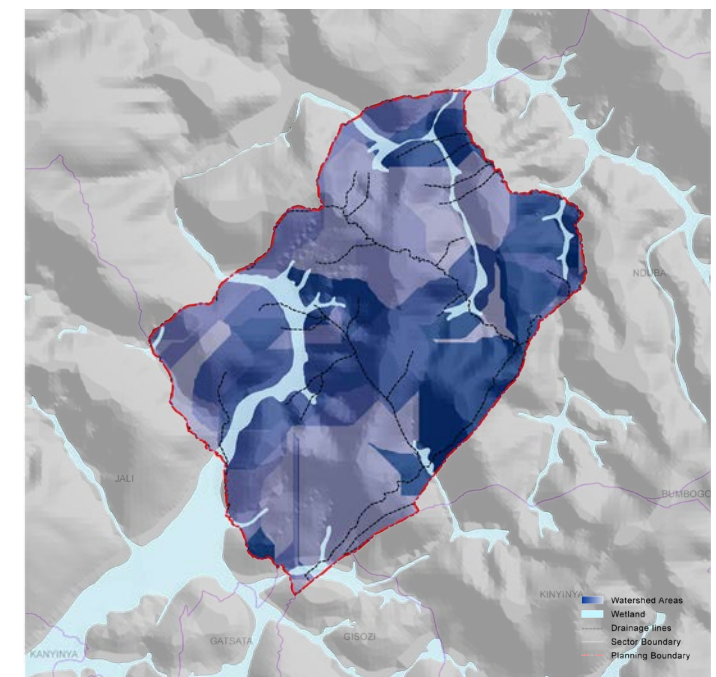


Fig.9.2 North Western Planning Area - Watershed and Drainage

Table 9.1 North Western Planning Area- Existing Land Use Distribution

BROAD LAND USE	DETAIL LAND USE	AREA (HA)	TOTAL AREA (HA)
Residential	Low Rise Residential	156	156
Commercial	Commercial General	2	3
	Hotel	1	
Public facilities	Educational	16	22
	Religious Facilities	3	
	Health Facilities	3	
Industries	Light Industrial	1	16
	Heavy Industrial	14	
	Warehousing	2	
Nature Area	Existing Forest	609	632
	Wetland	23	
Agriculture	Farmland	1697	2677
	Plantation	980	
Water Bodies	Rivers	6	6
Infrastructure	Transportation	75	75
Special Use	Utilities	9	35
	Quarry Land	26	
	Vacant Land	18	
	Total	3643	

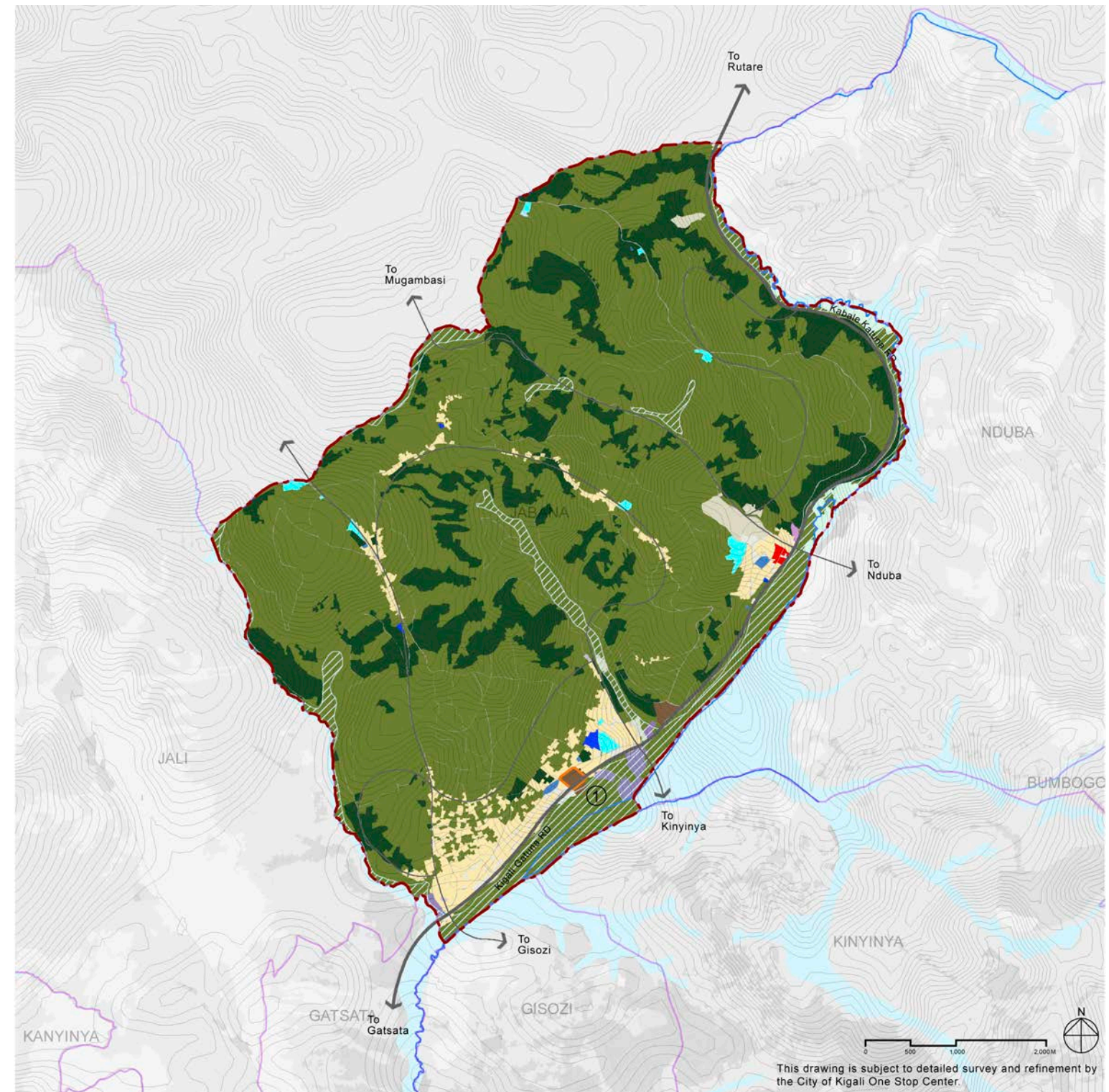


Fig.9.3 North Western Planning Area - Existing Land Use and Context Map

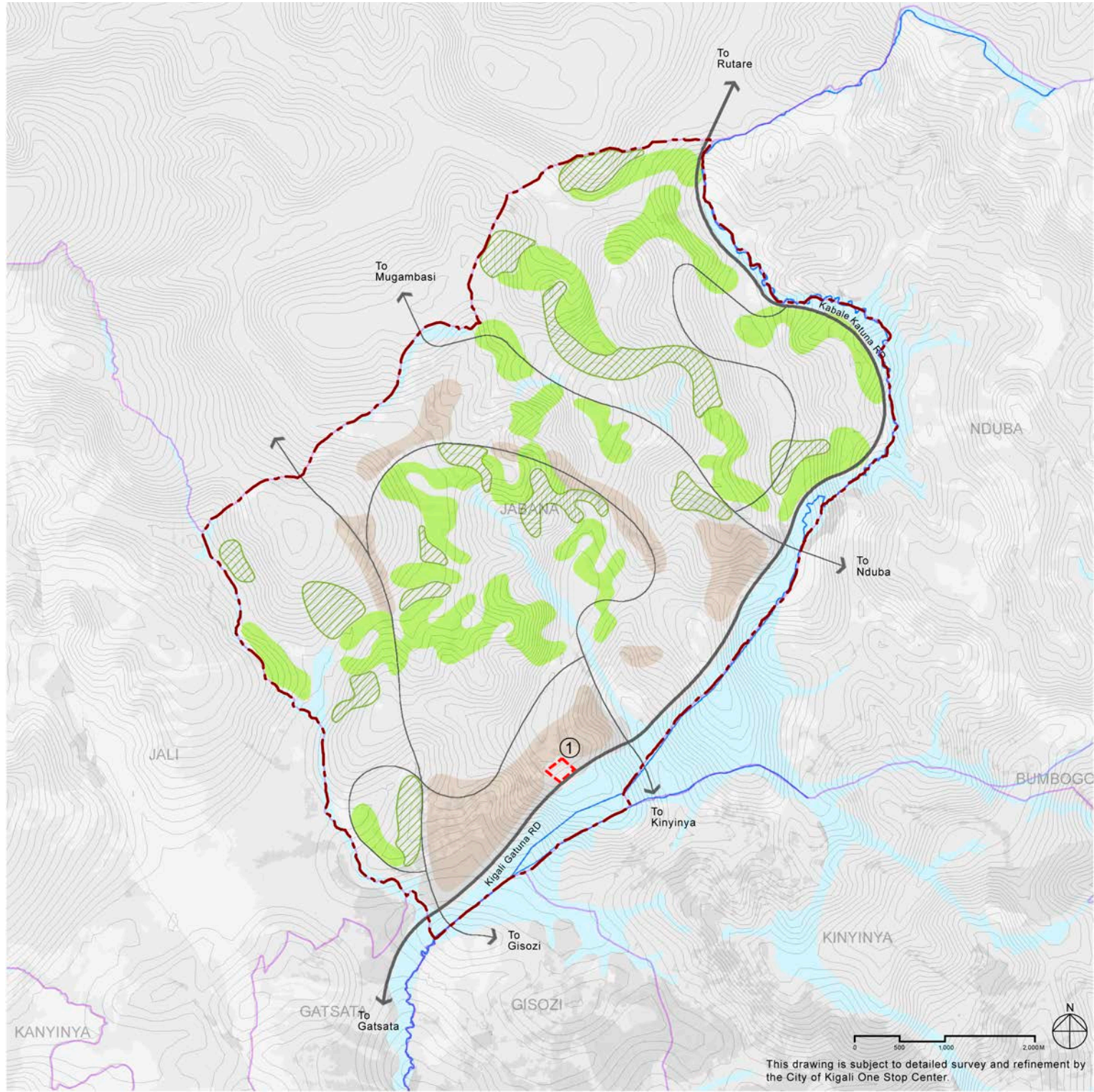


Fig.9.4 North Western Planning Area - Constraints Map

9.2 North Western Planning Area - Opportunities & Constraints

9.1.4 CONSTRAINTS

Constraints identified within the Planning Area are based on the existing context analysis.

The constraints are as follows:

- Sparse residential development , creating strain on existing infrastructure.
- Existing forest and wetlands need to be protected.
- There is lack of continuity within existing roads.
- There is lack of commercial centres within residential clusters.
- Some Industries are located in the Wetlands and will need to be relocated.

The constraints are illustrated in Fig.9.4

- Approved Projects
① Truck Fuel Depot
Forest conservation
Steep slopes that need to be protected
Scattered residential development
Wetland
Major road
Sector Boundary
--- Planning Boundary
1. The wetland boundaries as illustrated are based on the data received from Rwanda Environment Management Authority (REMA). This boundary is subject to change from REMA and should be updated accordingly by the City of Kigali, One Stop Center.
2. The illustrated approved projects data represents only the key strategic projects received from City of Kigali One Stop Center

9.1.5 OPPORTUNITIES

Opportunities identified within the Planning area are based on the existing context analysis.

The opportunities are as follows:

- There is an opportunity to develop an Industrial Area in the Planning Area, as 19% of the area is relatively flat lands (slope gradient 0-10%)
- The potential of the industrial development could be explored along the route connecting Uganda/ Byumba and the Kigali CBD. This will avoid buildup of heavy traffic within the city.
- There is an opportunity to re-develop and rejuvenate the existing residential developments along southern edge.
- The Planning Area has the potential to develop value added agriculture and thus to capitalize on the land as 46% of area is under agricultural use.
- There is an opportunity to develop on

the existing public facilities in order to support future residential developments.

- There is potential for residential development along flatter areas in the northern planning area.
- Another opportunity is to develop eco-corridor, which utilises the natural drainage channels and steep slopes to create a continuous green network.

These opportunities are illustrated in Fig.9.5

- Existing drainage route
- Opportunity to reorganize existing built-up area
- Potential areas for industrial development in Jabana in line with the proposed Broad Land Use
- Continuous wetland park connections
- Opportunity to develop large nature areas utilizing existing forests and greens
- Potential for value-added agriculture
- Wetland

- Major road
- Sector Boundary
- Planning Boundary

1. The wetland boundaries as illustrated are based on the data received from Rwanda Environment Management Authority (REMA). This boundary is subject to change from REMA and should be updated accordingly by the City of Kigali, One Stop Center.
2. The illustrated approved projects data represents only the key strategic projects received from City of Kigali One Stop Center

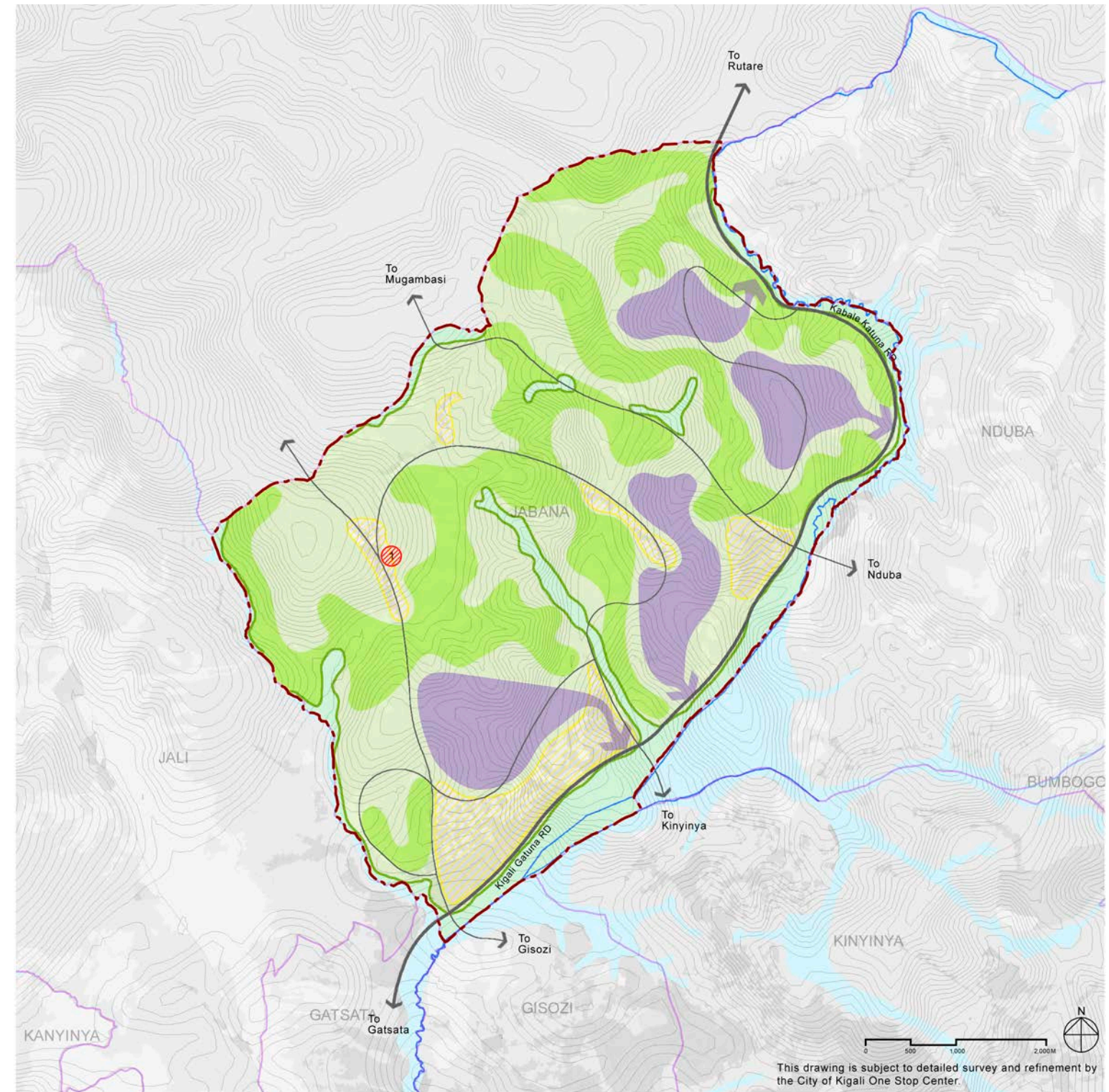


Fig.9.5 North Western Planning Area - Opportunities Map

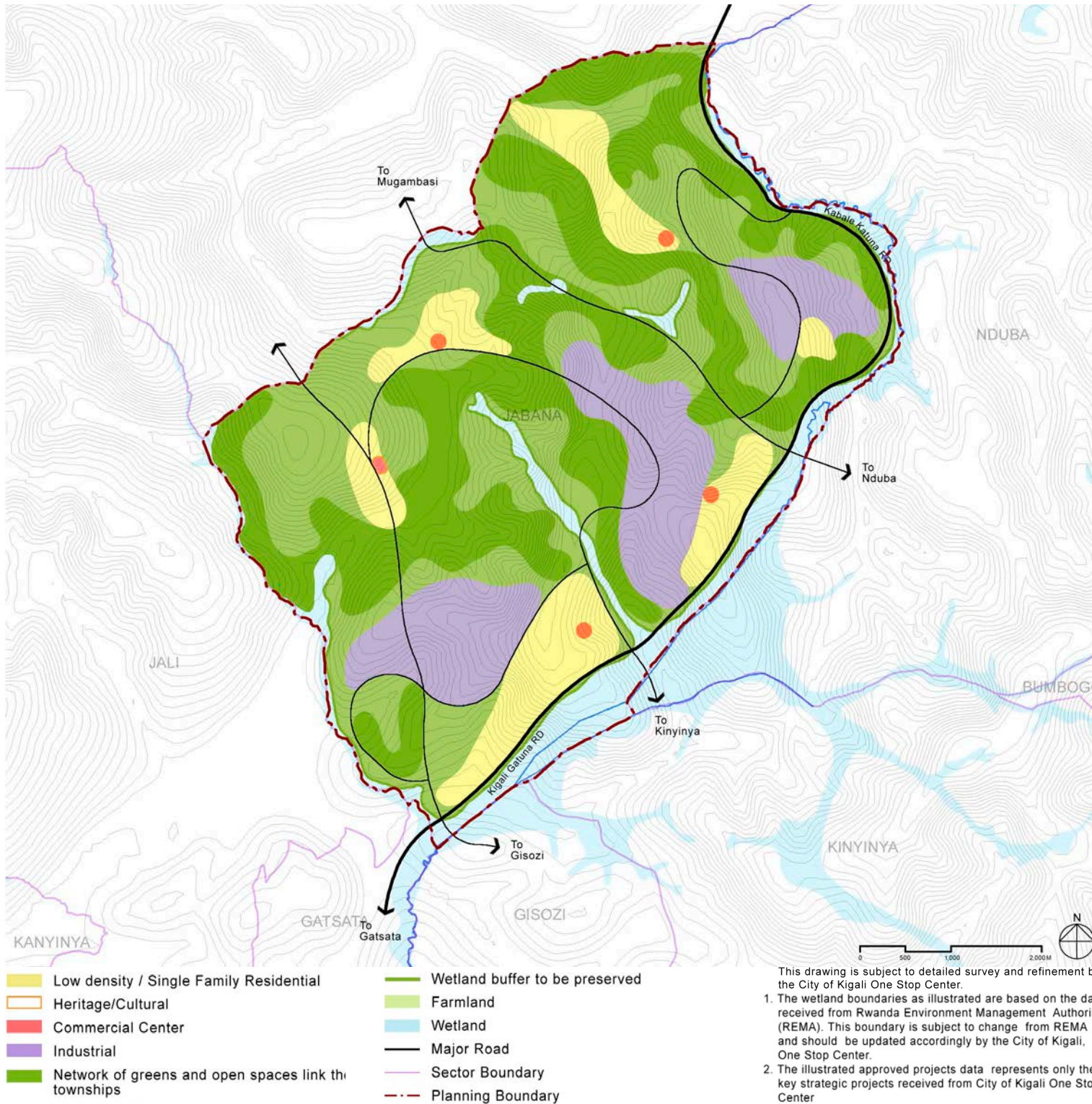


Fig.9.6 North Western Planning Area - Concept Plan

9.3 North Western Planning Area- Proposed Vision

Northern Employment Hub'

Due to its favorable topography and its strategic location for industrial use, the Planning Area is envisioned as the productive zone of the city. It would help in generating major employment for the City. The new residential enclaves in this upcoming growth area would offer attractive lifestyle choices with an opportunities to live within natural settings as well as closer to the employment generators.

9.4 North Western Planning Area - Proposed Concept

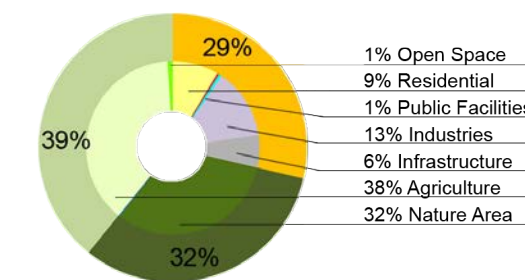
Based on the existing context, opportunities and constraints as well as the proposed vision, a development concept has been proposed for the Planning Area.

The key proposals of the concept plan are as follows:

- To develop a logistic park along the proposed semi-expressway that connects the major cities of Rwanda to Kigali CBD
- An opportunity to develop a petroleum depot within an enclosed terrain and secluded area yet well connected.
- to develop heavy industrial are, as the Planning Area is regionally connected and buffered by a thick band of wetland, thus mitigating adverse pollution impact on the city.
- To protect heritage site and promote a new cultural identity.

The concept is illustrated in Fig.9.6

38,000
Projected Population Year X



Proposed Land Distribution

9p/ha
Proposed Density

39%
Total Open Spaces

32%
Total Nature Area

29%
Total Urbanized Area



9.5 North Western Planning Area- Proposed Land Use Plan

The Land Use Plan aims to build upon the physical opportunities and constraints of the planning ares and offers incentives for integrated township developments.

The key strategies proposed in the Land Use Plan are:

- To upgrade the existing north-south road that connects the planning area to the City Centre into a semi-express way due to its regional connectivity.
- To categorise relatively flatter and naturally enclosed areas along the semi-expressway as industrial zones.
- Logistic hub to be proposed such that it is closer to the entry to the City and has direct access from the semi-expressway.
- To develop and expand upon the existing sites of the oil depot.
- To redevelop and rejuvenate the existing residential clusters into single family residential neighborhoods with sufficient facilities.
- To propose cell centres that integrate the existing public facilities supporting the increased residential population.
- To safeguard the areas of natural drainage courses as ecological corridors.

The Planning Area is proposed to accommodate a population of 38,000 people by Year X

The gross projected population density for the Planning Area is approximately 8 P/ha
The Proposed Land Use Plan is illustrated in Fig.9.7.

9.1.6 NORTH WESTERN PLANNING AREA- PROPOSED RESIDENTIAL USE PLAN

- The existing residential development along the southern wetland is zoned as single family residential neighborhoods.

- The northern residential clusters as well as the southern linear residential band will be zoned as a rural residential district offering single family low rise development.
- These new residential clusters, some of which are proposed to be developed by rezoning the imudugudu sites, will help address the future housing demand in the Gasabo District.

The Residential Use Plan is illustrated in . Fig.9.8.

9.1.7 NORTH WESTERN PLANNING AREA- PROPOSED COMMERCIAL PLAN

- The existing scattered industries would be consolidated into the three industrial precincts zoned as a general industrial district. These three industrial precincts are proposed with three different functions, namely logistic hub, oil depot and heavy industry.
 - The heavy industry zone would provide space for industries such as chemical industries, cement, fertilizer, synthetic industries, etc.
 - In addition to logistic activities, the logistic hub could also include warehouses, storage facilities, agro-processing, packaging units, etc.
 - The oil depot would be located on the site less than 10% of slope with a demarcated 6 ha start-up site.
 - Commercial sites in the imudugudu are proposed to be re-utilized for the development of the new cell centres.
 - The new cell centre is approximately 1.2 ha in size. One cell centre has been proposed in each residential clusters..
 - These centres comprise of cell office, small scale retail shops and a health post
- The Commercial Use Plan is illustrated in Fig.9.9.

9.1.8 NORTH WESTERN PLANNING AREA- PROPOSED PUBLIC FACILITIES

- The existing public facilities in the Planning Area have been preserved and additional facilities catering to the proposed population have been added.
- Public facilities such as health centres, community halls and churches, etc are integrated with the cell centre.

The Proposed Public Facilities Plan is illustrated in Fig.9.10.

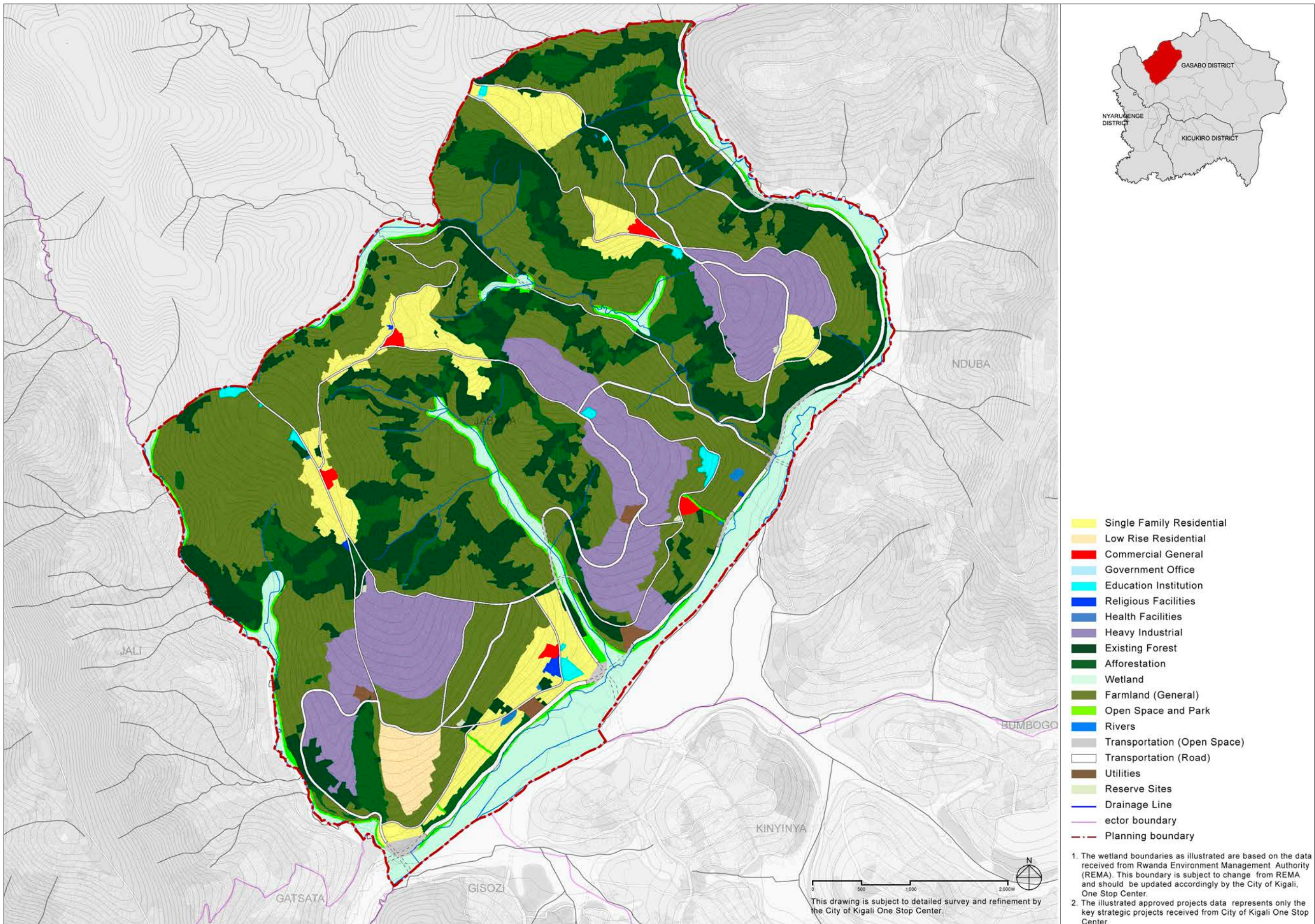
9.1.9 NORTH WESTERN PLANNING AREA- PROPOSED GREEN AND OPEN SPACES PLAN

- Protected areas along the steep slopes (30-40% & 40% above) are part of the corridors that connect the forest clusters.
- Areas along the natural drains and wetlands are protected as the ecological corridors. These corridors form a part of the storm water management system and are part of the larger green connector network proposed for the Gasabo District.

The Green and Open Spaces Plan is illustrated in figure Fig.9.11

Table 9.2 North Western planning Area- Proposed Land Use Distribution

BROAD LAND USE	DETAIL LAND USE	AREA (HA)	TOTAL AREA (HA)
Residential	Single family Residential	244	244
Commercial	Commercial General	12	12
Public facilities	Government Office	0.5	21.5
	Educational	15	
	Religious Facilities	3	
	Health Facilities	3	1164
Industries	Heavy Industrial	454	
Nature Area	Existing Forest	592	
	Afforestation	280	1469
	Wetland	292	
Agriculture	Farmland	1469	1469
Open Space	Open Space and Park	53	53
Water Bodies	Rivers	6.5	6.5
Infrastructure	Transportation	146	178
	Transportation(open Space)	20	
	Utilities	12	
	Total	3687	



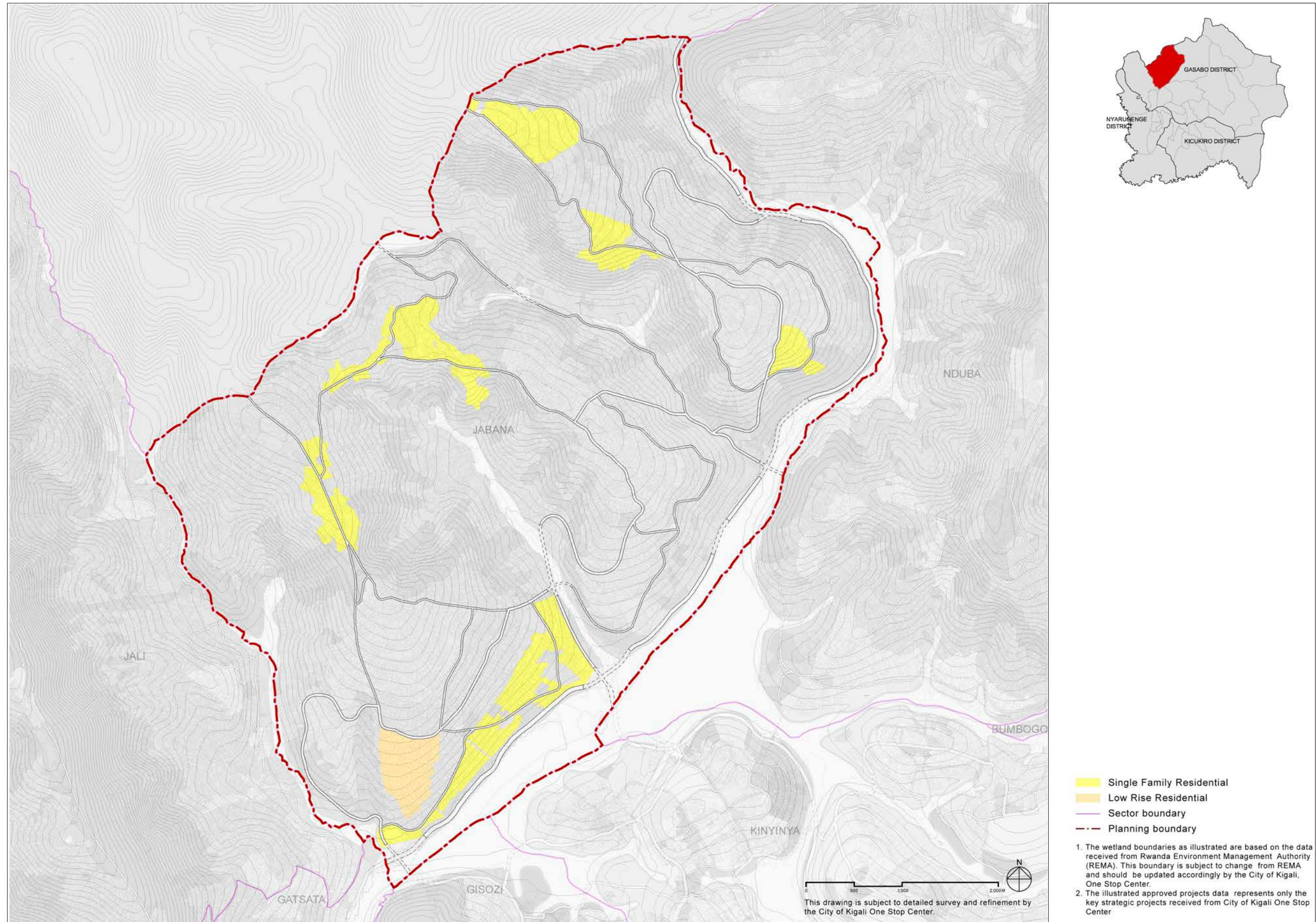


Fig.9.8 North Western Planning Area- Proposed Residential Use Plan

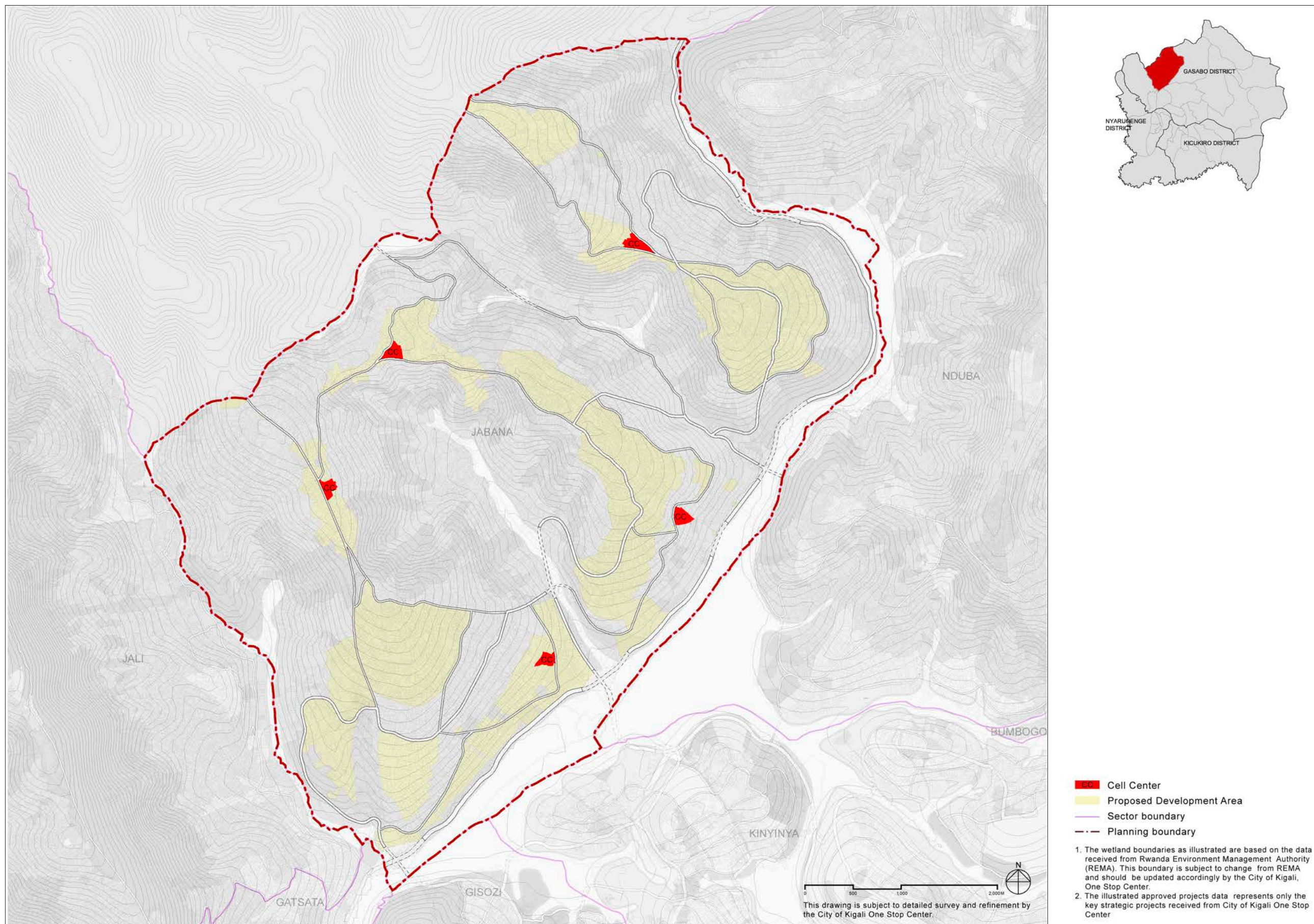


Fig.9.9 North Western Planning Area- Proposed Commercial Use Plan

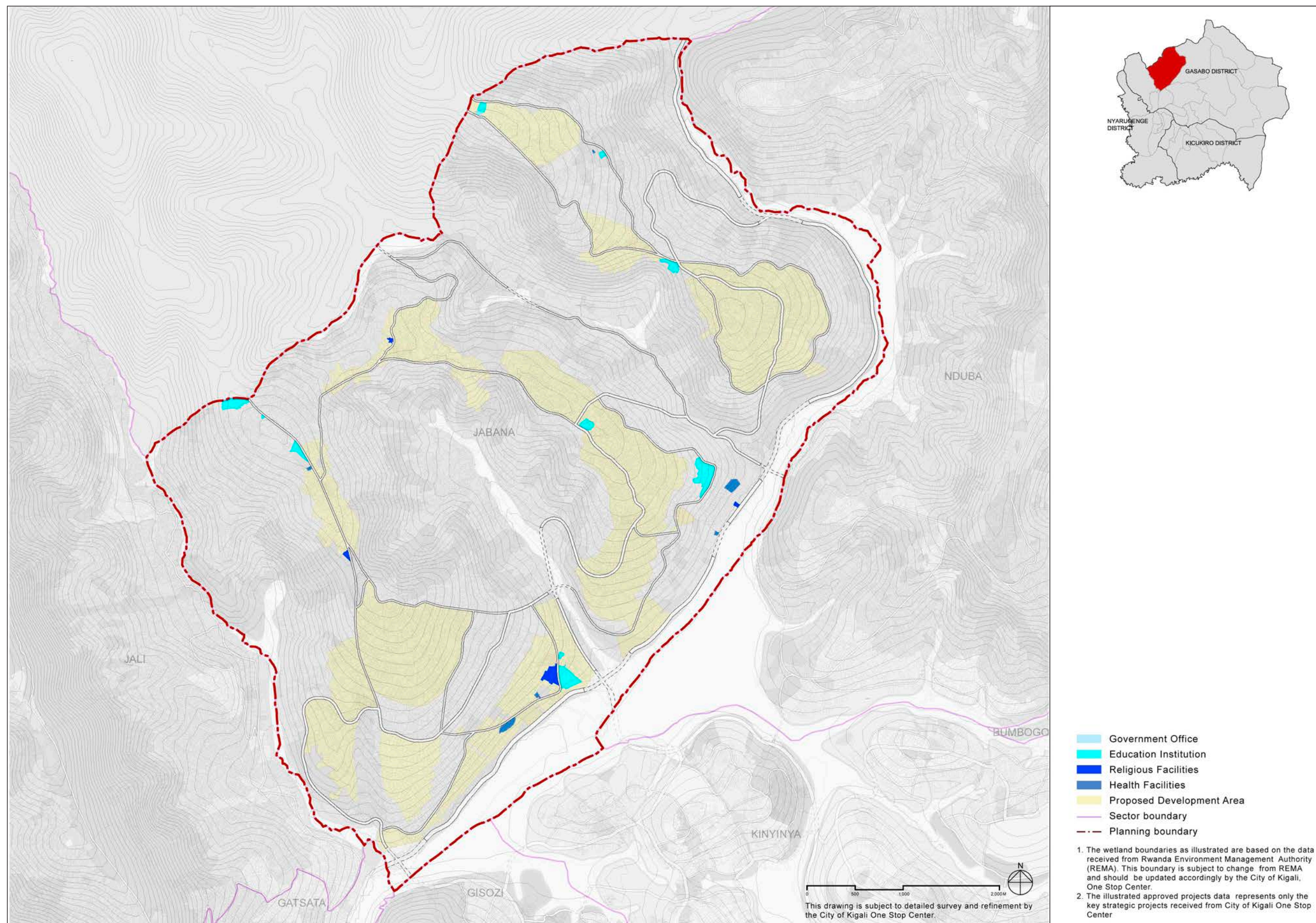


Fig.9.10 North Western Planning Area- Proposed Public Facilities Plan

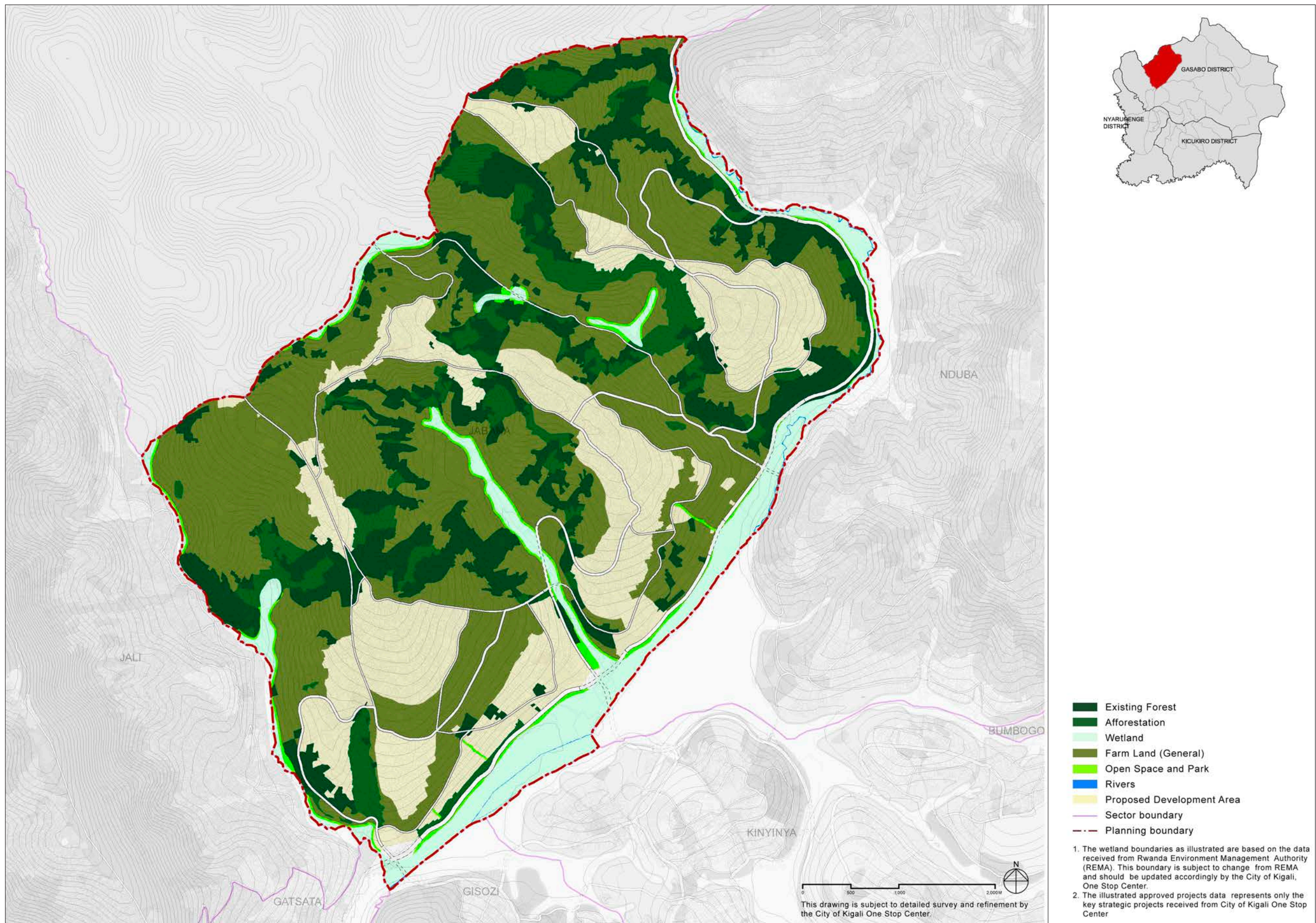


Fig.9.11 North Western Planning Area- Proposed Green and Open Space Plan

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10

DETAILED MASTER PLAN FOR NORTHERN PLANNING AREA

This chapter presents the detailed Master Plan for the Northern Planning Area. Based on the analysis of the existing context, opportunities and constraints, a vision and concept have been derived, to guide the development of the Master Planning area.

10.1 Northern Planning Area- Existing Context

The Planning Area comprises of Nduba Sector. The total Planning area is 4681 Ha.

10.1.1 LOCATION AND CONNECTIVITY

The Planning Area is considered a part of the rural area of the Gasabo District. Planning Area is surrounded by the wetlands. The Nyabugogo river on the western edge of Planning Area, separates it from Jabana. The southern wetlands (part of Nyabugogo river) define the edge of Kinyinya Sector. The wetlands on the eastern edge separates Planning Area from Bumbogo while the northern wetlands separates it from Rutunga Planning Area.

The existing central north-south road, forms the main connection within the Planning Area. The other local roads within the planning area join this central road. The junction with Jabana main road and the connection to Kinyinya sector are important.

10.1.2 EXISTING SITE CONDITIONS

The Planning Area is occupied by farmlands and sparse settlement. Farming and cultivation occurs on almost 79% of the land. Majority of the farmland is utilized for subsistence agriculture.

The existing population of the planning area is about 25,000 people (2013). There are no key developments in Planning Area except for the centrally located landfill site which is part of the approved projects. The three schools along with a religious facility are the other developments in the planning area.

The gross existing population density for the Planning Area is approximately 5 P/ha. The existing site conditions and site context for South eastern planning area are illustrated in Fig.10.3

10.1.3 NATURAL CONTEXT

The planning area is surrounded by wetlands. Existing forests occupy only 17% of the land.

The steep slopes (slope gradient above 20%) divide the Planning area into bands of developable land in north south direction.

The Nyabugogo river forms the major part of the wetlands that surround the Planning Area. Almost 10% of the land is occupied by the wetlands (REMA boundaries).

The slope analysis is illustrated in Fig.10.1

The watershed and natural water drainage channels are illustrated in Fig.10.2

4,681ha
Total Planning Area

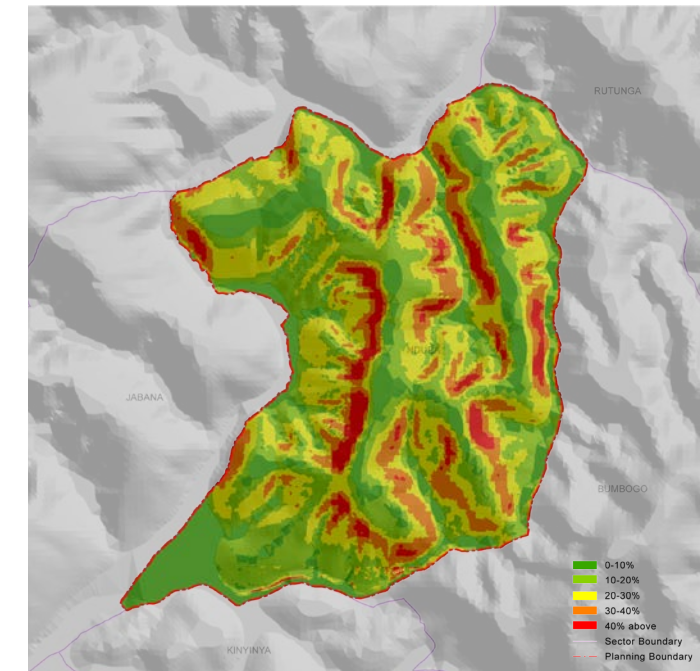
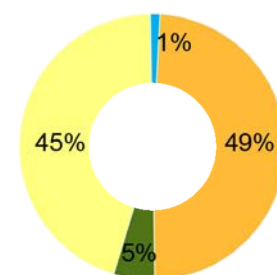


Fig.10.1 South Eastern Planning Area -Slope Analysis

25,000
Population 2013



Natural Constraints

5p/ha
Existing Density



49%
Steep Slopes Land

45%
Developable Land

6%
Wetland and Forest

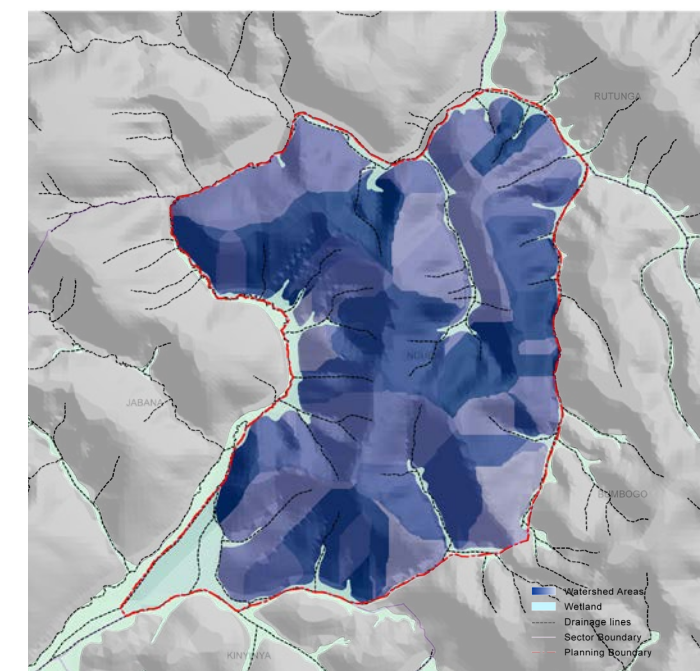


Fig.10.2 South Eastern Planning Area - Watershed and Drainage

Table 10.2 South Eastern Planning Area- Existing Land Distribution Table

BROAD LAND USE	DETAIL LAND USE	AREA (HA)	TOTAL AREA (HA)
Residential	Low Rise Residential	49	49
Public facilities	Government Office	0.5	10.5
	Educational	9	
	Health Facilities	1	
Industries	Heavy Industrial	5	5
Nature Area	Existing Forest	821	821
Agriculture	Farmland	3513	3697
	Plantation	184	
Water Bodies	Rivers	7	7
Infrastructure	Transportation	45	47
	Quarry Land	1	
	Vacant Land	1	
	Total	4682	

- Education Institution
- Health Facilities
- Heavy Industrial
- Existing Forest
- Farmland (General)
- Transportation
- Quarry Land
- Vacant Land
- Rivers
- Wetland
- Wetland within planning area

- Existing Expressway
- Major Roads
- Sector boundary
- Planning boundary
- 1 Jabana Fuel Truck Depot

1. The wetland boundaries as illustrated are based on the data received from Rwanda Environment Management Authority (REMA). This boundary is subject to change from REMA and should be updated accordingly by the City of Kigali, One Stop Center.
2. The illustrated approved projects data represents only the key strategic projects received from City of Kigali One Stop Center

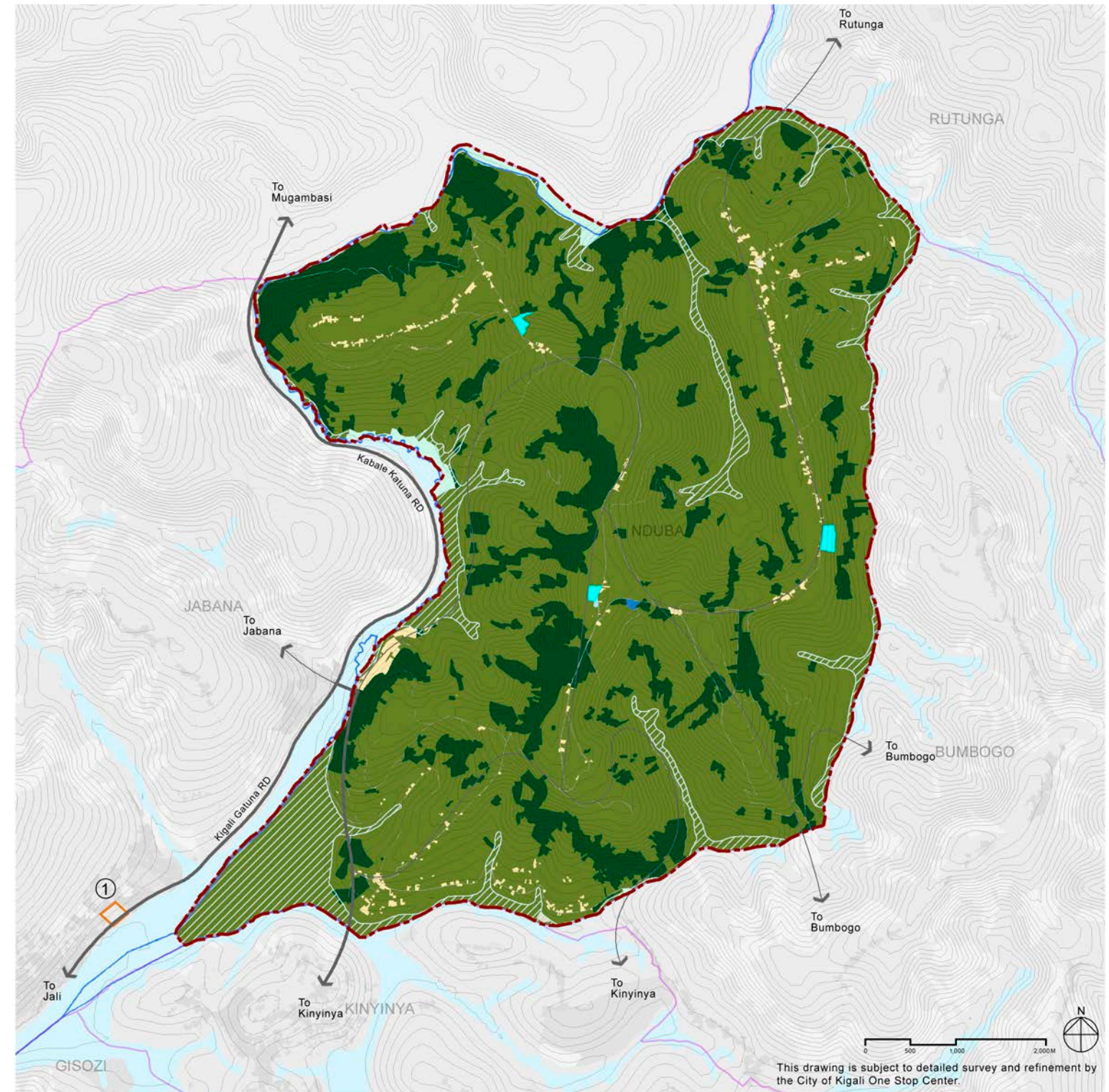


Fig.10.3 South Eastern Planning Area - Existing Land Use And Context Map

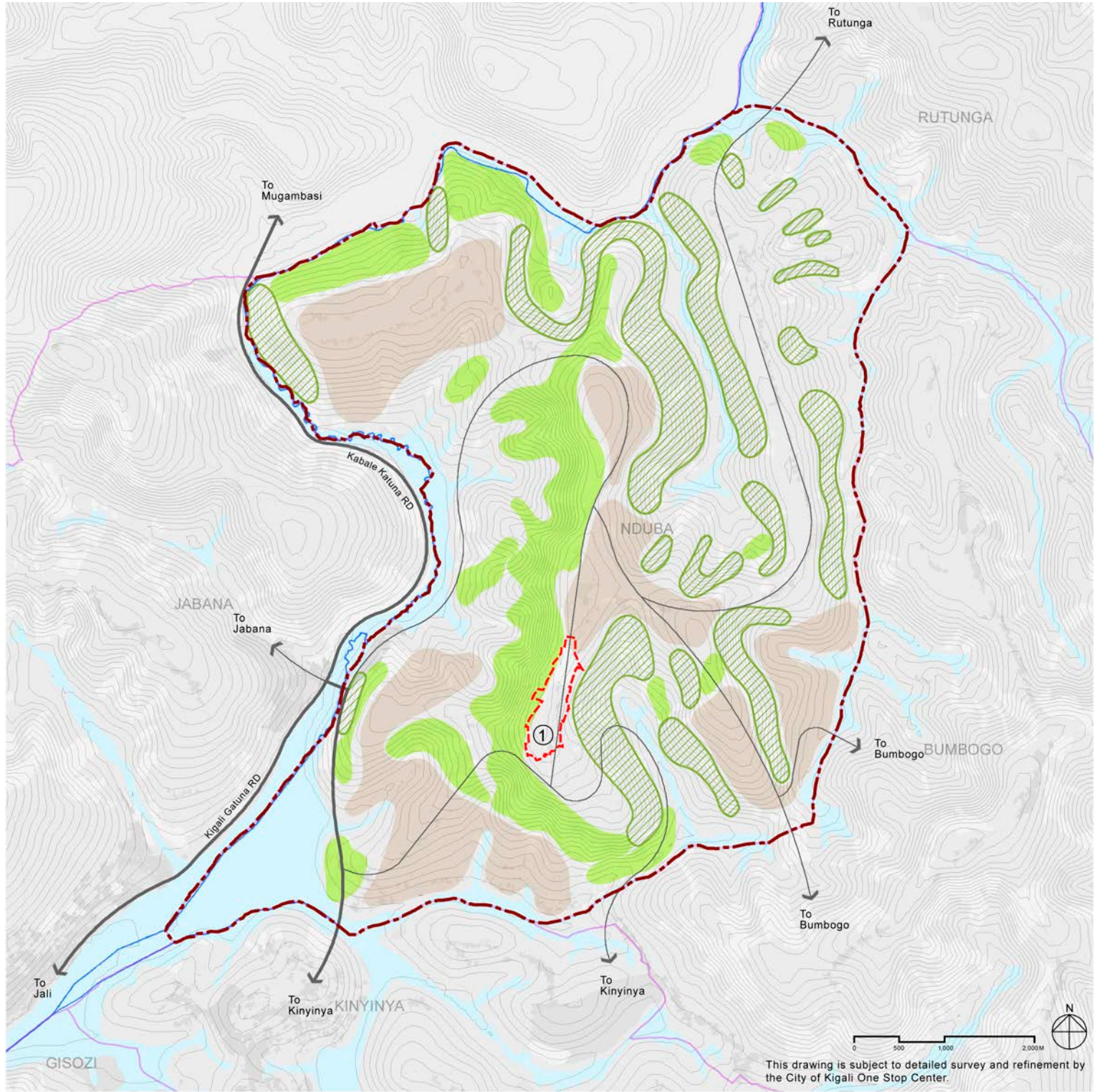


Fig.10.4 South Eastern Planning Area - Constraints Map

10.2 Northern Planning Area - Opportunities & Constraints

10.2.1 CONSTRAINTS

Constraints identified within the Planning Area are based on the existing context analysis.

The key constraints are as follows:

- About 40ha of land needs to be reserved as part of the approved project for landfill site located in the planning area.
- Sparse residential development makes it difficult to provide a sustainable infrastructure network.
- Existing forest and wetlands need to be protected.
- There is lack of commercial centres within residential clusters.

The constraints are illustrated in Fig.10.4

- Approved Projects
① Landfill Site
■ Forest conservation
▨ Steep slopes that need to be protected
■ Scattered residential development
■ Wetland
— Major road
— Sector Boundary
--- Planning Boundary
1. The wetland boundaries as illustrated are based on the data received from Rwanda Environment Management Authority (REMA). This boundary is subject to change from REMA and should be updated accordingly by the City of Kigali, One Stop Center.
2. The illustrated approved projects data represents only the key strategic projects received from City of Kigali One Stop Center

10.2.2 OPPORTUNITIES




Opportunities identified within The Planning area are based on the existing context analysis.

The key opportunities are as follows:

- There is an opportunity to develop a destination node along the regional north-south main road that borders the planning area.
- There is an opportunity to create wetland park along the Nybugongo river.
- There is potential to create an entry node at the junction of the regional north-south main road that borders the planning area. This junction is such that it connects to the urban sector of Kinyinya and is along the Nyubugongo wetlands.
- The Planning area has a potential to develop value added agriculture and thus to capitalize on the land, since 79% of area is categorised as agriculture use.
- There is an opportunity to develop compact clusters of residential developments on flatter land along the north-south rural collector.
- There is an opportunity to improve existing public facilities in order to support the future residential development.
- Another opportunity is to develop, new parks and open spaces which utilises the drainage and steep slopes creating a continuous green network.

These opportunities are illustrated in Fig.10.5

-  Opportunity to develop commercial node along the existing residential developments
-  Opportunity to reorganize existing built up area with everyday commercial needs
-  Potential low density development areas with scenic views
-  Good Site Views
-  Continuous wetland park connections
-  Opportunity to develop large nature areas utilizing existing forests and greens
-  Farmland

-  Major road
-  Sector Boundary
-  Planning Boundary

1. The wetland boundaries as illustrated are based on the data received from Rwanda Environment Management Authority (REMA). This boundary is subject to change from REMA and should be updated accordingly by the City of Kigali, One Stop Center.
2. The illustrated approved projects data represents only the key strategic projects received from City of Kigali One Stop Center

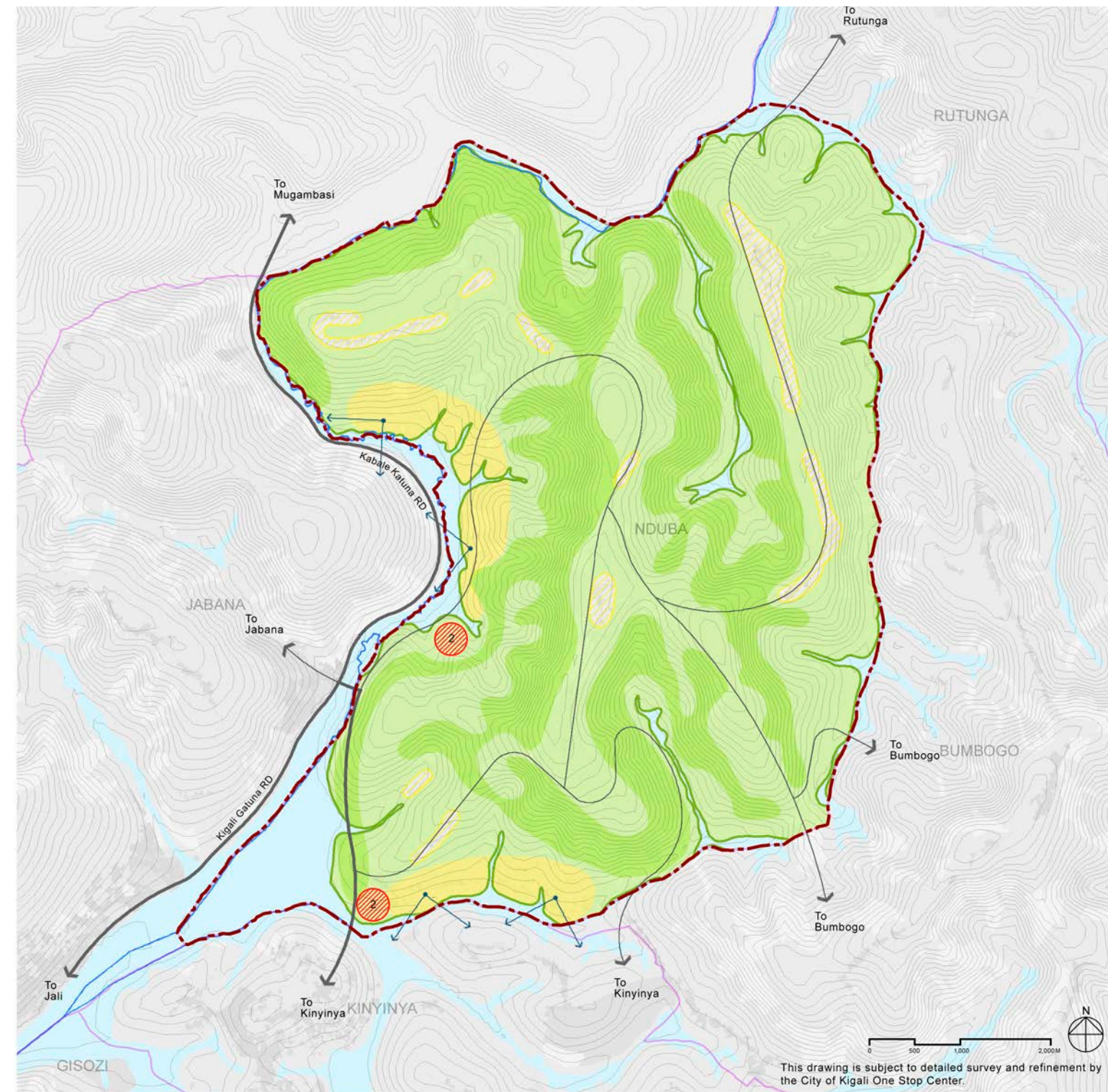


Fig.10.5 South Eastern Planning Area - Opportunities Map

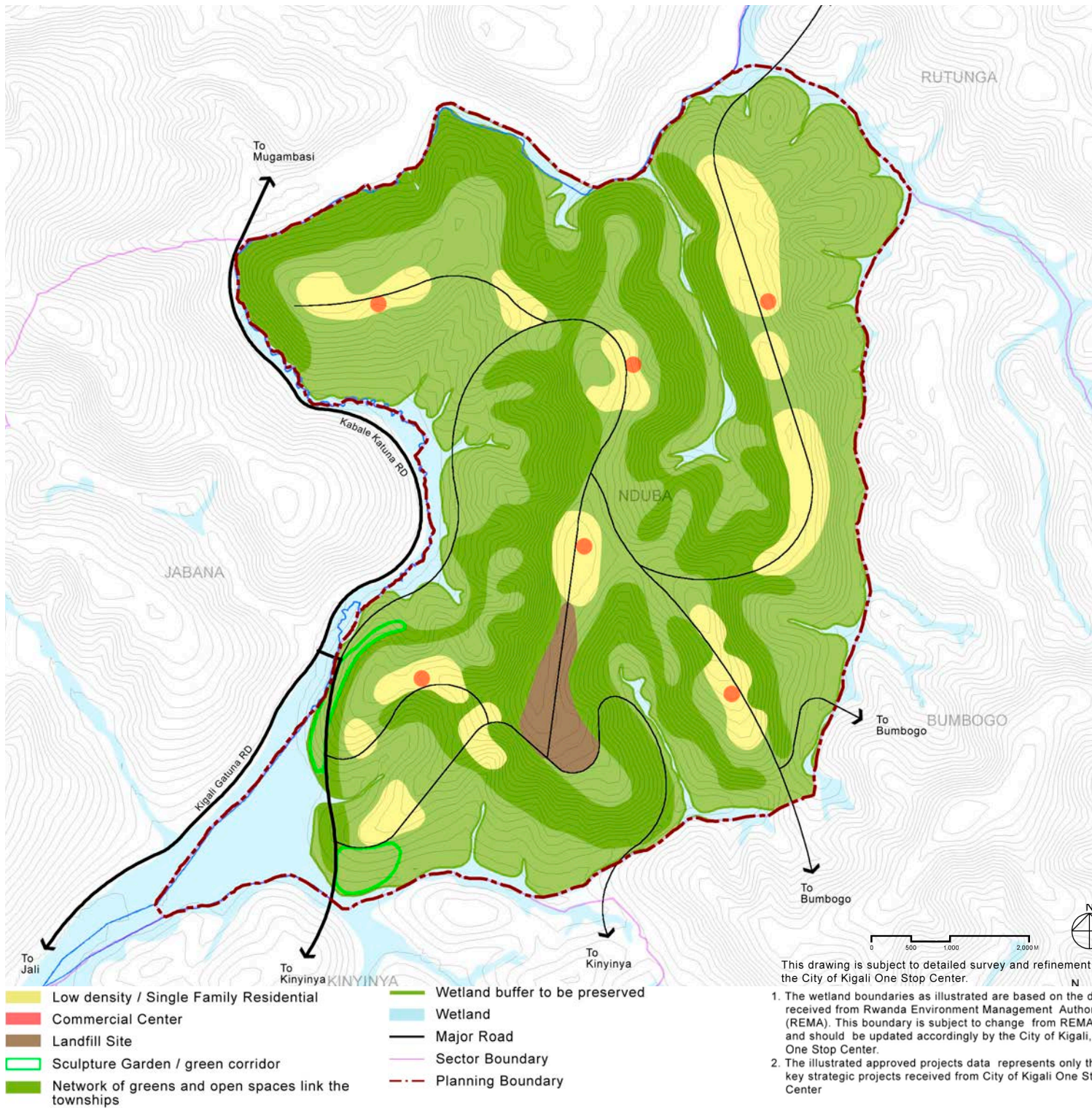


Fig.10.6 South Eastern Planning Area - Concept Plan

10.3 Northern Planning Area- Proposed Vision

“Scenic Cultural Hinterland”

The Planning Area is blessed with scenic agricultural landscapes. It is thus envisioned as the scenic agro-sector of Kigali City. The beautiful agricultural landscapes makes the Planning Area unique from other areas. The Planning Area also plays the role of ‘northern gateway’ to the urban area because of the semi-expressway connection. The new residential communities in this scenic area would offer a unique ‘feel-fresh’ lifestyle within the farmlands and into the natural environment.

10.4 Northern Planning Area - Proposed Concept

Based on the existing context, opportunities and constraints as well as the proposed vision, a development concept has been proposed for the Planning Area,

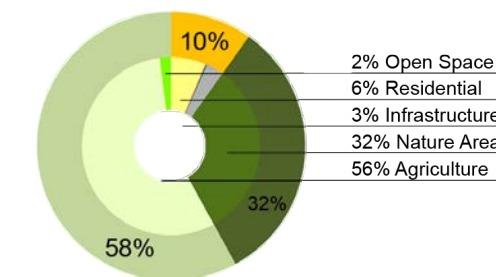
The key proposals of the concept plan are as follows:

- Agroventure Theme Park- To develop a destination node along the semi-expressway.
- Arrival Garden- An opportunity to develop a garden as a northern entrance to urban area of Kigali City.
- Forest trails- The protected areas of the forest provide an opportunity to develop trails with certain landscaped features.

The concept is illustrated in Fig.10.6

63,000

Projected Population Year X



Proposed Land Distribution

13p/ha

Proposed Density

58%
Total Open Spaces

32%
Total Nature Area

10%
Total Urbanized Area



10.5 Northern Planning Area- Proposed Land Use Plan

The Land Use Plan aims to provide the information on the location, distribution and character of the future Land Uses within the Planning Area. The key strategies proposed in the Land Use Plan are:

- To develop a destination node along the wetlands near the prime expressway junction. This destination node could be a theme park which will be an activity destination for the Northern region of Gasabo.
- To create an entry corridor in form of a scenic garden between the semi-express way junction and the junction entering the urban area. This would be a 'linear park' with landscape features.
- To create a 'sense of arrival' at the northern entry point of the urban area. The Nyabugongo river basin would provide an ideal setting for the 'arrival garden'. The linear park would terminate at the arrival garden.
- To allow for recreational activities within the protected areas of the Planning Area. Thus a forest trail is proposed looping the 'arrival garden', theme park and the agro-tourism valley in the north.
- To incorporate the landfill site as part of the approved projects.
- To redevelop and rejuvenate the existing residential clusters into single family residential neighborhoods with sufficient facilities.
- To propose cell centres that integrate the existing public facilities to support the increased residential population.
- To safeguard the areas of natural drainage courses as ecological corridors.

The Planning Area is proposed to accommodate a population of approximately 63,000 people by Year X.

The gross projected population density for the Planning Area is approximately 13 P/ha

The Proposed Land Use Plan is illustrated in Fig.10.6.

10.5.1 NORTHERN PLANNING AREA- PROPOSED RESIDENTIAL USE PLAN

- The existing residential clusters along the existing roads are redeveloped into relatively higher density neighborhoods as single family residential clusters.
- Some of the residential clusters are proposed by redeveloping existing residential clusters.

The Residential Use is illustrated in Fig.10.8.

10.5.2 NORTHERN PLANNING AREA- PROPOSED COMMERCIAL PLAN

- The proposed theme park will act as a main commercial node within the Planning Area. It would have hotels, restaurants, etc clubbed with adventure activities.
- Along the linear park, a mixed-use corridor is proposed,
- Commercial sites in the umudugudu are proposed to be re-utilized for the development of the new cell centres.
- 6 new cell centres of 1.2 ha are to be developed in the Planning area. These comprise of cell office, small scale retail and a health post.

The Commercial Use Plan is illustrated in Fig.10.9.

10.5.3 NORTHERN PLANNING AREA- PROPOSED PUBLIC FACILITIES

- Three schools and a religious facility. in the Planning Area have been retained.
- The cell centres are integrated with

public facilities such as health centres, community halls and churches, etc

The proposed public facilities are illustrated in Fig.10.10.

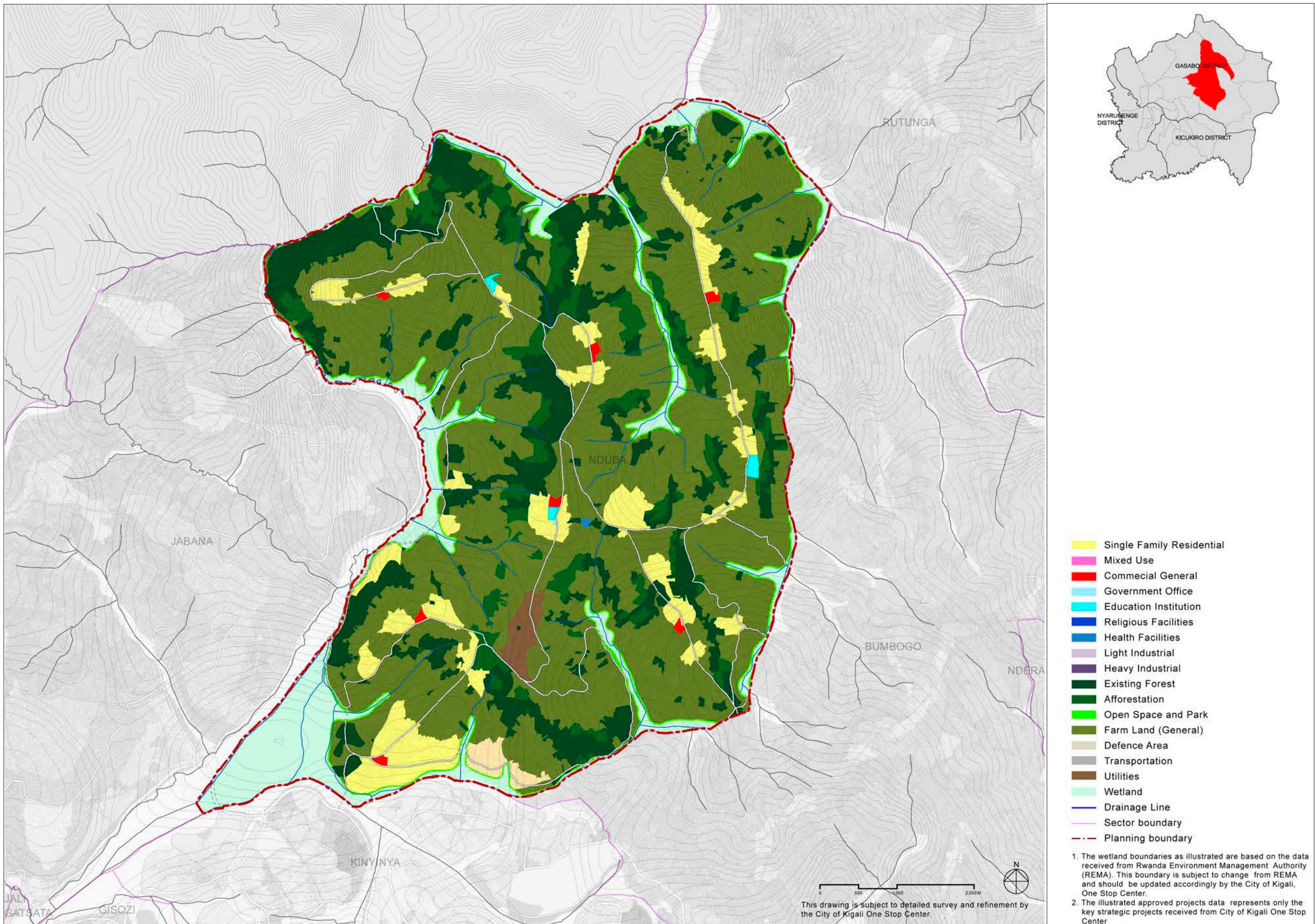
10.5.4 NORTHERN PLANNING AREA- PROPOSED GREEN AND OPEN SPACES PLAN

- Board-walks are proposed along the wetland park as part of the Arrival Garden.
- Arrival garden is proposed as sculpture garden with beautifully landscaped hard and soft spaces.
- The Nyabugogo river forms the major part of the wetlands. It provides opportunities for recreational development along it.
- Areas along the natural drains and wetlands are protected as the ecological corridors.
- These corridors form a part of the storm water management system and are part of the larger green connector network proposed for the Gasabo District.

The proposed Green and Open Spaces are illustrated in Fig.10.11.

Table 10.3 South eastern Planning Area - Proposed Land Use Distribution Plan

BROAD LAND USE	DETAIL LAND USE	AREA (HA)	TOTAL AREA (HA)
Residential	Single family Residential	346	346
Commercial	Commercial General	12	12
Public Facilities	Educational	8	9
	Health Facilities	1	
Nature Area	Existing Forest	722	1437
	Afforestation	254	
	Wetland	461	
Agriculture	Farmland	2611	2611
Open Space	Open Space and Park	95	95
Infrastructure	Transportation	103	127
	Utilities	33	
	Total	4681	



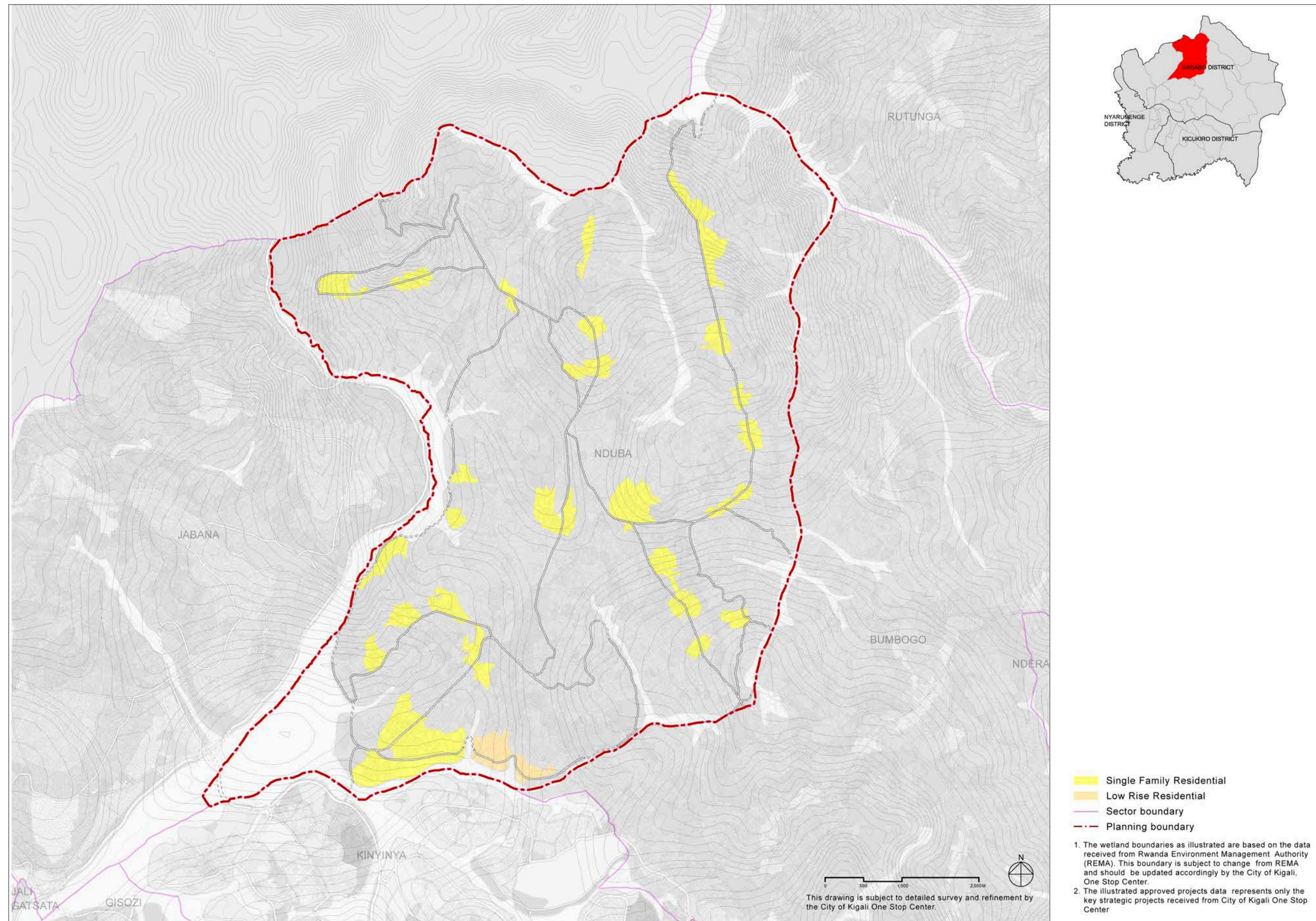


Fig.10.8 South Eastern Planning Area - Proposed Residential Use Plan

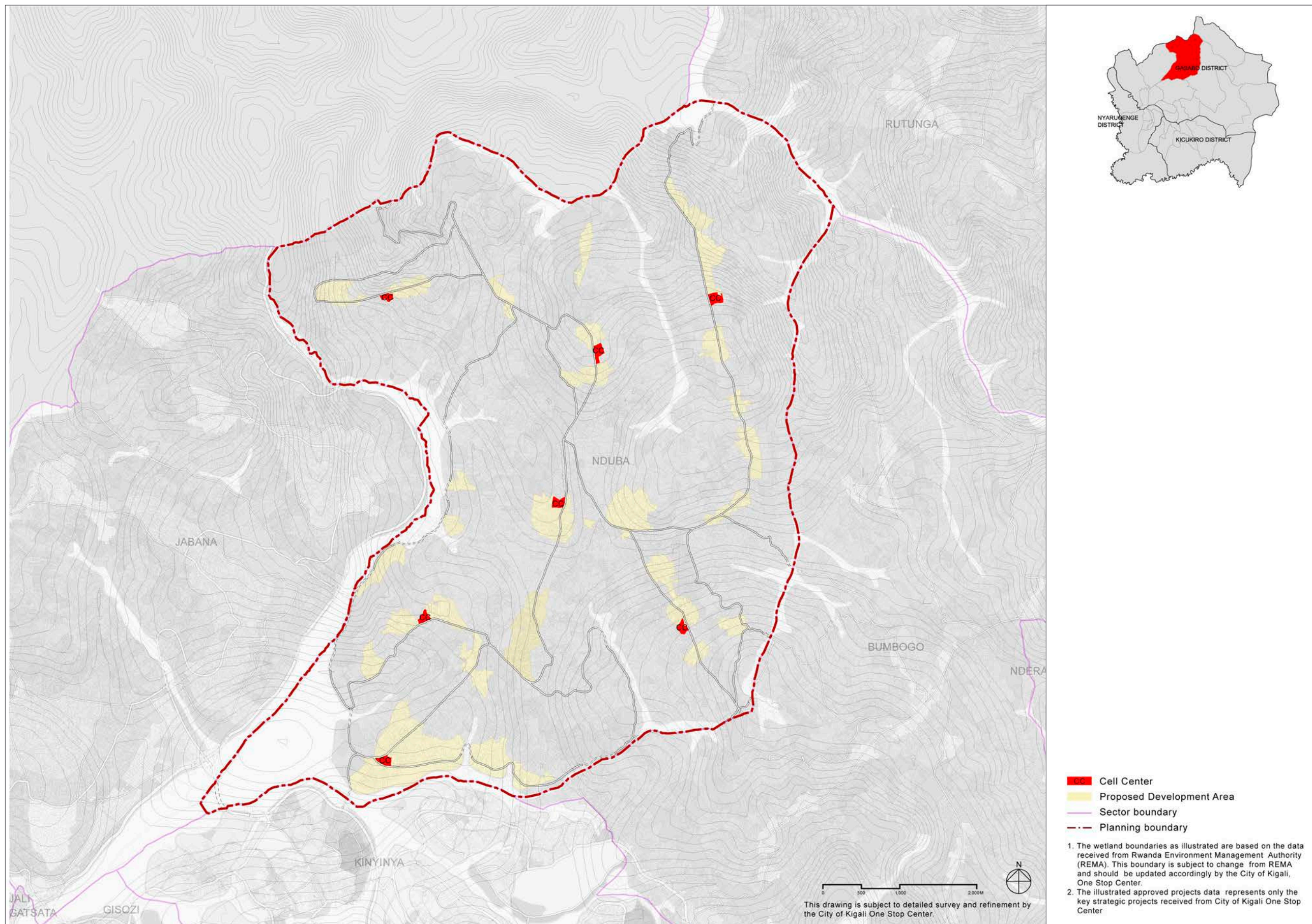


Fig.10.9 South Eastern Planning Area - Proposed Commerical Use Plan

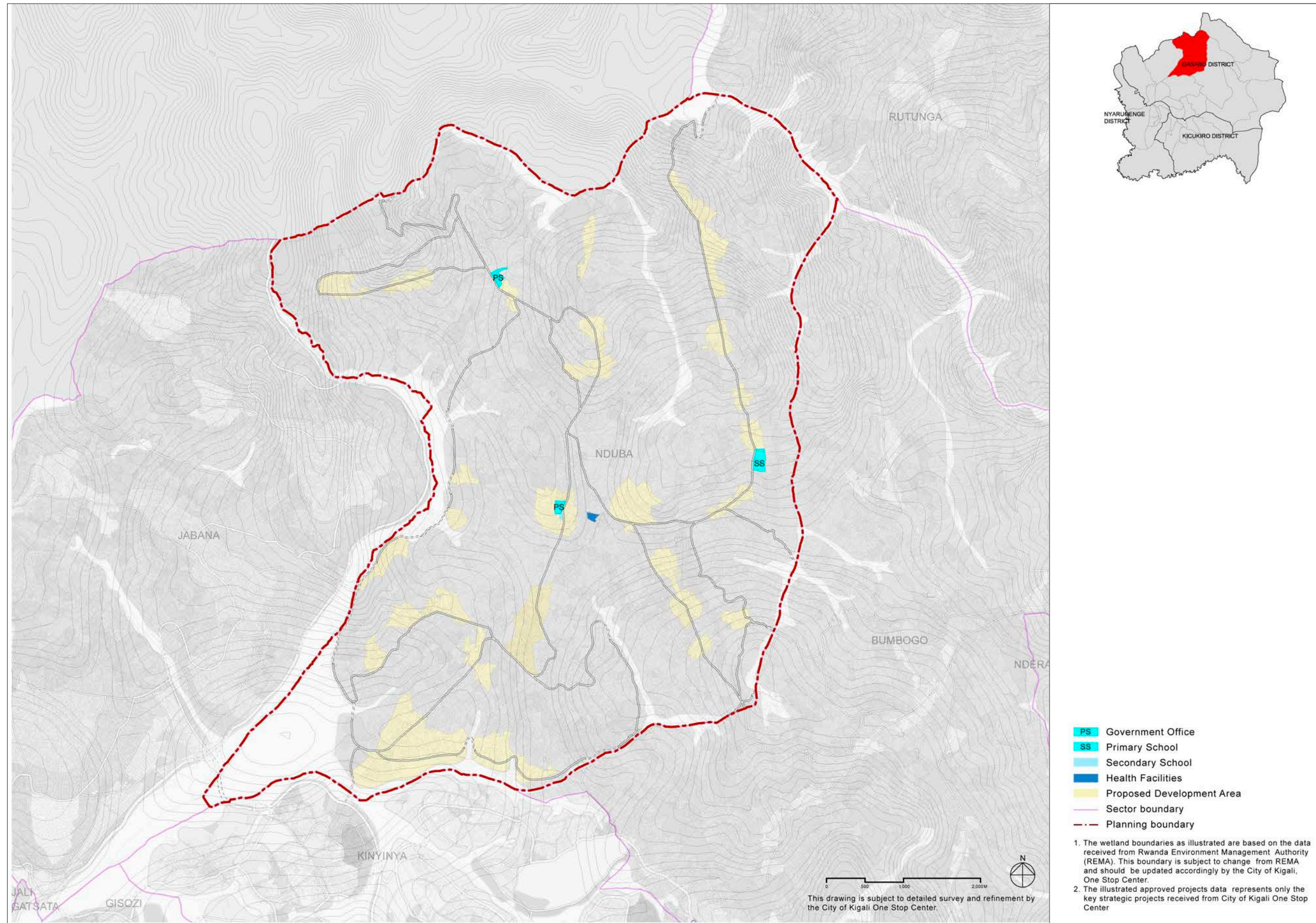


Fig.10.10 South Eastern Planning Area - Proposed Public Facilities use Plan

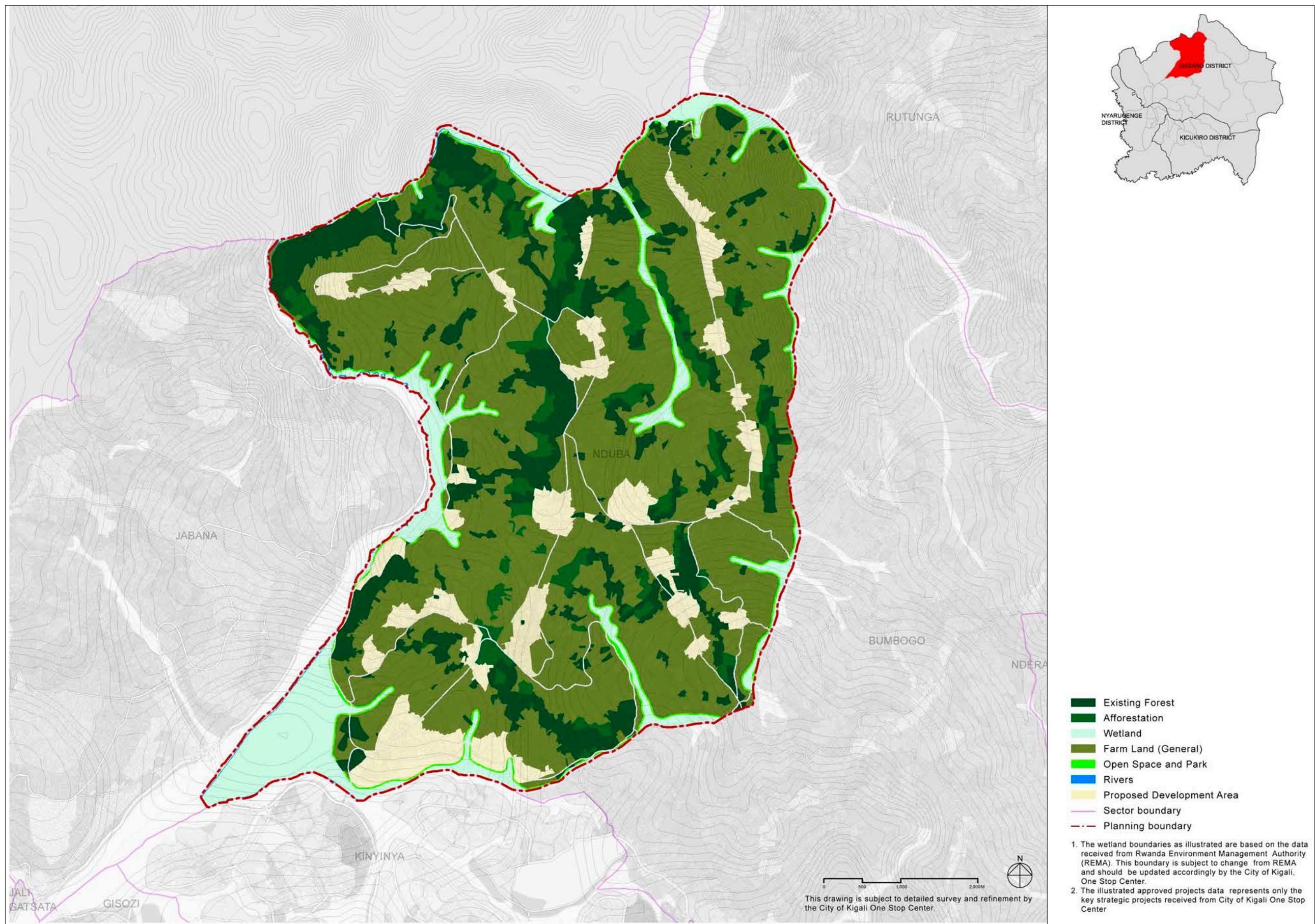


Fig.10.11 South Eastern Planning Area - Proposed Green and Open space use plan

10.6 Northern Planning Area- Key Features Plan

The Planning Area is envisioned as the northern scenic agro-sector of the City. The beautiful agricultural landscapes provide opportunity for development of touristic attractions.

As part of the Proposed Landuse Plan, two areas are identified as key features of the planning area. Agroventure Park and the Arrival Gardens are the new destinations for the Planning Area as well as for the City.

1. AGROVENTURE PARK

This destination node is proposed along the wetlands near the junction at the semi-expressway into the urban area. Adventure rides like roller coasters, slides, aqua-bikes, etc could be part of the Theme Park. Some activities related to agricultural harvesting like rowing, threshing, winnowing or activities related to animal breeding, etc could also be part of the activities. This park would provide an alternative mode of employment for the residents of the Planning Area.

2. ARRIVAL GARDEN

The Arrival Garden would mark the entry into urban area as it is located at the junction of the semi-expressway which connects Kigali City to Byumba or Uganda. This arrival garden would be a sculpture garden either hosting statues of various famous people of Rwanda or abstract sculptures depicting these famous personnels.

The garden is proposed to be extended on to the wetlands in form of boardwalks. These would line the wetlands of Nyabugongo River Basin.

The 'entry corridor' is a linear park connecting Agroventure and the Arrival garden. It is also the extension of the Garden. This linear park could be a landscaped flower garden, which attracts native colorful insects, butterflies.

Proximity to the urban area, regionally connected semi-expressway, and the proposed destinations could facilitate commercial developments such as resorts, restaurants, hotels, etc along the linear park.

The key Features are illustrated in Fig.10.12

- ① Agroventure Park
- ② Arrival Garden

1. The wetland boundaries as illustrated are based on the data received from Rwanda Environment Management Authority (REMA). This boundary is subject to change from REMA and should be updated accordingly by the City of Kigali, One Stop Center.
2. The illustrated approved projects data represents only the key strategic projects received from City of Kigali One Stop Center

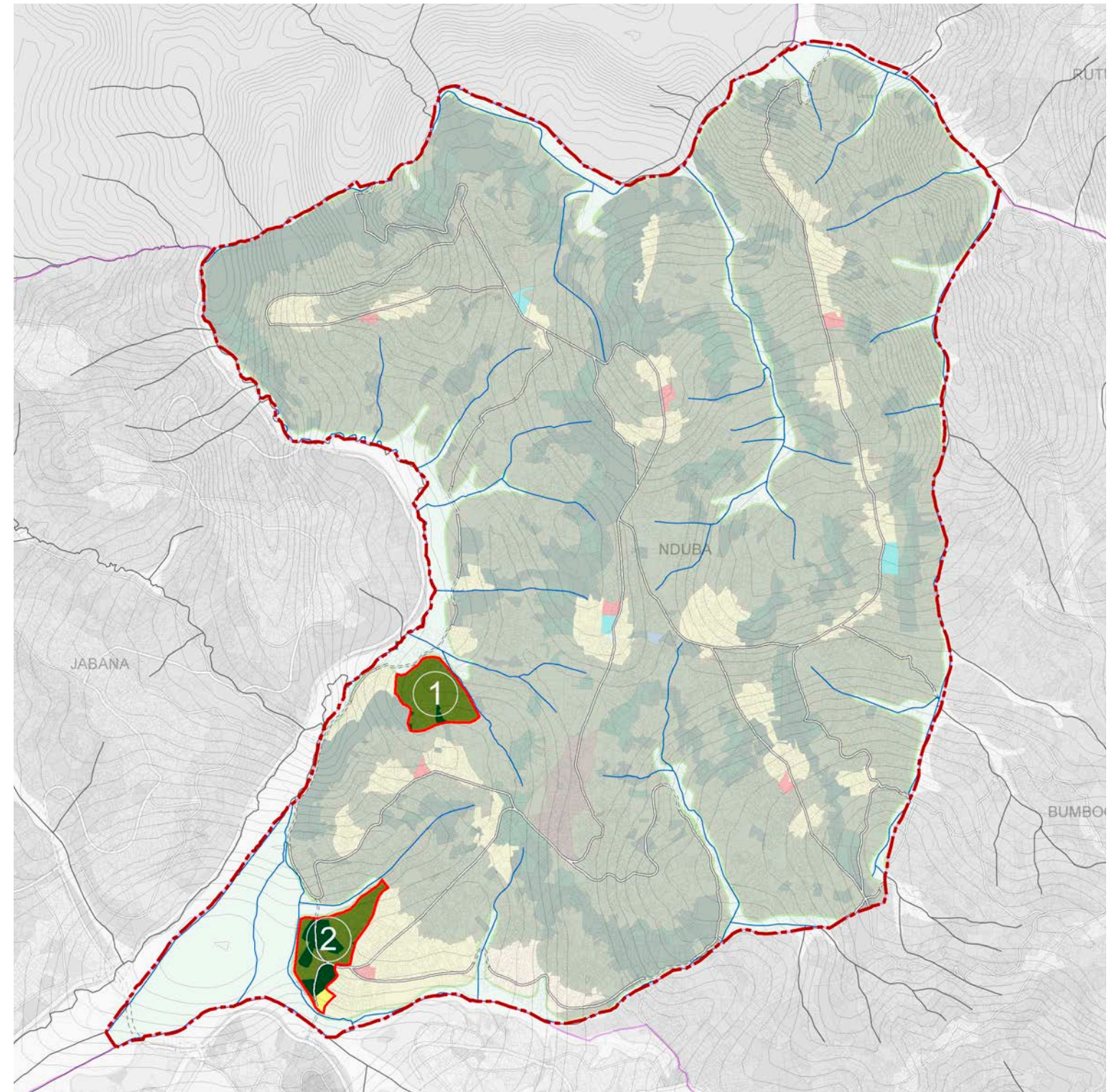


Fig.10.12 South Eastern Planning Area - Key Feature Plan

11

DETAILED MASTER PLAN FOR NORTH CENTRAL PLANNING AREA

This chapter presents the detailed Master Plan for the North-Central Planning Area. Based on the analysis of the existing context, opportunities and constraints, a vision and concept have been derived, to guide the development of the Master Planning area.

11.1 North Central Planning Area - Existing Context

The North Central Planning Area comprises of the Bumbogo Sector. The total Planning area is 6018.5 Ha.

11.1.1 LOCATION AND CONNECTIVITY

The North Central Planning Area of the Gasabo District is considered as a rural area. The southern and western border of the Planning Area is surrounded by urban sectors of Kinyinya, Kimironko and Ndera respectively. The rural sectors of Gikomero, Rutunga and Nduba encase the Planning area from northern and eastern regions respectively.

A north-south central road that extends to the international airport is located in Kicukiro District, as well as connects Rutunga sector. The diagonal road is another important link as it connects to the urban sector of Kinyinya and to the rural sector of Nduba.

11.1.2 EXISTING SITE CONDITIONS

The North Central Planning Area as a rural area, is largely occupied by farmlands, with some clusters of settlements on the relatively flatter areas. Farming and cultivation occurs on almost 83% of the land. Majority of the farmland is utilized for subsistence agriculture.

The existing population of the Planning Area is approximately 29,000 people (2013). The key development within the Planning Area is a heritage site called Bumbogo Bw'ingara Place. The place has four old sycamore trees. Historically, Rwabugiri's palace was

located here. Besides the heritage area the Planning Area has schools and a religious facility.

The proposed Free Trade Zone (FTZ) and residential development in the proximity of FTZ are part of the approved projects in the City. Phase 2 and 3 of the proposed FTZ are located at the southern tip of Planning Area.

The gross existing population density for the Planning area is approximately 5 p/ha. The Existing site conditions and site context for North Central Planning Area are illustrated in Fig.11.3

11.1.3 NATURAL CONTEXT

The southern area has relatively flat land. The existing forest occupies only 12% of the Planning area and is mostly centrally located.

As per the slope analysis, almost 20% of the planning area is under steep slopes and thus needs to be protected. Most of this protected land is covered under the existing forest.

Northern and southern edge of the Planning Area is lined by wetlands (as per the REMA boundary). It accounts up to 5% of the planning area.

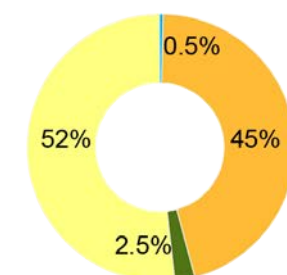
The slope analysis for North Central planning area are illustrated in Fig.11.1

The watershed and drainage for North Central planning area are illustrated in Fig.11.2

6,018ha
Total Planning Area



29,000
Population 2013



Natural Constraints

5p/ha
Existing Density

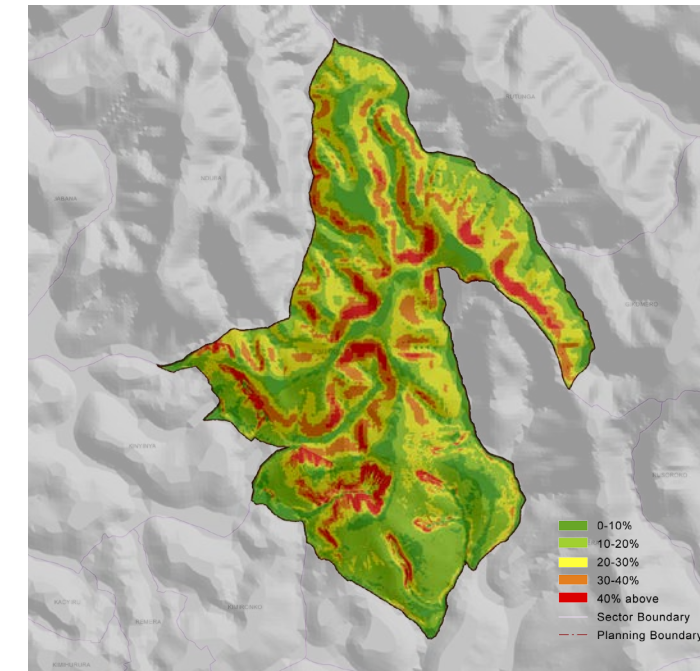


Fig.11.1 North Central Planning Area - Slope Analysis

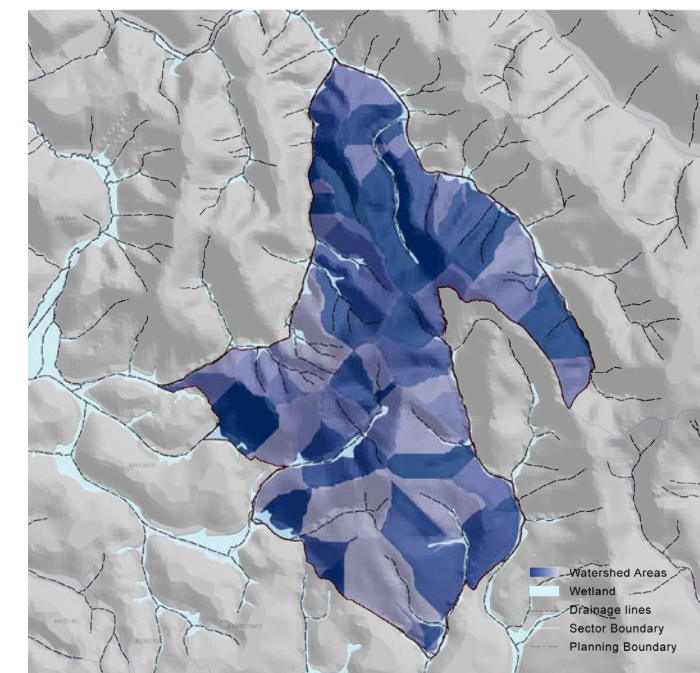


Fig.11.2 North Central Planning Area - Watershed and Drainage

Table 11.1 North Central Planning Area- Existing Land Distribution Table

BROAD LAND USE	DETAIL LAND USE	AREA (HA)	TOTAL AREA (HA)
Residential	Low Rise Residential	141	141
Public facilities	Government Office	1	19
	Educational	10	
	Religious Facilities	1	
	Health Facilities	7	
Nature Area	Existing Forest	764	777
	Wetland	13	
Agriculture	Farmland	4936	5008
	Plantation	72	
Infrastructure	Transportation	53	53
Special Use	Defence Area	1	10
	Vacant Land	9	
	Total	5994.09	

- Low Rise Residential
- Commercial General
- Commercial Office
- Government Office
- Education Institution
- Religious Facilities
- Health Facilities
- Civic Facilities
- Light Industrial
- Existing Forest
- Farm Land (General)
- Rivers

- Wetland
- Wetland within planning area
- Transportation
- Utilities
- Vacant Land
- Major road
- Sector boundary
- Planning boundary

- The wetland boundaries as illustrated are based on the data received from Rwanda Environment Management Authority (REMA). This boundary is subject to change from REMA and should be updated accordingly by the City of Kigali, One Stop Center.
- The illustrated approved projects data represents only the key strategic projects received from City of Kigali One Stop Center.

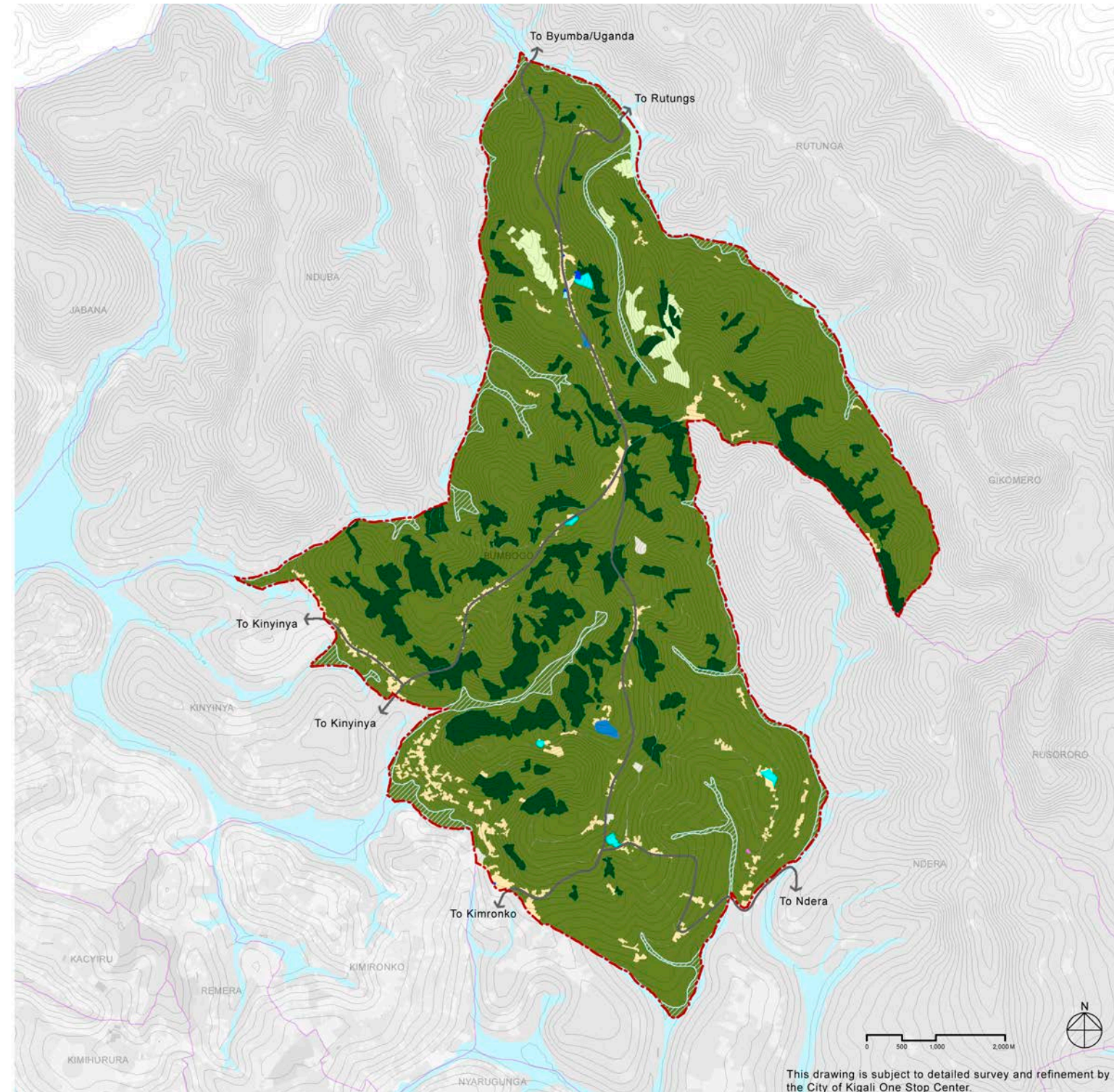


Fig.11.3 North Central Planning Area - Existing Land Use And Context Map

This drawing is subject to detailed survey and refinement by the City of Kigali One Stop Center.

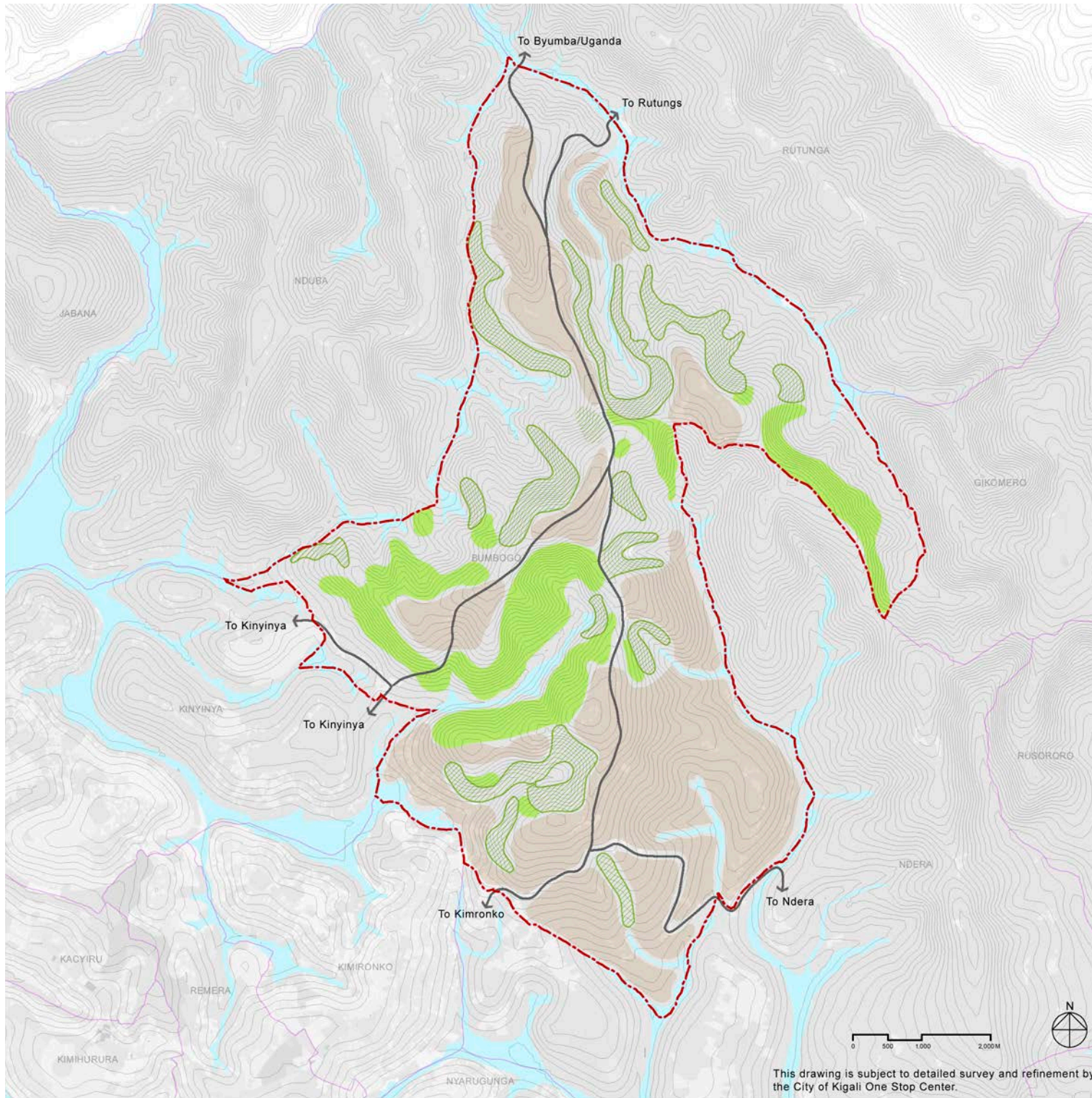


Fig.11.4 North Central Planning Area - Constrains Map

11.2 North Central Planning Area - Opportunities & Constraints

11.2.1 CONSTRAINTS

Constraints identified within North Central Planning area are based on the existing context analysis.

- Sparse residential development is creating a strain on the existing infrastructure.
- There is lack of commercial centres within residential clusters.

The constraints are illustrated in Fig.11.4

- Forest conservation
- Steep slopes 40% that need to be protected to prevent soil erosion
- Scattered residential development
- Wetland
- Major road
- Sector Boundary
- Planning Boundary

1. The wetland boundaries as illustrated are based on the data received from Rwanda Environment Management Authority (REMA). This boundary is subject to change from REMA and should be updated accordingly by the City of Kigali, One Stop Center.
2. The illustrated approved projects data represents only the key strategic projects received from City of Kigali One Stop Center

11.2.2 OPPORTUNITIES

Opportunities identified within North Central Planning area are based on the existing context analysis.

- The FTZ will provide a better opportunities for the area as it will provide for more employment and further improve the infrastructure development of the Planning area.
- There is an opportunity to develop upon the proposed residential development with close proximity of the FTZ.
- There is an opportunity to develop compact clusters of residential development on the flatter areas along the main north-south road.
- A central cultural node could be developed adjoining the Bumbogo Bw'ingara Place. It could serve as a touristic destination.
- An opportunity to develop tourist attractions along the northern wetlands, bordering Rutunga sector could be explored.
- There is an opportunity to develop on the existing public facilities in order to support the future residential development.
- Another opportunity is to develop, new parks and open spaces which utilises the drainage and steep slopes to create a continuous green network.

The Opportunities are illustrated in Fig.11.5

- ★ Heritage / Cultural sites
- Approved Projects
 - ① FTZ Phase 2
 - ② FTZ Phase 3
 - ③ Residential Development Project
- Good site views
- Continuous wetland park connections
- Opportunity to develop large nature areas utilizing existing forests and greens
- Potential low density development areas with scenic views
- Opportunity to reorganize existing built up with localized commercial

- Wetland
 - Major road
 - Sector Boundary
 - Planning Boundary
1. The wetland boundaries as illustrated are based on the data received from Rwanda Environment Management Authority (REMA). This boundary is subject to change from REMA and should be updated accordingly by the City of Kigali, One Stop Center.
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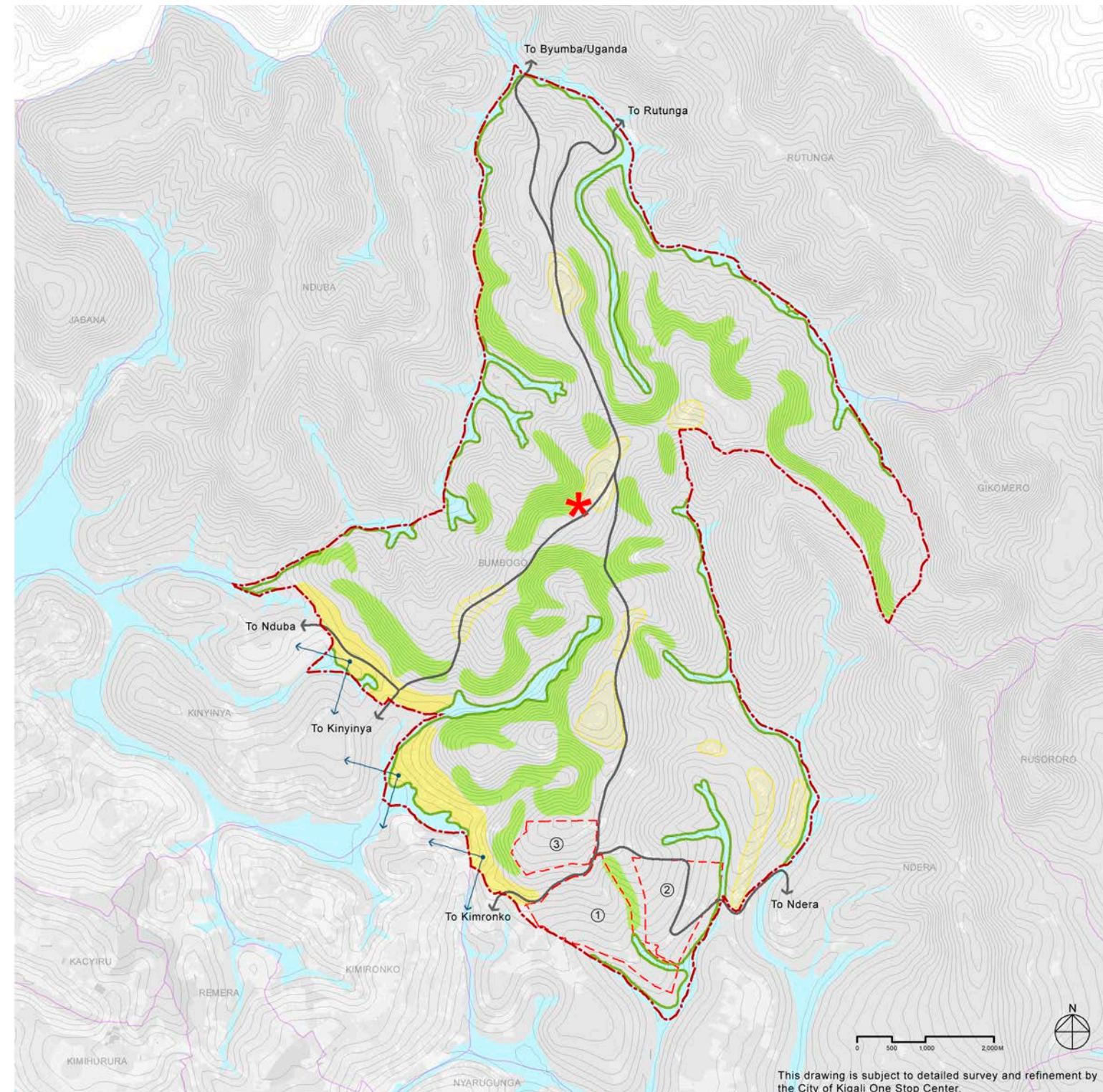


Fig.11.5 North Central Planning Area - Opportunities Map

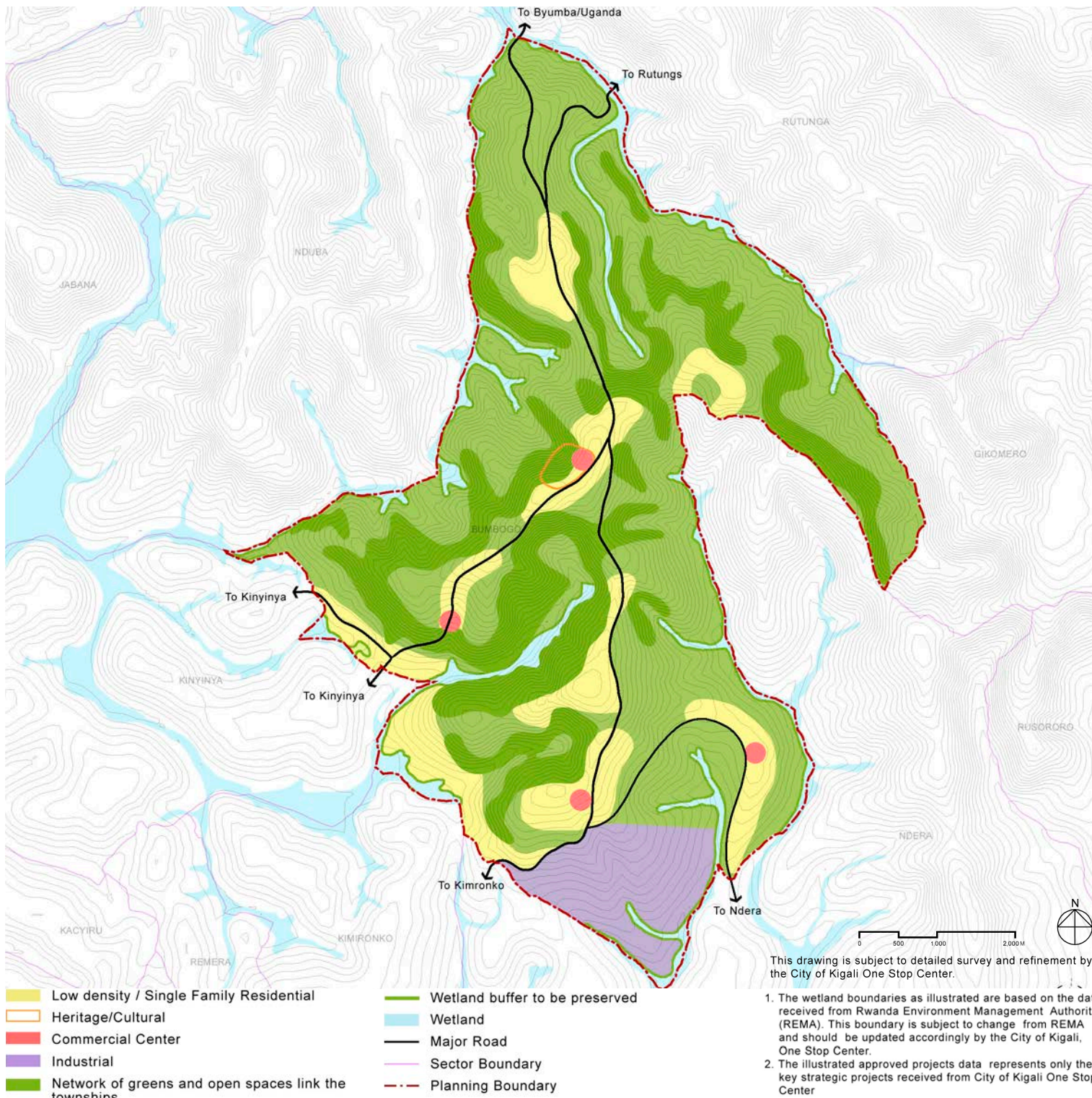


Fig.11.6 North Central Planning Area - Concept Plan

11.3 North Central Planning Area- Proposed Vision

'Cultural And Rural Heartland'

The North Central Planning Area is envisioned as an upcoming economic zone due to the Phase 2 and 3 of the proposed Free Trade Zone (FTZ) located at the southern tip of Planning Area. The FTZ will be a boon to the rural areas as well as City's economy.

The heritage site Bumbogo Bw'ingara Place at the centre of the Planning Area will give the Planning Area a soft and cultural dimension. It will create a unique identity for the place. The Planning area would also offer residential opportunities to live within the to the natural settings.

11.4 North Central Planning Area - Proposed Concept

Based on the existing context, opportunities and constraints as well as the proposed vision, a development concept has been proposed for the North Central Planning Area.

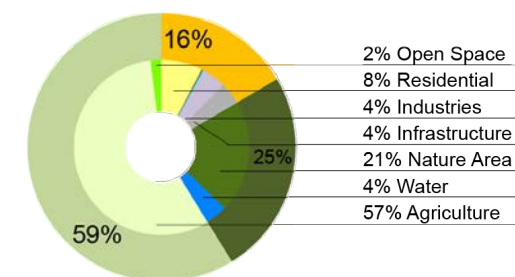
The key proposals of the concept plan are as follows:

- To integrate the Free Trade Zone into the Proposed Land Usa Plan.
- Bumbogo Bw'ingara Place- An opportunity for the Planning Area to create a unique identity for itself.
- To provide an area for showcase of Rwandan tribal culture reutilizing the protected land.
- Development of tourist related activities long the scenic wetlands bordering Rutunga & Bumbogo Sector.

The concept is illustrated in Fig.11.6.

76,000

Projected Population Year X



Proposed Land Distribution

13p/ha

Proposed Density

59%
Total Open Spaces

16%
Total Urbanized Area

25%
Total Nature Area



11.5 North Central Planning Area- Proposed Land Use Plan

The Land Use Plan aims to provide the information on the location, distribution and character of the future Land Uses within the Planning Area.

The key strategies proposed in the Land Use Plan are:

- To integrate and support the Free Trade Zone, single family residential development is proposed in its vicinity and also along the wetlands.
- To redevelop single family residential neighborhoods along the two main roads of the Planning Area.
- To propose cell centres that integrate the existing public facilities that support the increased residential population.
- To develop mixed use area for cultural activities adjoining the Bumbogo Bw'ingara Place.
- To allow for traditional practices of herdsman's within the protected areas of the Planning Area. Thus a Herdsman's Park is proposed.
- To safeguard the areas of natural drainage courses as ecological corridors.

The projected population for North Central Planning Area is 76,000 people by Year X. The gross projected population density for the Planning Area is approximately 13p/ha

The proposed Land Use is illustrated in Fig.11.7.

11.5.1 NORTH CENTRAL PLANNING AREA- PROPOSED RESIDENTIAL USE PLAN

- New single family residential development is proposed along the wetlands supporting the FTZ.
- Residential development adjoining the FTZ is part of the approved projects.

- The existing residential clusters are enlarged and rezoned as single family residential development.
- These new residential clusters, some of which are proposed to be developed by rezoning the umudugudu sites, will help address the future housing demand in the Gasabo District.

The Residential Use Plan is illustrated in Fig.11.8.

11.5.2 NORTH CENTRAL PLANNING AREA- PROPOSED COMMERCIAL PLAN

- The mixed use area adjoining Bumbogo Bw'ingara Place are proposed near the junction of the two main roads of the Planning Area. This cultural area connects to Herdsman's Park. It will create new opportunities for employment.
- Herdsman's Park will be an exhibition area for Rwandan and international tourists.
- Commercial sites in the imudugudu are proposed to be re-utilized for the development of the new cell centres.
- 7 new cell centre of approximately 1.2ha in size are located within the residential clusters.
- These centres comprise of cell office, small scale retail shops and health post.

The Commercial Use Plan is illustrated in Fig.11.9.

11.5.3 NORTH CENTRAL PLANNING AREA- PROPOSED PUBLIC FACILITIES

- The existing public facilities in the Planning Area have been retained and additional facilities catering the proposed population have been added.
- Public facilities such as health centres, community halls and churches, etc are integrated with the cell centre.

The proposed public facilities are illustrated in Fig.11.10.

11.5.4 NORTH CENTRAL PLANNING AREA- PROPOSED GREEN AND OPEN SPACES PLAN

- The area under the proposed forest near the Bumbogo Bw'ingara Place, is proposed as the Herdsman's Park.
- Areas along the natural drains and along wetlands are protected as ecological corridors.
- These corridors form a part of the storm water management system and are part of the larger green connector network proposed for the Gasabo District.

The proposed Green and Open Spaces are illustrated in Fig.11.1.

Table 11.2 North Central Planning Area- Proposed Land Use Distribution

BROAD LAND USE	DETAIL LAND USE	AREA (HA)	TOTAL AREA (HA)
Residential	Single family Residential	494	494
Commercial	Commercial General	11	11
Public facilities	Government Office	1	19
	Educational	10	
	Religious Facilities	1	
	Health Facilities	7	259
Industries	Light Industrial	9	
	Heavy Industrial	250	1294
Nature Area	Existing Forest	748	
	Afforestation	253	
	Wetland	293	3558
Agriculture	Farmland	3558	
Open Space	Open Space and Park	138	138
Infrastructure	Transportation	222	232
	Transportation(open Space)	10	
	Total	6018	

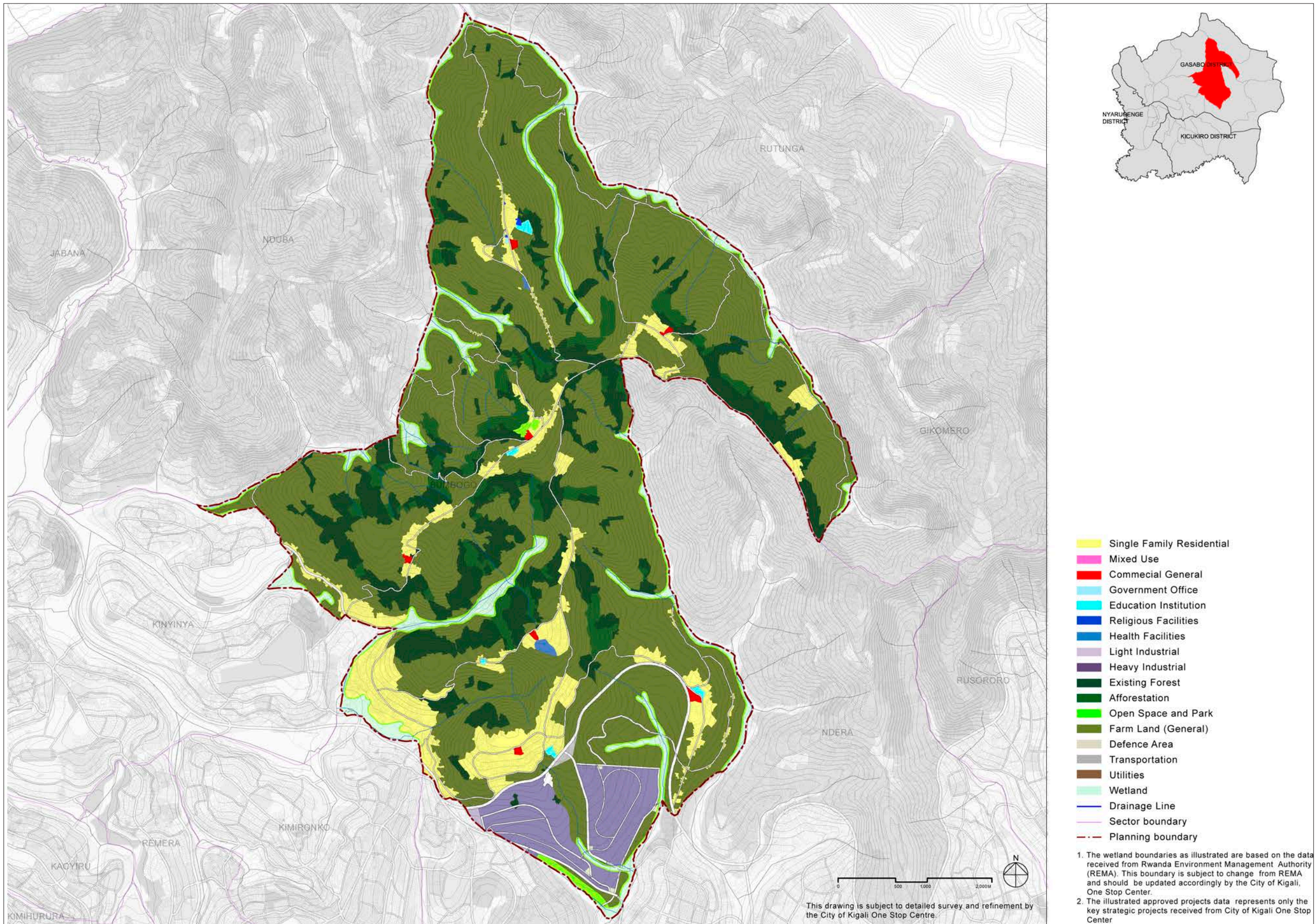


Fig.11.7 North Central Planning Area - Proposed Land Use Plan

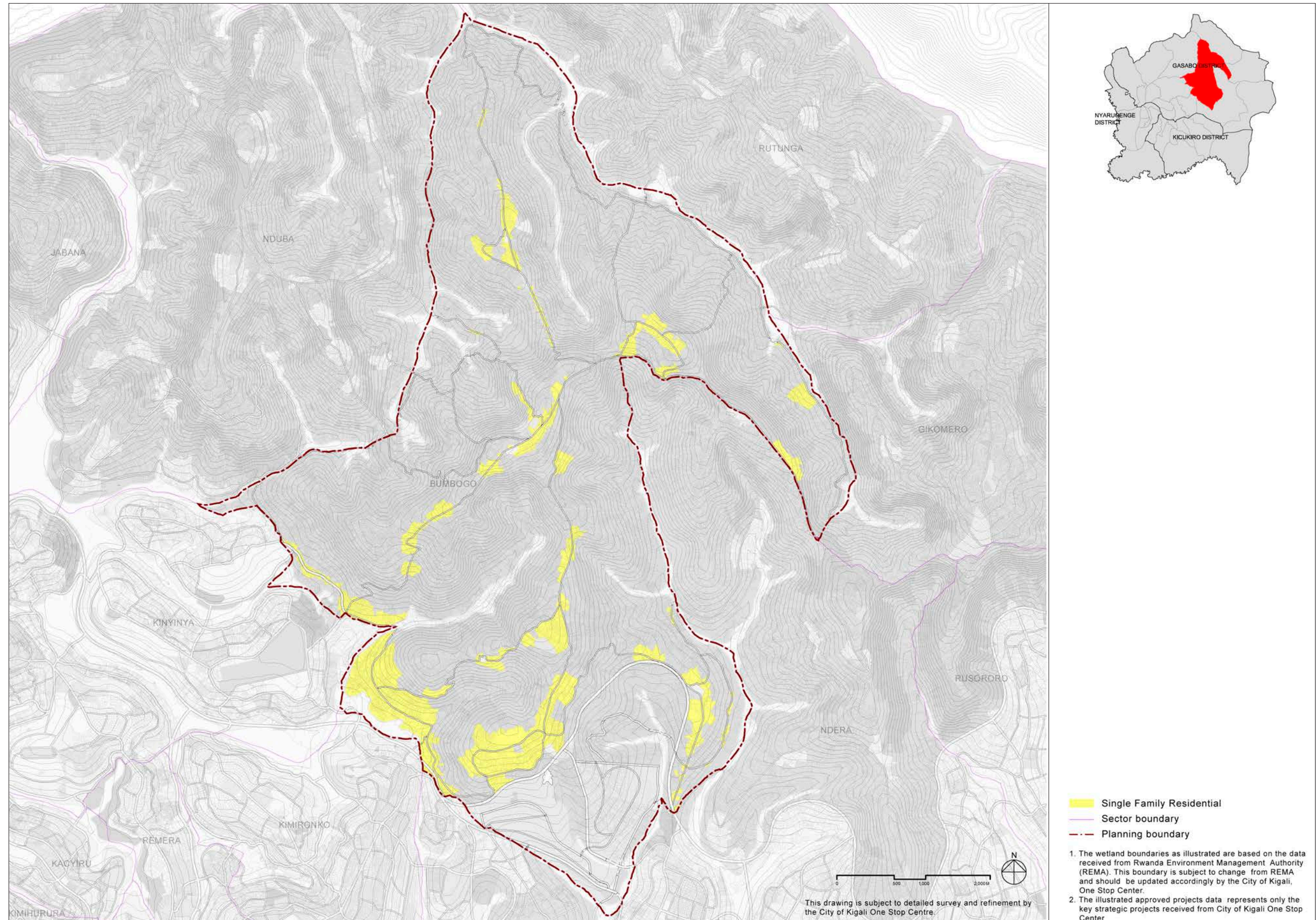


Fig.11.8 North Central Planning Area - Proposed Residential Use Plan

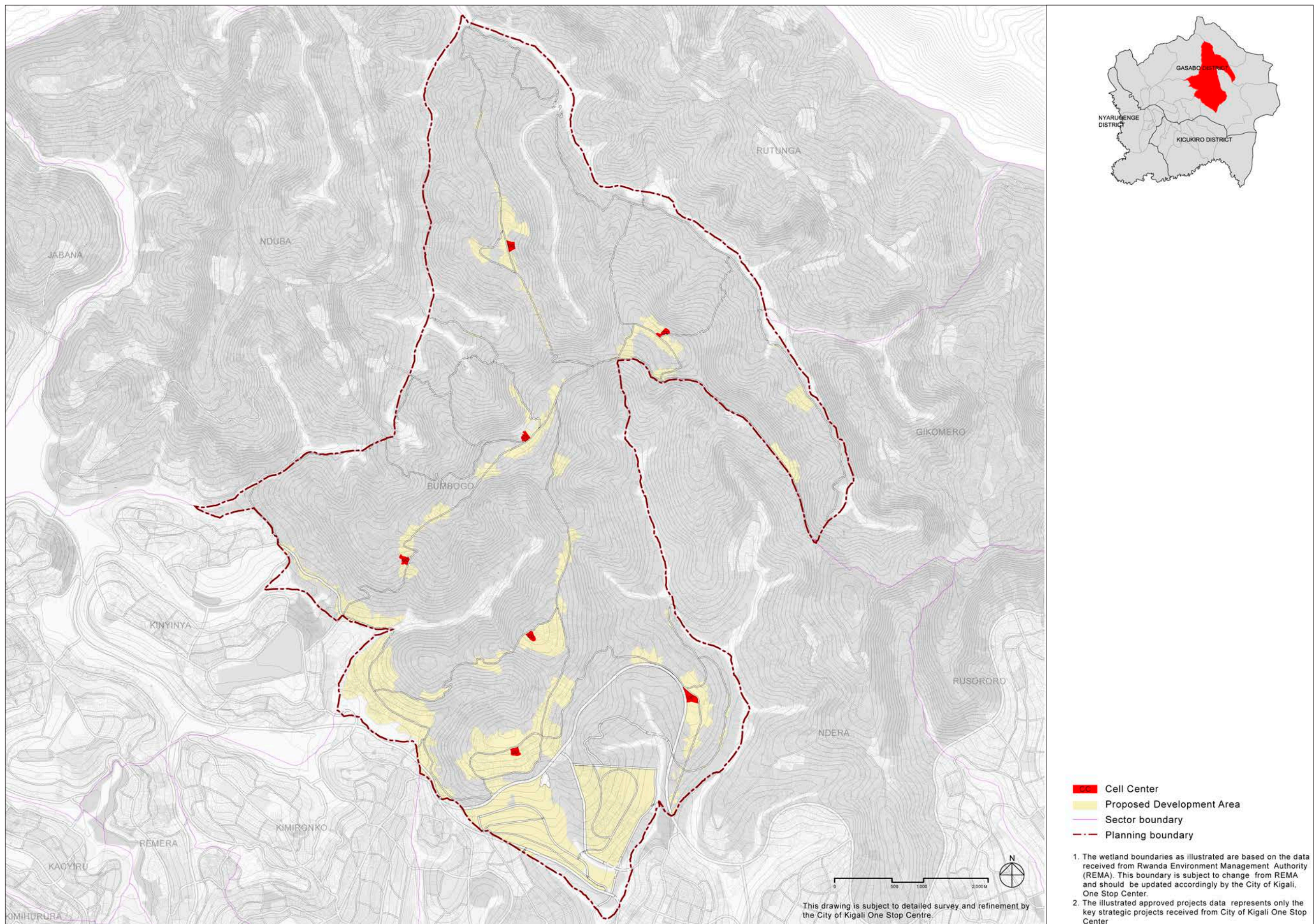


Fig.11.9 North Central Planning Area - Proposed Commercial Use Plan

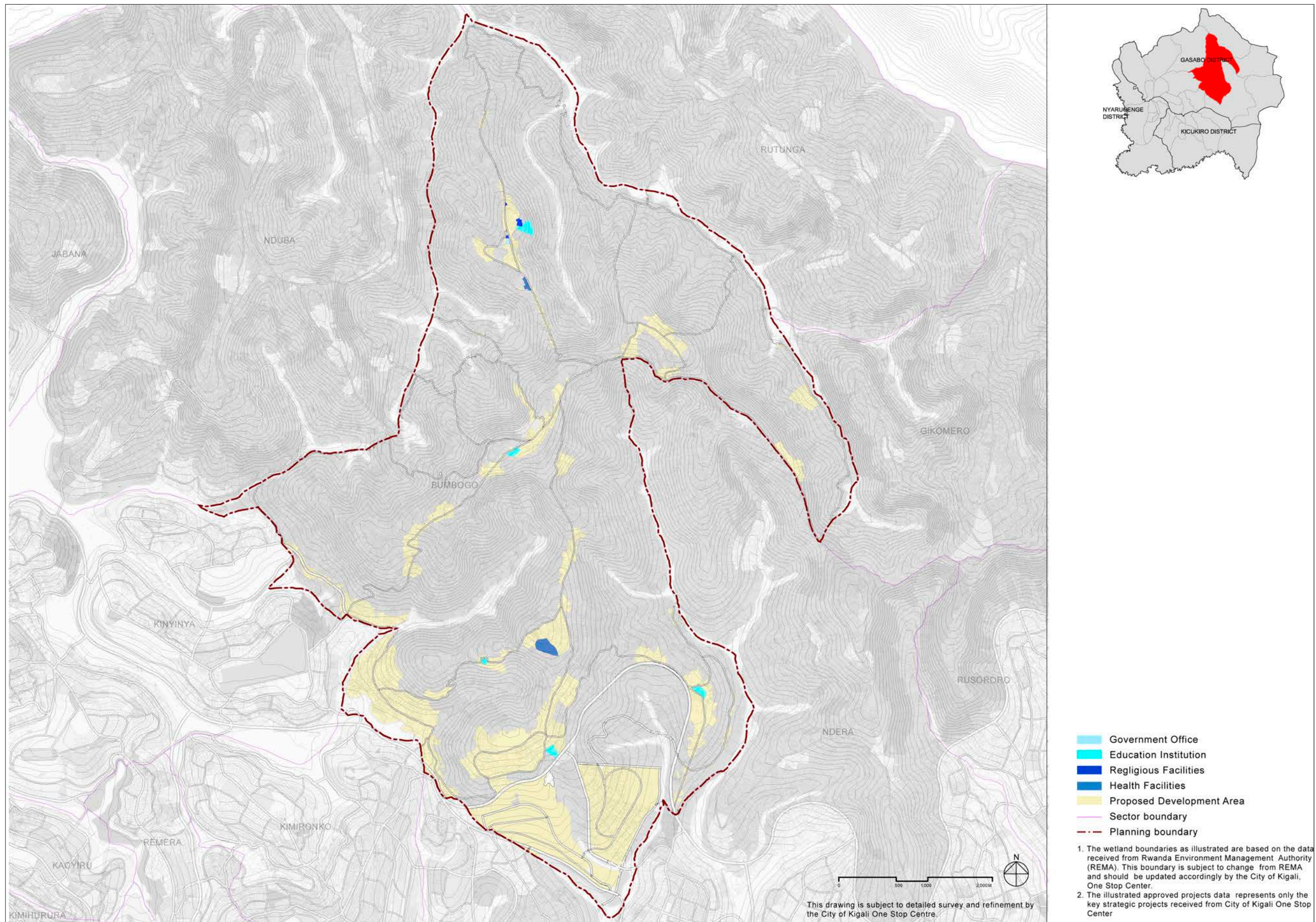
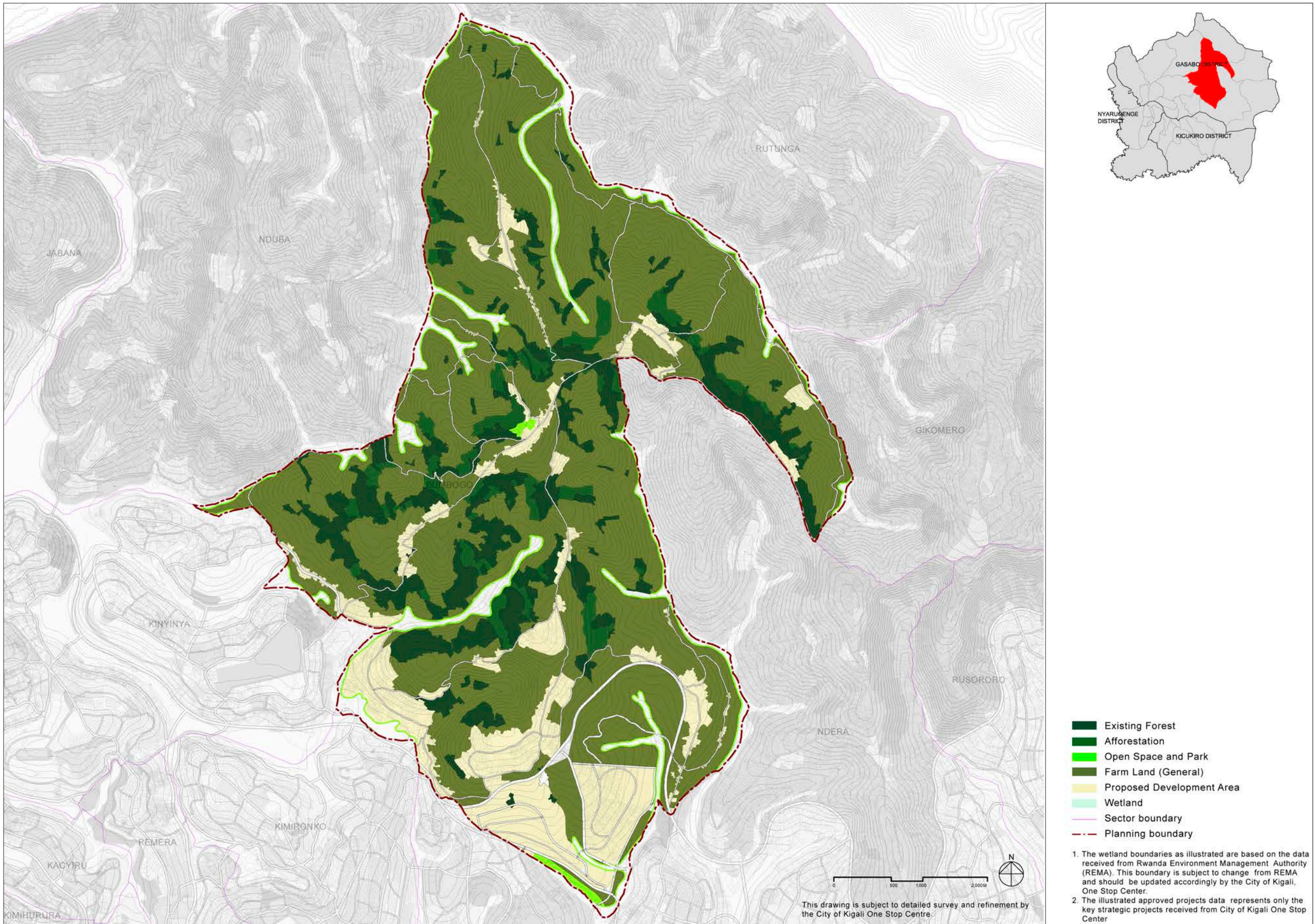


Fig.11.10 North Central Planning Area - Proposed Public Facilities Use Plan



11.6 North Central Planning Area- Proposed Key Features plan

North Central Planning Area is envisioned as the upcoming economical zone with a cultural core.

As part of the Proposed Land Use Plan of North Central Planning Area, the heritage area of Bumbogo Bw'ingara Place and the Herdsman's Park are identified as key features of the planning area. Bumbogo Bw'ingara Place and the Herdman's Park will offer planning area a new cultural identity.

1. BUMBOGO BW'INGARA PLACE

The Bumbogo Bw'ingara Place is approximately 4ha in area . Currently there exists four big old sycamore trees with a small house. In this very place existed a Palace belonging to King Rwabugiri where he married Queen Kanjogera. A new complex similar to the King's Palace is part of the proposal for this area.

This new palace could host activities such as wedding receptions, cultural performances, etc. The place could also provide space to sell artifacts and other cultural objects.

It could also accommodate a small concert area where the Bumbogo troupe could perform with a theme built on customs, traditions and taboos in Rwanda before the advent of Colonialists.

2. HERDSMAN'S PARK

The Herdsman's Park is a place dedicated to the special cattle herd called Inyambo. It is approximately 4ha in area adjoining the Bumbogo Bw'ingara Place

In this park the herdsman who raise these special cows will live in traditional ways.

They will show the rearing of these Inyambo cattle. It will help in preserving Rwandan traditions.

This park will showcase a cattle exhibition called "Kubyukurutsa" on request of the visitors / tourists. Some herdsman are well versed in poetry explaining the rearing of cattle.

The key features are illustrated in Fig.11.12

- ① Herdsman's Park
- ② Bumbogo Bw'ingara Place

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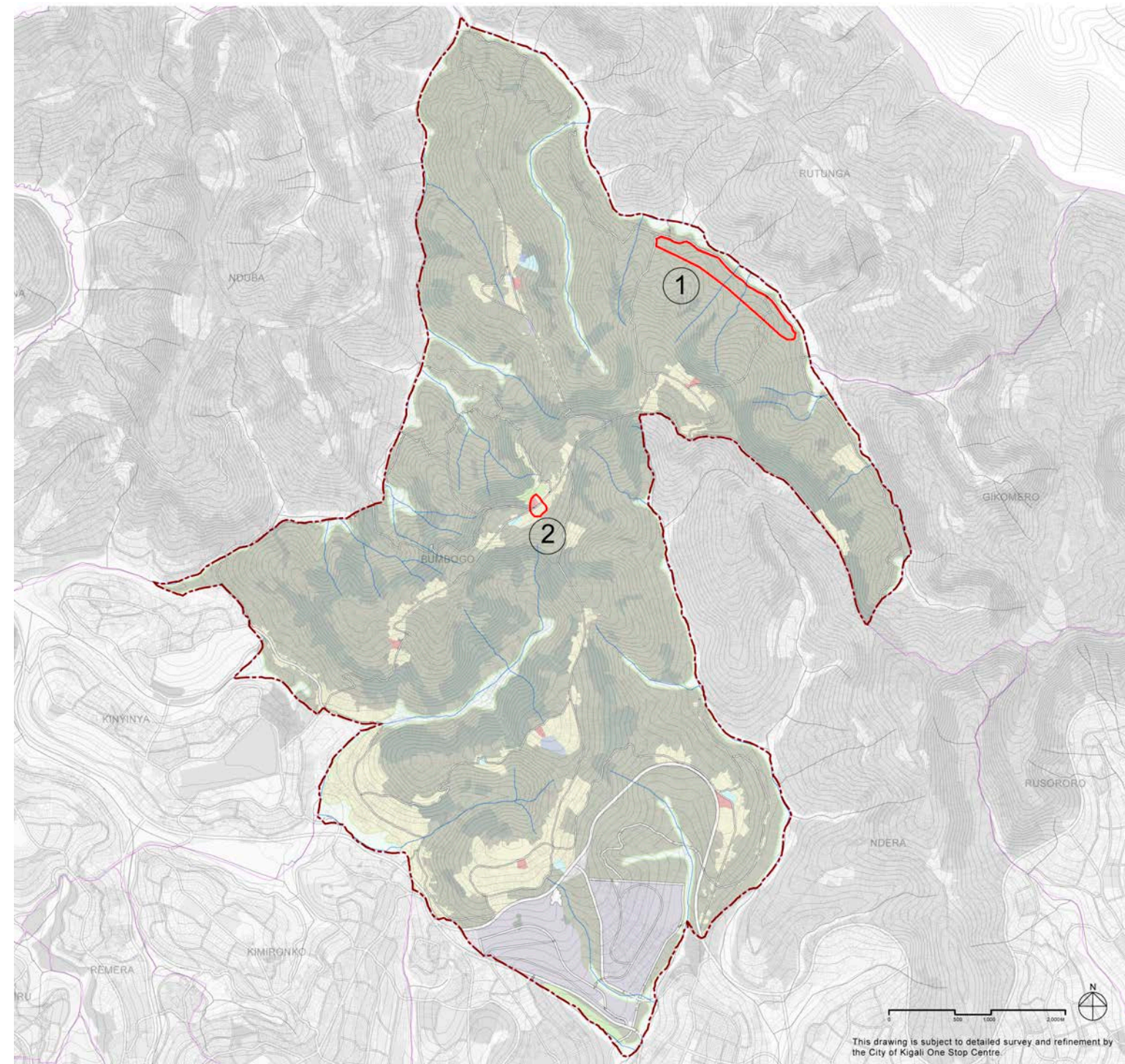


Fig.11.12 North Central Planning Area -Key Feature Plan

12

DETAILED MASTER PLAN FOR NORTH EASTERN PLANNING AREA

This sector presents the detailed Master Plan for North Eastern Planning Area. Based on the analysis of the existing context, opportunities and constraints, vision and concept are derived which guide the development of the Master Plan and design of the key features within the Planning Area.

12.1 North Eastern Planning Area - Existing Context

The North Eastern Planning Area comprises of the Rutunga and Gikomero Sectors. The total Planning area is 7773 ha.

12.1.1 LOCATION AND CONNECTIVITY

The North Eastern Planning Area of the Gasabo District is considered a rural area. The famous Lake Muhazi is located in this Area. The northern, Eastern & western borders of this Planning Area outline the Kigali City limits. The sectors of Nduba, Bumbogo, Ndera and Rusororo form the southern border of the Planning Area. There exists a linear central road that connects the road which borders Ndera and Rusororo sectors. The road parallel to Lake Muhazi connects back to this central main road. Since Lake Muhazi is a tourist attraction, the parallel road also becomes important connection.

12.1.2 EXISTING SITE CONDITIONS

Lake Muhazi borders the northern frontier of the Planning Area. Some clustered settlement exists along the linear central road while the rest of the area is largely occupied by farmlands. Farming and cultivation occurs on almost 85% of the land. Public Facilities and mixed-use developments exists on this central road. The area currently has a population of 66,000 people (2013) The North Central Planning area is a cultural place with

almost 10 sites reserved as heritage areas. These heritage areas along with the existing facilities are the key developments within the Planning Area

The existing gross population density for the Planning Area is approximately 10 p/ha.

The Existing site conditions and site context for North Eastern planning area are shown in Fig.12.3

12.1.3 NATURAL CONTEXT

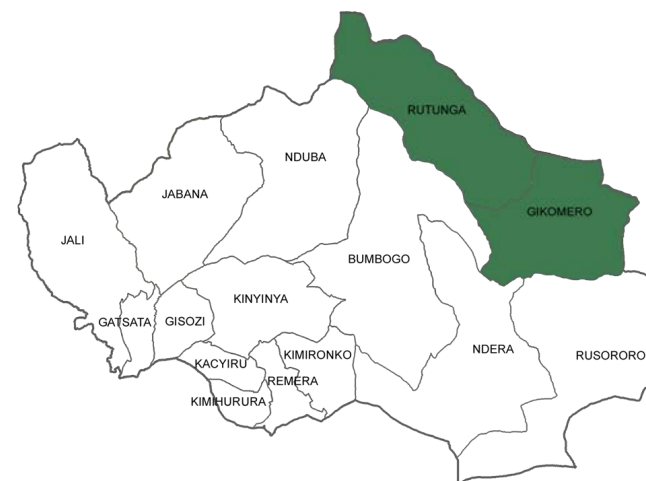
The ridge runs in a northwest- southeast direction dividing the Planning Area into two parts. The existing forest occupies only 9% of the total land.

As per the slope analysis, almost 22% of the planning area is steep. These slopes are unfavorable for any development and thus are protected. Most of this protected land is farmland. Thus maximum development occurs along the ridge.

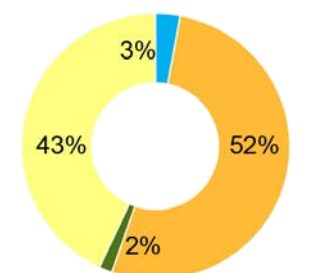
Northern, western and southern edges of the Planning Area are lined by wetlands (as per the REMA boundary). It accounts up to 9% of the planning area.

The slope analysis is illustrated in Fig.12.1 The watershed and drainage is illustrated in Fig.12.2

7,773ha
Total Planning Area



66,000
Population 2013



Natural Constraints

8p/ha
Existing Density

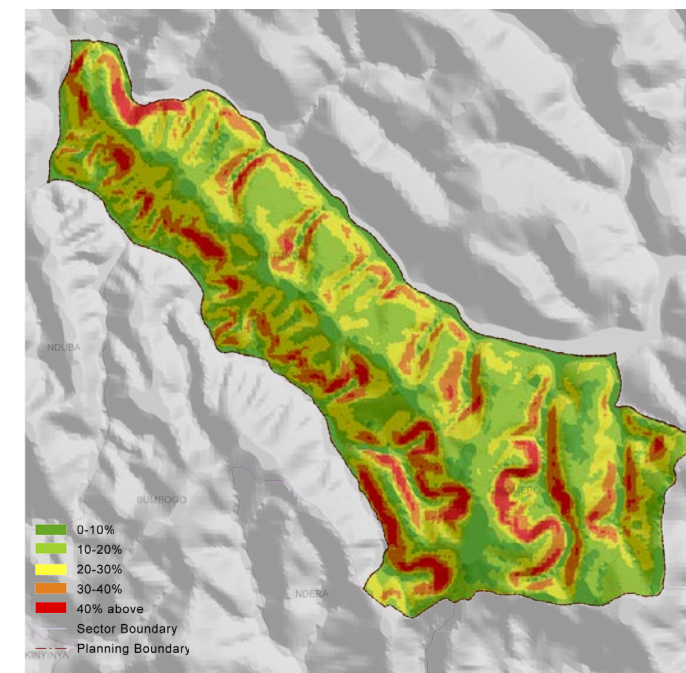


Fig.12.1 North Eastern Planning Area - Slope Analysis

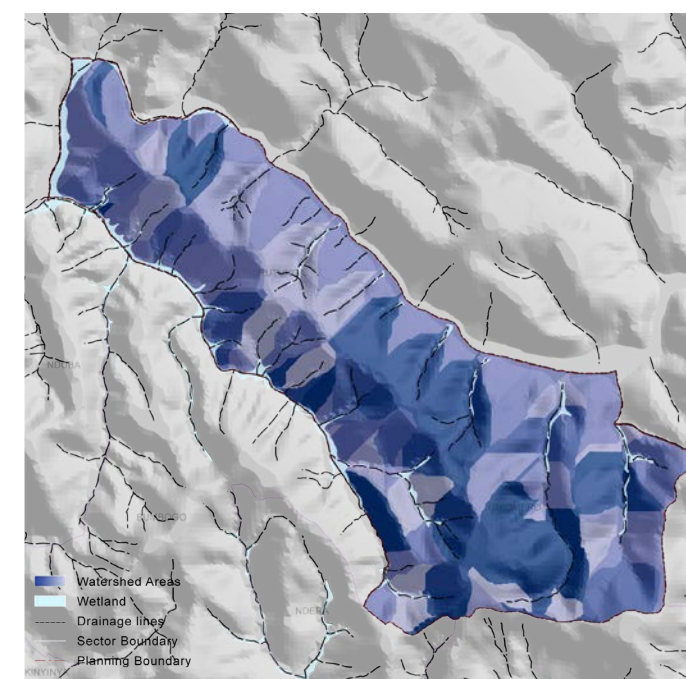


Fig.12.2 North Eastern Planning Area - Watershed and Drainage

Table 12.1 North Eastern Planning Area- Existing Land Distribution Table

BROAD LAND USE	DETAIL LAND USE	AREA (HA)	TOTAL AREA (HA)
Residential	Low Rise Residential	21	21
Commercial	Commercial General	1	1
Mixed Use	Mixed use	5	5
Public facilities	Government Office	1	28
	Educational	20	
	Religious Facilities	3	
	Health Facilities	4	
Industries	Heavy Industrial	4	4
Nature Area	Existing Forest	696	965
	Wetland	269	
Agriculture	Farmland	6324	6324
Open Space	Sports and Recreation	3	3
Water Bodies	Rivers	2	2
Infrastructure	Transportation	95	95
Total		7445	

Low Rise Residential
 Commercial General
 Commercial Office
 Mixed Use
 Government Office
 Education Institution
 Religious Facilities
 Health Facilities
 Civic Facilities
 Light Industrial
 Sports and Recreation
 Existing Forest
 Farm Land (General)

Wetland
 Wetland within planning area
 Transportation
 Vacant Land
 Major road
 Sector boundary
 Planning boundary

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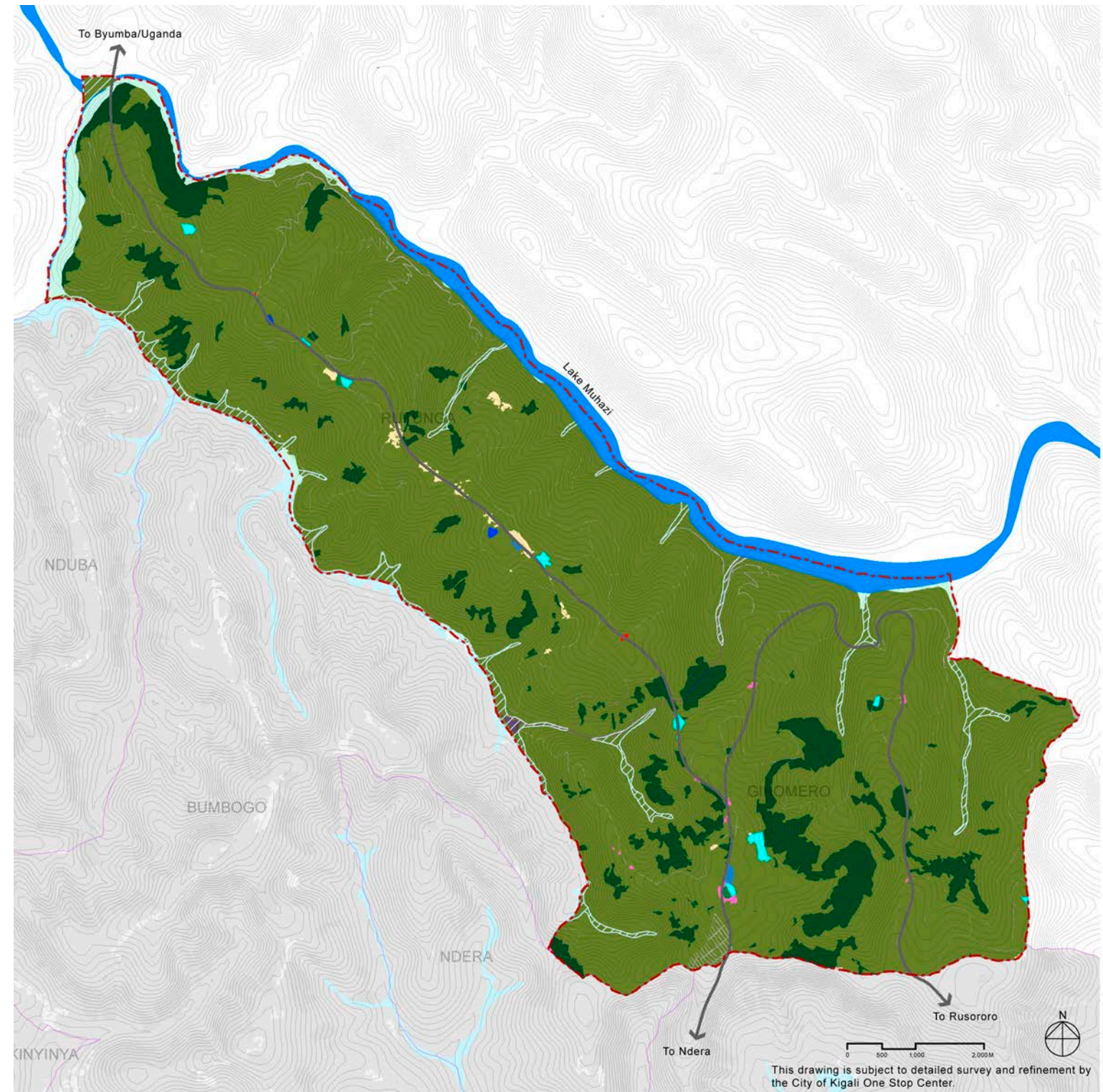


Fig.12.3 North Eastern Planning Area - Existing Site Conditions And Context Map

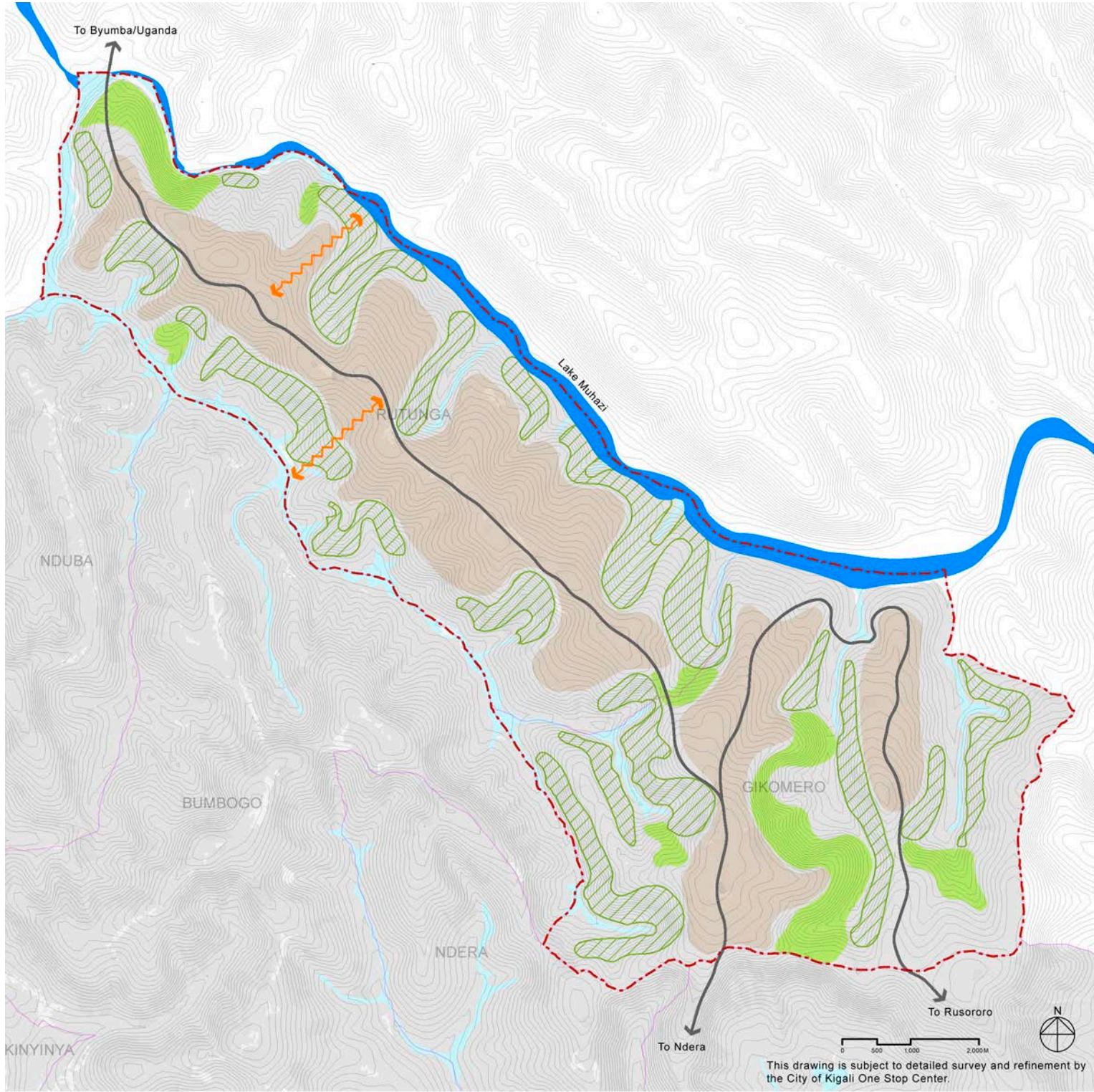


Fig.12.4 North Eastern Planning Area - Constrains Map

12.2 North Eastern Planning Area - Opportunities & Constraints

12.2.1 CONSTRAINTS

Constraints identified within North Eastern Planning area are based on existing context analysis.

These constraints are as follows

- Sparse residential development is creating a strain on the existing infrastructure.
- More commercial centres are required to support the future residential development.
- Steep slopes need to be protected thus the development is directed to the ridge.
- 50 m buffer along lake muhazi needs to be provided.

The Constraints are illustrated in Fig.12.4

- Forest conservation
- Steep slopes 40% that need to be protected to prevent soil erosion
- Scattered residential development
- Steep slopes and wetlands restrict connectivity and impose high infrastructure costs
- River
- Wetland
- Major road
- Sector Boundary
- Planning Boundary

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2. The illustrated approved projects data represents only the key strategic projects received from City of Kigali One Stop

12.2.2 OPPORTUNITIES

Opportunities identified within North Eastern Planning area are based on the existing context analysis.

The opportunities are as follows:

- The heritage sites provide an opportunity to develop touristic attractions and thus preserve the culture of the City.
- Lake Muhazi also provide an opportunity to develop touristic attractions for the Area.
- Tourism activity has the potential to provide employment and further improve the infrastructure development in the Planning area.
- There is an opportunity to develop compact clusters of residential development on flat land along the main north-south road.
- An opportunity to develop tourist attractions along the southern wetlands, which border Bumbogo sector could be explored.
- There is an opportunity to develop on the existing public facilities in order to support the future residential development.
- Another opportunity is to develop, new parks and open spaces utilizing the drainage and steep slopes to create a continuous green network.

The Opportunities are illustrated in Fig.12.5

- with new facilities
- Opportunity to develop major commercial nodes
- Good site views
- Continuous wetland park connections
- Opportunity to develop large nature areas utilizing existing forests and greens
- Potential low density development areas with scenic views
- Opportunity to reorganize existing built up area with commercial uses
- River

- Wetland
- Major road
- Sector Boundary
- Planning Boundary

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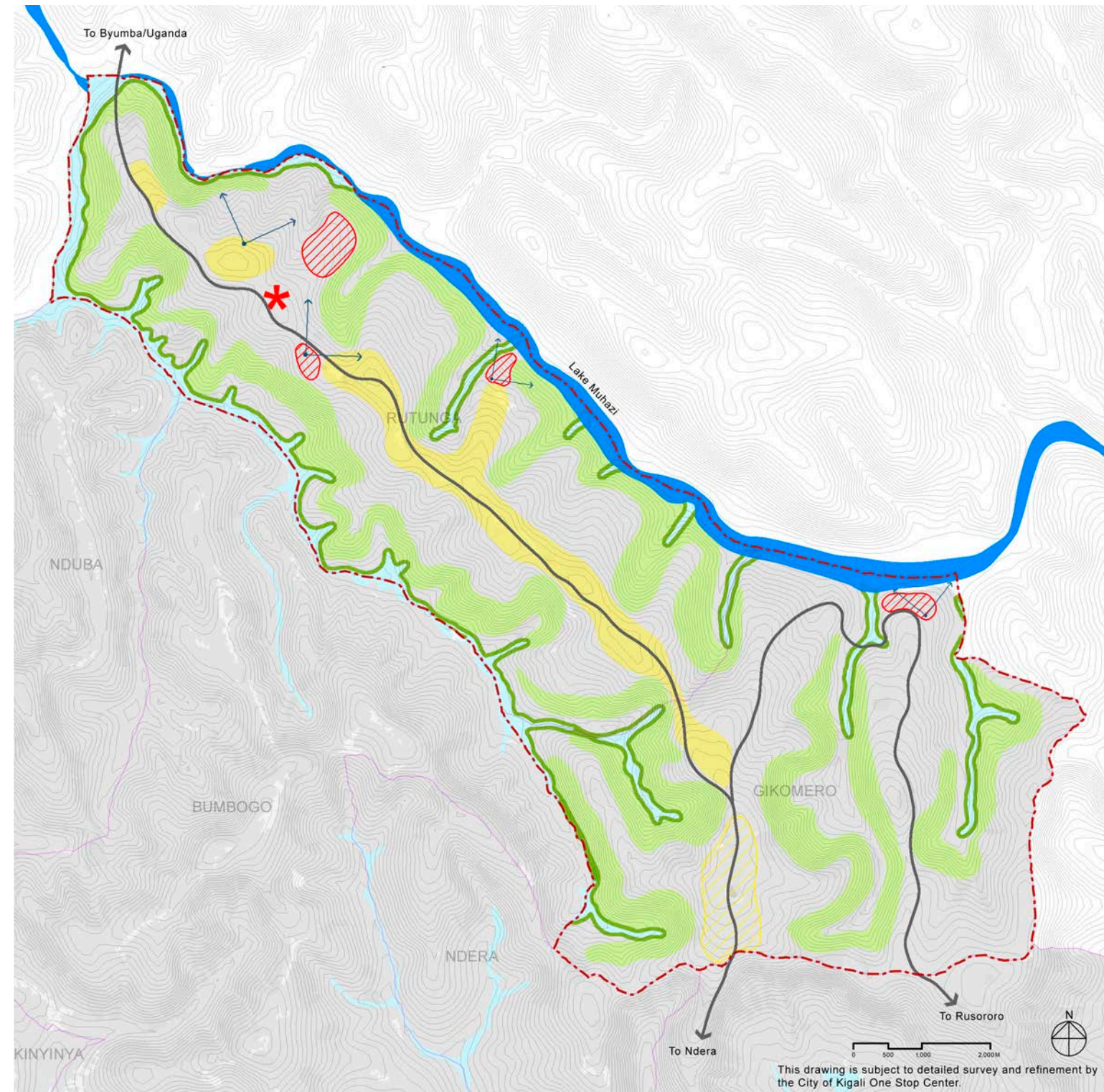


Fig.12.5 North Eastern Planning Area - Opportunities Map

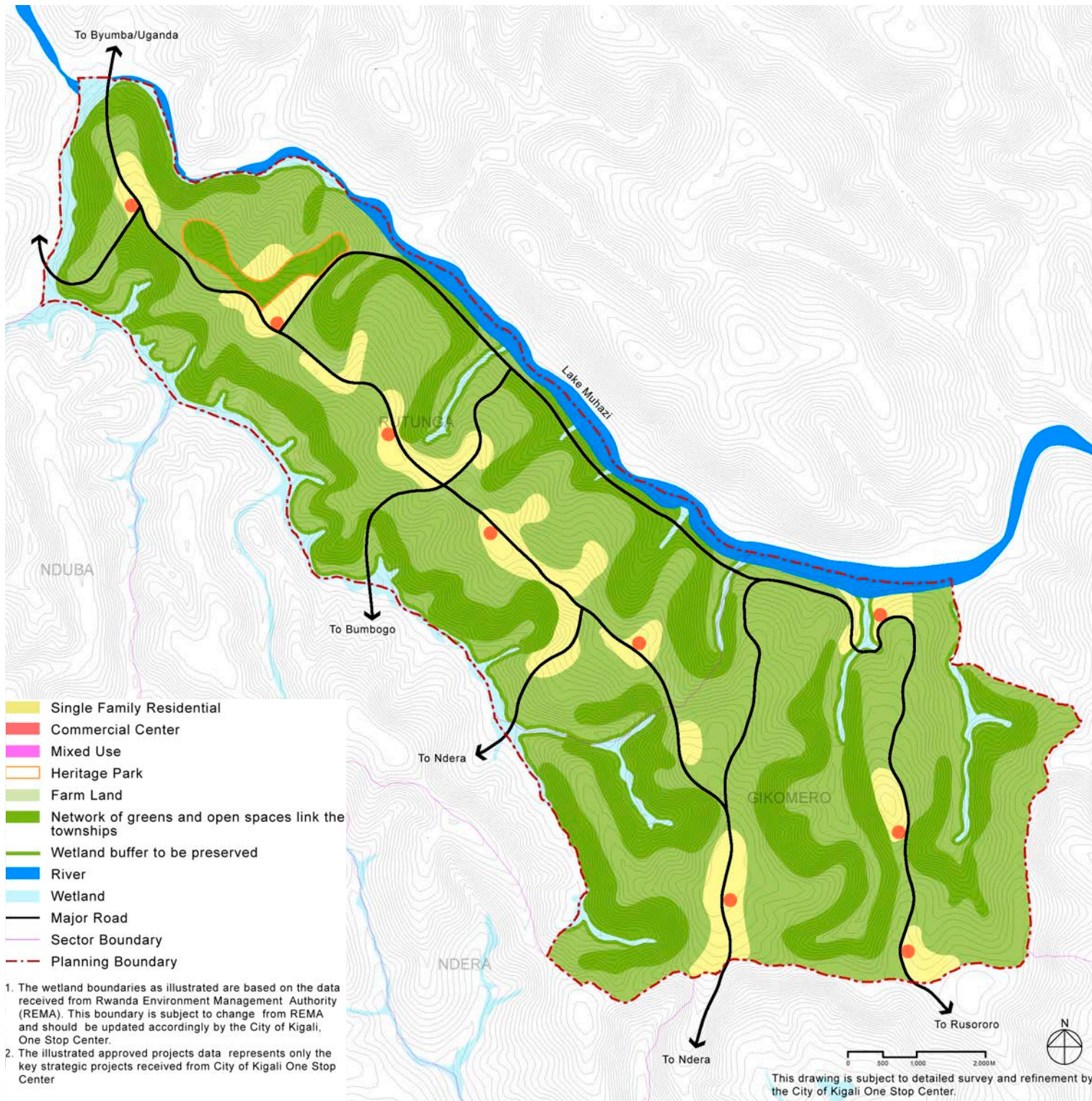


Fig.12.6 North Eastern Planning Area - Concept Plan

12.3 North Eastern Planning Area- Proposed Vision

'Pristine Waterfront Destination'

Lake Muhazi and the ten heritage sites adorns the Planning Area. Thus the Area is envisioned as a touristic destination that provides the opportunity to explore unique culture of the City while experiencing the mesmerizing scenery of the Lake. It would offer resorts, restaurants and adventure sports activities which leverages on its location as well as scenic views. The Area would also offer residential opportunities to live within natural settings.

vision, a development concept has been proposed for the Planning Area.

The key proposals of the concept plan are as follows:

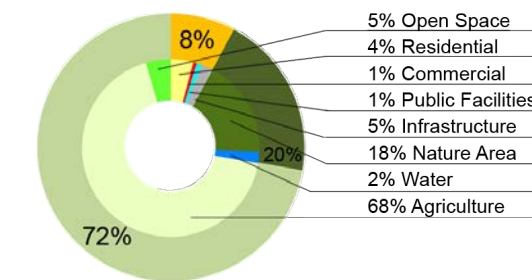
- Lake Muhazi Tourism Area- To capture upon the scenic views of Lake Muhazi and the valley.
- Agro-tourism valley- An opportunity to encourage visitors to experience agricultural life.
- Heritage Park- A park that celebrates the various heritage sites and builds upon the legends of the place.

The Concept is illustrated in Fig.12.6

12.4 North Eastern Planning Area - Proposed Concept

Based on the existing context, opportunities and constraints as well as the proposed

79,000
Projected Population Year X



Proposed Land Distribution

10p/ha
Proposed Density

72%
Total Open Spaces

20%
Total Nature Area

8%
Total Urbanized Area



12.5 North Eastern Planning Area- Proposed Land Use Plan

The Land Use Plan aims to provide the information on the location, distribution and character of the future Land Uses within the Planning Area.

The key strategies proposed in the Land Use Plan are:

- To propose restaurants and resorts along the Lake Muhazi
- To propose activity nodes along the Agro-tourism valley.
- To develop a park connecting all the heritage sites.
- To redevelop some traditional lifestyles experience within the park.
- To redevelop single family residential neighborhoods along the linear central road of the Planning Area.
- To integrate and support the tourism activities, single family residential development is proposed near resorts and hotels.
- To propose cell centres that integrate the existing public facilities supporting the increased residential population.
- To safeguard steep slopes through afforestation
- To safeguard the areas of natural drainage courses as ecological corridors.

The projected population of North Central Planning is approximately 79,000 people by Year X.

The gross projected population density for the Planning Area is approximately 10 p/ha.

The Proposed Land Use Plan is illustrated in Fig.12.7.

12.5.1 NORTH EASTERN PLANNING AREA- PROPOSED RESIDENTIAL USE PLAN

- New single family residential development

is proposed along the linear central road, along the ridge.

- The existing residential clusters are enlarged and rezoned as single family residential development.
- Single family residential developments are proposed along the Lake Muhazi.
- These new residential clusters, some of which are proposed to be developed by rezoning the umudugudu sites, will help address the future housing demand in the Gasabo District.

The Residential Use Plan is illustrated in Fig.12.8.

12.5.2 NORTH EASTERN PLANNING AREA- PROPOSED EMPLOYMENT PLAN

- Resorts and hotel developments are proposed overlooking the Lake Muhazi and well accessed from the road parallel to Lake Muhazi.
- Along with resorts, restaurants and hotels, small farmers markets are proposed along the Agro- tourism valley.
- Mixed use development within the Heritage park is proposed.
- Commercial sites within the imudugudu are proposed to be re-utilized for the development of the new cell centres.
- 11 new cell centre approximately 1.2ha in size are located within residential development.
- These centres comprise of cell office, small scale retail shops and health posts.

The Commercial Use Plan is illustrated in Fig.12.9.

12.5.3 NORTH EASTERN PLANNING AREA- PROPOSED PUBLIC FACILITIES

- Additional facilities depending upon the accessibility of the proposed population have been added.
- The existing public facilities in the

Planning Area have been retained.

- Public facilities such as health centres, community halls and churches, etc are integrated with the cell centre.

The proposed Public facilities are illustrated in Fig.12.10.

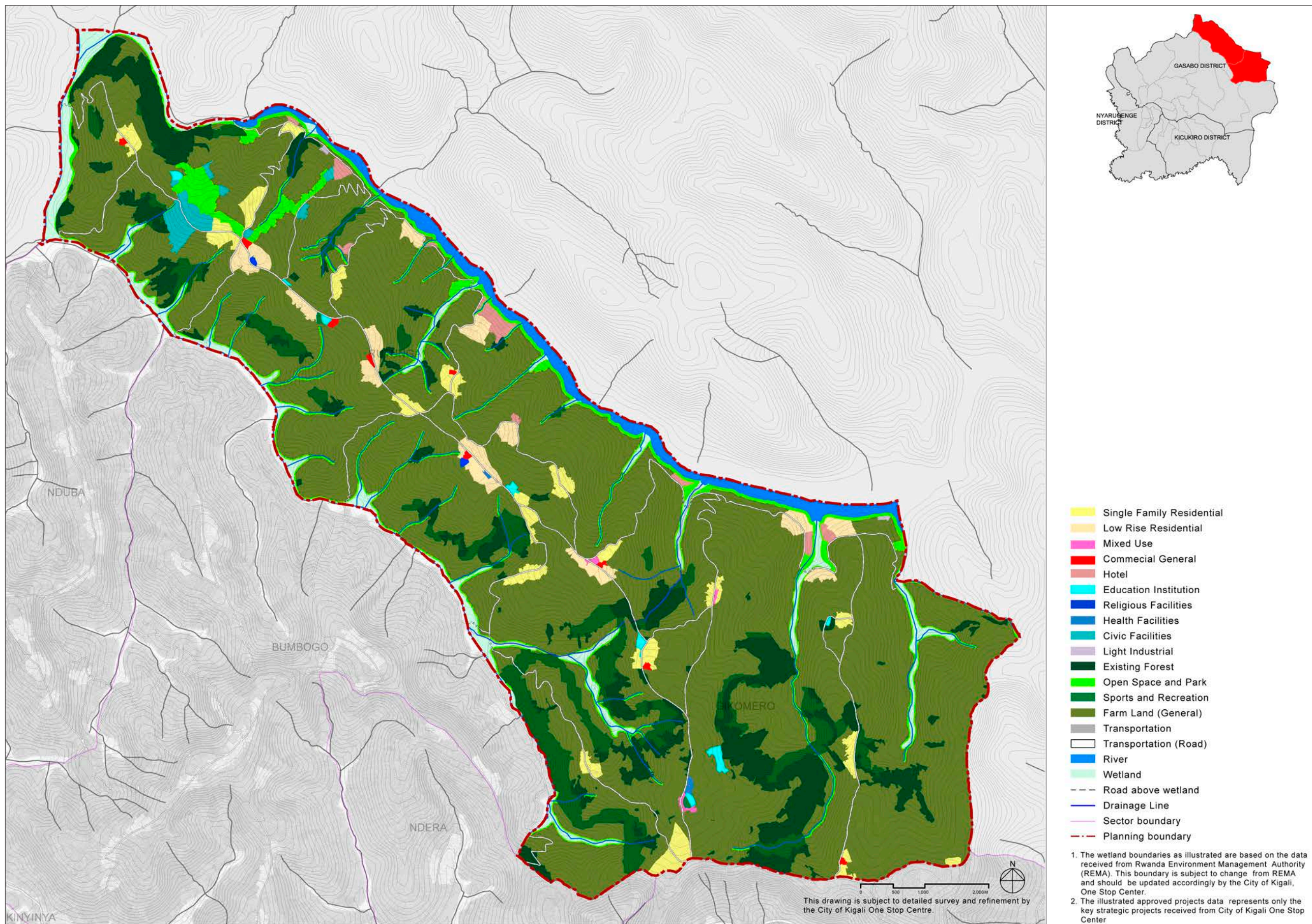
12.5.4 NORTH EASTERN PLANNING AREA- PROPOSED GREEN AND OPEN SPACES PLAN

- The Heritage park connects to the wetland buffer, thus connecting two main tourist attractions.
- Areas along the natural drains and along wetlands are protected as ecological corridors. These corridors form a part of the storm water management system and are part of the larger green connector network proposed for the Gasabo District.
- Hotels and resorts are proposed along these ecological corridors, thus bringing the nature closer.

The proposed Green and Open Spaces are illustrated in Fig.12.11.

Table 12.1 North Eastern planning area- Proposed Land Use distribution

BROAD LAND USE	DETAIL LAND USE	AREA (HA)	TOTAL AREA (HA)
Residential	Single family Residential	322	330
	Low Rise Residential	8	
Commercial	Commercial General	11	49
	Hotel	38	
Mixed Use	Mixed use	5	5
Public facilities	Educational	18	72
	Religious Facilities	3	
	Health Facilities	3	
	Civic Facilities	48	
Industries	Light Industrial	2	2
Nature Area	Existing Forest	688	1431
	Afforestation	437	
	Wetland	306	
Agriculture	Farmland	5185	5185
Open Space	Open Space and Park	371	374
	Sports and Recreation	3	
Water Bodies	Rivers	170	170
Infrastructure	Transportation	141	141
	Total	7773	



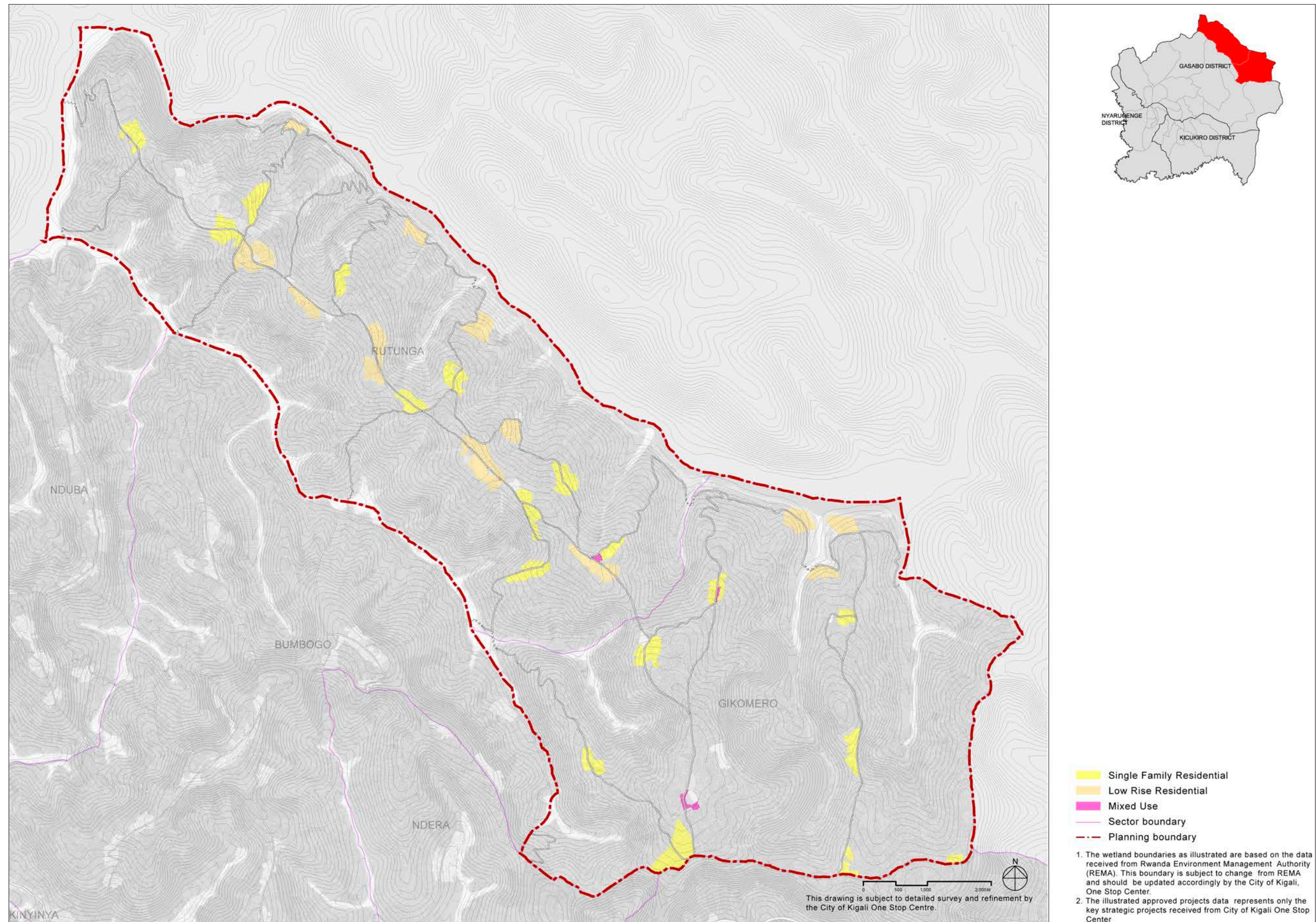


Fig.12.8 North Eastern Planning Area - Proposed Residential Use Plan

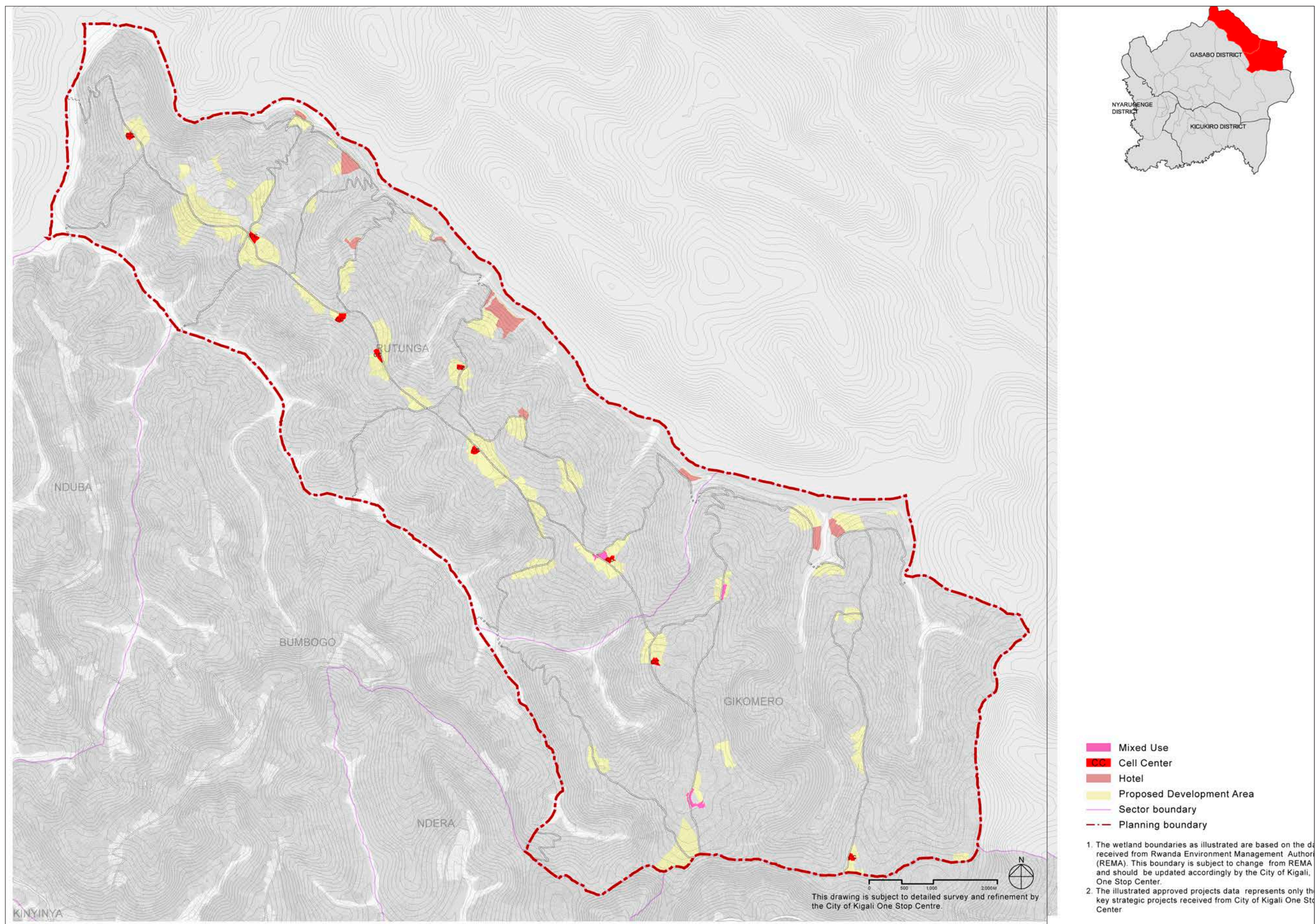


Fig.12.9 North Eastern Planning Area - Proposed Commercial Use Plan

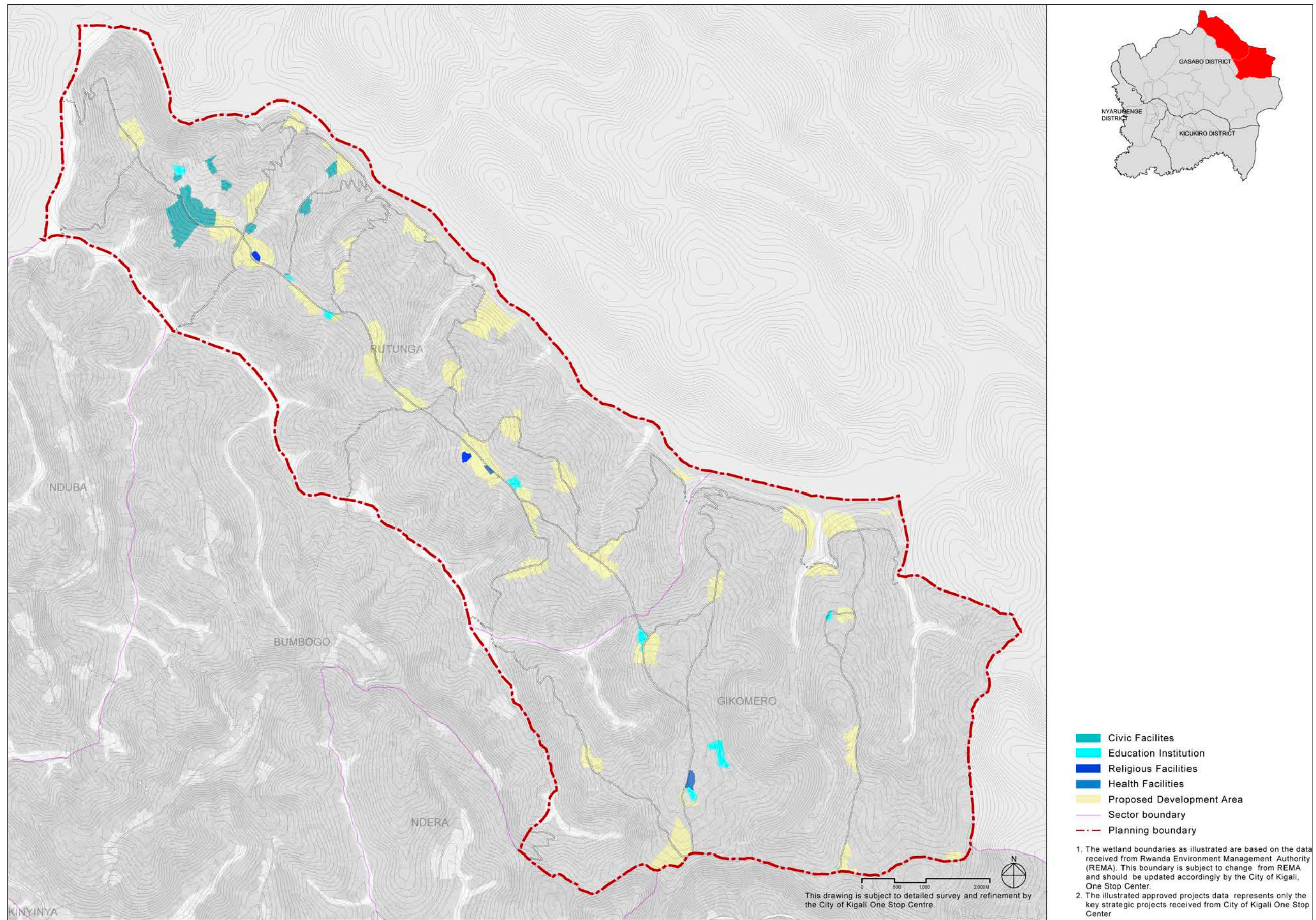


Fig.12.10 North Eastern Planning Area - Proposed Public Facilities Use Plan

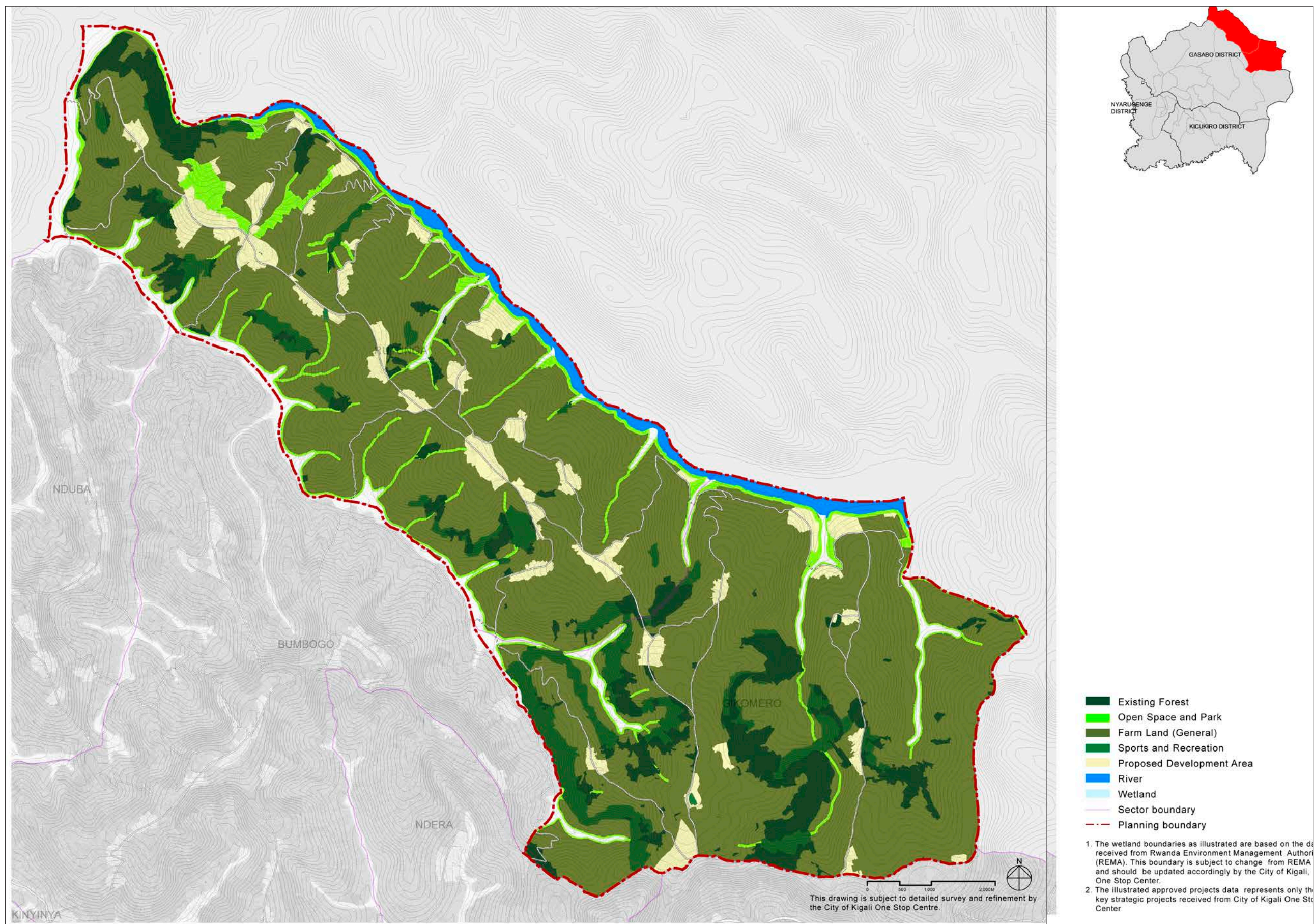


Fig.12.11 North Eastern Planning Area - Proposed Green and Open Space Use plan

12.6 North Eastern Planning Area- Proposed Key Features plan

The Planning Area is envisioned as a touristic destination where culture could be explored with a pleasure of being within scenic the natural settings.

As part of the Proposed Land Use Plan, two areas are identified as key features of the planning area. Heritage Park and the Agro-tourism valley offer Planning Area new identity.

HERITAGE PARK

Each of the Heritage sites are unique in nature. Each place has a story to showcase. The Ridge Park is a linear park along the main north-south access of the Planning Area, along the ridge. The activities like woodland walks, climbing, bike-rides, horse rides, camping would bring people closer to the nature. It would also provide an opportunity for eco-learning by proposing a nature interpretation centre within the park.

ECO ENERGY FARM

The ECO energy farm would be the new opportunity for the City to explore with the various renewable energy methods. Solar cells, wind farms, growing of fuel-crops, etc could be some of the renewable energy source activities within the ECO farm.

Multi-use of the same land in terms of food production as well as energy production is also part of the renewable energy resource. This multi use could be efficient with wind farming and solar cell installations. For example, the wind turbines could be installed alongside the crops or even on the animal grazing land. The turbines could generate enough energy to power the farm, or even produce extra energy to supply to the imudugudu's.

The Key features are illustrated in Fig.12.12.

- ① Heritage Park
- ② ECO Energy Farm

1. The wetland boundaries as illustrated are based on the data received from Rwanda Environment Management Authority (REMA). This boundary is subject to change from REMA and should be updated accordingly by the City of Kigali, One Stop Center.
2. The illustrated approved projects data represents only the key strategic projects received from City of Kigali One Stop Center

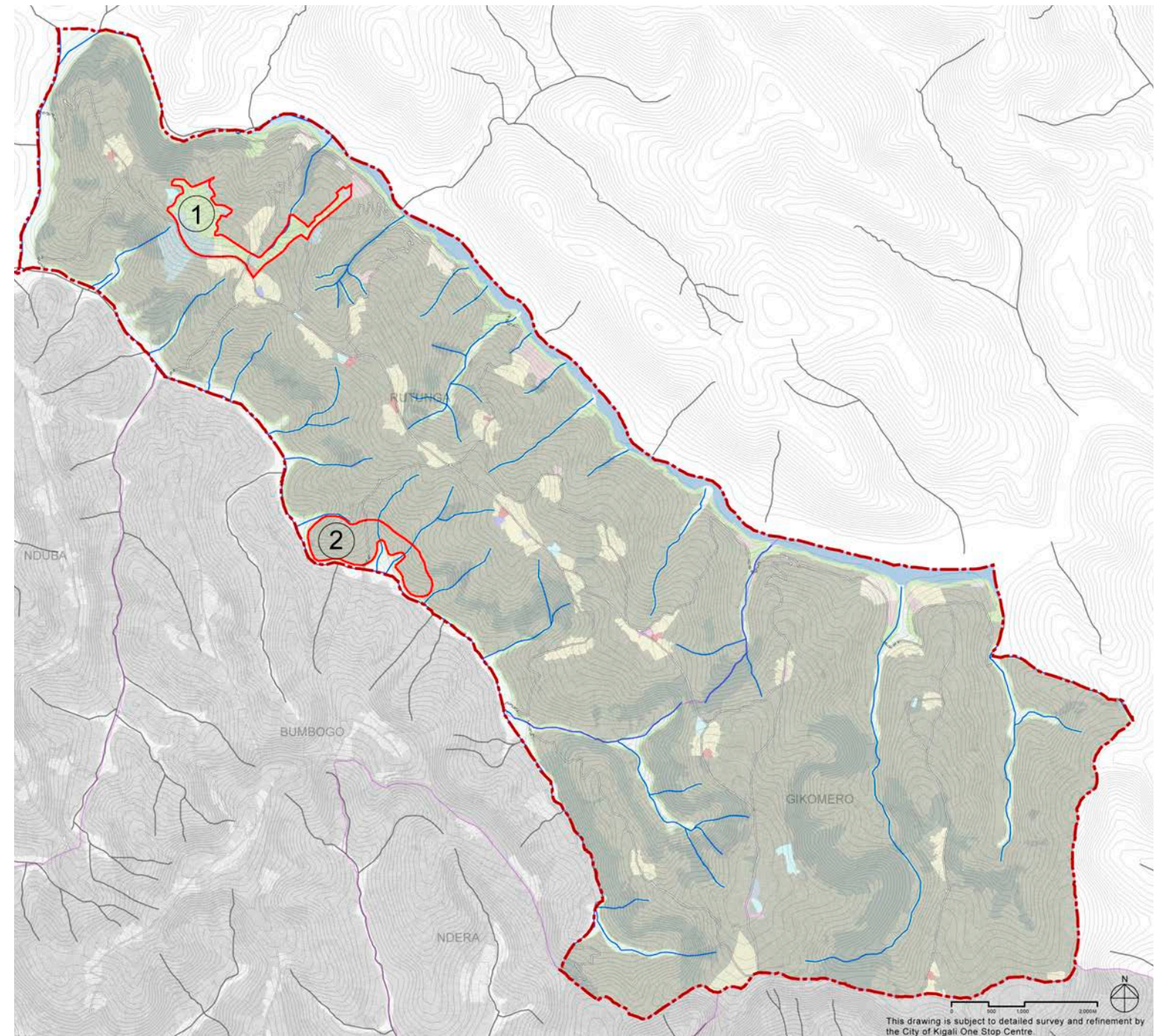


Fig.12.12 North Eastern Planning Area - Key Feature Plan

13 WAY FORWARD

13.1 Way Forward

13.1.1 SUMMARY

The Detailed Guide-plan report defines the planning approach and crystallizes the broader planning concepts into detailed Land Use and the zoning plan for the district.

The Gasabo DMP Year X, illustrates and discusses how the redevelopment of Gasabo can be carried forward. The plan follows the directions set by the Concept Plan and provides the Detailed Guide Plan for Gasabo District.

The DGP proposes:

- Setting a clear hierarchy for commercial and employment centres
- Injecting a variety of housing to provide quality as well as affordable housing with well distributed public amenities.
- Enhancing accessibility by providing better & more transportation choices.
- Re-networking the green system to provide variety of open spaces and protecting the existing nature areas.
- To develop a unique identity with exclusive heritage, culture, tourist and recreational areas
- Provide a zoning plan with updated regulations and guidelines.

Zoning Plan Report:

Zoning Plan report for the two districts are produced concurrent to the DGP report which further refines the guidelines with the following key additions:

- Defined process for Non-Standard Application with clear assessment criteria and review committee comprising of representatives and experts from key regulatory bodies;
- Evaluation criteria for special institutional

- buildings;
- Variety of Zoning Overlay Plans to guide zoning in specific areas which stipulate additional zoning regulations that will supersede the zoning guidelines; and
- Elaborate categories of uses to be considered for application assessment.

13.1.2 FOLLOW UP

STAGE 5: URBAN DESIGN

In line with the Land Use proposal, special areas in the district have been identified to be developed for detail Urban Design. Each district in Kigali is to have an urban design proposal for the identified key area. Kimironko-Gisimenti area in Gasabo and Gahanga area in Kicukiro have been identified as areas to have a detailed Urban Design Plan. The Urban Design Plan will look at the detailed context of the site and translate the proposed zoning and Land Use in a three dimensional plan for the area. This plan will demonstrate how the proposed development can enhance the character and identity of the place so as to become a special feature for the city to demonstrate urban renewal and redevelopment. Detailed Urban Design regulations would also be prepared for selected Urban Design areas. These catalyst projects will showcase the districts potential and attract future investments.

STAGE 6: IMPLEMENTATION STRATEGY

The Master Plan by itself has no power to develop the economy nor to improve the living quality of the people unless supported by efficient implementation strategies. Coordination with related Ministries & Authorities is key to the successful implementation of the Master Plan and in achieving the vision for the city. To forge better integration with regards to land utilization in the city, it is recommended to explore the possibilities of strengthening the capacity of different

institutions including One-Stop Centre by expanding its coordinating role.

The implementation strategy focuses on various issues is prepared which will highlight:

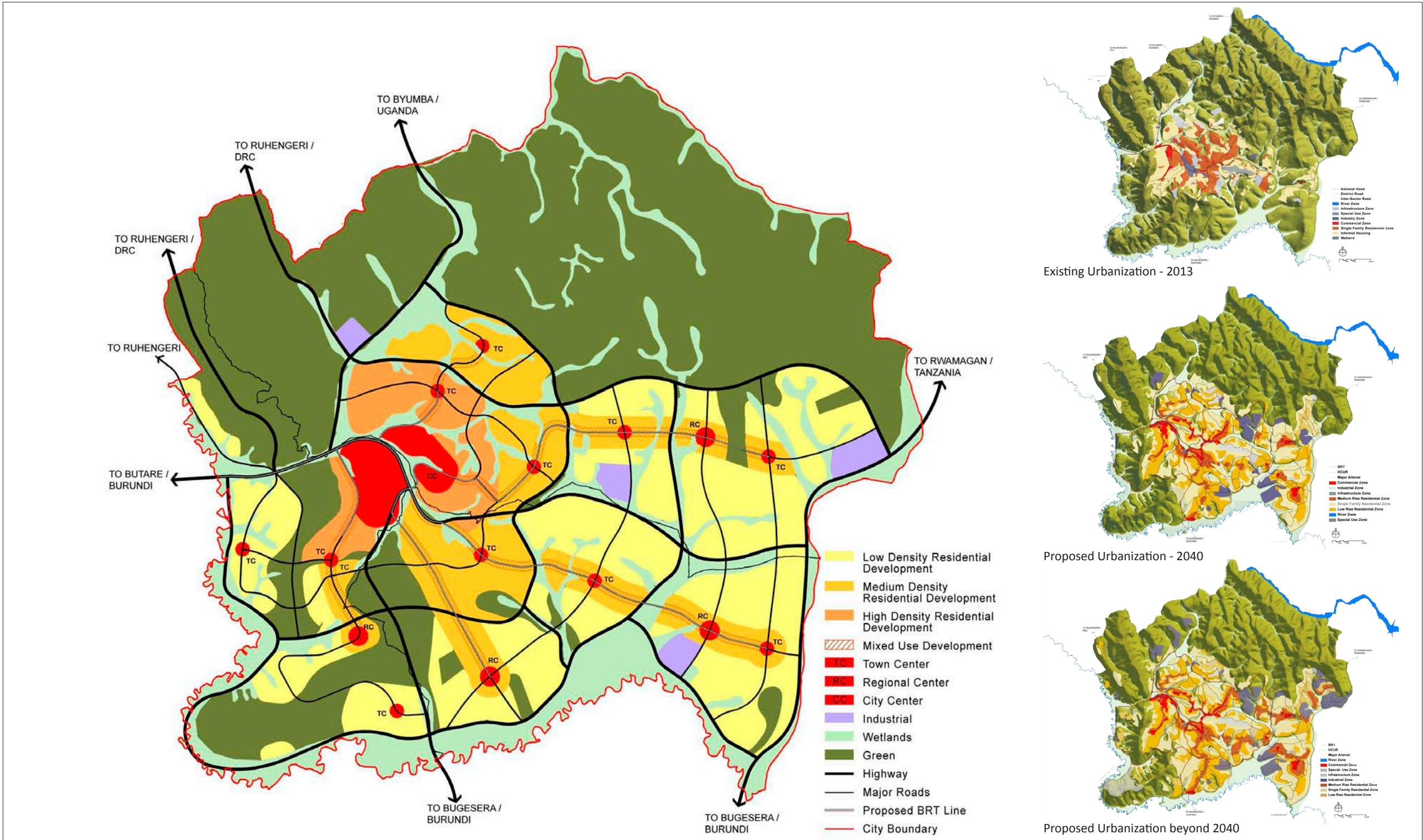
- Implementation and Refinement of Zoning Guidelines
- Capital Improvement Plan
- Additional Implementation Action Plan

GIS SETUP

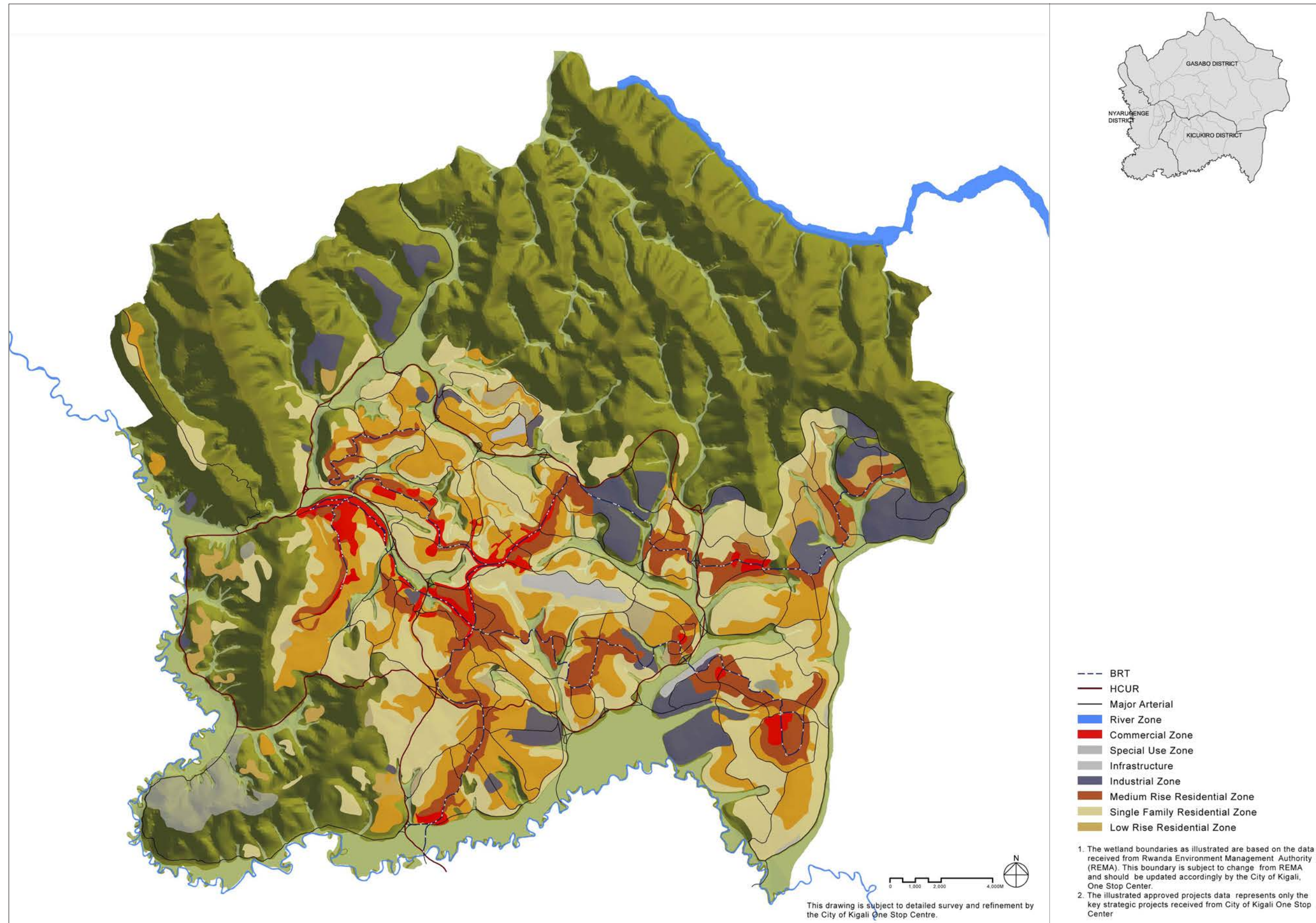
To establish a GIS database for the entire City which has a coordinated base map, proposed Land Use plan & development control information for all areas of the City.

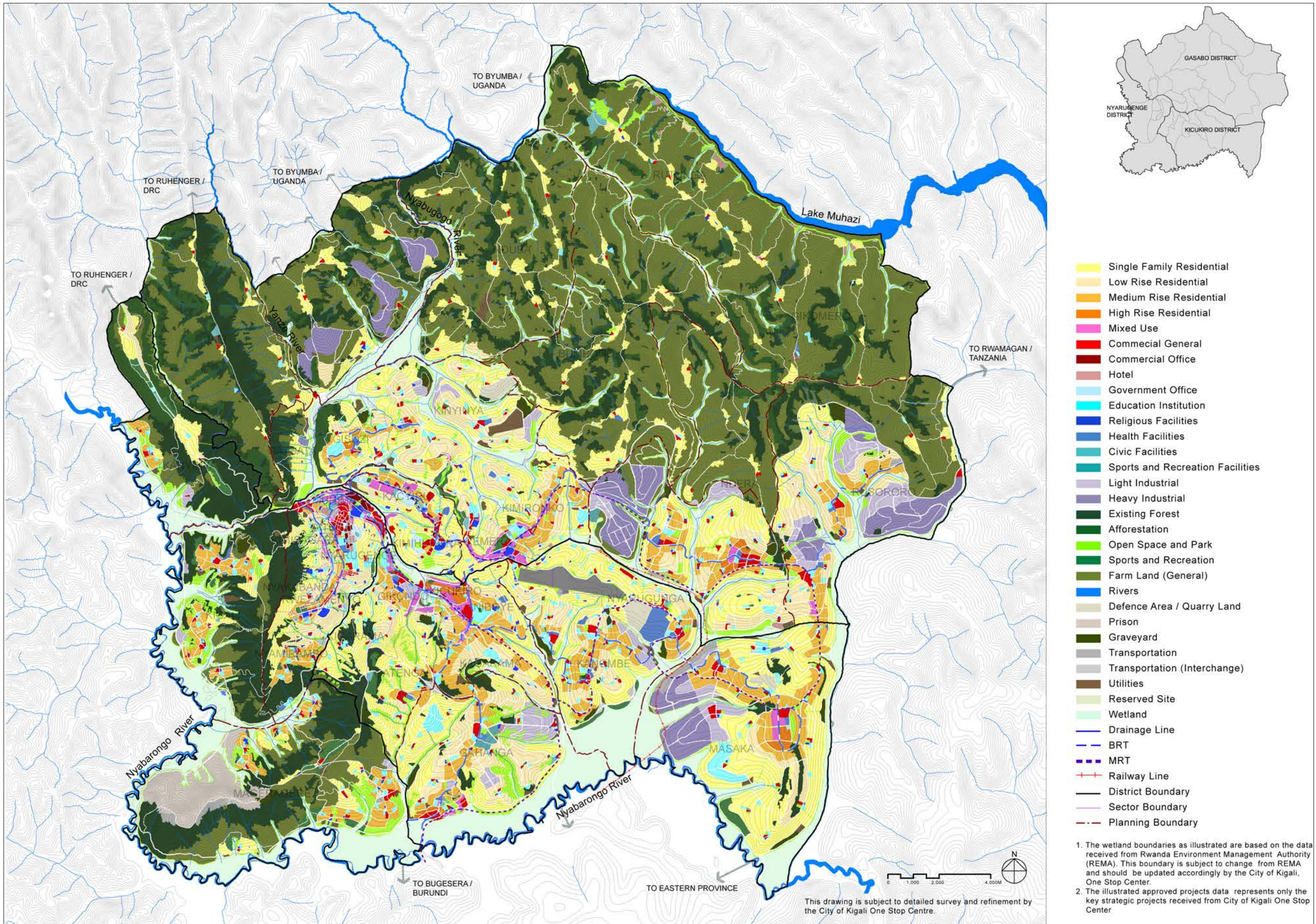
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APPENDIX 1: KIGALI CITY CONTEXT



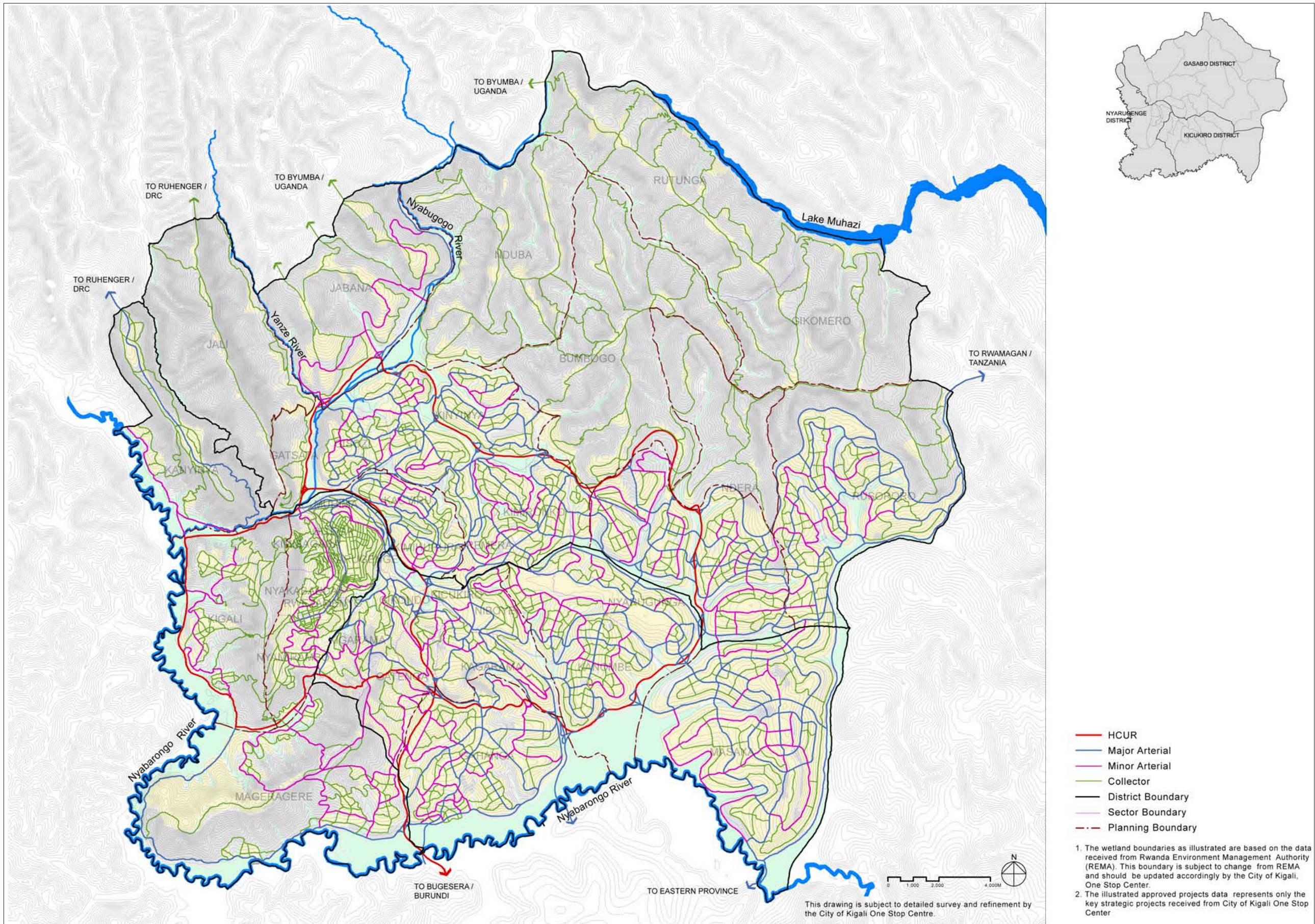
Kigali City - Structure plan



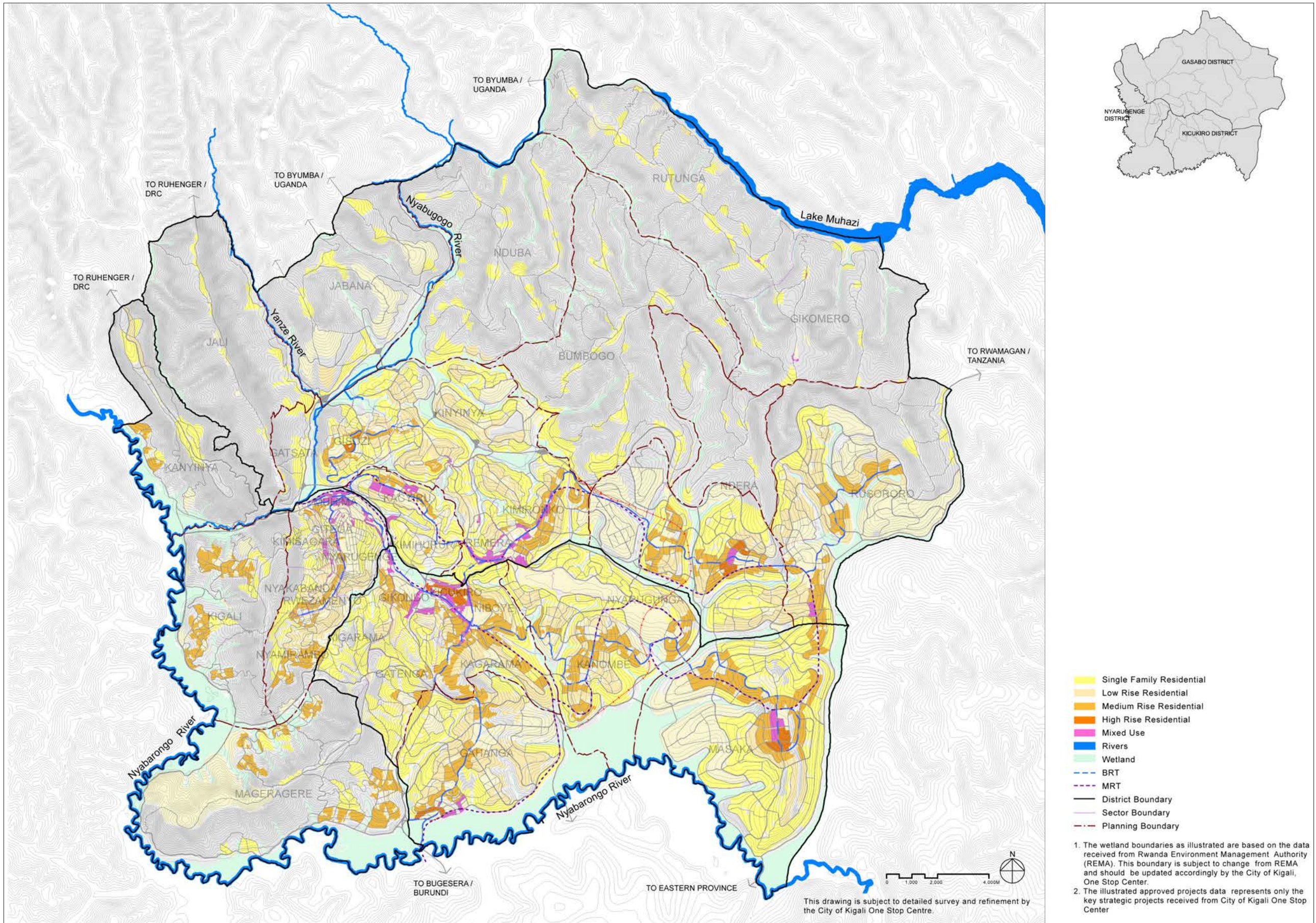


Kigali City - Land Use Plan - Year X

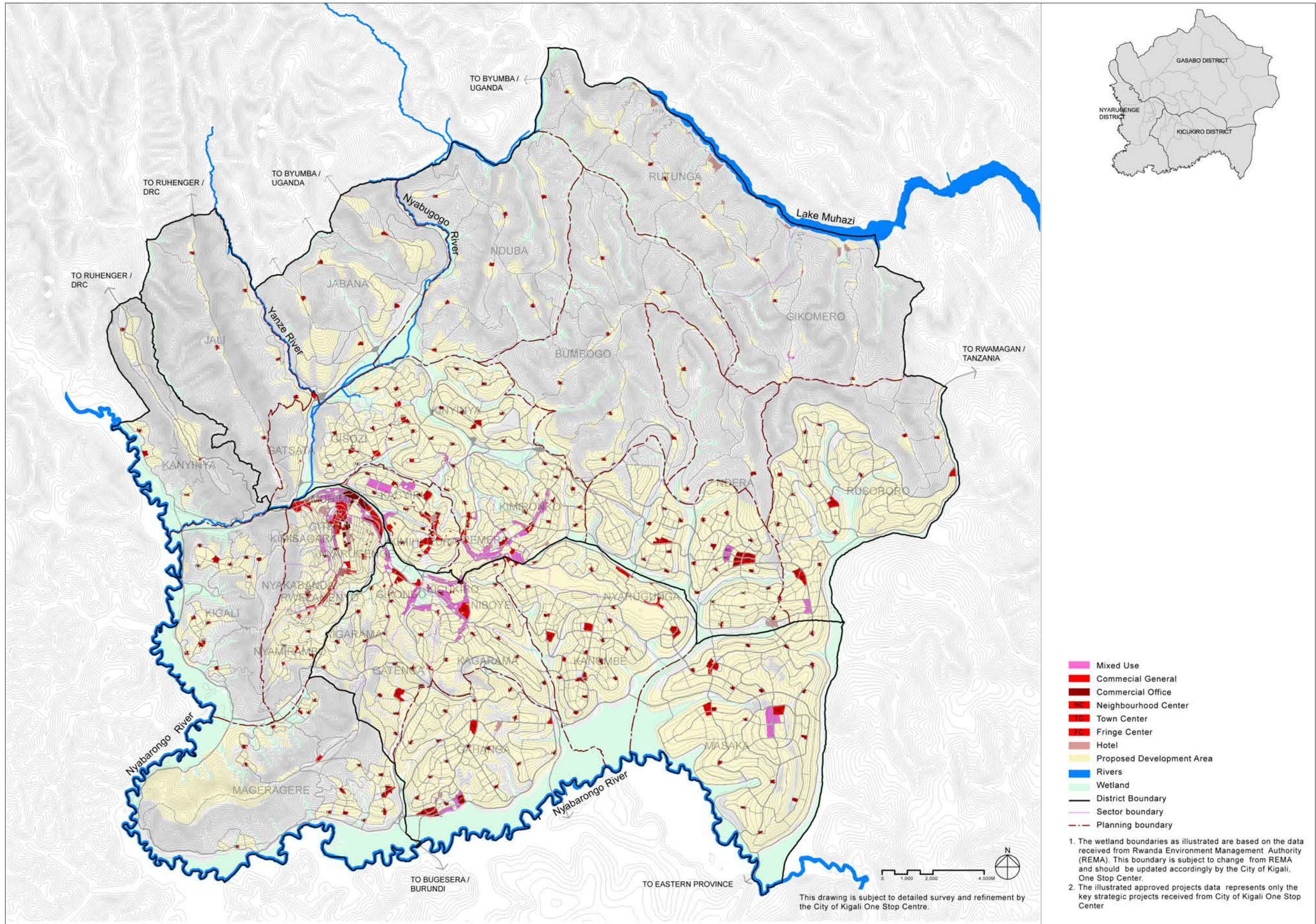


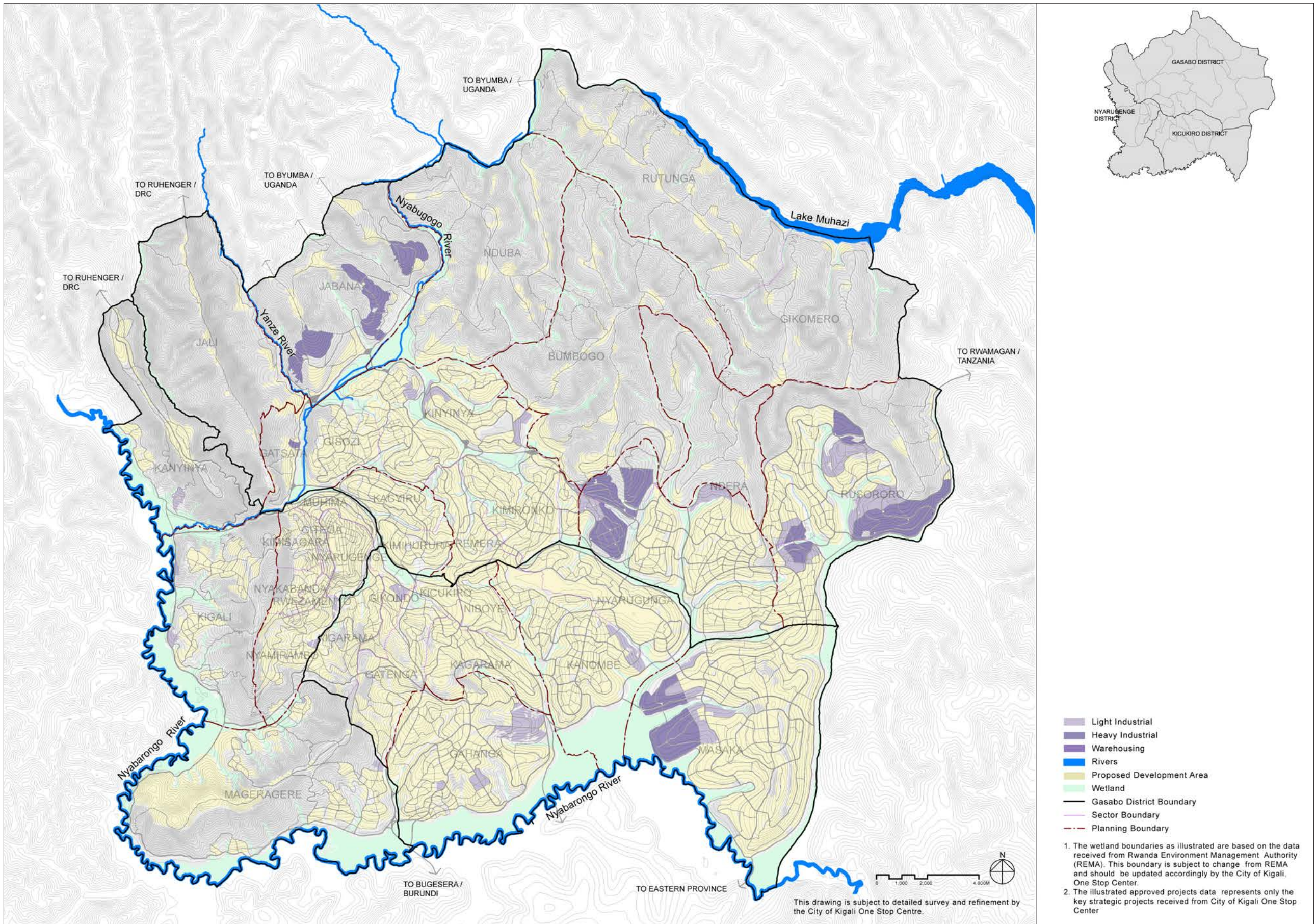






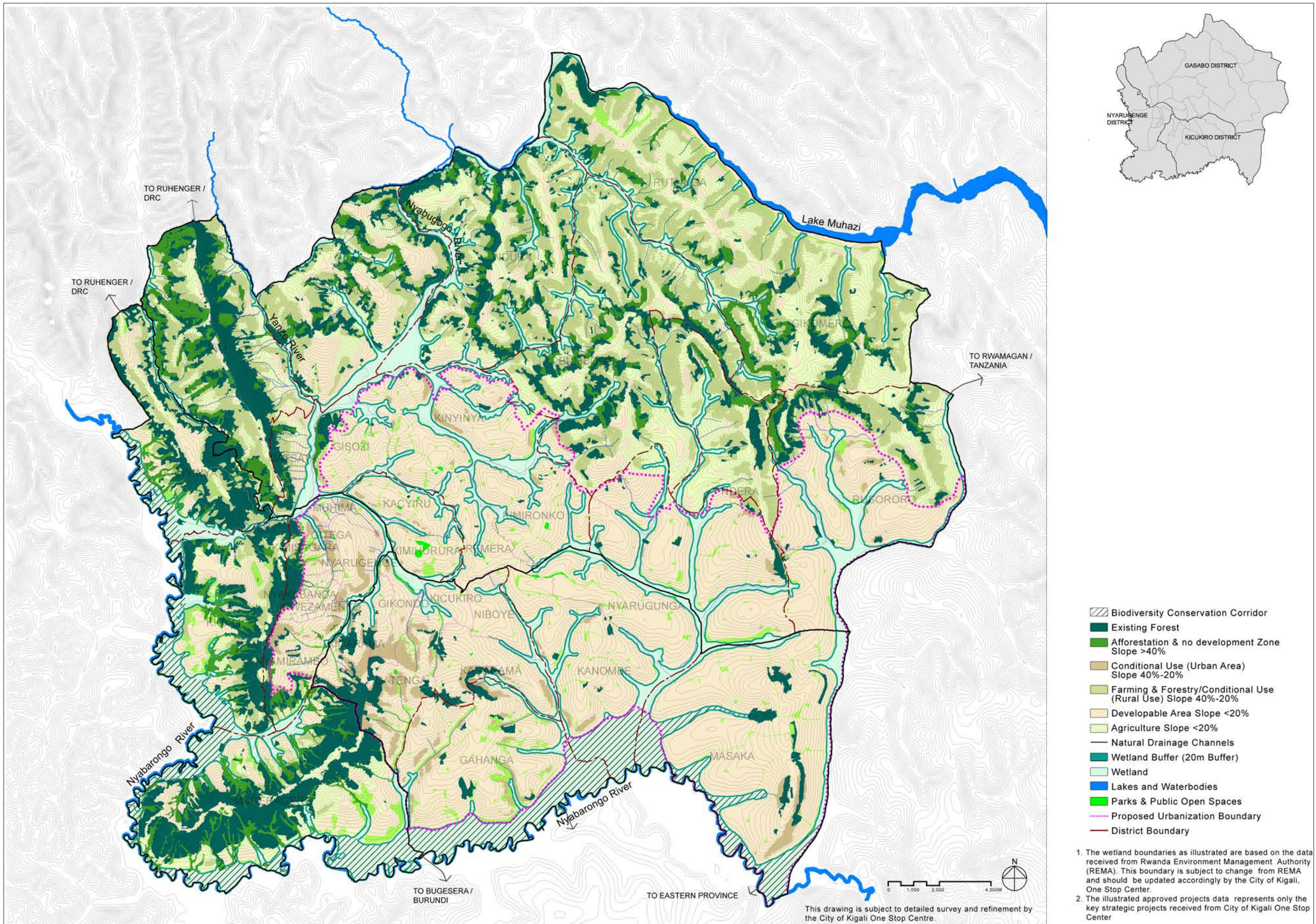
Kigali City - Proposed Residential Plan - Year X

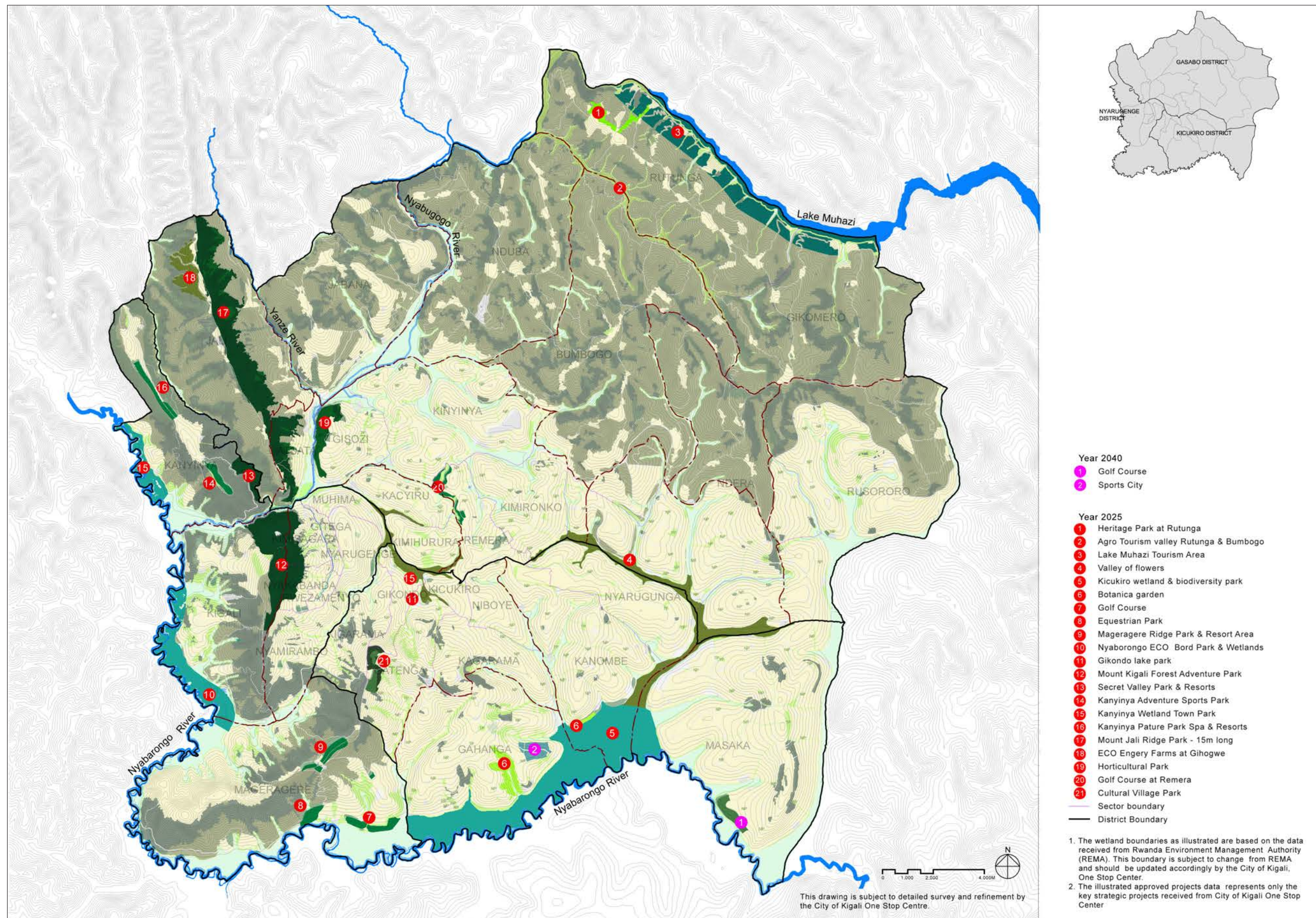


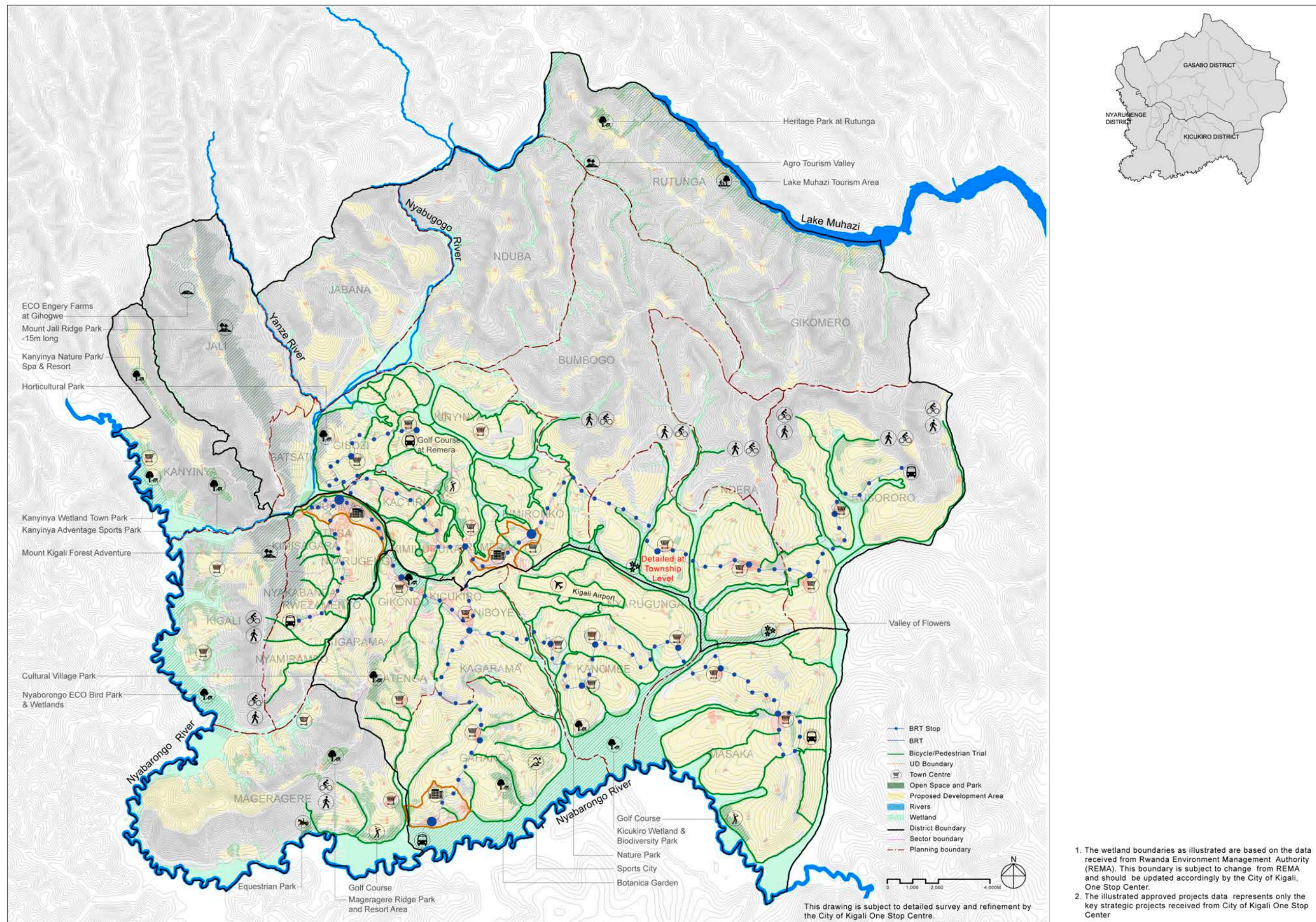


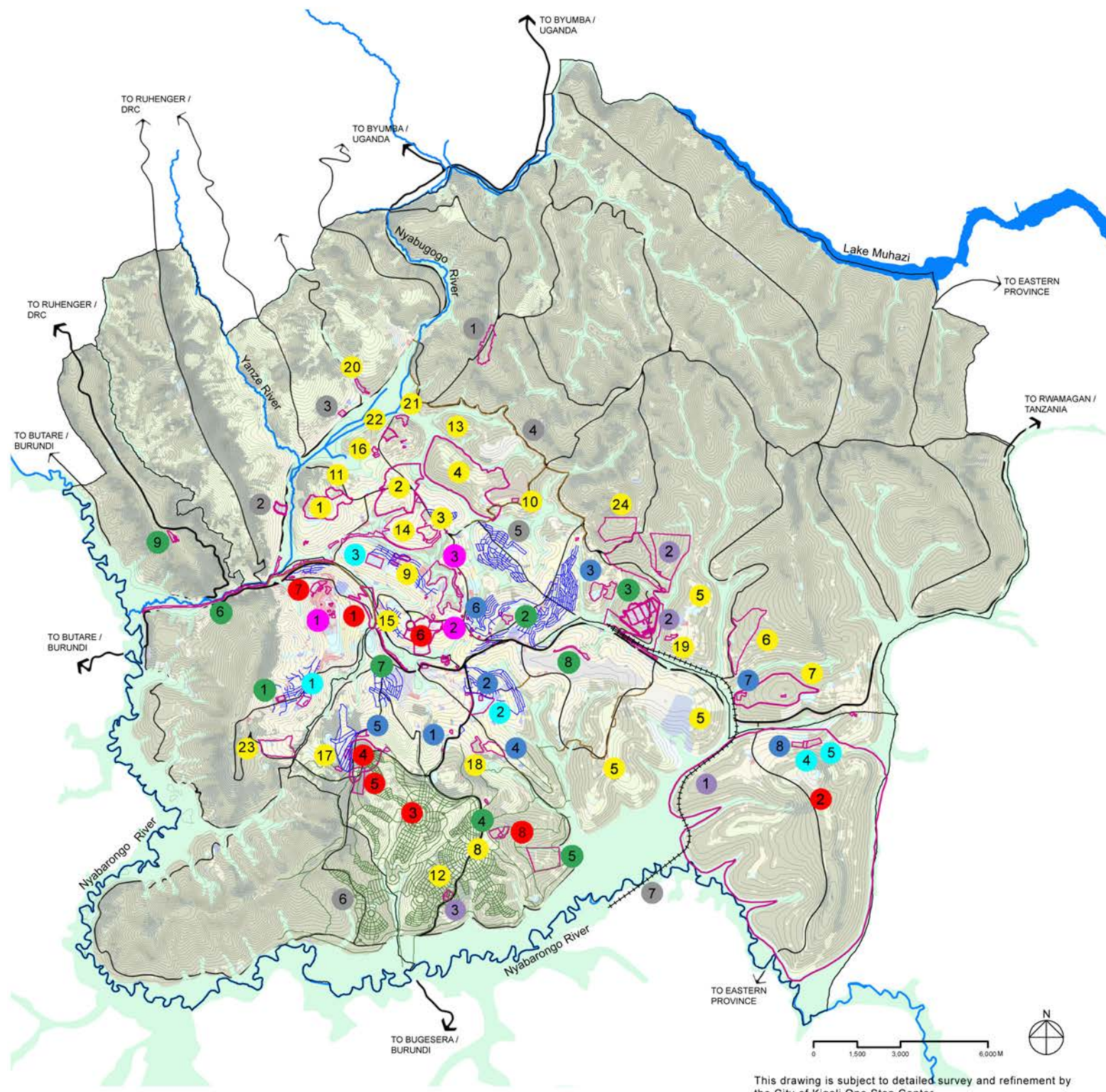
Kigali City - Proposed Industrial Plan - Year X

Kigali City - Proposed Public Facilities Plan - Year X









Residential

- 1 Diplomatic Zone (Single Family Residential, Gisozi)
- 2 RSSB Housing (Mixed Residential Township and town)
- 3 OZ Proposal (Residential Township, Kinyinya)
- 4 Surbana Proposal (Residential Township, Kinyinya)
- 5 Imudugudu (Low Rise Residential)
- 6 Single Family Housing, Cyaruzinge
- 7 Single Family Residential, Nyagahanga
- 8 Rukatsa Housing (Low Rise Residential)
- 9 Urkunundu Potter's Village Kacyiru
- 10 Gisozi Affordable Housing
- 11 RHA Affordable Housing
- 12 Amaremba / Nyarurembo
- 13 Kagugu Housing
- 14 Gaculiro Housing
- 15 Kiyovu Housing
- 16 Kubwimana Estates
- 17 Comfort Home
- 18 Rukatsa Housing
- 19 Nalioth Estates
- 20 Twagirayezu Celestin
- 21 Low Rise Residential_Zigira John
- 22 Batsinda_Masterplan
- 23 Residential_Akumunigo Housing Project
- 24 Residential_MININFRA & other institution prop res devs

Commercial

- 1 Muhima Phase 1 CBD (Mixed Use)
- 2 OZ Sub Area Plan - Sector Plan & City Centre, Masaka
- 3 OZ KCMP - City Centre Proposal (Commercial)
- 4 OZ Sub Area Plan - Rebero (Resort & Conference)
- 5 Kigali Culture Village (Tourism & Commercial)
- 6 OZ Sub Area Plan (Mixed Use Commercial Centre, Kimihurura)
- 7 CHIC
- 8 Gahanga Hotel Project

Mixed Use

- 1 Mariot Training Centre
- 2 Convention Centre
- 3 Century Park

Education

- 1 University (Mount Kenya)
- 2 Technical College
- 3 Education Masoro
- 4 Oklahoma University
- 5 Rwanda Tourism University
- 6 Advenist University
- 7 Betha Ammi Christian University
- 8 University

Public Facilities

- 1 Achidiolis de Kigali
- 2 IPRC
- 3 Police Headquarters
- 4 RALGA
- 5 Hospital

Infrastructure

- 1 Nduba Landfill
- 2 Gatsata Fuel Depot
- 3 Jabana Fuel Truck Depot
- 4 COX Roads
- 5 Pave Roads - Approved in Budget
- 6 KCMP Roads
- 7 RTDA Railway Project

Industrial

- 1 OZ Sub Area Plan - Masaka
- 2 RDB_FTZ
- 3 Gahanga Industrial Site

Landscape, Sports & recreation

- 1 Nyamirambo - Regional
- 2 Stadium - Ferwafa
- 3 Stadium_RCSF
- 4 Gahanga Indoor Stadium
- 5 Proposed Gahanga 60000 seater stadium
- 6 Afforestation Project
- 7 Kigali Youth Park
- 8 Airport Garden
- 9 Castle Wood Resort

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2. The illustrated approved projects data represents only the key strategic projects received from City of Kigali One Stop Center.

APPENDIX 2 : PLANNING REQUIREMENTS & STANDARDS

PROPOSED DISTRIBUTION OF TOWNSHIPS

The existing urban area are largely spread over 17 sectors and almost half of the City's urbanized area is unplanned. While there are a few new development projects that are proposed as cluster housing development, majority of the developments are developed individually. To move away from such small scale, individual plot based developments, it is proposed to organise the existing and new growth areas as integrated townships with a range of comprehensive facilities.

PROPOSED TOWNSHIP MODEL

Kigali City is proposed to be restructured into 24 self-sufficient townships. Majority of these townships are proposed to be served by public transit corridor which is also the main structuring element of these townships. The typical township size proposed for Kigali is around 900 to 1000 Ha accommodating an average population of 200,000 residents each.

Generally the townships are organized along the topography and 1-2 hills constitute one township entity. Arterial Roads form the

township boundary and the main central spine formed by the BRT corridor. The central spine holds commercial uses and major facilities with maximum density. Provision corridor for a future MRT corridor is also provided parallel to the BRT line.

A township model as shown in Fig.3.5, illustrates the key concept for typical new towns. The higher density residential neighborhoods are proposed around the town centre and in areas around the walking distance of the public transit corridor, as well as nodes around the proposed MRT stations.

Similar to the KCMP transect concept the density is proposed to gradually lower in the areas away from the transit corridor. Hence the higher density areas are located along the ridge. The density gradually reduces towards the lower areas along the wetlands.

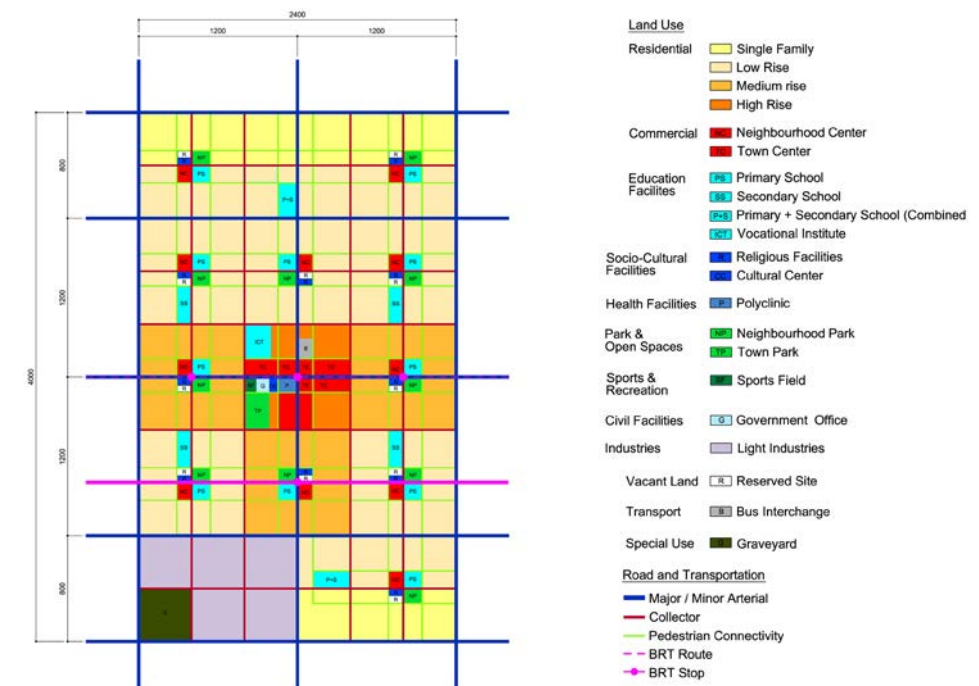
All the townships are proposed such that it ensures the walkability within its smallest neighborhood cells with the key facilities such as neighborhood centres, primary schools and local parks at the walking distance of the residents. Further to the Town Centre catering to town level commercial needs, other town facilities

such as the Vocational Training Institute, Polyclinic, Bus Interchange, Sports Field, Town Park, Cemetery and Light Industrial Estate, etc are proposed to be safeguarded in each township. Low density residential area are proposed at lower slopes, near the scenic wetlands with quick access to the highway network.

PROPOSED TOWNSHIP BOUNDARIES

The township boundaries are determined based on the following criteria:

- The township boundaries are based on the natural boundaries and geographically conglomerated urban areas.
- The township boundaries follow the respective sector boundaries where possible.
- The developable urban areas are divided by the highway grids of 3-6 kilometers and major arterial roads spaced at 800 to 1200 meters. The township boundaries at some areas are influenced by these road networks.



Proposed Township Model - Plan

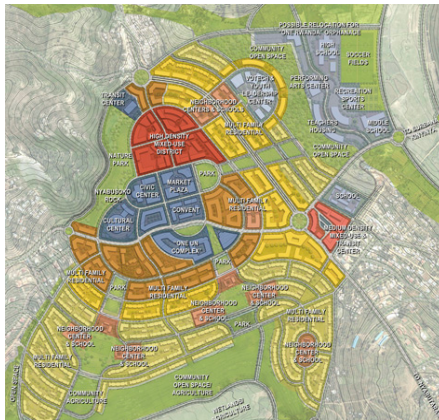


Township Model - The combination of KCMP's Transect model and the proposed High Density Transit Corridors; to accommodate the projected population.

Government will drive initiatives and provide incentives to developers for constructing affordable housing, as it is the backbone of Kigali's urban expansion.

SUB AREA PLANS IN THE NEW CITY MASTER PLAN

KINYINYA TOWNSHIP AND TOWN CENTRE (190 HA)

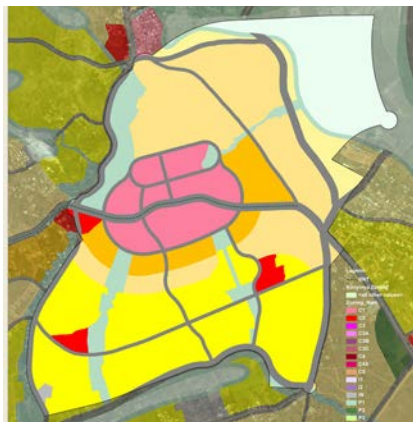


Source: Kigali Sub Area Plans, Schematic Planning; Oz architecture.era.edaw.tetrattech.winston associates-December 2010

Mixed Use Zones		Hotel Zones	
High Density		High Density/Conference Centre	
Medium Density		Medium Density	
Neighbourhood Centre		Low Density (Eco-Tourism/Retirement Housing)	
Residential Zones		Civic	
High Density		Educational	
Medium Density		Open Space	
Medium Low Density			

KININYA - OZ SUB AREA PLAN		
LAND USE	AREA (HA)	PERCENTAGE
OPEN SPACE	42	22%
MEDIUM LOW DENSITY	28	15%
MEDIUM HIGH DENSITY	17	9%
MEDIUM-HIGH DENSITY TEACHERS HOUSING	2	1%
HIGH DENSITY	7	4%
NEIGHBOURHOOD CENTERS AND SCHOOLS	4	2%
EDUCATIONAL	14	7%
CIVIC	26	14%
MIXED USE HIGH DENSITY	5	3%
MIXED USE MEDIUM DENSITY	2	1%
INFRASTRUCTURE RIGHT OF WAY	45	24%
TOTAL	190	100%

KININYIA - DETAILED MASTER PLAN



Single Family Residential	Health Facilities
Low Rise Residential	Civic Facilities
Medium Rise Residential	Wetland
Commercial General	Open Space and Park
Government Office	Transportation (Road)
Education Institution	Reserve Site
Religious Facilities	

KININYIA - DETAILED MASTER PLAN		
LAND USE	AREA (HA)	PERCENTAGE
CIVIC FACILITIES	2	1%
COMMERCIAL GENERAL	8	4%
EDUCATION INSTITUTION	2	1%
GOVERNMENT OFFICE	2	1%
HEALTH FACILITIES	6	3%
LOW RISE RESIDENTIAL	41	22%
MEDIUM RISE RESIDENTIAL	11	6%
OPEN SPACE AND PARK	15	8%
TRANSPORTATION - ROADS	27	14%
RELIGIOUS FACILITIES	2	1%
SINGLE FAMILY RESIDENTIAL	54	28%
WETLAND	20	11%
TOTAL	190	100%

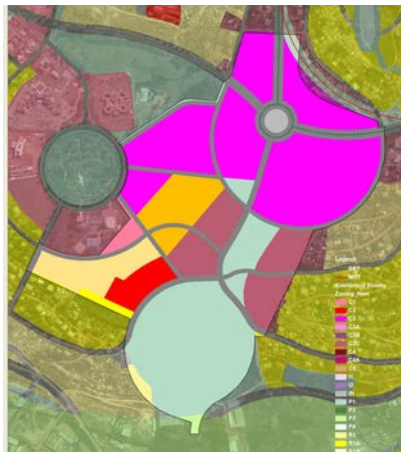
KIMIHURURA SUB AREA (87 HA)



Source: Kigali Sub Area Plans, Schematic Planning; Oz architecture.era.edaw.tetrattech.winston associates-December 2010

KIMIHURURA - OZ SUB AREA PLAN		
LAND USE	AREA (HA)	PERCENTAGE
RESIDENTIAL -MED.-LOW DENSITY	2	3%
RESIDENTIAL-MED.-HIGH DENSITY	4	5%
MIXED USE - HIGH DENSITY	16	18%
HOTEL - LOW DENSITY	2	2%
HOTEL - MEDIUM DENSITY	6	7%
OPEN SPACE	22	25%
PLAZA PROMENADE	1	1%
INFRASTRUCTURE RIGHT-OF-WAY	34	39%
TOTAL	87	100%

KIMIHURURA- DETAILED MASTER PLAN



KIMIHURURA - DETAILED MASTER PLAN		
LAND USE	AREA (HA)	PERCENTAGE
CIVIC FACILITIES	4	5%
COMMERCIAL GENERAL	20	23%
COMMERCIAL OFFICE	1	2%
EDUCATION INSTITUTION	3	3%
GOVERNMENT OFFICE	1	1%
LOW RISE RESIDENTIAL	4	5%
MEDIUM RISE RESIDENTIAL	5	5%
OPEN SPACE AND PARK	22	26%
TRANSPORTATION - ROADS	12	14%
RELIGIOUS FACILITIES	9	11%
SINGLE FAMILY RESIDENTIAL	3	3%
TRANSPORTATION OPEN SPACE	1	1%
TOTAL	87	100%

PUBLIC FACILITIES STANDARDS

		SOUTH AFRICA (CAPE TOWN)	SINGAPORE	PROPOSED FOR KIGALI
COMMERCIAL	NEIGHBORHOOD CENTRE	5 MIN WALK TO LOCAL MARKET; 1 PER 5000 POPULATION, 0.2 - 4 HA	1 PER 13,000 - 20,000 POPULATION, 1.7 HA SITE	1 PER NEIGHBORHOOD; 1.2 HA SITE.
	TOWN CENTRE	DATA NOT AVAILABLE	1 PER TOWN, 17-25 HA SITE	1 PER TOWNSHIP; 12.0 HA SITE.
	REGIONAL CENTRE	DATA NOT AVAILABLE	1 PER 0.5 MILLION, CATCHMENT RADIUS - 5 KM , 57 HA SITE	1 PER 0.5 MILLION, 50 HA SITE.
EDUCATIONAL FACILITIES	PRIMARY SCHOOL	1 PER 5500 POPULATION, MAX WALKING DIST. 2.25 KM. MIN 2.8 HA SITE. (INCLUSIVE OF FIELD)	1 PER 13,400 POPULATION. 1.8 HA SITE	1 PER NEIGHBORHOOD (15,000-20000 POPULATION). 1.5 HA SITE.
	SECONDARY SCHOOL	1 PER 12500 POPULATION, MAX DRIVINGING TIME. 15 MINS MIN 2.8 HA SITE, (INCLUSIVE OF FIELD)	1 PER 19,150 POPULATION. 3.0 HA SITE	1 PER 20,000 - 25,000 POPULATION. 2.4 HA SITE.
	PRIMARY + SECONDARY SCHOOL (COMBINED)	DATA NOT AVAILABLE	DATA NOT AVAILABLE	2.8 HA SITE. (BASED ON EXISTING SCHOOL SITES)
	VOCATIONAL / ICT INSTITUTE	1 PER 100,000 POPULATION, 1 HA SITE	1 PER TOWN. 5.0 HA SITE	1 PER TOWNSHIP. 5.0 HA SITE.
	HIGHER EDUCATION INSTITUTE	1 PER 1 MIL POPULATION, 8 HA SITE	1 PER 500,000 POPULATION. 6.0 HA SITE	1 PER 500,000 POPULATION. 6.0 HA SITE
SOCIO-CULTURAL FACILITIES	COMMUNITY HALL*	1 PER 10,000-60000 POP; MAX TRAVEL TIME 30 MINS; 0.5 HA SITE.	1 PER 40,000 POPULATION. 0.4 HA SITE	1 PER 5,000 POPULATION. 0.5 HA SITE.
	REGIONAL LIBRARY	1 PER 40000- 70000 POPULATION, MIN SIZE 0.03 HA	1 PER 65,000 POPULATION. 0.4 HA SITE	1 PER 500,000 POPULATION. 0.5 HA SITE.
	RELIGIOUS FACILITY	1 PER 3000 - 6000 POPULATION; 0.15 - 1 HA SITE, DISTANCE OF 2 KM	1 PER 25,000 POPULATION. 0.2 -0.45 HA SITE	1 PER NEIGHBORHOOD (15,000- 20000 POPULATION). 0.5 HA SITE.
	CEMETERIES	1 PER 100,000 PEOPLE 15.6 HA OVER 30 YEARS (2000 GRAVES PER HA)	DATA NOT AVAILABLE	1 PER TOWNSHIP 20 HA OVER 20 YEARS
	MUSEUMS/ CULTURAL CENTRE ETC.	1 PER 50000 (SMALL MUSEUM, SITE & PURPOSE SPECIFIC) 1 PER 50000 (PERFORMING ARTS CENTRE, SITE & PURPOSE SPECIFIC)	DATA NOT AVAILABLE	1 PER TOWNSHIP. 1.5 HA SITE.
HEALTH FACILITES	HEALTH CLINIC *	0.2 HA PER 5000-20000 POPULATION 0.5 HA PER 30000-50000 POPULATION 1 HA PER 60000-70000 POPULATION	SERVED BY PRIVATE PRACTITIONERS AS PART OF COMMERCIAL FACILITIES	1 PER NEIGHBORHOOD (15,000-20000 POPULATION). 0.5 HA SITE.
	POLYCLINIC	1.5 HA PER 60000 - 120000 POPULATION MAX VEHICULAR TRAVEL TIME OF 30 MINS	1 FOR MINIMUM POPULATION OF 150,000 (EXCLUDING PRIVATELY OPERATED CLINICS). 0.5 HA SITE FOR 150,000 - 200,000 POPULATION	1 PER TOWNSHIP. 5.0 HA SITE. MAX TRAVEL TIME OF 30 MINS.
	REGIONAL HOSPITAL	DISTRICT HOSPITAL: 450000 POPULATION; 5 HA SITE REGIONAL HOSPITAL: 1 MILLION POPULATION; 7 HA SITE TEACHING(SPECIALIST) HOSPITAL: 4.5 MILLION POPULATION; 35 HA SITE	4.5 BEDS PER 1,000 POPULATION. 5.0 HA SITE	1 PER 500,000 POPULATION. 5.0 HA SITE
PARKS & OPEN SPACES	NEIGHBORHOOD PARK	0.4 HA PER 1000 POPULATION, 20 MIN WALKING DISTANCE	DATA NOT AVAILABLE	1 PER NEIGHBORHOOD (15,000-20000 POPULATION). 1.0 HA SITE
	TOWN PARK	(DISTRICT /REGIONAL PARK) 0.2 HA PER 1000 POPULATION; 20MIN BY PUBLIC TRANSIT	1 PER TOWN. 10 HA SITE	1 PER TOWNSHIP. 6.0 HA SITE
	SPORTS FIELD	0.56HA PER 1 000 PEOPLE (+ ADDITIONAL 0.3/0.4HA PER 1 000 IN METROPOLITAN AREAS FOR HIGHER ORDER FACILITIES) 1 PER 60000 POPULATION, GROUPING OF FIELDS AND/OR SPORT FACILITIES, 1.5- 2.5 HA	1 PER 125,000 POPULATION. 3.0 HA SITE	1 PER TOWNSHIP . 1.5 HA SITE. (NEAR TO SCHOOLS OR COMMUNITY CENTRES OR COMBINE WITH PARKS.)

		SOUTH AFRICA (CAPE TOWN)	SINGAPORE	PROPOSED FOR KIGALI
SPORTS & RECREATION	SPORTS CENTRE (WITH SWIMMING POOL AND STADIUM)	SPORT STADIA , 1 PER 300,000 POPULATION (WITH TRACKS & 3000 SEATS) REGIONAL SPORTS ARENAS 1 PER 250000-500000, 0.5 HA (INDOOR SPORTS HALLS MAY HOST NON SPORTING EVENTS) INTERNATIONAL SPORTS COMPLEX, 10 PER 1.5 MILLION, 3 HA SITE	1 PER 125,000 POPULATION	1 FOR EVERY 500,000 POPULATION. 6.0 HA SITE.
CIVIC FACILITIES	FIRE STATION	1 PER MIN POPULATION OF 100000, 0.3 HA SUBURBAN STATION, 1.2 HA REGIONAL STATION	1 TO COVER 5 - 8 MINS RESPONSE TIME. 0.4 - 0.6 HA SITE	5 MINUTES RESPONSE TIME. 0.5 HA SITE.
	GOVERNMENT/ MUNICIPAL OFFICES	DISTRICT OFFICE - 40000 - 140000 POPULATION, TRAVEL TIME 30 MIN MUNICIPAL OFFICE - 1 PER SUB REGION/ 500000 POP., 0.3 - 1 HA SITE	DATA NOT AVAILABLE	1 SECTOR OFFICE PER SECTOR. 1 DISTRICT OFFICE PER DISTRICT.
*(as part of neighborhood centre)				

BROAD LAND REQUIREMENTS: COMMERCIAL COMPOSITION YEAR X

	Plot Ratio	Retail			Offices			Total Area	Total Floor Area
Provision Standard (M ² /PER)		1			1.2				
Commercial Floor Area (MIL M ²)		5			6				
Space Distribution		%	GFA (MIL M ²)	Area (SQKM)	%	GFA (MIL M ²)	Area (SQKM)	(KM2)	(MIL M2)
CBD	3	25%	1.25	0.42	30%	1.8	0.80	1.22	3.05
Regional Centre	2	35%	1.75	0.87	40%	2.40	1.20	2.07	4.15
Town/Fringe Centre	2	20%	1.00	0.50	20%	0.60	0.30	0.80	1.60
Others Comm	2	10%	0.50	0.25	10%	0.60	0.60	0.85	1.10
NCS	1	10%	0.50	0.50	-	-	-	0.50	0.50
TOTAL		100%	5.00	2.54	100%	5.40	2.90	5.44	10.40

BROAD LAND REQUIREMENTS: TOURISM FACILITIES YEAR X

	Hotel			
Provision Standard (M ² /PER)	0.1			
Commercial Floor Area (MIL M ²)	0.5			
Space Distribution	%	(MIL M ²)	Rooms*	Area
CBD	40%	0.20	3,333	0.07
Regional Centre	15%	0.08	1,250	0.04
Town Centre/Fringe Centre	15%	0.08	1,250	0.04
Others Comm	30%	0.15	2,500	0.08
NCS	-		-	
TOTAL	100%	0.50	8,333	0.22
* Based on avg 60 M ² /Room				

BROAD LAND REQUIREMENTS: INDUSTRIAL COMPOSITION YEAR X

Manufacturing			Logistics			Light Industries in Town			Total Area
Floor Area (MIL M2)	Area (KM2)	%	Floor Area (MIL M2)	Area (KM2)	%	Floor Area (MIL M2)	Area (KM2)	%	Area (KM2)
16.75	23.93	8.1	5.36	5.36	1.82	10.72	7.7	2.6	36.95
Note: Manufacturing: 50% of employment, Logistics: 10% of Employment, Industries in townships 40% Plot Ratio: Manufacturing - 0.7, Logistics- 1, Industries in townships - 1.4 Logistics: 80m ² /worker, Manufacturing: 50m ² /worker, Industries in townships: 40m ² /worker									

PROPOSED BROAD LAND USE REQUIREMENTS FOR KIGALI CITY YEAR X

		% of Urban Existing	% of Urban 2025	% of Urban Year X
URBANIZED AREA	Protected Forest / Wetland/ Waterbody	33%	75%	60%
	Agriculture	50%		
	Urbanized Area (%)	17%	25%	40%
	Area	731.27	731.27	731.27
	Population	1.2 Million	2.9 Million	5 Million
	Gross Density	1670 P/KM ²	3950 P/KM ²	6850 P/KM ²
	Gross Urban Density	11000 P/KM ²	15850 P/KM ²	17000 P/KM ²
	Residential	9%	75 KM ² (41 %)	150 KM ² (51%)
	Industrial	0.4%	24 KM ² (12.5 %)	30 KM ² (10%)
	Commercial + Mixed Use	0.4%	3 KM ² (1.5 %)	6 KM ² (2%)
Note: Residential Area is recommended to be secured for 5.5 Mil Population to balance the downzoning trend.				

KIGALI CITY - POPULATION, COMMERCIAL AND INDUSTRIAL EMPLOYMENT DISTRIBUTION

Population (mil)	Year 2012	Year 2025	Year X
Kigali City	1.3	3.1	5

Employment Year X (mil)	Service (mil)	Industrial	Agriculture (mil)	TOTAL (mil)
Kigali City	1.62	0.67	0.08	2.37

COMMERCIAL DISTRIBUTION													
Type of Commercial	Central area		Regional Centre		Fringe Centre		Town Centre		Neighborhood Centre		Other commercial		Total
	GFA share		GFA share		GFA share		GFA share		GFA share		GFA share		
Retail GFA (mil m2)	25%	1.25	35%	1.75	10%	0.50	10%	0.50	10%	0.50	10%	0.50	5.00
Office GFA (mil m2)	30%	1.80	40%	2.40	10%	0.60	10%	0.60	0%	0.00	10%	0.60	6.00
Hotel GFA (mil m2)	40%	0.20	15%	0.08	7.50%	0.04	7.50%	0.04	0%	0.00	30%	0.15	0.50
Total GFA		3.25		4.23		1.14		1.14		0.50		1.25	11.50

COMMERCIAL EMPLOYMENT DISTRIBUTION (TOTAL = 1.62 MIL)								
Type of Comm	Central area	RC	FC	TC	NC	TC+NC	Other com	Total
GFA %	28	37	10	10	4		11	100.00
Service emp	0.458	0.595	0.160	0.160	0.070	0.231	0.176	1.62

COMMERCIAL EMPLOYMENT DISTRIBUTION FOR OTHER COMMERCIAL (TOTAL = 0.176 MIL)		
Share of SP2	Percentage Share	Employment
G7	5%	8804
SP1	20%	35217
G4	20%	35217
R5	4%	7043
R8	1%	1761
K4	50%	88043
	100%	176087

INDUSTRIAL EMPLOYMENT DISTRIBUTION (TOTAL = 0.67 MIL)										
Type of Ind	Employment share	Total Employment	I1		I2		I3		I4	
			Employment share	Employment	Employment share	Employment	Employment share	Employment	Employment share	Employment
Manufacturing	50%	335,000	10%	33,500	35%	117,250	40%	134,000	15%	50,250
Logistics	10%	67,000	40%	26,800	10%	6,700	10%	6,700	40%	26,800
Light industrial in Townships	40%	268,000	-	-	-	-	-	-	-	-
Sub-total				60,300		123,950		140,700		77,050
Total		670,000								

KIGALI CITY - EMPLOYMENT DISTRIBUTION IN THE YEAR X

KIGALI CITY	POPULATION	EMPLOYMENT					TOTAL		
TOWNSHIP	YEAR X	SERVICE	LIGHT INDUSTRY	MANUFACTURING	LOGISTICS	RURAL	TOTAL		
SP1	480,000		493,043	-	-	-	-	-	493,043
R1	16,800								
NY1	80,000	3	7,568	2	4,464	-	-	-	12,031
NY2	170,000	7	16,081	4	9,485	-	-	-	25,567
NY3	300,000	24	38,599	6	16,739	-	-	-	55,338
NY4	80,000	3	7,568	2	4,464	-	-	-	12,031
NY5	140,000	6	13,244	3	7,811	-	-	-	21,055
G1	126,000	5	11,919	3	7,030	-	-	-	18,949
G2	173,000	14	22,259	4	9,653	-	-	-	31,912
G3	118,000	5	11,162	2	6,584	-	-	-	17,746
G4	321,000	26	76,519	7	17,911	-	-	-	94,429
G5	134,000	5	12,676	3	7,477	-	-	-	20,153
G6	283,000	32	198,391	6	15,790	-	-	-	214,182
G7	212,000	9	28,859	4	11,829				40,688
G8	149,000	6	14,095	3	8,314				22,409
KT1	133400	5	12,619	3	7,443	-	-	-	20,062
KT2	80,700	3	7,634	2	4,503	-	-	-	12,137
KT3	451,400	36	58,079	9	25,186	-	-	-	83,266
KT4	239,000	27	286,435	5	13,335	-	-	-	299,770
KT5	279,400	11	26,430	6	15,589	-	-	-	42,020
KT6	86,900	4	8,220	2	4,849	-	-	-	13,069
KT7	128,000	5	12,108	3	7,142	-	-	-	19,250
KT8	103,200	4	9,762	2	5,758	-	-	-	15,521
KT9	158,700	7	15,012	3	8,855	-	-	-	23,867
KT10	259,200	11	24,519	5	14,462	-	-	-	38,982
KT11	367,500	41	198,391	8	20,505	-	-	-	218,896
I1 (RURAL HOUSING)	25,000	-	-	-	-	33,500	26,800	-	60,300
I2 (HOUSING INCLD)	35,000	-	-	-	-	117,250	6,700	-	123,950
I3	98,000	-	-	-	-	134,000	6,700	-	140,700
I4	0	-	-	-	-	50,250	26,800	-	77,050
R5	37,000		7043						7,043
R8	18,000		1761						1,761
RURAL	224,000	-	-	-	-	-	-	80,000	80,000
TOTAL	5,507,200		1,620,000		255,178	335,000	67,000	80,000	2,357,178

GASABO DISTRICT - HOUSING AND POPULATION DISTRIBUTION

Planning Area	Overall Area (Ha)	Net Buildable land (Ha)	Exiting population (2013)	Projected Popula- tion (Using Density)	Projected Popula- tion (Using GFA)	Gross Pop Density (2013)	Net Pop Density (2013)	Gross Pop Density (Year X)	Net Pop Density (Year X)
Special Planning Area	1072.2	862.9	91,000	129,578	125,601	85	105	117	146
Central Planning Area	5770.7	4131.5	223,000	741,958	738,278	39	54	128	179
South Eastern Planning Area	5027.2	2428.3	37,000	467,990	463,939	7	15	92	191
Eastern Planning Area	5300.7	2859.2	43,000	468,440	474,381	8	15	89	166
Western Planning Area	3761.6	240.6	20,000	21,894	21,894	5	83	6	91
North Western Planning Area	3687.8	949.9	33,000	37,561	37,561	9	35	10	40
Northern Planning Area	4680.8	530.2	25,000	62,714	63,061	5	47	13	119
North Central Planning Area	6018.5	1016.9	29,000	76,044	76,044	5	29	13	75
North Eastern Planning Area	7863.2	602.0	66,000	77,075	78,825	8	110	10	131
Total	43,183	13622	567,000	2,083,252	2,079,584	19	55	53	126

*Proposed Land Use is used for the calculation of net buildable areas. The proposed net buildable area is used for the calculation of both, existing and proposed net population density.

COMPOSITION OF HOUSING- CENTRAL PLANNING AREA

Housing Type		Housing Area(Ha) (Net)	Dwelling Unit Size(sqm)	Du/ha (Net)	Gross Plot Ratio	Housing Area Share	Population share	Population (Using GFA)	Population (Using Density)	Dwelling Units (Using GFA)	Dwelling Units (using Density)	Floor Area (GFA)(sqm)
Single Family	1519.81	1519.81	250	40	1	57%	32%	234,051	234,051	60,792	60,792	15198110
Low Density	803.60	642.88	120	90	1.4	30%	38%	288,759	278,446	75,002	72,324	9000289
Medium Density	253.36	202.69	90	160	1.8	9%	21%	156,068	156,068	40,537	40,537	3648344
High Density	13.35	10.68	90	250	2.4	0%	2%	10,961	12,845	2,847	3,336	256241
Mixed Use	98.29	62.91	90	160	1.8	4%	8%	48,438	60,547	12,581	15,727	1132316
Total	2688.40	2438.96				100%	100%	738,278	741,958	191,760		29,235,298

COMPOSITION OF HOUSING- SPECIAL PLANNING AREA

Housing Type	Housing Area (Ha) (Gross)	Housing Area(Ha) (Net)	Dwelling Unit Size (in sqm)	Du/ha (Net)	Gross Plot Ratio	Housing Area Share	Population share	Population (Using GFA)	Population (Using Density)	Dwelling Units (Using GFA)	Dwelling Units (using Density)	Floor Area (GFA) (sqm)
Single Family	313.16	313.16	250	40	1	66%	37%	48,227	48,227	12,526	12,526	3131618
Low Density	63.43	50.74	120	90	1.4	13%	17%	22,792	21,978	5,920	5,708	710390
Medium Density	57.50	46.00	90	160	1.8	12%	27%	35,421	35,421	9,200	9,200	828015
High Density	0.00	0.00	90	250	2.4	0%	0%	-	-	-	-	0
Mixed Use	38.88	24.89	90	160	1.8	8%	18%	19,162	23,952	4,977	6,221	447940
Total	472.97	434.79				100%	100%	125,601	129,578	32,624	33,657	5,117,963

COMPOSITION OF HOUSING- SOUTH EASTERN PLANNING AREA

Housing Type	Housing Area(Ha) (Gross)	Housing Area(Ha) (Net)	House Size (in sqm)	Du/ha (Net)	Gross Plot Ratio	Housing Area Share	Population share	Population (using GFA)	Population (Using Density)	Dwelling Units (Using GFA)	Dwelling Units (using Density)	"Floor Area (GFA) (sqm)
Single Family	701.76	701.76	250	40	1	148%	23%	108,070	108,070	28,070	28,070	7017564
Low Density	285.56	228.45	120	90	1.4	60%	21%	102,611	98,947	26,652	25,700	3198272
Medium Density	343.69	274.95	90	160	1.8	73%	45%	211,713	211,713	54,990	54,990	4949136
High Density	41.63	33.30	90	250	2.4	9%	9%	34,192	40,069	8,881	10,408	799296
Mixed Use	14.92	9.55	90	160	1.8	3%	2%	7,353	9,191	1,910	2,387	171878
Total	1387.56	1248.01				293%	100%	463,939	467,990	120,504	121,556	16,136,146

COMPOSITION OF HOUSING- EASTERN PLANNING AREA

Housing Type	Housing Area(Ha)(Gross)	Housing Area(Ha) (Net)	House Size (in sqm)	Du/ha (Net)	Gross Plot Ratio	Housing Area Share	Population share	Population (Using GFA)	Population (Using Density)	Dwelling Units (Using GFA)	Dwelling Units (using Density)	Floor Area (GFA)(sqm)
Single Family	511.70	511.70	250	40	1	108%	17%	78,802	78,802	20,468	20,468	5117000
Low Density	569.90	455.92	120	90	1.4	120%	42%	204,784	197,470	53,191	51,291	6382880
Medium Density	300.82	240.66	90	160	1.8	64%	40%	185,305	185,305	48,131	48,131	4331808
High Density	0.00	0.00	90	250	2.4	0%	0%	-	-	-	-	0
Mixed Use	11.14	7.13	90	160	1.8	2%	1%	5,490	6,862	1,426	1,782	128333
Total	1393.56	1215.41				295%	100%	474,381	468,440	123,216	121,673	15,960,021

COMPOSITION OF HOUSING- WESTERN PLANNING AREA

Housing Type	Housing Area(Ha)(Gross)	Housing Area(Ha) (Net)	House Size (in sqm)	Du/ha (Net)	Gross Plot Ratio	Housing Area Share	Population share	Population (Using GFA)	Population (Using Density)	Dwelling Units (Using GFA)	Dwelling Units (using Density)	Floor Area (GFA)(sqm)
Single Family	142.17	142.17	250	40	1	100%	100%	21,894	21,894	5,687	5,687	1421700
Low Density	0.00	0.00	120	90	1.4	0%	0%	-	-	-	-	0
Medium Density	0.00	0.00	90	160	1.8	0%	0%	-	-	-	-	0
High Density	0.00	0.00	90	250	2.4	0%	0%	-	-	-	-	0
Mixed Use	0.00	0.00	90	160	1.8	0%	0%	-	-	-	-	0
Total	142.17	142.17				100%	100%	21,894	21,894	5,687	5,687	1,421,700

COMPOSITION OF HOUSING-NORTH WESTERN PLANNING AREA

Housing Type	Housing Area(Ha)(Gross)	Housing Area(Ha) (Net)	House Size (in sqm)	Du/ha (Net)	Gross Plot Ratio	Housing Area Share	Population share	Population (Using GFA)	Population (Using Density)	Dwelling Units (Using GFA)	Dwelling Units (using Density)	Floor Area (GFA)(sqm)
Single Family	243.90	243.90	250	40	1	100%	100%	37,561	37,561	9,756	9,756	2439000
Low Density	0.00	0.00	120	90	1.4	0%	0%	-	-	-	-	0
Medium Density	0.00	0.00	90	160	1.8	0%	0%	-	-	-	-	0
High Density	0.00	0.00	90	250	2.4	0%	0%	-	-	-	-	0
Mixed Use	0.00	0.00	90	160	1.8	0%	0%	-	-	-	-	0
Total	243.90	243.90				100%	100%	37,561	37,561	9,756	9,756	2,439,000

COMPOSITION OF HOUSING-NORTHERN PLANNING AREA

Housing Type	Housing Area(Ha)(Gross)	Housing Area(Ha) (Net)	House Size (in sqm)	Du/ha (Net)	Gross Plot Ratio	Housing Area Share	Population share	Population (Using GFA)	Population (Using Density)	Dwelling Units (Using GFA)	Dwelling Units (using Density)	Floor Area (GFA)(sqm)
Single Family	346.28	346.28	250	40	1	73%	85%	53,327	53,327	13,851	13,851	3462800
Low Density	27.09	21.67	120	90	1.4	6%	15%	9,734	9,387	2,528	2,438	303408
Medium Density	0.00	0.00	90	160	1.8	0%	0%	-	-	-	-	0
High Density	0.00	0.00	90	250	2.4	0%	0%	-	-	-	-	0
Mixed Use	0.00	0.00	90	160	1.8	0%	0%	-	-	-	-	0
Total	373.37	367.95				79%	100%	63,061	62,714	16,380	16,289	3,766,208

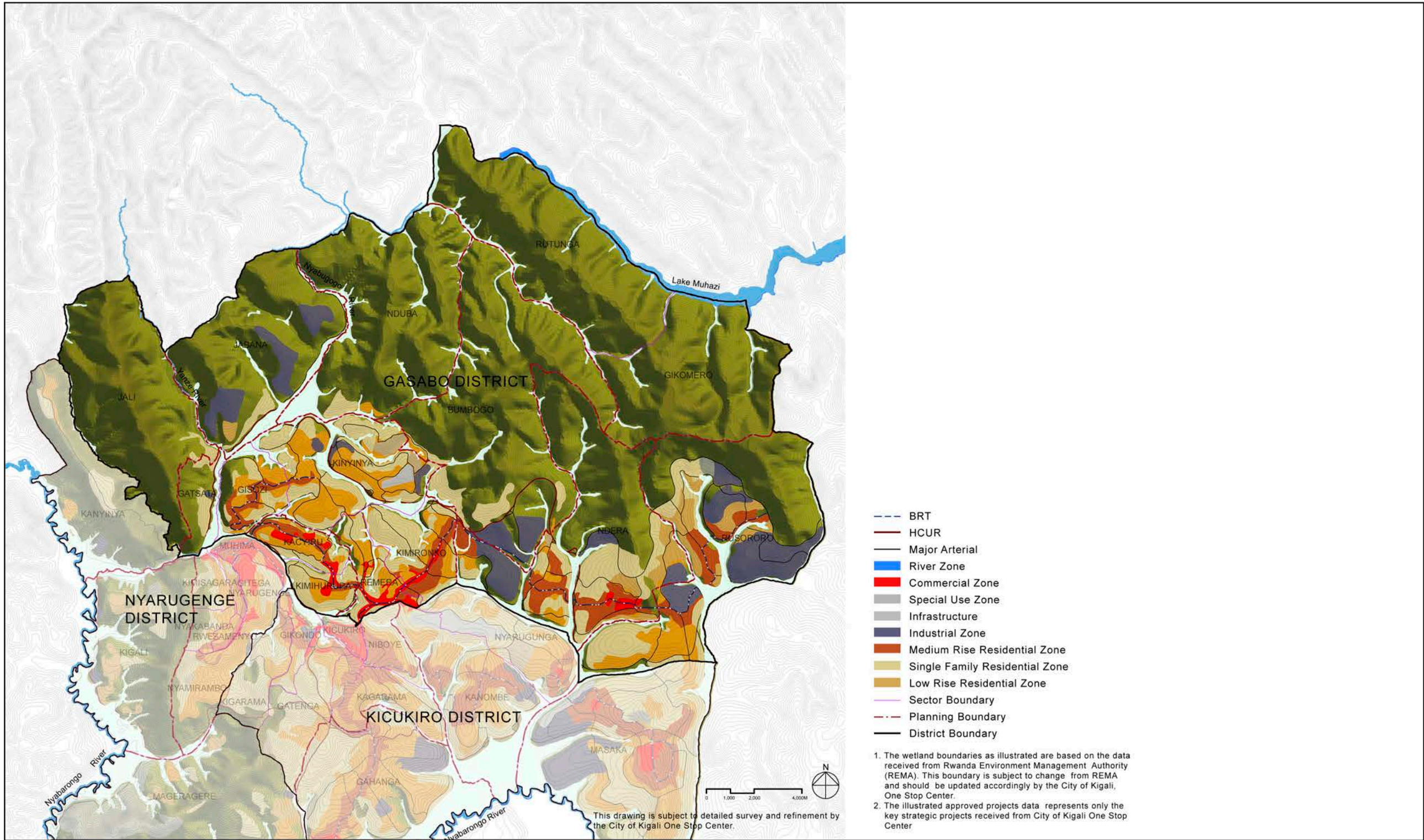
COMPOSITION OF HOUSING-NORTH CENTRAL PLANNING AREA

Housing Type	Housing Area(Ha)(Gross)	Housing Area(Ha) (Net)	House Size (in sqm)	Du/ha (Net)	Gross Plot Ratio	Housing Area Share	Population share	Population (Using GFA)	Population (Using Density)	Dwelling Units (Using GFA)	Dwelling Units (using Density)	Floor Area (GFA)(sqm)
Single Family	493.79	493.79	250	40	1	104%	100%	76,044	76,044	19,752	19,752	4937900
Low Density	0.00	0.00	120	90	1.4	0%	0%	-	-	-	-	0
Medium Density	0.00	0.00	90	160	1.8	0%	0%	-	-	-	-	0
High Density	0.00	0.00	90	250	2.4	0%	0%	-	-	-	-	0
Mixed Use	0.00	0.00	90	160	1.8	0%	0%	-	-	-	-	0
Total	493.79	493.79				104%	100%	76,044	76,044	19,752	19,752	4,937,900

COMPOSITION OF HOUSING-NORTH EASTERN PLANNING AREA

Housing Type	Housing Area(Ha)(Gross)	Housing Area(Ha) (Net)	House Size (in sqm)	Du/ha (Net)	Gross Plot Ratio	Housing Area Share	Population share	Population (Using GFA)	Population (Using Density)	Dwelling Units (Using GFA)	Dwelling Units (using Density)	Floor Area (GFA)(sqm)
Single Family	193.61	193.61	250	40	1	41%	39%	29,816	29,816	7,744	7,744	1936100
Low Density	136.39	109.11	120	90	1.4	29%	61%	49,009	47,259	12,730	12,275	1527568
Medium Density	0.00	0.00	90	160	1.8	0%	0%	-	-	-	-	0
High Density	0.00	0.00	90	250	2.4	0%	0%	-	-	-	-	0
Mixed Use	0.00	0.00	90	160	1.8	0%	0%	-	-	-	-	0
Total	330.00	302.72				70%	100%	78,825	77,075	20,474	20,020	3,463,668

APPENDIX 3: GASABO DISTRICT ZONING

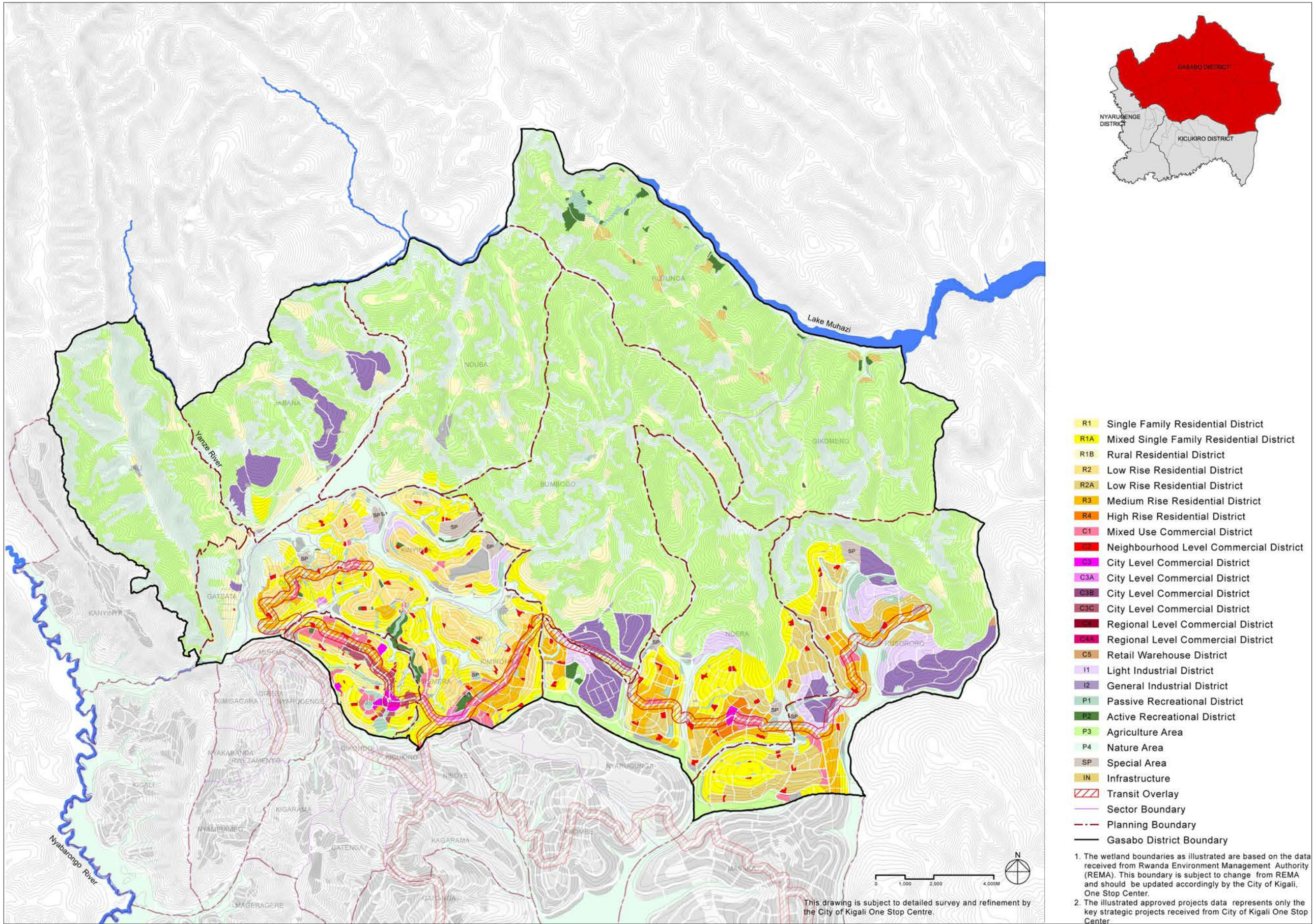


Gasabo District - Concept Plan

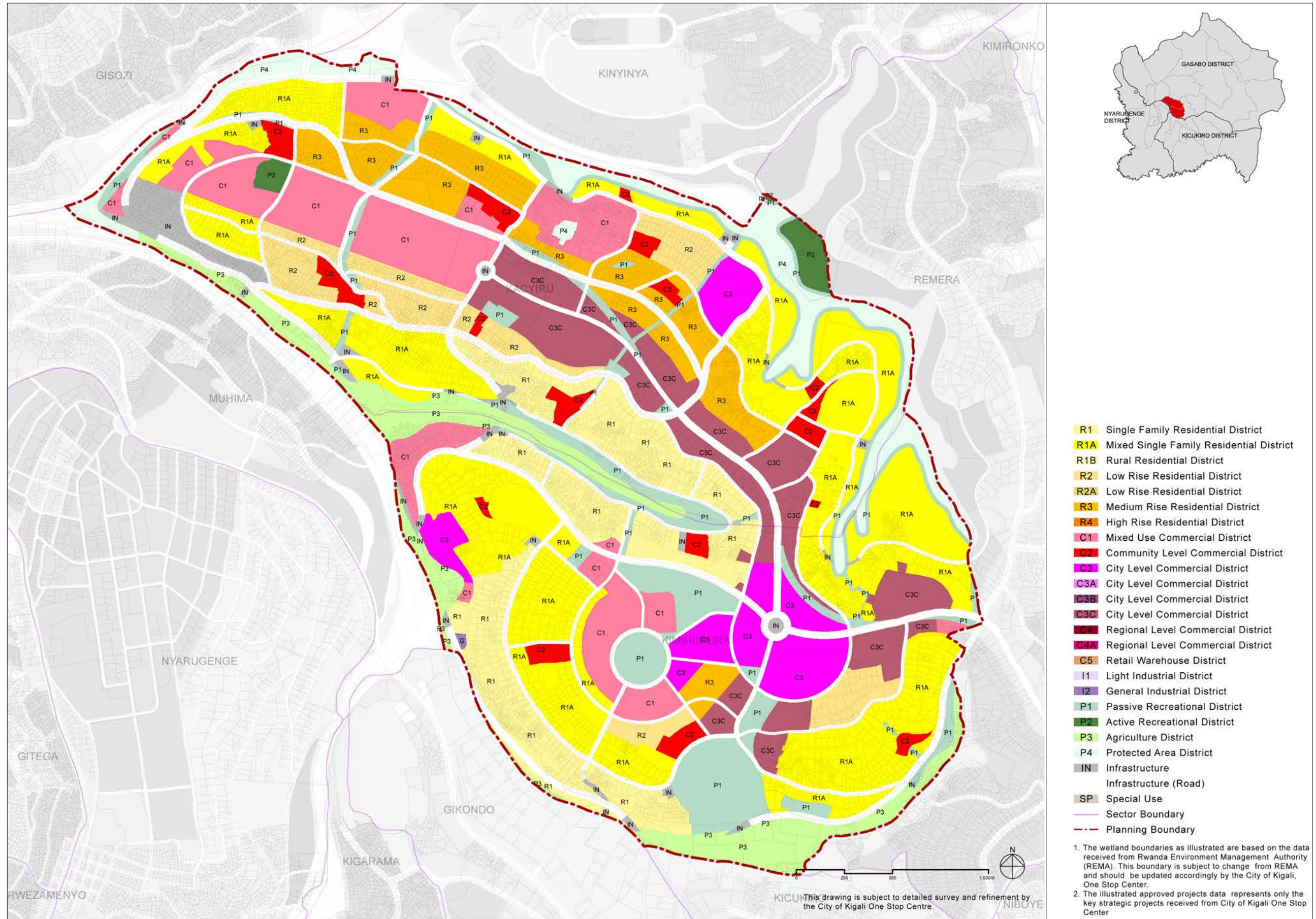
ZONING CLASSIFICATION AND LAND USE MATRIX

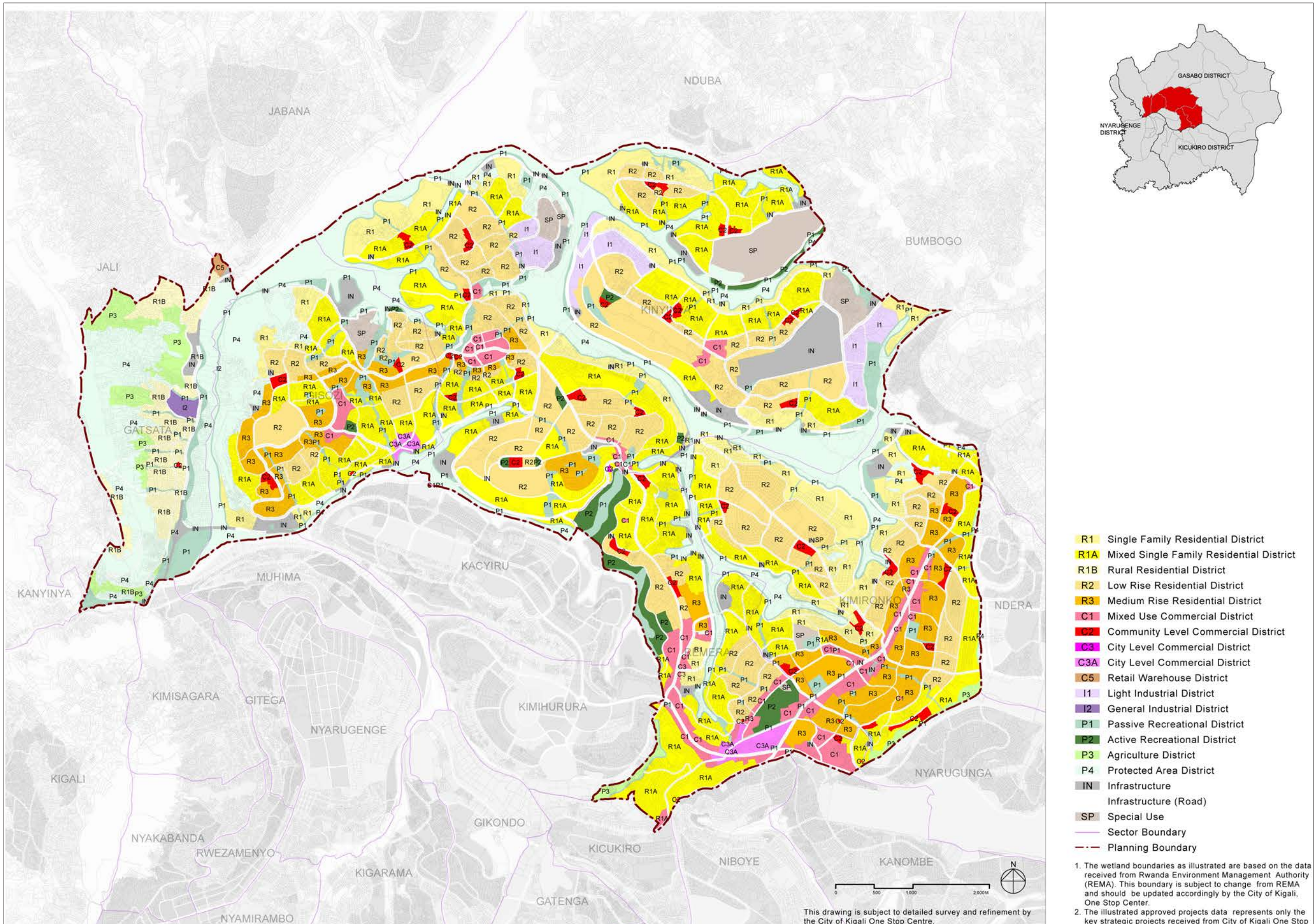
Zoning Category	R1	R1A	R1B	R2	R2A	R3	R4	C1	C2	C3	C3A	C3B	C3C	C4	C4A	C5	I1	I2	P1	P2	P3	P4
Building Use or Land Use																						
Residential																						
Single Family Housing (Detached Villa)																						
Single Family Housing (Detached and Attached)																						
Multi-family Housing (Condominiums and Apartment Flat)																						
Workers' Accommodation																						
Commercial																						
Retail – Sundries / Grocery Shops / Food and Beverage (Cafes) not exceeding 30 seats	C	C		C	C	C	C										C	C	C	C		
Barber shops / Hair Salons / Health Spa	C	C		C	C	C	C										C	C	C	C		
Laundry / Dry Cleaning	C	C		C	C	C	C															
Commercial Retail & Services (e.g.. Fashion, Stationery Shops, Travel Agencies, Banks, Hardware, Supermarket)																						
Shopping Centres/Malls, Hyper-marts																C						
Restaurants			C		C	C	C									C						
Offices					C	C	C									C						
Showrooms																C						
Retail - Warehouses																						
Entertainment Arcades, Cinema																						
Hotel	C	C		C	C	C	C															
Service Apartments				C	C	C	C															
Recreational Clubs/Holiday Chalets/Private Sport Club				C	C	C	C															
Petrol Station				C	C	C	C	C	C	C	C	C	C			C				C		
Industrial																						
Heavy Industrial	C	C																				
Minor Automotive Repair Workshop																						
Public Facilities																						
Kindergarten/Childcare Facilities																						
Primary and Secondary Schools (Boys and Girls)								C		C												
Polytechnic / University / Vocational Schools																	C					
Hospital and Health Institutions				C	C	C	C										C					
Medical / Dental Clinics	C	C		C	C			C									C					
Religious Institution																						
Government Offices						C	C										C					
Public Library																						
Museum , Gallery, Cultural Centres																						
Sport Complexes/ Sport Facility																						
Equestrian Park																						
Rapid Transit Station	C	C																		C		
Convention Centres																						
Open Space /Park																						
Public Parks																					C	C
Golf Course & Private Park																					C	C
Wildlife Park, Botanic Gardens, Conservatories, Arboretums																					C	C
Major Infrastructure:Utilities Corridor, Major Electrical Substation, Pumping Station, Expressways, Water Tank and Reservoir, Power and Desalination Plants, Sewage Treatment Works																						
Minor Infrastructure:11 KV ESS, Pumping Station, Roads (excluding Expressways), Telecommunications Antenna																						

Permitted Uses
 Conditional Uses
 Prohibited Uses

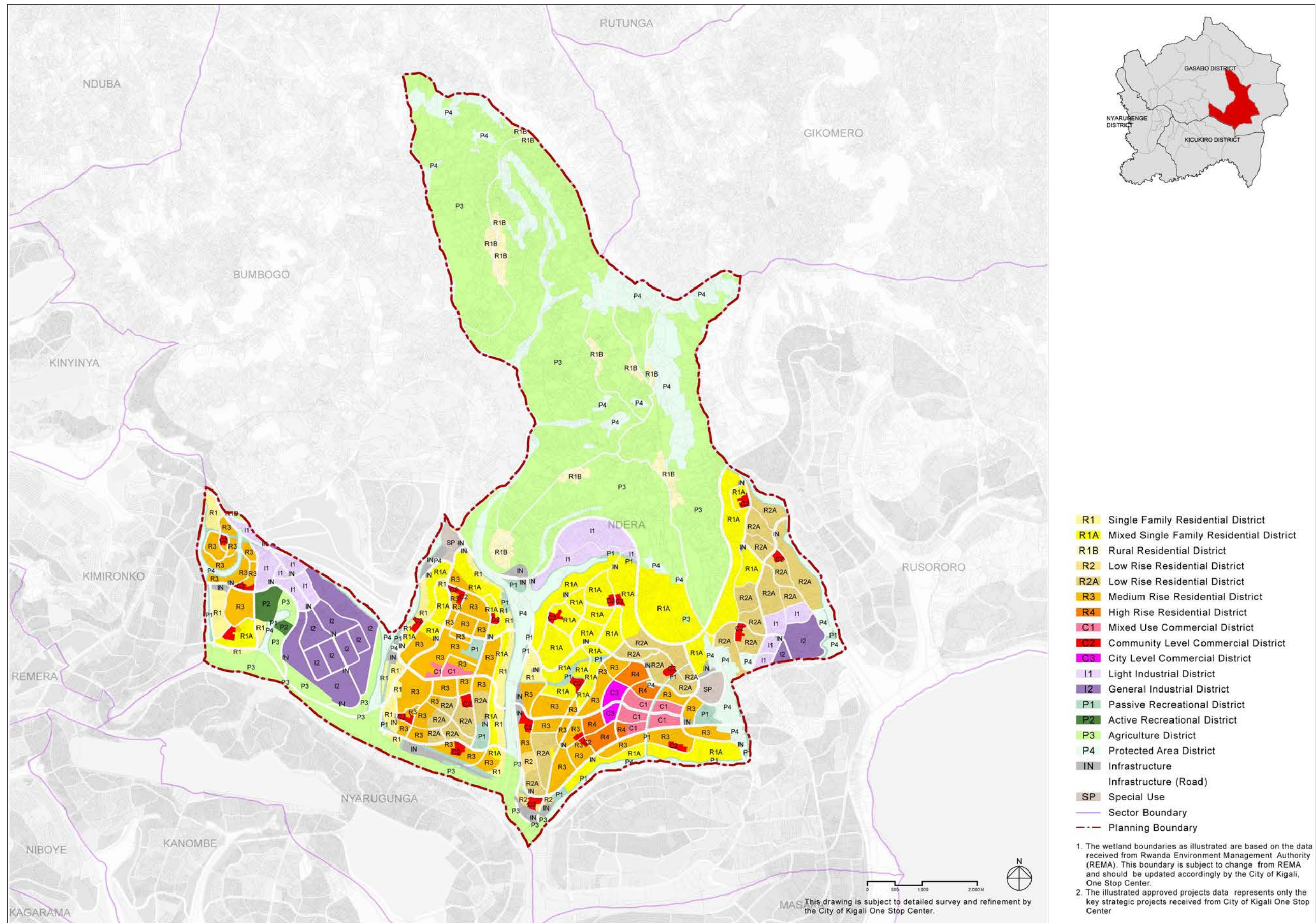


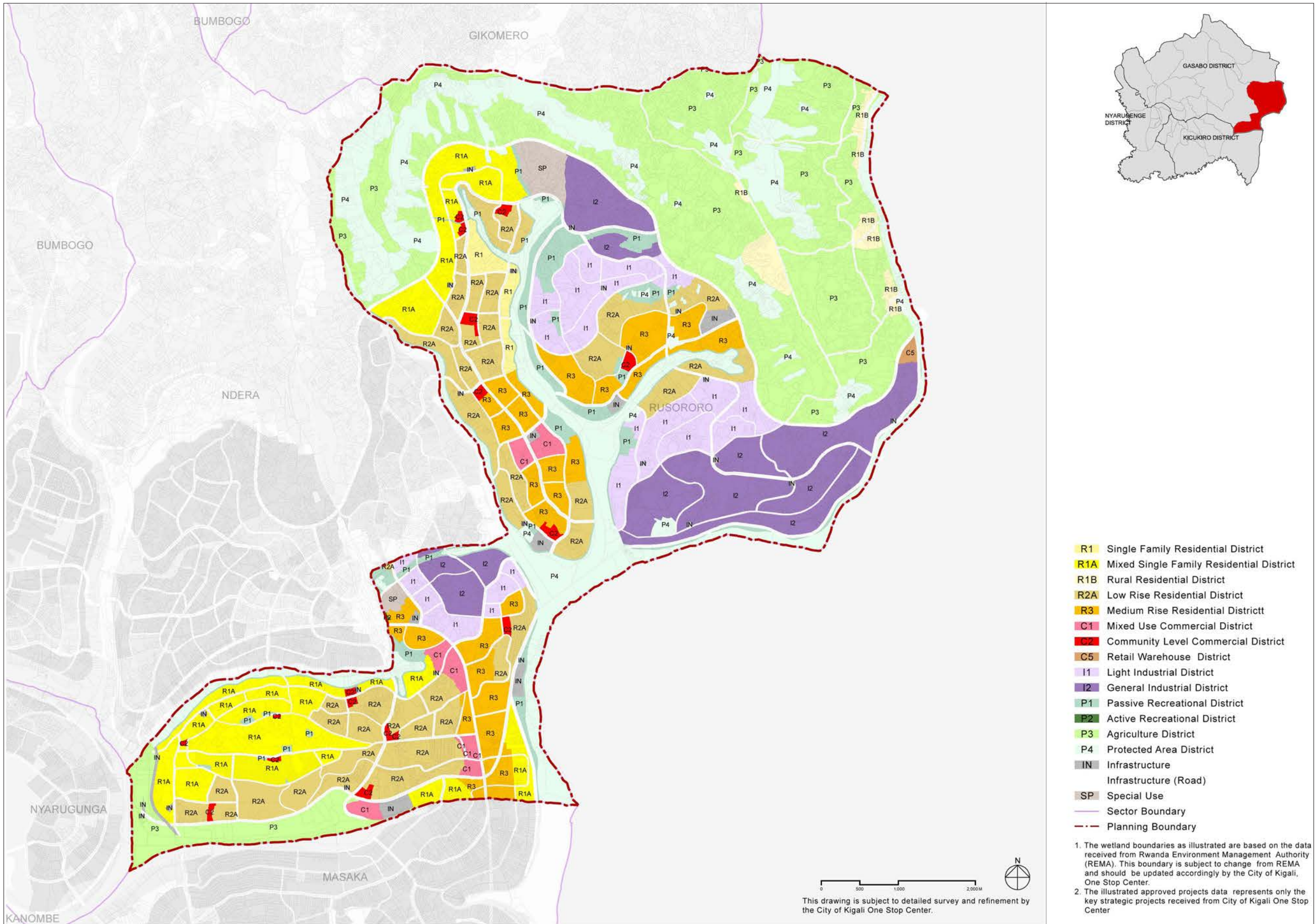
Gasabo District- Zoning Plan - Year X



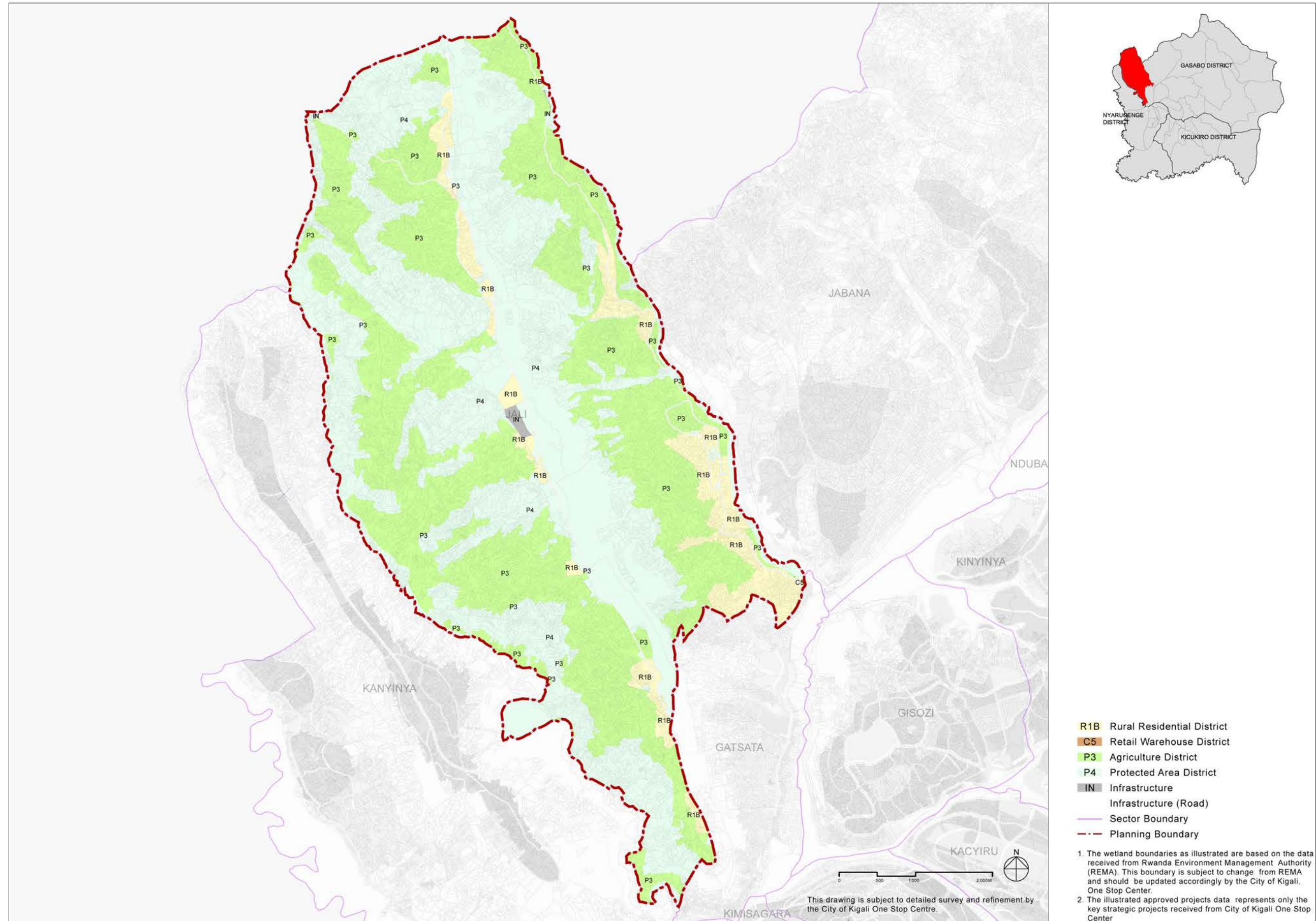


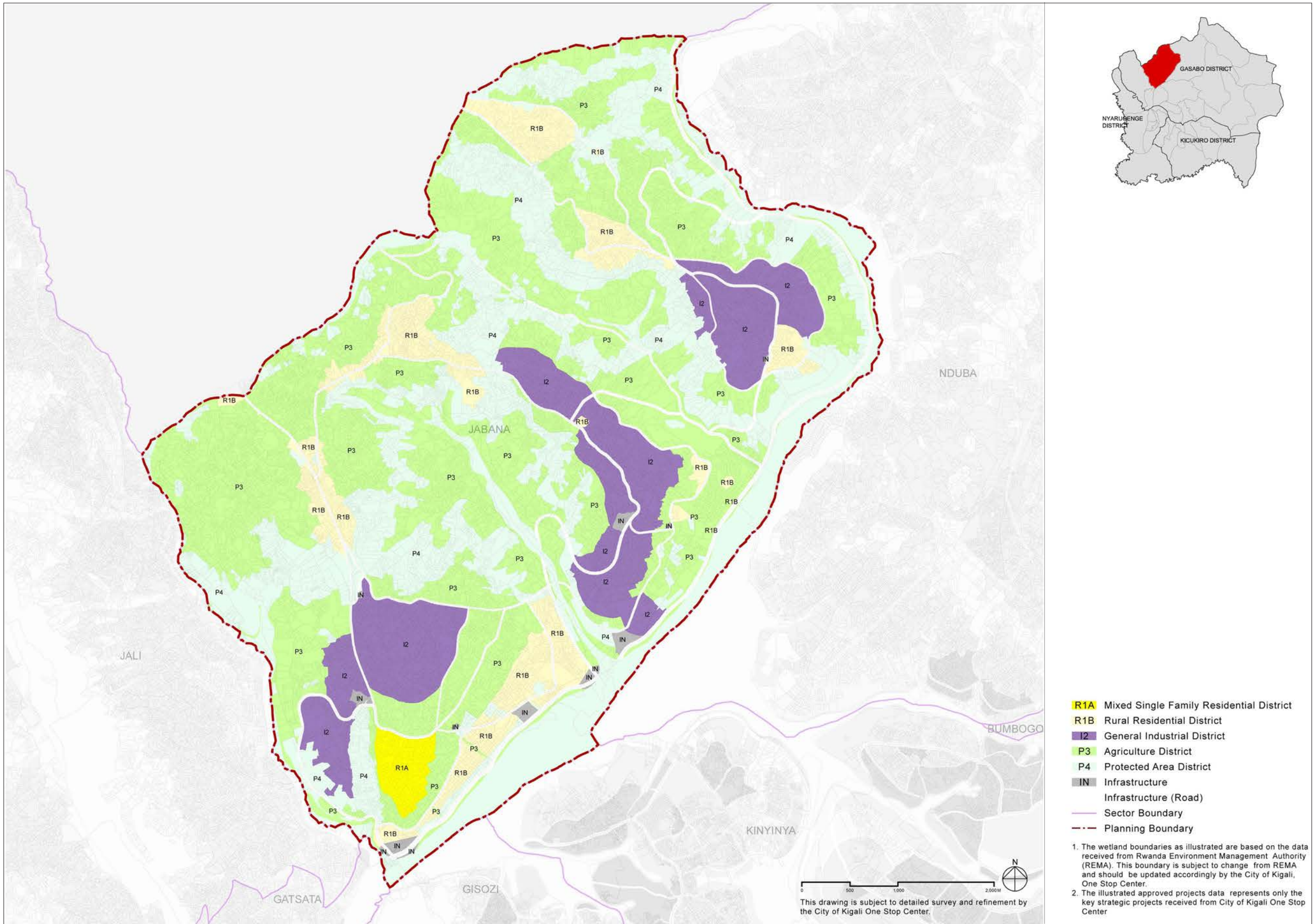
Central Planning Area- Zoning Plan - Year X



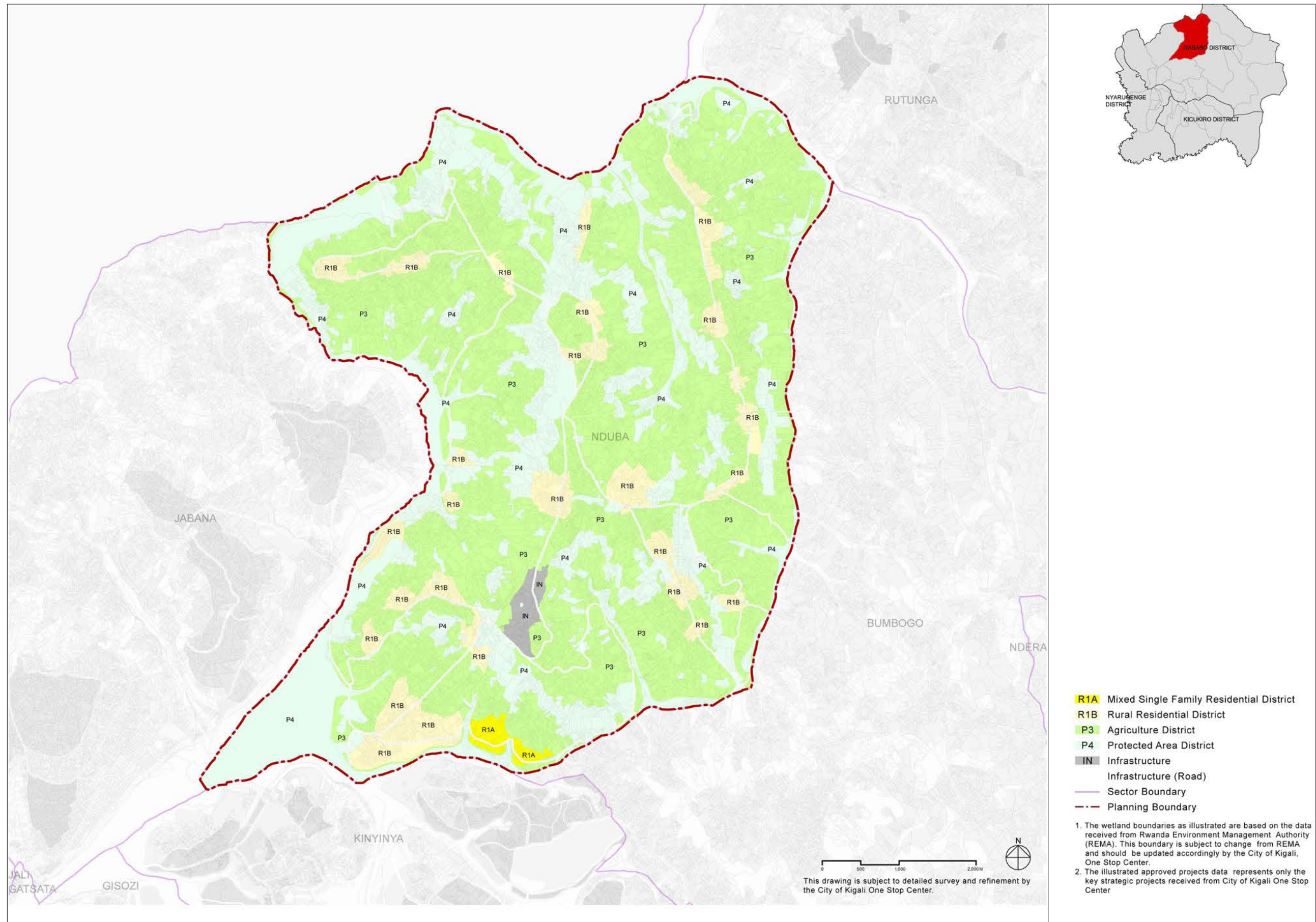


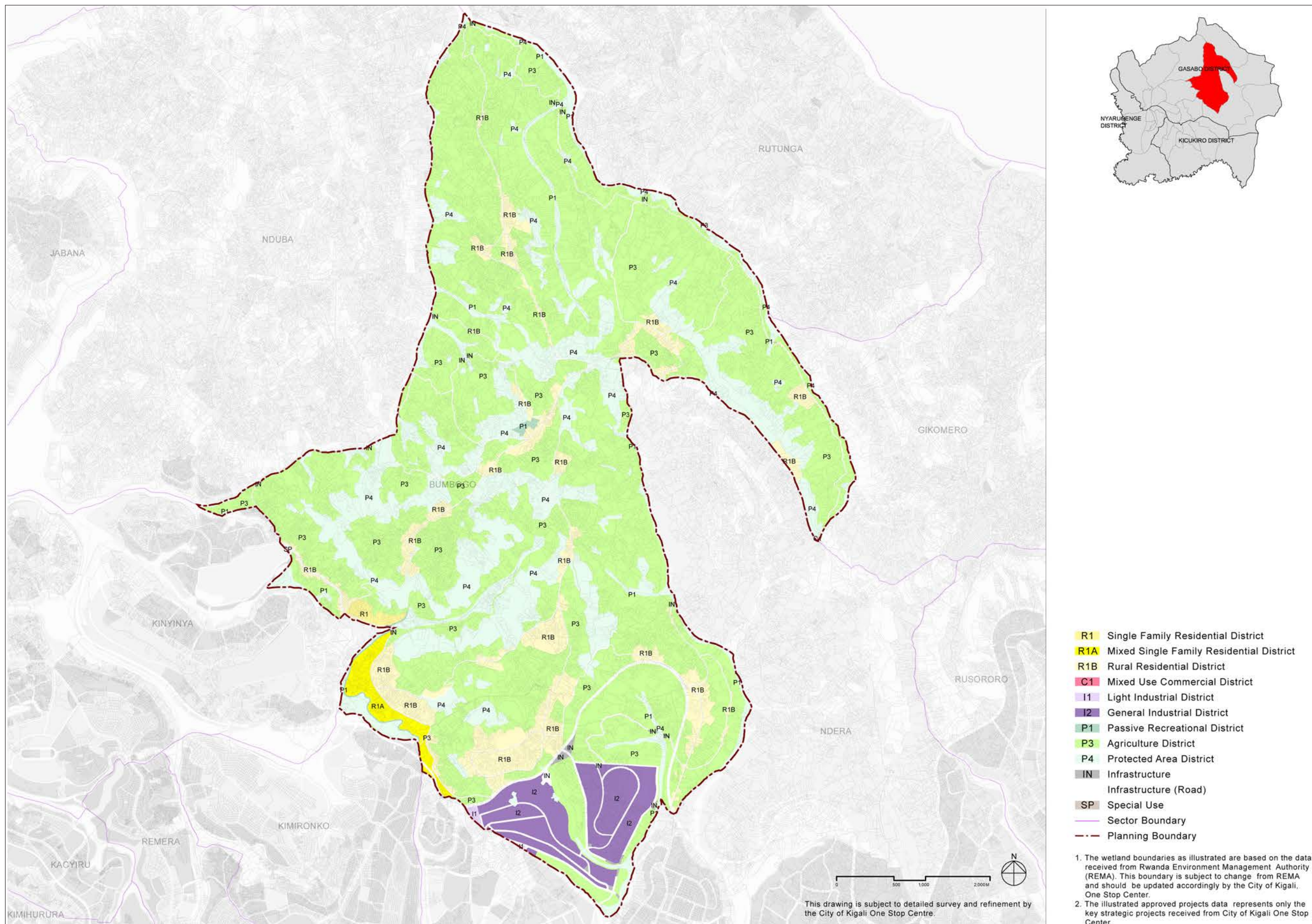
Eastern Planning Area- Zoning Plan - Year X



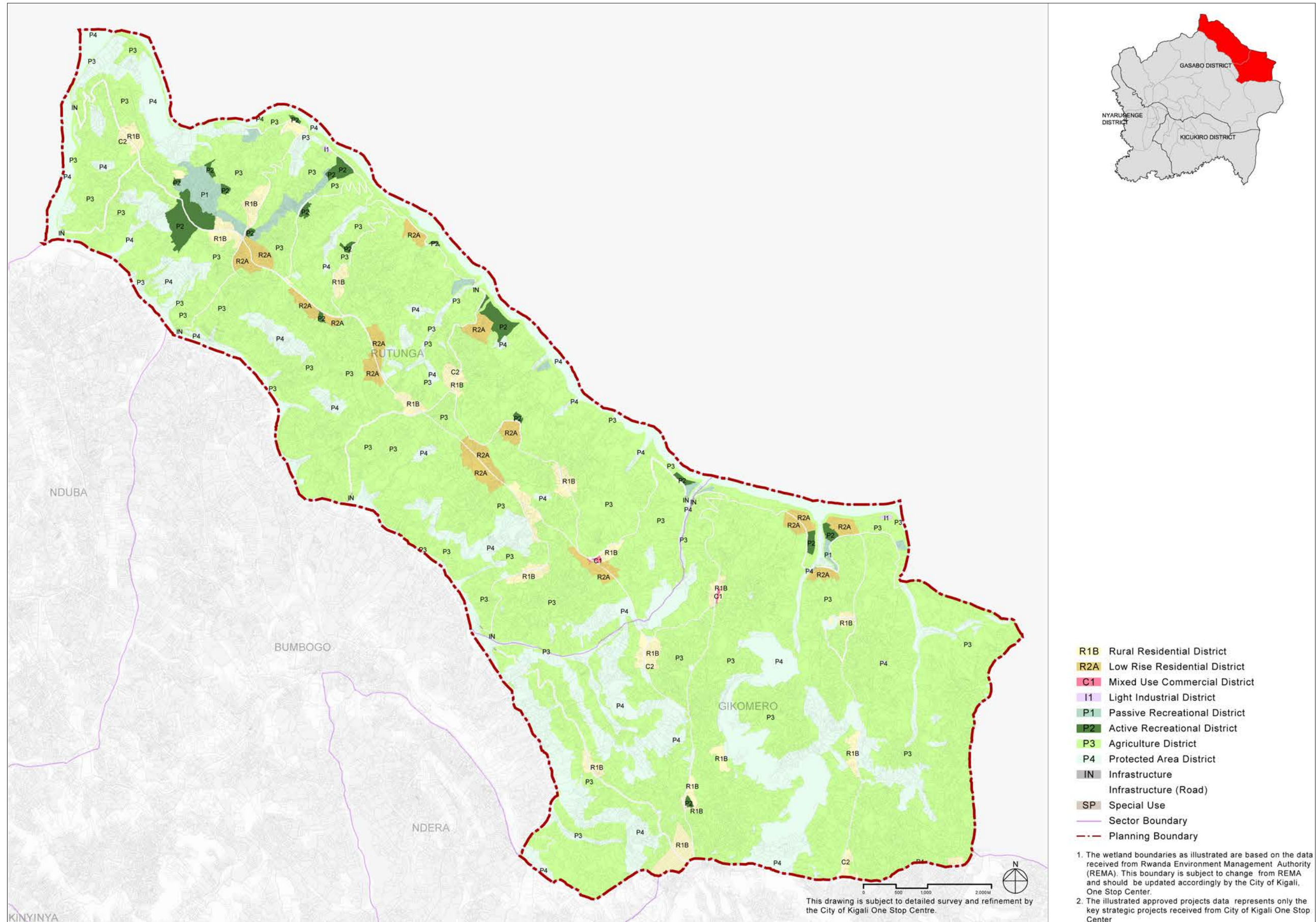


North Western Planning Area- Zoning Plan - Year X





North Central Planning Area- Zoning Plan - Year X



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