VERSION 3 (FINAL)

HEKPOORT
Precinct Plan

MOGALE CITY LOCAL MUNICIPALITY

NOVEMBER 2011

MOGALE CITY LOCAL MUNICIPALITY
PO Box 94
Krugersdorp
1740

NOVEMBER 2011

HEKPOORT
PRECINCT PLAN 2020

Compiled on behalf of the
Mogale City Local Municipality by:

Urban Dynamics Gauteng
P.O.Box 291803
MELVILLE
2109

Tel: (011) 482 4131
Fax: (011) 482 9959
www.urbandynamics.co.za
Contact: Heinrich Melcher

national treasury
Department
National Treasury
REPUBLIC OF SOUTH AFRICA

Mogale City
Local Municipality

Krugersdorp CBD PRECINCT PLAN, 2017

Submitted: 12 October 2017

Report Information

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Recipients:	Attention of Ms. Thandeka Kabeni On Behalf of National Treasury Tel: +27(0) 12 315 5286 Email: thandeka.kabeni@treasury.gov.za
KRUGERSDORP CBD Steering Committee members and participating officials	For National Treasury: Mr. C. Sekele, Ms. L. Lechuba, Ms T. Kabeni For Mogale City Local Municipality: Mrs N, Radebe, Mr. M Msezana
Prepared by:	VUKA AFRICA consulting engineers and project managers In Association with VUKA AFRICA PLANNERS TRIVIRON Infrastructure • Delivery • Service andira urban services MSAVHENI
Authors:	Collins Sepua, Phenyo Mathopa, Absalom Malobe, Rashika Padarath, Tokelo Molefe
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Acronyms

BRT	Bus Rapid Transit
CBD	Central Business District
EIA	Environmental Impact Assessment
GDP	Gross Domestic Product
GIS	Geographic Information System
GVA	Gross Value Add
HDA	Housing Development Agency
IDP	Integrated Development Plan
LSM	Living Standard Measure
MCLM	Mogale City Local Municipality
NDP	National Development Plan
SDF	Spatial Development Framework
SPLUMA	Spatial Planning & Land Use Management Act, 16 of 2013
TOD	Transit Oriented Development
UNS	Urban Network Strategy
WRDM	West Rand District Municipality
VACE	Vuka Africa Consulting Engineers (Pty) Ltd

Glossary of Terms

Transit Oriented Development

The type of development that promotes compact, walkable, pedestrian-oriented, mixed-use communities centred around high quality public transport systems.

Interchange Zone

Area of intense land uses (within 400m radius of the urban hub) where rail, bus and taxi service come together within easy walking (150 – 200m) distance of one another,

1. Introduction

1 Introduction

1.1 Background and process

Vuka Africa & Triviron have been appointed by Mogale City (herein after referred to as the Municipality) to undertake the preparation of a precinct plan for Krugersdorp CBD. The preparation of this plan involved a methodology consisting a series of work phases informed by the urban hub design toolkit and aligned to the Urban Network Strategy.

These phases included the following:

- **the urban network identification**
- **status quo and analysis**
- **network planning and project delivery**

This report is a consolidation of these phases and concludes the planning process. The report also identifies a pipeline of projects which will inform the implementation of projects within Krugersdorp CBD.

1.1.1 Study area and context

Leratong Hub was the initially identified as focus/ study area but presented environmental and land ownership challenges. In August 2016 it was revealed that key land ownership in the Leratong Hub precinct were no longer available for this type on intervention. The municipality then focused on Krugersdorp CBD as the preferred focus area.

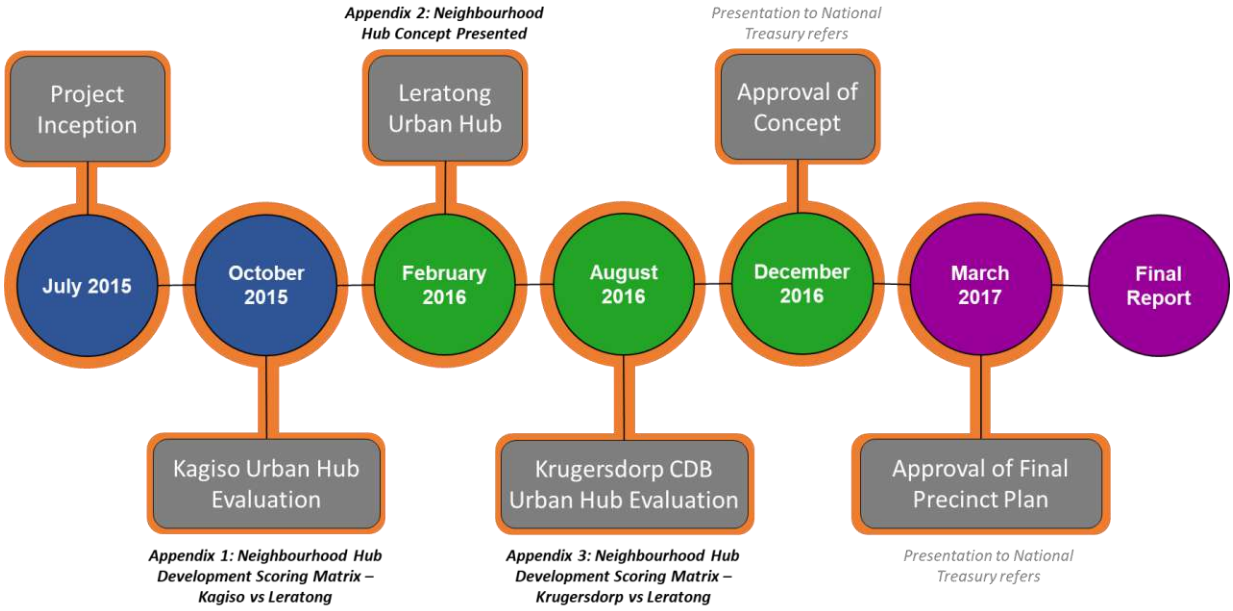


Figure 1: Project TimeLine

Krugersdorp CBD was approved as the primary urban hub/ focus area in December 2016. The final Precinct Plan was presented and approved in March 2017. This report represent background information and elaboration of the precinct plan with key proposals informed by a series of engagements with the Municipality and NDP.

1.1.2 Introduction to study area

1.1.2.1 Provincial Context

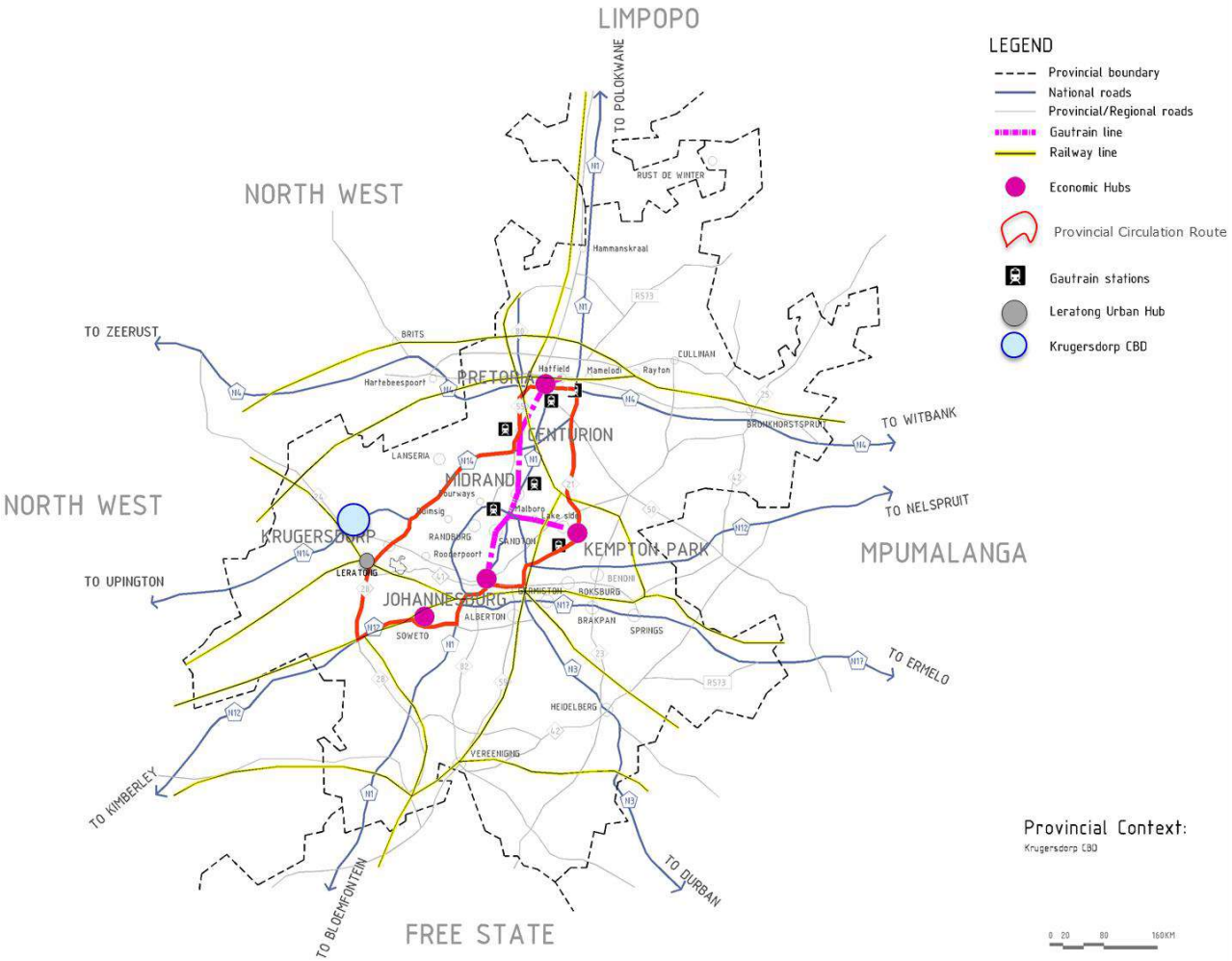


Figure 2. Location of the Krugersdorp CBD in Gauteng Province

In the provincial context, Mogale City is in the western extent of Gauteng Province, also borders onto the North-West Province on the western side. Krugersdorp CBD is in relative close proximity to the main provincial circulation route. Therefore, this makes the study area accessible from all the major centres of Gauteng and North West Province, namely Johannesburg (via R41), Pretoria & Midrand (via N14), Hartebeespoort Dam (via R24), and Randfontein (via R28), to name but a few places.

1.1.3 District Municipal Context

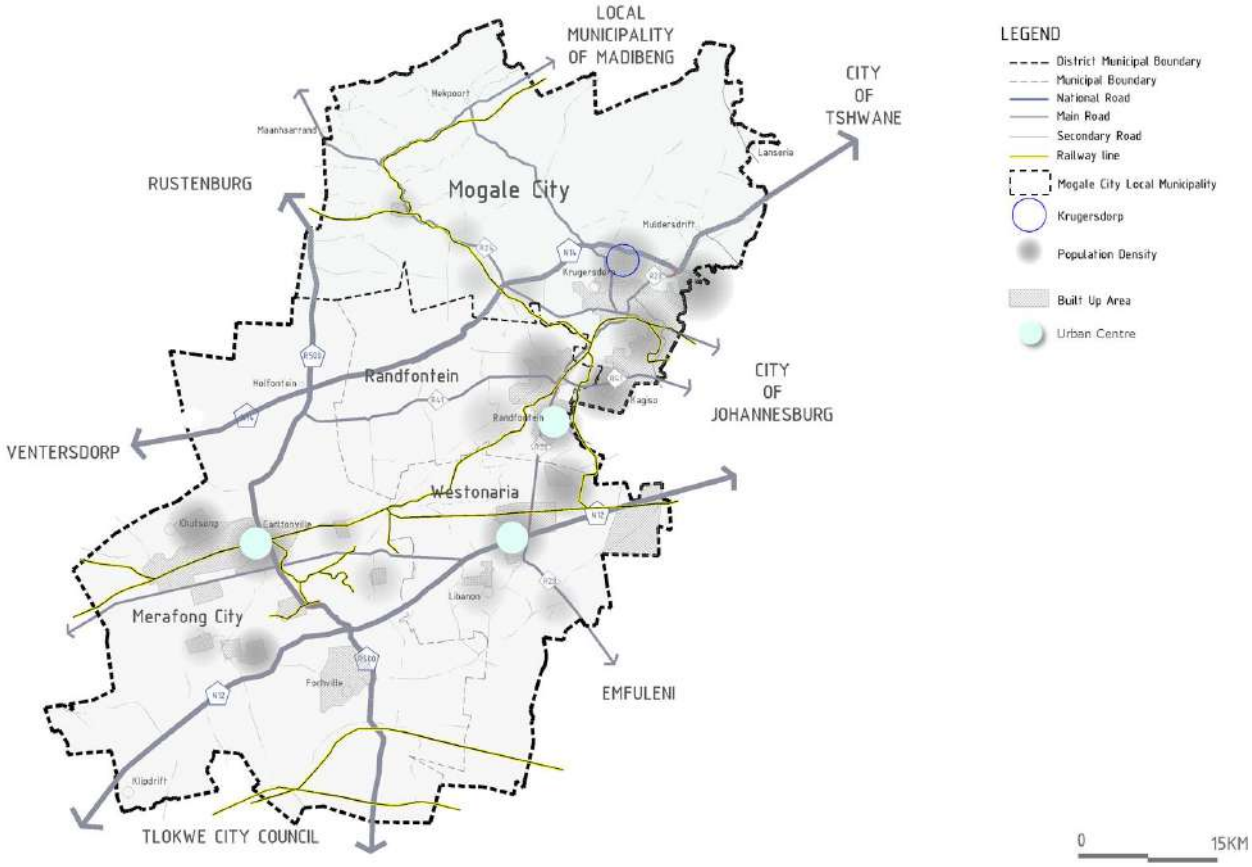


Figure 3: District Context of Mogale City

Much of the West Rand District is sparsely populated and largely undeveloped with a combination of agricultural, undermine land and nature reserves. From a district perspective, Mogale City is the northernmost local municipality in the district and Krugersdorp CBD is the northern most concentration of development and population density.

1.1.4 Mogale City Demographic Profile[1]

1.1.4.1 Population

Figure 5, below indicates Mogale City average population change from year to year. The population average growth increased at a decreasing rate. For instance, between 2010 to 2013, the rate was 1.85% and between year 2013 to 2017 it is estimated that average growth was 1.58%, a much less decreased growth rate.

1 Mogale City IDP 2017-2018

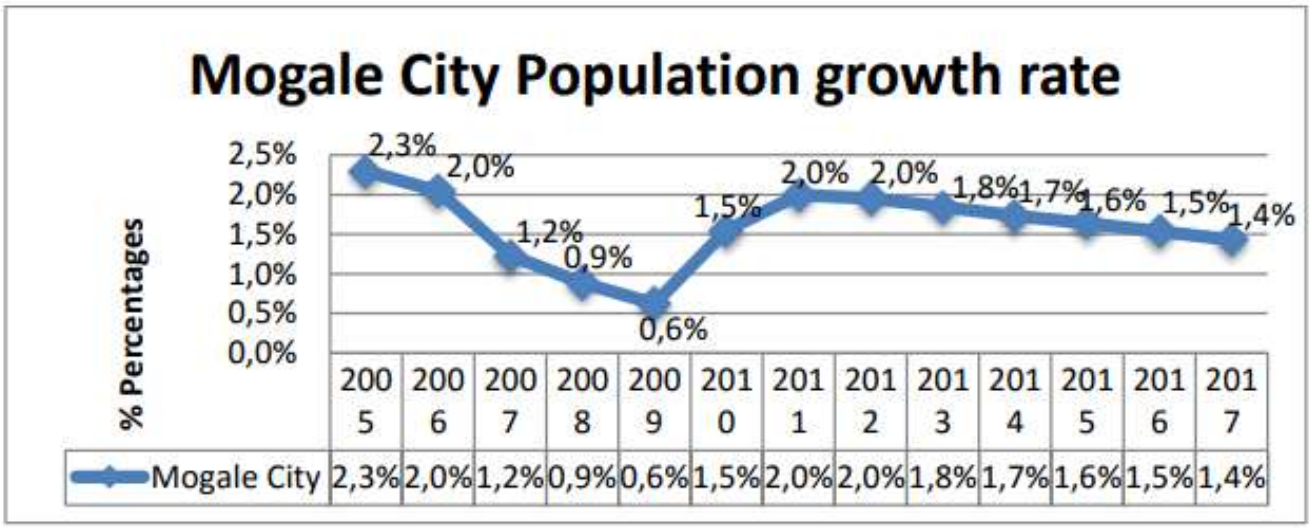


Figure 4: Mogale City Growth Rate

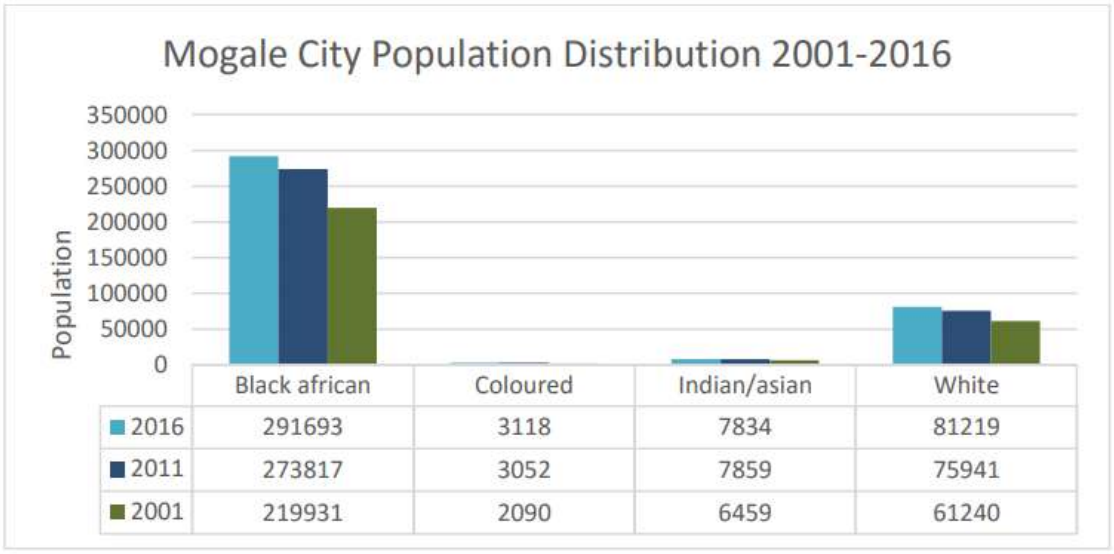


Figure 5: Mogale City proportional distribution of population groups

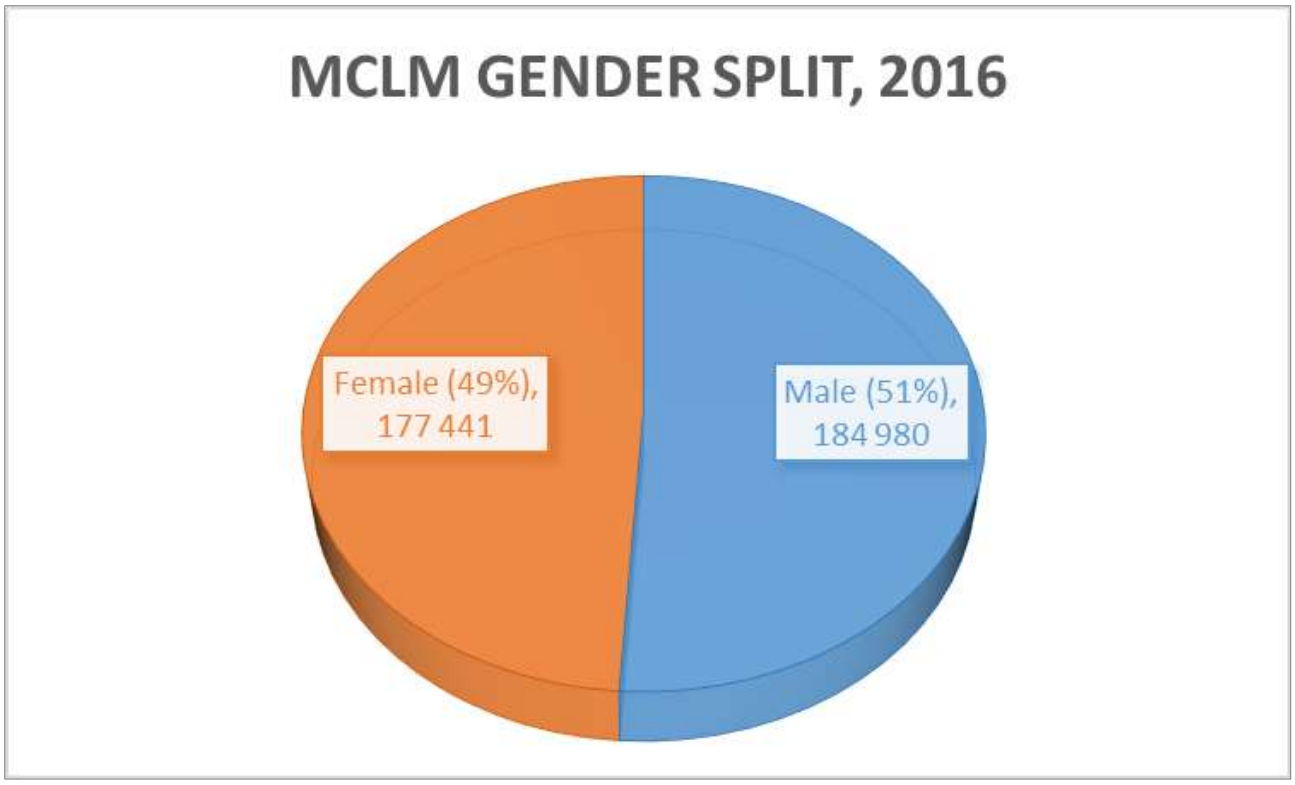


Figure 6: Mogale City Local Municipality Gender Split, 2016[2]

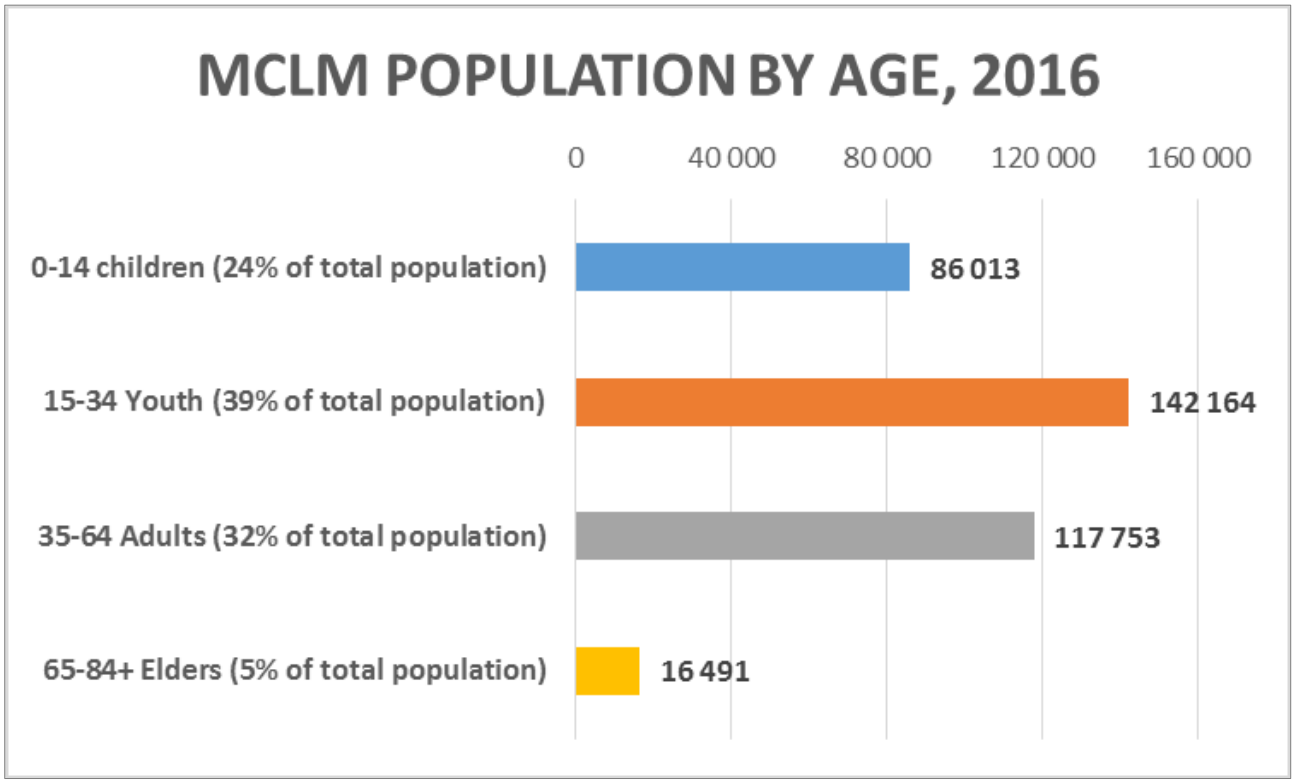


Figure 7: Mogale City Local Municipality Population by Age, 2016

2 Mogale City IDP 2016-2021 indicates that Mogale City Local Municipality has a total population of 362 421 people comprising 117 375 households.

1.1.4.2 Economic Development Indicators

Development indicators enable a region to gauge their progress on their developmental goals and objectives. These indicators include the unemployment rate, poverty and inequality.

1.1.4.2.1 Labour and Employment

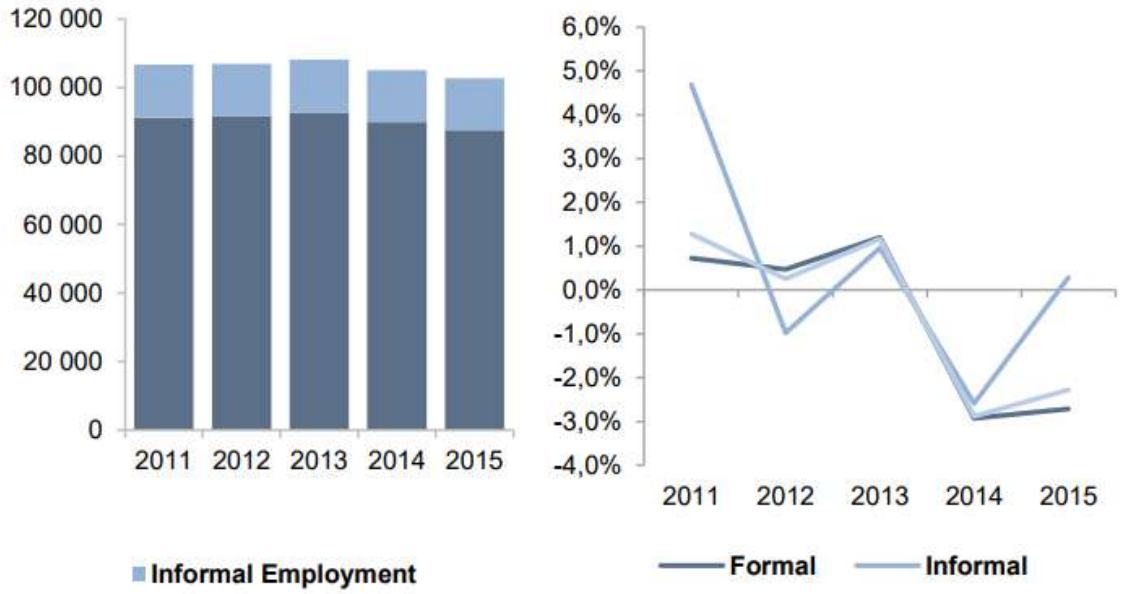


Figure 8: Total Employment and Growth, 2011-2015[3]

The figure above shows the Municipal total employment and growth levels from 2011 to 2015. Employment levels in the municipality show a declining trend over the review period. Formal employment declined from 91,210 in 2011 to 87,575 in 2015, whilst informal employment decreased from 15,477 in 2011 to 15,114 in 2015. Employment growth rate was in negative territory in 2014 and 2015. The Municipality experienced its lowest level of employment growth in 2015, contracting by 2.3%. During the same period, GDP-R growth also contracted by 1.8%.

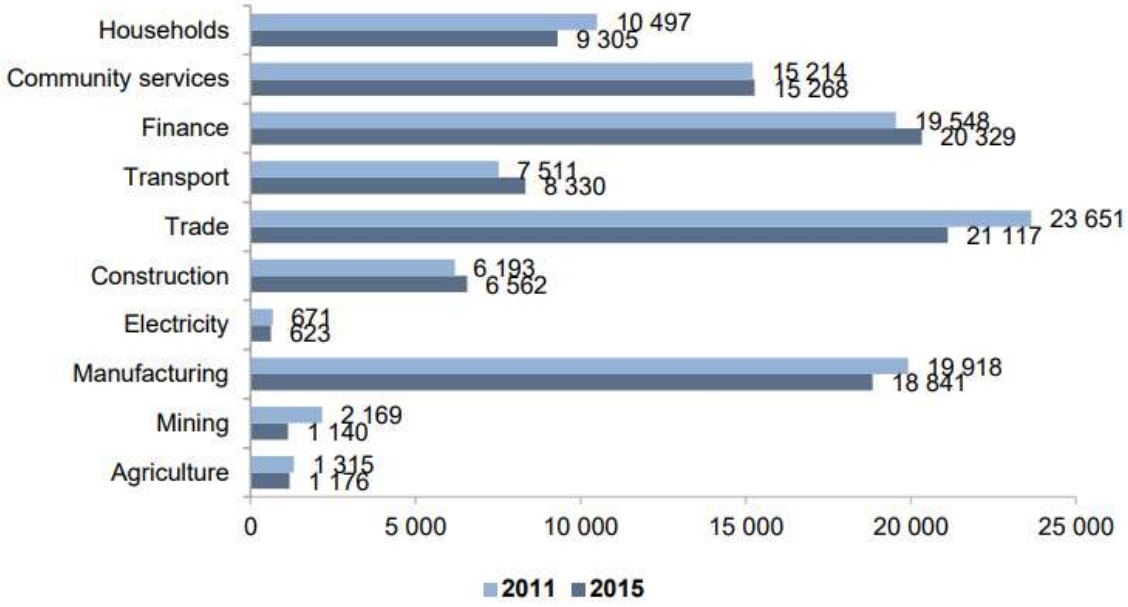


Figure 9: Employment by Sectors, 2015

3 Source: IHS Markit 2016

The figure above shows the number of employment by sector in Mogale City in 2011 and 2015. During the review period, there was a decline in employment levels in five sectors, except in construction, transport, community services and finance sectors. Nevertheless, the figure confirms that wholesale & retail trade and finance sectors are the largest employers in Mogale City. The trade sector employed a total of 21 117 people in 2015 and the finance sector employed 20 329 people. It however, also indicates the strength of the manufacturing sector which employed 18 841 people in 2015. The electricity and mining sectors had the lowest level of employment within the city.

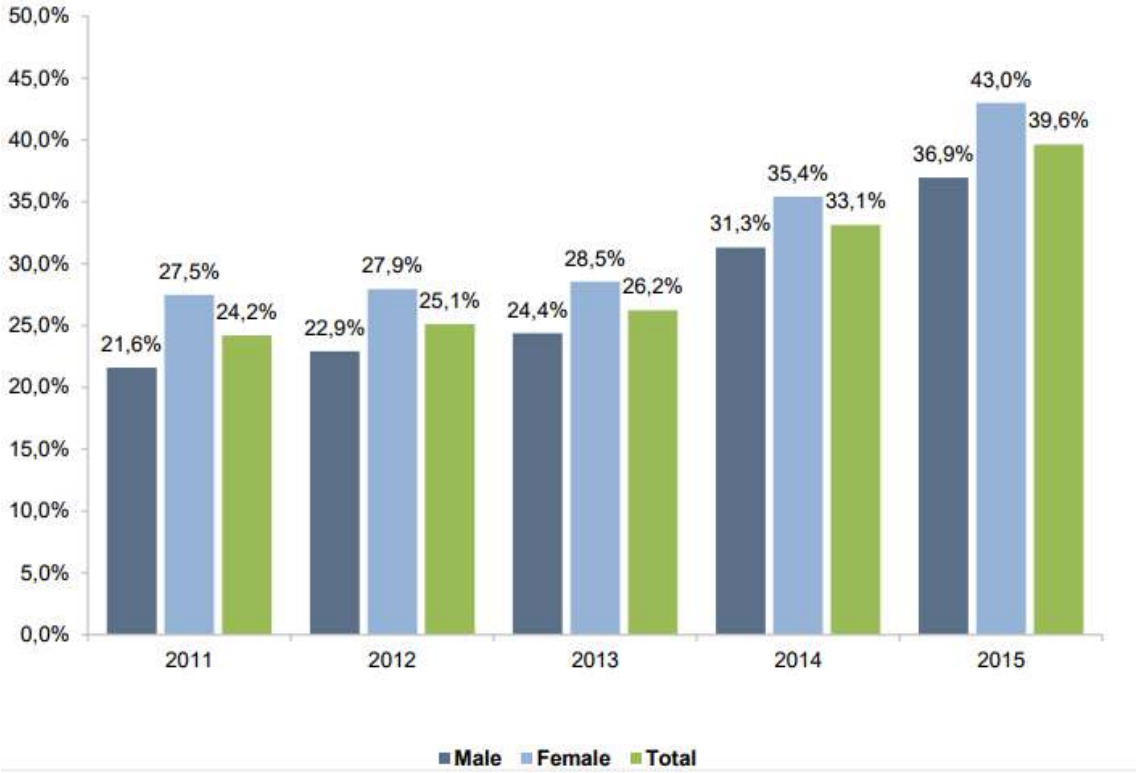


Figure 10: Unemployment Rates, 2011-2015[4]

1.1.4.2.2 Gini Co-efficient as a measure of Inequality

In measuring inequality, the Gini co-efficient is often used and measures the extent to which the distribution of income (or, in some cases, consumption expenditure) amongst individuals or households within an economy deviates from a perfectly equal distribution. Thus, a Gini co-efficient of 0 represents perfect equality, while an index of 1 implies perfect inequality.

4 IHS Global Insight, 2017

Figure 11: Gini co-efficient, 2011-2015[5]

The figure above shows the Gini co-efficient as a measure of income inequality for the Mogale City and the West Rand. The Gini has remained fairly constant in Mogale City across the years. Although there are instances where the Gini declined (such as between 2013 and 2015), the declines were very minimal. The Gini decline for Mogale City indicates that the poverty gap has widen, which implies more residents are becoming increasingly poor. With a coefficient of 0.62 in 2015, it means that only about 36 per cent of the population in Mogale City hold the majority of income or all the income, whilst the remaining 64% share very little or no income at all.

1.1.4.2.3 Poverty

Figure 10 shows the proportion of people that live below the food poverty line for Mogale City and the West Rand from 2011 to 2015. Both regions show a rising trend, with Mogale City recording higher proportions. In 2015, there were 15.7 and 15% of people living below the food poverty line for Mogale City and West Rand respectively.

5 Source: IHS Markit, 2017

Figure 12: Share Below Food Poverty Line, 2011-2015[6]

1.1.4.2.4 Income Distribution

The table below shows the income distribution of households in Mogale City in 2015. The annual income per household that constituted the largest number of households was the R42 001 to R96 000 range which accounted for 29.1% of total households within the Municipality. This was followed by the R96 001 to R360 000 range, which accounted for 27.7% of the households. The lowest percentage of households was in the highest income range of more than R2.4 million per annum and it comprised of 0.3% of the households.

Table 1: Income Distribution 2015[7]

Annual Income Per Household	Number of Households	Percentage of Households
Less than R12 000	4 414	3.6%
R12 001 toR42 000	30 162	24.7%
R42 001 to R96 000	35 577	29.1%
R96 001 to R360 000	33 866	27.7%
R360 001 to R2 400 000	17 911	14.6%
More than R2 400 000	409	0.3%
Total	**122 339**	**100.0%**

1.1.4.2.5 Service Delivery Context

The figures presented below refer to total number of households of **117 375** in Mogale City.

Table 2: Mogale City LM Service Delivery Context[8]

6 Source IHS Markit 2017

7 Source IHS Markit 2017

8 After MCLM at a glance, MCLM Integrated Development Plan 2016/17

Access to electricity	
Access to electricity	100 788 (86% of total households)
No access to electricity	16 584 (14% of total households)
Water access	
Access to drinking water	101 415 (86% of total population)
No access to drinking water	15 960 (14% of total population)
Toilet facility	
Access to toilet	106 968 (91% of total number of households)
No access to toilet	10 407 (9% of total number of households)

1.1.5 Krugersdorp CBD Profile

Krugersdorp CBD is the major service and economic centre in Mogale City. The other major centres of economic activity in the municipality include the emerging Cradlestone/Silverstar node and the Key West node to the north. The CBD is a service centre for residents of Munsieville, Boltonia and the suburbs south of the mining belt such as Azaadville and Kagiso.

The areas to the south of the CBD, namely Kagiso, Azaadville and Rietvallei (referred to as the Kagiso complex), are predominantly disadvantaged settlements with limited access to services and facilities. The Kagiso complex is physically separated from Krugersdorp's urban areas by an extensive mining belt that runs roughly in an east-west direction through the area.

The role of Krugersdorp CBD as a service centre for public services and amenities remains strong in this part of the province. This important role is cemented by the role the CBD plays as a rail, taxi and bus commuter node.

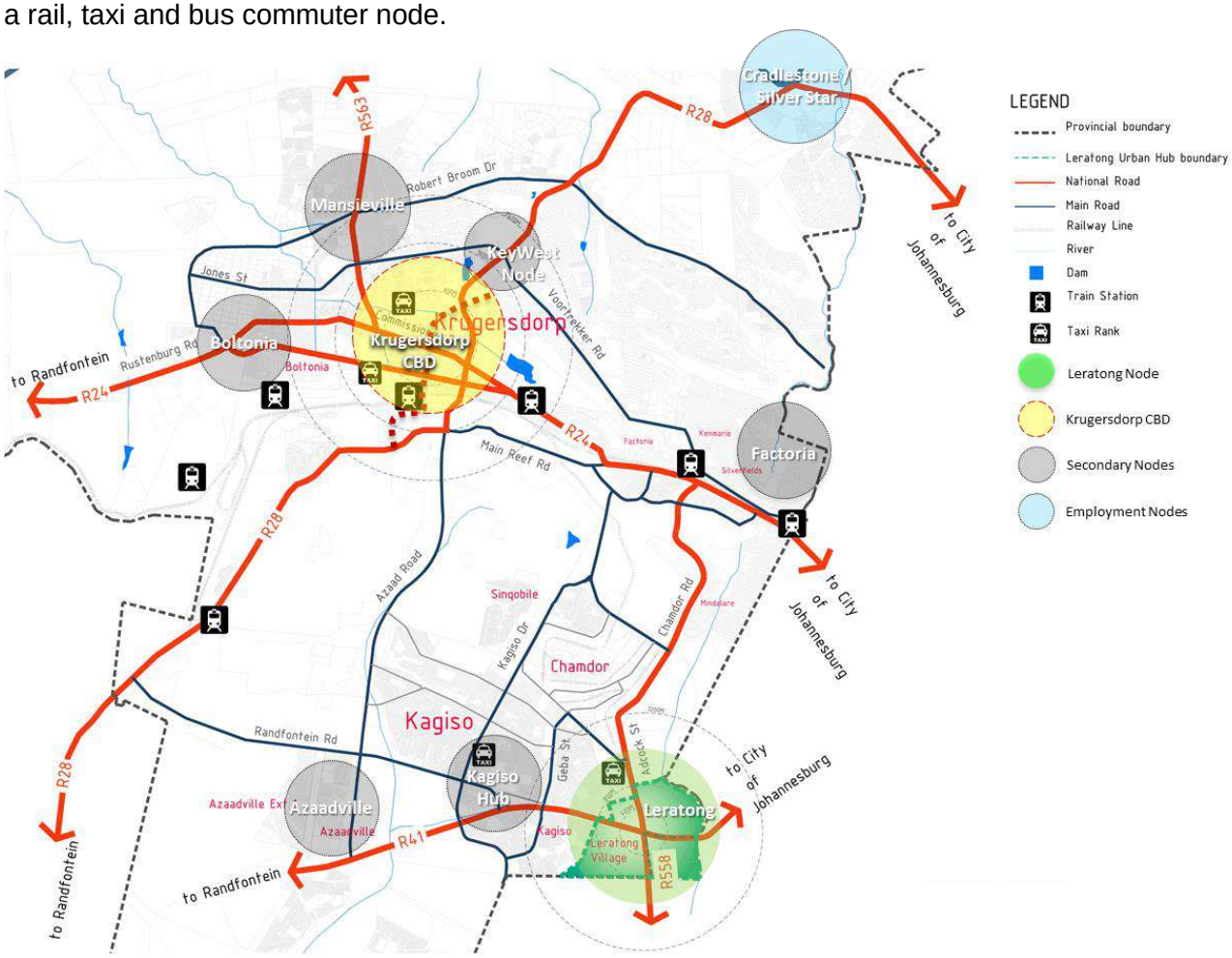


Figure 13: Krugersdorp CBD Linkage to Secondary Nodes

1.1.5.1 Precinct Context

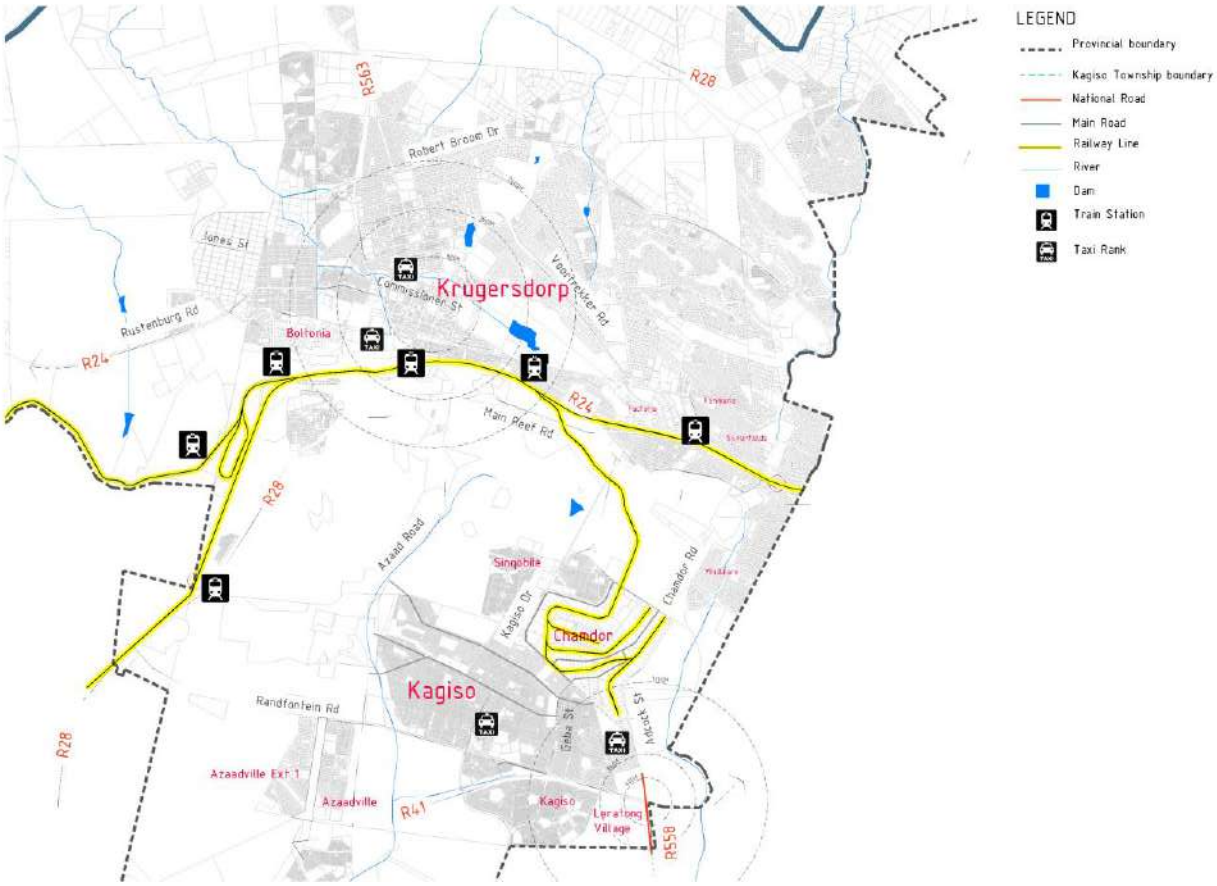


Figure 14: Krugersdorp CBD and surrounds

Krugersdorp CBD is surrounded by residential suburbs to the east, north and towards the west to a degree. Industrial areas like Boltonia are also present in the west. The study area is bounded by a railway line and undevelopable mining belt towards the south, forming a hard barrier to the settlement.

Most of the surburbs surrounding the CBD are charecterised by medium to low density development with little to no economic activity. .

1.1.6 Precinct Boundary

The Civic Centre is at the core (the heart) of the Krugersdorp CBD. The CBD is well served with access through the urban lattice throughout the whole area.

The 800 m precinct radius (precinct/ study area boundary) is drawn from the heart represents a walkable radius which places the opportunity to develop the CBD. . Nearly all of the Krugersdorp CBD is walkable with large opportunities in the north and west to intensify residential land uses.

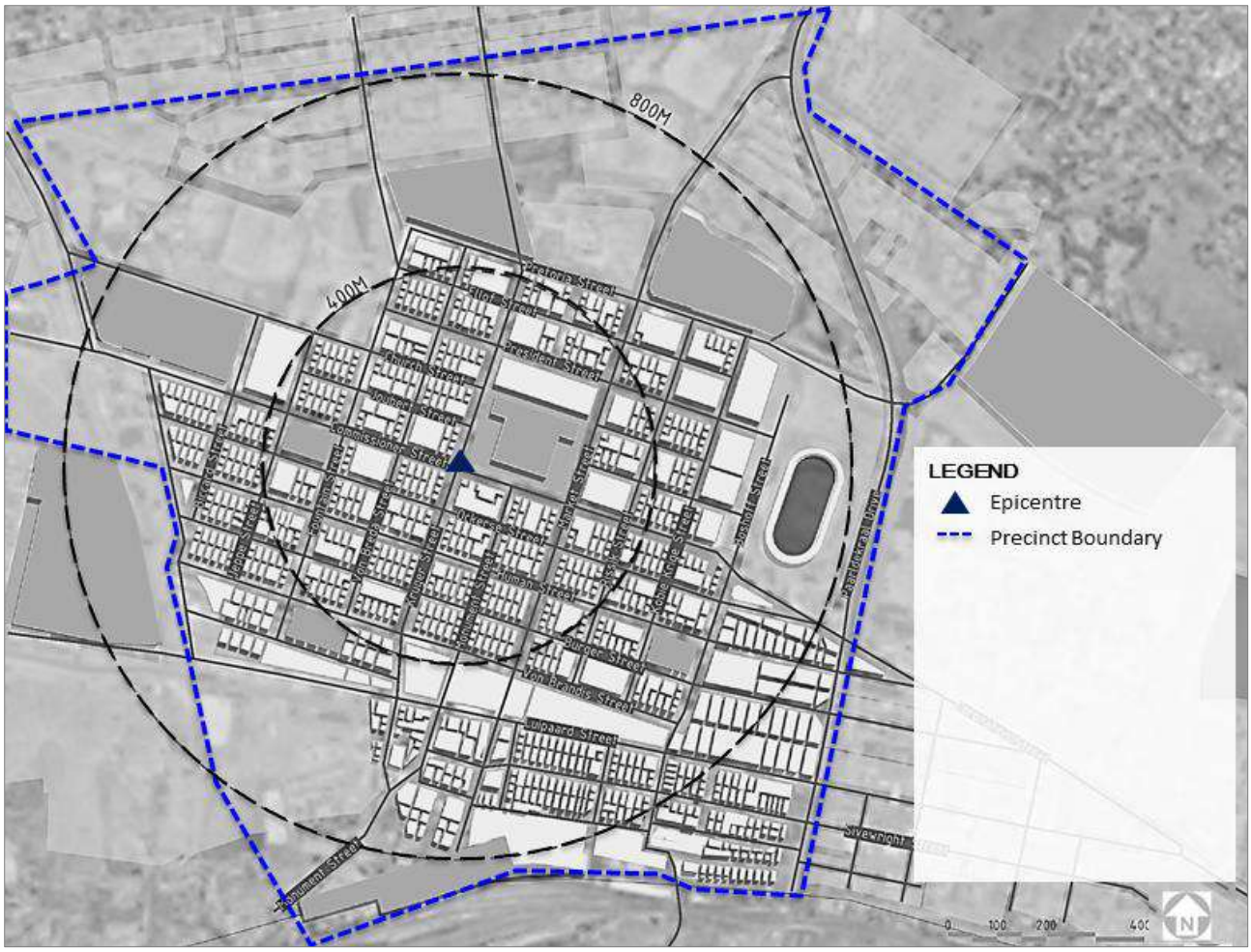


Figure 15: Precinct Boundary

With its grid pattern and maintained road surfaces, the Krugersdorp CBD's urban fabric provides for a solid skeleton to any future planning endeavours. The process going forth will require regeneration, enhancement and management of the CBD. There is basically no need to structurally redesign the street blocks.

The southern boundary of the precinct is the railway line with the eastern boundary largely following the R28 by-pass to the CBD. The residential area immediately northwest of Dr Yusuf Dadoo hospital is included as an opportunity to develop high density housing near the CBD.

The western boundary includes neglected and vacant land towards the southwest of the CBD, the area along the canal in front of the prison as well as the vacant property earmarked for Canal West Housing Development. The northern boundary comprises of Blommenstein Street in Quellerie Park as the link between Van Reibeeck Road and the R28.

1.1.7 Krugersdorp CBD Estimated Coverage

The current estimated coverage of various elements comprising the precinct is presented below.

Table 3: Estimated Coverage of Anchors

	Existing Detail				Existing FAR	Gross Lettable Area (GLA)
Reference No.	Erf / Stand Size	Est. Coverage (%)	Coverage	Height		
Museum	1 512	80%	1 210	2	1,6	2 419,2
Economic Development Building	1 239	80%	991	2	1,6	1 982,4
Civic Park	8 202	0%	-	0	-	-
WestColl	16 833	80%	13 466	1	0,8	13 466,4
Gauteng West District Education	177 777	80%	142 222	1	0,8	142 221,6
Netcare	5 951	80%	4 761	2	1,6	9 521,6
SARS	5 976	80%	4 781	2	1,6	9 561,6
Private Hospital	5 976	80%	4 781	1	0,8	4 780,8
Correctional Services	94 244	80%	75 395	1	0,8	75 395,2
Train Station	33 148	80%	26 518	1	0,8	26 518,4
Civic Centre	47 072	80%	37 658	1	0,8	37 657,6
Traffic Department	13 696	80%	10 957	1	0,8	10 956,8
Home Affairs	5 945	80%	4 756	1	0,8	4 756,0
Magistrate Court	3 971	80%	3 177	2	1,6	6 353,6
Taxi Rank	36 415	80%	29 132	1	0,8	29 132,0
Mall	40 728	80%	32 582	2	1,6	65 164,8
Public Hospital	40 728	80%	32 582	1	0,8	32 582,4
Library	10 756	80%	8 605	1	0,8	8 604,8
Precinct Totals:	550 169	14	433 574	23		481 075,2
Precint Average:	30 565	1	24 087	1	1,0	26 726,4

Table 4: Estimated Coverage of Residential Land

	Existing Detail				Existing FAR	Gross Lettable Area (GLA)
Reference No.	Erf / Stand Size	Coverage		Height		
Existing Residential within the Precinct	509 591	80%	407 673	2	1,6	815 345,6
Precinct Totals:	509 591		407 673	2		815 345,6
Precint Average:	509 591		407 673	2	1,6	815 345,6

Table 5: Estimated Coverage of Open Space

	Existing Detail				Existing FAR	Gross Lettable Area (GLA)
Reference No.	Erf / Stand Size	Coverage		Height		
Canal	75 319	0%	-	0	-	-
Behind the Mall	54 746	0%	-	0	-	-
Existing Sports Complex	111 631	0%	-	0	-	-
Behind Taxi Rank/ School	133 256	0%	-	0	-	-
Precinct Totals:	374 952		-	-		-
Precint Average:	93 738		-	-	-	-

Table 6: Estimated Coverage of Schools

	Existing Detail				Existing FAR	Gross Lettable Area (GLA)
Reference No.	Erf / Stand Size	Coverage		Height		
School 1	33 385	40%	13 354	0	-	-
School 2	98 032	40%	39 213	0	-	-
Precinct Totals:	131 417		52 567	-		-
Precint Average:	65 709		26 283	-	-	-

Table 7: Estimated Coverage of Vacant Land to the West of the Train Station

	Existing Detail				Existing FAR	Gross Lettable Area (GLA)
Reference No.	Erf / Stand Size	Coverage		Height		
Land- west of the Train Station	192 424	0%	-	1	-	-
Precinct Totals:	192 424		-	1		-
Precint Average:	192 424		-	1	-	-

Table 8: Estimated Coverage of Potential Sites for Redevelopment

	Existing Detail				Existing FAR	Gross Lettable Area (GLA)
Reference No.	Erf / Stand Size	Coverage		Height		
Retail	37915	80%	30 332	1	0,8	30 332,0
Commercial	25277	80%	20 222	1	0,8	20 221,6
Residential	63192	80%	50 554	1	0,8	50 553,6
Precinct Totals:	126 384		30 332	1		30 332,0
Precint Average:	37 915		30 332	1	0,8	32 859,8

Table 9: Estimated Coverage of Private Land

Reference No.	Existing Detail				Existing FAR	Gross Lettable Area (GLA)
	Erf / Stand Size	Coverage		Height		
Mix Use	47 300	80%	37 840	2	1,6	75 680,0
Retail	94 554	80%	75 643	2	1,6	151 286,4
Commercial	47 270	80%	37 816	2	1,6	75 632,0
Residential	47 300	80%	37 840	2	1,6	75 680,0
Precinct Totals:	236 424		113 483	4		378 278,4
Precint Average:	59 106		47 285	2	1,6	94 569,6

1.2 Precinct Profile

The precinct is home to **140 643** residents who comprise **5210** households[9]. The precinct has a strong male dominance with 54.4% male population versus a 45.6% female population. Of the total household recorded here, more than a quarter (27.5%) comprise of single occupancy households.

The area is largely formal in nature and well serviced. The precinct has 80.9% of buildings being formal dwellings. From a services perspective, the following indicators show good levels of service provided have been achieved in this location:

- **Flush toilet connected to sewage 78.3%**
- **Piped water inside dwelling 70.1%**
- **Electricity for lighting 83.2%**

The figure below indicates a profile of a mature area where a large proportion of properties are owned and fully paid off or are in the process of being paid off. More than 10% of properties are also occupied rent free as may be the case with family home and the likes. It is encouraging to see that almost 30% of the properties form part of the rental market.

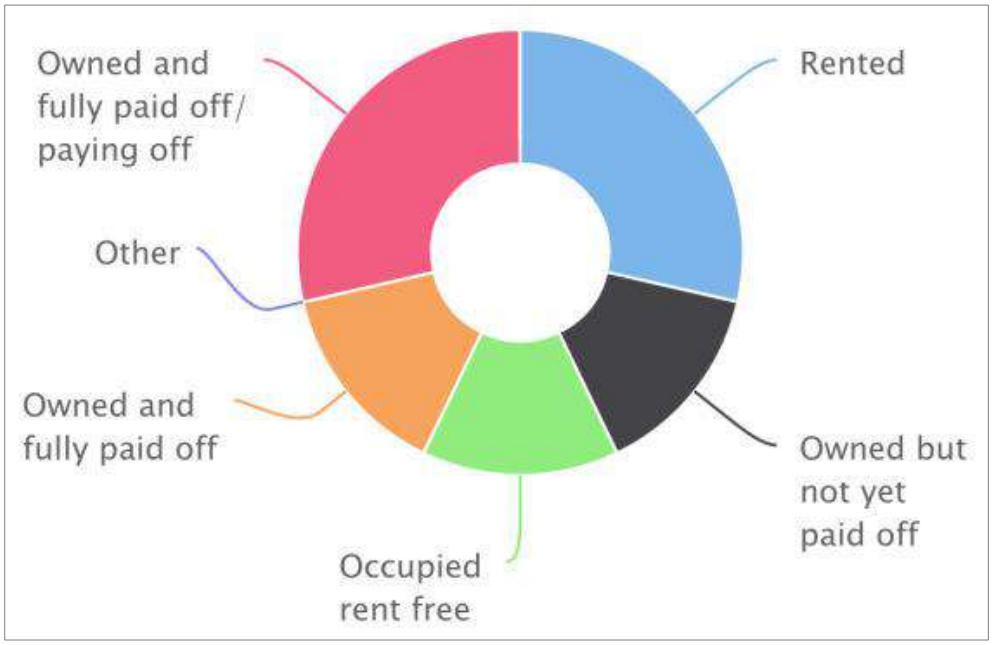


Figure 16: Property ownership

The above ownership profile indicates an opportunity to grow the amount of rental stock available in the precinct. It does also point to a challenge of financing and possibly upgrading the properties currently in the hand of private owners.

9 After Statssa, 2011

A separate challenge within the precinct is the levels of education of the populace. Approximately 55% of the people in the area have a matric and some higher education. The remainder are poorly educated and likely lowly skilled.

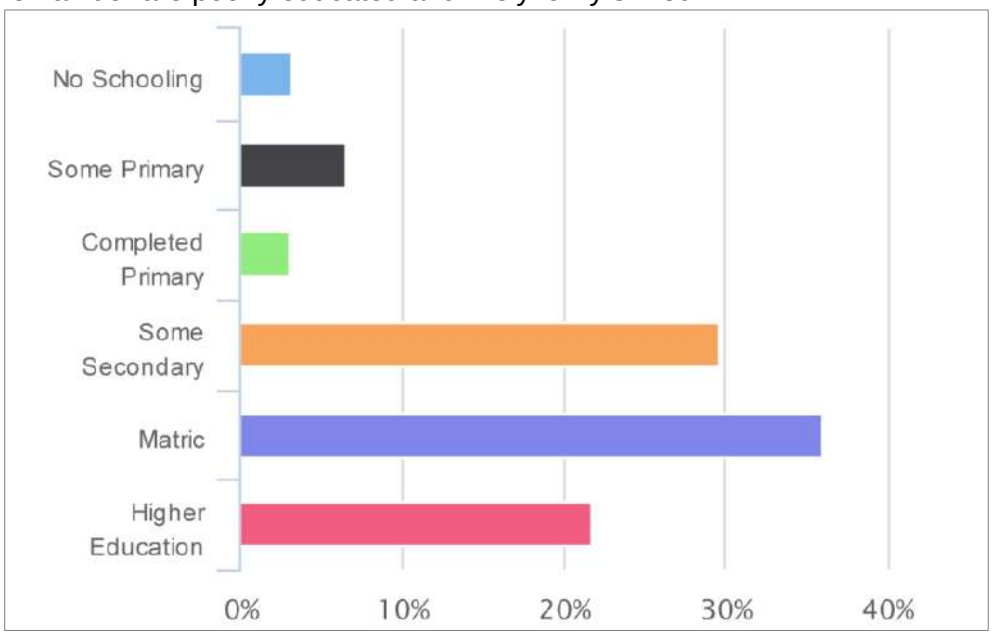


Figure 17: Level of education

The education profile in the precinct points to a need for interventions to create learning opportunities for all ages whilst also creating work opportunities for low skilled workers.

1.3 Krugersdorp CBD: Opportunities, Constraints and Challenges

This section outlines opportunities, constraints and challenges that face Krugersdorp CBD. The challenges identified will inform key proposals of this report and also the identification of projects aligned to the vision of the Municipality and also informed by the Krugersdorp CBD Precinct Plan of achieving outcomes based investments through spatial targeting.

1.3.1 Economic and Socio-economic context

Krugersdorp CBD is the site of many challenges that reflect Mogale City's complex history and its role as the leading municipality in the West Rand District. Many challenges remain in Mogale City and due recognition is being given to the significance of the CBD in revitalising and transforming the local municipality, its economy and the broader region through inner city improvements.

The Krugersdorp CBD nests in the broader socio-economic context of Mogale City. The socio-economic challenges facing Mogale City are high unemployment, a stagnant economy, a prevalence of poverty and hunger. High illiteracy and low skill youth contributing to rising unemployment compound this.

1.3.1.1 Declining economic activity

Mogale City Local Municipality remains seriously challenged in its efforts to attract investment to the inner city because of the low average economic growth rate for the sectors located within the Municipality. Stagnant rental rates and high vacancies in existing buildings are prevalent in the inner-city core, alongside a notably downmarket retail sector.

Krugersdorp in particular is currently experiencing urban decay alongside facing challenges of crime, grime and ageing infrastructure. Much of the higher-end retailing activity has moved to shopping malls in the area such as President's Square, Key West and Cradlestone.

To enhance the role of Krugersdorp CBD as an important economic generator within the Municipality and West Rand district as a whole will require concerted efforts from government and the private sector to attract new businesses and retain existing ones.

1.3.1.2 Unbalanced economy

The inner-city economy remains primarily focused on outdated forms of manufacturing. This means most of the manufacturing is growing increasing uncompetitive and under strain. New forms of manufacturing are emerging and must be accommodated in appropriate ways. The inner city's role as a hub for creative industries also requires targeted support.

Informal sector trade within Krugersdorp CBD is not adequately supported by the Municipality. This is reflected by the low numbers of informal trading stalls along high movement spines. Informal trade is prevalent throughout the CBD but lacks appropriate infrastructure and urban management. The potential benefits of this growing sector are not being adequately directed and/or captured.

1.3.1.3 Unemployment

A crucial concern for the inner city is the high unemployment rate (27% for MCLM as per previous section) of residents and users, most of whom commute into the CBD on a daily basis. The municipality faces challenges of low skill levels amongst its population and huge demand for jobs. The municipality must intervene directly in facilitating skills development and promoting activities that increase the number of jobs by, among other things, putting in place a public environment maintenance and upgrading programme.

1.3.1.4 On-going poverty and vulnerability amongst inner city residents

Krugersdorp CBD has a significant residential nature, even though it is mainly informal. This has not been matched with adequate provision of social services and facilities. Coherent plans are required to coordinate existing social services and to develop appropriate additional services for the future.

To ensure adequate impact to the delivery of social services, Mogale City must target particular services to the needy and most vulnerable inner city communities. This is not apparent in their current planning and delivery programmes. Services must cater specifically to the needs of orphans, abused women, people with skills deficiencies, street children, the aged, migrants, displaced people and the destitute, among others.

1.3.1.5 Hunger and food insecurity

Krugersdorp attracts migrants from other towns and rural areas. As in other urbanizing areas, food poverty is increasingly evident. Undernourishment and hunger affect many urban dwellers and will increasingly be a problem to be considered and managed.

The informal sector is a major supplier of fresh produce to residents and to commuters in Krugersdorp. Opportunity for urban agriculture and for linking such programmes with food-sellers must be seized in the inner city as well as the rest of Mogale City.

1.3.1.6 Social Amenities

The Urban Development Framework study (2014) commissioned by MCLM indicates that a good proportion of current and future residents in the inner city are likely to be younger generations, namely children, youth and young aldults. This means there is and will be a large

population in need of educational support and schooling facilities. Mogale City has competency over early childhood development (ECD), and must therefore scale up support to and monitoring of ECD institutions.

The current two schools in the CBD provide a good spread of learning facilities, however their design and capacity is insufficient to accommodate the need in this area. Overall, the municipality has a large gap in addressing the number, quality, spatial location and design of inner city schools. This requires a coordinated and programmatic response by the municipality partnering with provincial government both at the level of spatial planning and at the level of support services.

Further, the CBD in general lacks social amenities such as crèches and public clinics for users and residents alike. Facilities and services for children, youth and the elderly are also in short supply.

The central location of the CBD makes it an ideal place for developing and supporting job creation opportunities through industries and business that can take advantage of the central location. The largely inadequate business development support is also an opportunity for MCLM to lead the growth and development of the local economy through supporting local entrepreneurship.

1.3.2 Environmental context

Krugersdorp CBD is largely man-made with little natural environments save for dealing with pollution from emissions and economic activities. Furthermore, there are canals that bound the CBD area are surrounded by vacant and open space that is poorly structured and utilised.

1.3.2.1 Public Open Space

The precinct has few quality green spaces but is rather characterised by neglected patches of bushes and grasses that function as public space. There are limited sports fields, no public squares where people could gather and there are also limited safe parks. Some vacant land especially towards the southwest of the city has been used as illegal dumping sites which, at best, confirm the image of neglect and decay and, at worst, can be breeding grounds for crime and other illegal activities. Retaining, managing and enhancing the quality of open space in and around the CBD should be a priority of any development programme.

Threatened heritage buildings

In recent years, some inner city heritage buildings and assets have fallen into disrepair. This compromises the city's cultural identity that is admittedly changing and is in a state of flux.

Heritage and cultural issues cut across the inner city's planning portfolios and other functions. This suggests the need for greater cooperation and alignment of work amongst municipal line departments as well as with other spheres of government to ensure that the inner city's heritage is preserved and maintained. There is also a need to ensure important heritage sites are restored, and that the cultural identity of the city as a diverse and welcoming place is maintained.

Krugersdorp CBD's museums, public spaces and galleries are not sufficiently activated with performances and programmes. More is required to promote Mogale City's arts, performance and public art scene.

The arts, culture and heritage offerings must be consolidated into a programme that celebrates the inner city as MCLM's cultural capital and main discursive space.

The Municipality must consider art events and festival programmes as part of maintaining the cultural heritage and as means to boost economic, social and urban regeneration whilst also leading the dialogue of a changing identity.

Mogale City can also enter into agreements with heritage agencies on the re-development of the inner city as well as standardize and speed up processes to obtain heritage decisions in cases of demolition and major redevelopment of the current building stock.

1.3.3 Infrastructural context

1.3.3.1 Infrastructural needs, opportunities and constraints

Streetlights are not well maintained in Krugersdorp CBD. Those that are vandalised and damaged remain in a state of disrepair for long periods of time. Street lighting, in particular, is an opportunity to make a dramatic impact on safety and security of the CBD. Krugersdorp CBD requires significant upgrades to existing infrastructure and new infrastructure is required for areas that are not currently serviced.

1.3.3.2 Untapped tourism potential

Krugersdorp CBD is well located and is well accessible from Johannesburg, Tshwane and Rustenburg. It has the potential to attract passing traffic from the two Gauteng centres en route to the Cradle of Mankind, the Magaliesburg Nature Reserve as well as Sun City Resort.

The CBD also has a unique history and has an important role in repositioning the local identity for residents, users and 'outsiders' alike. Krugersdorp offers several tourism assets including diverse cultural offerings, a variety of distinct neighbourhoods, a mining history, heritage buildings, hotels, and a museum among others.

These assets can be activated through the introduction of cafes, public art and performances and the active support of a creative quarter or art-based precinct. These should be showcased to tourists provincially, nationally and internationally by linking Cradle of Mankind tours to stops among revamped historical sites in the Krugersdorp CBD. This offering could be tailored for school children and other tour groups frequenting the Cradle of Mankind and Magaliesburg Nature Reserve in Mogale City.

1.3.4 Crime and grime

1.3.4.1 Compromised safety and security

Perceptions of crime in Krugersdorp CBD is a key deterrent to investment and compromises quality of life for all who live, work, trade or pass through the inner city. Crime poses a threat to people's lives in the inner city and threatens people using public space, amenities, public transportation and parks.

Some public and private efforts have been directed at increasing levels of policing and law enforcement in the inner city. However, these are poorly publicised and/or coordinated with Mogale City.

1.3.5 Urban Access and Connectivity

Krugersdorp CBD is a main commuter node and destination for residents of surrounding township as well as for neighbouring municipalities. Commuters from a far afield as Randfontein in the southwest pass through Krugersdorp CBD on their way to places of work in Key West and Cradlestone Malls and further on to Johannesburg northern suburbs, Lanseria, Midrand and Tshwane. Krugersdorp CBD is a place where one can change modes of transport from taxi to train and bus and vice versa. Residents of Mogale City townships like Leratong, Kagiso and

Munsieville also use Krugersdorp as an interchange location to access Krugersdorp itself, the rest of the municipality and the broader Gauteng Region.

The CBD has a well-developed movement and services infrastructure and is highly accessible via rail and road. However, this can be improved as no focused attention has been paid to enhancing and connecting between the modes of transport in the CBD.

1.3.5.1 Pedestrian Movement

The precinct needs dedicated moving space of pedestrians on the pavements, especially during peak hours. Most of the CBD is poorly lit during dusk and dawn when most pedestrian movement is taking place. The increases the vulnerability of pedestrians to crime and injury when using the CBD.

The opportunity lies in the established urban fabric already in place in Krugersdorp CBD. Whilst this provides an opportunity to redevelop and improve, it also does present a constraint in that new development would be constrained by dealing with what is already there. Brownfield development is generally constrained by the need to motivate and fund the change of use and function of existing buildings.

1.3.6 Institutional Context

1.3.6.1 Fragmented planning and inadequate information

Significant planning work has already been done for the inner city and some detailed plans have been prepared. These are anchored in an urban design implementation framework that has been developed by MCLM. This work however, has not been translated into the implementation programme of the municipality. Municipal officials are also concerned that previous plans produced have not been based on sound information. Essential data relating to the condition of infrastructure and the availability of services are often absent.

1.3.6.2 citizens and stakeholder participation

Public sector programmes in the Krugersdorp inner city have in the past been beset by problems because of inadequate communications. Ongoing, sustained, and inclusive communication between the general public and Mogale City's departments and entities is essential to ensure good planning, effective delivery, and the preservation and management of public infrastructure and services. A well-conceived and professionally implemented communication programme, tied directly to inner city developments is needed to enhance stakeholders' understanding of their responsibilities in the inner city

Addressing the challenges identified above in Krugersdorp CBD will require coordinated effort from the Municipality and different stakeholders to resolve. Implementation of proposals to deal with these challenges also require buy-in of affected communities. The regeneration of the inner city thus requires the input and commitment of state, private and community organisations.

1.4 Spatial Analysis

1.4.1 Anchors in the Krugersdorp CBD

For any precinct to function efficiently, there should be key points of population concentration at certain times in the day spread evenly across the precinct. These are termed Precinct Anchors. Movement between these anchors then becomes the lifeline of other smaller shop outlets/offices/residential dwellings along the routes that lead to and from various Precinct Anchors.

1.4.1.1 Primary Anchors

Krugersdorp CBD has sixteen anchors that are generators of pedestrian activity at different times of the day, week and month across the CBD. For the purposes of this study, these anchors have been divided into primary and secondary anchors.

The anchors are in close proximity to one another, they are all within 800m radius. The primary anchors were selected for the volume of daily traffic generated and their ability to generate city-wide movements. President's Mall, Dr. Yusuf Dadoo Hospital, the Taxi Rank and Train Station, the Civic Centre alongside key public services such as Home Affairs, Traffic Department and the Magistrate's Court fall within this primary set of anchors contributing prominently to the activity in the Krugersdorp CBD. This first set of anchors are predominantly located towards the north of the identified precinct.

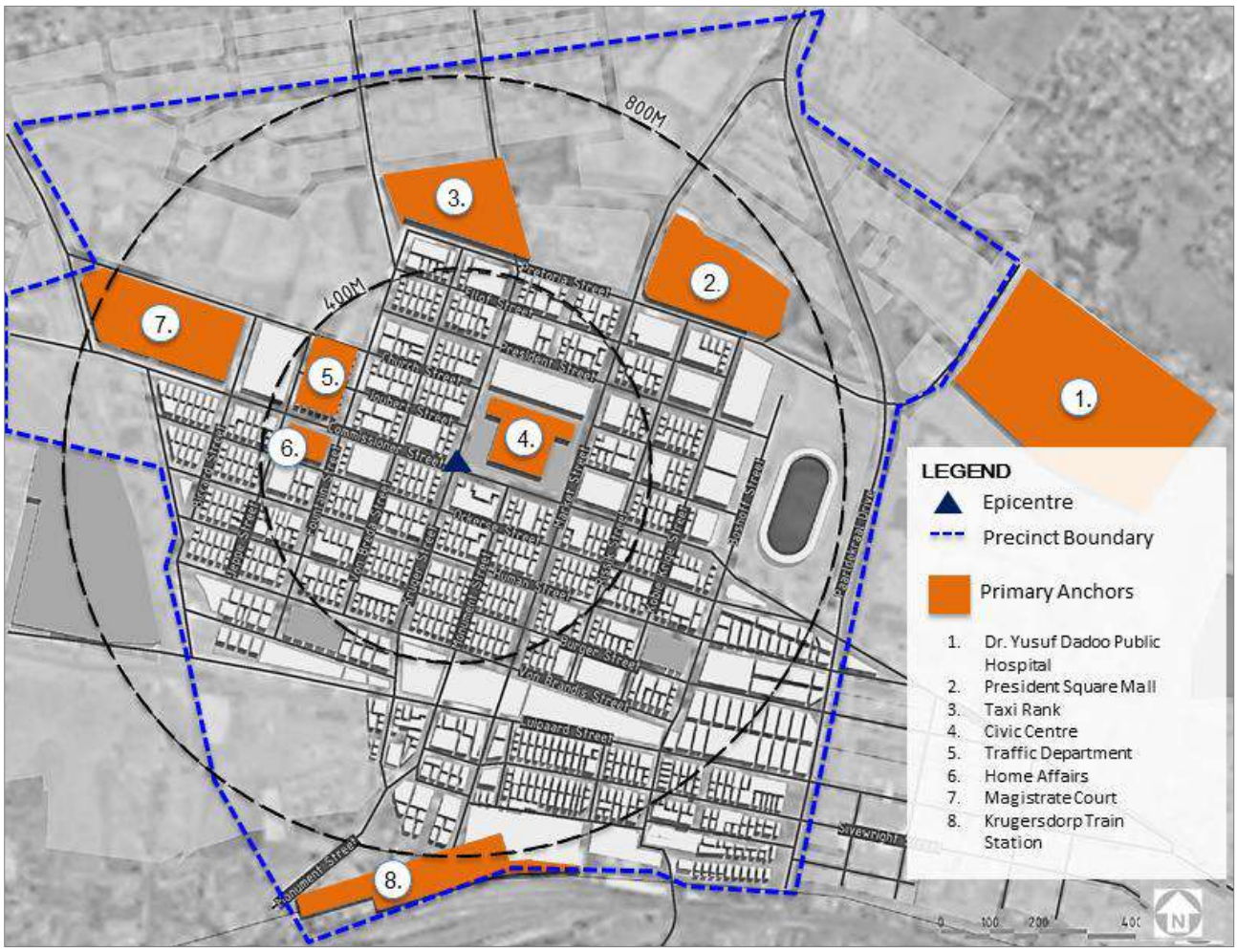


Figure 18: Primary Anchors

The prominent anchors generating pedestrian movements is the taxi rank and train station. These anchors act as significant gateways and/ or points of entry to the CBD precinct .

The Civic Centre and the mall are important destinations in the precinct. These are complemented by a range of public facilities, namely the Dr Yusuf Dadoo public hospital, the traffic department, home affairs and the magistrate's court.

1.4.1.2 Secondary Anchors

The secondary anchors generate less activity compared to the primary anchors. They are equally important in that they introduce further destinations and represents a different set of

amenities available for users in the Krugersdorp CBD. The secondary anchors identified here represent a subsector of CBD activity generated for purposes as diverse as education, the South African Revenue Services, Correctional Services, a library, museums and private hospital. Whilst these anchors are located towards the centre of the precinct area, these amenities may form additional destinations and pedestrian trips as people using the CBD may move interchangeably between primary and secondary nodes depending on times of day, month and year.

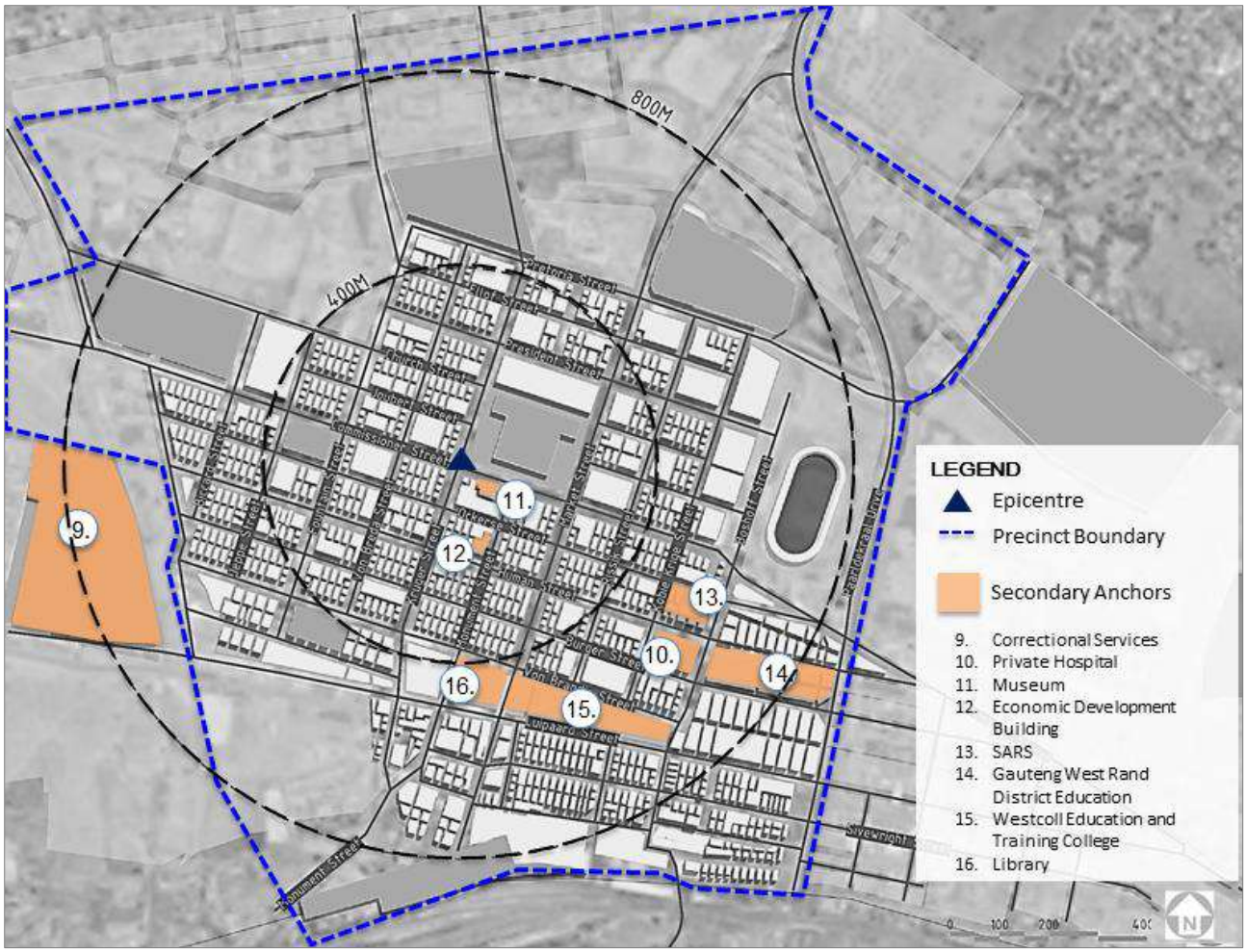


Figure 19: Secondary Anchors

There is further set of lower order anchors that are also significant generators of pedestrian traffic in the central part of the CBD precinct. These include the prison in the west, training colleges in the southeast of the city as well as other destinations like the museum, SA Revenue Services offices as well as the private hospital in the city.

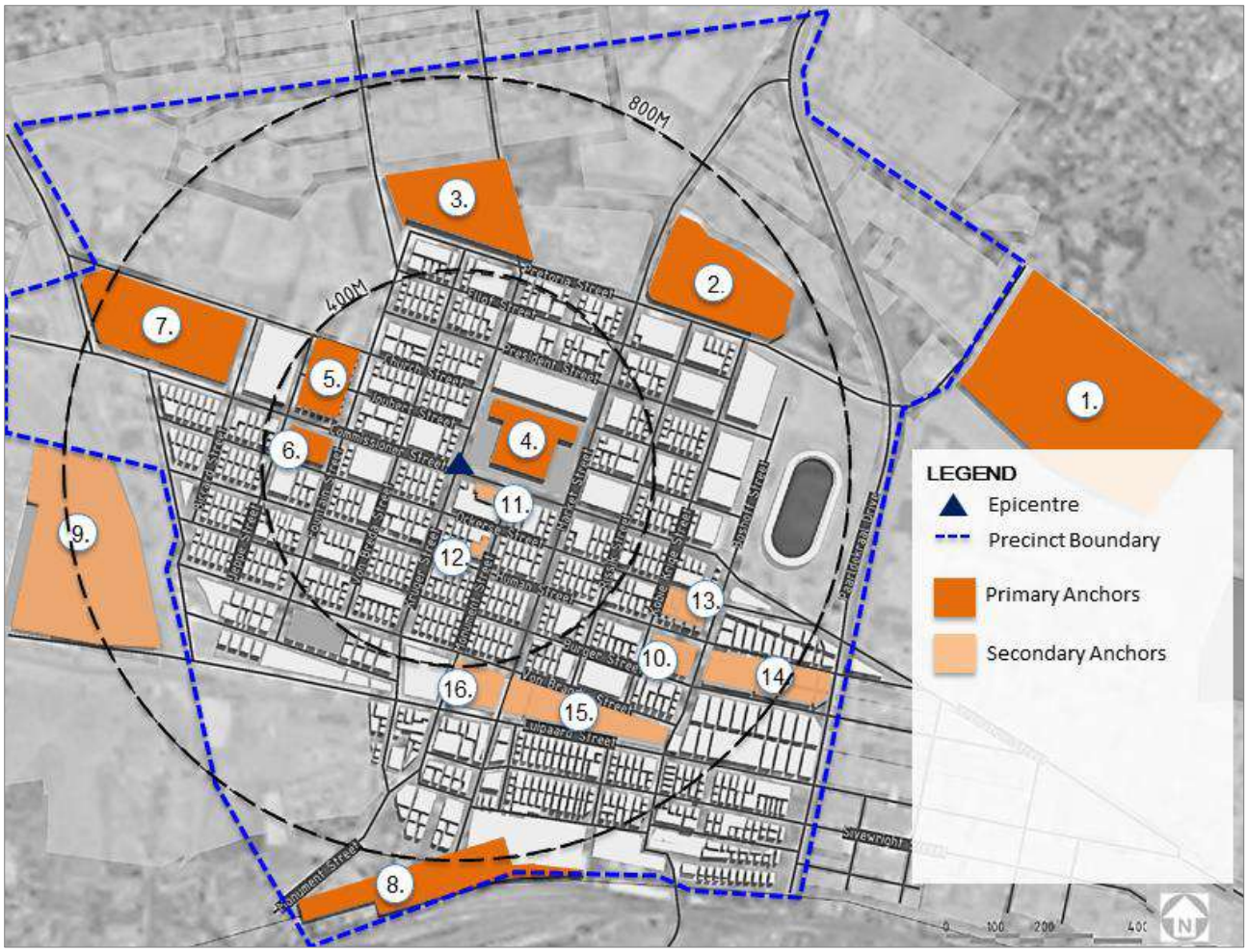


Figure 20: Synthesis of Primary and Secondary Anchors

Krugersdorp CBD is an established business district with a range of state offices (magistrate's court, SARS, home affairs) that is highly accessible through pedestrian movements. The concentration and relatively even distribution of anchors generating pedestrian movements across the CBD is an opportunity to be maximised in this location.

1.4.2 Current land uses

Krugersdorp is dominated by institutional land uses from the schools in the north, the civic spine in the west that includes the magistrates court, home affairs and the traffic department, the Civic centre and public hospital in the east as well as an educational cluster in the south east of the CBD.

The CBD is also characterised by vertical mixed land uses. The central core of CBD is dominated by primarily commercial and retail interspersed with residential, commercial and institutional uses.

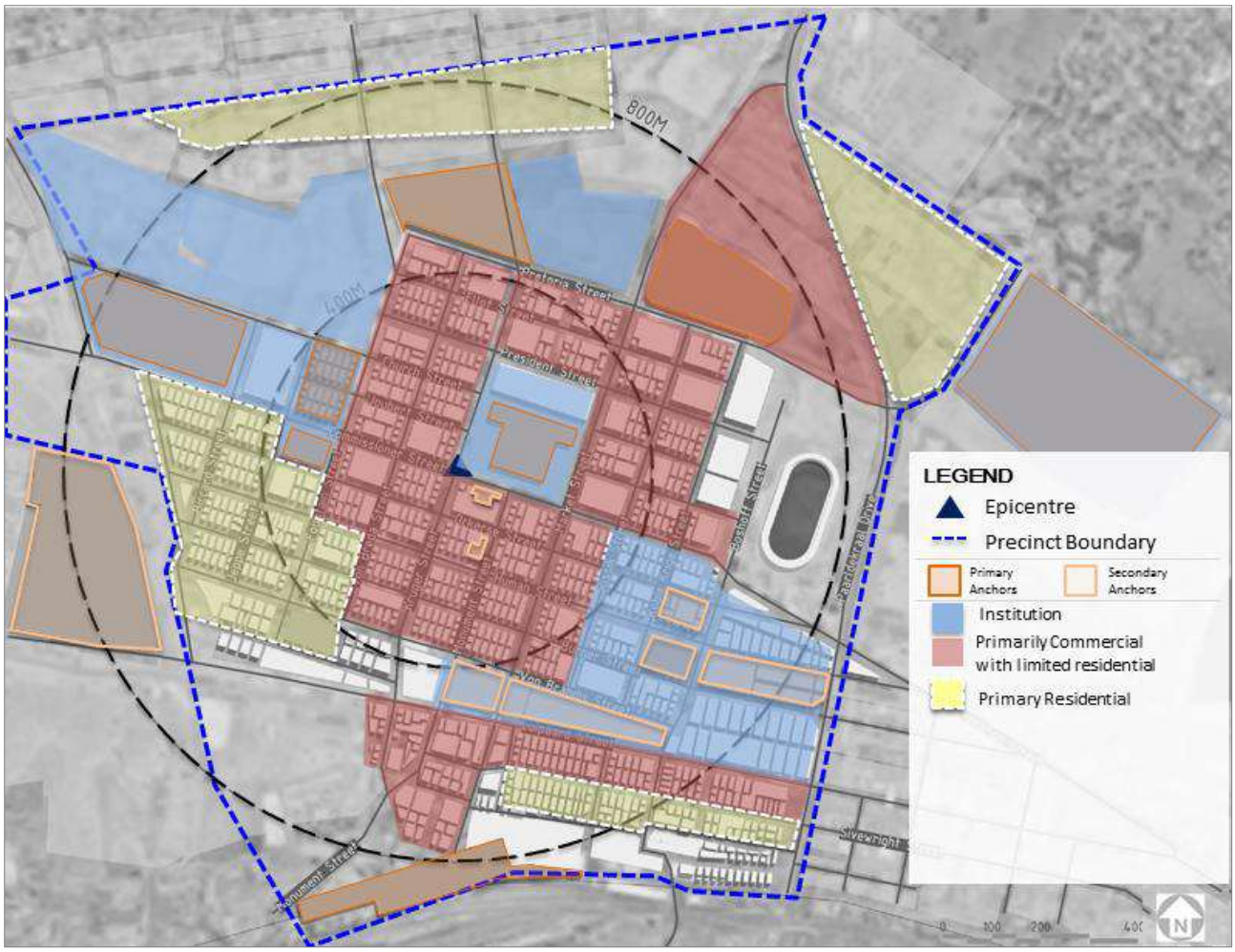


Figure 21: Current Land Uses

The map indicates the prevalence of institutional land uses. These uses are contrasted with primarily residential land uses, meaning these areas serve a residential function first, but may contain light industrial, retail, commercial and other land uses therein. The CBD also hosts primarily commercial land uses that include ground floor retail. Whilst the character of these zones may be commercial in nature, it does not preclude the existence of residential land uses in upper floors, behind shops and in-between commercial and light industrial uses.

Residential uses are also prevalent in the outskirts of the CBD. These range in character from single dwelling residential neighbourhoods such as in Quellerie Park in the North and towards the East. Alternatively, walk-up residential buildings can also be found towards the western end of the CBD, including residential footprints found amongst commercial and light industrial uses towards the south.

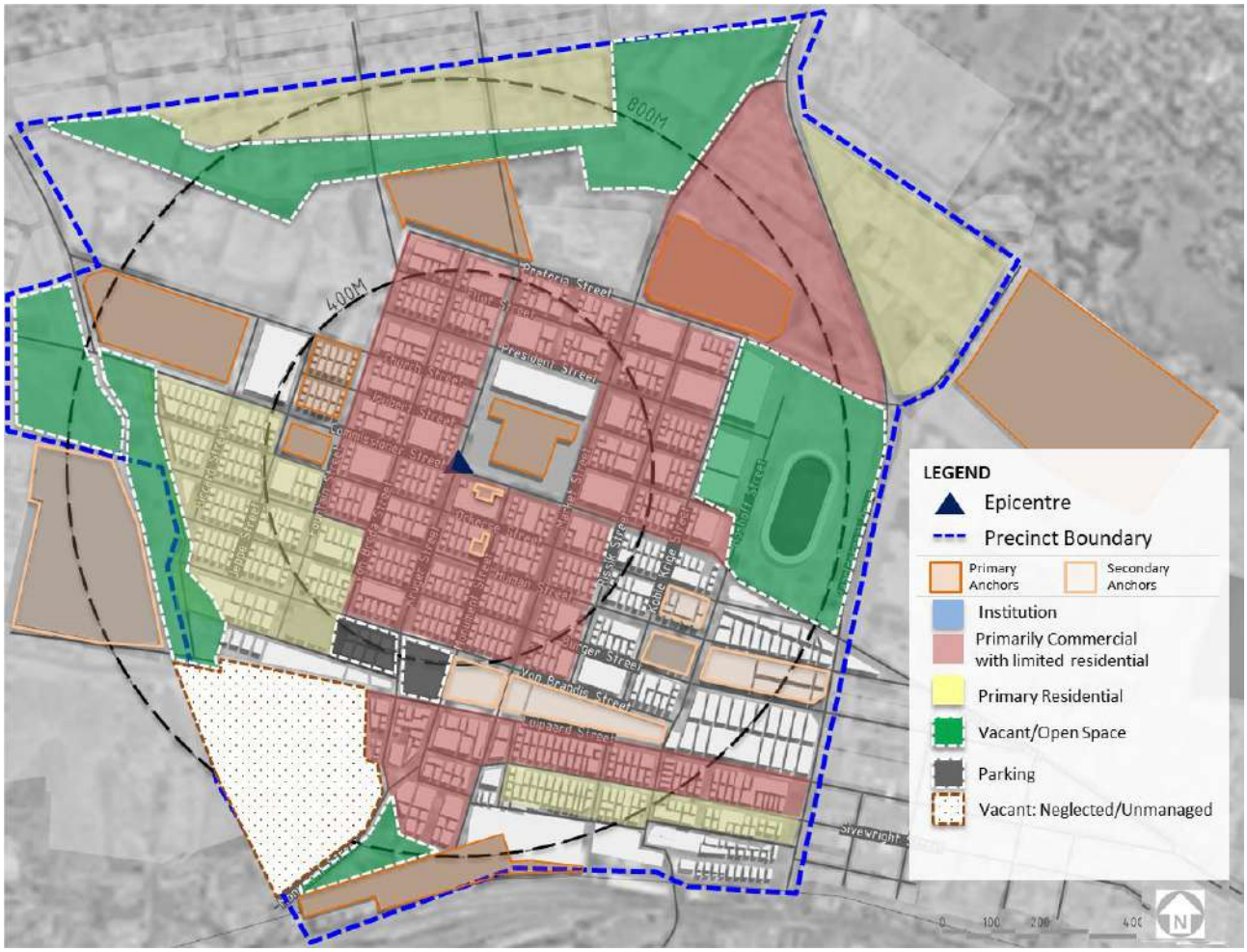


Figure 22: Open Space, Parking and Vacant/ Underutilised Land

Krugersdorp CBD is well endowed with vacant and open space. Much of it is largely unstructured and underutilised. This gives the impression of a CBD that could be making better use of its available resource. In fact, much of the vacant land is suitable for locating high-density housing within close proximity of the CBD. These include the portion of land southwest of the precinct are that's adjacent the Krugersdorp Train Station.

There are two well-located pieces of land being utilised as parking towards the south of the CBD. This land use could be placed in better use as the CBD is relatively well provided for in terms on on-street parking and the site currently being used for this are prime CBD properties.

Lastly, there is neglected and unmanaged vacant land in the Krugersdorp CBD whose land ownership is currently unknown. This land is different from vacant land and open space in Krugersdorp CBD as its scale and observed activities thereon indicate that the land may have possibly been utilised for industrial and/or mining uses at some point. Its proximity to undermined land in the south and southwest of the CBD as well as its disturbed nature may mean it is zoned for mining and/or industrial activity.

This land can be repurposed for light industry and/or high density residential use. Currently, this portion of land in the southwest of the precinct is ill-defined and underutilised despite its great proximity to the train station.

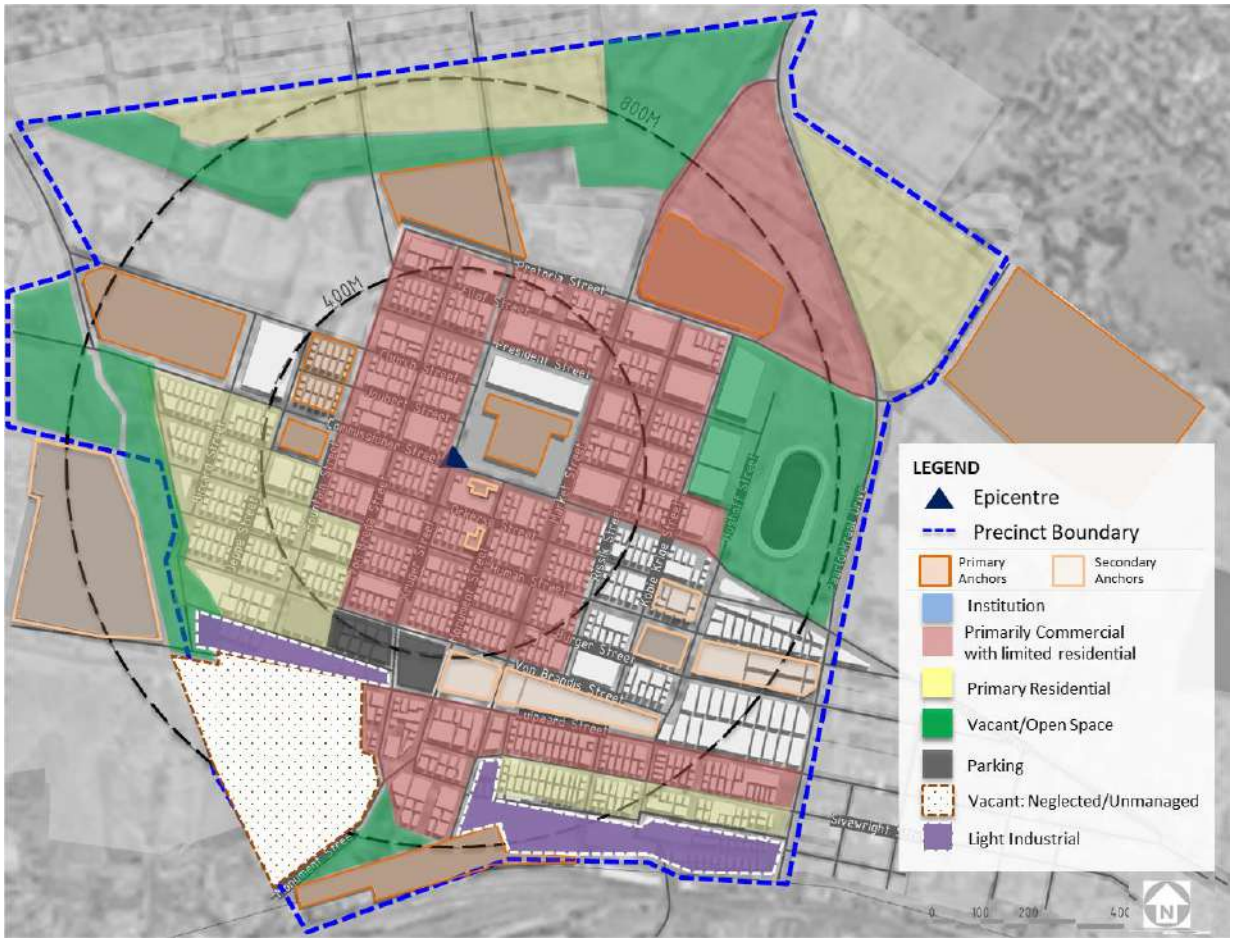


Figure 23: Light Industrial Land Use

There are underutilised light industrial sites bordering the CBD along Luipaard Street and along the railway line. With poor urban management, some of these sites have become evening hideouts for vagabonds. However, these sites represent an opportunity for economic activity that could be job creating for various lower skills segments in the area. Furthermore, with the National Development Plan's drive for industrialisation and beneficiation in the mining sector, the Krugersdorp CBD is well poised to take on any light industrial land use spillage from Johannesburg.

1.4.2.1 Spatial Synthesis Map

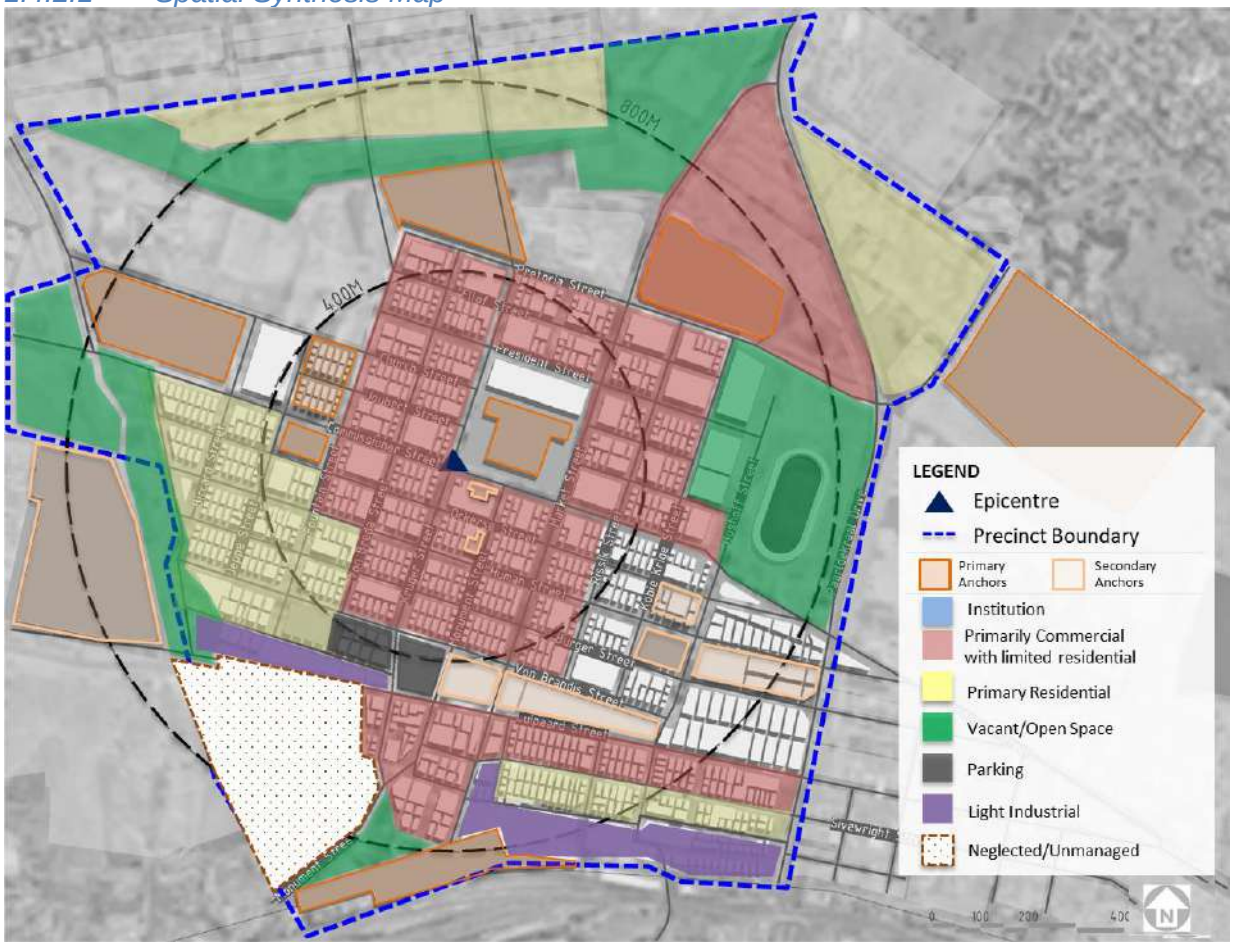


Figure 24: Spatial Synthesis Map

The opportunity for redevelopment of Krugersdorp CBD is largely restricted to infill development of vacant land on the periphery and redevelopment of key sites within the urban fabric.

The spatial analysis reveals Krugersdorp CBD as characterised by underutilised brownfields with very few opportunities for greenfield development. These few opportunities should be maximised by encouraging high density residential development. High density residential development in and around the Krugersdorp CBD is informed by maximising land uses at the core where more inclusive housing may be introduced on well located, serviced land. Doing this in this precinct is in line with the transit oriented development principle of providing access to this and other locations that form part of the urban network.

Krugersdorp CBD also has several nodal/landmark opportunities, namely, the Civic Centre, taxi rank, the train station and the sports precinct. The Civic Centre is located centrally within the CBD, whilst the taxi rank is located towards the northwest. The train station is at the southern point whilst the sports precinct is located in the east of the CBD. These locations are prominent well traversed and largely visible to passing traffic. There greater advantage to these landmarks being dispersed throughout the CBD lends itself to the development of distinct and complementary precincts.

Existing key places in the Krugersdorp CBD remain in the mixed-use core, the emerging education district in the south east as well as the well traversed north part of the CBD with its diverse public services.

The precinct's residential areas, movement pathways need to be upgraded to achieve connectivity. In the process, the nodal/landmark opportunities can be connected to the existing key places through a range of city building and place making interventions.

The future plans concerning the proposed zones and interventions in Krugersdorp CBD, will be discussed in the last two chapters of this report.

1.4.3 Hub Identity

1.4.3.1 Key characteristics include:

- **The Krugersdorp CBD is a highly traversed node where people of different incomes commute to or use as a destination.**
- **Over the years, Krugersdorp CBD has become progressively down market in general and is characterized by significant low income groups, nonetheless, Krugersdorp CBD could benefit from middle and lower-middle income earners as they commute through or come to the CBD.**
- **Krugersdorp CBD has the greatest development pressure in the region as a result of its central location and its role as the main commuter thoroughfare in this part of the MCLM.**
- **Krugersdorp CBD is a popular retail and social service destination as represented by its many anchors and range of private retail and commercial activity still taking place in the city.**
- **In terms of accessibility and installed infrastructure Krugersdorp CBD offers significant development potential. Thus, the opportunity for new and higher density development will require brownfield approach.**

1.4.4 Character of Hub: Interchange Zone

The Interchange zone lies mainly within a 400m radius form the civic centre at the heart of the precinct. In the Krugersdorp case this area stretches to include the train station in the south.

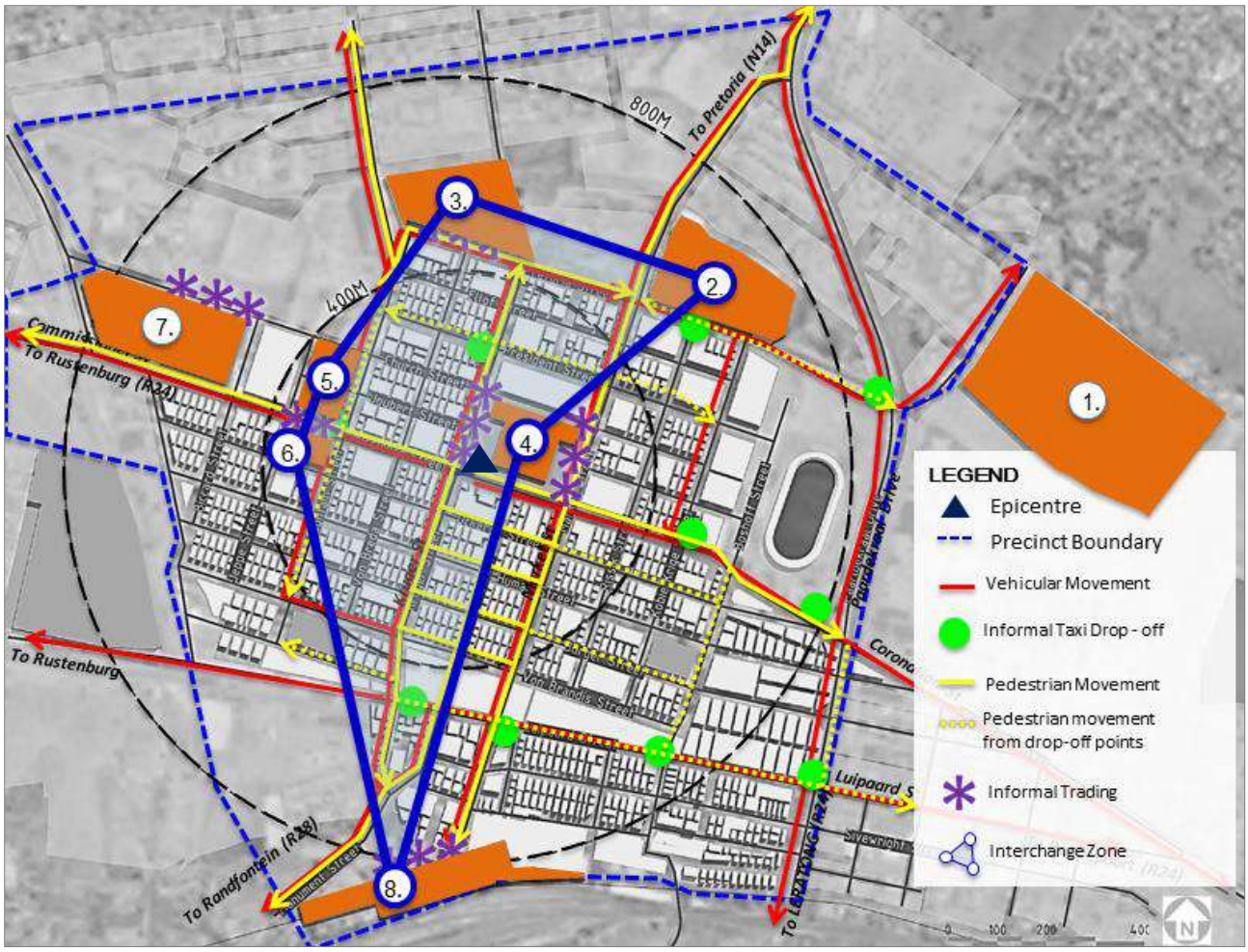


Figure 25. Krugersdorp CBD Interchange Zone

The numbered anchors on the map and those forming the interchange zone are identified as follows:

Table 10: Anchors forming the Interchange Zone

	Anchor	Part of Interchange Zone?
•	Dr Yusuf Dadoo Public Hospital	No
•	President's Square Mall	Yes
•	Taxi Rank	Yes
•	Civic Centre	Yes
•	Traffic Department	Yes
•	Home Affairs	Yes
•	Magistrate's Court	No
•	Train Station	Yes

The Civic Centre as well as the mall are important destinations in the precinct. These are complemented by a range of public facilities, namely, the traffic department, home affairs and the magistrate's court.

1.4.4.1 Limitations of Existing Zoning and Land Ownership

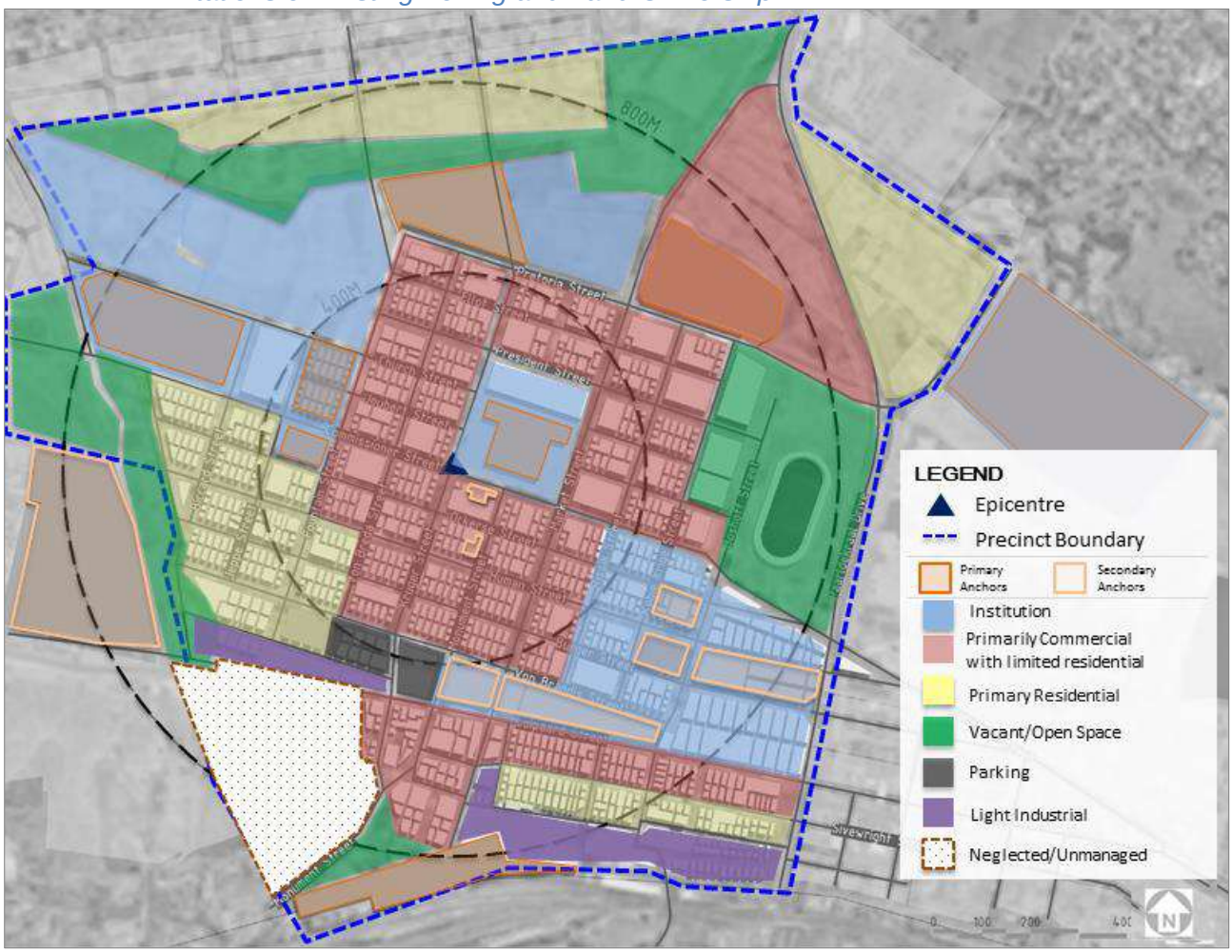


Figure 26. Existing zones and land ownership

1.4.5 Overall Spatial Informants and Concerns

When reviewing the available information and prevailing conditions on site, the preeminent spatial informants and concerns that emerge are:

- **Inadequate spatial structure within Krugersdorp CBD – components of pedestrian network are missing and underdeveloped; vehicular movement network is experiencing congestion along certain routes; and its built form is not fit for its purpose. Intensification of land use can also be improved.**
- **Economic development is limited – there is a need to diversify the economic activity outside of informal trade and mall retail and introduce commercial and other community uses.**
- **Poverty is a major issue as 38.4 % of the residents live below the poverty line. All initiatives must take into consideration the present profile of users and make sufficient accommodation for such.**
- **Housing densities are very low, this presents an opportunity for densification and intensification of land uses.**
- **Civic facilities (arts & culture, recreational, education and primary healthcare) are undersupplied in the immediate area and in the surrounding parts of the precinct.**
- **Public spaces are not well maintained and few areas are well developed and landscaped.**
- **The environment is mostly manmade and vacant areas are neglected and have become waste dumping sites.**

- **Visible efforts are required to address the perceptible decline of the CBD**

1.5 Access and Movement Analysis

1.5.1 Connecting the Hub to the Broader Context

1.5.1.1 Structural Typology Identification

For multi-modal public transport to function effectively, there should be a clear and seamless relationship that requires minimal effort from a commuter to move from the one mode to the other. In Krugersdorp CBD, the railway line creates a commuter catchment boundary. In Krugersdorp, the station buildings can be utilised to reinforce the buffer that marks the edge of the CBD. The train station represents a gateway into the city that could be repackaged to present opportunities for spatial integration/pedestrian linkage across the precinct.

A large proportion of Krugersdorp CBD users use rail as the primary mode of transport. Thus, the public transport network needs to be improved to ensure easy flow and connectivity because the majority of the Krugersdorp CBD commuters rely heavily on public transport due to not owning their own vehicles.[10]

The current structure of the interchange zone is comprised of disconnected anchors scattered throughout the CBD. There is a lack of physical connectivity and legible public space framework between them. This can be improved by ensuring a smooth flow of access between facilities/ anchors by improving the walkability and safety for pedestrians. The distances between the taxi rank and the train station are long and there is a lack of established Transport Orientated Developments (TODs) in the CBD. Further, public transport along prominent pedestrian movement areas is not provided for in a structured and managed way.

1.5.2 Connectivity at Local Level

1.5.2.1 Interchange Zone Structure

The Interchange Zone lies within a 400m radius from the heart of the precinct. This radius follows the design guidelines of the Urban Hub Design Toolkit, which states that the maximum distance of separation between public transport modes (rail, bus, taxi) should not be more than 150-200 m (2-3-minute walk). A network of both motorised and non-motorised transport linkages need to be connected in the areas surrounding the hub for easy connectivity, flow through the hub and access to resources.

10 After Krugersdorp UDF

1.5.2.2 Nodal structuring elements

1.5.2.2.1 Activity Spines

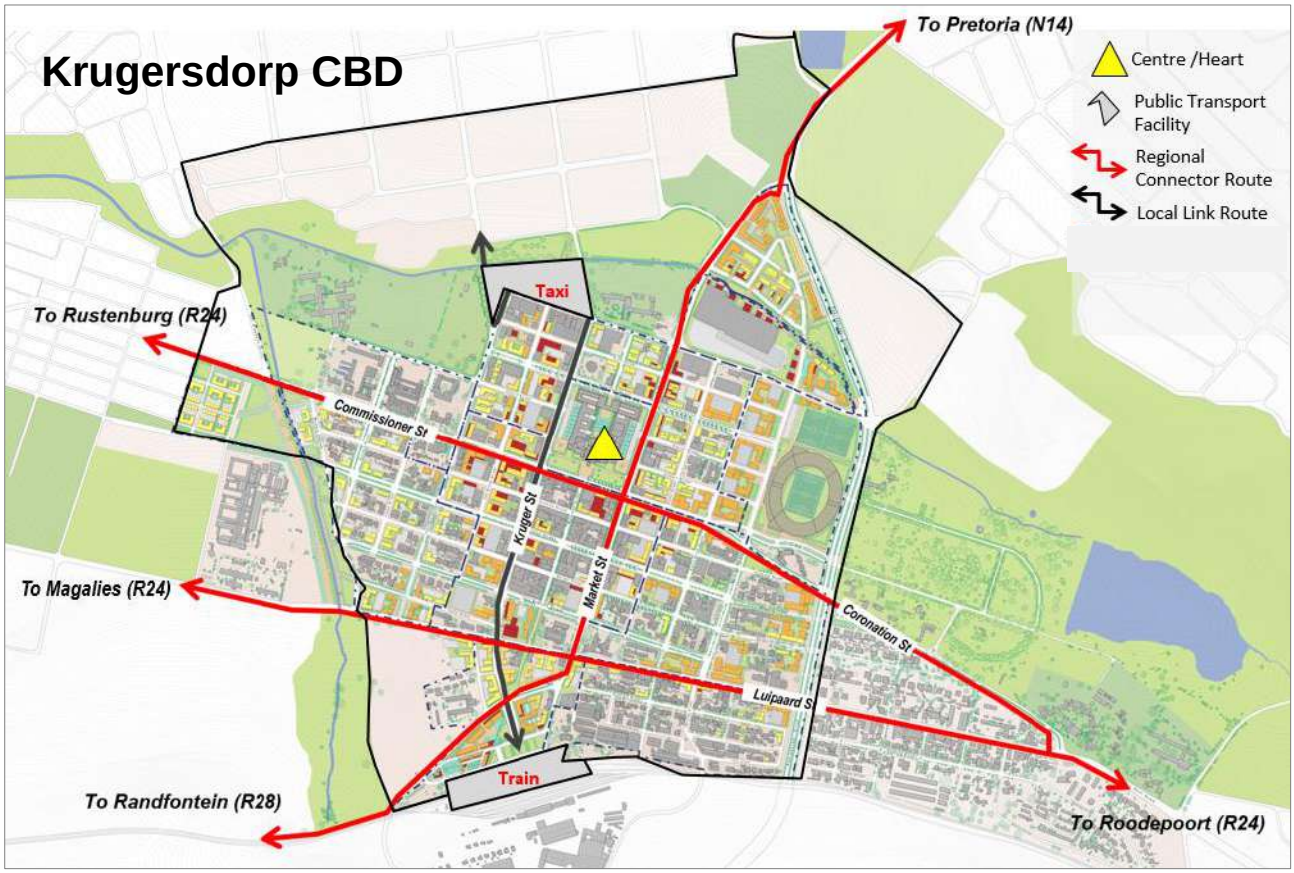


Figure 27. Activity spines

Activity spines integrate movement, land use and economic activity. Positive aspects of successful activity spines consist of high intensities of mixed land uses comprised of mixed uses (residential, retail, commercial, community facilities). In Krugersdorp CBD, this is the case with Kruger and Market Streets (north-south corridors) and Luipaard and Commissioner Streets (east-west corridors).

People move between various points along the corridor as well as between the two outer points of the corridor. Most community activities and mixed-use development within activity corridors are connected and accessible due to focused major transportation routes (activity spines). Activity spines are accessed through various modes of private and public transport because they are traffic orientation dependent; giving direct access to a range of high intensity land uses. In Krugersdorp CBD, these four corridors are important centres for activity as well as facilitators of vehicular and pedestrian mobility.

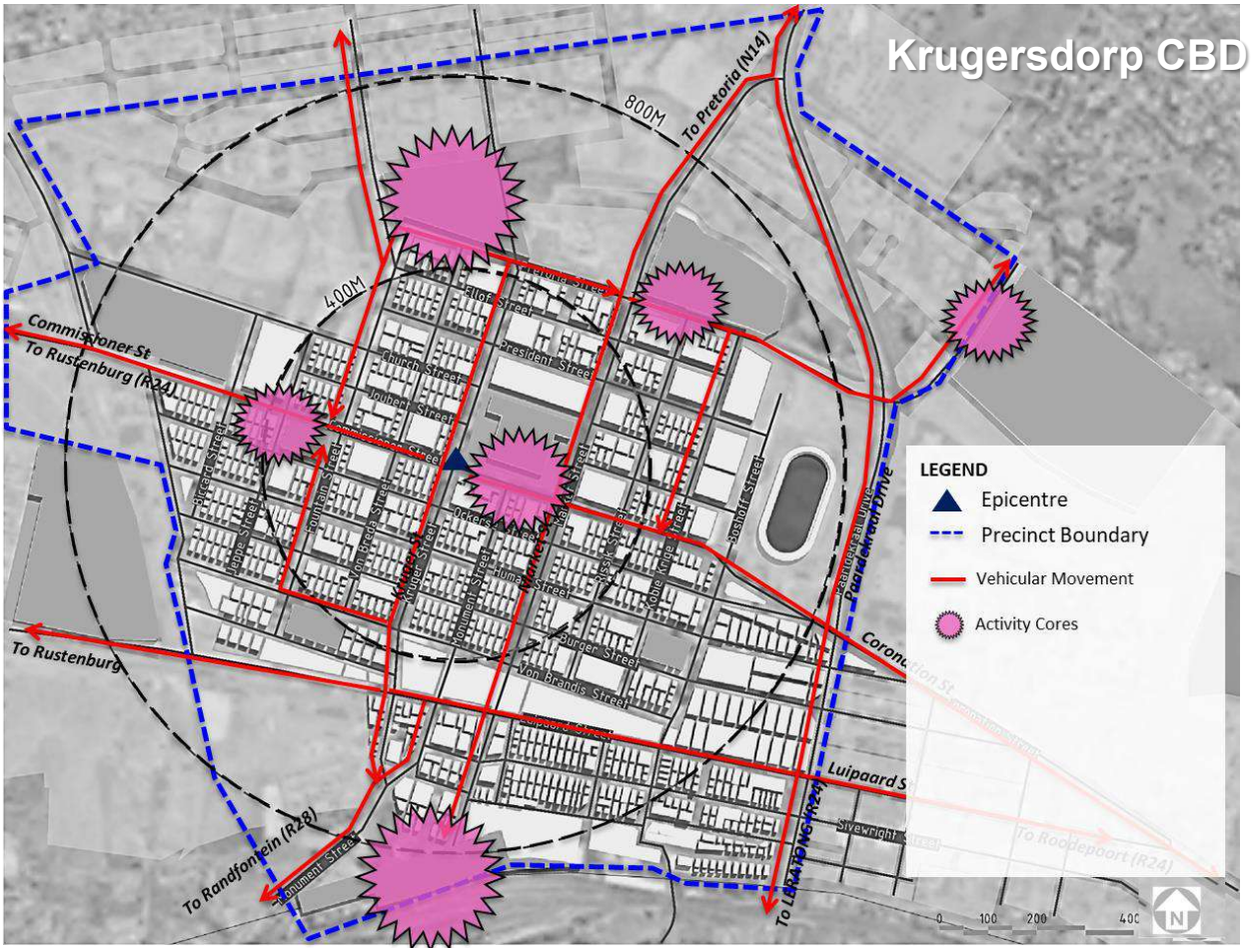


Figure 28: Existing vehicular network with Activity Cores

1.5.2.2.2 Activity Cores

Activity core nodes are highly accessible hubs of activities and are closely integrated with movement patterns and transport routes. Activity nodes have integrated function with activity corridors and spines; as well as that they are ideally situated at regular intervals within urban areas i.e. transfer stations and street intersections. Lastly, these nodes have a plethora of functions that can either be social, public or commercial in nature.

Sixteen (16) urban hub anchors have been identified across Krugersdorp CBD and the three transport facilities (the train station, taxi/rank, multi modal facility) have been mapped revealing a functional core of the Krugersdorp CBD. The core of activity in Krugersdorp takes place in the area between the taxi rank and President Square Mall in the north; the range of public buildings along commissioner Street and along the north-south corridors leading to the train station in the south.

1.5.2.2.3 Walkability



The scale and original layout of the CBD considers pedestrian movement and accommodates them comfortably alongside vehicles. Several pavements within the CBD are covered by canopies providing shelter for pedestrians.

Great urban zone design and development does not only consider a pedestrian's movement from point A to point B, but rather also considers small details such as the materials used to create seating, the lighting suitable for a certain pavement or movement zone to broader aspects such as the experience the pedestrian experiences during their walk. Whilst pavements are comfortable and reasonably well maintained, there is little to ensure a consistent level of safety, interest and convenience as a pedestrian.

Walkability ensures that a pedestrian can take the shortest linear route to reach their destination in Krugersdorp, the human scale block sizes ensure a high level of permeability of the urban fabric.

The linear movement that gets a pedestrian to its destination is not the full scope of what could possibly occur as they travel. For instance, an individual may want to change direction at a point in time, stand alone or chat to a stranger and/or acquaintance, or sit, to name but a few. Throughout all these examples, movement regions should be able to accommodate all these wants/or needs of one pedestrians whilst not hindering the movement of other pedestrians moving through the same area. The considerations of the needs and/or wants of pedestrians lower the stressful impacts associated with the fast-flowing traffic typical or urban growth and development.

Whilst Krugersdorp CBD has adequate pedestrian space throughout the CBD, the space is not maintained nor is it structured to respond to where the highest pedestrian needs are. Movement regions and designing streets to suit pedestrian behaviours could be considered by Mogale City. Additionally, the municipality can improve in how it provides for expressed and implied needs through streetscape design and provision of urban furniture.

1.5.2.2.4 Legibility

Legibility is ideally achieved through prominent view and vistas. Branding the City through those landmark features that have outstanding beauty and the potential to draw tourism. The top landmarks in Krugersdorp CBD remain the Civic Centre with its statue of Chief Mogale and its outstanding architecture. The museum and monument along Monument Avenue and the stadium in the east are other landmarks within the CBD.

The legibility of an urban environment is marked by a landmark (external reference). Landmarks are conspicuous and often located at junctions as they need to be spotted from a great distance; and they serve as orientation systems, because they have the ability to guide individuals through its environment and the character of the surroundings is depicted through the built form (landmark).

Krugersdorp has a range of street level landmarks whose prominence and legibility can be improved, especially for pedestrian users of the CBD. This includes the monument near the museum, the statue of Chief Mogale near the Civic Centre and several heritage buildings with plaques thereon. Mogale City can also lead a process of identifying the commonly used references for wayfinding in the CBD. Overall, the legibility of the inner city can be improved by better signage, systematic placement and structured treatment of signage to assist especially users of the CBD who are not regularly in Krugersdorp.

1.5.3 Pedestrian Network and Connectivity

1.5.3.1 Existing Pedestrian Connectivity Network

Krugersdorp CBD is well-structured as evidenced in the regular and well-developed grid layout for CBD streets. Whilst being well-developed, the pedestrian networks are diverse and permeate the CBD in ways that require further study and detailing in order to fully support their strengthening.

The existing pedestrian connectivity network is intricately tied in with how people enter the CBD. The taxi rank in the north and train station in the south are two major transport facilities originating much of the pedestrian traffic into the city. However, several journeys in the Krugersdorp CBD commence from observed taxi drop-offs across the city. These locations are known and facilitate the transition from vehicular to pedestrian movement. They are however informal and not managed to optimise vehicular movement through the CBD nor pedestrian safety and access to different parts and services within the City.

Pedestrian activity is also the fuel driving the informal trading activity in the CBD. Therefore, the most highly traversed pavement locations tend to attract informal trading responding to the opportunity presented by large groups of pedestrians at certain times of the day. The map below illustrates some of these locations.

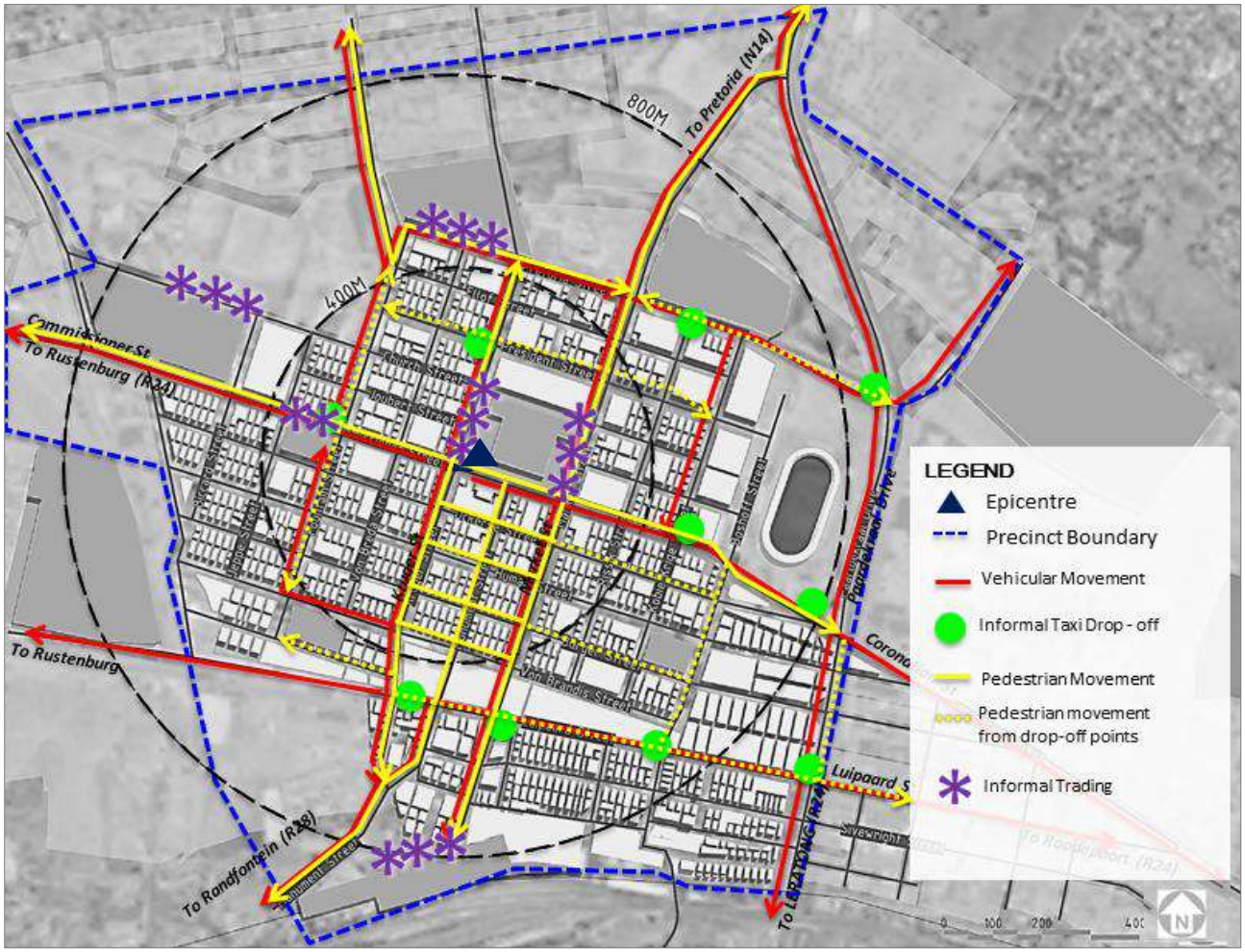


Figure 29. Existing pedestrian connectivity network and informal trading

1.5.3.2 Character of Hub: Access Zone

Krugersdorp CBD is well networked with major vehicular and pedestrian routes permeating through most of the urban grid.

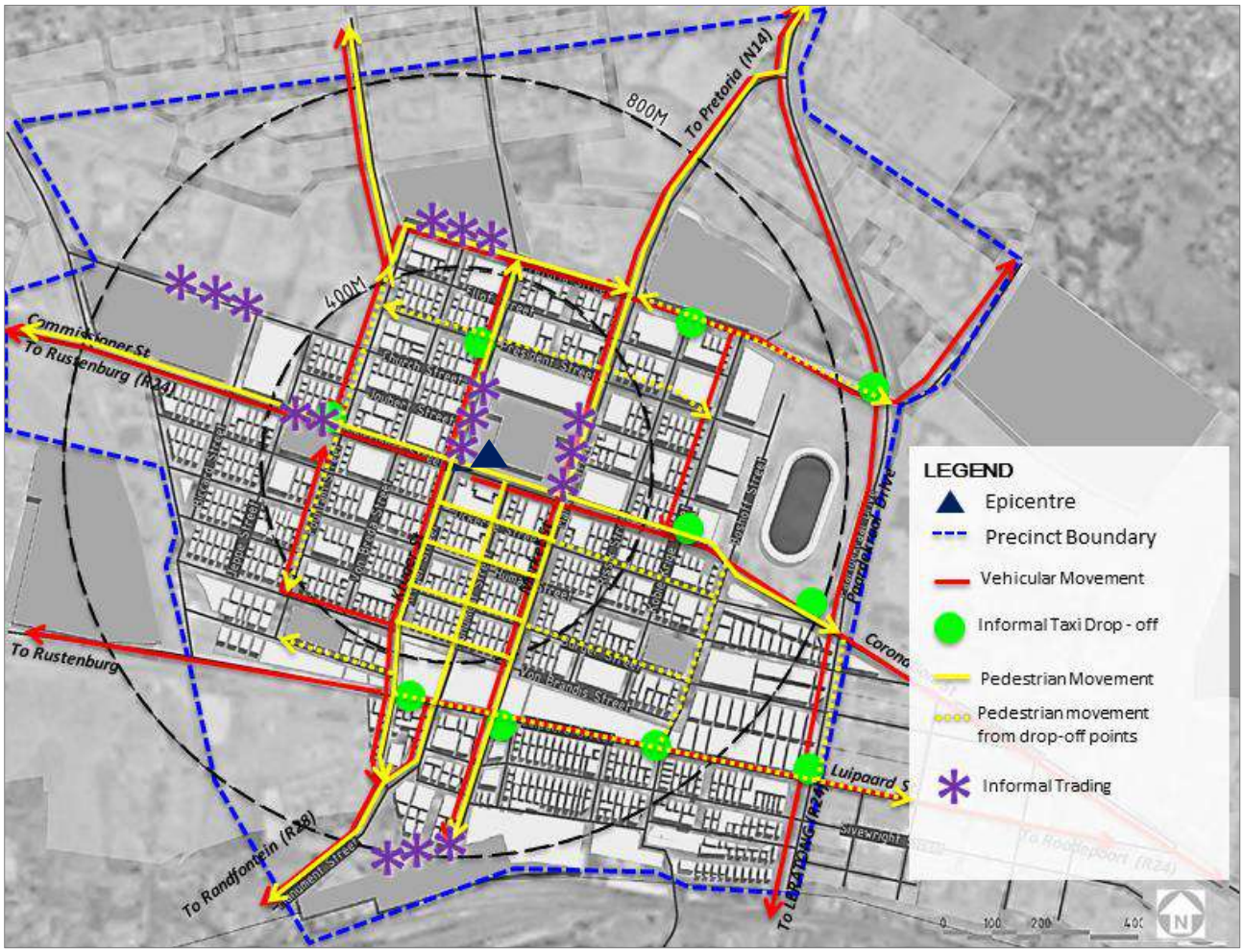


Figure 30.Pedestrian, Vehicular and Public Transport Movement

1.6 Access and Movement Framework Proposal

1.6.1 Movement Framework

The movement framework envisioned for the future of Krugersdorp CBD takes into consideration the need for more concerted focus on public transport and urban management interventions for the benefit of pedestrians.

1.6.2 Vehicular Networks

The vehicular network in Krugersdorp CBD is robust and adequate for providing access and movement to destination in and around the CBD. The network plays an important regional link with strong mobility routes bypassing the CBD. Private passenger vehicles and other vehicles are assumed to have been largely accommodated in the Krugersdorp CBD. Attention needs to be paid to provision of road space and loading bays for delivery vehicles whilst also considering responsible ways of reducing on-street parking to create space for bus and taxi lay-byes, informal trading space as well as other high-order uses for pavements.

1.6.3 Public Transport

In Krugersdorp CBD, the vehicular movement network is focused on the private motor vehicle and rarely makes provision for public transport.

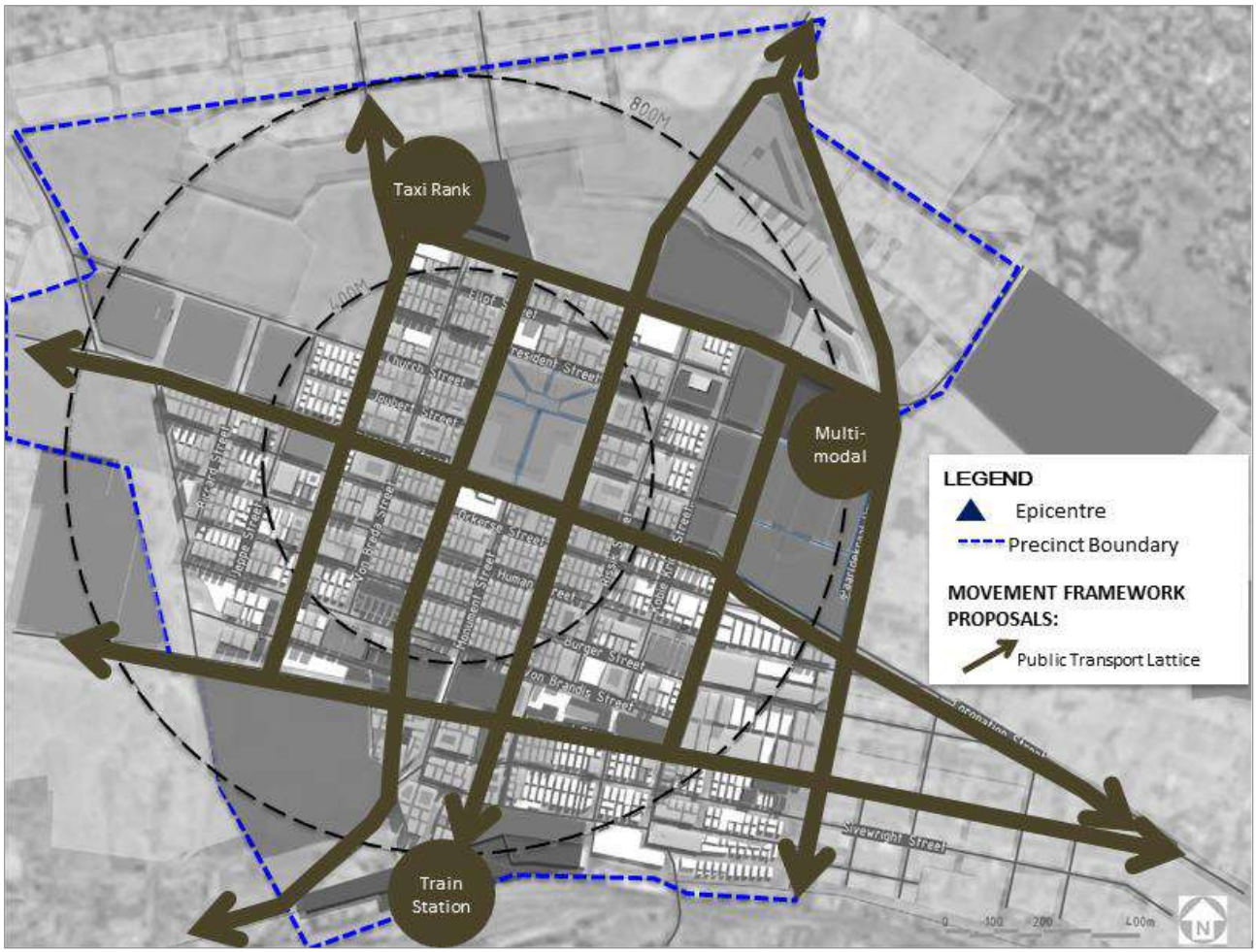


Figure 31. Proposed access and movement through Krugersdorp CBD through a public transport lattice

Provision for public transport circulation in the form of dedicated and differentiated routes is a large gap in the transport network of Krugersdorp. The future Krugersdorp will have to establish and maintain a public transport lattice that allow for taxi and bus circulation without adding pressure to other vehicular movement through the CBD. This taxi and bus circulation will complement the train service already available to the south of the CBD.

The backbone of a public transport lattice is an important feature for accommodating the contemplated bus rapid transit (BRT) stations and loop. A public transport lattice can already reserve provisions and align development and upgrading intervention in the interim.

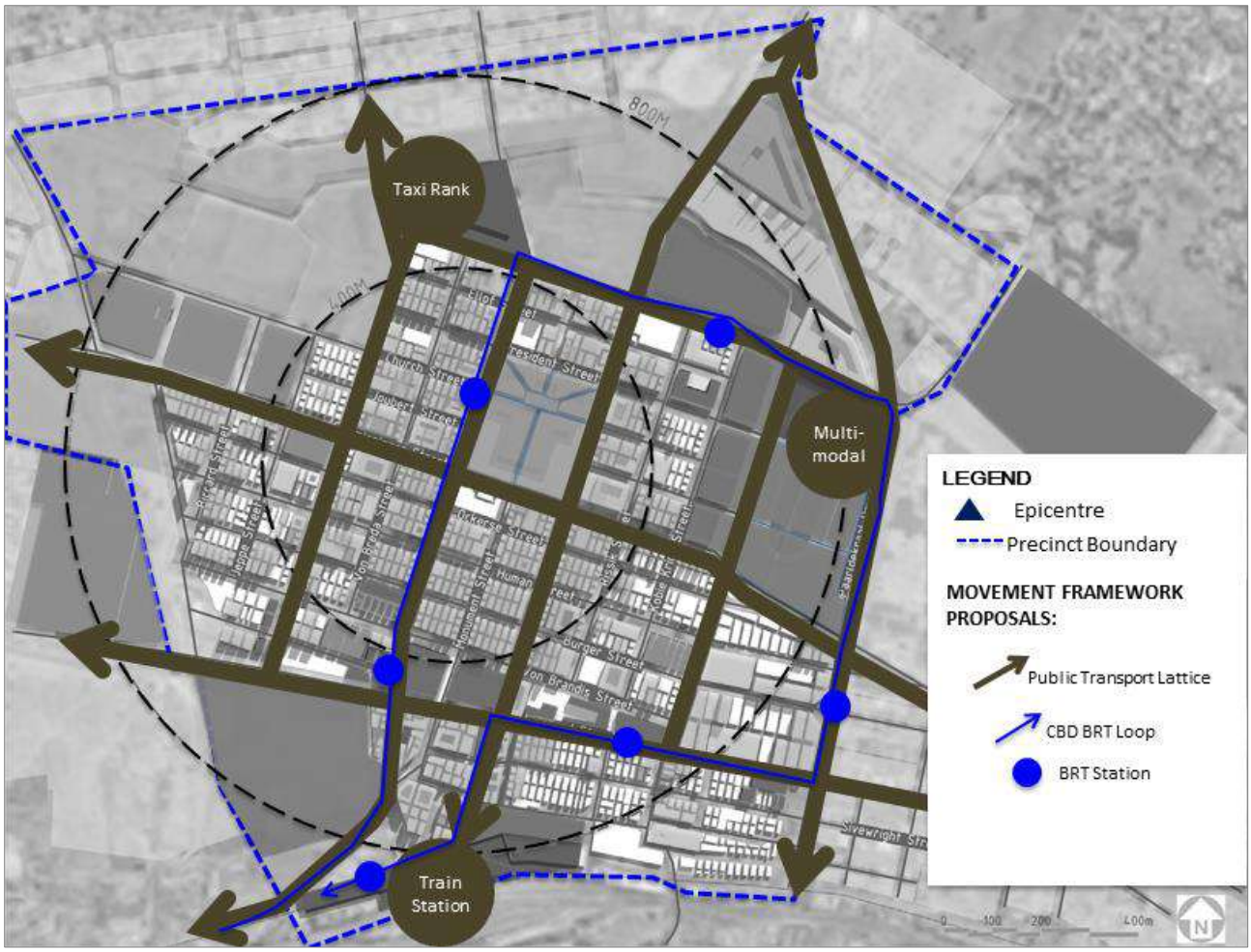


Figure 32: Proposed access and movement – BRT Loop & Station locations

The figure above illustrates how a CBD BRT loop and potential stations may be located in relation to the existing pedestrian movement networks.

The BRT must be imagined alongside the fuller accommodation of taxi traffic and improved drop-offs. It is recommended that a CBD taxi loop be introduced as well provide a structured and managed inner-city taxi route. The purpose of this taxi loop would be to offer improved convenience for pedestrians travelling to different parts of the city including connection to the train station and other public transport facilities like the taxi rank and multi modal facility.

The taxi loop, like the BRT loop would utilise to the public transport lattice but would provide a differentiated service. There is a need to upgrade existing popular taxi drop-off zones whilst also ensuring safe and managed accommodation is made for drop-off facilities at specific points across the city to facilitate access.

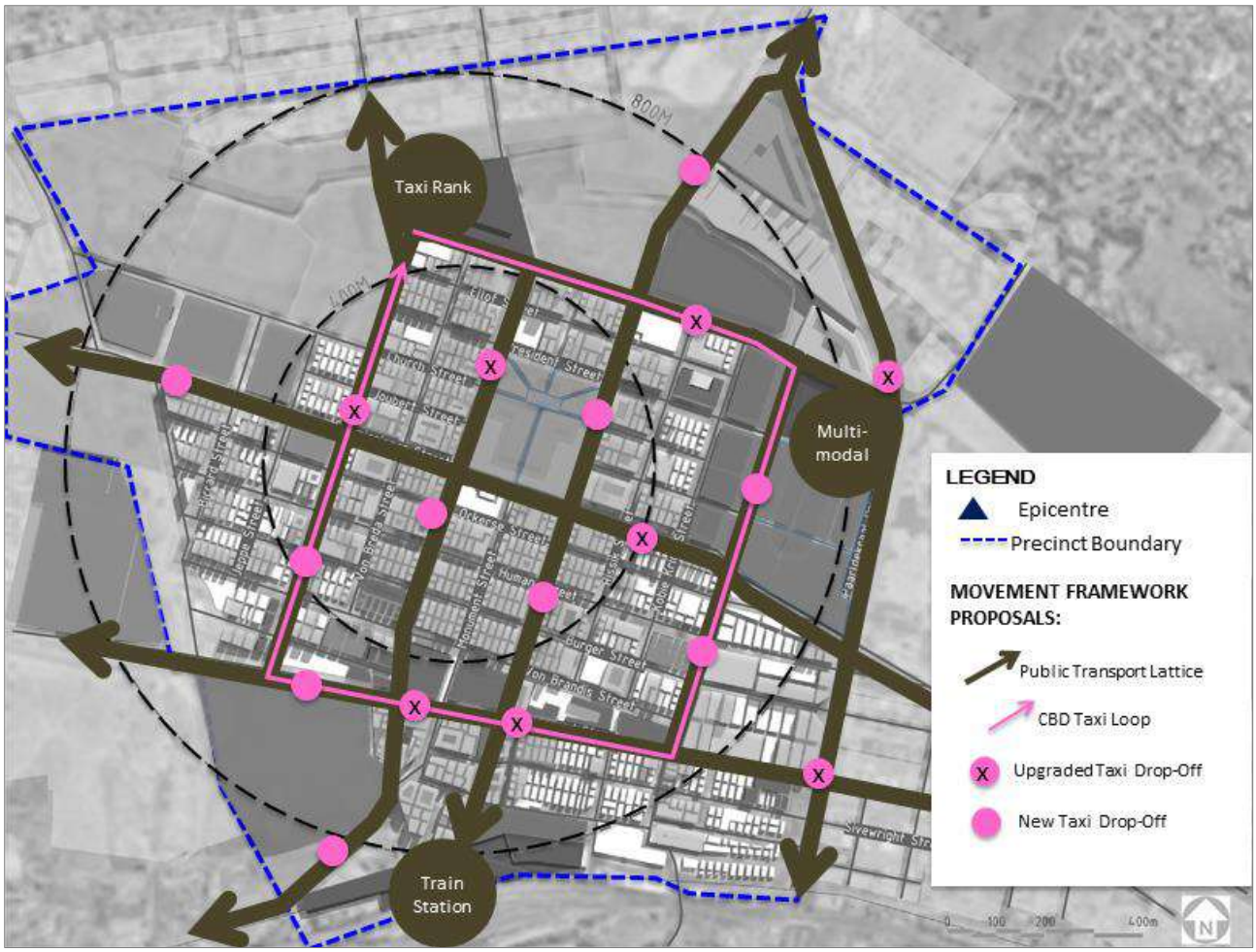


Figure 33: Proposed access and movement – CBD Taxi Loop & Upgraded Taxi Drop-off

Efficient and convenient public transport access across the CBD is important for all classes in society, especially for the lower income earning clientele of Krugersdorp who will likely be CBD residents as well in the medium term.

1.6.4 Proposed Pedestrian Networks

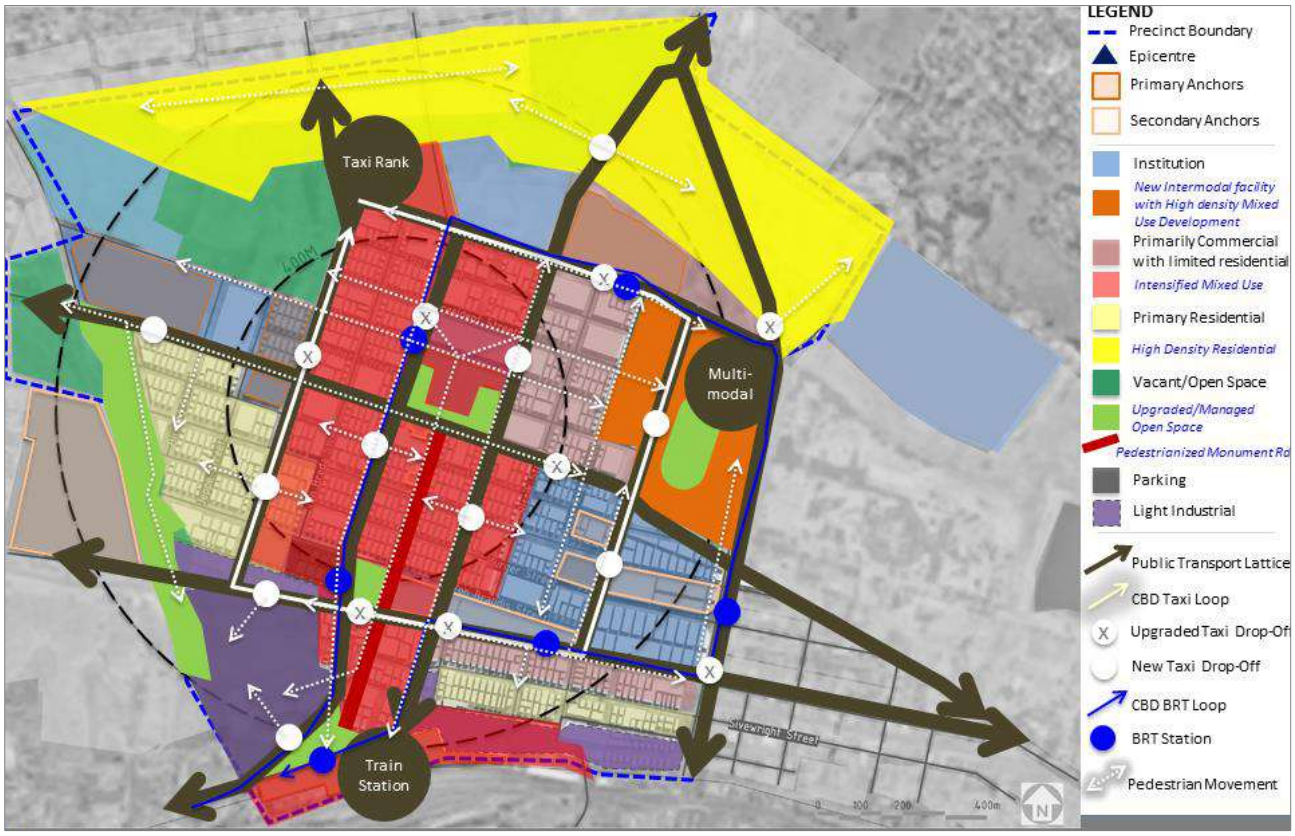


Figure 34. Proposed pedestrian network in Krugersdorp CBD

The proposed pedestrian network in Krugersdorp responds to the need for universal access to most parts of the city and is proposed to tie in with the recommendations made for public transport accommodation on and along the streets of the CBD.

More specifically, the diversity of pedestrian movements in Krugersdorp means that a robust upgrading strategy is required to improve the pedestrian experience. The introduction of formalised taxi and bus drop-offs alongside a dedicated inner-city taxi route ensuring regular and reliable access to all parts of the CBD would be a marked improvement.

The improvements in convenience may be matched with improvements in treatment of pavement, street furniture and streetscaping along priority routes. In future, the same public transport lattice will provide increased amenity through the possible introduction of a BRT service and stations that align to and are complementary to the inner-city taxi loop.

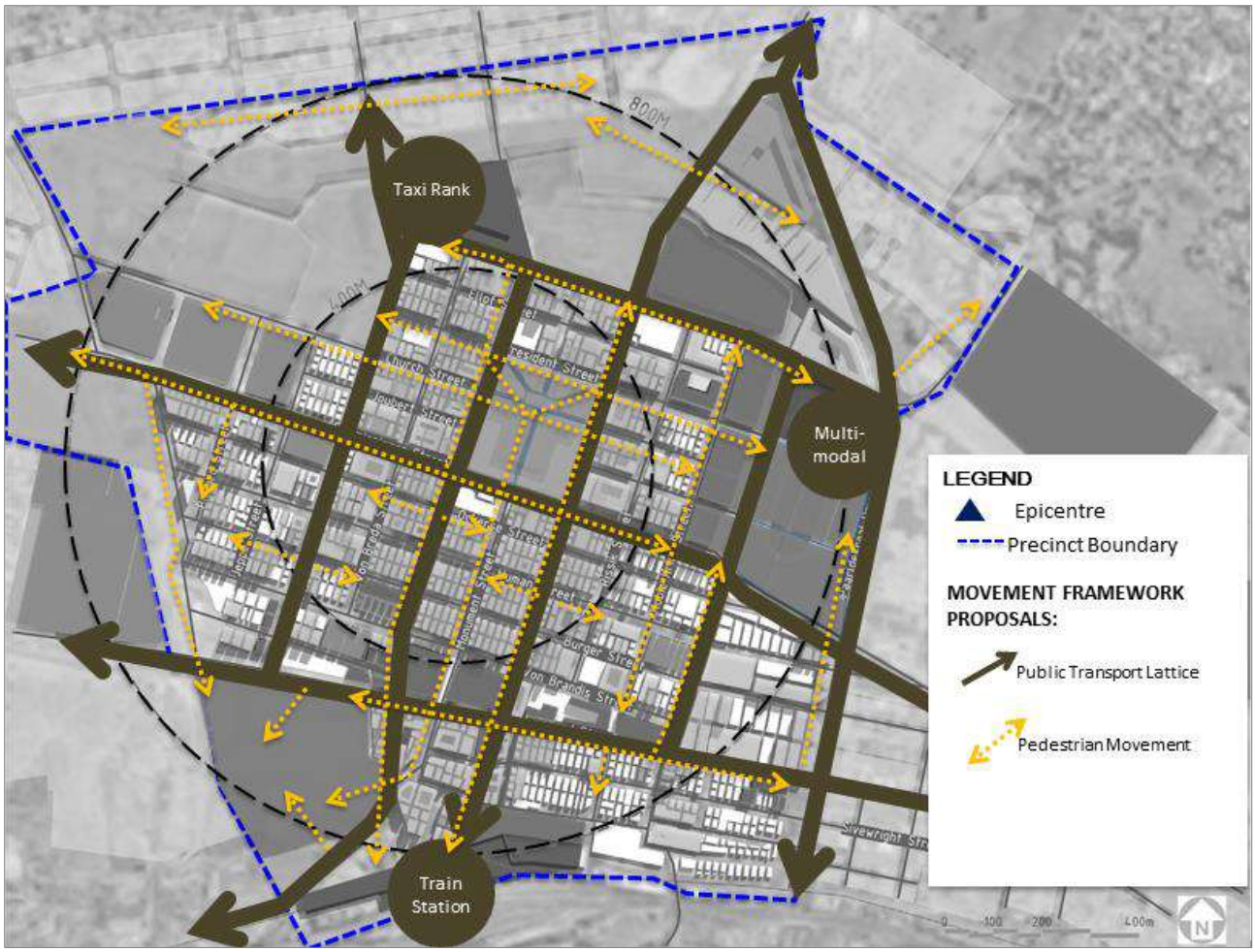


Figure 35: Proposed pedestrian networks

The proposed pedestrian movement above promotes easy accessibility and access to and from the main CBD anchors, public transport facility and improved pedestrian connectivity throughout the CBD.

1.7 Summary of Spatial and Movement Analysis

Below is a summary of key findings on the overall performance of the Krugersdorp CBD precinct.

Mogale City is the northern most local municipality in West Rand District Municipality and is well located along the N14 east-west link between City of Tshwane and the North West and Northern Free State hinterland. Mogale City and Krugersdorp in particular are the first significant urban centre in Gauteng for freight and commuter traffic.

Mogale City is experiencing declining population growth as a result of slowing industries and lower in-migration of workers to the area. This trend however has not curbed urbanisation to Mogale townships as people seek better opportunity from better access to services and areas of economic activity. Mogale City has an unemployment rate of about 40%.

Krugersdorp is a well located CBD in relation to Gauteng Province as it includes functional linkages with Johannesburg, Tshwane and the greater region along the N14, R41 and R28 respectively.

Krugersdorp CBD is the largest and one of the more established CBD in the West rand with an established heritage and infrastructure network. It is also the major service and economic centre in Mogale City. Krugersdorp is an important economic activity area in relation to secondary nodes of Randfontein, Westonaria and Carltonville. Within the municipality, Krugersdorp sits alongside the Cradlestone/Silverstar node and the Key West node to the north as other centres of economic activity.

The Krugersdorp CBD is a major service centre for nearby suburbs of Munsieville, Boltonia, Azaadville and Kagiso. The CBD is also an important rail, taxi and bus commuter node. Additionally, the strength of the CBD is its walkability and relative close proximity of amenity. The CBD provides opportunities for densification at different scale and typologies that can be led by both public and private sector interventions. It has a well developed urban fabric that is structurally sound albeit old and in need of various levels of upgrading and improvement.

The Krugersdorp CBD is important as a location to responding to the challenges of locating lower income earners where physical and economic access is highest. The opportunity is to also amplify the role of Krugersdorp as a commuter node and distinct destination within the hierarchy of Gauteng nodes. This CBD is also an opportunity to increase the density of people at this location, thereby increasing the viability of locating industry and other economic activity in this area. This is specifically targeted at impact the high unemployment rate in the broader Mogale City municipal area.

From a movement perspective, the well developed urban lattice throughout the CBD needs to be upgraded and differentiated to serve the particular needs of pedestrians and public transport movement throughout the CBD. Whilst the CBD is walkable, the is no considered provision of street furniture and public infrastructure catering to the needs of pedestrians at different places in the city. The opportunity is to consider improvements in public infrastructure alongside planning the desired and dedicated movement of public transport within and through the CBD.

1.8 Checklists

1.8.1 Status Quo Report Evaluation Checklist

Table 11. Status quo evaluation checklist (as per the Urban Hub Design Toolkit)

STATUS QUO REPORT	YES	PG
1. Are the economic, environmental and social needs identified?	Yes	
2. Is there a spatial synthesis that identifies and maps major opportunities and constraints?	Yes	
3. Is there a provisional understanding of the extent of the Hub to be the subject of this exercise (greenfield and brownfields)?	Yes	
4. Is there a description of the character of the node, now and into the future?	Yes	
5. Is there an understanding of the land use planning, policy and land ownership constraints?	Yes	

1.8.2 Access and Movement Framework Report Evaluation Checklist

Table 12. Access and movement framework report evaluation checklist (as per the Urban Hub Design Toolkit)

ACCESS AND MOVEMENT FRAMEWORK REPORT	YES	NO
• Does the road network respond to the topography appropriately?	Yes	
• Are the urban blocks proportioned so as to allow a set of transport services to operate efficiently as one integrated system?	Yes	
• Can people find/orientate themselves easily by referencing off topographical features and a hierarchical logic in the network?	Yes	
• Has the proposed network addressed the challenges presented by major linear forms of infrastructure (rail lines) and/or topographical features (rivers) which prevent seamless connections for those on foot?	Yes	
• Does the network locate the main bus, taxi and rail/BRT facilities within walkable distance from each other?	Yes	
• Does the network provide for a set of continuous local road and NMT connections between the Interchange Zone and the Hub surrounds?	Yes	
• Do the strategies supporting the framework address the scale of the roads to allow for the correct balance of pedestrian to vehicular needs to be met in strategic locations and zones?	Yes	
• Does the framework adhere to current and proposed local transport policy and proposals and if not, are there implications for the planning?	Yes	

2. Integrated Development Concept and Land Use Framework

2 Integrated Development Concept and Land Use Framework

The integrated development concept and land use framework for Krugersdorp CBD is guided by key findings of the analysis as detailed above. It is also guided by a vision of the area incorporated in previous work led by MCLM in the CBD. It is also guided by the UNS strategy based on TOD principles of walkability, access, mixed use, density and transit.

2.1 Role and Importance of the CBD

The inner city is birthplace and historic core of the city. It serves at their first point of entry for those who come to live in the city for short or long periods, making it the most diverse space at Mogale City. The precinct plan seeks to build on and restore the following characteristics inner city, namely the inner city as:

- **a place of opportunity**
- **a place of inclusivity**
- **an important employment and productivity node**
- **an important residential neighborhood**
- **a commercial node**
- **a transportation hub**
- **a site of intense investment, attracting both private and public sector money and businesses**
- **characterized by a diverse mix of land uses**
- **an important generator of municipal income, and**
- **the cultural hub of the city**
- **the site of multiple educational amenities.**

2.2 Precinct Vision

In 2014, the MCLM had a vision for the Krugersdorp CBD of, "*Develop[ing] a regional node with social and economic vibrancy that attracts private sector development whilst enhancing its unique character.*[11]"

The focus of this vision was to address the target market of LSM 1 to 7 (R400 000pa) whilst also providing increased residential accommodation for housing target market of LSM3 – 7 (R3 500 – R10 000pm).

The vision for this iteration of work in the Krugersdorp CBD builds on this and centres on six key principles described below.

- **Retain a Walkable core around precinct**

Vibrant and working CBDs like Krugersdorp are growing rarer. The overarching vision in this precinct is to retain and reinforce those elements that are currently functioning whilst introducing improvements for current residents and users.

In line with this principle the following thrusts will be encouraged:

- **Support Existing Anchors - Taxi Rank, Train Station and Civic Centre**
- **Revitalise and redevelopment of the Civic Centre**
- **Formalise Pedestrian Routes & Upgrade Streetscape along Market Street**
- **Traffic calming along existing Vehicular Routes**

11 KD INNER-CITY REGENERATION BUSINESS PLAN presented to Mogale City Exco, 2 July 2014.

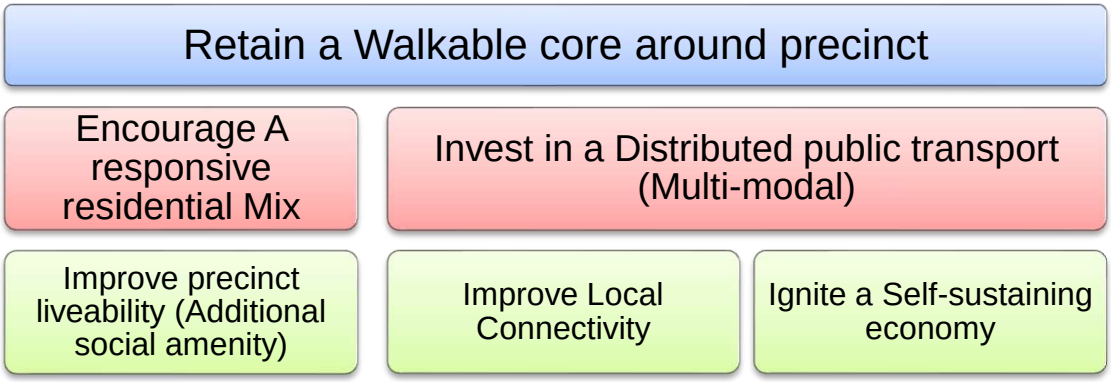


Figure 36: Six Principles guiding vision for Krugersdorp CBD

- **Encourage A responsive residential Mix**

The CBD is surrounded by land whose use can be intensified. In South Africa there is a need for inclusive opportunities to house people on well-located land. Mogale City has Krugersdorp CBD as an ideal opportunity to achieve a transformation in the functioning of the current CBD whilst also providing future generations with new opportunities.

An improved and inclusive residential is a key driver for growth and improvement of an area. Thus, the following are recommended in the precinct:

I. **Introduce Medium to High density residential – 3 storey walk-ups**
II. **Introduce Social housing – Student residential Units, 3 storey walk-up, 3 – 4 storey redevelopment and 6 – 8 storey redevelopment of existing buildings.**

- **Improve precinct livability by adding social amenity**

Krugersdorp is relatively well serviced but has a distinct lack of social amenity for urban residents and other users. This is viewed as a focus area for improvement.

In this vein, the following are suggested for the precinct:

- **Develop Educational Facility along Commissioner Street**
- **Mixed-discipline Sports Centre**
- **Strengthen Heritage Corridor – Existing Civic Centre and along Monument Street.**

- **Invest in a Distributed public transport (Multi-modal)**

The Krugersdorp has a good base for vehicular movement, however public transport routes are not well structured in the CBD.

The following are recommended:

- **Development of New Taxi & Bus Facilities around the Civic Centre (precinct heart) including additional Drop-offs Zones**
- **Differentiated public transport routes around precinct**

- **Improve Local Connectivity**

Beyond provision of public transport, pedestrians are also challenged by long distances that need to be travelled across the CBD. Pedestrians are not prioritised nor accommodated specifically within the built form of the CBD, i.e. no pedestrianised streets, no special pavement treatments for legibility and/or disability, etc.

Interventions suggested are:

- **Restore Market Street as the main pedestrian route in the CBD**
- **Strengthen Monument Street as a pedestrianized street mall**

- **Improve streetscape within the 400m to encourage pedestrian movement and permeability**

- **Ignite a Self-sustaining economy**

The sustainability of the local economy is also something to be enhanced and diversified. The suggested interventions should include:

- **Increase commercial accommodation**
- **Fuel the retail transition - Award retail rights to existing owners around precinct**
- **Introduce commercial development along Commissioner Street**
- **Introduce trading stall with the New Taxi and Bus Station development**

2.3 Land Use Framework

The proposed land use framework was concluded after reviewing the needs, opportunities and constraints presented by the Krugersdorp CBD precinct. The precinct concept land use presented below corresponds to the TOD targets outlined in the table 13 below:

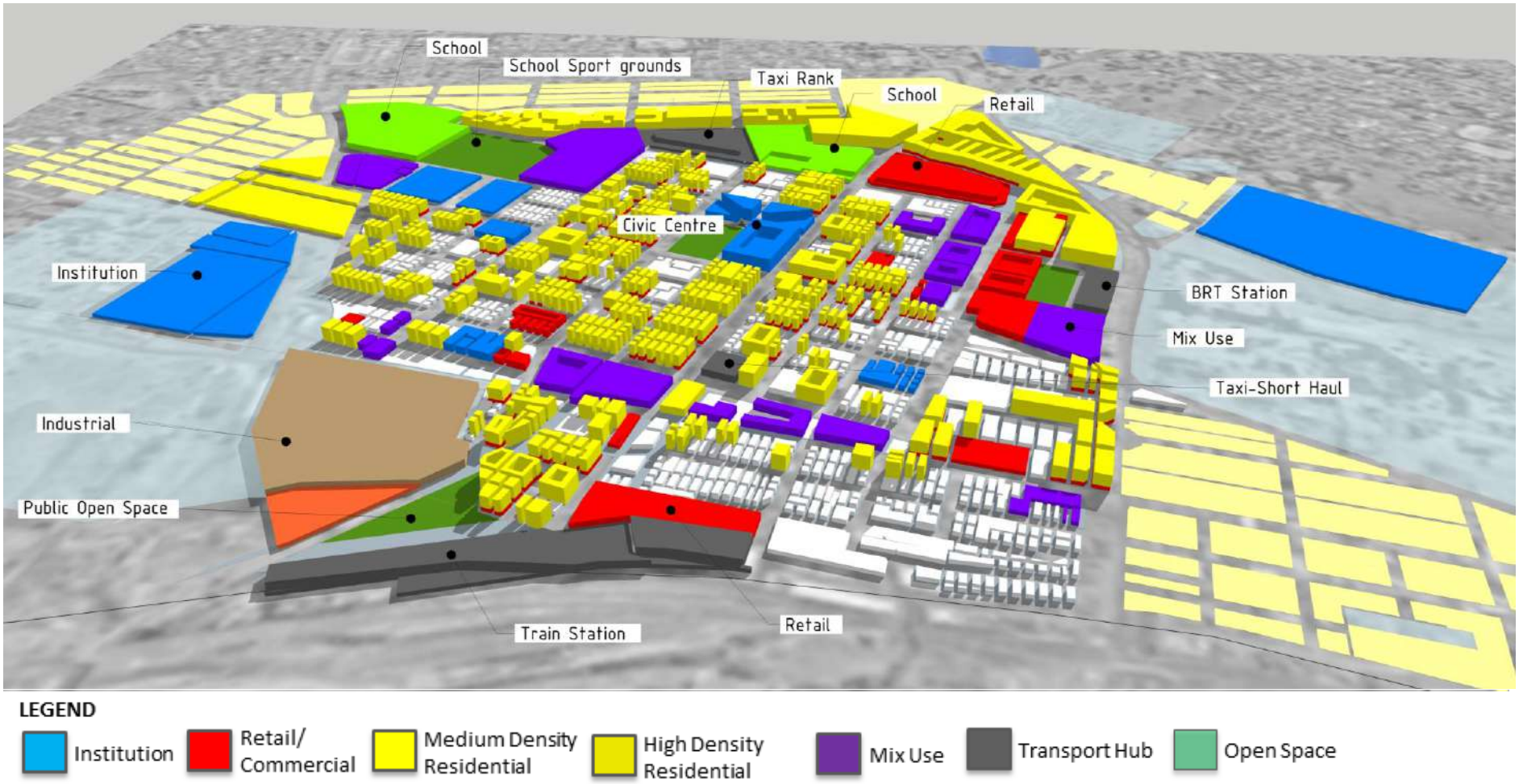


Figure 37: Proposed Development concept and Land Use Framework (North view)

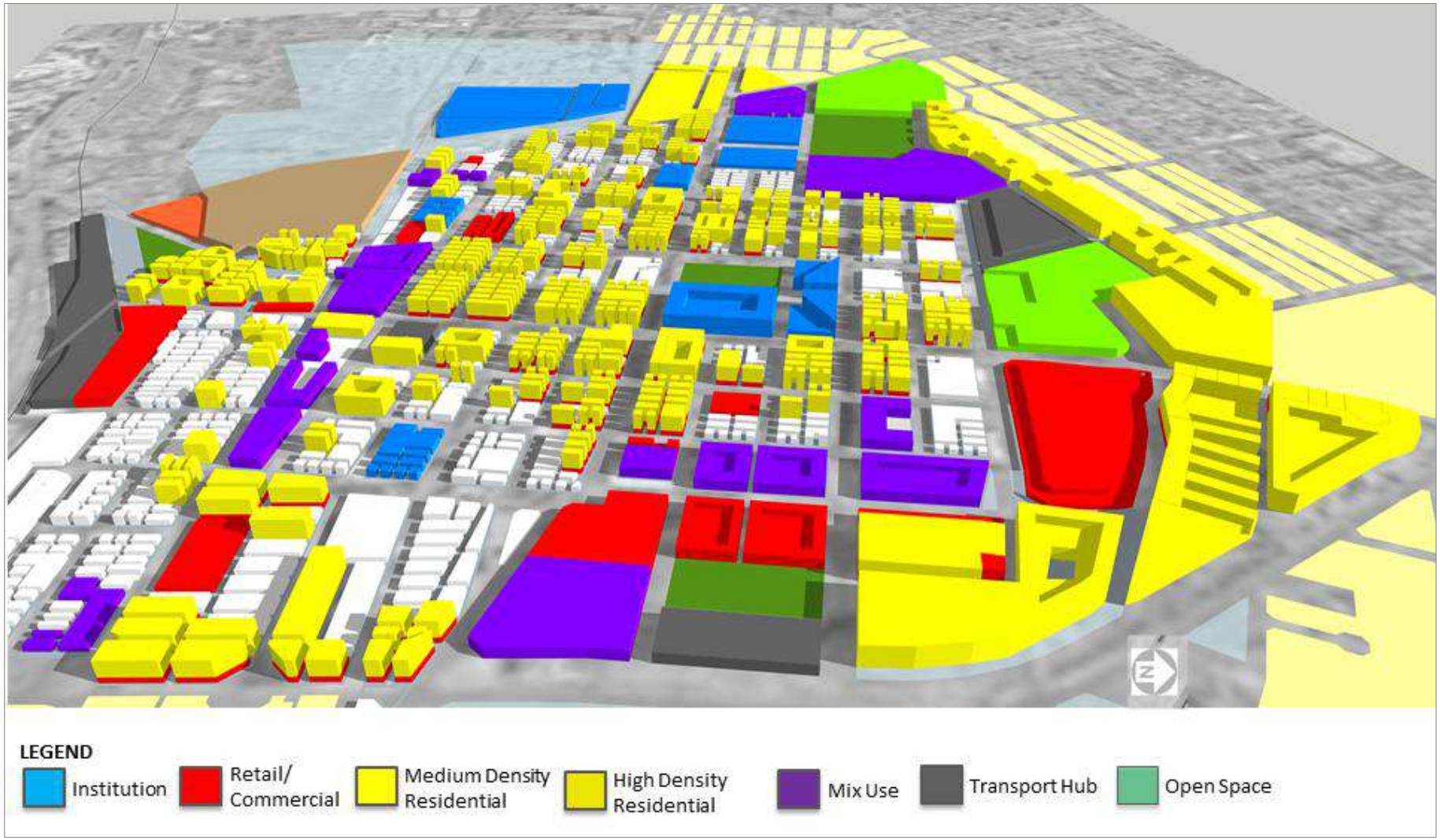


Figure 38: Proposed Development concept and Land Use Framework (West view)

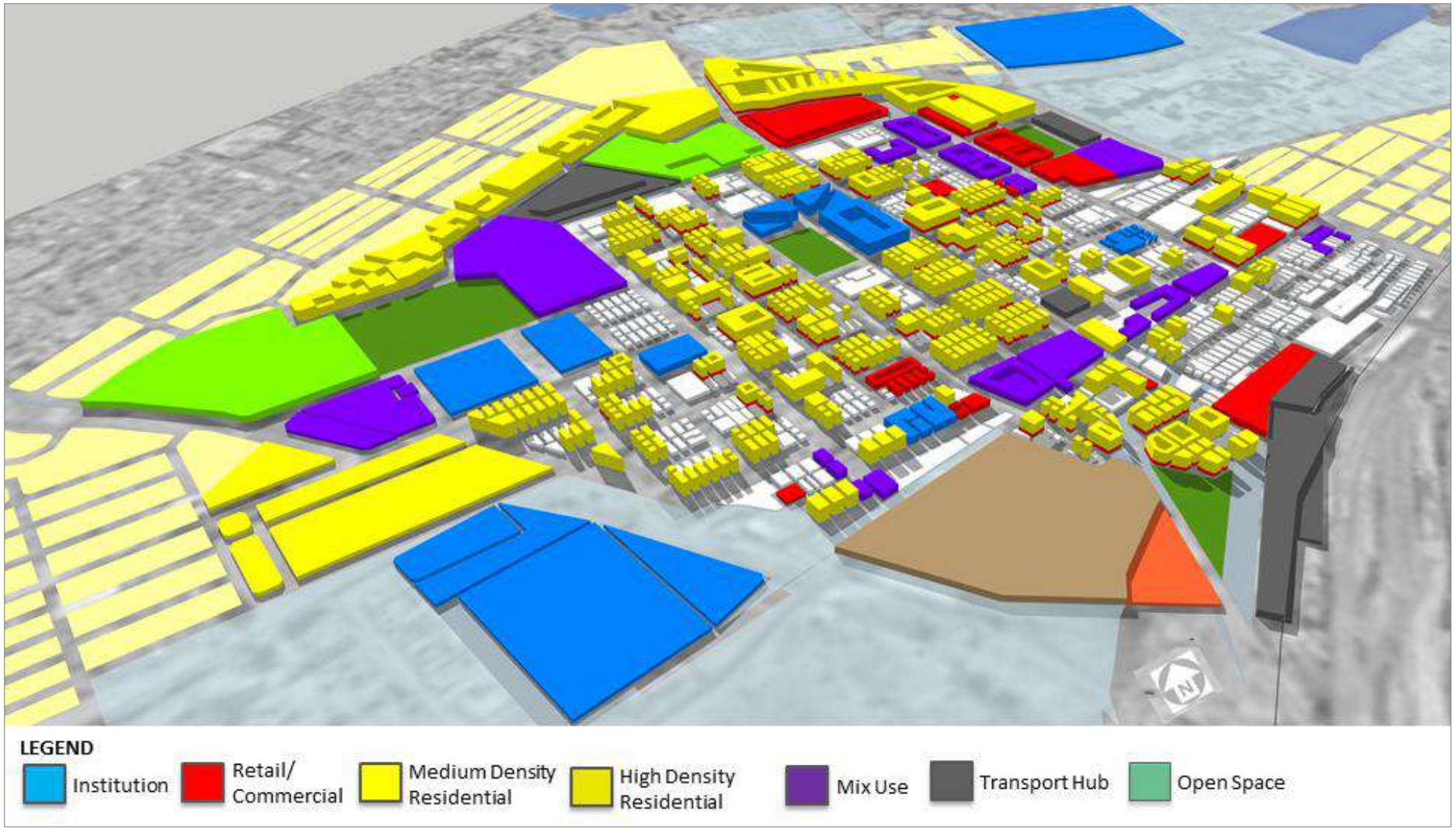


Figure 39: Proposed Development concept and Land Use Framework (Northeast view)

2.3.1 Proposed Land Budget

The proposed land budget for various elements comprising the proposed precinct is presented below. All units are in square metres (m^2).

Table 13: Proposed Land Budget of Anchors

Reference No.	Proposed Detail				Proposed FAR	Gross Lettable Area (GLA)
	Erf / Stand Size	Prp.Coverage (%)	Coverage	Height		
Museum	1 512	80%	1 210	2	1,6	2 419,2
Economic Development Building	1 239	80%	991	2	1,6	1 982,4
Civic Park	8 202	40%	3 281	4	1,6	13 123,2
WestColl	16 833	80%	13 466	1	0,8	13 466,4
Gauteng West District Education	177 777	80%	142 222	1	0,8	142 221,6
Netcare	5 951	80%	4 761	2	1,6	9 521,6
SARS	5 976	80%	4 781	2	1,6	9 561,6
Private Hospital	5 976	80%	4 781	1	0,8	4 780,8
Correctional Services	94 244	80%	75 395	1	0,8	75 395,2
Train Station	33 148	80%	26 518	2	1,6	53 036,8
Civic Centre	47 072	80%	37 658	4	3,2	150 630,4
Traffic Department	13 696	80%	10 957	1	0,8	10 956,8
Home Affairs	5 945	80%	4 756	1	0,8	4 756,0
Magistrate Court	3 971	80%	3 177	2	1,6	6 353,6
Taxi Rank	36 415	80%	29 132	2	1,6	58 264,0
Mall	40 728	80%	32 582	2	1,6	65 164,8
Public Hospital	40 728	80%	32 582	1	0,8	32 582,4
Library	10 756	80%	8 605	1	0,8	8 604,8
Precinct Totals:	550 169	**tal Prp.Coverage**	436 854	32		662 821,6
Precint Average:	30 565			2	1,3	36 823,4

Table 14: Proposed Land Budget of Residential Land

Reference No.	Proposed Detail				Proposed FAR	Gross Lettable Area (GLA)
	Erf / Stand Size	Coverage		Height		
Housing Development within the Precinct	509 591	80%	407 673	15	12,0	6 115 092,0
Precinct Totals:	509 591	**tal Prp.Coverage**	407 673	15		6 115 092,0
Precint Average:	509 591			15	12,0	6 115 092,0

A further residential land use breakdown of proposed units is as follows:

Table 15: Breakdown of Proposed Residential Land Use

Total Residential	**857 674**	Percentage	40,43%
Total Residential within the Hub heart	**101 475**		
Social housing (R2900-R3400)	**104 335**	Percentage	12,16%
Social housing (R3500-R7500)	**310 042**	Percentage	36,15%
Social housing (R7500 and more)	**443 298**	Percentage	51,69%
Affordable and Market private rentals options	**104 335**	Percentage	12,16%
Social housing rental options	**310 042**	Percentage	36,15%
Properties in ownership including full title, sectional title	**443 298**	Percentage	51,69%

Table 16: Proposed Land Budget of Open Space

	Proposed Detail				Proposed FAR	Gross Lettable Area (GLA)
Reference No.	**Erf / Stand Size**	**Coverage**		**Height**		
Park Development	75 319	20%	15 064	1	0,2	15 063,8
Housing	54 746	80%	43 797	15	12,0	656 952,0
Retail,MultiModal,Public Square, Residential	111 631	80%	89 305	8	6,4	714 438,4
Housing	133 256	80%	106 605	15	12,0	1 599 072,0
Precinct Totals:	374 952	**tal Prp.Coverage**	254 770	39		2 985 526,2
Precint Average:	93 738			10	7,7	746 381,6

Table 17: Proposed Land Budget of Schools

	Proposed Detail				Proposed FAR	Gross Lettable Area (GLA)
Reference No.	**Erf / Stand Size**	**Coverage**		**Height**		
School 1	33 385	40%	13 354	6	2,4	80 124,0
School 2	98 032	40%	39 213	9	3,6	352 915,2
Precinct Totals:	131 417	**tal Prp.Coverage**	52 567	15		433 039,2
Precint Average:	65 709			8	3,0	216 519,6

Table 18: Proposed Land Budget of Vacant Land to the West of the Train Station

Reference No.	Proposed Detail: Erf / Stand Size	Coverage		Height	Proposed FAR	Gross Lettable Area (GLA)
Industrial and Parking	192 424	80%	153 939	2	1,6	307 878,4
Precinct Totals:	192 424	**tal Prp.Coverage**	153 939	2		307 878,4
Precint Average:	192 424			2	1,6	307 878,4

Table 19: Proposed Land Budget of Potential Sites for Redevelopment

Reference No.	Proposed Detail: Erf / Stand Size	Coverage		Height	Proposed FAR	Gross Lettable Area (GLA)
Retail	37915	80%	30 332	9	7,2	272 988,0
Commercial	25277	80%	20 222	9	7,2	181 994,4
Residential	63192	80%	50 554	15	12,0	758 304,0
Precinct Totals:	126 384	**tal Prp.Coverage**	101 107	33		1 213 286,4
Precint Average:	42 128			11	8,8	404 428,8

Table 20: Proposed Land Budget of Private Land

Reference No.	Proposed Detail: Erf / Stand Size	Coverage		Height	Proposed FAR	Gross Lettable Area (GLA)
Mix Use	47 300	80%	37 840	15	12,0	567 600,0
Retail	94 554	80%	75 643	9	7,2	680 788,8
Commercial	47 270	80%	37 816	9	7,2	340 344,0
Residential	47 300	80%	37 840	15	12,0	567 600,0
Precinct Totals:	236 424	**tal Prp.Coverage**	189 139	48		2 156 332,8
Precint Average:	59 106			12	9,6	539 083,2

2.4 Development concept and land use framework Evaluation Checklist

Table 21. Conceptual land use framework evaluation checklist (as per the Urban Design Toolkit)

CONCEPTUAL LAND USE FRAMEWORK	YES	PG
1. Can the most accessible and visible locations accommodate street vending?	Yes	
2. Does the layout allow large commercial anchor tenants to be located strategically in support of smaller scale operators including street vendors?	Yes	
3. Does the layout allow commercial activity to agglomerate in relation to activity routes and the Interchange Zone?	Yes	
4. Is there a mix of land uses to extend hours of activity (beyond standard work day hours) at strategic points in the Hub such as within the Interchange Zone and Activity Corridors?	Yes	
5. Are SAPS facilities located so as to be visible and accessible to main commuter flows?	Yes	
6. Do the routes within the Prioritised Pedestrian Network link key public destinations?	Yes	
7. Are the public institutions, facilities, amenities and services clustered where possible?	Yes	
8. Are land uses such as manufacturing located to ensure residents are not exposed to harmful noise levels, fumes, etc.?	Yes	
9. Are the green open spaces located in relation to the topography in such a way as to help storm water management?	Yes	
10. Does the layout allow significant historical and cultural linkages to be maintained and strengthened? The Public Space Network should reinforce the critical linkages.	Yes	
11. Does the land budget consider the needs of the community?	Yes	
12. Have the housing densities and typologies been informed by local housing needs?	Yes	
13. Are the land uses proposed broadly compatible with each other and those outside the Hub?	Yes	
14. Does the framework adhere to current and proposed zoning and policy and if not, has a land use planning process to seek additional development rights and revise existing policy been highlighted?	Yes	

3. Development Proposals and Project Pipeline

3 Development Proposals

This section is an outline of an implementation framework as per the Development concept and land use framework detailed above.

3.1 Proposed sites for redevelopment

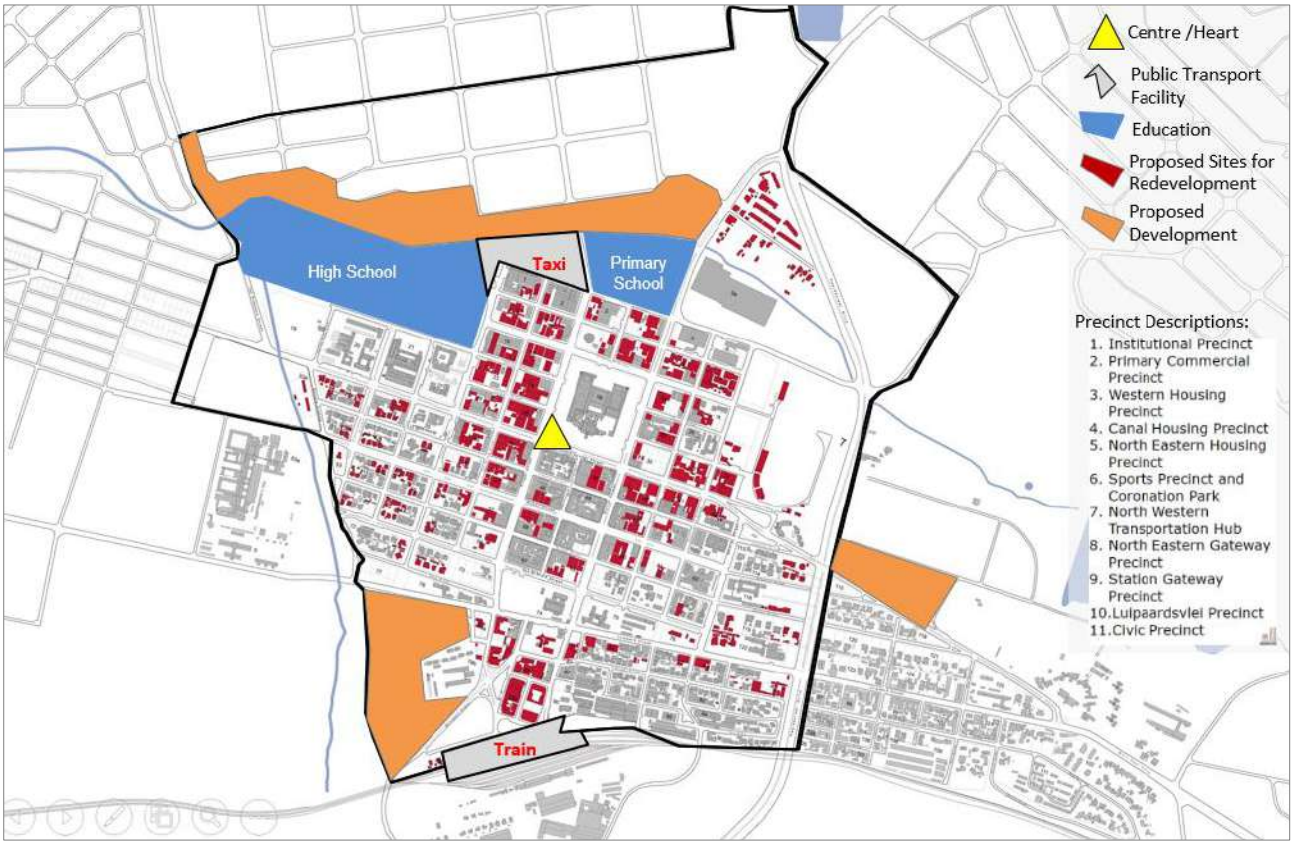


Figure 40: Proposed Sites for Redevelopment

The development opportunities for Krugersdorp CBD present as largely a brownfields redevelopment. A large proportion of the Krugersdorp CBD is older and requires refurbishment, reinvestment and redevelopment.

The approach adopted in this plan is leads and gives tangible form to Mogale City's policy around densifying the inner city, introducing additional development rights and revising existing policy for a more vibrant and inclusive CBD.

3.2 Sub-Precinct Identification and development proposals per sub precinct

In addition to the sites identified for redevelopment five sub-precincts are identified for intervention.

Sub Precinct 1: Municipal Precinct

Sub precinct 1 represents the heart of the precinct. It encapsulates the physical and symbolic transformation contemplated for the CBD as a whole.

The key proposal for this precinct include removing the fence around the Civic Centre to create an accessible and functional park. This park will be significant and symbolic because of its location close to the historically significant Monument Road.

Sub Precinct 2: Mixed land use precinct

This sub-precinct comprises most of the CBD regeneration effort. This includes areas for Taxi Rank and Train Station Upgrades; new parks, the pedestrianisation of Monument Street and the pavement and Greening of Kruger and Market Streets among others. Above ground residential densification and redevelopment is also anticipated for this sub precinct.

It makes sense that the focus of most of the envisioned investments will take place in the sub-precinct that includes the interchange zone.

Sub Precinct 3: Western Residential Precinct

Sub-precinct three forms the western edge of the Krugersdorp CBD, towards the north is the proposed Canal Housing development that is adjacent to a poorly structured and maintained green space along the canal. The green space should be redeveloped and its use intensified by also introducing new industrial development in the neglected and unmanaged vacant land toward the southwest of the CBD and demarcated precinct area. This area near the train station is also suitable for high density housing for low income earners.

Sub Precinct 4: Northern Residential Precinct

This sub-precinct is current vacant land north of the canal and bounded by the residential suburb of Quellerie Park. This is identified as an infill opportunity for new high-density housing as well as an opportunity to redevelop existing erven for three to four storey walk-ups, complexes and estates. The intention is to introduce much higher densities of people closer to the amenity and services in the Krugersdorp CBD.

Sub Precinct 5: Artsy Regeneration Precinct

This sub-precinct is one that will be led by a public-private collaboration. Interventions on this sub-precinct should seek to take advantage, complement and maximise the presence of large number of youth and students in this part of the CBD as a result of the colleges located here. The area lacks definition and can benefit from positioning itself as a student hub and can take on more adventurous character and identity.

3.2.1 Other Mogale City Projects

The following initiatives were identified as part of the Mogale City's Inner City Regeneration Programme and have as far as possible been incorporated into projects above:

- **The Civic Square (the anchor of the Municipal Precinct);**
- **The Taxi Hub Facility;**
- **The Sport Academy;**
- **Canal Housing (Social Housing) Initiative;**
- **The Transit Node – Station Hub, and**
- **Public Infrastructure Upgrade – along main roads.**

The Inner City Regeneration Programme provided the initial building blocks for the future planning of the inner city.

3.3 Project Pipeline and Phasing

The following table is LIST OF FIFTY SEVEN (57) proposed priority projects for Krugersdorp CBD and the precinct as a whole.

3.3.1 Proposed Projects

No.	Intervention name	Intervention description	Project Ref	Subprojects	Status	Project Stage	Responsibility	Funding source	Priority	Municipal role
1	Municipal Precinct Upgrade	Redevelopment of the Civic Centre building and creation of an accessible public park.	1.1	Municipal Building Redevelopment	Existing	Refurbish/Upgrade	MCLM	MCLM / NDPG / GDID	Medium-term	Provision and maintenance
			1.2	New Public Park	Existing	Refurbish/Upgrade	MCLM	MCLM / NDPG / GDID	Short-term	Provision and maintenance
2	Movement-Oriented Mixed Use Developments	Leverage the improvement of bus and taxi facilities in the CBD to intensify integrated developments at highly trafficked locations.	2.1	New Taxi Rank	New	Concept	Relevant PPP arrangement(s)	MCLM / NDPG	Medium-term	Facilitation, coordination and enablement
			2.2	Upgrade the Taxi Rank	Existing	Refurbish/Upgrade	MCLM	MCLM / NDPG	Short-term	Provision and maintenance
			2.3	BRT Station	New	Concept	MCLM / Relevant PPP arrangement(s)	MCLM / NDPG / GDRT / BRT Grant / Private Developers	Medium-term	Facilitation, coordination and enablement
			2.4	Offices (private)	New	Concept	Relevant PPP arrangement(s)	Private Developers	Medium-term	Facilitation, coordination and enablement
			2.5	Retail	New	Concept	Relevant PPP arrangement(s)	Private Developers	Medium-term	Facilitation, coordination and enablement
			2.6	Residential	New	Concept	Relevant PPP arrangement(s)	Social Housing Agent / Private Developers	Medium-term	Facilitation, coordination and enablement
			2.7	Public Square	New	Concept	MCLM / Relevant PPP arrangement(s)	MCLM / NDPG	Medium-term	Provision and maintenance

No.	Intervention name	Intervention description	Project Ref	Subprojects	Status	Project Stage	Responsibility	Funding source	Priority	Municipal role
3	New Industrial Development	Encourage new industrial development targeted at economic support and re-industrialisation on well-located property to the southwest of CBD.	3.1	Maximizing underutilized inner city land	New	Concept	Private Developer(s)	MCLM with Land Owner / Private Developers	Long-term	Facilitation, coordination and enablement
4	Upgrading Public Open Space	Develop and maintain a differentiated and complementary set of public open spaces around CBD.	4.1	New Civic Square	Existing	Refurbish/Upgrade	MCLM	MCLM / NDPG	Short-term	Provision and maintenance
			4.2	Redeveloped Sports Ground	Existing	Refurbish/Upgrade	MCLM	MCLM / Gauteng Sport, Arts, Culture and Recreation / NDPG / GDRT / BRT Grant / Private Developers	Medium-term	Facilitation, coordination and enablement
			4.3	Station forecourt/ Public Square	Existing	Refurbish/Upgrade	PRASA / Intersite	PRASA / Intersite	Short-term	Facilitation, coordination and enablement
			4.4	Museum Square	Existing	Refurbish/Upgrade	MCLM	MCLM / Gauteng Sport, Arts, Culture and Recreation	Short-term	Provision and maintenance
			4.5	Canal green space near Canal Housing	Existing	Refurbish/Upgrade	MCLM	MCLM / Gauteng Sport, Arts, Culture and Recreation	Medium-term	Provision and maintenance
5	Streetscape Upgrades along key link routes	Installing and maintain pedestrian-friendly public walkways and higher quality public environment to complement other CBD interventions.	5.1	Pavement upgrades	Existing	Refurbish/Upgrade	MCLM	NDPG / MCLM	Short-term	Provision and maintenance
			5.2	Trading stalls	New	Concept	MCLM	NDPG / MCLM	Medium-term	Provision and maintenance

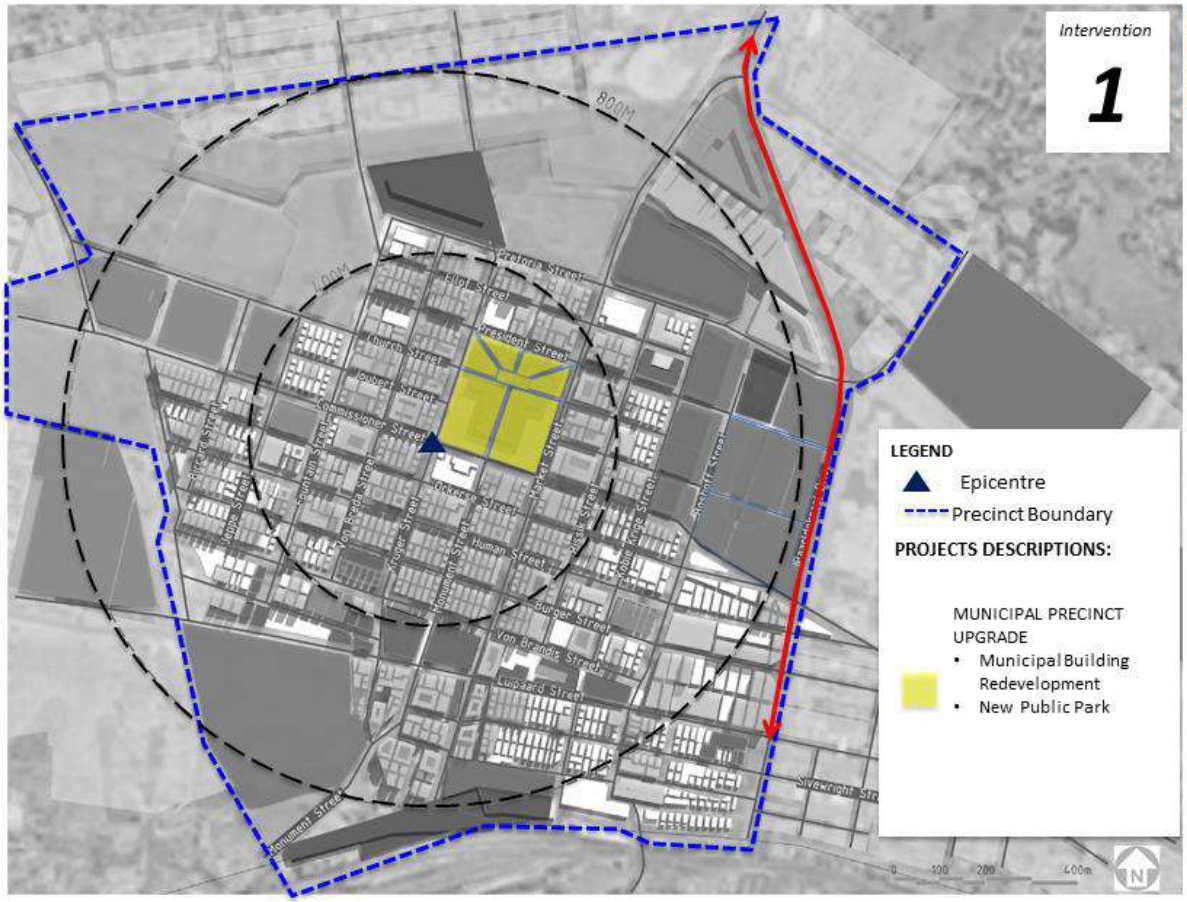
No.	Intervention name	Intervention description	Project Ref	Subprojects	Status	Project Stage	Responsibility	Funding source	Priority	Municipal role
			5.3	Tree planting	New	Concept	MCLM	NDPG / MCLM	Short-term	Provision and maintenance
			5.4	Traffic calming	New	Concept	MCLM	NDPG / MCLM / GDRT	Short-term	Provision and maintenance
			5.5	Street Furniture	New	Concept	MCLM	NDPG / MCLM	Medium-term	Provision and maintenance
			5.6	Taxi Drop off	New	Concept	MCLM	NDPG / MCLM / GDRT	Medium-term	Provision and maintenance
			5.7	Bus Stops	New	Concept	MCLM	NDPG / MCLM / GDRT	Medium-term	Provision and maintenance
			5.8	Pedestrianizing Monument Street from the train station to the Civic Centre	Existing	Refurbish/Upgrade	MCLM	NDPG / MCLM	Short-term	Provision and maintenance
6	Road Upgrade	Upgrading of the R28 to accommodate dedicate bus/BRT and taxi access and egress to the new multimodal facility at this location.	6.1	Upgrade of R28 between Market and Coronation Streets	Existing	Refurbish/Upgrade	Gauteng Provincial Roads Department	Gauteng Provincial Roads Department	Medium-term	Facilitation, coordination and enablement
7	New High Density Residential Developments	New high-density housing developments in existing neighbourhoods to the west and north of the CBD. This will take the form of infill and inclusive development and redevelopment.	7.1	Canal Housing Development	New	Detailed Design	MCLM	Social Housing Development Agency / GDHS	Short-term	Development owner
			7.2	Northern Residential Precinct	New	Concept	MCLM / Social Housing Agent / GDHS / Private Developers	Social Housing Development Agency / GDHS / Private Developers	Long-term	Development facilitation and promotion of increased housing opportunities through commensurate service provision
8	Creative Industries	Public-private collaboration to	8.1	Pavement Upgrades	Existing	Refurbish/Upgrade	MCLM	MCLM / NDPG	Short-term	Provision and maintenance

No.	Intervention name	Intervention description	Project Ref	Subprojects	Status	Project Stage	Responsibility	Funding source	Priority	Municipal role
	Regeneration Precinct	achieve an attractive and vibrant regeneration of this part of the city around a student precinct.	8.2	Greening	New	Concept	MCLM	MCLM / NDPG	Short-term	Provision and maintenance
			8.3	Public Art and Creative Street Furniture	New	Concept	PPP / CID / MCLM	MCLM / Private Property owners / New Developers	Medium-term	Facilitation, coordination and enablement

3.3.2 Precinct Project Phasing

The development proposals for achieving the vision for the Krugersdorp CBD precinct have been phased into eight (8) major interventions. These are designed to indicate governments commitment and intention for the CBD whilst building confidence for private investors to follow suit and position themselves and their properties to contribute to the vision outlined.

The interventions are detailed below.

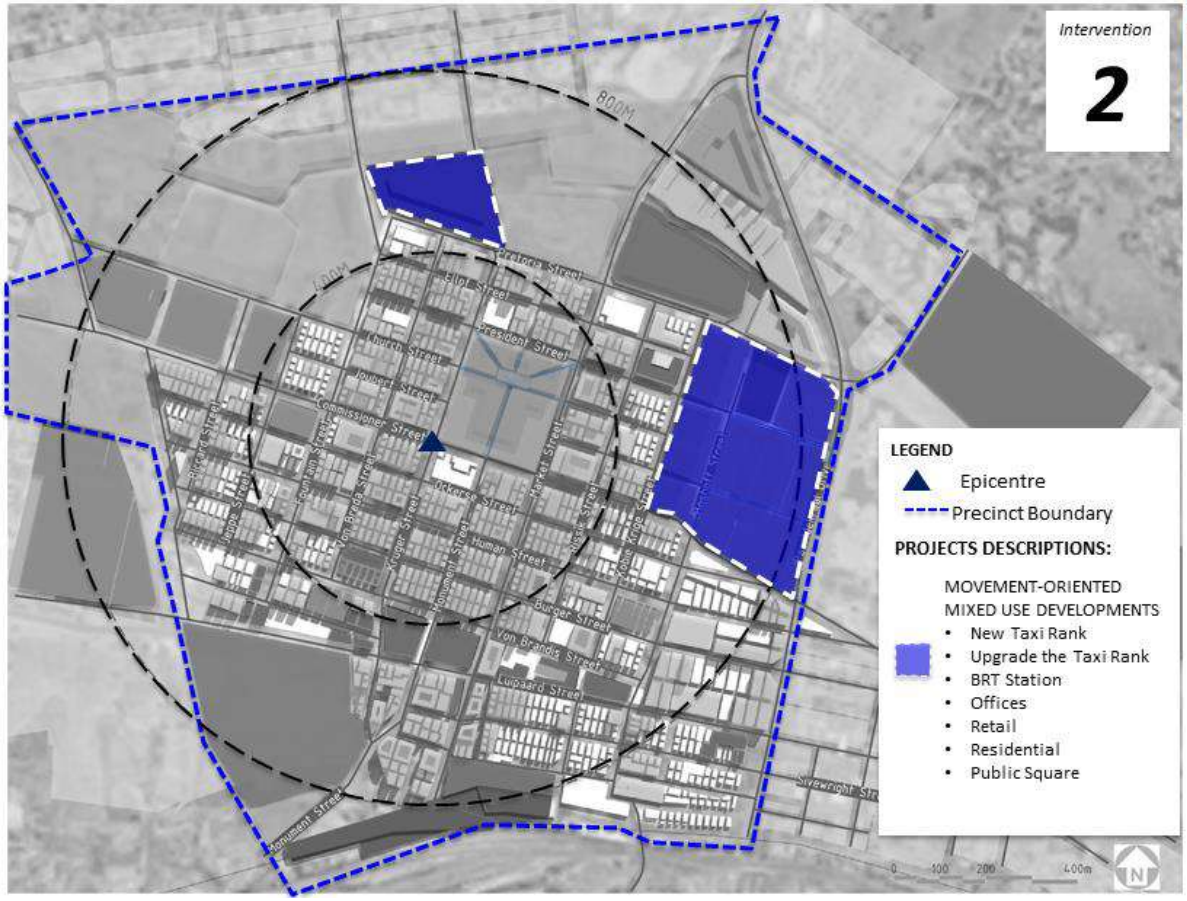


Intervention name	Municipal Precinct Upgrade
Intervention description	Redevelopment of the Civic Centre building and creation of an accessible public park for the Krugersdorp CBD.
Intervention Location	Sub-Precinct 1
No. of Sub-projects	2

Firstly, the redevelopment of the Civic Centre building and creation of a new and accessible public park for the Krugersdorp CBD will be a prominent initial step to change the face and function of the precinct.

Figure 41: Precinct Project Phasing - Intervention 1: Municipal Precinct Upgrade

Project Ref	Subprojects	Status	Project Stage	Estimated Costing	Responsibility	Funding source	Funding Model	Priority	Municipal role
1.1	Municipal Building Redevelopment	Existing	Refurbish/Upgrade	R 650 000 000,00	MCLM	MCLM / NDPG / GDID	PPP/Loan/Grant	Medium-term	Provision and maintenance
1.2	New Public Park	Existing	Refurbish/Upgrade	R 30 000 000,00	MCLM	MCLM / NDPG / GDID	PPP/Loan/Grant	Short-term	Provision and maintenance



Intervention name	Movement-Oriented Mixed Use Developments
Intervention description	Leverage the improvement of bus and taxi facilities in the CBD to intensify integrated developments at highly trafficked locations.
Intervention Location	Sub-Precinct 2
No. of Sub-projects	7

The second set of initiatives are aimed at leveraging the bus and taxi movement in and around the CBD. These include the redevelopment of the existing taxi rank in its current location and the development of a new multimodal bus and taxi facility close to the stadium.

This facility will reposition the use of that site whilst also introducing more intense mixed uses to complement the highly traversed and urban nature of the site. This will include the redevelopment of the stadium and the inclusion of a public square.

Figure 42: Precinct Project Phasing - Intervention 2: Movement-Oriented Mixed Use Developments

Project Ref	Subprojects	Project / Facility Status	Project Stage/Intervention Required	Estimated Costing	Responsibility	Funding source	Funding Model	Priority	Municipal role
2.1	New Taxi Rank	New	Concept	R 25 000 000,00	Relevant PPP arrangement(s)	MCLM / NDPG	NDPG Grant / Transport Grant / MCLM funds	Medium-term	Facilitation, coordination and enablement
2.2	Upgrade the Taxi Rank	Existing	Refurbish/Upgrade	R 30 000 000,00	MCLM	MCLM / NDPG	NDPG Grant / Transport Grant / MCLM funds	Short-term	Provision and maintenance

Project Ref	Subprojects	Project / Facility Status	Project Stage/Intervention Required	Estimated Costing	Responsibility	Funding source	Funding Model	Priority	Municipal role
2.3	BRT Station	New	Concept	R 130 000 000,00	MCLM / Relevant PPP arrangement(s)	MCLM / NDPG / GDRT / BRT Grant / Private Developers	NDPG Grant / Transport Grant / MCLM funds / Private funds	Medium-term	Facilitation, coordination and enablement
2.4	Offices	New	Concept	R 400 000 000,00	Relevant PPP arrangement(s)	Private Developers	Private funds	Medium-term	Facilitation, coordination and enablement
2.5	Retail	New	Concept	R 130 000 000,00	Relevant PPP arrangement(s)	Private Developers	Private funds	Medium-term	Facilitation, coordination and enablement
2.6	Residential	New	Concept	R 250 000 000,00	Relevant PPP arrangement(s)	Social Housing Agent / Private Developers	Social Housing Grant / Private Funds	Medium-term	Facilitation, coordination and enablement
2.7	Public Square	New	Concept	R 15 000 000,00	MCLM / Relevant PPP arrangement(s)	MCLM / NDPG	NDPG Grant / Transport Grant / MCLM funds	Medium-term	Provision and maintenance

Intervention name	New Industrial Development
Intervention description	Encourage new industrial development targeted at economic support and re-industrialisation on well-located property to the southwest of CBD.
Intervention Location	Sub-Precinct 3
No. of Sub-projects	1

Thirdly, the positioning of the vacant neglected and unmanaged property to the southwest of the CBD as a new industrial development in the main should be encouraged. This should be developed to take advantage of the economic development support and re-industrialisation efforts and funding available from other spheres of government whilst also encouraging affordable housing in this area.

This intervention ranks highly in the schedule due to the expected long lead time for the results of this intervention to be realised visibly in the CBD. The positive outcomes of this initiative are expected when most of the development facilitation, industrial activity and residential units are largely in place.

Figure 43: Precinct Project Phasing - Intervention 3: Industrial Development

Project Ref	Subprojects	Project / Facility Status	Project Stage/Intervention Required	Estimated Costing	Responsibility	Funding source	Funding Model	Priority	Municipal role
3.1	Maximizing underutilized inner city land	New	Concept	R 2 000 000,00	Private Developer(s)	MCLM with Land Owner / Private Developers	Public funding incentivising private development	Long-term	Facilitation, coordination and enablement

Intervention name	Upgrading Public Open Space
Intervention description	Develop and maintain a differentiated and complementary set of public open spaces around CBD.
Intervention Location	Sub-Precinct 1, 2, 3 and 5
No. of Sub-projects	5

The fourth intervention relates to public open spaces that are to be developed and maintained for different purposes. These purposes include the largely ceremonial civic centre and monument street (site currently used as parking) public spaces. The gateway and symbolic park and public outside the train station. The intensified recreational use of the current stadium site as well as the structuring and redevelopment of the western canal park strip as a managed public open space.

Figure 44: Precinct Project Phasing - Intervention 4: Upgrading Public Open Space

Project Ref	Subprojects	Project / Facility Status	Project Stage/Intervention Required	Estimated Costing	Responsibility	Funding source	Funding Model	Priority	Municipal role
4.1	New Civic Square	Existing	Refurbish/Upgrade	R 10 000 000,00	MCLM	MCLM / NDPG	NDPG Grant / MCLM funds	Short-term	Provision and maintenance

Project Ref	Subprojects	Project / Facility Status	Project Stage/Intervention Required	Estimated Costing	Responsibility	Funding source	Funding Model	Priority	Municipal role
4.2	Redeveloped Sports Ground	Existing	Refurbish/Upgrade	R 800 000 000,00	MCLM	MCLM / Gauteng Sport, Arts, Culture and Recreation / NDPG / GDRT / BRT Grant / Private Developers	Public funds / Relevant PPP arrangement(s)	Medium-term	Facilitation, coordination and enablement
4.3	Station forecourt/ Public Square	Existing	Refurbish/Upgrade	R 7 000 000,00	PRASA / Intersite	PRASA / Intersite	Public funds	Short-term	Facilitation, coordination and enablement
4.4	Museum Square	Existing	Refurbish/Upgrade	R 15 000 000,00	MCLM	MCLM / Gauteng Sport, Arts, Culture and Recreation	NDPG Grant / GSACR Grant / MCLM funds	Short-term	Provision and maintenance
4.5	Canal green space near Canal Housing	Existing	Refurbish/Upgrade	R 10 000 000,00	MCLM	MCLM / Gauteng Sport, Arts, Culture and Recreation	NDPG Grant / GSACR Grant / MCLM funds	Medium-term	Provision and maintenance

Intervention name	Streetscape Upgrades along key link routes
Intervention description	Installing and maintain pedestrian-friendly public walkways and higher quality public environment to complement other CBD interventions.
Intervention Location	All Sub-Precincts
No. of Sub-projects	8

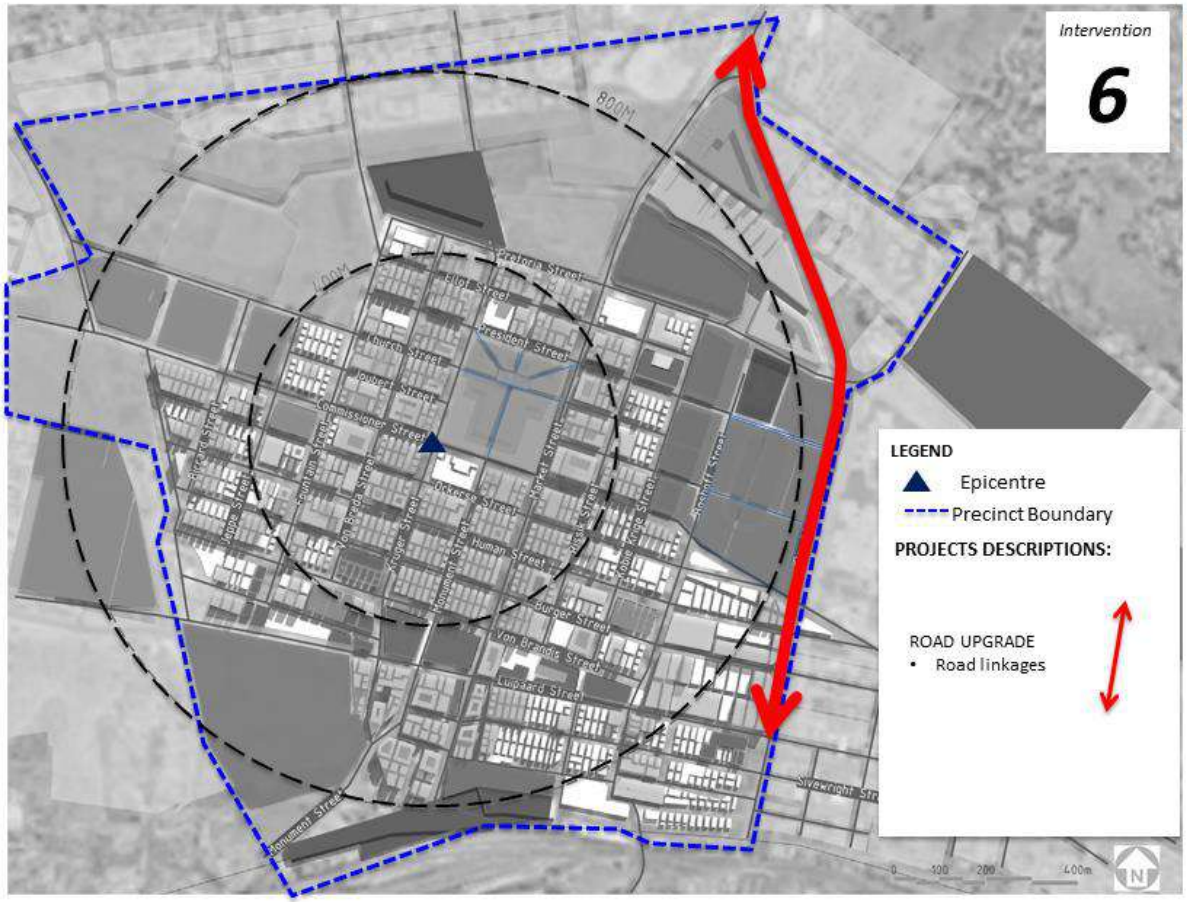
The fifth intervention acknowledges that prioritised public walkways require intervention to make them more pedestrian friendly with interventions that include additional trees, street furniture, informal trading stalls and bus and taxi lay-byes.

Among these interventions, one of the most important is the full pedestrianisation of Monument Street from the train station to the Civic Centre and the creation of pedestrian focused access route, promenade and mall.

Figure 45: Precinct Project Phasing - Intervention 5: Streetscape Upgrades along key link routes

Project Ref	Subprojects	Project / Facility Status	Project Stage/Intervention Required	Estimated Costing	Responsibility	Funding source	Funding Model	Priority	Municipal role
5.1	Pavement upgrades	Existing	Refurbish/Upgrade	R 20 000 000,00	MCLM	NDPG / MCLM	NDPG Grant / MCLM funds	Short-term	Provision and maintenance
5.2	Trading stalls	New	Concept	R 5 000 000,00	MCLM	NDPG / MCLM	NDPG Grant / MCLM funds	Medium-term	Provision and maintenance

Project Ref	Subprojects	Project / Facility Status	Project Stage/Intervention Required	Estimated Costing	Responsibility	Funding source	Funding Model	Priority	Municipal role
5.3	Tree planting	New	Concept	R 5 000 000,00	MCLM	NDPG / MCLM	NDPG Grant / MCLM funds	Short-term	Provision and maintenance
5.4	Traffic calming	New	Concept	R 5 000 000,00	MCLM	NDPG / MCLM / GDRT	NDPG Grant / MCLM funds	Short-term	Provision and maintenance
5.5	Street Furniture	New	Concept	R 8 000 000,00	MCLM	NDPG / MCLM	NDPG Grant / MCLM funds	Medium-term	Provision and maintenance
5.6	Taxi Drop off	New	Concept	R 8 000 000,00	MCLM	NDPG / MCLM / GDRT	NDPG Grant / MCLM funds	Medium-term	Provision and maintenance
5.7	Bus Stops	New	Concept	R 5 000 000,00	MCLM	NDPG / MCLM / GDRT	NDPG Grant / MCLM funds	Medium-term	Provision and maintenance
5.8	Pedestrianizing Monument Street from the train station to the Civic Centre	Existing	Refurbish/Upgrade	R 10 000 000,00	MCLM	NDPG / MCLM	NDPG Grant / MCLM funds	Short-term	Provision and maintenance



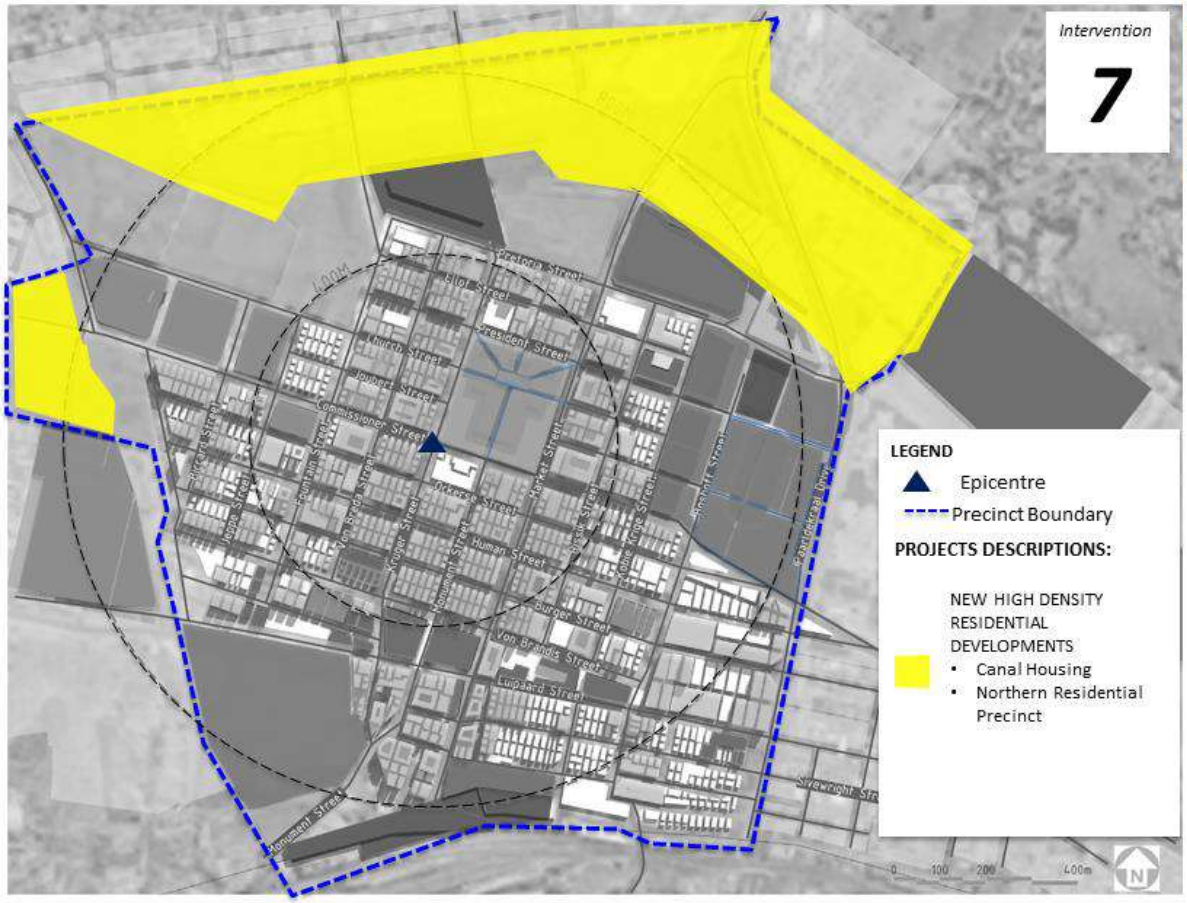
Intervention name	Road Upgrade
Intervention description	Upgrading of the R28 to accommodate dedicate bus/BRT and taxi access and egress to the new multimodal facility at this location.
Intervention Location	Sub-Precinct 4 and 5
No. of Sub-projects	1

The sixth intervention will likely take place as intervention two is being developed. This intervention talks to the upgrading of the R28 to accommodate dedicate bus/BRT and taxi access and egress to the new multimodal facility at this location.

This intervention also requires a long lead time, but should be carefully and separately considered as it is an important complement and enabler for especially public transport movement in the Krugersdorp CBD.

Figure 46: Precinct Project Phasing - Intervention 6: Road Upgrade

Project Ref	Subprojects	Project / Facility Status	Project Stage/Intervention Required	Estimated Costing	Responsibility	Funding source	Funding Model	Priority	Municipal role
6.1	Upgrade of R28 between Market and Coronation Streets	Existing	Refurbish/Upgrade	R 200 000 000,00	Gauteng Provincial Roads Department	Gauteng Provincial Roads Department	Public funds / Grant	Medium-term	Facilitation, coordination and enablement



Intervention name	New High Density Residential Developments
Intervention description	New high-density housing developments in existing neighbourhoods to the west and north of the CBD. This will take the form of infill and inclusive development and redevelopment.
Intervention Location	Sub-Precinct 4 (Northern Residential Project) and 3 (Canal Housing)
No. of Sub-projects	2

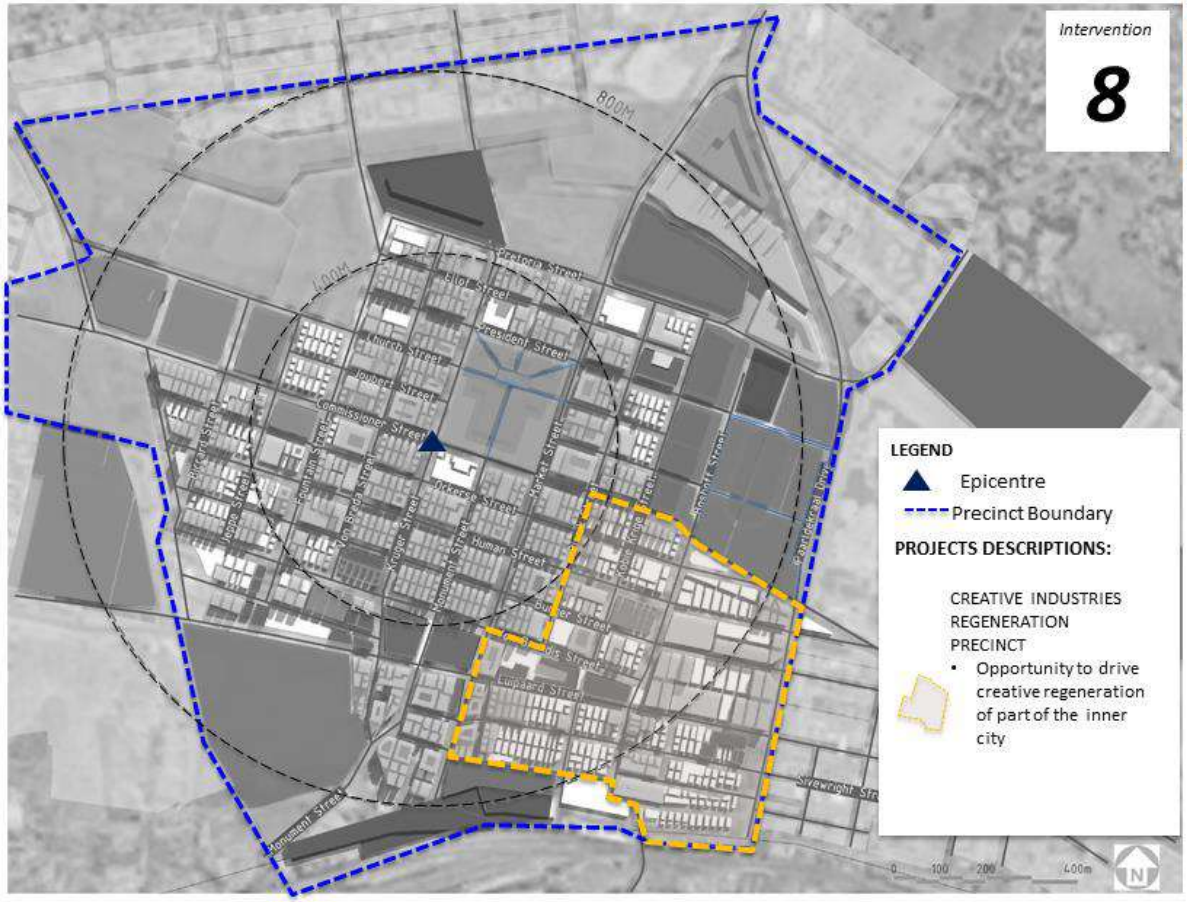
The new high-density housing developments in the west and north form the seventh intervention. This intervention is made complex by the fact that it is not only infill in nature but will require a delicate balancing of inclusive development, the redevelopment of existing neighbourhoods and residential uses as well as positioning new residents to take advantage of the amenity and public services at this location.

This intervention is a major transformation of the Krugersdorp CBD requiring coordination across the spheres of government, alongside private sector actors and in consultation with interested and affected communities.

Figure 47: Precinct Project Phasing - Intervention 7: New High Density Residential Developments

Project Ref	Subprojects	Project / Facility Status	Project Stage/Intervention Required	Estimated Costing	Responsibility	Funding source	Funding Model	Priority	Municipal role
7.1	Canal Housing Development	New	Detailed Design	R 500 000 000,00	MCLM	Social Housing Development Agency / GDHS	Grant / Loan	Short-term	Development owner

Project Ref	Subprojects	Project / Facility Status	Project Stage/Intervention Required	Estimated Costing	Responsibility	Funding source	Funding Model	Priority	Municipal role
7.2	Northern Residential Precinct	New	Concept	R 600 000 000,00	MCLM / Social Housing Agent / GDHS / Private Developers	Social Housing Development Agency / GDHS / Private Developers	Grant / Loan	Long-term	Development facilitation and promotion of increased housing opportunities through commensurate service provision



Intervention name	Creative Industries Regeneration Precinct
Intervention description	Public-private collaboration to achieve an attractive and vibrant regeneration of this part of the city around a student precinct.
Intervention Location	Sub-Precinct 5
No. of Sub-projects	3

The last intervention talks to the public-private collaboration required to achieve an attractive and vibrant regeneration of this part of the city. This intervention envisages a student precinct that can be enhanced by street art and furniture that can tie into this theme. The vision will have to be built and shared with key property owners in the area who could cooperate in leading a response in the management and built form of the area to complement this.

Figure 48: Precinct Project Phasing - Intervention 8: Creative Industries Regeneration Precinct

Project Ref	Subprojects	Project / Facility Status	Project Stage/Intervention Required	Estimated Costing	Responsibility	Funding source	Funding Model	Priority	Municipal role
8.1	Pavement Upgrades	Existing	Refurbish/Upgrade	R 15 000 000,00	MCLM	MCLM / NDPG	Grant / Own funds	Short-term	Provision and maintenance
8.2	Greening	New	Concept	R 5 000 000,00	MCLM	MCLM / NDPG	Grant / Own funds	Short-term	Provision and maintenance

8.3	Public Art and Creative Street Furniture	New	Concept	R 50 000 000,00	PPP / CID / MCLM	MCLM / Private Property owners / New Developers	PPP / CID / City-led public space improvement and management	Medium-term	Facilitation, coordination and enablement

Each intervention listed above will consider the following:

- **Pavements:**

Pavement in the CBD are at least 2m wide which enables easy pedestrian movement and flow throughout the precinct. A standard paving palette should be introduced and installed consistently across the CBD.

- **Ground Floor Interfaces (detailed, transparent and interactive):**

Ground floor interfaces should be sufficiently detailed and appropriately scaled to encourage people to pause (space to stand and/or seat), linger and engage with what is on display (i.e. statues, street art). In addition, they will also be sufficiently transparent (open space with little/if any obstructions) to allow easy surveillance (lowing criminal activity as criminals will be easily exposed) of the streets and public spaces within Prioritised Pedestrian Network. Lastly, they should be interactive whereby their design can inspire pedestrians to pause for a moment and to engage each other and/or participate in on-street activities.

- **Common Language of Design:**

Public spaces should have a common language design i.e. seating areas, green space patches throughout the precinct.

- **Lighting:**

Spaces and streets within Pedestrian Prioritised Network should have sufficient lighting with a view to ensuring easy movement at night especially within each sub-precinct. The lighting should enable people to survey the area at all times so as to lower criminal activity whereby pedestrians cannot be easily mugged due to having a good view of their surroundings.

- **Architecture and climatic conditions:**

The architecture should respond appropriately to the climatic conditions in Krugersdorp CBD. For instance, there are shade areas created by refuge areas during sunny days i.e. under trees and shelter along the pedestrian movement network. Similarly, during rainy days, there is shelter along the pedestrian movement network i.e. in taxi ranks, bus stop hubs and train stations to shelter people as they wait for slow moving traffic.

- **Overlooking features:**

The levels above ground along key public routes should have overlooking features encouraging occupants to have their eyes on the street.

- **Dominant wind protection:**

The public spaces and routes should be oriented optimally in that, as far as possible, they should be sufficiently enclosed to protect from dominant winds.

- **Refuge from the sun and rain:**

There are opportunities for commuters to seek some refuge from rain and the sun when moving between the main PT (public transport) interchanges, stops and stations i.e. built shelter and trees for shade. This will be particularly important for the pedestrianised Monument Street and those routes leading to the existing and new bus and taxi ranks.

- **Special events accommodation:**

There are spaces within the Krugersdorp CBD that can accommodate special events, i.e. having a multipurpose function. These spaces should not only be encouraged and managed, but busking and other activities in these location should also be programmed so as to introduce on-street interest and vibrancy that does not detrimentally affect pedestrian and traffic flows.

- **Pedestrian movement priority:**

The pedestrian movement planning should include identification of roads that handle large volumes of parallel and perpendicular pedestrian movement designed to prioritise pedestrians.

- **Landscaping material maintenance:**

Landscaping material should be robust enough that they will require minimal and simple maintenance thus at a low cost to maintain.

- **Street elements' replicability:**

Street elements i.e. seating, refuse bins, and lighting should be simple and functional, and the cost of their manufacture and replicability will be inexpensive.

- **Tree planting:**

Tree planting will create shade in well-utilised public spaces and cast shadows across warmer building interfaces. It should also be utilised in public parking areas to lessen the visual impact (i.e. the clutter effect). It should also be utilised in hard surfaced areas to reduce heat build-up thus creating a net cooling effect because trees can aid in the moderation of the Krugersdorp CBD local climate.

- **Public bins location:**

Public bins should be placed in the mostly in pedestrian moving and "pause" areas in order to keep litter to a minimal. The bins will be closer to roads so that the trash collectors can swiftly and efficiently collect the rubbish with minimal effort.

- **Plant materials maintenance (water-wise):**

The plants should be low maintenance (i.e. no need to shape or trim); water-wise as they are not greatly water dependent and the planting should be grouped to enable easy irrigation systems and arrangements. Furthermore, the irrigation systems should be designed in such a way as to reduce excessive water evaporation i.e. minimal watering of plants.

- **Street furniture:**

Street furniture should be placed in such a manner as to not restrict critical pedestrian flows i.e. there will be seats placed in a straight line or other suitable arrangement through a certain portion of the pedestrian pavements and "pause" areas with mini-passages after a couple seats in order for pedestrians to move freely to the front, forwards and backwards of the direction they are travelling.

- **People engagement:**

The seating and lighting in pedestrian movement and "pause" areas should be optimally positioned to allow increased levels of engagement between people (e.g. round or square tables, seats that can accommodate from two to more people).

3.4 Implementation Framework

Mogale City has initiated an approach to implementing the conceived projects and programme for the inner city. This approach defines five pillars of inner city transformation to be achieved through City initiatives and partnerships in the inner city. They are:

- **A well-governed inner city;**
- **A clean and safe inner city ;**
- **A sustainable inner city;**
- **A productive inner city, and**
- **An inclusive inner city.**

The implementation approach will use the precincts identified as a framework for intervening and measuring progress. Within the MCLM-led interventions for the inner city are the development of a City Improvement District (CID) Policy and By-law alongside assessing the viability of establishing an Urban Development Zone (UDZ) within the Krugersdorp CBD.

3.5 Sub-Precinct Plans (Urban Design Framework) Evaluation Checklist

Table 22. Sub-precinct plans evaluation checklist (as per the Urban Design Toolkit)

SUB-PRECINCT PLANS	YES	PG
1. Are the pavements generous enough to accommodate the required pedestrian flows? (Pedestrian routes should have a clear width of a minimum of 2 meters)	Yes	
2. Are the ground floor interfaces sufficiently detailed and appropriately scaled to encourage people to pause, linger and engage with what is on display?	Yes	
3. Is there a common language of the design within the main public spaces that comprise the Public Space Network?	Yes	
4. Is there sufficient lighting within the Sub-Precinct and, in particular, the spaces and streets within the Prioritised Pedestrian Network?	Yes	
5. Are the ground floor interfaces going to sufficiently transparent and interactive to allow surveillance of the streets and public spaces within the Prioritised Pedestrian Network?	Yes	
6. Does the architecture respond appropriately to the climatic conditions?	Yes	
7. Do the levels above ground along the key public routes have overlooking features encouraging occupants to have their eyes on the street?	Yes	
8. Where pedestrians are channeled through subways, are they generous, well lit and activated with commercial activities as well as universally accessible?	Yes	
9. Where pedestrians are channeled over the rail line via bridges, are they generous, well lit and activated with commercial activities as well as universally accessible?	Yes	
10. Are the critical access routes to and between the various modes of transport universally accessible?	Yes	
11. Are the public spaces and routes oriented optimally as far as possible and sufficiently enclosed to protect from dominant winds?	Yes	
12. Are there opportunities for commuters to seek some level of refuge from rain and sun when moving between the main PT interchanges and stops, stations?	Yes	
13. Are there spaces within the Public Space Network that can accommodate special events that do not detrimentally affect pedestrian and traffic flows?	Yes	
14. Are the roads that handle large volumes of parallel and perpendicular pedestrian movement designed to prioritise pedestrians?	Yes	
15. Are the proposed landscaping materials robust enough that they require only limited and simple maintenance?	Yes	
16. Are street elements such as seating, refuse bins, lighting etc. designed for easy replicability?	Yes	

17. Does tree planting create shade in well-utilised public spaces and cast shadows across warmer building interfaces?	Yes	
18. Is tree planting utilised in public parking areas to lessen the visual impact?	Yes	
19. Is tree planting utilised in large hard surfaces areas to reduce heat build-up?	Yes	
20. Are public bins located to allow for easy collections and recycling strategies to be implemented?	Yes	
21. Are plant materials low maintenance and water-wise?	Yes	
22. Is planting grouped to facilitate easy irrigation arrangements?	Yes	
23. Are irrigation systems designed to reduce excessive water evaporation?	Yes	
24. Is street furniture placed so as not to restrict critical pedestrian flows?	Yes	
25. Is seating and lighting positioned optimally to allow increased levels of engagement between people?	Yes	

4. References

4 References

No.	Document Name	Document Format	Author
1.	Final Annual Review of the 5 year IDP, 15/16 IDP	PDF	
2.	Magaliesburg Draft Precinct Plan 2011	PDF	
3.	Mogale City Local Municipality Housing Sector Plan	PDF	
4.	Mogale City Local Municipality Spatial Development Framework 2011	PDF	The Development Partnership
5.	Mogale City Local Municipality LED Strategy	MS PowerPoint	Urban Econ
6.	Mogale City – Leratong Urban Hub	MS PowerPoint	

5. Appendices

5 Appendices

5.1 Appendix 1: Neighbourhood Hub Development Scoring Matrix – Kagiso vs Leratong

Neighbourhood Hub Development Scoring Matrix Evaluation of Merits of Proposed Kagiso and Leratong Hubs					
		Kagiso Hub		**Leratong Hub**	
Measure	**Indicators**	**Pros**	**Cons**	**Pros**	**Cons**
A. Existing Attributes					
Function of Roads	Evaluate the purpose of roads traversing the hub	Intersection of Kagiso Drive and Randfontein Rd (Proposed Heart) are collector/arterial roads. R41 is a regional abutts southern edge of proposed hub.		R41/R558 (Proposed Heart) are provincial mobility routes	
		Proposed development/heart are visible from R41: Visual relationship with destination that does not detract passerby's.	Heart of hub is almost 800m from R41.	Roads are carriers of significant through-traffic for all modes; significant vehicular traffic numbers	Vehicular traffic dissects the proposed node.
					Leratong is not a destination during peak hours
	SCORE:	**+2**	**-1**	**+1**	**-2**
Presence Pedestrian Movement	Presence of varied pedestrian movement that encourages on-street activity and requiring streetscape development to support	Pedestrian movement is observed in Kagiso Hub – Pedestrian movement comprises though-traffic, movement to and from residential homes and anticipated movement from offices to mall; social and religious centre are also generators of pedestrian movement		Pedestrian movement is observed in Leratong Hub – movement from taxi/bus drop-offs to access Leratong Village/Kagiso	
		Diversity of pedestrian movement lends itself to a mixed use development hub.		Pedestrian movement is closely related to transport/transit function of the node	Leratong hub is not a destination in itself, unless you are going to the hospital
		The core of the urban hub has little room to accommodate large vehicular movement.			

Neighbourhood Hub Development Scoring Matrix Evaluation of Merits of Proposed Kagiso and Leratong Hubs					
		Kagiso Hub		Leratong Hub	
Measure	Indicators	Pros	Cons	Pros	Cons
	SCORE:	+2	0	+1	-1

Neighbourhood Hub Development Scoring Matrix Evaluation of Merits of Proposed Kagiso and Leratong Hubs					
		Kagiso Hub		Leratong Hub	
Measure	**Indicators**	**Pros**	**Cons**	**Pros**	**Cons**
Land availability	Observed sqm available for development	Land is available to the East of proposed hub; towards the South West of the hub; and along the R41.		Vast tracts of land are available at the intersection of R41/R558.	
		Available land is located in difference parts of node = wide scope for placemaking and creating unique places across hub.	Fewer vacant land portions requiring more intense use of land.	All available land is vacant/undeveloped and not serviced = ideal for greenfields development.	All land parcels are divided by major mobility routes.
					Fewer existing/established residential and/or neighbourhood uses =
	SCORE:	**+1**	**-1**	**+1**	**-2**
Land Uses Within Proposed Nodes	Observed land uses	Existing Kagiso Retail Mall; Existing Institutional development (Magistrates Court, Community Hall & Provincial Service Point; Library); 18x Churches; 2x Clinics/Medical Centres; Informal Taxi rank; 12x tuck shops; 2x Restaurant/Pubs; 2x filling station; 7x Schools; Large residential component		4x schools; 1x hospital; 1x informal taxi rank; 1 filling station	
		Land uses are mixed and diverse.		Scope to develop anew.	Land uses are separated in space.
		Evidence of established public and private sector investment in close proximity.			
	SCORE:	**+2**	**0**	**+1**	**-1**
Land Legal Considerations	Legal and land use rights considerations that may impact time required to achieve development.	Available land is within approved township and is vacant/undeveloped. Most land is serviced.		Available land is not in approved townships, is largely unserviced and is traversed by rail, electricity and roads servitudes.	
		Proposed developments may require subdivisions and consolidations of	Wetlands that are currently being used for informal urban		Wetlands are present in close proximity to proposed hub and may

Neighbourhood Hub Development Scoring Matrix Evaluation of Merits of Proposed Kagiso and Leratong Hubs					
		Kagiso Hub		Leratong Hub	
Measure	**Indicators**	**Pros**	**Cons**	**Pros**	**Cons**
		properties and minor road realignment.	agriculture may require specific environment management measures and water use licences.		require specific environment management measures.
		No new investments in bulk services, perhaps upgrades that may be required.	Basic Assessment Studies likely to be required in most instances.		Full EIAs likely to be required in most instances.
	SCORE:	**+2**	**-2**	**0**	**-2**
Linkages to Other Nodes	Specifically linkages to CoJ, Ekurhuleni, CoT Township Regional Hubs	Node is located off of R41 approximately 5km west of Leratong Hospital		Node proposed is on intersection of R41/R558	
			Weak linkage to regional nodes due to its location within a neighbourhood in Kagiso township.	Strong linkages to regional nodes due to its location at edge of municipal boundary; and at intersection of major provincial routes.	
	SCORE:	**0**	**-1**	**+1**	**0**
Development dependencies	Dependencies that must be accommodated in the development facilitation process. Effectively, increasing time required to achieve NDPG impact and reducing certainty of achieving planned impact/goals.	Several public and private sector parties share an investment vision that has been implemented in part – i.e. on allocated dedicated sites where said parties have committed long term investments. Small private sector players are responding to this opportunity, especially on Kagiso Drive, through residential conversions and a range of township businesses growing around this location. The node remains incomplete and incoherent with key neighbourhood elements missing, i.e. accommodation of bus/taxi ranking; unstructured pavements; no clear neighbourhood square; poorly managed environment between buildings.		Development actors in this location are few, namely Gauteng Dept of Health, private mall developer and City of Johannesburg Housing. Further along R41 Calgro M3 is developing Witpoortjie – middle/lower middle income bonded housing development. The municipality – through NT NDPG – has to lead conceptualisation of future vision on relatively greenfield site, where: • **GDoH has maintenance vision for facility;** • **Mall developer has land availability agreement likely to expire soon;**	

Neighbourhood Hub Development Scoring Matrix Evaluation of Merits of Proposed Kagiso and Leratong Hubs					
		Kagiso Hub		Leratong Hub	
Measure	**Indicators**	**Pros**	**Cons**	**Pros**	**Cons**
				• **25% of intersection is controlled by another municipality; and** • **25% of intersection is sterilised by electricity and provincial road servitudes.**	
		Major investments have and are currently being made into development of public buildings on site.	Most developments are established and fully planned. Scope for development is strictly integration of hub environment.	Opportunity to start a new inclusive and neighbourhood-focused development vision on relatively greenfields site.	No evidence of a community node or anchor developments for an NDPG node in this location.
		A working node with an evening/morning cycle, growing daytime office/commercial/retail component, and a vibrant weekend communal pull is evident at this location. People come here for different reasons during most times of the week.	Dept of Water Affairs will need to be involved to obtain water use licenses to formalise the urban agriculture taking place along the wetland/water courseway along the south of the propose hub.	Private mall developer has commenced earthworks and has approved plans for development in this node. This is an opportunity to establish an achor on the site in the next 2-3 years. Uncertainty over land availability agreement is also an opportunity to enter into new terms with developer and/or drive for a new more NDPG responsive vision on the site.	Provincial Dept of Roads and Transport have registered servitudes over part of site. Priority of this intersection needs to be determined and will be guided by provincial road-building agenda. Need to establish their willingness to accommodate neighbourhood development vision at this location.
		Anchor development and activities are present.		Leratong is an anchor for development in the node.	PRASA has a rail servitude traversing site for a proposed east-west link within their 30-year planning horizon. Rail development is driven by national rail development priorities

Neighbourhood Hub Development Scoring Matrix Evaluation of Merits of Proposed Kagiso and Leratong Hubs					
		Kagiso Hub		Leratong Hub	
Measure	**Indicators**	**Pros**	**Cons**	**Pros**	**Cons**
					that may or may not be responsive to the neighbourhood and/or TOD requirements and timelines in this node.
Development dependencies	Dependencies that must be accommodated in the development facilitation process. Effectively, increasing time required to achieve NDPG impact and reducing certainty of achieving planned impact/goals.				Gauteng Dept of Health has own vision for Leratong Hospital in their service centre hierarchy. NDPG will require to align with their vision and applicable legislation and regulations in developing their neighbourhood vision and restructuring the land parcels and uses on their site.
					Provincial Dept of Roads and Transport have recently upgraded this intersection and are currently completing a paving project. There is less likelihood to negotiate roads upgrades given the recent upgrades implemented.
					Dept of Water Affairs will need to be involved for comment and/or approval for the wetland in the east of the propsed hub site.
					Eskom is the custodian for the servitude for the

Neighbourhood Hub Development Scoring Matrix Evaluation of Merits of Proposed Kagiso and Leratong Hubs					
		Kagiso Hub		Leratong Hub	
Measure	**Indicators**	**Pros**	**Cons**	**Pros**	**Cons**
					power lines running east of R558. These have also been recently been upgraded to concrete pylons that are an alternative for undergroung powerline. Therefore, these are likely a fix to be accommodated in the NDPG vision for the site.
	SCORE:	**+3**	**-2**	**+3**	**-7**
B. Impact / Consequences of Proposed Development					
Development Impact	Assuming the development vision is implemented as proposed, what development impact can be expected in this part of Mogale City and the Gauteng City Region?	The development vision for Kagiso Hub is one focused on integration and consolidating current investments.		The development at Leratong Hub is one focused on new investment to take advantage of long-term opportunities proposed.	
		The development with complete the development vision for Kagiso and consolidate the public and private investments already in this area. This would assist to enhance the budding and vibrant township economy that is beginning to emerge.	This development will likely have a limited impact on the functioning of the broader Gauteng City Region. This would likely be a short- to medium-term precursor for a broader development vision in this area that includes the R41/R558 intersection.	The development will likely introduce a new destination and new node in this location. It will drive the densification of especially residential uses in Mogale City and will establish another centre in the West of the Gauteng City Region.	This development will likely compete with, compromise and even cannabilise some of the investment currentlylocated in Kagiso Mall due to its close proximity (less than 5km). Introducing this new focus would likely contribute to the lack of coherence in government's investment programme and send mixed signals to the market.

Neighbourhood Hub Development Scoring Matrix Evaluation of Merits of Proposed Kagiso and Leratong Hubs					
		Kagiso Hub		Leratong Hub	
Measure	**Indicators**	**Pros**	**Cons**	**Pros**	**Cons**
	SCORE:	**+1**	**-1**	**+1**	**-1**
Functioning of the overall node	Assuming the development vision is implemented as proposed, how will this contribute to the internal functioning of the node?	The development vision for Kagiso Hub looks to knit the key elements present in the local node to enhance their function and viability through public space investments.		The development at Leratong Hub is looking to link in space communities that may not necessarily relate to each other due to the roads dissecting the node. The vision also looks to lead by preparing the environment for new anchors to locate here, such as the mall.	
		Introduction of urban elements to Kagiso Hub as a transport hub and walkability.		The development will look to establishing uses that possibly relate to each other at this prominent intersection.	
		Proposal for a single on-grade pedestrian bridge that improve connectivity of 'Rietvallei' south of R41.			Proposal for three above ground bridges that connect disparate communities. Above ground pedestrian bridges decrease pedestrian safety, especially when located on main roads that are not part of surveyed established neighbourhoods.
	SCORE:	**+2**	**0**	**+1**	**-1**
C. UNS Performance Evaluation - ASSESSING PRECINCT PROFILE, CONTEXT AND READINESS FOR PRECINCT MANAGEMENT		**Kagiso Hub**		**Leratong Hub**	
Status of the property market	Easiest to implement where strong private property base gives an economic incentive for committed action.	Well established private property base evident.			Weak private property base.
Nature of property ownership	Easiest to implement where large private property owners	Mixed land ownership with prominent new retail,			Single large institutional owner (GDoH) alongside

Neighbourhood Hub Development Scoring Matrix Evaluation of Merits of Proposed Kagiso and Leratong Hubs					
		Kagiso Hub		Leratong Hub	
Measure	**Indicators**	**Pros**	**Cons**	**Pros**	**Cons**
	have an economic interest and additional capacity to become involved in PM. Dominant public sector institutions can also provide strong leadership. More difficult to implement with a diversity of small interests.	commercial and community ownership. Residential owners responding to new investments through complementary investments.			too many small single property owning landowners (Leratong Village). Mall developer not certain on land ownership.
Nature of customers/users	Applicable to all types, but must be responsive to their needs. Must be aware of the unmet demands on the node, and not have unrealistic expectations of future.	Demand in the node comprises of mixed users, i.e. commuters, office tenants, community interest groups, religious groups and for destination shoppers. Secondary users are budding auxiliary econmy players, tuck shops, home enterprises and informal traders.			Demand in the node comprises mainly of commuters and passerby's. Destination users are coming to the hospital. Anticipated mall development has no demonstrated uses.
Land-uses present	Diverse, mixed use areas	Mixed and diverse, possibly missing light industrial uses.			Two land uses: institutional (Hospital) and residential (Leratong Village)
Municipal plans for the area	Higher order nodes: in particular CBDs and urban hubs	Appears in Municipal Plans.		Appears in Municipal Plans.	Mall development is likely not highest and best use of that portion of site. Best use conceptualisation also constrained by land legal concerns on north east portion of the site
Role of the municipality	Will vary according to the context: may be a founding member in some cases, or it may be restricted to	Municipality is not dominant land-owner, but is main development facilitator for public space upgrades and controls			Municipality is not a land owner at this location. One of several landowners with a sub-ordinate agenda to

Neighbourhood Hub Development Scoring Matrix Evaluation of Merits of Proposed Kagiso and Leratong Hubs					
		Kagiso Hub		Leratong Hub	
Measure	**Indicators**	**Pros**	**Cons**	**Pros**	**Cons**
	coordination and general service provision	approvals on all remaining vacant land portion.			national and provincial interests and decisions.
Role of the public sector	One of many stakeholders	One of several landowners.			Dominant land-owner.
State of municipal service provision	An insufficient level of service is a key driver for establishing a PM entity	High quality given scale and newness of developments in Hub.			Poor. Largely unserviced land. Leratong Village falls within CoJ.
Core need	Supplementary service provision, Community organization and lobbying/engagement with municipality.	Public space upgrades. “Crime and grime” issues, to marketing and branding.			Basic service provision, initial development visioning and facilitation. Establishment of basic economic infrastructure.
Focus of precinct management		Inclusive operational management possible given range and commitment of existing stakeholders			Precinct establishment

Summary Scoring of the Matrix

	Kagiso Hub		Leratong Hub	
	Pros	**Cons**	**Pros**	**Cons**
A. Existing Attributes				
Function of Roads	+2	-1	+1	-2
Presence Pedestrian Movement	+2	0	+1	-1
Land availability	+1	-1	+1	-2
Land Uses Within Proposed Nodes	+2	0	+1	-1
Land Legal Considerations	+2	-2	0	-2
Linkages to Other Nodes	0	-1	+1	0
Development dependencies	+3	-2	+3	-7
B. Impact / Consequences of Proposed Development				
Development Impact	+1	-1	+1	-1
Functioning of the overall node	+2	0	+1	-1
Total:	+15	-8	+10	-17
Overall Score:	+7		-7	
C. UNS Performance Evaluation	**Kagiso Hub**		**Leratong Hub**	
Status of the property market	Favourable		Not Favourable	
Nature of property ownership	Favourable		Not Favourable	
Nature of customers/users	Favourable		Not Favourable	
Land-uses present	Favourable		Not Favourable	
Municipal plans for the area	Favourable		Not Favourable	
Role of the municipality	Favourable		Unclear	
Role of the public sector	Favourable		Not Favourable	
State of municipal service provision	Favourable		Not Favourable	
Core need	Favourable		Not Favourable	
Focus of precinct management	Favourable		Not Favourable	
Result:	**Kagiso Urban Hub is preferred.**			

5.2 Appendix 2: Leratong Neighbourhood Hub Concept Presented

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SECTION 1: INTRODUCTION

1.1. STUDY BRIEF

The Mogale City Local Municipality appointed Urban Dynamics Gauteng to prepare a Precinct Plan for Hekpoort within the context of the Municipal and District SDFs. The primary purpose of the Precinct Plan was to provide a tool to manage spatial development within the Hekpoort Study Area and ensure coordinated and integrated land use development within the Study Area. The broad objectives of the project were as follows:

- To provide a strategic development vision for the study area
- To identify specific interventions to realise the development vision
- To draft a comprehensive spatial development framework for the study area
- To address specific developmental issues and challenges within the study area
- To provide a more details development proposal for inclusion in the Municipal and District SDFs
- To provide a basis for guiding the land-use management decision making process
- To ensure environmentally sustainable development
- To promote eco-tourism and economic development within the Study Area
- To address the need for rural housing and to cater for existing and displaced rural communities
- To guide the development of municipal infrastructure development within the Study Area
- To ensure viable commercial agriculture and general food security within Gauteng
- To address all matters that affects the development potential of the study area

To address the objectives above, the Hekpoort Precinct Plan places emphasis on a number of planning aspects, such as land use development, environmental sustainability, geotechnical suitability, rural housing development, economic viability, public land utilization, social facilities provision and the integration of transport. The way these sectors are addressed is set out in the project methodology below.

1.2. PROJECT APPROACH

1.2.1. METHODOLOGY

The methodology for the preparation of the Hekpoort Precinct Plan was conducted in 5 distinct phases, as set out in detail below. This methodology was based on the interpretation of the Terms of Reference and aimed to holistically address all the project requirements set out in the Terms of Reference.

Phase 0: Project Inception

This phase involved preparing the base information for the compilation of the Hekpoort Precinct Plan. Primarily, this involved creating GIS base maps, delineating Study Area boundaries and requesting Census 2001 data from Statistics South Africa. It also involved acquiring data relevant to the Study Area form various sources, such as the Department of Transport, Gauteng Department of Agriculture and Rural Development (GDARD) and the Satellite Application Centre (SAC). All documents relevant to the Study Area were obtained, such as the relevant Municipal and District Spatial Development Frameworks.

Phase 1: Status Quo Analysis

Phase 1 involved the analysis of the information obtained for the Study Area. The Status Quo Analysis aimed to present all the opportunities and constraints affecting the Study Area and it provided a sound base upon which to motivate the development proposals for the Study Area. The Status Quo Analysis comprised of the following components:

a. Socio-economic analysis

This component involved an analysis of the socio-economic profile of the Study Area population. This profile specifically toke into account socio-economic attributes of households that live within the Study Area, such as household income and age distribution.

b. Spatial characteristics

This involved an analysis of the spatial characteristics of the Study Area. The spatial characteristics included aspects such as the existing land uses within the Study Area, rural housing within the Study Area and social amenities currently available within the Study Area.

c. Infrastructure network

This component involved an analysis of the existing and planned transportation network within the Study Area. It included identifying the existing public transportation network for all modes of public transportation (bus, taxi and commuter rail). The existing municipal services (water, sanitation and electricity) infrastructure network serving the Study Area was also determined and information was obtained with regard to the current capacity of this infrastructure network.

d. Environmental issues

This component involved determining environmental issues affecting the Study Area. In particular, environmental sensitive area, high-potential agricultural soils and geo-technically unsuitable areas were identified. The impact of these on land use development was illustrated.

Phase 2: Development Potential Analysis

The purpose of this phase was to determine the development potential of the Study Area and the necessary public facilities needed to support this development potential. With this in mind, Phase 2 consisted of the following components:

a. Economic development potential

The purpose of this component was to determine the economic development potential of the Study Area. This component of the project analysed the various economic sectors of the Study Area, including the agricultural, tourism and housing sectors and determined the development potential in each of these sectors. This provided a clear indication of the development envisaged within the Study Area. In turn, this enabled the planning of the road and municipal services infrastructure that will be needed to support development within the Study Area.

b. Supporting facilities estimate

In addition to the above, this component calculated the community facilities that will be needed to support the existing and envisaged residential population residing within the Study Area. Community facilities include, for example, schools, clinics and police stations.

Phase 3: Spatial Development Concept

The vision phase involved defining objectives for the development of the Study Area, based on the status quo analysis and the analysis of the development potential of the Study Area. These objectives focused on issues such as economic sector development, rural housing development, environmental conservation and Infrastructure development. Based on these objectives, a Development Concept was drafted for the Study Area. This Development Concept, for example, illustrated proposed areas for development, areas for the location of rural housing and environmentally sensitive areas that need to be conserved.

Phase 4: Development Framework Proposals

The fourth phase involved preparing development proposals for the Study Area. The development proposals were based on the information gathered and conclusion made in previous phases. Proposals were made with regard to the following:

a. Spatial Development

Proposals were made with regard to land use development to ensure the orderly development of future land uses within the Study Area. It included proposals with regard to the expansion of rural settlements, the development of activity nodes, and promoting selected economic sectors within the Study Area. Proposals were also made with regard to the development of municipal-owned land, where applicable.

b. Infrastructure Development

The proposals included guidelines for the development of transportation infrastructure, the promotion of public transport and the integration of land use and transportation. The proposals also guided the development of

municipal infrastructure, based on existing infrastructure development initiatives of the Municipality and based on the development potential envisaged within the Study Area.

c. Socio-Economic Development

The proposals incorporated criteria for the provision of community facilities in an equitable manner. This includes, for example, the provision of education facilities, health facilities and recreation facilities. It calculated the need for community facilities based on the existing and envisaged residential population that will reside within the Study Area.

d. Housing Development and Land Reform

This component addresses the need for rural housing development and land reform within the Study Area. The need for rural housing within the Study Area was based on the population growth estimates and the calculations with regard to existing backlogs in rural housing development.

e. Open space conservation

Guidelines for the conservation of natural open space and the creation of an open space lattice were proposed. These proposals were based on environmental documents, such as C-Plan2 prepared by GDARD.

Phase 5: Implementation Framework

A comprehensive implementation framework was prepared for the implementation of the proposals of the Hekpoort Precinct Plan. This implementation framework contained the following components:

a. Development programme

The Hekpoort Precinct Plan phased development projects in the Study Area over a number of years. This development programme aimed to guide township establishment and the approval of land use rights within the Study Area. In addition, this programme enables the planning of the roads and bulk municipal services infrastructure that needs to coincide with the development of each phase. This phasing programme also enables the planning of rural housing development and the provision of the necessary community facilities.

b. Capital Investment Programme

A Capital Implementation Programme (CIP) was prepared; based on the development programme set out above. It is a year-based capital investment programme per proposal identified in terms of the development framework. The CIP focuses on the public sector investment needed to unlock the development potential of the Study Area.

2.2.2. GIS DATABASE COLLATION

The spatial and infrastructure planning information of the Study Area was drawn into a GIS database. The electronic mapping and other information was made available to the Municipality for inclusion in their GIS database and is compatible with the Municipality's Geographical Information System. Care was taken to ensure the information presented is as true as possible, legible and user-friendly.

2.2.3. STAKEHOLDER PARTICIPATION PROCESS

It was considered essential to obtain buy-in into the Hekpoort Precinct Plan. To achieve this, Urban Dynamics Gauteng consulted with relevant stakeholders. Consultation was conducted on the following three levels:

a. Project Manager

Bi-weekly meetings were held with the municipal project manager and the core municipal planning team responsible for the management of the Hekpoort Precinct Plan. This enabled the municipal project manager to keep up to date with the progress of the project.

b. Technical Steering Committee

Two meetings were held with the Technical Steering Committee, which included relevant municipal technical representatives from all the relevant municipal departments of the Municipality. Technical meetings were convened and chaired by the Municipality.

c. Community Stakeholders

Urban Dynamics Gauteng consulted with key local stakeholders in the Study Area. To ensure relevant and needs-accurate inputs were obtained, the consultation process targeted specific stakeholders that have a good understanding of the Hekpoort Study Area, but also have the necessary experience of and exposure to town planning and town planning principles. Typically, this included ward representatives, environmental action groups, property owners, town planning consultants, developers, and resident's associations.

A number of project presentations were presented to the Technical Steering Committee and to local stakeholders. The comments and issues raised at these meetings were drawn into the Hekpoort Precinct Plan proposals where applicable and where in line with sound planning principles.

SECTION 2: STATUS QUO

2.1. CONTEXTUAL SETTING

The Hekpoort Precinct Plan Study Area (either referred to as the Hekpoort Study Area or simply the Study Area) is located within the northern region of the Mogale City Local Municipality. As depicted on Figure 1, the Study Area is situated northwest of the Krugersdorp CBD, southeast of Rustenburg and northeast of the Hartebeespoort Dam. The Krugersdorp CBD provides largest cluster of social amenities and shopping opportunities in the vicinity of Hekpoort. Smaller nodes include Magaliesberg, situated directly west of the Study Area, and Hekpoort itself, situated within the centre of the Study Area. The Study Area has access to the N14 freeway linking Mogale City to Tshwane. The Study Area also has access to the R24, linking Mogale City to Rustenburg. Also significant is the fact that the Study Area is located between two mountain ranges: the Magaliesberg, which is located on the northern boundary of the Study Area, and the Witwatersberg, which traverses the southern parts of the Hekpoort Study Area.

Figure 2 depicts an aerial photograph of the Hekpoort Study Area. It is evident from this photograph that the Study Area is rural in nature, comprising farmland linked to the Magaliesrivier traversing the northern half of the Study Area. The Magaliesberg, which is located on the northern boundary of the Study Area, and the Witwatersberg, which traverses the southern half of the Study Area, is clearly distinguishable on the aerial photograph.

2.2. SPATIAL DEVELOPMENT FRAMEWORKS

Two existing Spatial Development Frameworks (SDFs) and two Development Strategies apply to the Hekpoort Study Area. The SDFs include the West Rand District SDF and the Mogale City SDF. These SDFs are recognized as the primary tools for structuring land use development within Mogale City and are, as such, considered the basic points of departure when developing the Hekpoort Study Area. The two strategy documents are the West Rand District Municipality Tourism Development Strategy and the West Rand Rural Housing Strategy. These two strategy document cover the key economic industries applicable to the Hekpoort Study Area.

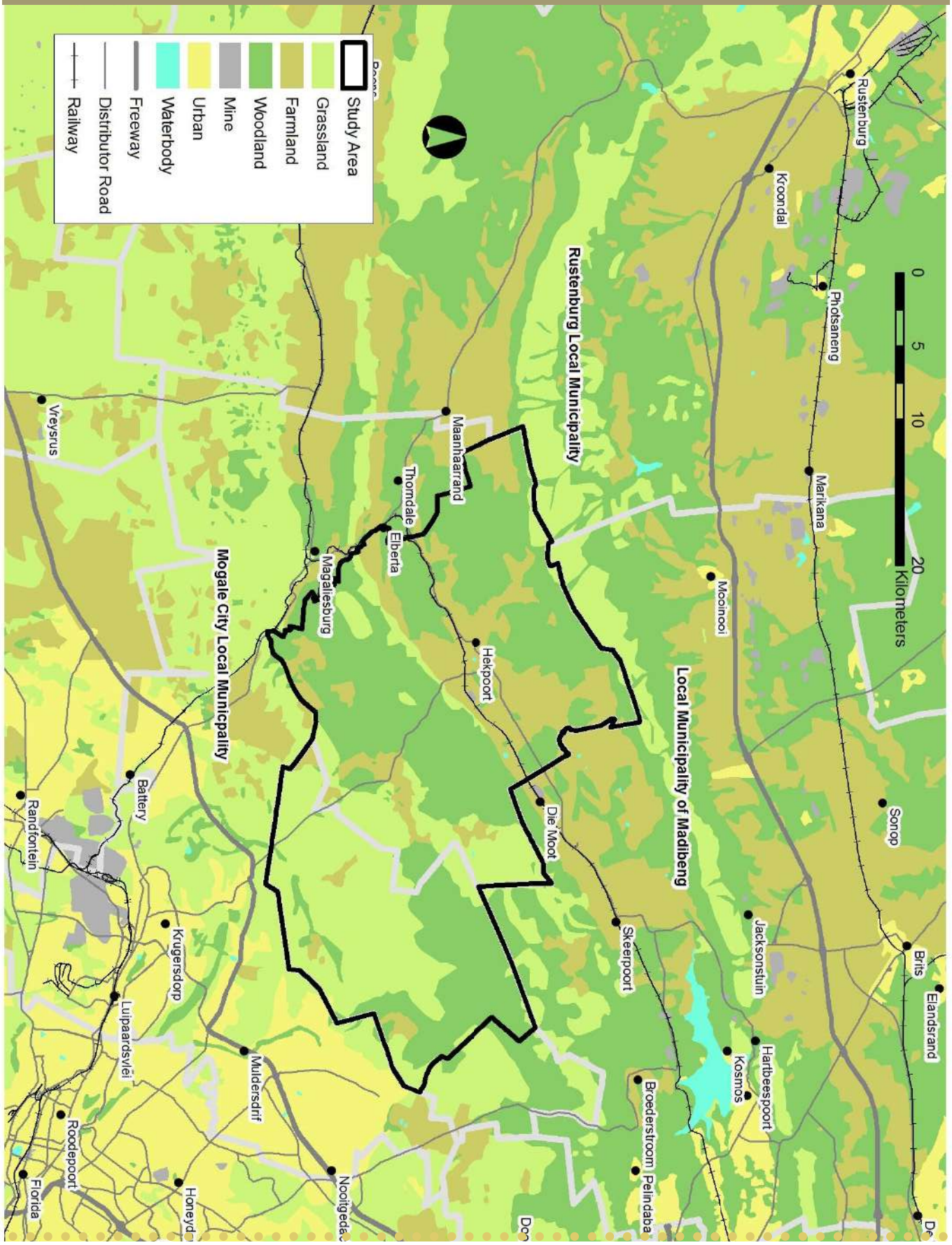


FIGURE 1
STUDY AREA LOCALITY

Mogale City

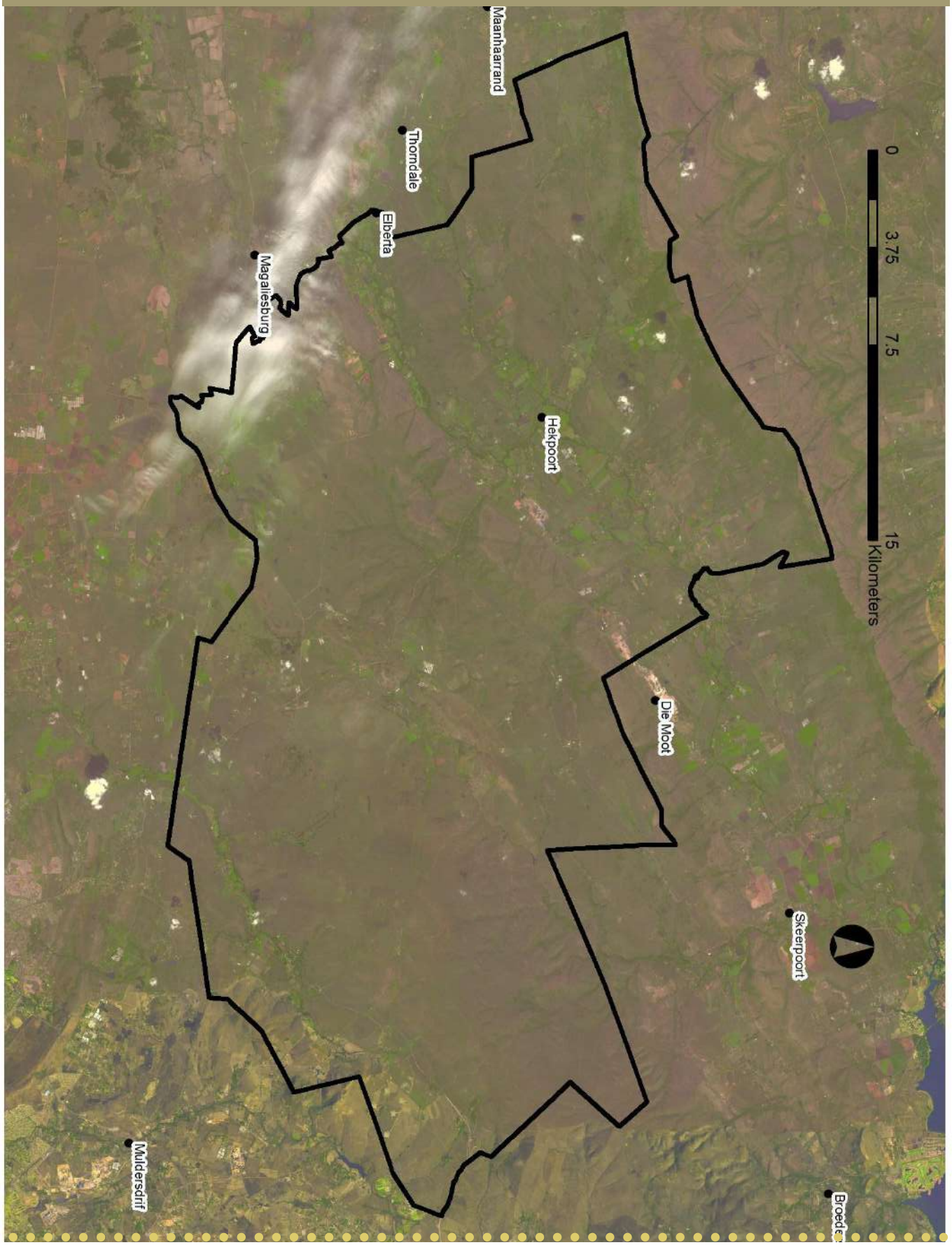


FIGURE 2
AERIAL PHOTOGRAPH

FIGURE 2
AERIAL PHOTOGRAPH

Mogale City

2.2.1. WEST RAND DISTRICT MUNICIPALITY SDF (2008)

The West Rand District Municipality (WRDM) SDF was compiled by Akanya Development Solutions and deals with spatial development on a District level. As such, the WRDM SDF makes proposals with regard to the transportation network, activity nodes and strategic development areas. The proposals of the WRDM SDF that directly or indirectly affect the Hekpoort Study Area are as follows:

a. Agriculture

According to the WRDM SDF, agriculture is an important economic sector within the WRDM, which is predominantly located on the western and northern side of the District. The dominant agricultural activities are maize farming and cattle grazing. The WRDM SDF points to the need for the protection and sustainable development of proven and latent potential in the agriculture sector in the western and northern areas of the District.

b. Tourism

According to the WRDM SDF, a large proportion of the existing tourism product supply is concentrated in the northern and eastern parts of the WRDM. Specifically, tourism product supply is concentrated around the towns of Krugersdorp, Muldersdrift and Magaliesberg. Two successful tourism routes, the Crocodile Ramble and the Magalies Meander, provide linkages and direct tourism flows between the tourism clusters surrounding these towns. Furthermore, the Cradle of Humankind World Heritage Site is creating greater opportunities for tourism in the northern region of the WRDM.

c. Natural open space

According to the WRDM SDF, the most important areas for biodiversity conservation and protection of cultural heritage are located in the northern areas of the WRDM. These include the Cradle of Humankind World Heritage Site and Magaliesberg protected nature environment. The Magaliesberg mountain range located in the northern areas of the district is identified as ecologically and culturally significant in the northern parts of the WRDM. Even though large parts of this mountain range are privately owned, large parts of this mountain range is protected as conservation areas in which species diversity is protected.

The WRDM SDF refers to the Management Framework and Management Plan for the Cradle of Humankind World Heritage Site (2008). This plan was in the process of completion during the compilation of the WRDM SDF. The WRDM SDF proposed that the Management Plan development controls should be complied with once completed. These development control measures will have a significant impact on certain types of rural developments in the vicinity of the Cradle of Humankind.

d. Rural Settlement

According to the WRDM SDF, the patterns of settlement in rural areas lack agri-ecological and socioeconomic logic. Rural settlements that do exist are often located far from job opportunities or social services. It is often also entirely unrelated to major commercial and public transport routes. The spatial location of rural settlements needs to be addressed.

e. Activity Nodes

The WRDM SDF proposes an intensification of activities and social services at specific locations that will serve a specific area in terms of appropriate thresholds for the activities or services provided. The WRDM proposes a hierarchy of node, ranging from rural to urban-suited nodes. According to the WRDM SDF, the nodes must not be seen in isolation, but all attempts must be made to ensure that the combined resources of the District and the Local Municipality, as well as the private sector, are focused to stimulate the development and growth of these nodal areas.

In terms of the WRDM SDF, both Magaliesburg and Hekpoort are designated Rural Service Centers. The proposed function of a Rural Service Center is to:

- Serve specific sub-municipal regions and specifically rural communities
- Encourage the development of a mix of uses in these nodes
- Promote a range of public facilities that could serve a wider population
- Enable improved public transport services and transport infrastructure
- Contain the sprawl of peripheral settlements
- Utilize the opportunity of tourism development

The WRDM SDF also considers Magaliesburg and Hekpoort to be Tourism Nodes. According to the WRDM SDF, the proposed function of a Tourism Node is to:

- Serves specific local communities and tourists
- To focus on restaurants and curio/ gift shops
- Enable further tourism development
- Present a clear tourism node profile
- Enable sustainable environmental management
- Present clearly demarcated nodal boundaries

f. Roads

The WRDM SDF identifies 2 road typologies that are relevant to the Hekpoort region: Provincial Rural Road and District/ Rural Distributor Roads

Provincial Rural Road include, for example, the R 563 and the northern parts of the R24, which is located in a rural area. According to the WRDM SDF, the purpose of this road typology is to:

- Facilitate regional mobility
- Enable regional route continuity
- Cater as public transport routes

The WRDM SDF characterizes District or Rural Distributor Road by moderate-high traffic volumes, limited access into farm portions, and moderate speeds and mobility. These are roads to be identified in the Local Municipality SDFs. According to the WRDM SDF, the purpose of this road typology is to:

- Link primary roads with rural settlements
- Links rural areas with employment areas

g. Public Transport Corridors

The WRDM SDF identified seven Public Transport Corridors that can facilitate the movement of commuters and increase the accessibility within the West Rand District Municipality, but also to the larger region of the Municipality. According to the WRDM SDF, the R24 corridor is a public transport corridor stretching from Magaliesburg via Krugersdorp towards Johannesburg. The corridor also functions as an important regional linkage and an access route between Johannesburg and Rustenburg.

2.2.2. MOGALE CITY SDF (2009)

Whereas the West Rand District Municipality SDF provides broad guidelines for the development of the district municipal area, the proposals of the Mogale City SDF aims to provide more detailed proposals for land use development within the Mogale City municipal area. These include proposals include the following, which are relevant to the Hekpoort area:

a. Objectives

Specific development objectives were formulated by the Mogale City SDF which are, amongst others:

- The promotion and facilitation of economic development
- The sustainable management of the natural environmental assets and heritage
- The promotion of tourism development
- The promotion of sustainable rural development
- The development of sustainable human settlements
- Service delivery and providing sufficient services capacity
- The sustainable management of the Cradle of Humankind World Heritage Site
- Identify tourism development opportunities in close proximity to the Cradle of Humankind

b. Agriculture

The Mogale City SDF considers high potential agricultural areas as an important structuring element in the long term growth of the municipality. This is based on the need for intensive agricultural production areas in close proximity to the city on account of cost advantages due to proximity to the city market. According to the Mogale City SDF, these areas should be reserved as prime agricultural land in Mogale City and be protected from any development or land uses that may have a negative impact on the agricultural potential of these areas. According to the Mogale City SDF, activities that may typically be permitted in the high potential agricultural area are agriculture, agri-industry and agri-processing, agri-village and agri-tourism.

c. Tourism

According to the Mogale City SDF, the natural environment forms the basis of tourism in Mogale City and it is therefore imperative that the natural environment is conserved to ensure the long-term sustainability of the tourism industry in Mogale City. Eco-tourism is seen as the next logical step in utilising protected areas and conservancies. A notable example is the Magalies Mountain Bike Trail.

The Cradle of Humankind is considered to be the most important tourism development projects in the Hekpoort region. The Mogale City SDF proposes defining and strengthening tourism clusters related to the Cradle of Humankind and improving accessibility to tourism areas and facilities within the Cradle of Humankind.

The Mogale City SDF considers Hekpoort a tourism focus area. Typical tourism facilities and services which may be permitted in this tourism focus areas include guest houses and lodges, cultural villages, environmental education centres, restaurants, tea gardens, wellness centres and spas, and infrastructure that serves these tourism facilities.

A number of rural tourism routes have been identified in the Mogale City SDF, which should be the focus for tourism related developments. These include the R563, the R24 (north of Tarlton up to the R560) with Magaliesburg as tourism node, and the R560, with the Hekpoort town as tourism node. The intersections of these routes are considered to be the main gateways into the tourism areas and, as such, should be afforded specific attention in terms of environmental quality and the quality of any development.

d. Rural settlement

According to the Mogale City SDF, the municipal area comprises three rural towns, namely Tarlton, Magaliesburg and Hekpoort, of which Magaliesburg is most developed. The main purpose of these rural towns is to act as central places in the rural environment where basic day-to-day services are delivered to the rural communities. The Mogale City SDF states that the Hekpoort, Magaliesburg and Tarlton areas experience very little development pressure as such. However, one of the aspects that do place pressure on these areas is the existence of informal settlements near these towns. This requires the formalisation of these informal settlements.

Interestingly, the Mogale City SDF states that no housing development should take place in the Hekpoort area. Informal settlements should be relocated to housing developments in Magaliesburg. The only developments that should be

promoted in and around Hekpoort is tourism related facilities. Despite this proposal, a rural settlement housing initiatives is already underway in the Hekpoort Study Areas, which in turn requires the development of supporting social facilities.

e. Roads

The Mogale City SDF that key road linkages between Krugersdorp and the western parts of Mogale City (Tarlton, Magaliesburg and Hekpoort) are the N14, R24, R562 and the R560. Accessibility shaped by the availability of routes but more importantly by the geographical constraints in terms of the mountains and ridges running through the area. The Strategic Public Transport Network (SPTN) affecting the Hekpoort Study Area runs along the N14 and the R24.

2.2.3. WEST RAND DISTRICT MUNICIPALITY TOURISM DEVELOPMENT STRATEGY (2005)

The West Rand District Municipality Tourism Development Strategy provides guidelines for the development of tourism in the West Rand District municipal area. The primary aim of the guidelines is to implements the long-term vision of the municipality to develop the West Rand as a premier tourist destination. To achieve this, the Tourism Development Strategy considers it important that the West Rand focuses on achieving key objectives in a competitive and unique way. These objectives are as follows:

- Be visitor focused
- Match tourism products to markets
- Strengthen and expand the tourism product portfolio
- Define and strengthen tourism clusters
- Develop and position the area as a unique destination
- Customise experiences through packaging
- Marketing to chosen and specific market segments
- Make it easy to access tourist areas
- Facilitate public sector investment in infrastructure

2.2.4. WEST RAND RURAL HOUSING STRATEGY (2008)

The West Rand Rural Housing Strategy provides guidelines for housing development in the rural areas of the West Rand District Municipality. It does this through identifying potential areas for the settlement of informal rural households. The Rural Housing Strategy makes certain strategic planning proposals pertaining to development in rural areas, which are focused on the following:

- Agricultural development
- Rural service delivery, e.g. community facilities, recreational facilities, transport facilities and informal markets
- Provision of engineering infrastructure and municipal services

The Rural Housing Strategy proposes that no new, separate settlement be established within the rural environment of Mogale City, with the exception of Hekpoort. Is also proposes that Mogale City focuses on the development of sustainable rural settlements, as opposed the establishment of smaller fragmented settlement areas. The strategy also proposes the existing settlements within rural settlement be enlarged at identified development nodal areas and in line with the identified development principles of the Strategy. According to the Rural Housing Strategy, the enlargement of existing settlements will promote sustainability, increase investor confidence and maximize existing resources.

The Rural Housing Strategy states that it must not be accepted that all informal rural dwellers want to reside within the rural areas. Upon the planning of new affordable housing developments in urban areas, an allocation should be provided to accommodate these rural dwellers.

2.3. SOCIO-ECONOMIC

2.3.1. SOCIO-DEMOGRAPHIC PROFILE

The purpose of this section is to provide an analysis of the Hekpoort Study Area in terms of its socio-demographic development, particularly with regard to population and education.

2.3.1.1. POPULATION AND HOUSEHOLDS

The Hekpoort Study Area population was calculated using Census 2001 figures based on Census 2001 sub-place areas (see Figure 3). As depicted by the Table below, the Hekpoort Study Area population was estimated to be approximately 21000 people by the year 2001. It was estimated that this population had increased to approximately 26000 people by the year 2010. The number of households that lived in Hekpoort Study Area by 2001 was estimated to be approximately 6400. This figure was estimated to have increased to an estimated 8500 by the year 2010.

TABLE 1: HEKPOORT PRECINCT PLAN STUDY AREA POPULATION 2010

	Census Population (2001)	Population Estimate (2005)	Population Estimate (2010)
Total Population	**20744**	**23257**	**25930**
Formal population	16891	20158	23243
Informal population	3853	3099	2688
% growth		2.9	2.2
Households	***6363***	***7625***	***8502***
Formal households	5181	6609	7621
Informal households (backyard)	273	306	341
Informal households (settlement)	909	710	540
Average household size	3.26	3.05	3.05

Source: Estimated from Census 2001

It was estimated that the Hekpoort Study Area currently has approximately 540 informal households living in informal settlement and approximately 340 informal households living within backyard shacks. The 2010 informal household figure living on informal settlement is a figure determined by PMM in a door-to-door survey conducted in 2010. The survey method used makes this figure a highly accurate figure.

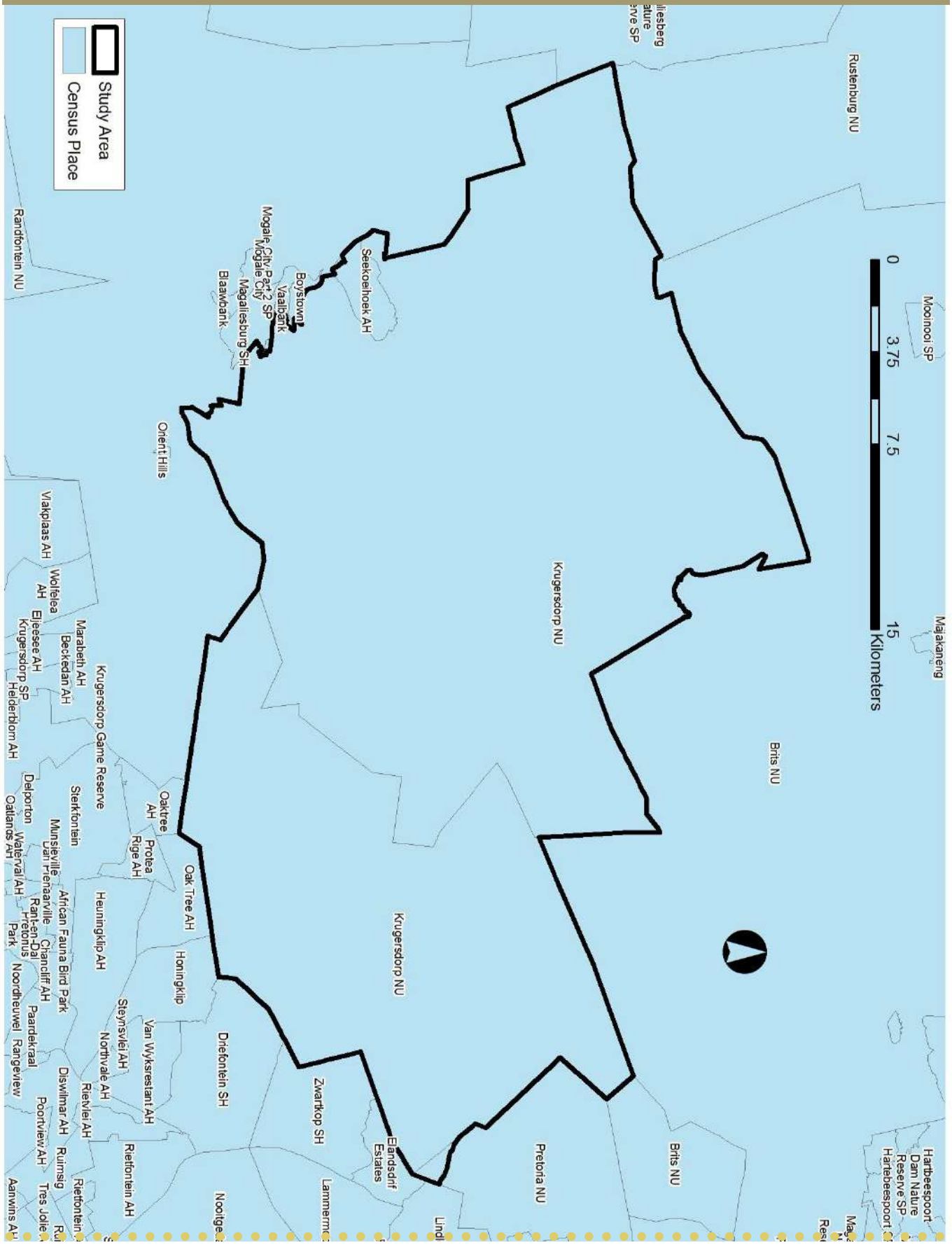


FIGURE 3
CENSUS 2010 SUB-PLACES

2.3.1.2. AGE PROFILE

The Diagram below reflects the age distribution within the Study Area. From this Diagram it can be concluded that the Study Area has a predominantly young to middle-age population with most of the residents being between the ages of 20 and 39 years. The relatively lower numbers of children (ages 0 and 19 years) suggest that household sizes are becoming smaller.

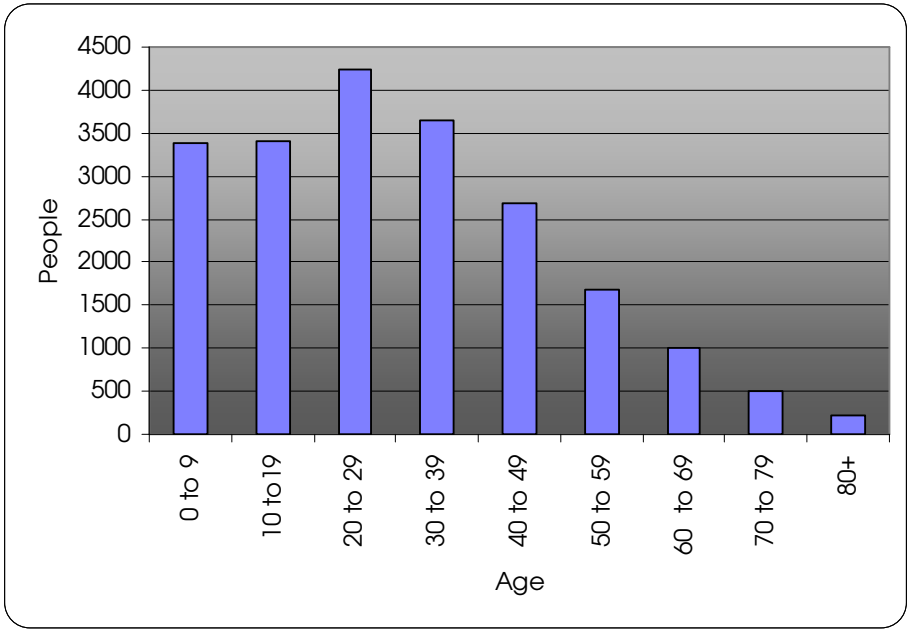


DIAGRAM 1: AGE PROFILE
Source: Census 2001

2.3.1.3. EDUCATION LEVEL

The Diagram below illustrates the education levels within Hekpoort Study Area. This Diagram shows that 41% of the Hekpoort Study Area population has a primary school education and 34% of the residents living within the Hekpoort Study Area have completed secondary school education. In total, 20% of the population has no education, which constitutes a significant section of the population that is uneducated. Only 5% of the population has a post-scholastic educational qualification. Higher education levels are usually associated with higher income levels and certain employment categories, such as professional and managerial positions.

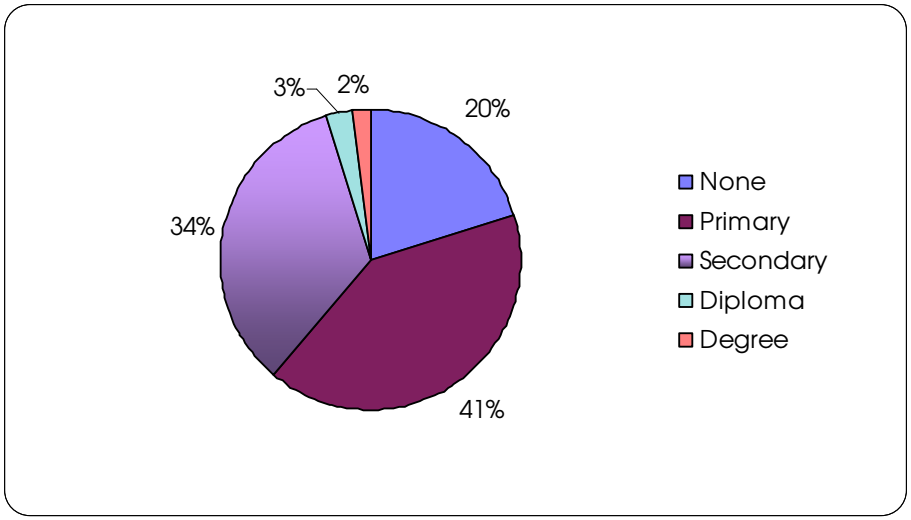


DIAGRAM 2: EDUCATION LEVEL
Source: Census 2001

2.3.1.4. MIGRATION RATE

The Diagram below illustrates the number of people who lived in Hekpoort Study Area for more than 5 years, versus the number of people who lived in Hekpoort Study Area for less than 5 years. It is evident from this Diagram that the Hekpoort Study Area is a dynamic community, with almost 20% of its residents not having lived within the Study Area for more than 5 years.

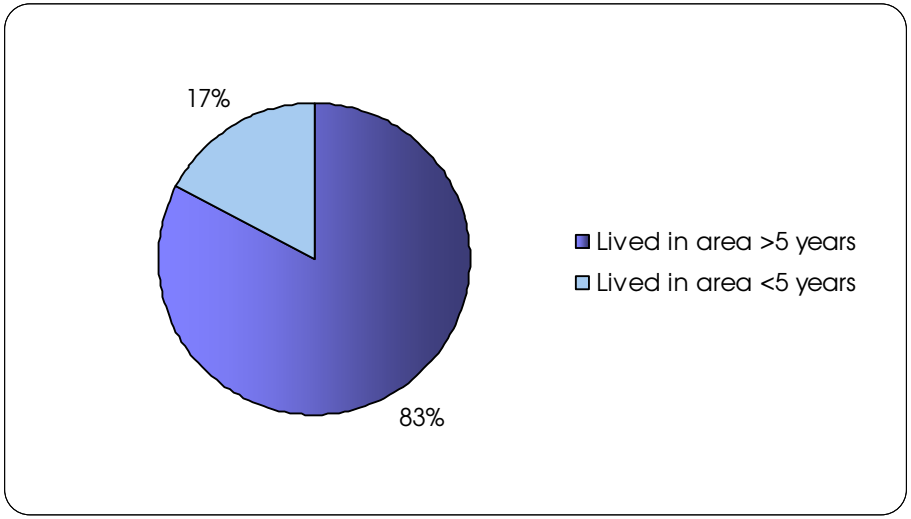


DIAGRAM 3: MIGRATION RATE
Source: Census 2001

2.3.1.5. CITIZENSHIP

The Diagram below illustrates that most (97%) of the residents of the study area are South African citizens. A small number (2%) of Study Area residents are from SACD countries. In terms of housing provision, this implies that a small measure of rental housing

will have to be provided to house the non-South African citizens within the Hekpoort Study Area, because non-South African citizens do not qualify for a government housing subsidy.

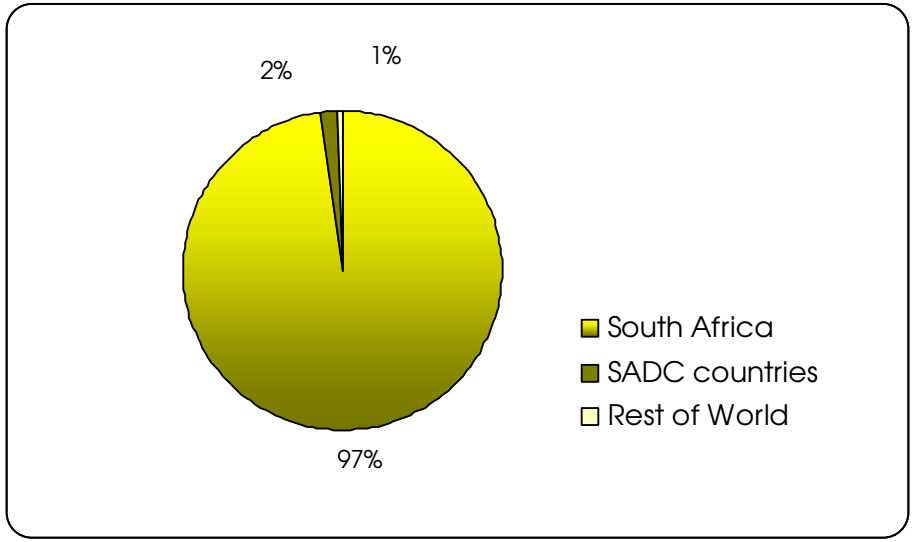


DIAGRAM 4: CITIZENSHIP
Source: Census 2001

2.3.2. ECONOMIC OVERVIEW

The purpose of this section is to perform an analysis of Hekpoort Study Area in terms of its economic development, particularly with regard to employment, income and expenditure patterns.

2.3.2.1. LEVEL OF EMPLOYMENT

The unemployment rate can be expressed as the number of economically active people who are willing and able to work but do not have jobs. Unemployment is one of the major contributors to poverty as unemployed people are not able to provide for their household's basic needs due to the lack of disposable income. The Diagram above indicates relatively low unemployment levels within Hekpoort Study Area, with more than 80% of the economically active population employed.

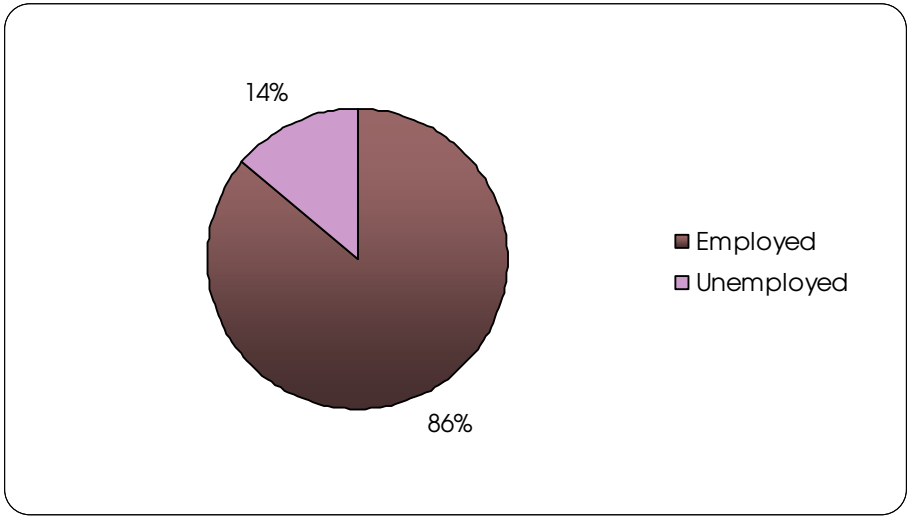


DIAGRAM 5: LEVEL OF EMPLOYMENT
Source: Census, 2001

2.3.2.2. SECTOR EMPLOYMENT

The Diagram below shows major employment sectors that employ residents living within the Hekpoort Study Area. As can be expected, the key employment sector is the agricultural sector. Other employment sectors employing Hekpoort Study Area residents are the community sector, the retail sector and the manufacturing sector.

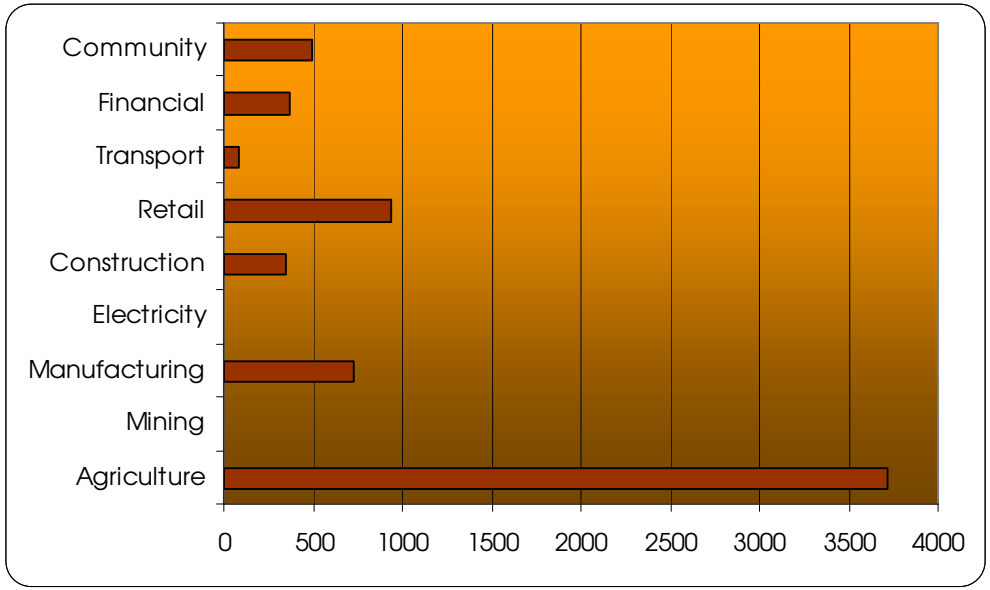


DIAGRAM 6: EMPLOYMENT BY SECTOR, 2001
Source: Census, 2001

2.3.2.3. OCCUPATION

The Diagram below depicts the occupations held by economically active persons within Hekpoort Study Area. As can be expected, most of the Hekpoort Study Area population is employed as farm labourers or agricultural workers. A smaller number of persons within the Hekpoort Study Area are tradesman and machine operators. Occupation relates directly to other economic factors, such levels of education, employment levels and income.

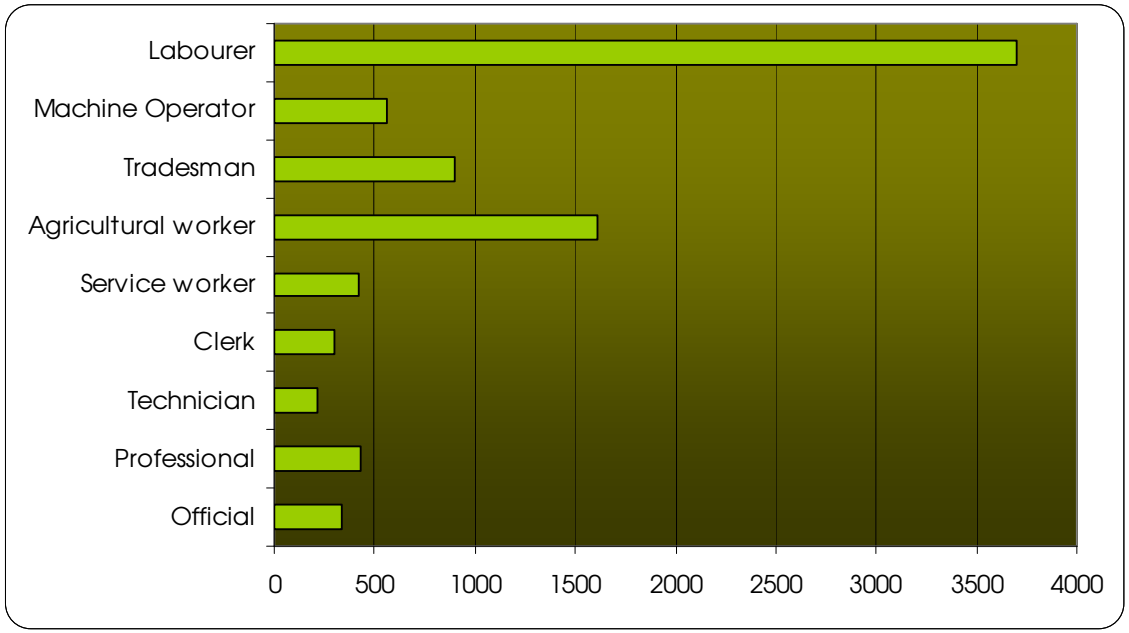


DIAGRAM 7: OCCUPATION
Source: Census 2001

2.3.2.4. ANNUAL HOUSEHOLD INCOME

Household income levels are most generally used as an indicator of the general economic well being of a community. The Diagram below gives an estimate of the annual household incomes within the Hekpoort Study Area, which have been corrected to reflect 2011 values, using a 5% annual growth in income. It is clear from the Diagram below that the average annual income of income-earning households within Hekpoort Study Area is relatively low, with most households earning an income of between R8000 and R30000 per year. A relatively small number of households within Hekpoort Study Area earned no income at all in 2001.

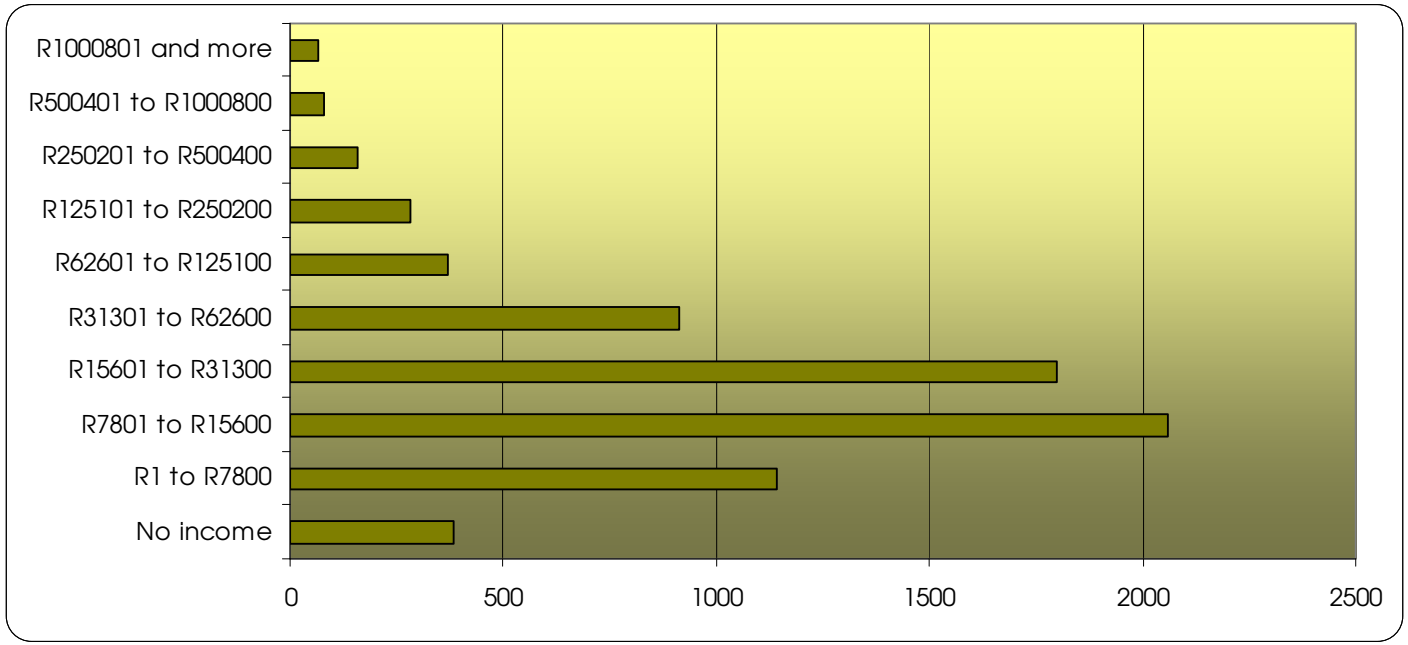


DIAGRAM 8: ANNUAL HOUSEHOLD INCOME
Source: Census 2001

2.3.2.5. INDIVIDUAL MONTHLY INCOME

The Diagram below gives an estimate of the monthly incomes of income-earning individuals living within Hekpoort Study Area. These figures have been corrected to reflect 2011 values, using a 5% annual growth in income. It is clear from the Diagram below that the average income earner within Hekpoort Study Area earned an income of between R700 and R1300 per month. An insignificant portion of the Hekpoort Study Area population earns less than R700 per month.

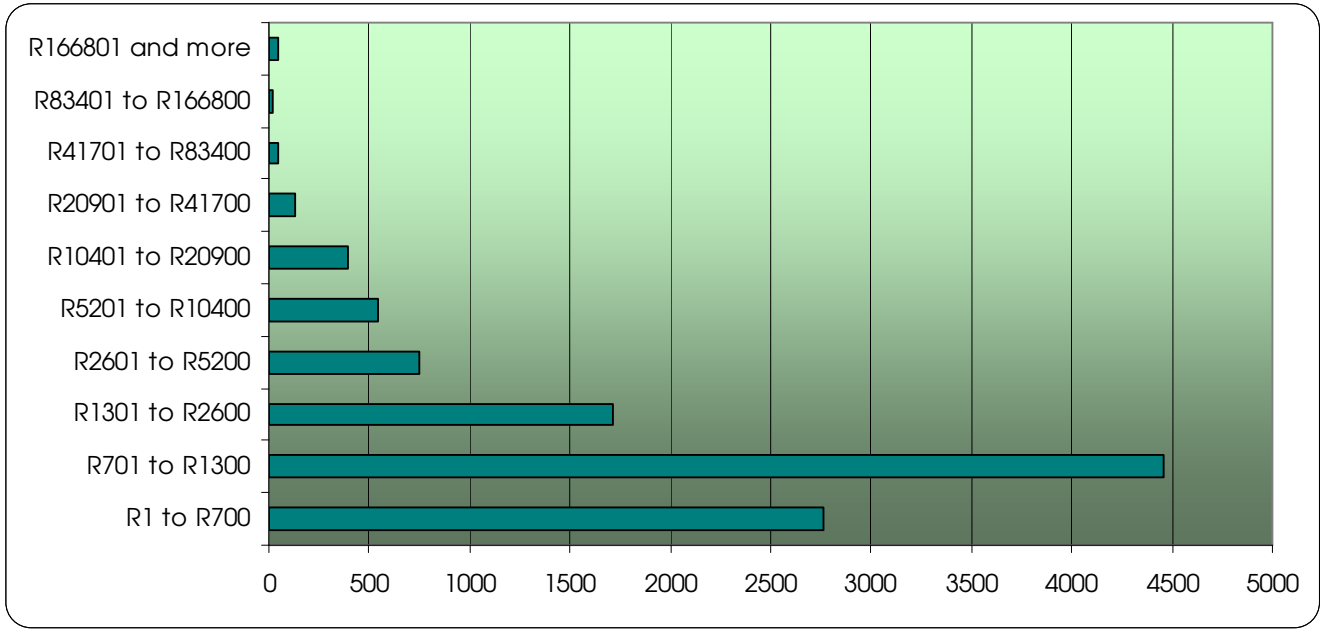


DIAGRAM 9: MONTHLY INDIVIDUAL INCOME
Source: Census 2001

2.4. TRANSPORTATION

2.4.1. MOVEMENT PATTERN

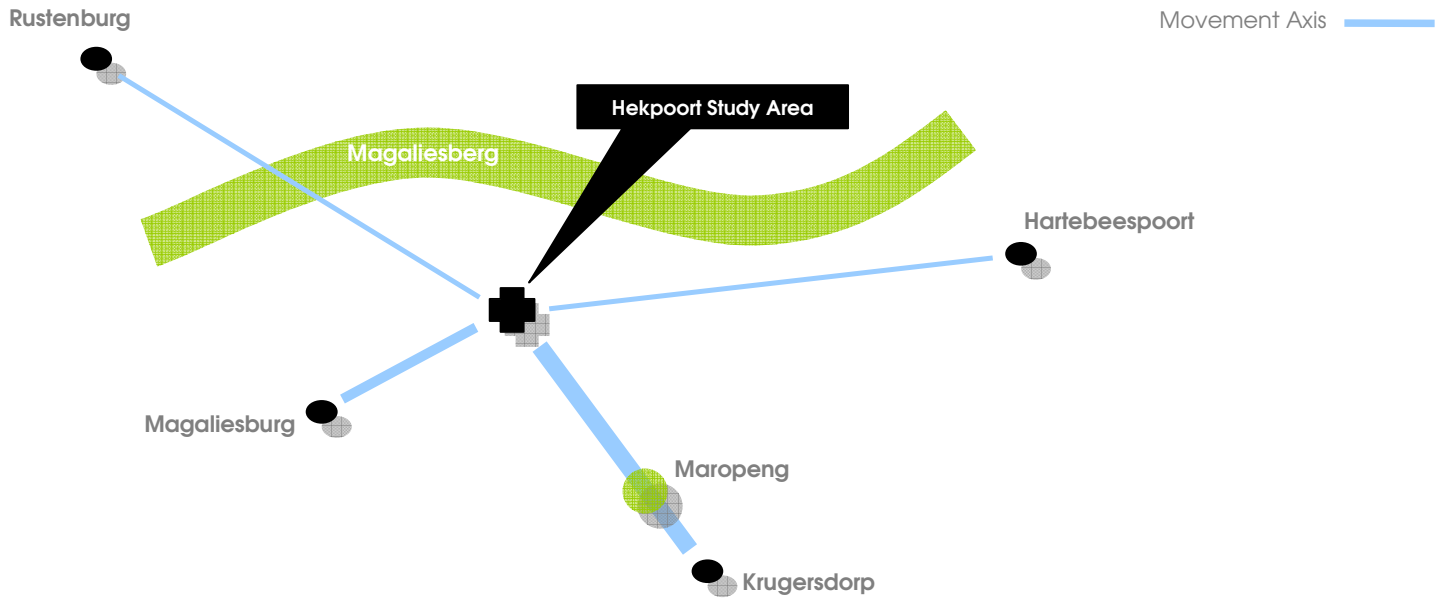


DIAGRAM 10: MOVEMENT AXIS

Movement patterns provide an understanding of how an area functions, because it illustrates the spatial relationships between settlements and core areas and the linkages that exist between such spatial entities. The Diagram below depicts the movement of people between the Hekpoort Study Area and the neighbouring settlement and core areas (shopping opportunities and social amenities). Four movement axes emanate from the Hekpoort Study Area to surrounding settlements and core areas. The strongest movement of people is between Hekpoort and the employment and shopping opportunities of the Krugersdorp CBD.

A strong movement axis also exists between Hekpoort Study and Magaliesburg, the tourism hub of Mogale City. To a lesser extent, a movement axis exists between Hekpoort and Rustenburg and between Hekpoort and the Hartebeespoort Dam settlements. These movement axes are weaker due to distance and topography constraints affecting movement between these settlements.

2.4.2. ROAD AND RAIL INFRASTRUCTURE

In South Africa, a typical road hierarchy functions on 4 levels (see Diagram below). The first level contains freeways, consisting of national freeways and provincial PWV roads. These roads provide regional access, connecting neighbouring cities and towns. The second level comprises distributor roads, which aim to provide better access within urban area and between settlements within rural areas. The third level comprises collector roads. These roads connect residential areas or rural residential areas to the mentioned distributor road network. On the fourth level, internal streets provide direct access to land uses and link these land uses to the mentioned collector roads.

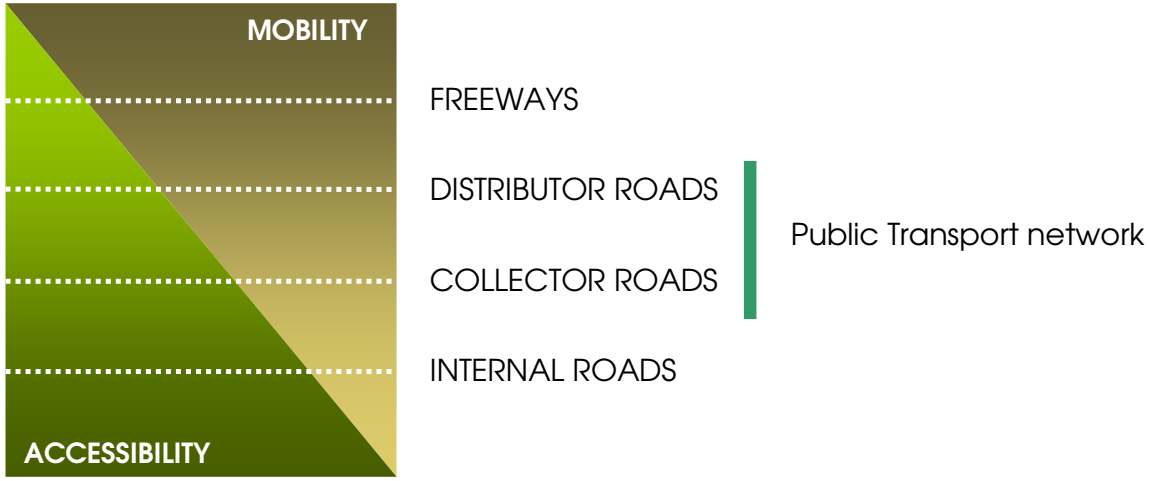


DIAGRAM 11: MOBILITY-ACCESSIBILITY RATIO

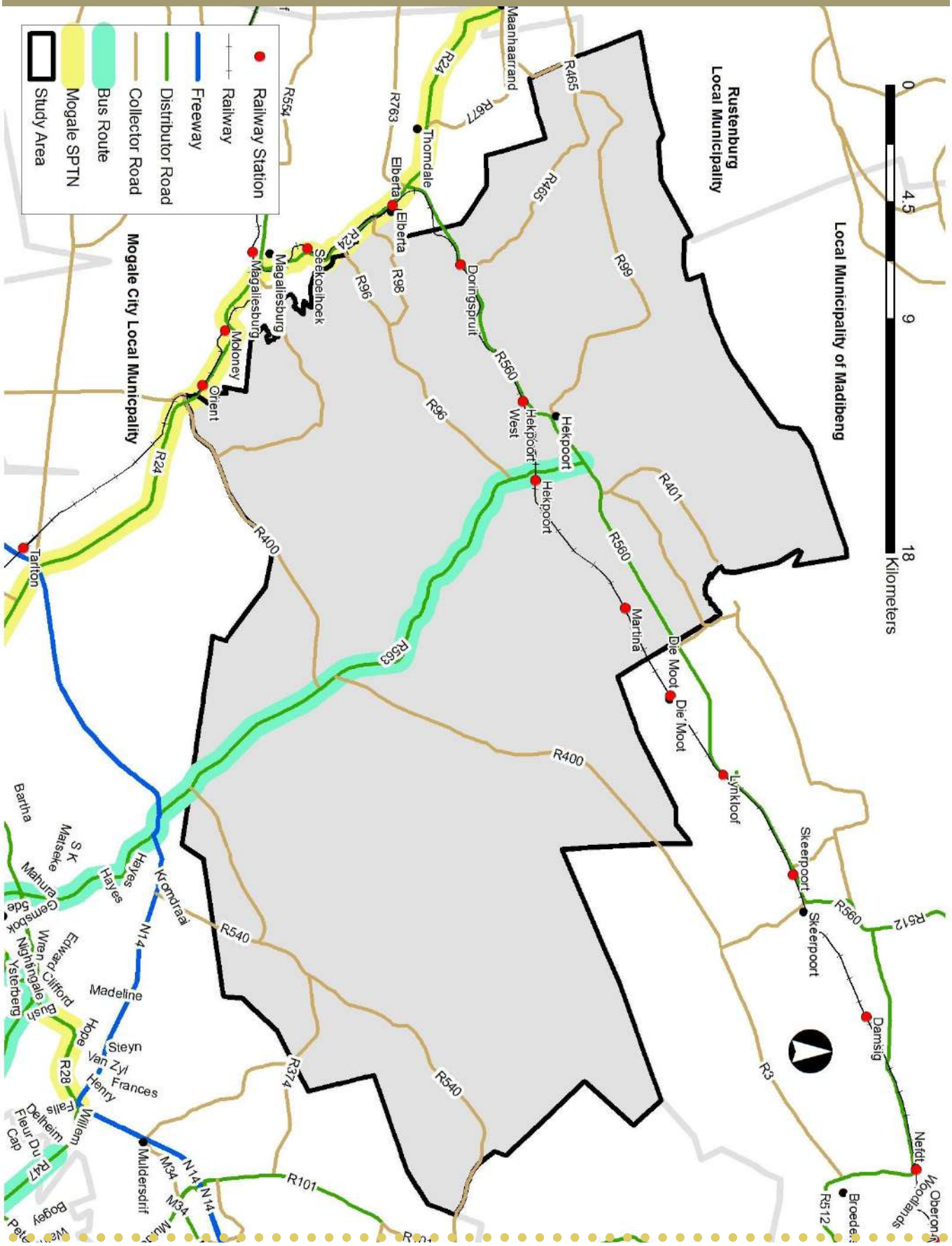


FIGURE 4
TRANSPORTATION NETWORK

FIGURE 4
TRANSPORTATION NETWORK

In essence, freeways and distributor roads are highly mobile and therefore aim to connect people over large distances to neighbouring cities and towns. Collector roads and internal streets provide good accessibility and therefore aim to connect people and land uses to the more mobile freeways and distributor roads. Road-based public transportation systems (taxis and busses) mostly use distributor roads and collector roads, as these provide an effective balance between mobility and land use accessibility. Figure 4 depicts the road network serving the Hekpoort Study Area.

Three distributor roads currently serve the Hekpoort Study Area. The R560 runs parallel to the Magaliesberg and is the primary link to the Hartebeespoort Dam. As such, this road also functions as a tourist route linking the Hartebeespoort Dam to Magaliesburg. The R560 links to the R24, which is the primary transportation spine linking Johannesburg via Magaliesburg to Rustenburg. The R563 links Hekpoort to the Krugersdorp CBD, which is the primary shopping destination of Hekpoort communities. This road is also functions as the only bus route serving the Hekpoort Study Area. The R563 also passes Maropeng, which is a provincial tourism facility linked to the Cradle of Humankind. The R563 also links Hekpoort to the N14 freeway, located south of the Study Area.

In addition to the distributor road network, a relatively extensive collector road network serves the Hekpoort Study Area. Most of these collector roads link up with the R560 distributor road and include the R465, the R99, the R401 and the R96. The R400 is a collector road serving the southern parts of the Hekpoort Study area. This collector road links Maropeng and the Cradle of Humankind to the R563. It is thus a primary access route to Maropeng from Johannesburg. Maropeng is directly accessed from Tshwane via the R400 collector road.

Apart from the abovementioned primary road network, an extensive rural road network comprising mostly dirt roads provide access to the rural properties within the Hekpoort Study Area. **Many of these roads are in dire need of maintenance. This maintenance is especially needed to stimulate tourism development within the Study Area**. The current state of the roads within the Study Area make it difficult for tourists to reach the existing tourist accommodation facilities, especially during bad-weather conditions. Many roads located near the Magaliesrivier experience serious drainage problems during the rainy summer months. This makes access to neighbouring properties often almost impossible. It is often impossible to use heavy vehicles on these roads in the rainy season. This requires the construction of storm water draining systems along roads that are located near the Magaliesrivier.

Regarding rail, the Magaliesburg-Hartebeespoort railway line traverses the Hekpoort Study Area. This railway line runs parallel to the R560 distributor road and forms part of the larger rail network linking Tshwane to Mogale City. A number of railway stations are located along this line. These stations include Doringspruit, Hekpoort-West, Hekpoort and Martina Stations. The Magaliesburg-Hartebeespoort railway line is no longer commercially operational. However, the railway line has for some time been used as a tourist line associated within the Hartbees port Dam and Magaliesburg tourist areas. Whether this line is still used

as such could not be verified. It has to be stressed that, despite the current operational status of the line, the railway remains an infrastructural asset, which could in future hold economic development potential for the Hekpoort Study Area.

2.4.3. PUBLIC TRANSPORTATION

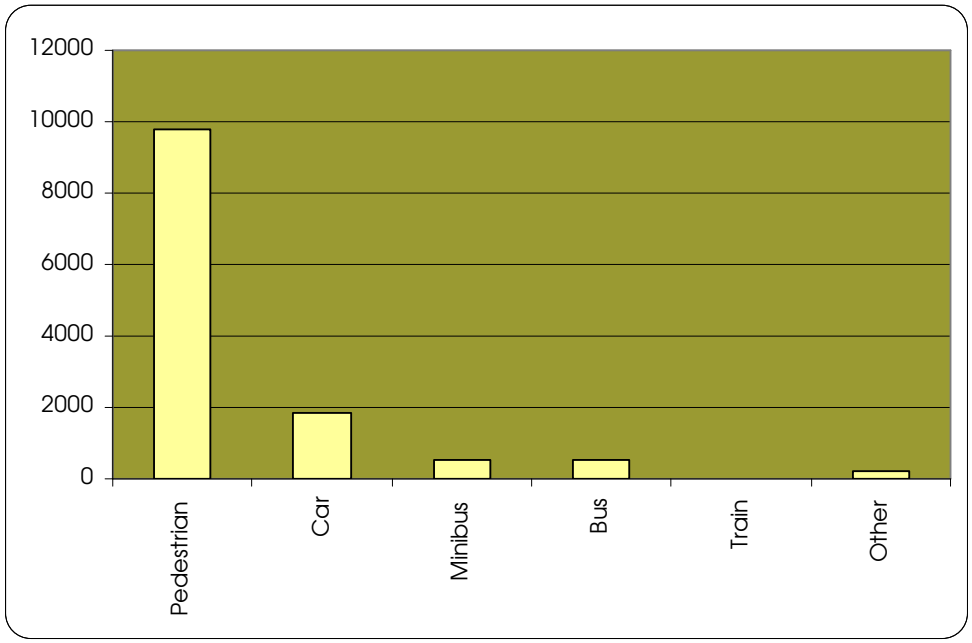


DIAGRAM 12: MODE OF TRANSPORT
Source: Census 2001

The Diagram above provides an indication of the modes of transport that commuters within the Hekpoort Study Area use to access employment opportunities and social amenities. According to this Diagram, most people within the Hekpoort Study

Area walk to their place of employment or social amenities, making the Hekpoort Study Area is predominantly pedestrian community. Mini-bus taxis and busses are used as modes of public transportation to access employment opportunities and social amenities within the region. The car is the primary form of motorized transport used to access employment opportunities and social amenities.

The modes of transport used, as set out above, points to a situation were most households within the Study Area are to poor the own a car or even use public transport as a primary means of accessing employment opportunities of social amenities. The latter can also be due to poor public transport services or a lack of public transportation routes. However, the poor use of public transport does not negate the need for public transport. There are very specific and valid reasons for providing and promoting the use of public transport; even in a rural environment.

Despite the peripheral location of the Hekpoort Study Area within Gauteng, it is serves by a road-based public transportation network. As depicted on Figure 4, this network includes the bus route linking Hekpoort to the Krugersdorp CBD, using the R563. In addition, the Mogale City Strategic Public Transportation Network (SPTN) passes directly west of the Hekpoort Study Area, linking Mogale City to Rustenburg along the R24. This SPTN network is accessed from Hekpoort via the R560. As mentioned regarding rail, the existing Magaliesburg-Hartebeespoort railway line remains an infrastructural asset, even though it is not currently commercially uses. Thus, the possibility exists that it can in future be used as a commuter line, even if only is conjunction with commercial services.

2.5. MUNICIPAL SERVICES

The primary municipal services (water, electricity and sanitation) are briefly discussed below. It illustrates the level of municipal services provision within the Hekpoort Study Area, as well as the bulk network serving the Study Area. The level of service is derived for Census 2001 and only shows the existing number municipal services connections by 2001.

2.5.1. WATER SUPPLY

According to the Diagram below, the majority of households that live in the Hekpoort Study Area have access to taped water within their house or a tap inside their yard. A relatively large number of households acquire water from a standpipe.

Argus Gibb was approached to prepare a status quo report on the current and planned water infrastructure network serving the Hekpoort Study Area. As depicted on Figure 5, there are two existing Rand Water bulk supply mains (900 mm dia. and 610 mm dia.) that cut across the Hekpoort Study Area, stretching from Randfontein to Rustenburg. The two water mains belong to the Randfontein-Rustenburg water supply system. There is no existing internal water reticulation network serving the Study Area.

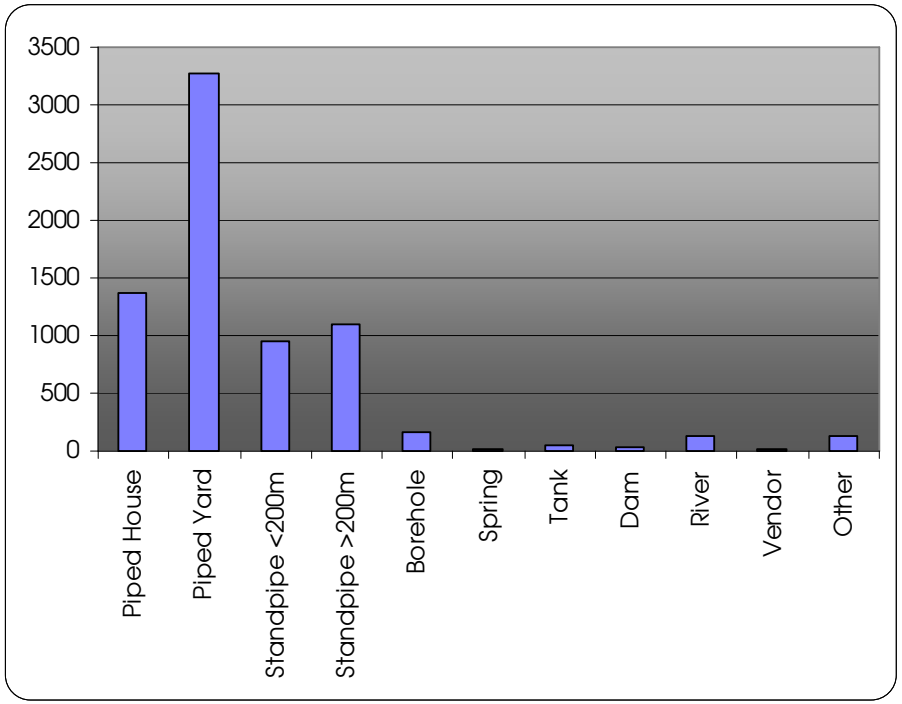


DIAGRAM 13: WATER SUPPLY
Source: Census 2001

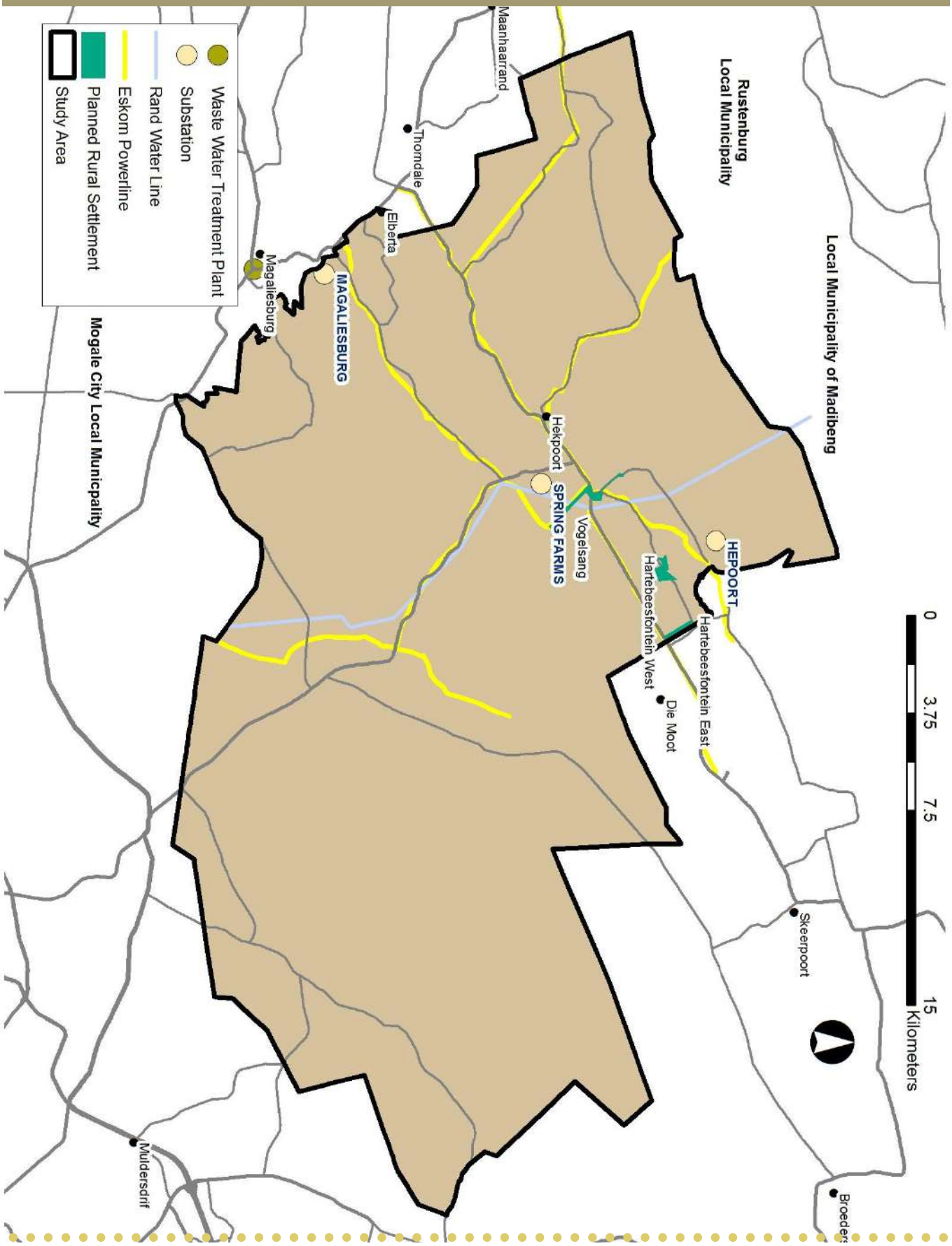


FIGURE 5
MUNICIPAL SERVICES NETWORK

MUNICIPAL SERVICES NETWORK

According to Rand Water, the two existing water pipelines (900 mm and 610 mm) have already reached their combined design capacity of 140Mℓ/d. During periods of peak demand the pipelines are operated beyond their capacities. During the same peak periods, severe water supply crisis is experienced in Rustenburg and surrounding areas that periodically lead to water restrictions. Rand Water further reported that the Randfontein-Rustenburg water supply system does not have additional capacity, to the extent that any additional take-off from the system will severely affect existing consumers.

Based on the above, it has to be stressed that the Rand Water cannot guarantee any additional take-off from the Randfontein-Rustenburg water supply system. In fact Rand Water is not accepting any new water supply applications requiring water from the Randfontein-Rustenburg water supply system at present. This situation is expected to continue until local water supply resources are introduced for Rustenburg, or until the existing Randfontein-Rustenburg Rand Water system is upgraded.

There are no existing reservoirs located within the vicinity of the Hekpoort Study Area. The nearest reservoir is the Barendsvlei Reservoir, which is located 18 km to the north of the Study Area, on the other side of the Magaliesberg mountain range. This reservoir has a capacity of 97 Mℓ.

2.5.2. SANITATION SUPPLY

As depicted by the Diagram below, most of the Hekpoort Study Area households use a ventilated pit latrine. A large number of households have access to a flush toilet connected to a septic tank. A significant number of households have no access to a sanitation system.

Argus Gibb was approached to prepare a status quo report on the current and planned sewer infrastructure network serving the Hekpoort Study Area. The Water and Sanitation Department of Mogale City, as well as Rand Water were approached for information on existing services and their status quo. According to these Departments, there is no sewer infrastructure within the Hekpoort Study Area. Mogalesburg Wastewater Treatment Works is the nearest wastewater treatment facility and is located at Magaliesburg.

The design capacity of Mogalesburg Wastewater Treatment Works is 1.1Mℓ/d. It is currently receiving an average flow of approximately 0.5 Mℓ/d. According to Mogale City's Water and Sanitation Department, the Mogalesburg Wastewater Treatment Works is expected to be upgraded to approximately 2.2 Mℓ by the year 2015. Figure 5 depicts the location of the Mogalesburg Wastewater Treatment Works.

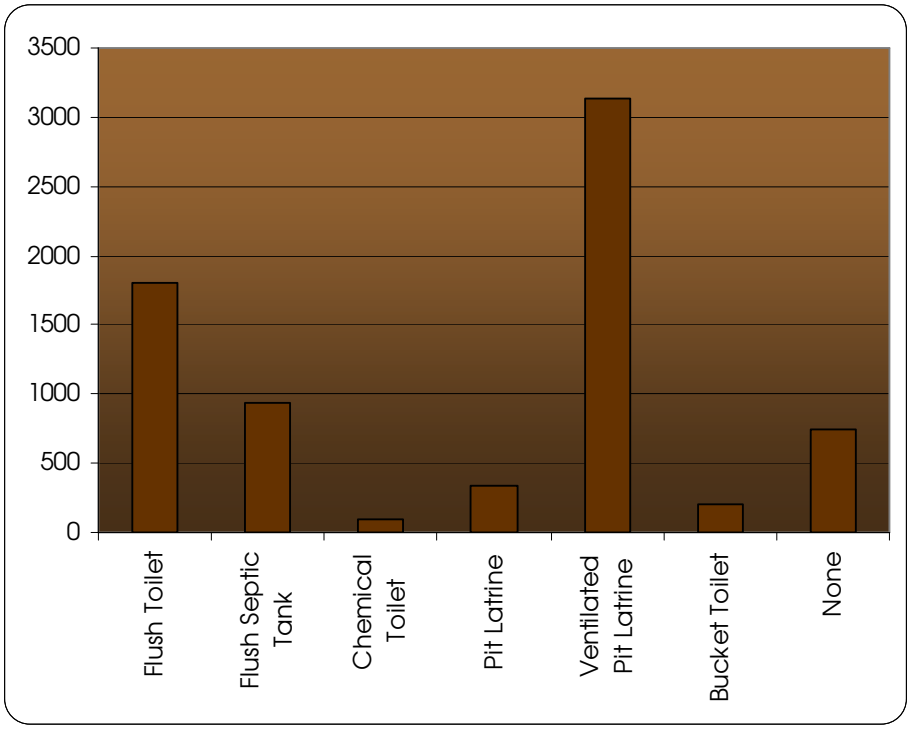


DIAGRAM 14: SANITATION SUPPLY
Source: Census 2001

2.5.3. ENERGY SUPPLY

As depicted by the Diagram below, more than half the Hekpoort Study Area population uses electricity as their source of energy supply. The remainder of the Hekpoort Study Area population uses candles as their primary source of energy.

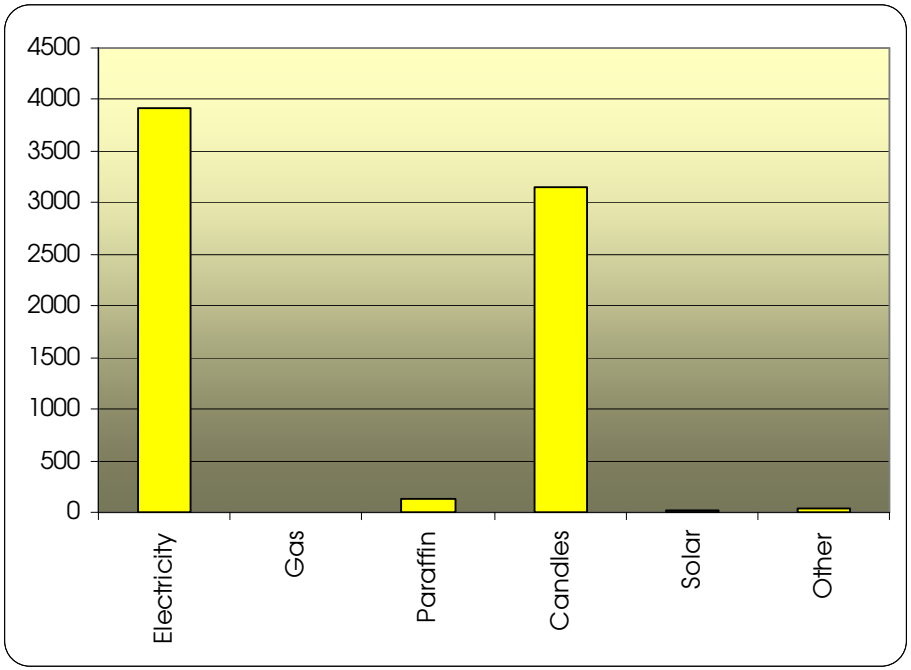


DIAGRAM 15: ENERGY SUPPLY
Source: Census 2001

Argus Gibb was approached to prepare a status quo report on the current and planned electrical infrastructure network serving the Hekpoort Study Area. Eskom provides and maintains the electricity network within the Hekpoort Study Area. Consequently, the Network Planning Division of Eskom Central Region was approached to determine the status of the current and planned electrical network within the Hekpoort Study Area.

The electrical infrastructure in the Hekpoort Study Area is limited and is at present barely sufficient to meet existing demand. The network comprises three MV substations with a total capacity of 30 MVA. The locations of the substations are shown in Figure 5. There are three substations individually have the following capacities:

- Magaliesburg Substation: 15 MVA capacity
- Spring Farm Substation: 10 MVA capacity
- Hekpoort Substation: 5 MVA capacity

The Magaliesburg substation is located near Magaliesburg and is fed from a 44 kV line coming form the Tarlton direction, the Spring Farms substation is fed from the same 44 kV line but is approximately 7 km from Hekpoort along the R563. The third substation (Hekpoort) is located near Die Moot along the R560 is fed from a separate 44 kV line coming form the North.

Eskom plans on upgrading the line that feeds the Magaliesburg and Spring Farm substations from 44 kV to 132 kV. This upgrade is planned for the year 2013 and will allow the Magaliesburg substation to be upgraded to 25 MVA. The Spring Farms substation will be upgraded to 15 MVA within the next 18 months. There are no plans to upgrade the Hekpoort substation. After completion, the total capacity available to the Hekpoort Study Area will be 45 MVA. Currently, Eskom only plans upgrades based on existing need and commitments. However, Eskom is willing to further expand its network depending on the size and the requirements of new developments.

2.6. NATURAL ENVIRONMENT

2.6.1. TOPOGRAPHY AND HYDROLOGY

As depicted by Figure 6, the Hekpoort Study Area has an undulating topography. The Magaliesberg runs along the northern boundary of the Study Area and comprises the highest peak in the North West Province (see tourism map). The Witwatersberg traverses on southern parts of the Hekpoort Study Area. These two mountain ranges form the sides of a valley that runs through the northern parts of the Study Area in an east-west direction. The Study Area drains into this valley and into the Magaliesriver that flows within this valley. The Magaliesriver flows into the Hartebeespoort Dam. The Magaliesberg and Witwatersberg thus function as watersheds within the Study Area. Apart from the hydrological function, these mountain ranges provide a picturesque environment, which lends the Study Area a tourist potential that can be exploited in the vicinity of Maropeng and the Hartebeespoort Dam.

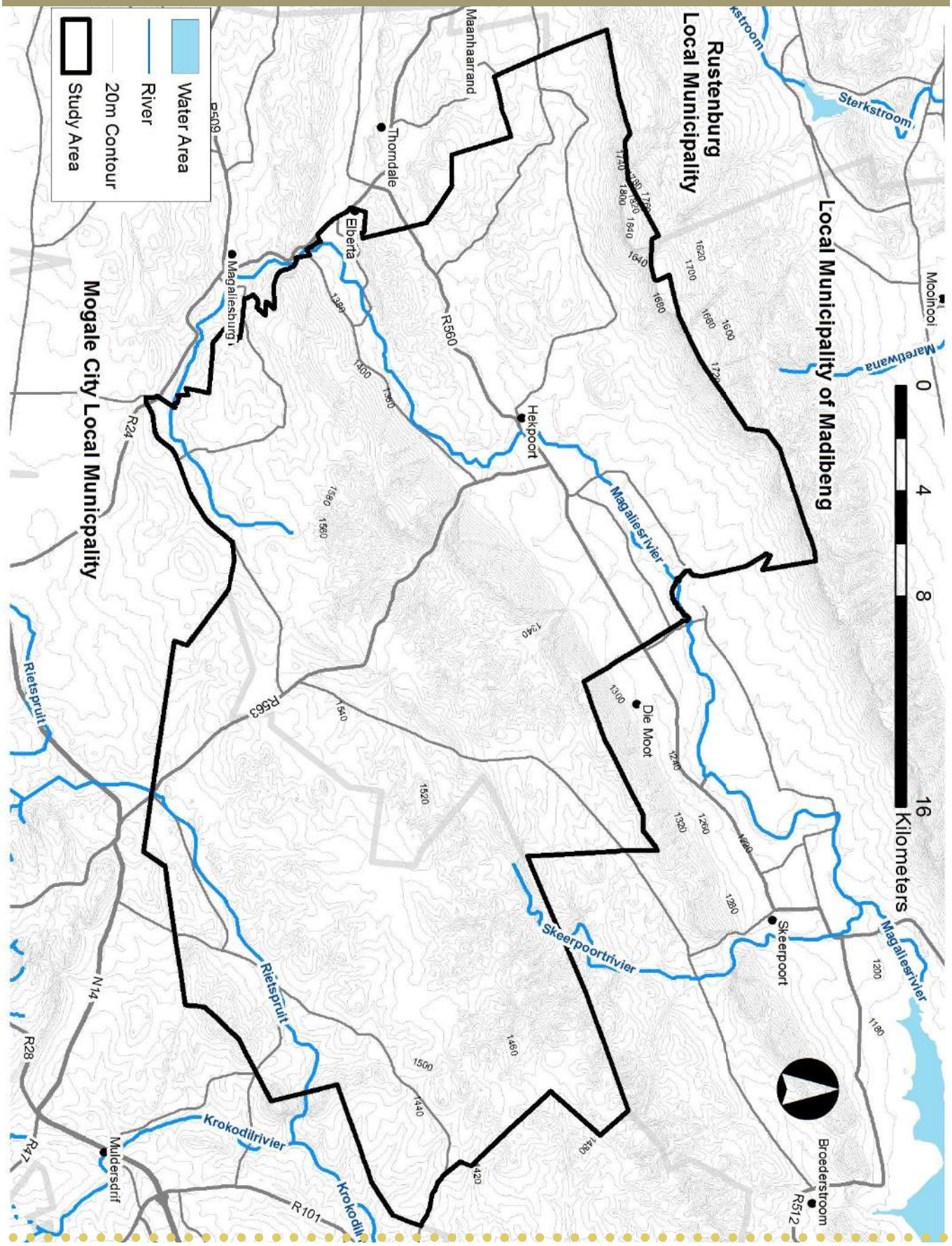


FIGURE 6
TOPOGRAPHY AND HYDROLOGY

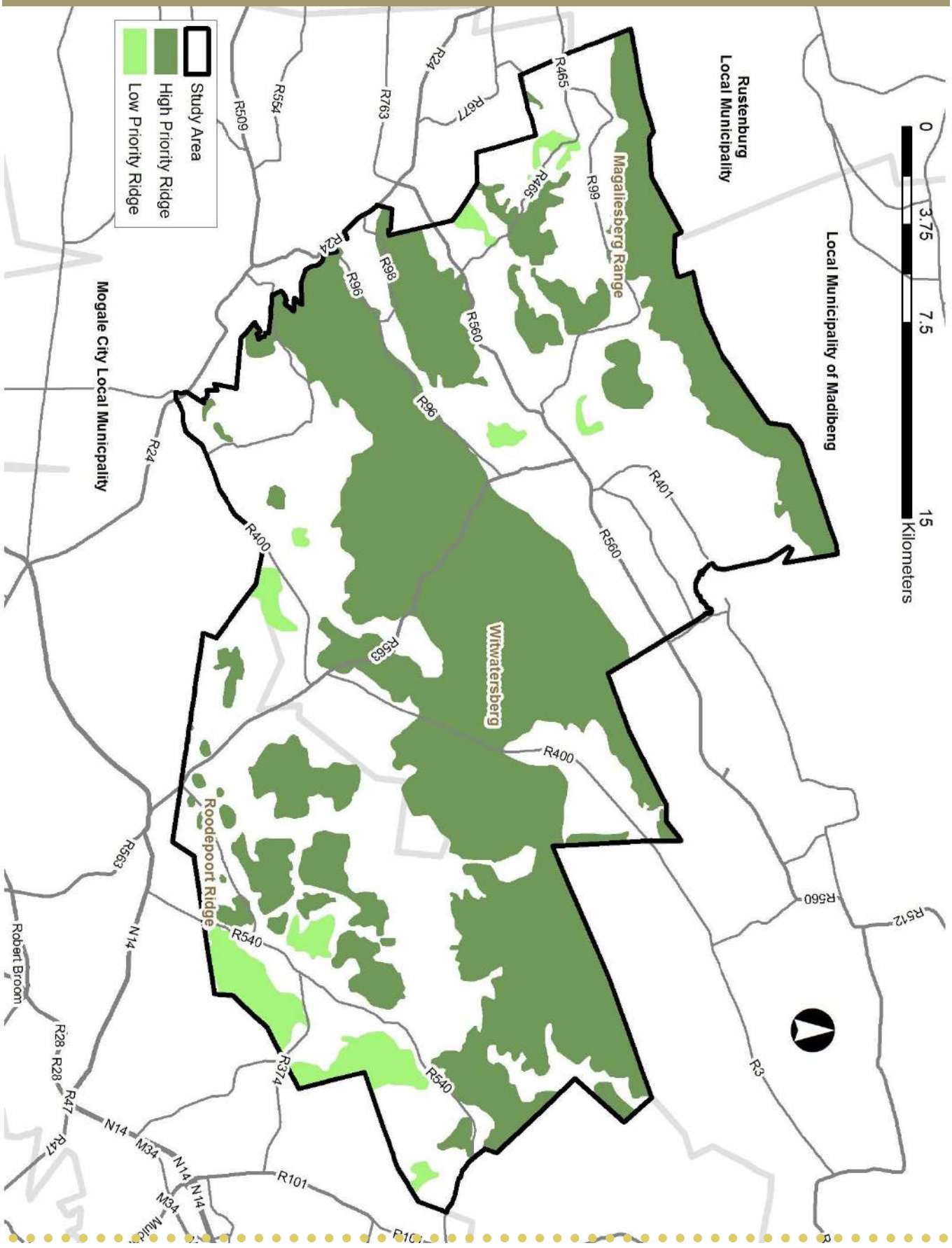


FIGURE 7
MOUNTAINS AND RIDGES

MOUNTAINS AND RIDGES

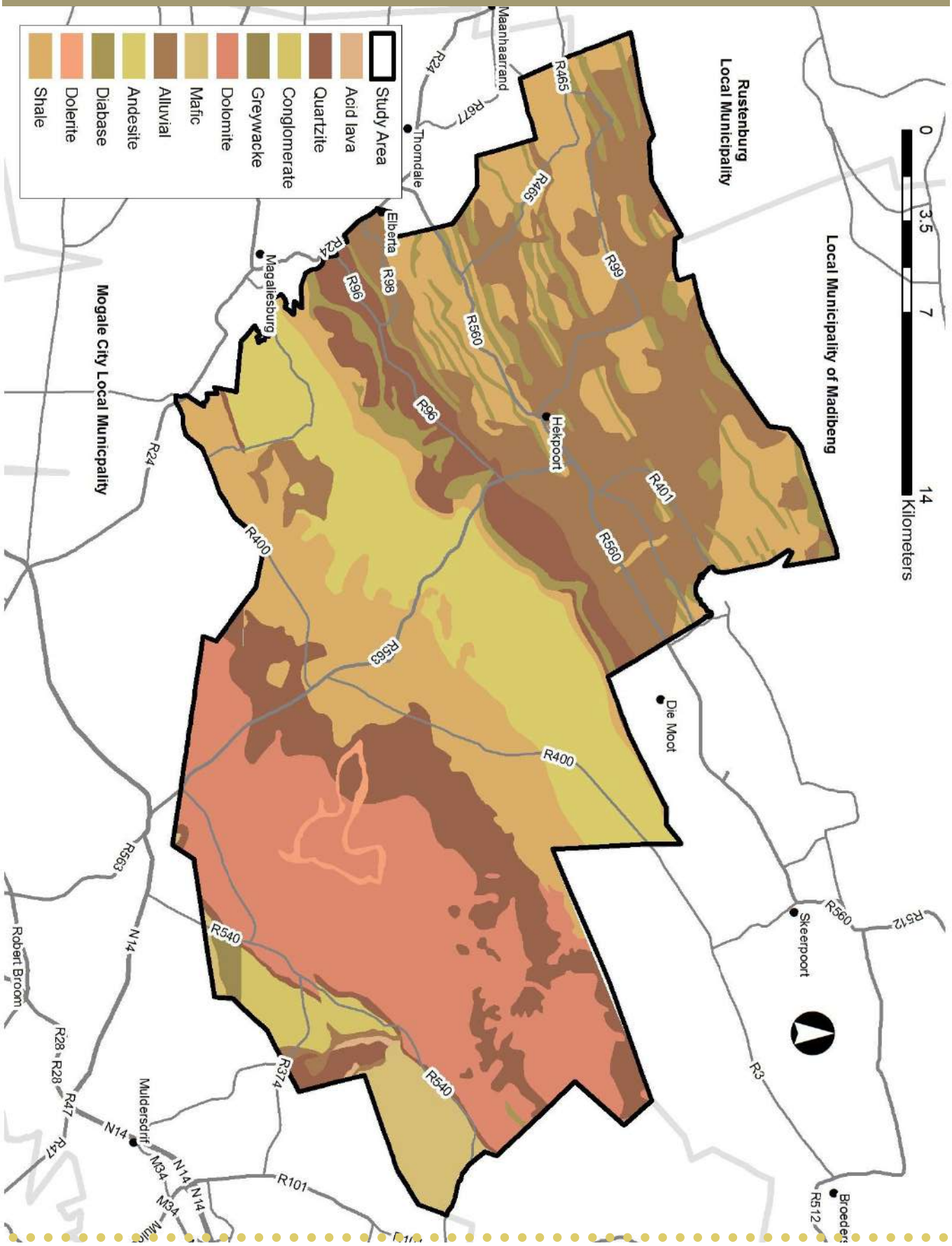


FIGURE 8
GEOLOGICAL PROFILE

GEOLOGICAL PROFILE

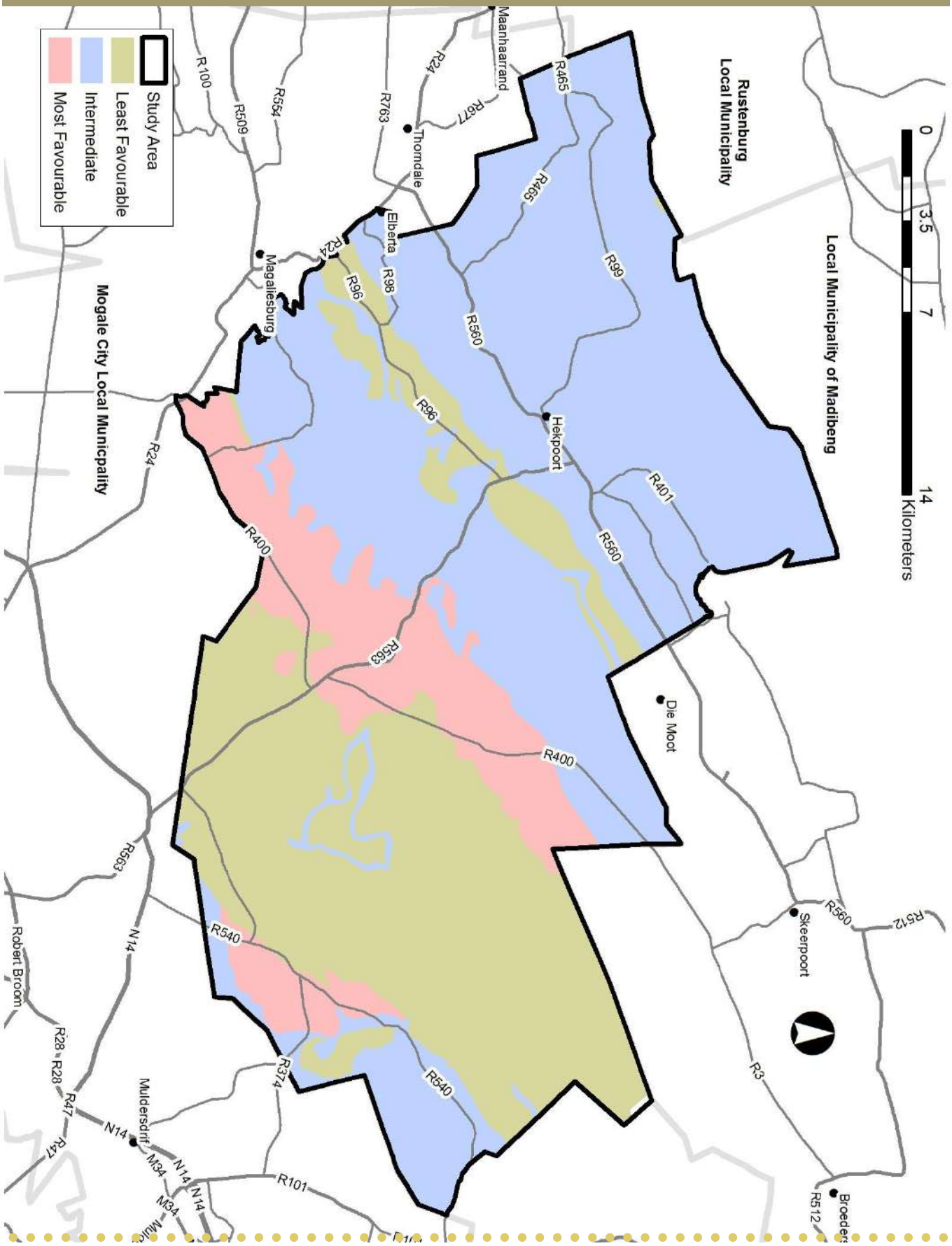


FIGURE 9
GEOTECHNICAL SUITABLITY

GEOTECHNICAL SUITABLITY

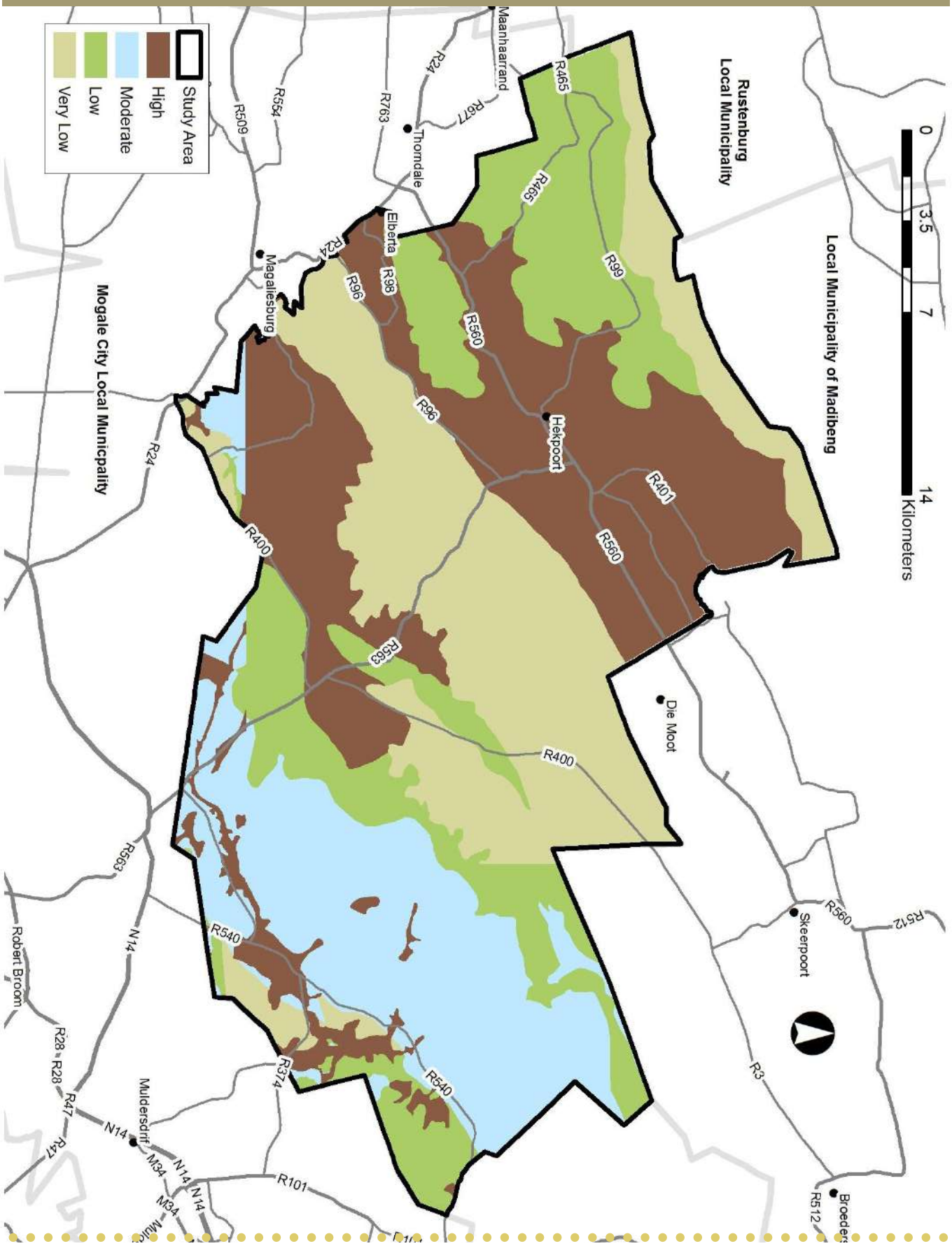


FIGURE 10
AGRICULTURAL POTENTIAL

AGRICULTURAL POTENTIAL

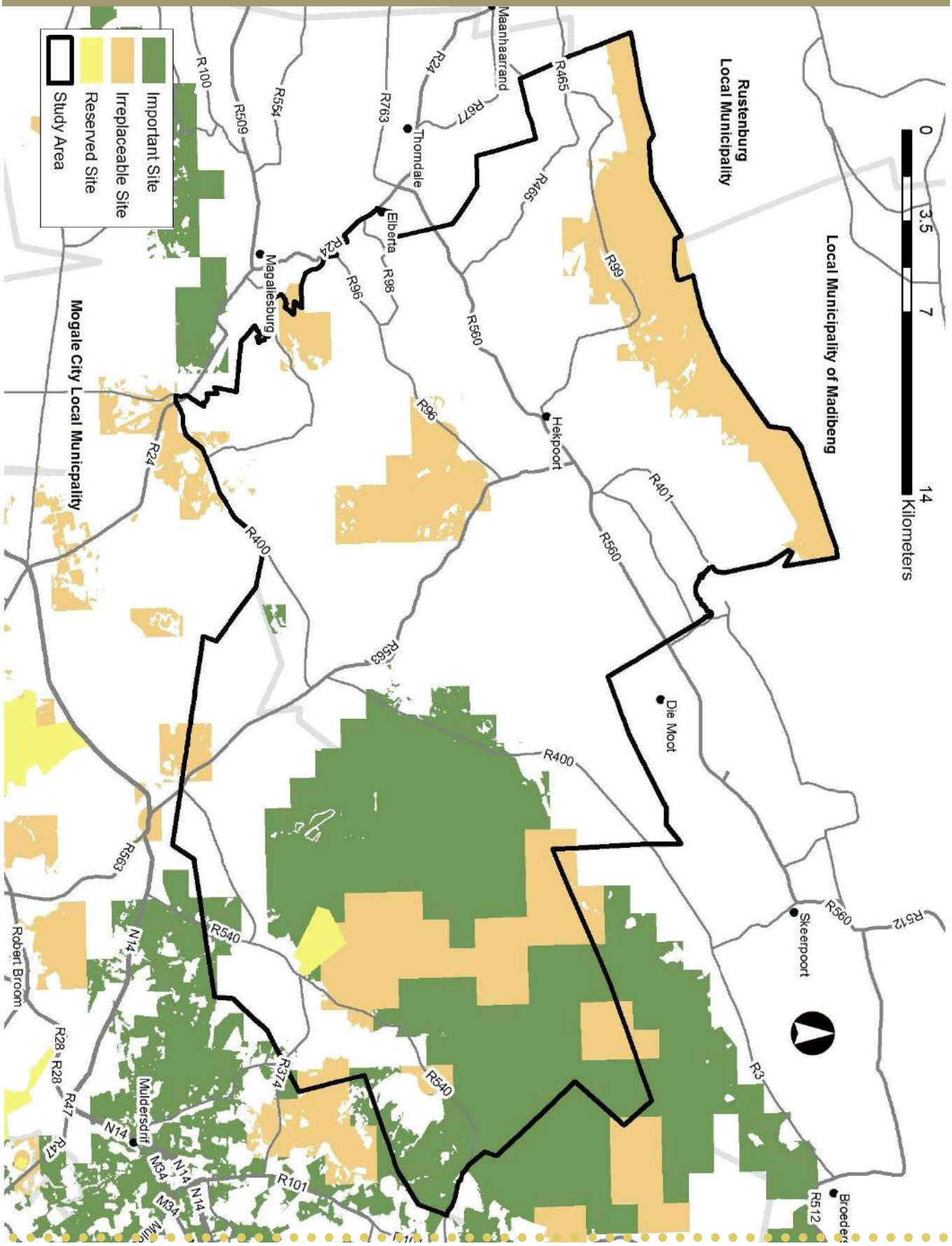


FIGURE 11
C-PLAN 2 ENVIRONMENTAL AREAS

FIGURE 11
C-PLAN 2 ENVIRONMENTAL AREAS

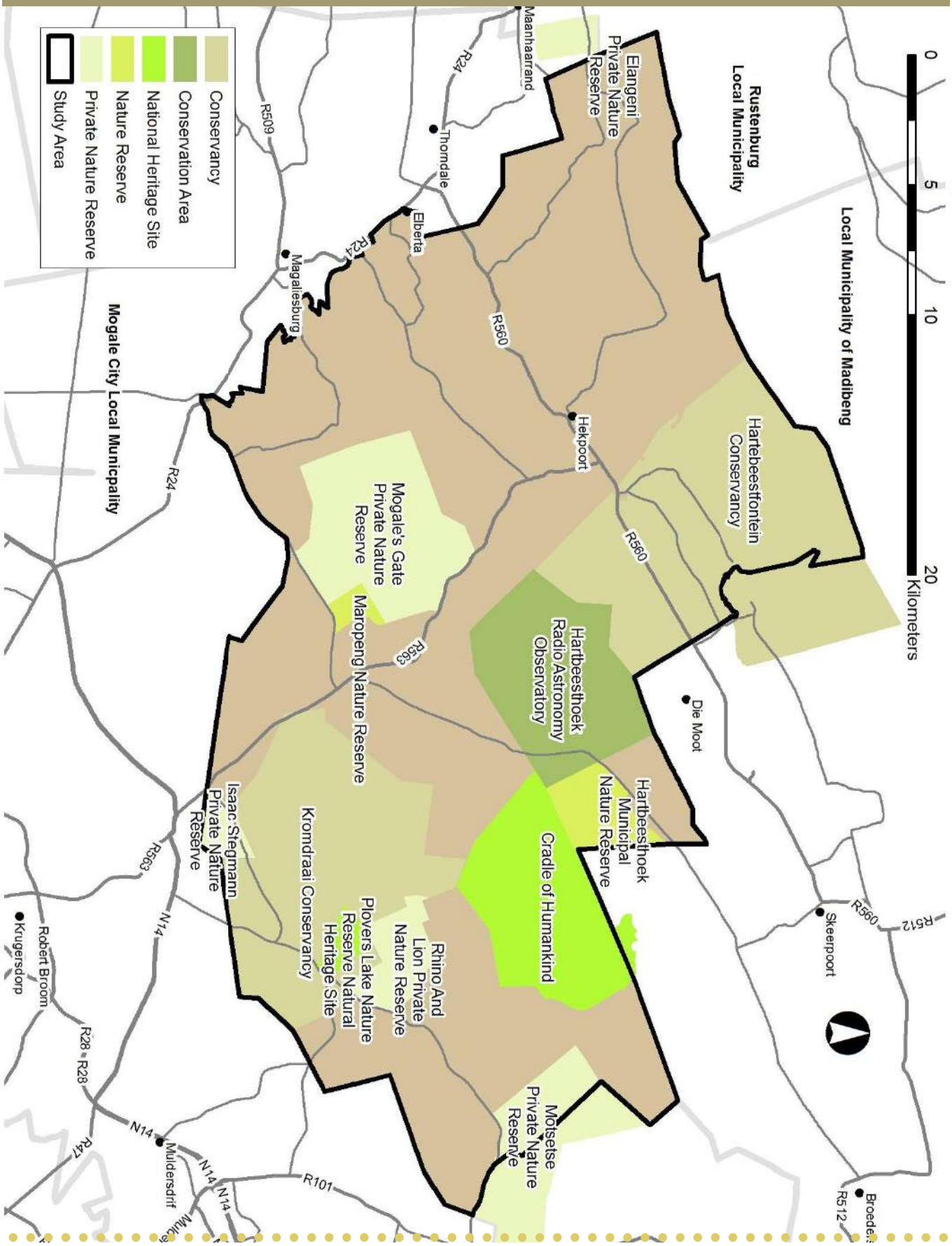


FIGURE 12
CONSERVATION AREAS

2.6.2. MOUNTAINS AND RIDGES

According to the GDART Ridges Policy (GDACE, 2001), there are a number of major ridges within the Hekpoort Study Area. These ridges are depicted on Figure 7. The Magaliesberg is located on the northern boundary of the Study Area it is the highest-priority ridge traversing Gauteng. The Witwatersberg is also a high-priority ridge within Gauteng. This ridge traverses the southern reaches of the Study Area. Both the Magaliesberg and Witwatersberg are Class 1 ridges. No development is permitted on a Class 1 ridge. If a developer wishes to deviate from the strict no-go policy, a full EIA is required with a full set of specialist reports including an ecological study, including both functional (ecological processes including connectivity of ridge at a landscape level perspective) and compositional (biodiversity) aspects, which usually include:

- A Red Data study for both fauna and flora
- An invertebrate study
- A hydrological/ geo-hydrological study
- A geotechnical study
- A pollution study, including both air and water pollution
- A social study, including cultural, historical and open space value aspects
- A visual study
- A study of service provision and access

A small number of low priority ridges (Class 2-4 ridges) are found within the Hekpoort Study Area. These ridges are all deemed sensitive until verified by GDACE. Low impact developments will be considered only on submission of full EIA and specialist studies. Any proposed developments must include a management plan to maintain the ecological integrity of the remaining property. No exempt from the EIA process will be given if a Red Data species is recorded on the ridge, the open space is 4 ha or larger, and or the surrounding landowners object to proposed development.

2.6.3. GEOLOGICAL AND GEOTECHNICAL

Figure 8 shows the Hekpoort Study Area is underlain by a number of geological formations. The northern half of the Study Area is largely underlain with Alluvial and Shale. This part of the Study Area is more intensively used than the than the southern part of

the Study Area. The southern part of the Study Area is underlain by Quartzite, Andesite and Dolomite. The eroding of the Dolomite band traversing the southern half of the Study Area is the reason for the formation of, amongst others, the Sterkfontein Caves within this part of the Study Area.

Figure 9 depicts the geotechnical suitability (DPLG, 2002) of the geological profile for settlement location and development. Most of the Hekpoort Study Area has geotechnical conditions that are favourable for urban development. The only unfavourable geotechnical conditions are located on the abovementioned dolomitic area, which traverses the southern part of the Study Area. Large portions of this land fall within Maropeng and the Hartbeeshoek Radio Astronomy Observatory (RAO).

The geotechnical information presented above is only based on a broad desktop analysis of the geotechnical conditions affecting Hekpoort Study Area. Consequently, it cannot be determined conclusively whether a land parcel within the Study Area is deemed suitable or unsuitable for settlement development. Such an assessment can only be done through a detailed geotechnical survey that involves drilling test-pits.

Detailed geotechnical investigations will be required before considering any site within the Hekpoort Study Area for settlement development, whether such a site is located within favourable or unfavourable geotechnical area. Such a detailed study will have to assess the risk of locating on a particular geological formation and the possible risk of structural damage to planned buildings due to geotechnical conditions. In turn, the results of such a study could have a decisive influence on the typology and intensity of land uses allowed on such a site. **The results of such an investigation will override any the land use proposal made in this report, if the geotechnical conditions are assessed to pose a significant risk to life and buildings.**

2.6.4. AGRICULTURAL POTENTIAL

According to GDACE (2002), the agricultural potential of the Hekpoort Study Area varies from high to very low potential. As illustrated on Figure 10, much of the northern half of the Study Area has a high agricultural potential. This is also the location of most of the small farm within the Study Area that were historically used for intensive farming purposes. It was used as such because this high-potential agricultural area also contains the Magalies River, which flows through it towards the Hartebeespoort Dam, making this area suitable for irrigation farming. **However, there is no longer enough water in the Magaliesriver to conduct irrigation farming in the Hekpoort Study Area, because the irrigation water is now mostly depleted upstream by irrigation farmers in the Tarlton area. The high-potential agricultural soils in the Hekpoort Study Area are now mostly used for grazing.**

An area of high-potential agricultural soils is also located on the southern boundary of the Hekpoort Study Area. However, most of the area is located within Maropeng, which implies that the land will rather be used for tourism purposes than agricultural purposes. This high-potential agricultural land parcel does not have access to a perennial river for irrigation purposes.

Due to the scarcity of high-potential agricultural soils within South Africa and the fact that it is a finite resource; areas with high-potential agricultural soils are not suitable for settlement development from an agricultural point of view. Settlement development should therefore not be encouraged on high-potential agricultural soils. This implies that the location of rural settlements should be carefully considered, choosing lower-potential agricultural soils as a more suitable location for such settlements.

In addition to the above, GDACE requires an agricultural study for settlement development on areas of moderate to high agricultural potential to determine the viability of the area for supporting certain crops and the expected crop yields. The results of such a study are used to determine whether a particular land use is appropriate for a site located within a moderate to high agricultural potential area. For example, such as study can determine whether a settlement would be the appropriate land use on a moderate to high agricultural potential land parcel, or whether the settlement should rather be located in an alternative, more favourable location. An agricultural study can also be used to determine the suitability for community-based commercial agriculture neighbouring a rural settlement development. An agricultural study usually includes:

- The demarcation and identification of the soil potential
- An assessment of the agricultural potential
- Possible crop yields according to the soil and climate
- Possible yields per recommended crop
- Economic viability in relation to potential crops
- Irrigation potential
- Water availability, source and quality

The Gauteng Department of Agriculture, Conservation and Environment (GDACE now GDART) has demarcated a number of agricultural hubs throughout the Gauteng Province. These areas are to be reserved as prime agricultural land and to be protected from any development or land uses that may have a negative impact on the agricultural potential of these areas. The agricultural hubs aim to the creation of centres of high quality agricultural activity, where niche market agricultural products can be farmed. The south-western part of Mogale City, roughly to the south and west of the R24, forms part of one of these hubs. This agricultural hub is thus located west of the Hekpoort Study Area and is therefore does not directly affected by this hub.

2.6.5. ENVIRONMENTAL SENSITIVITY

C-Plan2, which was compiled by GDACE (2005), provides an overview of ecologically sensitive sites within Gauteng and is used in part by GDACE to determine whether a site is suitable for urban development. It therefore provides an indication of the chances of having more intense land uses (such as settlement development) supported by GDACE within a specific area. C-Plan2 divides ecologically sensitive sites into two categories: 'Irreplaceable Sites', which contain fauna and flora that are not found elsewhere, and 'Important Sites', which are required for the healthy functioning of an eco-system.

According to C-Plan2, which is depicted by Figure 11, 'Irreplaceable Sites' include the Magaliesberg and parts of the Witwatersberg. An 'Importance Site' is found on the southeastern boundary of the Hekpoort Study Area, which is located within the Cradle of Humankind. Intensive land uses, such as settlement development, will not be allowed within these areas. These areas will most likely be more suitable for low-intensity uses, such as tourism facilities.

2.6.6. CONSERVATION AND OPEN SPACE

According to Figure 12, there a number of conservation areas in and around the Hekpoort Study Area, which are protected in terms of National and Provincial demarcation and legislation. Two conservation areas are located within the Study Area. The first and largest conservation area is the Hartebeesthoek Radio Astronomy Observatory (RAO), which houses numerous satellite dishes. The Hartebeesthoek RAO property has been proclaimed a conservation area. The second conservation area is the Hartbeesthoek Municipal Nature Reserve, which is located on the eastern boundary of the Hekpoort Study Area. This nature reserve abuts the Cradle of Humankind.

The Cradle of Humankind World Heritage Site is a major Provincial conservation initiative of international importance, linked to the presence of pre-historic hominoids and cultural artifacts. The Cradle of Humankind area, which covers a significant part of the Hekpoort Study Area, stipulates the nature and intensity of land uses which can be accommodated in this area. All future developments which fall within the Cradle of Humankind area must therefore adhere to and be evaluated according to the Environmental Management Framework of the Cradle of Humankind World Heritage Site.

A number of smaller nature reserves are situated outside the Hekpoort Study Area. As depicted on Figure 12, most of these nature reserves are located within the Cradle of Humankind and include the Rhino Lion Private Nature Reserve, the Plovers Lake Nature Reserve and Natural Heritage Site, and the Isaac Stegmann Private Nature Reserve. The Elangeni Private Nature Reserve is located on the northwestern boundary of the Hekpoort Study Area, near Maanhaarrand. These mentioned nature reserves are all located within the Mogale City municipal area.

Apart from the conservation areas mentioned above, the Hekpoort Study does not have a protected open space system as would be found within an urban area. Nevertheless, the Hekpoort Study Area does have an open space network that needs to be identified and protected. This open space network includes the Magalies River, which flows through the northern parts of the Hekpoort Study Area. The mountains and ridges traversing the Study Area must also be considered part of the open space network. These ridges are essentially protected by the GDART Ridges Policy (GDACE, 2001), which restricts land use within such areas. As far as possible, the ecological integrity of the open space network must be maintained to allow for connectivity between open spaces. GDART may require an ecological study focusing on the impacts of a proposed land use development on the connectivity of an open space system.

2.7. LAND USE

Taken as a whole, the Hekpoort Study Area is largely rural in character. Most of the Study Area comprises small and larger agricultural units. However, there are a number of non-agricultural uses worth mentioning.

2.7.1. FARM PORTION SIZES

As mentioned above, the Hekpoort Study Area mostly comprises farmland. These farms are of varying sizes. The farm sizes found within the Hekpoort Study Area are depicted on Figure 13. Four basic farm sizes can be identified: farms up to 1ha in size, farms between 1ha and 4ha in size, farms between 4ha and 20ha in size and farms larger than 20ha in size. Farm portions smaller than 20ha in size can be considered small farms that are either used for intensive agricultural purposes or for rural residential purposed. Farm portions larger than 20ha can be considered large farms with extensive, commercial farming potential. The subdivision of farms larger than 20ha in size is generally prohibited to ensure the viable operation of the commercial farming practices and the overarching National objective of to ensure national food security.

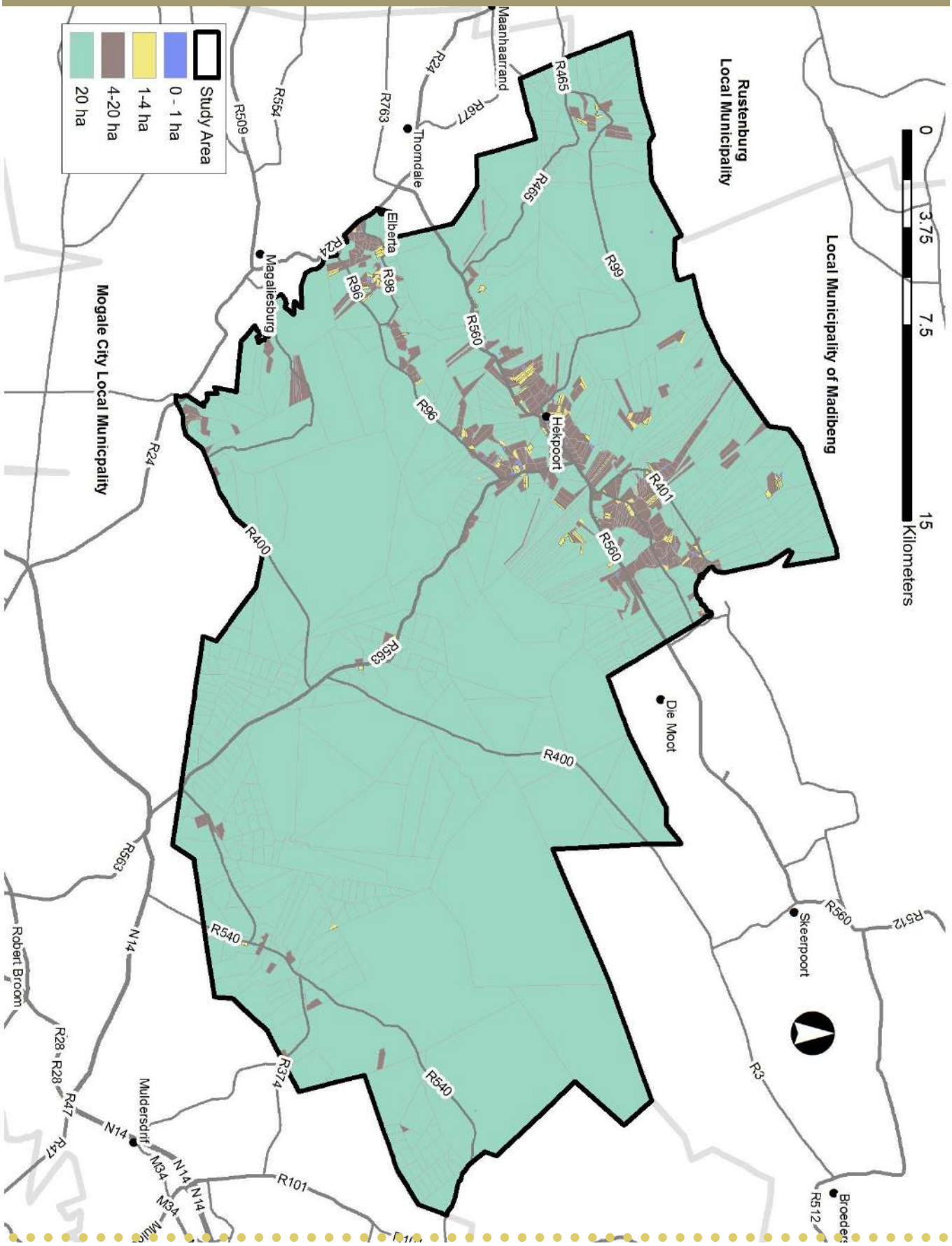


FIGURE 13
FARMS PORTIONS SIZES

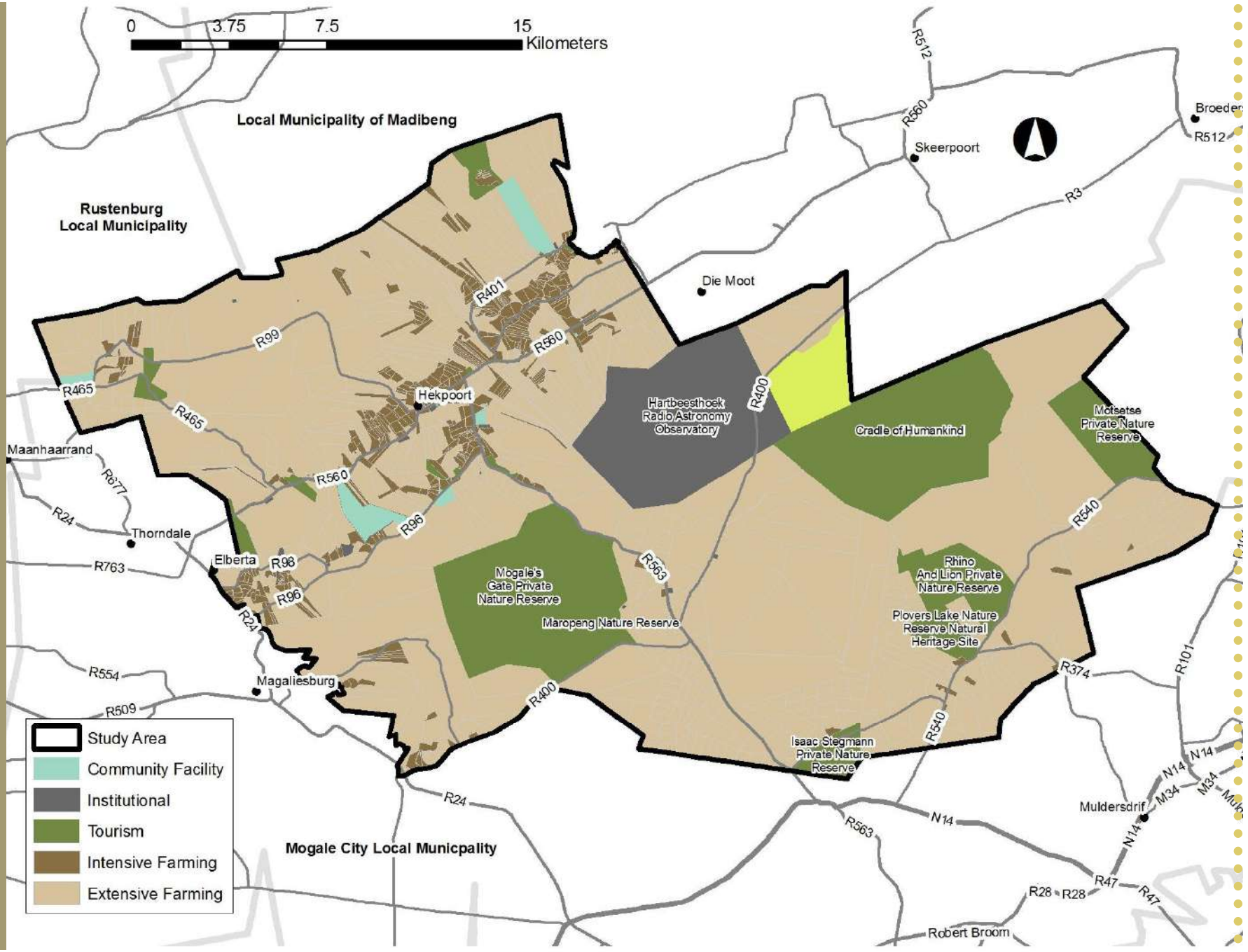


FIGURE 14
EXISTING LAND USE

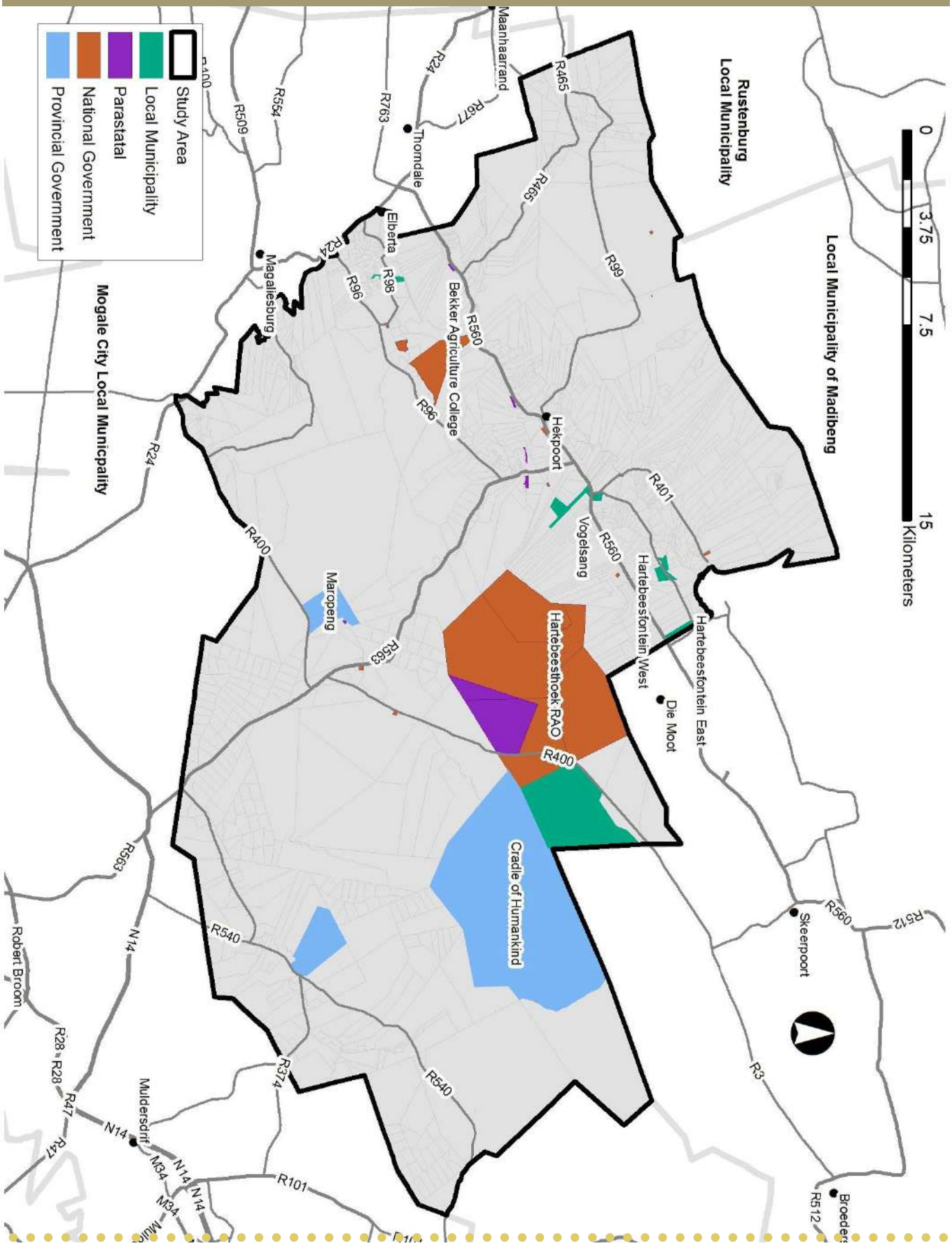


FIGURE 15
PUBLIC-OWNED LAND

PUBLIC-OWNED LAND

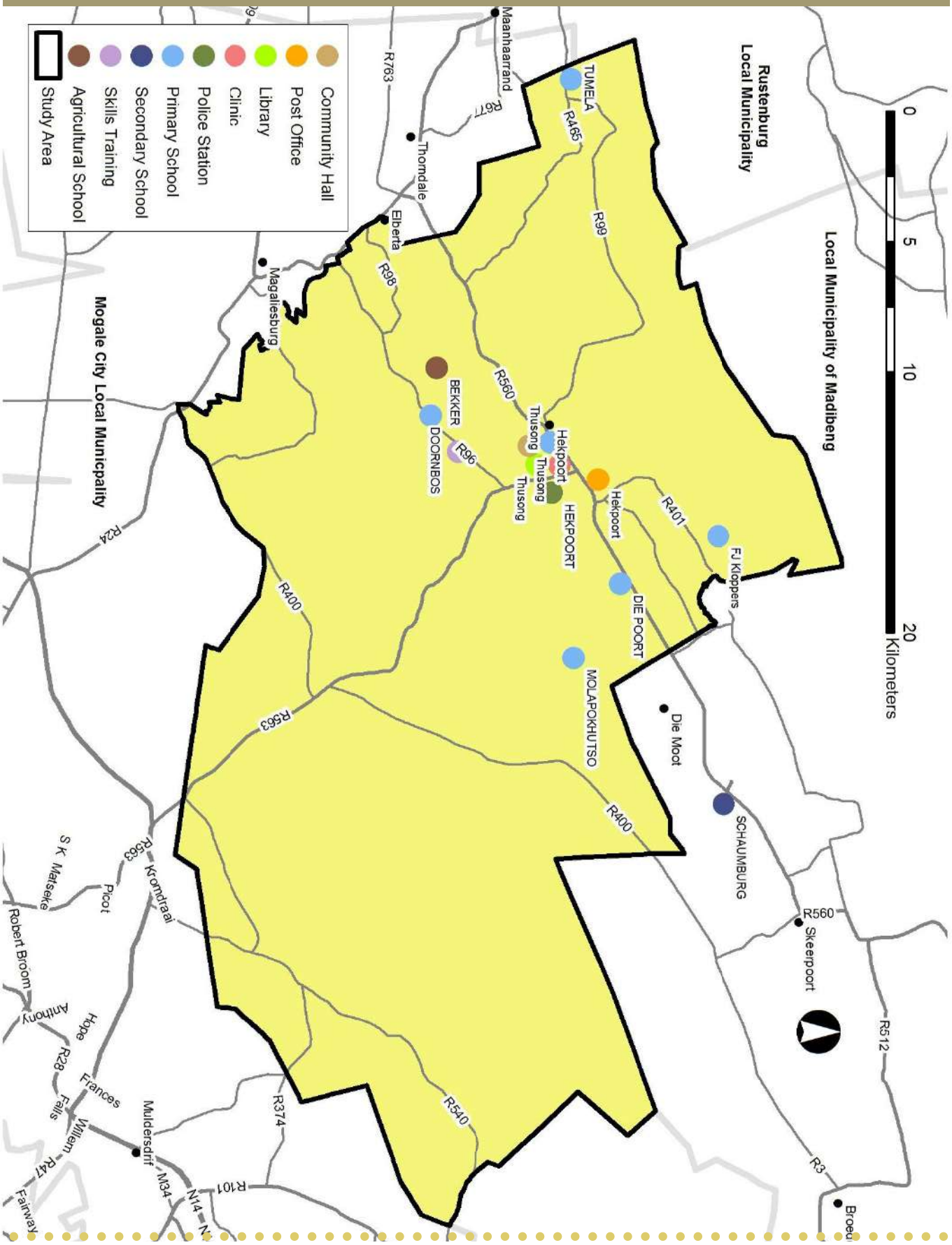


FIGURE 16
COMMUNITY FACILITIES

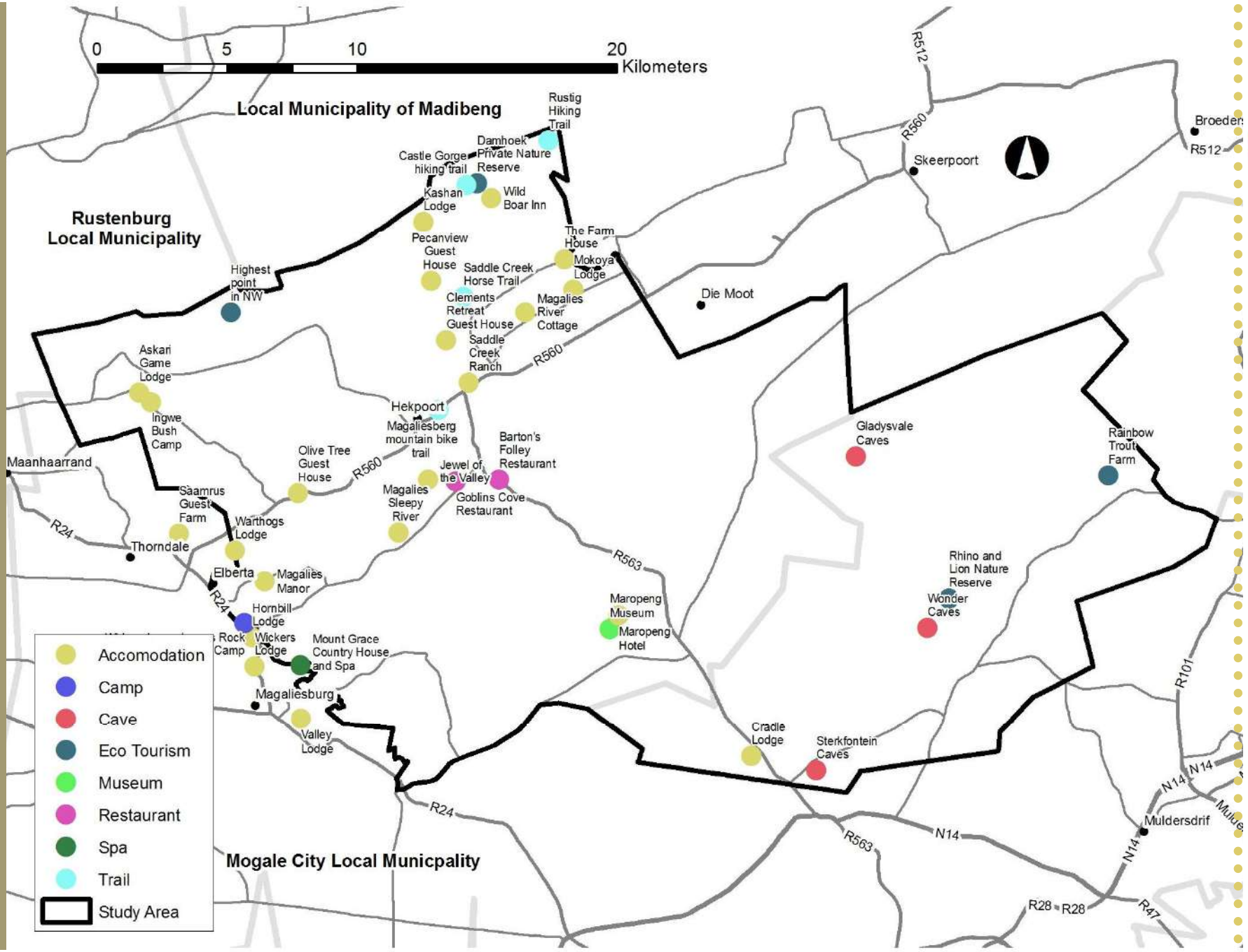


FIGURE 17
TOURISM FACILITIES

Geographically, farm sizes in the Hekpoort Study Area relate to these spatial entities, such as rivers, mountain ranges and high potential agricultural soils. The smaller farm portion (smaller than 20h in size) occur along the Magalies River, which flows through the northern half of the Study Area. These farm portions are mostly located on high-potential agricultural soils and can draw irrigation water from the Magalies River. This allows the intensive farming of the smaller farm portions. The smaller farm portions also relate to the road network, which can be interpreted as these farm portions being used for rural residential purposes. The larger farm portions (larger than 20h in size) largely straddle the boundaries of the Hekpoort Study Area, are mostly located on the mountainous regions of the Study Area and are mostly located on the lower-potential agricultural soils.

2.7.2. LAND USE STRUCTURE

The Hekpoort Study Area is largely rural in character and land uses within the Study Area therefore largely reflect rural activities. Figure 14 depicts a land use map of Hekpoort Study Area, illustrating the land use pattern evident in the Study Area. The following land uses occur within the Study Area:

a. Intensive agricultural and rural residential

Farm portions that are smaller than 20ha in size are either used for intensive agricultural purposes or for rural residential purposes. These intensive farming units mostly located within the northern half of the Hekpoort Study Area, situated along the road R560. These farms are predominantly located on high-potential agricultural soils, which has the capacity the high-yield, intensive farming. These farms are also located on the Magalies River, which allow irrigation water to be drawn from the river. The combination of high-potential agricultural soils and irrigation water allows for intensive farming practices. The fact the these smaller farm portions are also mostly located next to the distributor and collector road network, can be interpreted as these farm portions being used for rural residential purposes as well.

b. Extensive agricultural

As mentioned above, the Hekpoort Study Area mostly comprises farmland. Farm portions larger than 20ha can be considered large farms with extensive, commercial farming potential. Geographically, the larger farms are located in the northern and southern parts of the Study Area. Many of the larger farms (although not all) are located on lower-potential agricultural soils, which limits the carrying capacity of these farms. This limited carrying capacity is offset in part by the

larger farm portions. The larger farms located in the southern half of the Study Area are mostly located on the mountainous Witwatersberg region of the Study Area.

c. Community facilities

A number of community facilities support the rural residential component of the Hekpoort Study Area. Predominantly, these are primary and secondary schools, but there are also other community facilities such as a police station and clinic serving the Study Area. The largest and most significant community facility within the Hekpoort Study Area is the Bekker Agricultural Primary and Secondary School, situated on the R98 and the R96 in the centre of the Study Area.

d. Tourism

Apart from agriculture, tourism is a primary economic activity found within the Hekpoort Study Area. This potential is to a large extent derive form the Study Area's proximity to Maropeng, the Cradle of Humankind and the Hartebeespoort Dam. The Study Area tourism activity is largely vested in tourist accommodation, such as lodges and guest houses. These tourist accommodation facilities are scatters throughout the Hekpoort Study Area. The largest and most significant tourist facility within the Hekpoort Study Area is the Maropeng Museum and Hotel, situated in the southern half of the Study Area. Maropeng is a Gauteng Blue IQ tourism project of national significance.

e. Conservation

Two conservation areas are located within the Hekpoort Study Area. The first is the abovementioned Maropeng, which cover a significant geographical area in the southern parts of the Study Area. The second conservation area is the Hartbeesthoek Municipal Nature Reserve located on the eastern boundary of the Hekpoort Study Area.

f. Institutional

The only significant institutional facility within the Hekpoort Study Area is the Hartebeesthoek Radio Astronomy Observatory (RAO), which is situated on the eastern boundary of the Study Area and is accessed from the road R400.

2.7.3. PUBLIC-OWNED LAND

Figure 15 depicts the public-owned land within the Hekpoort Study Area. Only properties larger than 1ha are displayed on this map.

The largest public land owners are the National and Provincial governments. The National government owns the Hartebeesthoek Radio Astronomy Observatory (RAO), as well as the Bekker Agricultural School. Part of the Hartebeesthoek RAO property is in parastatal ownership. The Provincial government owns Maropeng, which consists of three farm portions that have been purchased as part of the Cradle of Humankind provincial Blue IQ initiative.

The Mogale City Local Municipality owns a relatively small land parcel, consisting of 3 portions, situated on the intersection of the R560 and the R401. The northern part of this land parcel was purchased for the development of a rural village to house informal households within the Study Area. The southern part of this land parcel is intended to be used for community-based commercial farming.

2.7.4. COMMUNITY FACILITIES

The Hekpoort Study Area has a well-developed community infrastructure network, providing educational and other essential social services to the Study Area population. The Hekpoort Rural Node is generally considered a rural service centre to the surrounding rural and farming communities. This service centre function is largely reflected by the Thusong Service Centre located within the node, next to the R560. Figure 16 illustrates the location of these community facilities within the Hekpoort Study Area.

- Education: The community facilities located within the Study Area are mostly educational facilities comprising primary schools and a high school. These schools largely serve a rural population and are therefore scattered over large distance throughout the Study Area. The largest and most significant educational facility within the Study Area is the Bekker Agricultural Primary and Secondary School, situated on the R98 and the R96.
- Health: Hekpoort only has clinic that is situated at the municipal services centre located at the Hekpoort Rural Node, situated on the R560.

- Community: As far as could be determined, Hekpoort does have basic municipal community facilities such as a post office, a library and a community hall, which are all situated at the municipal services centre located at the Hekpoort Rural Node.
- Safety and Security: The Hekpoort Study Area has a police station, which is located on the R563.

Apart from Bekker Secondary School, the only other secondary school serving the Study Area population is the Schaumburg Primary and Secondary School, situated on the R560 in the Madibeng area. This facility is over-crowded and is therefore totally inadequate for the number of children that it needs to accommodate. To a large extent this has to do with the fact that the neighbouring informal settlement has expanded considerably in recent year, dramatically increasing the need for secondary educational facilities. The establishment of rural housing within the Hekpoort Study Area will only increase the pressure on existing educational facilities within the Study Area.

2.7.5. TOURISM FACILITIES

As depicted on Figure 17, a substantial number of tourist accommodation is found within and neighbouring the Hekpoort Study Area. A wide range of tourist accommodation typologies are found within the Study Area. The various different types of accommodation include guesthouses, game farms, lodges, resorts, spas, hotels and camping areas. Some of these establishments have ancillary facilities, such as conference facilities, restaurants, tea gardens and pubs. Many of these accommodation facilities are conducted by local residences on their properties, while other facilities are more formal businesses which are operated exclusively as businesses.

As is evident from the above, there are many tourist accommodation typologies. There are also additional typologies, which are not necessarily found within the study area. These include bed and breakfast establishments, backpacker's accommodation, self-catering facilities and caravanning areas. Thus, simply defining tourism accommodation can be challenging, but needs to be done in order to manage tourism facilities within the Study Area. Management implies allowing residents and land owners to operate an accommodation establishment from a property to a degree that does not impact adversely on the quality and amenity of the surrounding rural environment. Apart from tourist accommodation, a number of tourist facilities exist within and neighbouring the Hekpoort Study Area. Within the Study Area, the most significant tourist attraction of the Maropeng Museum situated on the R563 (see Figure 17). Maropeng is an international tourist destination. Most of the significant tourist attractions neighbouring the Hekpoort Study Area are associated with the Cradle of Humankind, situated on the southeastern boundary of the Study Area.

2.8. HOUSING & TENURE

The Hekpoort, Magaliesburg and Tarlton areas experience very little development pressure as such. However, one of the aspects that do place pressure on these areas is the existence of informal settlements near these towns. This requires the formalisation of these informal settlements. A number of housing initiatives are already underway in these areas which in turn require the development of supporting social facilities. The Rural Housing Strategy for the West Rand District Municipality makes specific recommendations on how this pressure should be dealt with.

2.8.1. HOUSING TYPOLOGIES

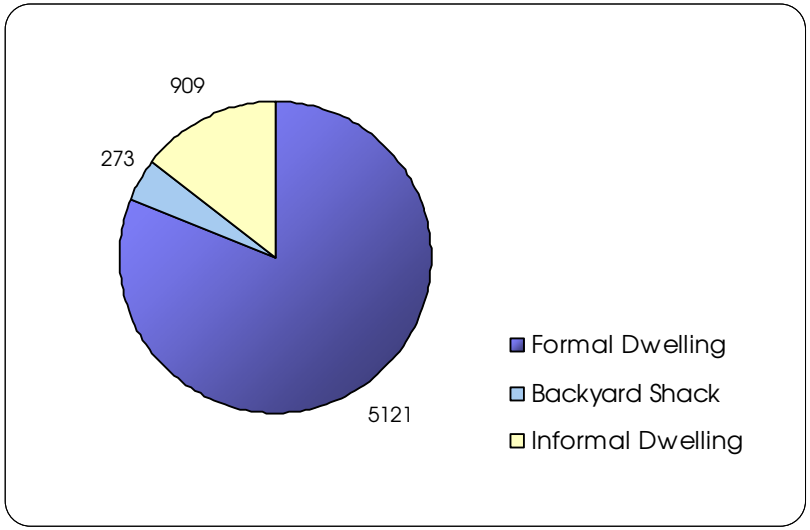


DIAGRAM 16: DWELLING TYPOLOGY
Source: Census 2001

Census 2001 provides information with regard to the state of housing within the Hekpoort Study Area. This information is reflected in the Diagram above. According to this Diagram, the Study Area had approximately 5100 formal dwelling units in 2001. Most of these dwellings are single, detached houses, making it the dominant housing type within the Study Area. In 2001, the Study Area had approximately 900 informal dwelling units and approximately 300 backyard shacks. The number of informal dwelling units has been more accurately calculated in 2010 by Professional Mobile Mapping (PMM). These more accurate figures are presented in a section below.

2.8.2. TENURE

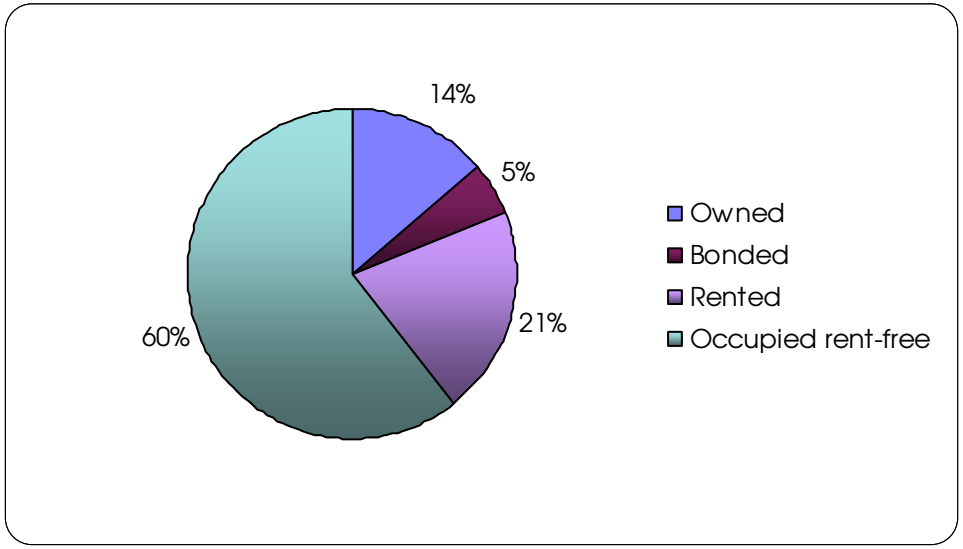


DIAGRAM 17: DWELLING TENURE
Source: Census 2001

Tenure involves the type of ownership that people have of the dwelling they reside in. As depicted by the Diagram above, 60% of the households living within the Hekpoort Study Area occupy their dwelling units rent-free. This state is typical of rural areas, where farm worker are allowed to live rent-free on the farm that they are employed at. In total, 21% of the households living within the Study Area rent the dwelling unit they occupy. A total of 14% of the households living within the Study Area own their dwelling units or property; not having a bond registered to the property. Only 5% of the households living within the Study Area have a bond registered on their property, which is in stark contrast to that which is found in typical urban areas.

2.8.3. INFORMAL SETTLEMENT

A number of informal settlements are prevalent within the Hekpoort Study Area. These informal settlement have largely originated due to farm worker evictions, which is turn has been brought about by changes in legislation affecting the residence of farm workers on privately-owned farmland. Many of these evicted farm workers still work on the farms within the Hekpoort Study Area and therefore require formal housing within the Hekpoort Study Area, as is required by the Constitution of South Africa. This necessitated the development of rural settlements within the Hekpoort Study Area.

Professional Mobile Mapping (PMM) surveyed the Informal Settlement within the Hekpoort Study Area in the year 2010. This project involved an extensive process whereby the positions of all informal structures were captured from recent aerial photography. Individual informal dwellings were then visited by field workers that captured socio-economic data using GPS technology and handheld computers.

A total of 10 settlements in the Hekpoort region were surveyed by PMM. Four smaller settlements in the Hekpoort region (Active, Nooitgedacht, Top Rose and Ralebobe), located on existing farms, were not surveyed by PMM, but these are included in the Hekpoort Precinct Plan and have been counted from recent aerial photography. The Masakane settlement is located outside the Hekpoort Precinct Plan Study Area, but because it was considered functionally part of Hekpoort in the PMM study, it was included in the Hekpoort Precinct Plan count. Four informal settlements were also identified within the Cradle of Humankind, situated along the R540. These settlements (Kromdraai and Tweefontein) were not surveyed by the PMM study and have therefore been counted from recent aerial photography for the Hekpoort Precinct Plan.

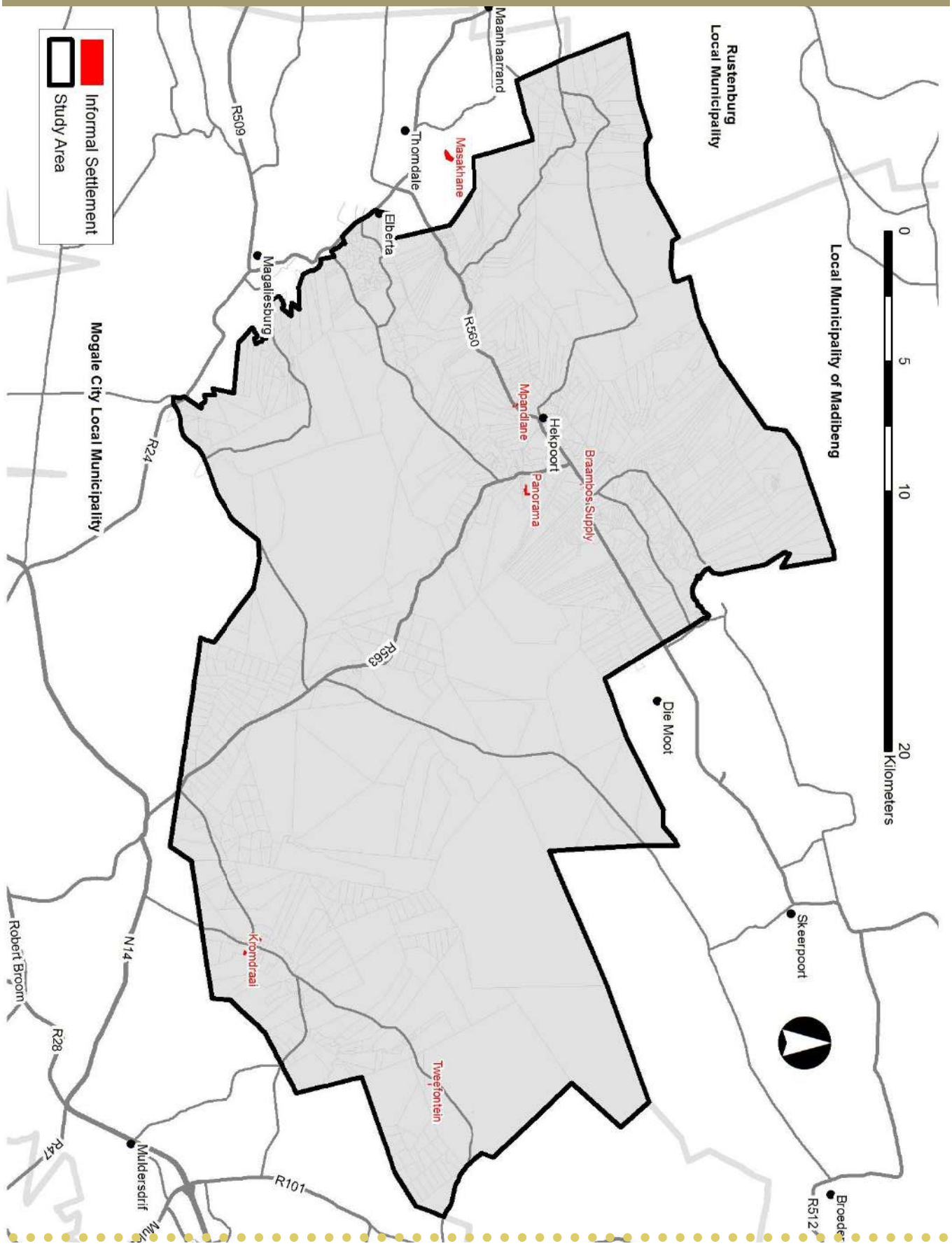


FIGURE 18
INFORMAL SETTLEMENTS

INFORMAL SETTLEMENTS

TABLE 2: INFORMAL SETTLEMENT COUNT 2010

Name	Informal Dwellings	Do Not Qualify for Housing Subsidy	Qualify for Housing Subsidy
Hekpoort Region			
Roelofs	76		
Active	7		
Braambos Supply	53		
Nooitgedacht	9		
Radikgomo	25		
Top Rose	6		
Mpandlane	73		
Ralebobe	15		
Dizozo	24		
Toet Tree	26		
Pokolo	32		
Panorama	90		
Sunburst	15		
Masakane (outside)	89		
Sub-total	540	95	445
Cradle of Humankind Region			
Kromdraai 1	43		
Kromdraai 2	54		
Kromdraai 3	12		
Tweefontein	11		
Sub-total	120		
Total	**660**		

Source: PMM and Urban Dynamics Gauteng, 2011

According to the Table above, which summarises the informal dwelling counts of the PMM study and the Urban Dynamics aerial photograph count, approximately 540 informal dwelling units are located within the Hekpoort region of the Study Area. This figure included the Masakane settlement, which is located outside the Study Area boundary. The largest informal settlements include Roelofs, Braambos Supply, Mpandlane, Panarama and Masakane. In addition, approximately 120 informal dwelling units were counted in the Cradle of Humankind region. Thus, the Hekpoort Study Area comprises approximately 660 informal dwelling units in total. The spatial distribution of the informal settlements within the Hekpoort Study Area is illustrated on Figure 18.

2.8.4. PLANNED AFFRODABLE HOUSING DEVELOPMENT

TABLE 3: VOGELSANG AFFORDABLE HOUSING DEVELOPMENT

Land Use	*No. of Stands*	**Area**
Residential	222	4.86 ha
Mixed use node	1	1.44 ha
Crèche	1	0.14 ha
Park	3	0.95 ha
Road purposes	18	0.69 ha
Streets		2.96 ha
Total	245	11.04 ha

Source: Urban Dynamics Gauteng, 2011

Currently, a small-scale affordable housing project is underway within the Hekpoort Study Area to provide affordable housing within the Study Area. This project is known as Vogelsang and is funded by the Gauteng Department of Housing affordable housing subsidy programme. The township is situated on Portion 1 of the farm Vogelsang 429-JQ, which is located on the intersection of road R560 and road R401. This location is depicted on Figure 18. The owner of Portion 1 of the farm Vogelsang 429-JQ is the Mogale City Local Municipality. The Municipality also owns the Remainder of the farm Vogelsang 429-JQ, which is situated south of the R560. The Remainder does not have the access requirement needed to allow the development of affordable housing. Consequently, the Municipality intends using the Remainder of Vogelsang for community-based commercial farming purposes associated with the Vogelsang affordable housing development.

As depicted by the Table above, the Vogelsang townships is located on a site 11ha in extent. This township will comprise stands for 222 affordable housing units, as well as a mixed-use node, comprising informal markets, retail, tourist facilities, community facilities and a sports field. The affordable housing units to be provided in the Vogelsang townships will cater for the need for affordable housing units within the informal settlements within the Hekpoort Study Area. The 222 affordable housing units to be provided will comprise approximately half of the 445 affordable housing units currently required. The 95 informal families that will not be able to quality for a housing subsidy will most likely require rental housing. Rental housing can be developed as a second dwelling unit linked to the subsidy granted to a qualifying family receiving an affordable housing unit.

SECTION 3: LAND USE ESTIMATES

3.1. POPULATION GROWTH

Population estimates need to be based on a base year. In other words, a specific year must be chosen of which the population number is known or can be calculated to a reasonably accurate degree. This base year is used as a platform on which to calculate or project the population growth up to the current year (in this case 2010), as well as the population growth up to certain points in the future. The base year used for the Hekpoort Study Area is the year 2001, which correlates with the Census 2001 year. The future population growth was calculated for 2 incremental periods: 2015 and 2020.

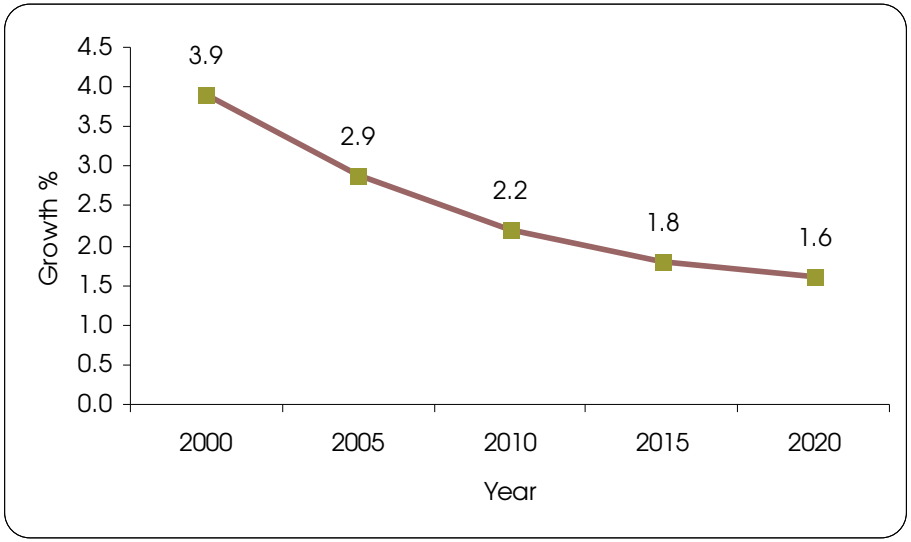


DIAGRAM 18: POPULATION GROWTH RATE

The population growth scenarios considered for Hekpoort was based on historic trends, current governmental policies, urban realities and the proliferation of life-threatening diseases such as AIDS. This growth scenario assumes a strong and positive starting population growth, with a gradual decrease in the population growth over the medium term and a leveling out of the growth rate over the longer term.

As depicted by the Diagram above, a population growth rate of between 3.9% and 1.6% per annum was used for the period 2000 to 2020. The relatively sharp decline in the growth rate between 2000 and 2010 is mainly due to a number of reasons: (a) the impact of the abolition of the Group Areas Act in 1994 is diminishing as time passes, and (b) HIV/AIDS is significantly increasing mortality rates. After 2010, the growth rate is expected to level out at about 1.6% per annum.

TABLE 4: HEKPOORT POPULATION 2020

	Census Population (2001)	Population Estimate (2005)	Population Estimate (2010)	Population Estimate (2015)	Population Estimate (2020)
Total Population	**20744**	**23257**	**25930**	**28350**	**30691**
Formal population	16891	20158	23243	26339	30691
Informal population	3853	3099	2688	2011	0
% growth		2.9	2.2	1.8	1.6
Households	***6363***	***7625***	***8502***	***9295***	***10063***
Formal households	5181	6609	7621	8636	10063
Informal households (backyard)	273	306	341	341	0
Informal households (settlement)	909	710	540	318	0
Average household size	3.26	3.05	3.05	3.05	3.05

Source: Estimated from Census 2001 and PMM informal household figures

According to the Table above, the population of the Hekpoort Study Area in 2010 was estimated to be approximately 26000 people or 8500 households. Of the 8500 households, approximately 900 households were estimated to be informal. The Study Area population will grow to an estimated total population of approximately 28000 people and 9300 households by the year 2015 and an estimated total population of approximately 31000 people and 10000 households by the year 2020. This is an additional 800 households by 2015 and an additional 780 households by 2020. These additional households include the informal households living within the Hekpoort Study Area. Thus, the additional households equate to the approximate number of new housing units that will need to be constructed within the Hekpoort Study Area by the year 2020.

3.2. ECONOMIC DEVELOPMENT POTENTIAL

Demacon Market Studies were commissioned by Urban Dynamics Gauteng to compile a comprehensive economic study to serve as input for the Hekpoort Study Area Plan. Herewith a brief overview of the findings of that the economic study. Inserts from Hekpoort community comments are also provided. These findings have been used to guide the formulation of development proposals for the Hekpoort area in a following section of this Hekpoort Study Area Plan.

3.2.1. CURRENT ECONOMIC CONDITION

Over the past years the Hekpoort Study Area evolved from what was mainly a farming community, with the bulk of the population employed in this sector, to an area that can no longer support its population through its agricultural industry. The changes in the Hekpoort Study Area can be summarized as follows:

- The number of people in the Stud Area whose sole income is farming has shrunk considerably
- Many still indulge in farming activities on a part-time basis but their income is supplemented by other employment
- Hekpoort's business climate today is far more negative than it was years ago – businesses have closed and most household purchasing is done outside of the Hekpoort Study Area in Rustenburg, Krugersdorp and Brits.
- No evidence of a vibrant business community exists – the collapse of the flower industry, formerly a mainstay of the valley and a major employer of labour, led to large-scale unemployment
- Few business premises are available for rent and those that are on offer demand exorbitant rents that cannot be sustained by the current business climate
- Many tourism related businesses exist, all facing similar and growing problems namely:
    - Deteriorating road infrastructure, making it difficult for tourists to reach tourist destination and accommodation
    - Poor economic conditions which have a negative impact on client numbers and spending ability
    - Difficulty in finding a motivated and appropriately trained labour pool with the required skills to support the tourism industry
    - The perception that the area has a high level of crime and insecurity
    - Poor comprehension of the importance of aesthetics in a tourism area
- Poor business investment climate as a result of uncertainty regarding future development plans for the area.

In the longer term, the goal that should be worked towards is improving the investment climate of the Hekpoort Study Area to promote private sector initiatives that would create employment without an added burden on the local government. In the shorter term, local government will be required to address the current lack of economic development through initiatives that could bring about a more immediate improvement in the living conditions of the local population.

3.2.2. ECONOMIC ACTIVITIES IN HEKPOORT

A rapid appraisal of existing economic activities was conducted within the Study Area in order to highlight the economic performance of the Study Area. The findings are as follows:

- The activities found along the R400 are predominantly tourism and agriculture related.
- The activities along the R563 is predominantly tourism and agriculture orientated, supported by agricultural related businesses, small scale restaurants, small scale retail and transport related businesses.
- The activities along the R96 are also predominantly orientated towards the tourism and agricultural sector, supported by small scale retail, restaurants and a secondary school.
- Economic activities along the R560 are more diverse including a range of tourism related activities, agricultural activities, retail, manufacturers, wholesalers, local municipal offices and service functions and a primary school.
- The economic activities along the R465 are predominantly related to the tourism industry, with emphasis on the Askari Game Lodge.
- Economic activities along the R99 are predominantly agricultural orientated, supported by a small general dealer.
- Economic activities along the R1676 are predominantly tourism and agricultural related.
- Activities along the R401 are predominantly tourism and agricultural orientated, supported by a small general dealer.

The dominant activities include nurseries, lodges, poultry farms, camp and caravan sites, general dealers, horse racing and breeding farms and stables, game reserves, suppliers / wholesalers and game farms and self-catering and cottage facilities. From the analysis it is evident that the dominant activities found within the Hekpoort Study Area are vested in the Tourism, Agriculture, Trade, Business and Financial Services and General Government Services Sectors. These sectors should be targeted in order to develop the economic base of the Study Area. These sectors correlate with the target sectors of Mogale City (except for agriculture).

3.2.3. RETAIL SUPPLY

TABLE 5: RETAIL CENTRES IN PROXIMITY TO HEKPOORT

Centre	Suburb	m2 GLA	Type
Westgate Shopping Centre	Roodepoort	106 270	Super Regional Centre
Key West - Krugersdorp	Krugersdorp	53 000	Major Regional Centre
Princess Crossing Shopping Kingdom	Roodepoort	36 909	Value Centre
Sediba Plaza	Hartebeespoort	10 052	Neighbourhood Centre
Anthos Centre	Krugersdorp	8 500	Neighbourhood Centre
Witpoortjie Shopping Centre	Roodepoort	7 320	Neighbourhood Centre
Rant-En-Dal Shopping Centre	Krugersdorp	7 000	Neighbourhood Centre
Pick n Pay Centre - Noordheuwel	Krugersdorp	6 289	Neighbourhood Centre
Rainbow Village Centre	Marikana	5 000	Neighbourhood Centre
Monument Mall	Krugersdorp	4 554	Local Convenience Centre
Noordheuwel Shopping Centre	Krugersdorp	4 141	Local Convenience Centre
The Mountain Lake	Hartebeespoort	3 500	Local Convenience Centre
Wilrokrans Shopping Centre	Roodepoort	3 400	Local Convenience Centre
Wilro Park Shopping Centre	Roodepoort	2 300	Local Convenience Centre
Wilro Corner	Roodepoort	1 850	Local Convenience Centre
Monilith Shopping Centre	Krugersdorp	1 700	Local Convenience Centre

Source: Demacon Market Studies, 2011

Limited retail uses exist within the Study Area except for the Hekpoort Village and three general traders. Even Hekpoort town is characterised by minor levels of economic activity and it lacks a major regional function from an economic perspective. It predominantly caters for day-to-day convenience shopping and focus of surrounding developments relating to the tourism industry.

No formal retail shopping centre is located within the Hekpoort Study Area. The majority of retail centres are found outside the Study Area boundary in Krugersdorp, Roodepoort, Hartbeespoort, Brits and Rustenburg. The Table above provides an overview of the retail centres found in closest proximity to the Study Area. It is anticipated that the Study Area could support a larger retail node serving the surrounding agricultural communities and tourism market segments.

3.2.4. TOURISM ATTRACTIONS

The Hekpoort Study Area is characterised by numerous tourist attractions and accommodation facilities. The dominant tourism activities are short-stay accommodation, restaurants, animal sanctuaries, game farms, health spas, and many more. The surrounding region strengthens the Hekpoort Study Area as a tourist destination with a supportive array of tourism products and activities.

The proximity of the Study Area to the Cradle of Humankind World Heritage Site and surrounding tourism facilities bode well towards tourism and rural development within the Hekpoort Study Area. However, the Cradle of Humankind area covers most of the southern half of the Study Area and there is no indication of the nature or intensity of land uses that will be permitted within this area. Due to the fact that the Cradle of Humankind area abuts some of the major roads within the Study Area it could have an impact on the development potential of the southern half of the Study Area.

The Hekpoort Study Area is also identified as an important tourism development area with emphasis on the R563 and R560 tourism routes and the Hekpoort town. The R24 (North of Tarlton) is identified as an important tourism development corridor and will impact positively on the development potential of the Hekpoort Study Area.

3.2.5. COMPETATIVE ADVANTAGE OF MOGALE CITY

An analysis of the competitive and comparative advantages of Mogale City was conducted to identify potential target sectors that can contribute towards the sustainable development and diversification of the local economy of Mogale City as a whole. In the context of the above, it is anticipated that local economic growth in Mogale City can be driven by investment in the following economic sectors:

- Retail and Wholesale Market
- Residential Property Market
- Office Market
- Short-Stay Accommodation and Conferencing Market

The Short-Stay Accommodation and Conferencing Market is the most applicable economic sector to the Hekpoort Study Area, because this can potentially be linked to Maropeng and the Cradle of Humankind.

3.2.6. PROPOSED DEVELOPMENT APPROACH

Addressing the issue of economic growth will have a positive impact on employment and will reduce poverty. The primary catalyst for economic growth within the Hekpoort Study Area will be the level of investor confidence that exists. The negative economic growth in the Hekpoort Study Area is directly related to the low level of investor confidence that has developed over recent years. Addressing this low level of investor confidence demands that the following measures be taken:

- Coherent, clear and transparent development plans be formulated that support the main economic drivers of the area
- Improve the relationship between the rate paying section of the community and Mogale City Municipality to enable these parties to move forward jointly to the benefit of the community as a whole
- Acceptance by the Municipality that management approached appropriate for an urban area do not necessarily apply in a rural area, thus requiring that management approaches be developed that suit rural conditions
- Improvement of the business climate and business potential by upgrading local infrastructure; in particular dirt roads
- Provision of incentives to encourage new investors

Based on the above, two economic development goals are broadly identified for the Hekpoort Study Area, which are (a) create a transformed rural area that is socially and economically developed and (b) enable an institutional environment that is conducive for rural development. Principles underlying the implementation of these economic development goals include:

- Empowerment, mobilisation and organisation of rural people
- Public-private partnerships and collaboration
- Enhancement of available assets, knowledge and resources
- Sustainable utilisation of available natural resources
- Local investment attraction
- Local economic growth
- Local job creation and social upliftment
- Expansion of local rates and tax base
- Integration and coordination of government programmes

- Medium to long term planning.

The economic development goals can be realised through the effective implementation of the following economic pillars:

TABLE 6: PROPOSED ECONOMIC PILLARS

Economic Pillar	Description	Development Objectives
Agricultural Development	Expanding the diversity of the agricultural sector within the Study Area.	• Conduct research and identify viable development options and methods for the diversification of the agriculture sector in the Study Area
Agrarian Transformation and Food Security	Agrarian transformation should be the main driver for rural development. Focus should be on attaining the objectives of food security, agricultural production and distribution.	• Ensure food security • Accelerate participation, equity and productivity in commercial agricultural development • Facilitate and support access to markets and distribution channels for community-based commercial farmers
Non-Farm Rural Economy	In order to strengthen the local economic base, emphasis should be placed on non-farm economic activities. For the non-farm rural economy to make an impact, consideration should be given to a wide range of issues that include infrastructure, labour, skills, productivity, markets, marketing, information communication and technology, as well as information sharing and knowledge management.	• Create economic opportunities for sustainable livelihoods
Infrastructure	Address the social, transport, logistics and economic infrastructure backlogs	• Improve and maintain rural roads, transport and logistics network • Provide energy, water and sanitation infrastructure to rural areas
Social and Human Development	Support social and human development to increase levels of health, education and employment.	• Co-ordinate and ensure access to quality services • Build vibrant, caring and cohesive communities that embrace cultural and moral values
Enabling Environment	Creating an enabling environment where channels of communication exist between the private and public sector in such a manner that it promotes investment within the Study Area.	• To promote trust and co-operation between the public and private sector • To ensure that local government processes support investment attraction.

Source: Demacon Market Studies, 2011

3.3. COMMUNITY FACILITY NEED

From the onset it has to be emphasized that the following community facility estimate is only a rough estimate of the number of community facilities, business space and open space needed within the Hekpoort Study Area. The actual provision of such land uses within the Hekpoort Study Area may depend on a number of undetermined factors, such as distance and accessibility. The community facility estimate is presented by the Table below and can be summarized as follows:

a. Community Facilities

The community facility estimate has calculated the number of community facilities required within the Hekpoort Study Area to support the existing and future population residing within the Hekpoort Study Area. According to the community facility estimate, the Hekpoort Study Area has an oversupply of primary, but requires a secondary school. The need for a secondary school was confirmed by the Hekpoort community. The oversupply of primary schools can largely be attributed to the size of the Study Area, because more primary schools were provided than is necessary in order to located schools in closer proximity to rural subareas. Regarding other community facilities, community facility estimate determined that the Hekpoort Study Area has all the required community facilities (such as a library and a community hall) to serve it's existing and future population growth up to the year 2015, but would require an additional clinic by the year 2020.

b. Business

The viable retail and office floor area that can be accommodated within a given area depends on the spending capital of the people living in that area. In turn, the spending capital depends on the socio-economic position of the people living in that area. The potential retail and office floor area to support the current population within Hekpoort Study Area was calculated based on the socio-economic position of people living within the Hekpoort Study Area, as set out in the socio-economic section of this report. Currently, the Hekpoort Study Area has an existing retail centre of approximately 1700m^2. It was calculated, taking the above into account, that the Hekpoort Study Area can accommodate an additional 23,000m^2 of retail space up to the year 2020. It was also estimated that the Hekpoort Study Area can accommodate approximately 7,000m^2 of office space up to the year 2020. In other words, a total business floor area of approximately 30,000m^2 can potentially be develop within Hekpoort Study Area up to the year 2020, based on the estimated population growth of the region.

TABLE 7: HEKPOORT COMMUNITY FACILITIES ESTIMATE 2020

Land Use	Existing 2010			Need 2015			Backlog 2010-2015			Need 2020			Backlog 2015-2020		
	no.	ha	m²	no.	ha	m²	no.	ha	m²	no.	ha	m²	no.	ha	m²
Population	***25930***			***28350***						***30691***					
Households	***7962***			***8977***						***10063***					
Educational	***8***	***24.4***		***7***	***25.0***		***-1***	***0.6***		***8***	***29.2***		***0***	***4.8***	
Primary School	7	19.6		4	12.1		-3	-7.5		5	14.1		-2	-5.5	
Secondary School	1	4.8		2	10.4		1	5.6		3	12.1		2	7.3	
Tertiary Institution	0	0.0		0	2.6		0	2.6		0	3.0		0	3.0	
Health	***1***	***0.2***		***2***	***2.1***		***1***	***1.9***		***2***	***2.3***		***1***	***2.1***	
Clinic	1	0.2		2	0.4		1	0.2		2	0.4		1	0.2	
Hospital	0	0.0		0	1.7		0	1.7		0	1.8		0	1.8	
Community	***4***	***23.8***		***5***	***9.2***		***1***	***-14.6***		***6***	***9.9***		***0***	***0.7***	
Library	1	0.4		1	0.6		0	0.2		2	0.6		0	0.0	
Community Hall	1	1.0		1	1.4		0	0.4		2	1.5		0	0.1	
Post Office	1	0.2		1	0.3		0	0.1		2	0.3		0	0.0	
Police Station	1	1.0		1	1.0		0	0.0		1	1.0		0	0.0	
Emergency Service Centre	0	0.0		0	0.3		0	0.3		0	0.3		0	0.0	
Cemetery		21.2			5.7			-15.5			6.1			0.5	
Business		***0.6***	***2210***		***7.4***	***29484***		***6.8***	***27274***		***8.0***	***31919***		***0.6***	***2435***
Retail		0.4	1700		5.7	22680		5.2	20980		6.1	24553		0.5	1873
Private Office		0.1	510		1.7	6804		1.6	6294		1.8	7366		0.1	562
Open Space		***0.0***			***17.0***			***17.0***			***18.4***			***1.4***	
Active		0.0			17.0			17.0			18.4			1.4	
Transit Station	***0***	***0.0***		***3***	***1.5***		***3***	***1.5***		***3***	***1.5***		***0***	***0.0***	

Source: Urban Dynamics Gauteng, 2011

c. Open Space

Open space can be classified as active and passive open space. The former involves recreation and sport facilities. The latter involves natural areas, such as ridges and river flood areas. According to the Land Use Budget, the Hekpoort Study Area requires approximately 18ha of active open space to support its population up to the year 2020. The high open space figure can be contributed to the fact that the Hekpoort Study Area currently has no formally developed active open space.

SECTION 4: DEVELOPMENT VISION

4.1. SWOT ANALYSIS

An analysis was conducted to determine the primary developmental strength, weakness, opportunity and constraint affecting the Hekpoort Study Area, as depicted by the Table below. This analysis concluded the following:

a. Strength

The primary strength of the Study Area is the fact that it contains high-potential agricultural soils with irrigation potential. This has always been the strength of the Study Area. This strength is reflected in the cadastral layout of the Study Area, with intensive, irrigation farms found along the Magaliesrivier. The Magalies River flows through a region containing high-potential agricultural soils towards the Hartebeespoort Dam. Due to the scarcity of high-potential agricultural soils within South Africa and the fact that it is a finite resource; requires the continuous protection of these high-potential agricultural soils.

b. Weakness

The primary weakness of the Study Area is the fact that it does not have an identifiable settlement pattern. The nearest spatial entity of a settlement is Hekpoort, but this settlement is no more than a small cluster of businesses and community facilities. As a result, the Study Area has a poorly defined node or focal point. In additional to the aforementioned, the danger exists that the establishment of rural settlement within the Study Area would result in the further weakening of the Hekpoort node. It will therefore be important to encourage the growth of the Hekpoort node and only allow settlement formation in the Study Area that would enable the development of rational and logical settlement pattern.

c. Opportunity

The Hekpoort Study Area has a number of opportunities to development is tourism industry. As mentioned above, the addition of Maropeng to the Study Area has significantly added to the economic potential of the Study Area. But there

are other opportunities related to the tourism industry as well. For example, the Hartebeesthoek Radio Astronomy Observatory (RAO) can become a tourist destination in itself. The new Sutherland SALT Observatory as an example has successfully become a tourist destination, with daily tours to the observatory. In addition, the Magaliesberg mountain range has many eco-tourism opportunities. In fact, the higher point along the Magaliesberg is located within the Study Area.

TABLE 8: SWOT ANALYSIS

Strength	**Weakness**
• High-potential agricultural soils with irrigation potential • Pristine beauty and natural environment • Regional accessibility from Tshwane and Johannesburg • Proximity to a number of employment nodes • Availability of land • High value agricultural land • Tourism activities and products – heritage, eco-tourism, outdoor recreation, agricultural tourism • Proximity to Cradle of Humankind • Demand for local economic development • Access to public transport facilities	• A weak and inadequate settlement pattern • A shortage of appropriate housing for a significant section of the population • Low population and demand densities • Outflow of buying power • Limited employment opportunities • Quality and availability of infrastructure • Hekpoort lacks a major function within the rural environment other than day-to-day convenience • Rural skill levels
• Tourism development linked to Maropeng • Tourism product development • Tourism corridor development along R560 and R563 • Proximity of Magaliesberg • Hekpoort rural and tourism • Community-based commercial agricultural projects • Agri-processing • Rural housing opportunities • Community, social and business services	• Lack of economic growth which leads to unemployment and poverty • No bulk municipal water capacity • Lack of investment in infrastructure • Extent of the Cradle of Humankind • Rural land invasion • Availability of more diverse business nodes beyond the Study Area • Poverty • Land assembly
Opportunity	**Threat**

Source: Urban Dynamics Gauteng and Demacon Market Studies, 2011

d. Constraint

The primary constraint of the Study Area is the fact that it has severe municipal water capacity constraints. Currently, there are two existing Rand Water bulk supply mains that cut across the Hekpoort Study Area, stretching from Randfontein to Rustenburg. Both these water pipelines have already reached their combined design capacity and during periods of peak demand the pipelines are operated beyond their capacities. Consequently, the Randfontein-Rustenburg water supply system does not have additional capacity, to the extent that any additional take-off from the system will severely affect existing consumers. Based on the above, Rand Water cannot accept any new water supply applications requiring water from the Randfontein-Rustenburg water supply system at present. This situation is expected to continue until local water supply resources are introduced for Rustenburg, or until the existing Randfontein-Rustenburg Rand Water system is upgraded.

4.2. DEVELOPMENT OBJECTIVES

The Spatial Development Framework needs to adhere to a set of objectives, which aim to address the weaknesses and constraints and harness the strengths and opportunities of the Study Area. The following development objectives need to the met when preparing the Precinct Plan for the Hekpoort Study Area:

Objective 1: Create an rational and efficient rural settlement pattern

Settlement patterns deal specifically with the relationship between the localities of places of living and places of work and the accessibility between them in terms of movement and mobility. To create a rational and efficient settlement pattern within the Hekpoort Study Area will require locating rural settlement near employment opportunities and social amenities. With regard to social amenities, it will be necessary to locate rural settlements near nodal areas containing social amenities, such as Hekpoort and Magaliesburg.

Objective 2: Integrate land use and public transportation

It is important not to create a settlement pattern that has no relation to the existing transportation infrastructure, an especially the public transportation network, serving the Study Area. This is of particular importance in an area the size of the Hekpoort Study Area. This requires the placing of rural settlement near major roads, which provides access to public

transport services, which can provide access employment and nodes containing social amenities located within or near the Study Area. In turn, such an integrated settlement pattern forms the bases for the provision of better and more cost-effective public transportation services.

Objective 3: Provide access to municipal services and social amenities

Economic and settlement development within the Hekpoort Study Area in future will be subject to the development of municipal services and community facilities. The development of municipal services in particular, can place a constraint of development within the Study Area if not addressed in a pro-active manner. As was mentioned, the Hekpoort currently has no additional water supply capacity, and with out this, it is not possible for the Study Area to develop its tourism industry of develop rural settlements to cater for its location population.

Objective 4: Protection of open space and high-potential agricultural soils were feasible

Agriculture and tourism are the primary economic sectors within the Hekpoort Study Area. These are also the sectors with the greatest development potential within the Study Area. Linked to agricultural development is the protection of high-potential agricultural soils and linked to tourism development is the conservation and conservation-worthy natural environments, such as the Magaliesberg mountain range. To guarantee to vitality of growth of the mentioned economic sectors will thus require the deliberately protection of ecologically sensitive areas and high-potential agricultural soils. Such areas typically come under threat by the inconsiderate location and expansion of settlements and mining activities.

4.3. DEVELOPMENT CONCEPT

On a regional level, 3 nodal areas impact on the Hekpoort Study Area: Mogale City, Rustenburg and Hartbeespoort (see Diagram below). The Hekpoort Study Area is situated at the centre of these nodal areas, which basically form a triangle placing the Study Area at its centre. The Magaliesberg mountain range separates the Hekpoort Study Area from the Rustenburg area. A transportation corridor exists along the R24 connecting Mogale City to Rustenburg. Magaliesburg is a tourism node located on the R24. The R560 connect the Hekpoort Study Area to the Hartbeespoort situated on the Hartebeespoort Dam.

Within the regional context set out above, and aiming to address the development set out above, a development concept was drafted for the Study Area. The Development Concept, which is illustrated by the Diagram below, is made up of the following elements:

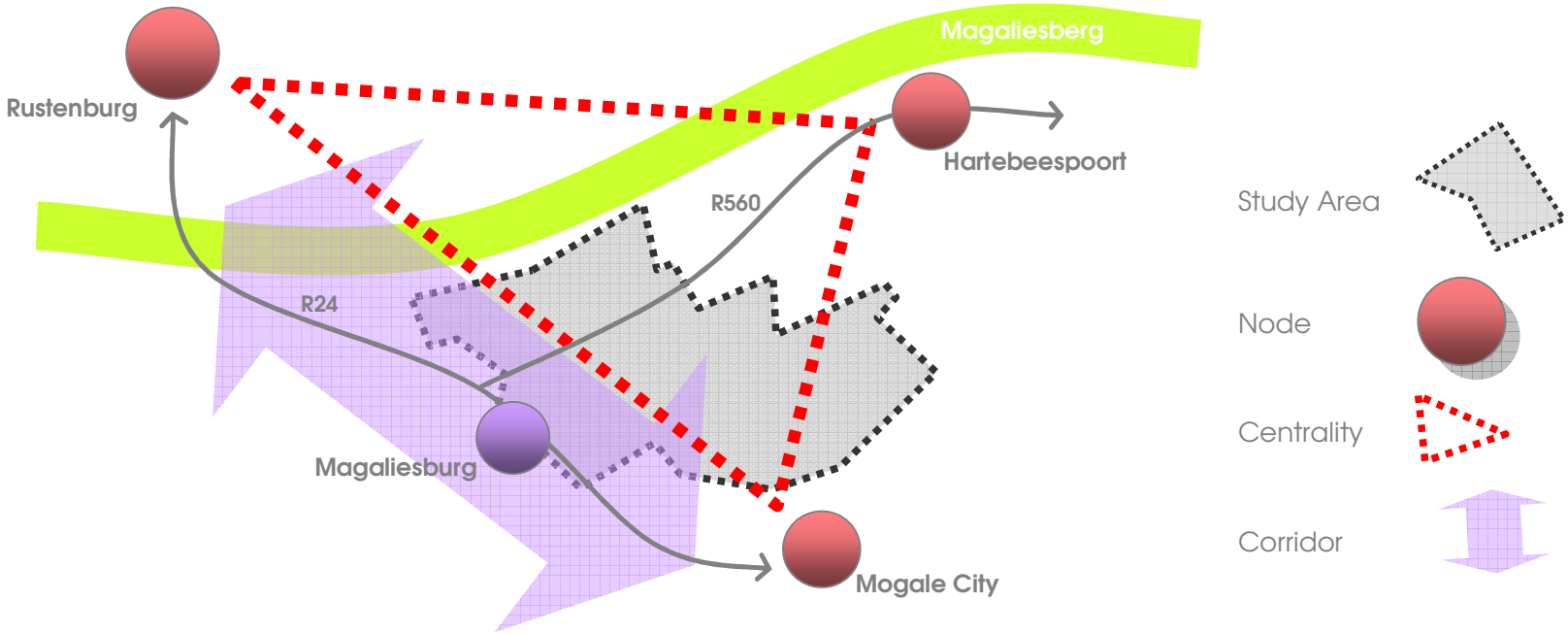


DIAGRAM 19: REGIONAL CONTEXT

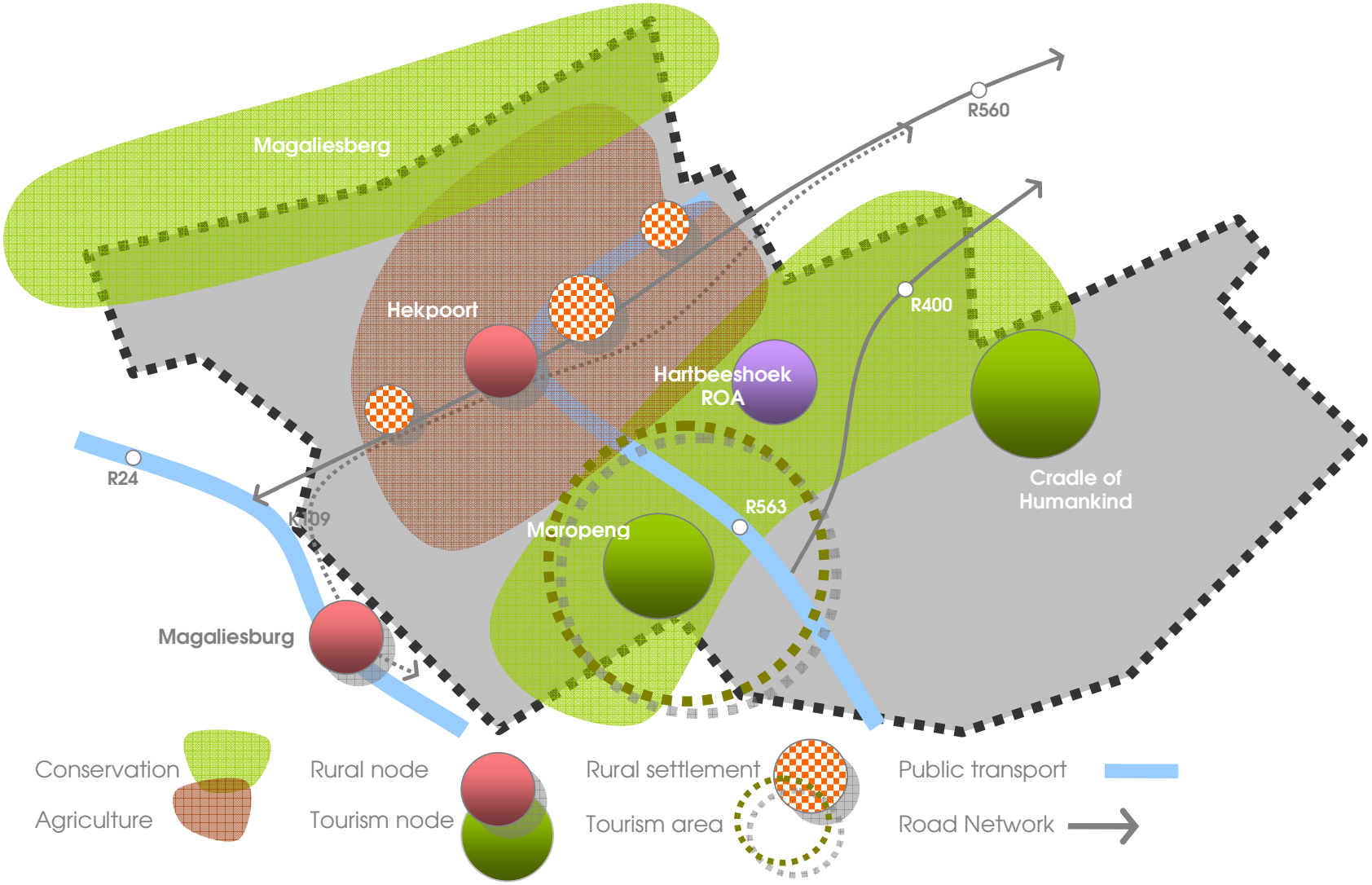


DIAGRAM 20: DEVELOPMENT CONCEPT

a. Transportation structure

The Hekpoort Study Area has a well-developed distributor road network that poses a number of advantages with regard to land use and economic development. The primary distributor roads serving the Study Area include R560 and the R563. The R560 traverses the Study Area in an east-west direction and links Hekpoort the Magaliesburg and Hartbeespoort. The R563 functions as a public transportation spine and links Hekpoort to Mogale City. Opportunities exist for rural settlement development along this transportation the R560/ R563 axis, allowing for the **creation of a rational and efficient settlement pattern**, as well as allow for effective **land use and transportation integration**. The Magaliesburg-Hartbeespoort railway line is a disused railway line traversing the Study Area.

b. Nodal structure

Hekpoort is the only node situated within the Study Area, containing a few businesses and community facilities. This node must become the focus for the **provision of municipal services and social amenities** within the Hekpoort Study Area. However, this node must not be seen in isolation, but all attempts must be made to ensure that it fits into the hierarchy of nodes of the larger West Rand District Council area. In terms of the WRDM SDF, the Hekpoort node is designated a Rural Service Centers with the function to serve rural communities, encourage the development of a mix of uses, improved public transport services and utilize the opportunity of tourism development. To this end, all attempts must be made to ensure that the combined resources of the Local Municipality and the private sector are focused to stimulate the development and growth of this nodal area.

c. Land use structure

Agriculture and tourism are the primary economic sectors within the Hekpoort Study Area. These are also the sectors with the greatest development potential within the Study Area. To guarantee to vitality of growth of the mentioned economic sectors will thus require the **protection of ecologically sensitive areas and high-potential agricultural soils**. In addition, existing agricultural and tourism elements should the optimally utilized in order to future develop the Study Area economically. For example, Maropeng is a newly constructed tourist facility of Provincial importance, which can form the bedrock for tourism development within the Study Area; facilitating the development of accommodation facilities within the Study Area in particular.

SECTION 5: DEVELOPMENT FRAMEWORK

5.1. SETTLEMENT AND HOUSING

The land use development proposals made for the Hekpoort Study Area are presented below. The aim was to make location-appropriate land use development proposals, taking into account environmental factors, access to public transportation and the need for housing development within the Study Area. The development potential of the Hekpoort Study Area was determined using the Land Use Estimates presented in Section 3 of this report and should be read in conjunction with this section. The Development Framework is presented on Figure 19.

5.1.1. LAND USE AND TRANSPORTATION INTEGRATION

Land use and transportation integration forms the backbone of any settlement pattern, be it within an urban area or rural environment alike. It not only ensures the cost-effective operation of the region's public transportation system, but it also tends to concentrate settlement development at specific and rational locations along public transportation routes. In addition, the rational location of settlement ensures a better relationship between areas of residence and employment, which can lead to shorter commuter distances and a better use of transport infrastructure. Based on the aforementioned, it is therefore necessary to approach the settlement and housing development within the Hekpoort Study Area from a transportation perspective.

The key to successful land use and transportation integration is encouraging settlement development along existing or proposed public transportation routes and in particular at the transit stops and stations along such routes. These are the points where access is obtained to the public transport systems and attempts should thus be made to optimally use these strategic locations. This can be done by locating settlements and the supporting community facilities near these stops and stations at, thus dramatically increasing the accessibility of these settlements. This location principle is known as Transit Oriented Development or TOD.

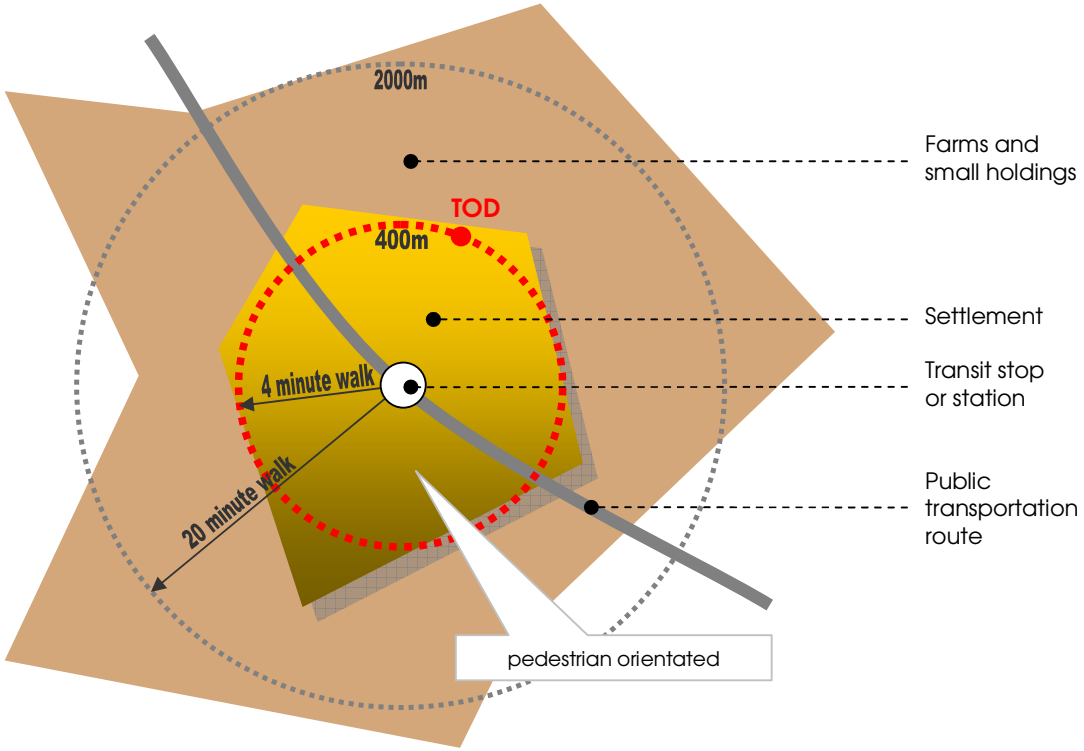


DIAGRAM 21: TRANSIT ORIENTED DEVELOPMENT (TOD)

Because pedestrian access is critical to the functioning of a TOD, walking distance is the primary criterion for delineating settlement boundary. In other words, the optimal size of a TOD is determined by the walking distance from the edge of the settlement to the transit stop or station. In this regard, the following two critical distances apply (see Diagram above):

- *4 minute walk*: The 4 minute walk basically delineates the edge or boundary of a rural settlement. This area is reserved for residential uses and residential supporting uses. Such a settlement places a relatively large number of households within walking distance of their daily needs, such as a convenience store, post office, police station, automatic teller, school, crèche and transit stop.

- *20 minute walk*: Whereas the 4 minute walk is a predominantly residential environment, the 20 minute walk delineates a rural environment, comprising farms and agricultural holdings. This outer ring is still within walking distance of the transit stop and station and community facilities provided within the TOD. The TOD is thus considered a service centre for the surrounding rural population and is also vital to the functioning of the TOD itself. This outer ring is typically required to supply the threshold population needed to sustain the community facilities and public transportation station located within the TOD. Pedestrian connections between the TOD and the surrounding rural areas are therefore essential. The area located beyond the outer 20 minute boundary is not considered to be within walking distance of the TOD.

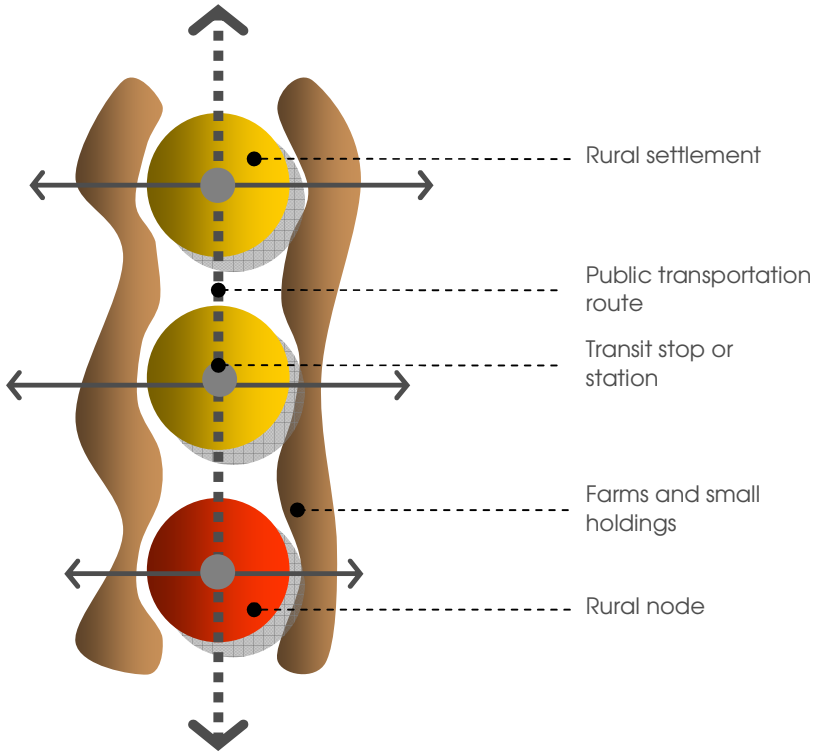


DIAGRAM 22: STRING-OF-BEADS CONFIGURATION

As should be evident from the above that the key to the development of a TOD is the manner in which land uses within a rural settlement are integrated with the public transit station or stop serving the settlement. This will involve creating a pedestrian-friendly environment within a rural settlement, and using this pedestrian environment as the link between the public transport station and stop and the surrounding land uses. A grid road and pedestrian network best suites pedestrian movement.

Public transportation is and must be central to rural settlement development, simply because households that typically live in rural settlements are reliant upon cheap and efficient public transport to access employment opportunities and social amenities. To achieve the aforementioned, TODs are best applied using a string-of-beads development pattern. A string-of-beads development pattern is usually shaped by a public transportation route or commuter railway line, concentrating the TODs at transit stops or stations situated along these transportation routes or railway lines (see Diagram above). Consequently, the string-of-beads settlement configuration is ideal for the viable and cost-effective operation of public transportation systems.

It is proposed that the TOD concept be embraced for the Hekpoort Study Area and implemented over the long term. Practically, this will involve identifying potential TOD areas and facilitating the development of rural settlements at these TOD locations. Apart from the Municipal Town Planning Departments, institutions that should be involved in developing TODs are the transit agencies (Department of Transport, taxi associations and bus companies), provincial departments (housing, health and education), private enterprise (e.g. retailers), financiers and the local community. Because the success of TODs requires committed stakeholders, these bodies should be involved in all the planning stages of TODs.

5.1.2. RURAL SETTLEMENT DEVELOPMENT

The establishment of rural settlements supports agricultural production and provides security of tenure to rural households and farm workers. However, the unsustainable development of rural settlements has the potential to lock people into poverty through limiting access to social and economic opportunities. Also, the development of too many rural settlements in a rural area and the development of buildings with an inappropriate form, style and scale, can impact on the amenity of natural, agricultural and tourism environments. Taking the above into account, the following two-pronged approach to rural settlement development is proposed:

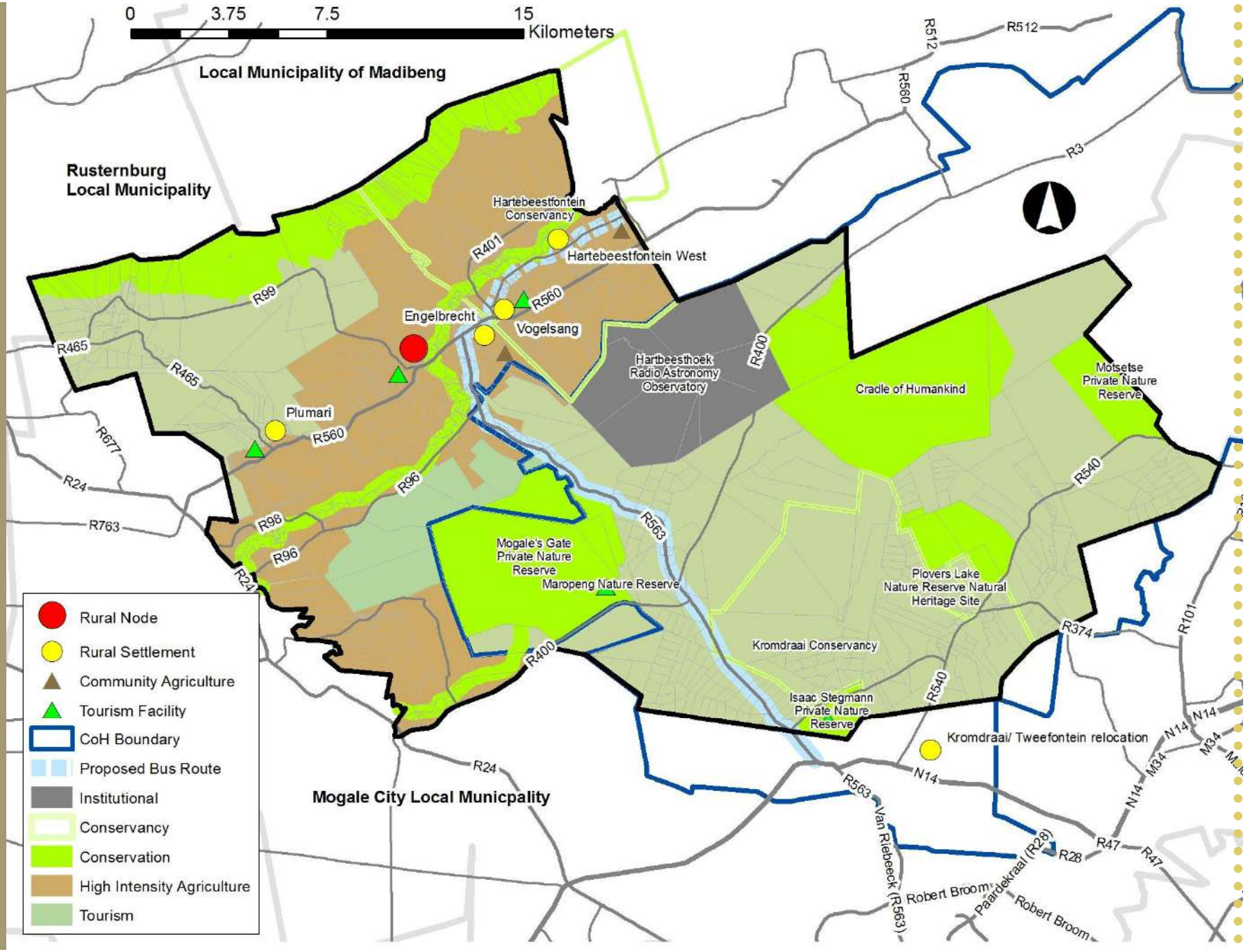


FIGURE 19
DEVELOPMENT FRAMEWORK

a. Improvement of existing rural settlements

A number of rural settlements already exist along the R560 tar road, most of which are situated on privately-owned land. These rural settlements have been in existence for an extended period of time and primarily serve as location in close proximity to their place of employment. Moreover, these existing rural settlements have easy access to the community facilities located within the Hekpoort Rural Node.

These nodes could be upgraded in certain cases to better serve the households currently living within these rural settlements. Because these rural settlements are located on privately-owned land, a partnership agreement can be reached between such landowners and the municipality, whereby the upgrading of these rural settlements can be done at municipal cost in exchange for continued security of tenure for the households of these rural settlements. New technology in terms of energy generation, water recycling and purification and sewerage treatment could be employed in these settlements.

b. New housing development

The development of a new rural settlement in the Hekpoort Study Area is desperately needed. Such a development should preferably be located on a tar road to provide access to public transport and provide ease of access to the community facilities located within the Hekpoort Rural Node. Preferably, such a rural settlement should be provided in a single location, as this will provide economies of scale for the provision of municipal services infrastructure and community facilities. The development of such a rural settlement should be sensitive to its environmental impact and its impact of the tourism industry, which is a primary economic sector of the Hekpoort Study Area.

Thus, the following criteria should guide decisions regarding the location and establishment of rural settlements:

- The rural character of the area should be preserved
- The aesthetics of the development should be in keeping with the goal of promoting the tourism industry
- Water is a scarce resource and in situ recycling and purification methods should thus be considered
- In situ sewerage treatment should be done at such a high standard to avoid the pollution of boreholes and the Magaliesrivier at all costs
- The use of solar technology for electricity generation should be considered
- It is desirable that any rural settlement development should take place on the tar road, because locations on poorly maintained dirt roads become inaccessible during rainy periods.

- A sequential approach must be used to determine the optimal location of a rural settlement. For example, it must be demonstrated why farm worker housing cannot be provided within an urban area, before a rural settlement can be established outside the existing urban development boundary
- Rural settlements should be located in areas where there is sufficient economic development potential
- Rural settlements should be within walking distance of a public transport route to allow people to access other employment opportunities and social amenities
- Rural settlements should preferably be established on sites within rural areas that are not used for commercial farming purposes
- **Rural settlements should have a predetermined and limited population size and the external growth of these settlements must be curtailed. Such settlements must not be allowed to turn into urban areas that are located outside the urban development boundary.**
- Rural settlements must contain or have access to all major settlement functions, such as social facilities
- Rural settlements should have access to farmland that can be utilized for community-based commercial farming purposes

The Hekpoort Study Area has a number of sites that can be utilized for residential purposes. These sites have been identified with the aim of strengthening existing or proposed public transportation routes and using land belonging to the Mogale City Local Municipally for rural settlement development. Inevitably, municipal services constraints will ultimately also play a central role in identifying sites for residential development within the Hekpoort Study Area.

Central to the location of rural settlement is the potential of these locations to adhere to the criteria that govern TOD development, because the success of a TOD is largely depended upon its location. Based on the theoretical aspects set out above, the following guidelines need to be applied to determine suitable locations for TODs within Hekpoort Study Area:

- TODs must be located on an existing or planned public transportation route.
- TODs must utilize existing or planned transit termini, such as a commuter railway station or bus stop.
- TODs should comprise vacant land areas to enable the development of a rural settlement and it's supporting uses.
- Ideally, the land available should be in public ownership, as this would guarantee the development of a TOD rural settlement.

Figure 19 depicts the sites set aside for rural settlement development within the Hekpoort Study Area. These locations are all located on land that is in the ownership of the Mogale City Local Municipality. In addition, these sites all have the potential to be linked to a public transportation route, thus enabling TOD development. This route can be established by extending the

existing bus route located on the R563 along the R560 and the R1676, as depicted on Figure19. A bus stop can be developed at each rural settlement, thus linking the rural settlement to the public transportation route. In addition, a bicycle lane can be included in the design of this bus route to allow for alternative modes of transport that is suited to the rural environment. The Hekpoort Rural Node is within cycling distance of the proposed rural settlements.

TABLE 9: PLANNED AND PROPOSED RURAL SETTLEMENTS

Item/ Rural Settlement	Proposed Development Phase	Proposed TOD Facility	Land Parcel Size	Existing Informal Dwelling Units	Estimated Number of Residential Stands	Proposed Community Facility
Backyard shacks				341 units		
Informal shacks				540 units		
Vogelsang Settlement	Phase 1	Bus stop	11ha		222 stands	Primary school
Hartebeesfontein West Settlement	Phase 2	Bus stop	26ha		830 stands	Use Vogelsang primary school
Hekpoort Rural Node	Phase 3	Bus stop	3ha		70 stands	Use Hekpoort primary school
Hartebeesfontein East Settlement	Phase 4	Bus stop	35ha		1120 stands	Use Vogelsang primary school
Total			72ha	881 units	2242 stands	

Source: Urban Dynamics Gauteng, 2011

In total, four rural settlement are proposed for the Study Area; each with the potential to be developed with TOD principles in mind. These proposed rural settlements and there development characteristics are as follows:

a. Vogelsang

The most notable rural settlement is the one that is currently being planned on the R560. This is known as the Vogelsang development, as it is situated on Portion 1 of the Farm Vogelsang 429-JQ. This project is funded by the Gauteng Department of Housing affordable housing subsidy programme. This township is in its preliminary design stage and will contain 222 residential stands once developed, as well as a mixed-use node, comprising informal markets, retail, tourist facilities, community facilities and a sports field. The affordable housing units to be provided in the Vogelsang townships will cater for the need for affordable housing units within the informal settlements within the Hekpoort Study Area. The 222 affordable housing units to be provided will comprise approximately half of the 540 affordable housing units currently required to eradicate informal settlements within the Hekpoort Study Area.

b. Hartebeesfontein West

The second consolidated land parcel located on the R1676 and comprises 3 properties situated on either site of the road. It is estimated that this land parcel, which is approximately 26ha in size. This rural settlement development can contain 830 residential stands and will therefore be able to accommodate the remaining 318 affordable housing units required to eradicate informal settlements within the Hekpoort Study Area. This settlement will also have enough stands to accommodate the 341 households currently living within backyard shacks within the Study Area and will thus be able to eradicate the informal backyard dwelling units currently located within the Hekpoort Study Area. This land parcel should be development as the second-phase rural settlement development, after the Vogelsang development has been completed.

c. Hekpoort Rural Node

A rural settlement is proposed within the Hekpoort Rural Node is order to (a) achieve a more diverse nodal environment and (b) in order to fully utilize the advantage of the close proximity of community facilities and retail opportunities. Currently, Mogale City is located on a parcel of land which is situated on the R560. However, this land parcel is considered more suitable for retail purposes (see Hekpoort Rural Node design) and it is therefore proposed that this parcel of land rather of exchanged for a parcel of land located further away from the R560. It was estimated that a land parcel of approximately 3ha in size is available for rural housing development, and that this land parcel can accommodate approximately 70 residential stands. This land parcel should be development as the third-phase rural settlement development, after the Vogelsang and Hartebeesfontein West developments have been completed. **Because the need of affordable housing will be absorbed by the Vogelsang and Hartbeesfontein West developments, the Hekpoort Rural Node development can be considered for bonded rural housing development.**

d. Hartebeesfontein East

A fourth property, which also constitutes the third land parcel available for rural settlement development, is also situated on the R1676, on the eastern boundary of the Hekpoort Study Area. This property is approximately 35ha in size and should thus be able to accommodate approximately 1120 residential units once developed. However, a significant part of the land parcel is used as a cemetery and this will inevitably impact on the number of residential units proposed above. Be as it may, there is currently not a sufficient need within the Hekpoort Study Area to develop this land parcel for affordable housing purposes. **It is thus proposed that this land parcel be left undeveloped until such time that there is sufficient need for further affordable housing development within the Study Area**.

e. Kromdraai/ Tweefontein Relocation

The parcel of land located on the intersection of the N14 and the R540 is currently being investigated for the relocation of the existing Kromdraai and Tweefontein informal settlements. Although this land is located within the Cradle of Humankind, it is located outside the previous District Management Area (DMA). It was estimated that a land parcel of approximately 10ha in size will be required to house the120 informal households currently living within the Kromdraai and Tweefontein informal settlements. This land includes enough space to also develop a primary school to serve the needs of the relocated Kromdraai and Tweefontein communities.

The Hekpoort community was is agreement of informal households living within Hekpoort region need to be housed formally within Hekpoort. The Hekpoort community also agreed that the development of the currently planned Vogelsang rural settlement is in order. However, the Hekpoort community stated that all additional rural settlement should be consolidated directly south of the Vogelsang settlement, by buying up the `Engelbrecht' land for this purpose. **To allow for this possibility, it is proposed that the purchase of the 'Engelbrecht' land for rural residential purposed be investigated by Mogale City. If it is found that the 'Engelbrecht' land can be purchased at a reasonable cost, then the development of the 'Engelbrecht' land for rural residential purposes should be considered the preferred scenario. If this scenario is followed, then the development of Hartebeesfontein East and West for rural residential purposed will no longer be necessary. These municipal owned properties can then be used for community-based commercial agriculture linked to the Vogelsang/ Engelbrecht rural settlement.** Consolidating rural settlement at Vogelsang will have infrastructure cost savings, which could in part be used to finance the purchase of the `Engelbrecht' land. For example, it would not require the tarring of R1676 to serve the proposed Hartebeesfontein West rural settlement.

If the development of the `Engelbrecht' land for rural residential purposes would be found not to be feasible, the development of the proposed Hartebeesfontein West site for rural residential purposed will need to be pursued. In this case, extending the existing bus route located on the R563 along the R560, the R401 and the R1676, as depicted on Figure19, will be required to provide public transport access to this rural settlement. A bicycle route can also be provided along the bus route to provide for alternative modes of transport. Apart from providing a primary school in each rural settlement proposed, no other community facilities, such as police station, libraries or clinics, are proposed. In the first instance, none of the rural settlements proposed will have the necessary threshold populations necessary to justify any of these community facilities. Secondly, such facilities are best located within the Hekpoort Rural Node, as proposed in the West Rand District SDF.

With the exception of the Hekpoort Rural Node, the entire Hekpoort Study Area is located outside the Urban Development Boundary. It could therefore be argued that the rural settlement development within the Study Area should therefore be affected by the Urban Development Boundary. However, in such a case it would be necessary to point out that rural settlement development within the Study Area is intended to accommodate rural households currently living within the Study Area only, and therefore does to constitute urban development or urban expansion. In addition, it could be pointed out (if the information exists), that these rural households are and will in future be dependant upon the Hekpoort rural area for employment opportunities.

5.1.3. AFFORDABLE HOUSING DEVELOPMENT

Affordable housing development, and in particular affordable rural housing development, is a national government priority. Affordable housing programmes are aimed to housing the poor who do not have the financial ability to take care of their own housing need. Affordable housing development is administered in terms of the National Housing Subsidy Scheme. Affordable rural housing has in recent year become a more prominent part of the affordable housing delivery programme, simply because of the recognition that this housing category has been neglected in the past in favour of affordable urban housing programmes, the latter of course being a greater challenge to address.

5.1.3.1. HOUSING TYPOLOGIES

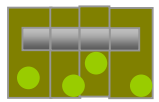
Housing typologies can be categorised according to level of attachment. Level of attachment refers to the vertical and horizontal attachment of buildings. There is a tendency, when addressing the housing demand, especially for the affordable housing sector of the population, to provide freestanding units with little on no level of attachment. There is little exploration of the benefits of other housing typologies, such flats, walk-ups, row housing and semi-detached units.

The following discussion on affordable housing typologies is not exhaustive, but rather focuses on affordable housing and density types that are appropriate for rural settlements in the Hekpoort Study Area. The Table below provides an easy-reference summary of the attributes of the different housing typologies and how it compares with the attributes of other housing typologies.

a. Detached housing

Detached units are standalone structures situated on a single, individually registered stand. This is the most commonly used housing type and is used for bonded and well as affordable housing. As an affordable housing unit, the design of this housing typology is usually limited to the requirements of the government housing subsidy scheme. The densities of this housing type varies dramatically, depending on it use. As an affordable housing option, this housing typology is usually located on stands of approximately 250m2 and achieve nett densities of approximately 40u/ha. Such densities do not promote the efficient use of land and do not promote the viable operation of public transportation systems. Consequently, this housing type should not be promoted is close proximity of high-volume public transportation systems, such as commuter railway lines.

TABLE 10: BONDED AND AFFORDABLE HOUSING TYPOLOGIES

Housing Typology	Gross Density	Nett Density	Stand Size	Building Height	Tenure Options	Subsidy Options	Plot layout
Detached housing	20 u/ha	40 u/ha	250 m^2	1 storey	Full title	Project-linked subsidy	
Semi-detached	25 u/ha	50 u/ha	200 m^2	2 storey	Full title	Project-linked subsidy	
Row housing	30 u/ha	60 u/ha	160 m^2	2 storey	Full title	Project-linked subsidy	
Walk-ups	40 u/ha	80 u/ha	n/a	3 storey	Rental or sectional title	Institutional subsidy	

Source: Urban Dynamics Gauteng, 2011

In terms of infrastructure costs, this housing typology is the most expensive housing option. The low densities and large stand sizes of this housing type result in large street frontages, which result in long infrastructure runs. On the other hand,

this housing type is the least complicated to construct, resulting in relatively low construction costs, when compared to other housing typologies. Detached housing is a housing typology that is quite suites for rural areas, simply because it is relatively easy to construct, and this factor becomes important in more remotely located rural areas.

b. Semi-Detached Housing

Semi-detached housing is a suitable affordable housing option and involves 2 housing units attached to one another, thus sharing at least one wall of the unit. This housing type does not exclude a second storey. Ground access, a private garden and on-site parking is possible with the housing typology.

Semi-detached houses are usually located on individually registered stands of smaller size than those used for single detached housing. These smaller stand sizes are achieved through the use of shared walls. Stand sizes are typically 200m² and yield a nett density of approximately 50u/ha. The smaller stand sizes translate to substantial infrastructure cost savings, making semi-detached housing more cost-effective than detached housing units. Shared walls also reduce the construction costs of the buildings, compared to detached housing units.

The smaller stands and higher densities achieved by this housing typology, compared to that of single detached housing units, make it more suitable as a public transport related development. Although it does not create the desired densities that would significantly boost public transport patronage, it is a better option than detached units. In a sense, this housing typology creates a balance between creating affordable housing units (within the subsidy range) and achieving higher densities that are more transport related. This housing typology is also the best option to follow when seeking higher residential densities within rural settlements.

c. Row Housing

Row housing is largely an affordable housing option and comprises more than 2 housing units linked to one another, as opposed to semi-detached housing with involves linking only 2 housing units to one another. The housing units that can be attached are not limited to a specific number, but 4 attached units create a well-scaled building. Usually, row housing comprises 2-storey units and this, combined with shared walls, reduces the construction costs of these units. This configuration allows small stand sizes in the order of 160m2 and this makes substantial infrastructure cost savings possible. Row houses have ground access and each unit has a private garden. On-site parking is possible.

The small stand sizes of row housing yield a nett density of approximately 60u/ha. This density is basically the entry-level density to ensure the optimal operation of public transportation systems. By developing such housing types within walking distance of public transport termini, would better serve public transport than lower density housing and better ensure the viability of these public transport systems, specifically commuter rail.

d. Walk-ups

Walk-ups provide a low-rise, higher-density housing option and are suitable as an affordable housing option. It is only at this level of density that it really becomes beneficial for public transportation and the cost-effective operation of public transport. With nett densities of approximately 80u/ha, this housing typology places enough commuters within walking distance of public transportation stations to ensure the viable operation of a public transportation system. Also, residents living in walk-up apartments are usually of a household income bracket that uses public transport as their means of transport, which implies a mutually beneficial relationship between walk-up housing and public transport.

This housing type involves individual housing units stacked on top of each other up to 3 storeys high and is located on a single stand. Consequently, full title ownership is not possible. Such units are either sold off as sectional title units or applied as rental units. What distinguishes walk-up from flats is the fact that walk-up units are accessed via a staircase. The gardens surrounding the building are in communal ownership and use. On-site parking is possible in the form of a parking lot and garages.

This housing typology does is cheaper to built than flats, because it does not require costly lifts or and costly construction methods to construct high buildings. In addition, the higher densities obtained through walk-ups compared to detached and semi-detached housing units, makes substantial savings in infrastructure costs possible. This cost saving not only applies to municipal infrastructure (water, sanitation and electricity), but also to the provision of roads. Despite this cost-saving, walk-up units cost substantially more than conventional affordable housing typologies and are therefore not possible to provide within the government housing subsidy limit. Provisions are higher-density housing options within the Restructuring Grant of the Housing Subsidy. In general, it can be said that this housing typology is more suited for an urban environment than a rural environment and it is therefore not suitable as a housing typology to be uses in rural settlements.

5.1.3.2. NEW DEVELOPMENT APPROACH

In the past, the Provincial Department of Housing considered that the best way to address the housing backlog was to adopt a strategy that was based on chasing numbers: a mass housing approach. Through this approach, houses were built where land could be acquired cheaply and this usually perpetuated urban sprawl and unsustainable development. In recent years, realities in the provision of housing have brought about a shift in the housing strategy. Now the challenge is to go beyond the simple provision of houses and build communities and create conditions that promote sustainability. For example, today the emphasis is on providing a mix of housing typologies and tenure types, achieving transportation integration and linking affordable housing developments with employment opportunities and community facilities. The principles of this new approach can and should also be applied to affordable housing development in rural areas. Rural settlements also need to be sustainable in terms of access to transport, employment opportunities and social amenities. However, achieving these objectives in rural areas is usually more challenging than the urban areas, simply due to the differences in scale relating to geographical distances, population densities and employment opportunities.

5.1.3.3. AFFORDABLE HOUSING APPROACH APPLIED

It should be evident from the above that the challenge is to go beyond the simple provision of affordable houses and build rural communities and create conditions that promote sustainability. Central to sustainability is the issue of location, which involves building affordable houses on well-located land that has access to public transportation, which places such developments close to job opportunities and necessary social amenities.

The locations of rural settlement within the Hekpoort Study Area have been dealt with in a previous section of this report. What remains is the manner in which these rural settlements are developed and how affordable housing is applied within these rural settlements. There is basically 3 ways in which affordable housing can be developed within rural areas, as depicted by the diagrams below: an expansive low-density approach, a consolidated high-density approach and an intermediate conventional density approach.

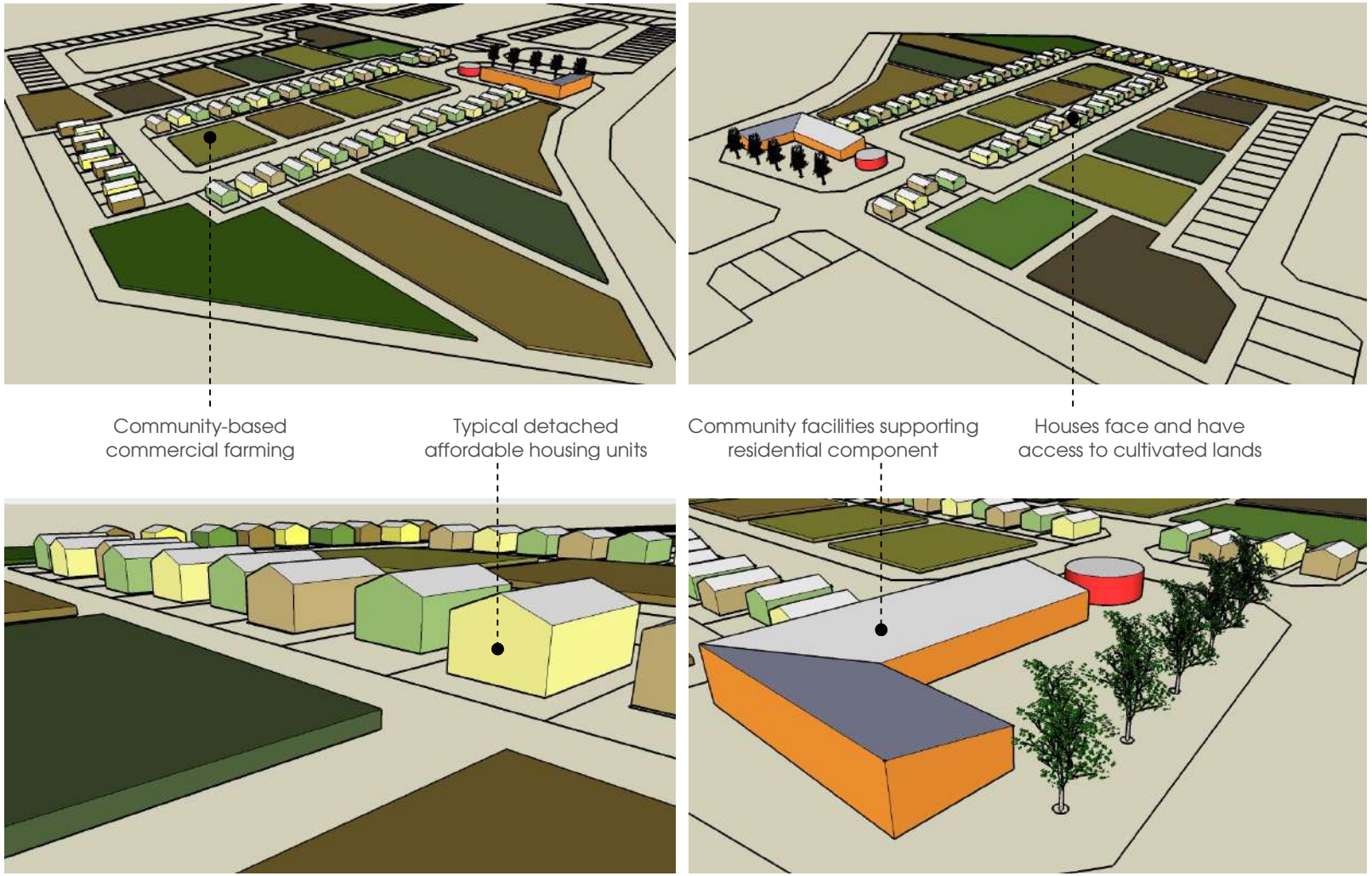


DIAGRAM 23: EXPANSIVE LOW-DENSITY APPROACH

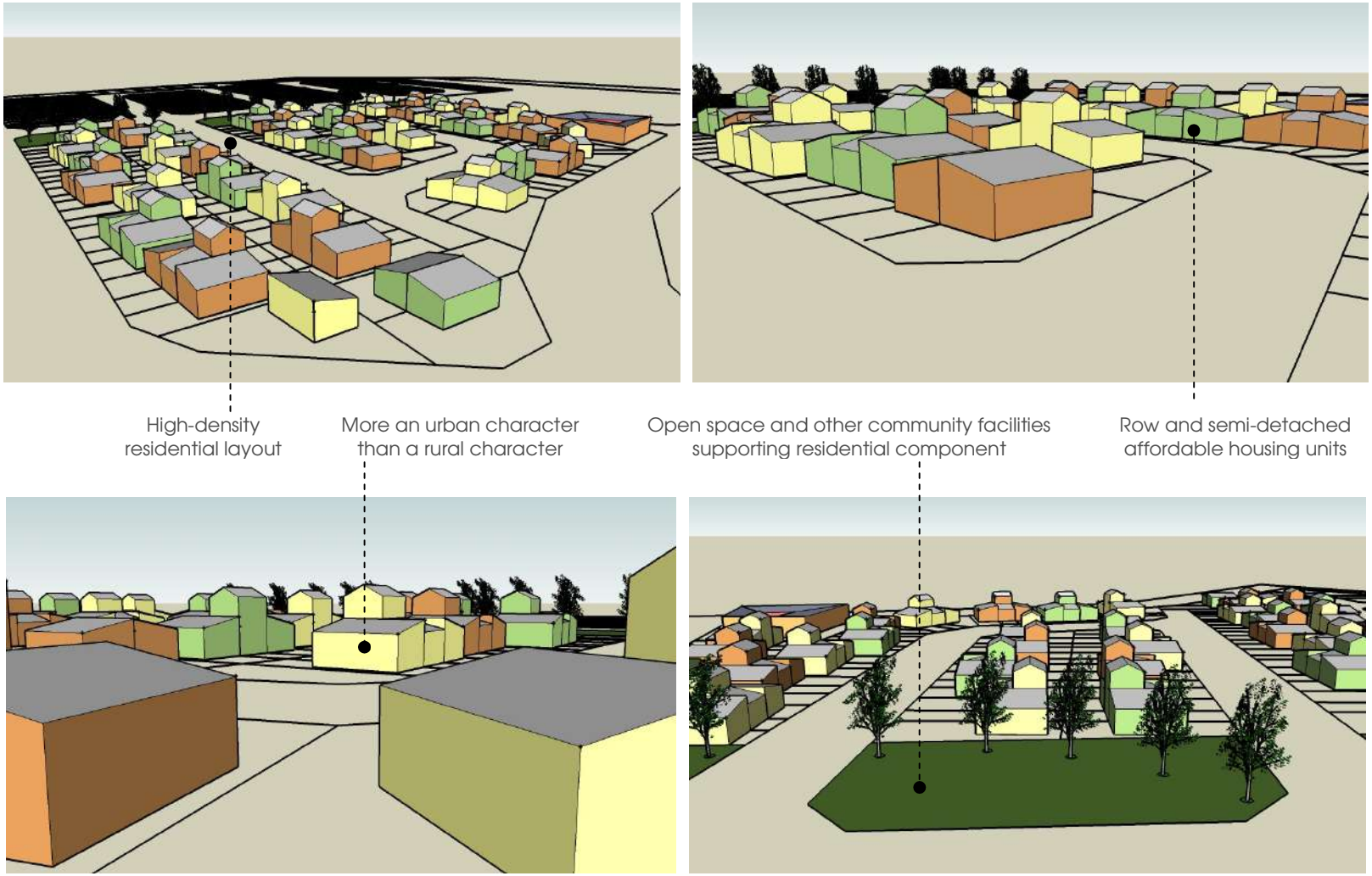


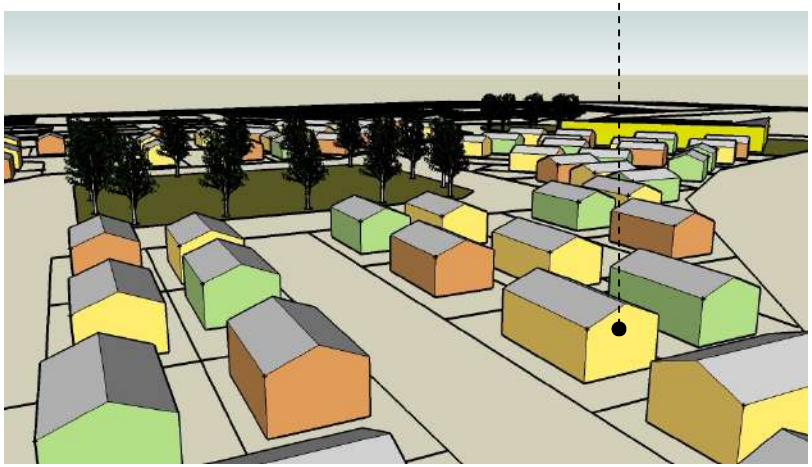
DIAGRAM 24: CONSOLIDATED HIGH-DENSITY APPROACH

Typical affordable housing development and layout

Typical detached affordable housing units

Community facilities supporting residential component

Houses face open spaces and parks



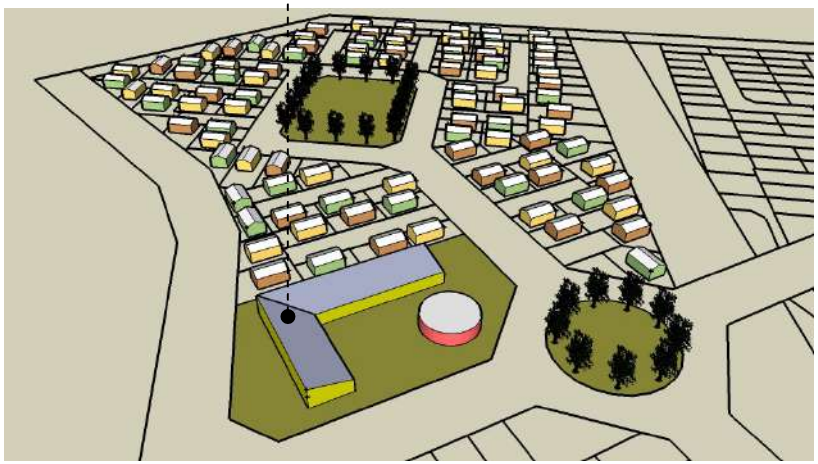


DIAGRAM 25: INTERMEDIATE CONVENTIONAL DENSITY APPROACH

a. Expansive low-density approach

The expansive low-density approach involves developing a rural settlement at low residential densities and mingling the residential units with intensely cultivated farmlands. This mixture of uses creates a rural setting by design, which in turn ensures that the rural settlement sit comfortably in it rural environment. This approach would be suitable in an area where the local community would have concerns over the visual impact that the rural settlement would have on the surrounding rural environment. The housing typology used in this approach would exclusively be detached housing units, as this housing typology is a low-density typology, which would suite the overall low-density, low-impact nature of this approach. The cultivated lands will be in communal ownership and will largely be used for community-based commercial farming. This should create a virtually self-sustainable settlement. The drawback of the settlement type is that it uses up a lot of land, which means that fewer housing units can be developed on a parcel of land.

b. Consolidated high-density approach

The consolidated high-density approach essentially involves an opposite approach to rural settlement development than the expansive low-density approach provides. The consolidated high-density approach aims to place as many housing units n a parcel of land. Logically, this approach is best used in a rural environment where there is a greater need for affordable housing units and a scarcity of land to locate rural settlements. The high residential densities are largely achieved through the application of high-density residential typologies, such as row housing and semi-detached housing. Because this approach aims to achieve maximum residential densities, it does not make provision of farmland cultivation, as in the case of the expansive low-density approach.

c. Intermediate conventional density approach

The intermediate conventional density approach aims to strike a balance between the consolidated high-density approach and the expansive low-density approach. It uses the conventional detached housing units used in the expansive low-density approach, but makes no land available for farmland cultivation, as in the consolidated high-density approach. As such, this approach largely reflects the conventional affordable housing develops typically found in urban areas. This approach would most likely be uses in cases where there is a relatively high need for rural housing, but blending the rural settlement into the surrounding rural environment is also considered a priority.Deciding on which approach to apply in the Hekpoort Study Area would inevitably differ form case-to-case, depending on the circumstances in each case. These circumstances can differ in terms of the need for affordable housing, the availability of land for rural settlement development, and the need to maintain the character of the rural environment. Form the

status quo analysis and land use estimates presented in this report; it appears that there is more land available than is needed to accommodate rural housing needing affordable housing within the Study Area. In addition, **the Hekpoort environment is sensitive to changes in its rural character, because is area has significant environmental features (such as the Magaliesberg) and the area is highly reliant of the tourism industry. This situation tends to favour applying the expansive low-density approach to rural settlement development within the Study Area**.

Apart from the above, a number of general aspects need to form the basis of the design and the development of affordable housing within the Hekpoort Study Area:

a. Create a housing typology mix

Create a housing typology mix that will cater for a wide range of households and income groups. Applying a housing typology mix will also enable a better interface between an affordable housing development and neighbouring rural land uses.

b. Creating a housing tenure mix

Creating a housing tenure mix that will cater for a wide range of households and income groups. One will most probably find the many households living in and around the Hekpoort Study Area, who require affordable housing, are not South African citizens. Such households are not eligible for a housing subsidy and are therefore reliant on rental housing for accommodation. Rental housing can be applied in many different ways, such as providing a second dwelling for rent on a property developed under the housing subsidy scheme.

c. Link higher-density housing to public transportation

Link the affordable housing developments to the public transportation network serving the Hekpoort Study Area. This implies creating rural settlement and affordable housing on public transportation routes. Semi-detached housing units can effectively be used for this purpose.

5.1.4. LIMITATIONS

Although an attempt was made to point out the constraints affecting rural settlement development within the Hekpoort Study Area, it has to be stressed that localized constraints could emerge once a site earmarked for development is investigated in greater detail. Also, it may be that the constraints are more prohibitive than assumed in this report. Such issues may surface during the EIA process, during the township establishment application process, or during the construction phase, when building foundations are investigated. The following development constraints could emerge during these detailed phases:

- Geotechnical conditions: It is known that suitable geotechnical conditions underlie most of the Hekpoort Study Area. However, it may be that localized areas within the Study Area may have geotechnical conditions that are not suitable for building construction, or would require specialized building foundations that will increase building cost.
- Municipal services: As was mentioned, no water supply capacity exists within the Hekpoort Study Area and proposed or planned developments can therefore not be linked to the bulk water network due. To address this may require, for example extending or upgrading the water network over a timeframe that cannot be determined by this study.
- Flooding: Although the protection of natural drainage systems within the Hekpoort Study Area have been pointed out, in impact of natural drainage systems within the Study Area and its flood areas need to be determined in detail proceeding any development or development application in the Study Area.
- Land ownership: Because most of the land within the Hekpoort Study Area is in private ownership, would imply that the development of many of the proposals made in this report are up to the owner who may opt not to develop his or her land in the manner proposed in this report.
- Environmental constraints: Although C-Plan2 of GDACE has been taken into account in this report; localized environmental constraints could affect the land available for development within the Hekpoort Study Area. GDACE does not only use C-Plan2, but also supplements this data source with site visits when evaluating a specific application for land use change. The proximity of a river system or ridge heightens the changes of finding localized environmental constraints during the application process.
- High-potential agricultural soils: The Hekpoort Study Area contains large tracts of high-potential agricultural soils. Development on such soils, such as rural settlement development, may be strongly objected by GDART during township establishment, which could affect the manner and extent to which these areas can be developed.
- **The entire Hekpoort Study Area is located outside the Urban Development Boundary. Rural settlement development within the Study Area could therefore potentially be affected by the Urban Development Boundary**. This report cannot determine the definition or interpretation that the Municipality or any other institution could assign to what may and what may not constitute suitable land uses that can be developed outside the Urban Development Boundary. Such

a definition or interpretation could possibly affect future rural settlement development within the Hekpoort Study Area.

5.2. TRANSPORTATION AND INFRASTRUCTURE

Infrastructure development forms of backbone of spatial development, simply because infrastructure development provides the necessary access, capacity and opportunities for spatial development. It is therefore essential that infrastructure development be addressed in relation to the spatial development proposals made in the Hekpoort Precinct Plan.

5.2.1. TRANSPORTATION

Developing the Hekpoort Study Area's transportation infrastructure is dealt with in terms of the road network and public transportation network. Whereas the road network primarily refers to the provincial road network, the public transportation network refers to public transportation routes serving the Study Area. Figure 20 illustrates the transportation infrastructure development proposals made for Hekpoort Study Area.

5.2.1.1. ROAD NETWORK DEVELOPMENT

Because the Hekpoort Study Area is a rural area, it does not have an intricate existing or planned freeway and distributor road network as one would find in a more urban region of Gauteng. However, it does have a number of existing roads that provide the necessary access the Study Area requires. These existing roads include the R560, which links Hekpoort to Magaliesburg and the Hartebeespoort Dam region, and the R563, which links Hekpoort to Mogale City.

With regard to the future road network serving the Study Area, the PWV1 freeway is the only road planned for the Study Area. This freeway will traverse the southeastern parts of the Study Area and will basically link the Hartebeespoort Dam region to Mogale City. The development of this road is not considered a priority and should therefore not be taking to be a land use affecting elements in the near future.

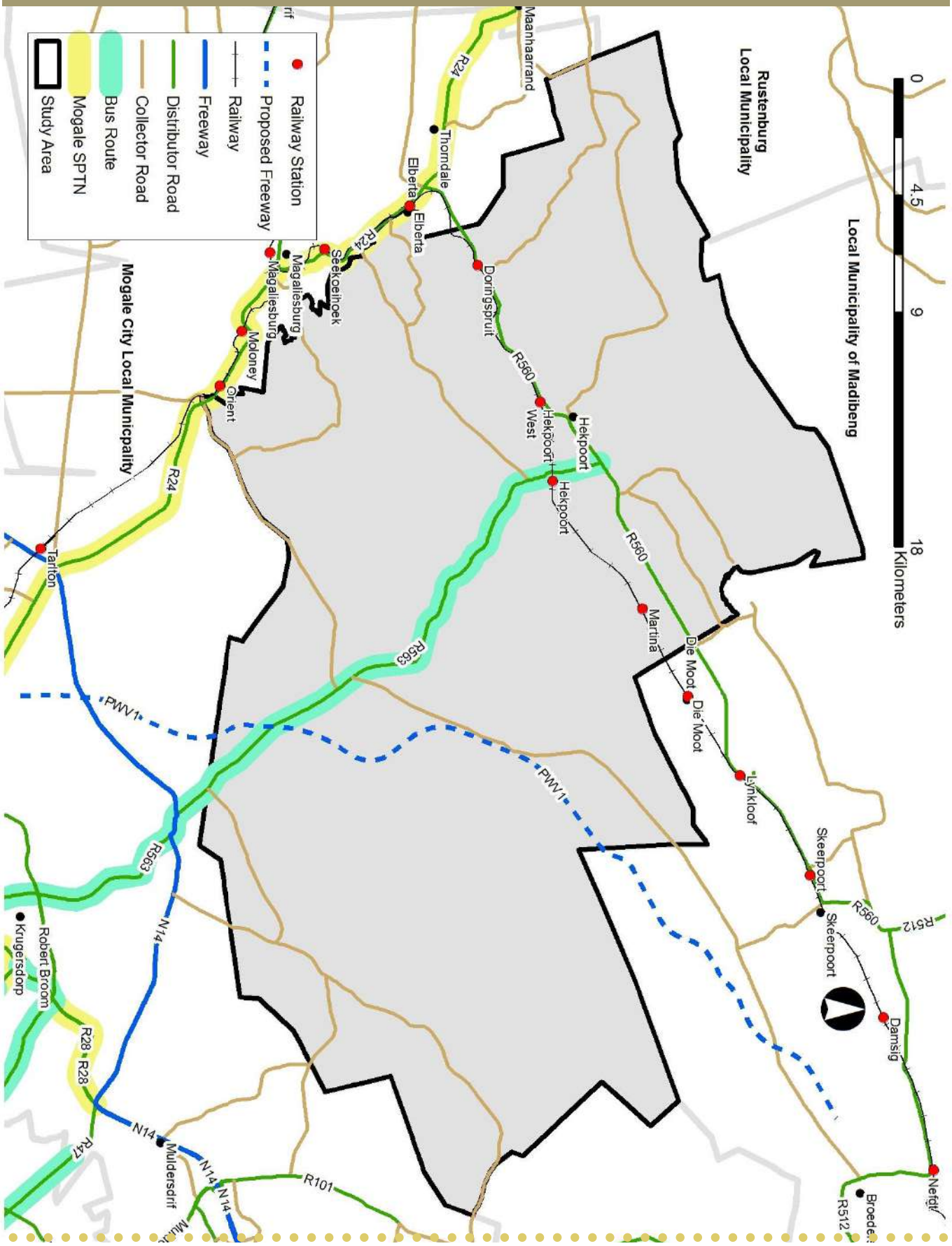


FIGURE 20
PROPOSED ROAD NETWORK

PROPOSED ROAD NETWORK

On the whole, the existing road network serving the Hekpoort Study Area is considered to be sufficient to serve its existing and future access needs. The primary roads of this road network links and provide access to all the prominent land uses within the Study Area. For example, the R563 provides direct access to Maropeng, the R400 provides direct access to the Hartbeeshoek RAO and the R560 gives direct access to the Hekpoort rural node. In addition, the current road network is sufficient to provide access to the numerous tourist accommodation facilities (guest houses, lodge, etc.) and it also serves the agricultural industry sufficiently.

Altough the primary road network adequately serves the Hekpoort Study Area, the extensive rural road network (mostly dirt roads) does not provide adequate access to rural properties within the Hekpoort Study Area. This is largely due to the lack of maintenace of these roads. The maintenance of this rural road network is of critical importance, as it is needed amongst to stimulate tourism development within the Study Area. The current state of the roads within the Study Area make it difficult for tourists to reach the existing tourist accommodation facilities and poor drainage conditions make the use of these roads almost impossible. To address the above, **Mogale City will need to implement a retainer budget for road maintenance within the Hekpoort Study area and the Municipality will need to make funds available for the construction of storm water draining systems along roads that are located near the Magaliesrivier**.

5.2.1.2. PUBLIC TRANSPORTATION DEVELOPMENT

As with the road hierarchy, public transportation also functions on different levels (see Diagram below). The level on which each mode of public transportation within the public transportation hierarchy functions is determined by the type of transportation system that is used, the destination that is accesses, the passenger volumes it can carry and the flexibility of the system. In other words, each system occupies a niche within the network, fulfilling a specific function which the other systems within the network cannot fulfill. Having a public transportation network that contains transit systems operating on different levels and having different functions, provides the bases for inter-modal connectivity and interchange.

To date, the public transportation system serving the Hekpoort Study Area only consists of a low-frequency bus service, which uses the R563 to transport commuter between Hekpoort and Mogale City. However, this public transportation service links into the larger public transportation network in Mogale City, where the public transportation system expands into a 3-tier public transportation system, consisting commuter rail services, bus services and mini-bus taxi services. The mini-bus taxies are at the lowest level of the public transportation network, followed the busses (including cross-border bus operators) and metro-rail, at the highest level of the public transportation network. The bus service serving the Hekpoort Study Area is a appropriate mode of

public transportation serving the Study Area, because is busses can be operated more cost-effectively over larger distance than mini-bus taxis can be operated at.

Although the bus service currently serving the Hekpoort Study Area is considered sufficient, the currently bus route will need to be extended in future in order to provide access to the proposed rural settlement to be established within the Study Area. To this end, it would be necessary to extend the existing bus route from the Hekpoort Rural Node (where it currently terminates); eastwards along the R560, the R401 and the R1676. This will allow the bus route to pass the land parcels currently in the ownership of Mogale City, which the municipality intends to develop for rural settlements. **Developing this public transportation route will require the tarring of the R401 up to the R1676, as well as the tarring of the R1676 up to the Hekpoort boundary**. Also, a bicycle lane can be constructed as part of this bus route to provide for alternative modes of transportation.

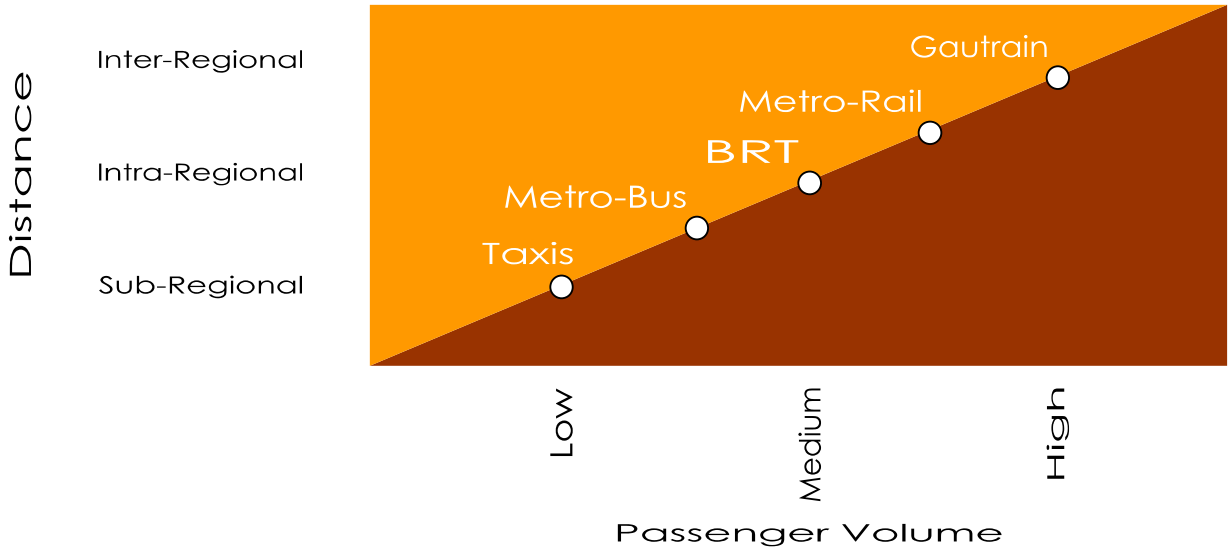


DIAGRAM 26: PUBLIC TRANSPORTATION HIERARCHY

The efficient functioning of the public transportation system within the Hekpoort Study Area will not only require a well-developed public transportation network, but will also require a well-developed public transit stops that are strategically

located along the public transport routes. It is proposed that bus stops be developed at the rural settlements proposed within the Hekpoort Study Area, which correspond with the Transit Oriented Developments (TODs) proposed for the Study Area. Smaller bus drop-off and pick-up points can be places at 400-600m intervals along the public transportation routes.

To ensure the optimal use of the bus stops located at each rural settlement, these bus stops will have to be integrated through competent design with the land uses found within the rural settlements. This design will need to focus on pedestrian movement and how pedestrians exchange between the bus stop and the surrounding land uses. Competent building design is also necessary to ensure land use and transportation integration and will, in particular, have to be applied to non-residential buildings located within the rural settlements.

5.2.2. MUNICIPAL SERVICES

Although this study provides an overview of the primary municipal services (water, electricity and sanitation) and its capacity, it does not determine the exact capacity of the bulk municipal services network to accommodate spatial development and settlement expansion within the Study Area. Determining such detailed capacities involves complex calculations by engineers, thus falling outside the brief of this study. The way this study addresses the issue of bulk municipal services is to (a) to provide indication as which areas can connect to the bulk network (specifically the water network) and (b) provide an indication of the potential need for the expansion of the existing network.

The municipal sewer network and in particular the water network, plays a central role in determining the spatial development and rural settlement development possibilities within the Hekpoort Study Area. With regard to the water network, a Rand Water pipeline that currently runs through the Study Area from Rustenburg to Mogale City has no capacity to serve the Hekpoort Study Area. The capacity of this line will have to be upgraded in order for it to serve the proposed rural settlement within the Hekpoort Study Area. Despite the aforementioned, the planned Vogelsang rural settlement development claims that the Rand Water pipeline has sufficient capacity to serve its needs. The Vogelsang rural settlement is estimated to need 300m^3 of bulk water per day. **Whether there is bulk water capacity for the other rural settlements proposed for the Study Area will need to be determined through an investigation before detailed planning commences for these rural settlement**.

As was mentioned in the status quo section of this report, no sewer network serves the Hekpoort Study Area. The location of the surrounding waste water treatment plants also makes it impossible to connect to these plants using gravity, simply because all these waste water treatment plants are located at higher elevations than the proposed rural settlements. In addition,

constructing pipelines and pump station to these proposed rural settlements will be prohibitively expensive and will not be justified when considering the small number of households that will be served by such a network extension. In the case of Vogelsang, a small, isolated waste water treatment plant is being considered that will serve the needs of this rural community. This plant will be of a type that would be approved by the Department of Water Affairs and a maintenance contract will be included with the awarding of the contract. A similar arrangement can be set up for the other rural settlement proposed in the Hekpoort Study Area.

With regard to the electrical network, three substations were mentioned in the status quo section of this report, which serve the greater Hekpoort Study Area. Two of these substations, the Hekpoort Substation which is located east of the Study Area and the Springs Farms Substation which is located in the southern half of the Study Area, can be considered to serve the proposed rural settlements serving the Study Area. The former would most likely be more suitable, as it is located nearest to the proposed rural settlements. The planned Vogelsang rural settlement will tap directly into the existing Eskom power line using a purpose-build substation.

5.3. ACTIVITY NODES

Creating a sustainable rural settlement and rural environments involves creating balanced rural communities in terms of employment opportunities, social amenities and recreation facilities. In other words, it involves supporting rural residential development with other land use types, such as schools, clinics, retail facilities and recreation facilities.

5.3.1. NODAL DEVELOPMENT

Community, recreation and economic facilities proposed for the Hekpoort Study Area should be clustered, rather than dispersed, in order to (a) stimulate the viability of these activities, (b) create strong focal points with which the surrounding rural communities can identify and (c) create a more ordered spatial structure. To achieve this concentration of facilities, a hierarchy of nodes should be created within the Hekpoort Study Area.

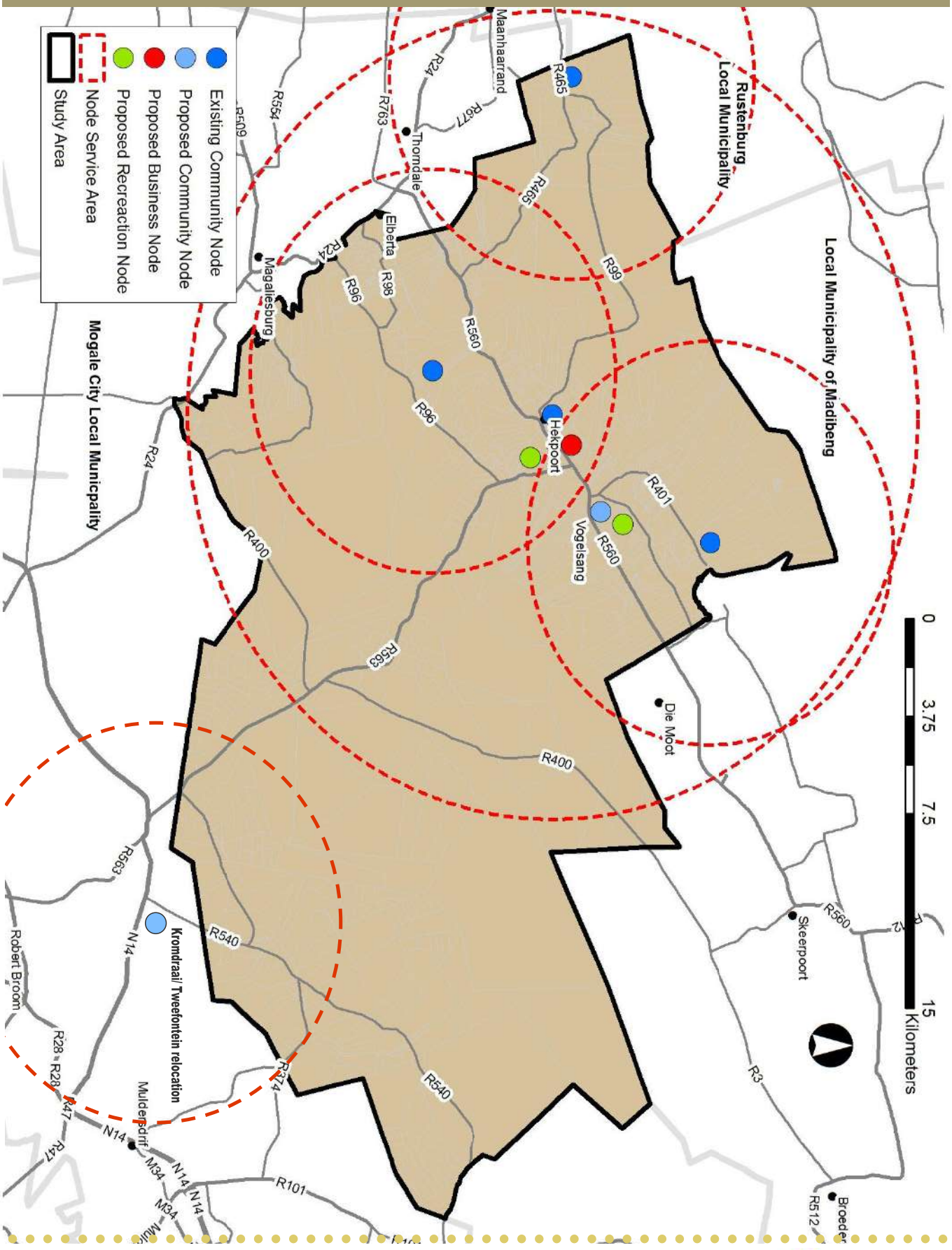


FIGURE 21
PROPOSED NODAL STRUCTURE

A two-tier rural nodal hierarchy is proposed for the Hekpoort Study Area. The existing and proposed community facilities, recreation facilities and economic facilities are dealt under this nodal classification. The Table below depicts the number of nodes needed within the Study Area as per the above classification. It is evident that the Study Area can accommodate 1 primary business node, 1 primary community node and 4 secondary community nodes, and 2 secondary recreation nodes by the year 2020.

The composition of each node within the nodal hierarchy must take into account certain key variable, such as its intended function of the node; the size of the population its serves and its geographical location. For example, a higher order community node must contain higher-order community functions, such as a police station, a clinics and a library. A lower-order community node must contain community uses that are required on a local level, such as a primary school.

TABLE 11: PROPOSED ACTIVITY NODES

Node	Need 2015			Need 2020		
	no.	ha	m²	no.	ha	m²
Community		***36.3***			***41.3***	
Primary Node	*1*	*10.9*		*1*	*12.4*	
Secondary Node	*4*	*25.4*		*4*	*28.9*	
Business		***7.4***	***29484***		***8.0***	***31919***
Primary Node	*1*	*7.4*	*29484*	*1*	*8.0*	*31919*
Secondary Node	*0*	*0.0*	*0*	*0*	*0.0*	*0*
Open Space		***17.0***			***18.4***	
Primary Node	*0*	*0.0*		*0*	*0.0*	
Secondary Node	*2*	*17.0*		*2*	*18.4*	

Source: Urban Dynamics Gauteng, 2011

The successful development of a rural nodal is the result of a variety of location factors. The following are some of the most important location aspects that influence successful nodal development:

a. Accessibility

The accessibility of a rural nodal to the households it serves is an important location factor in the development of a rural node. Direct access to a rural node from prominent roads, instead from a minor back road, is of paramount importance. This determines the convenient of access to and from the rural nodes. Traffic flow patterns, coupled with higher traffic volumes, increase the gravitational forces of a rural node.

b. Visibility and exposure

A rural node should be highly visible and accessible to the households it serves. As such, nodal areas should be located in close proximity to an efficient road and public transportation route. In this regard, orientating a rural nodal towards a public transportation facility, such as a bus stop, is of great value.

c. Complimentary surrounding activities

The development of the business component of a rural node often serves as a catalyst for the further development of the node. As such, positioning and future expansion possibilities should be sensitive to future development prospects, which may include other types of nodal land uses, such as a library or clinic. Adding such land uses can help create a mutually beneficial energy that strengthens the attraction of the node as a whole.

d. Competing nodes

Competition plays an important role in the location of nodal area. An important consideration in the development of a rural node is that rural nodes of the same order and size will compete in the same market (economic or social) and should therefore not be located in close proximity of each other.

The spatial distribution of the community, business and recreation nodes is illustrated on Figure 21. The Hekpoort rural node proposed in the West Rand District Spatial Development Framework, which is located on the intersection of the R560 and the R563, is the location of the proposed primary business node, the proposed primary community node and the proposed primary recreational node. The proposed secondary community nodes have been located on the R465, the R401, R400 and the R540. Most of these nodes, with the exception of the nodes located on the R400 and the R540, have been located at existing schools within the Study Area. These secondary community nodes are all located in positions which allow them to serve specific quadrants of the Hekpoort Study Area. These positions also ensure that the nodes proposed for the Study Area do not compete for the same service areas.

The nodes located on the R400 and R540 have been proposed specifically to serve the planned rural housing settlements at these located: the Vogelsang rural settlement of the relocated Kromdraai/ Tweefontein settlements. **It should be noted that neither of these settlements will have the household thresholds needed to support these community nodes. These nodes are provided to locate community facilities within walking distance of each of the proposed rural settlements**.

5.3.2. HEKPOORT RURAL NODE

There exists the possibility of creating sustainable employment opportunities and a willingness by entrepreneurs to invest in the Hekpoort Study Area if the Hekpoort Rural Node is developed into a thriving rural town or service centre. This will require a properly demarcated nodal area, with business uses, rural housing, schools and recreation facilities. If this node is allowed to reach a certain threshold, the local population will start supporting the businesses within this node, instead of travelling to Mogale City or Rustenburg for their day-to-day needs. A number of commodities produced on the farms with Hekpoort will also in all probability become available within these shops.

The Hekpoort Rural Node also has the potential to develop a significant tourist trading industry. The Hekpoort Rural Node is ideally situated for this, as it is located on the R560, which was designated a tourism route in the Mogale City SDF 2011. The timing for developing a strong tourism component within the Hekpoort Rural node is also opportune, with the establishment of the Magaliesberg Biosphere being in its final stages. The proximity to the Cradle of Mankind and Maropeng also contributed to the potential of developing a strong tourism component within the Hekpoort Rural Node.

5.3.2.1. BUILDING BLOCKS OF A RURAL NODE

Whereas a secondary community node typically consists of no more than a primary school, the Hekpoort rural node situated on the intersection of the R560 and the R563 should reflect a more typical nodal development in terms of layout and composition. The following specific types of activities comprise the building blocks of such a nodal area, which should be the building blocks of the Hekpoort rural node.

a. Community facilities

Community facilities are able to attract people and customers and community facilities therefore form an important anchor activity within a nodal area.

b. Structured Informal trade

Informal trade can fulfill an important role within nodal area. Such economic activities can help address unemployment and the lack of job opportunities within rural areas and it can help support SMME development. Key to this can be the

development of a local business support centre (LBSC) that would provide facilities and assistance to informal traders and emerging entrepreneurs.

c. Well-designed buildings

Good building is a prerequisite for attracting both residents and businesses to nodal areas. Building design should be location-specific and must be created in consultation with property owners, businesses, and local residents. Building design must take into account simple design features like having storefronts and entryways face streets.

d. Transport facilities

Due to the location of a primary rural node, it is important to develop an effective public transportation facility, such as a bus and taxi rank. The positioning of such a facility is a key to unlocking the potential of the nodal area.

e. Connect to surrounding areas

The development of a primary rural node must be compatible with adjacent rural areas, and where possible be jointly planned to ensure a compatible spatial pattern.

f. Compact and complete

Nodal developments should be designed to include a range of mutually supportive uses, including retail and community service combined and integrated in a compact form. Due to the extensive nature of rural areas, the danger always exists in rural areas that nodal areas are spread out over large areas. This should be avoided at all costs.

g. Pedestrian friendly

Street life is an integral component of any successful nodes. To encourage and facilitate walking, a successful primary rural node must feature a comfortable, safe and efficient pedestrian network with wide sidewalks and other pedestrian features. Thus the node layout and building designs should be pedestrian-oriented and accommodate pedestrians in a safe manner.

h. Green landscapes

Successful nodal developments integrate, protect and enhance natural features and open space. Existing vegetation like trees and notable landforms, such as large boulders, should be maintained as focal points or incorporated in the overall design. These give an area a unique appearance and create a special sense of place. Naturalized storm water management is also encouraged to reduce servicing costs and create more multi-purpose green and open space. Plant trees along the pedestrian walkways within nodal area in order to strengthen visual linkages and accentuate pedestrian connections.

5.3.2.2. HEKPOORT RURAL NODE LAYOUT AND COMPOSITION

The Hekpoort Rural Node need to become a focal area within the Hekpoort Study Area, which provides necessary services to surrounding rural communities and in particular rural settlements proposed for the Hekpoort Study Area. Currently, the Hekpoort Rural Node lacks a mix of land uses and the layout design that is necessary for the development vibrant and sustainable rural node. To address the aforementioned, it will be necessary to design and develop the Hekpoort Rural Node is such a manner that that (a) it is transformed into a vibrant nodal environment and (b) that it provide provides the necessary threshold economic can community facilities to support the demand for such services by the Study Area population in a sustainable manner.

The proposed Hekpoort Rural Node is illustrated on the Diagrams below. This rural node includes all the existing community and retail facilities currently found within this rural node, but is also allows for the future northward expansion of this rural node up to the Magaliesrivier. This will allow for the development of additional land uses within the Hekpoort Rural Node, which will enable the node to development into a more substantial nodal area serving the Hekpoort Study Area. A perspective drawing of the nodal design is illustrated by the Diagram on a following page. The design of the Hekpoort Rural Node was based on a number of design principles. The design principles are as follows:

Principle 1: Develop a collector road

A collector road will need to be developed in order to expand the Hekpoort Rural Node and provide access to the proposed additional nodal facilities. To this end, it is proposed that a collector road loop be development that intersects with the R560. This collector road loop is depicted on the Diagram below and will provide access to the recreation

facility and rural housing development proposed for the Hekpoort Rural Node. In addition, the intersections between this collector road and the R560 will create focal points the can visually signify the location of the Hekpoort Rural Node. This focal function can be enhanced through the use of landscaped traffic circles.

Principle 2: Create an open space network

Creating and protecting open space is necessary to foster community identity and stimulating cultural life within a rural community. Providing open space on a number of geographical levels allows open space to be provided in the most effective manner. The open space network proposed can be developed on 2 levels within the Hekpoort Rural Node.

The first level is the protection of the Magaliesriver open space, which includes the embankment vegetation of the Magaliesriver. This will ensure the open space remains interconnected to the larger open space lattice of the Hekpoort Study Area. The second level involves creating a recreation complex. This recreation complex should preferably be linked to the Magaliesrivier open space, as depicted on the Diagram below.

Principle 3: Develop a pedestrian network

Public buildings, open spaces and retail facilities must be linked by a network of pedestrian walkways and traffic tamed streets. The goal must be to make these facilities accessible by foot within the nodal area. Pedestrian network design should incorporate sidewalks, seating, lighting and signage. Where vehicles cross the pedestrian network, the pedestrian must be accommodated in a safe manner. Many techniques exist to calm vehicular traffic and give priority to pedestrian, such as roundabouts and raised pedestrian crossing. Roundabouts, as depicted on the Diagram below, can also become focal points within the rural node, signifying the location of the nodal area.

Principle 4: Cluster community facilities

Community facilities need to be clustered within a rural node, rather than dispersed individually throughout the node. This will stimulate the viability of these facilities and create strong focal points within the node. The composition of community facilities within the rural node will depend upon the need for such facilities within the larger Hekpoort Study Area. A cluster of community facilities already exist within the Hekpoort Rural Node. **This community facility cluster can be strengthened by relocating the existing Hekpoort police station, which is currently located on the R563, the to Hekpoort Rural Node.**

DIAGRAM 27: PROPOSED HEKPOORT RURAL NODE BOUNDARY

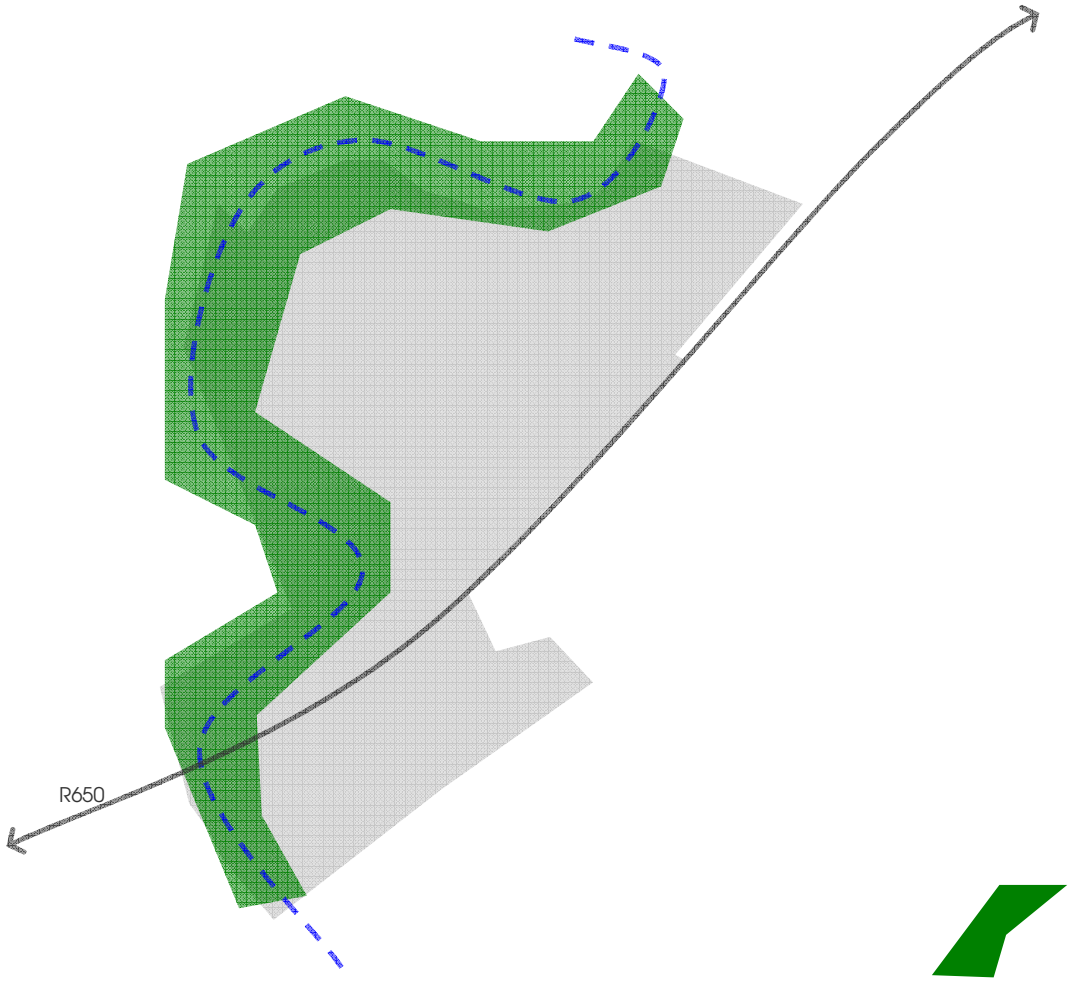


DIAGRAM 28: HEKPOORT RURAL NODE RIVER ENVIRONMENT

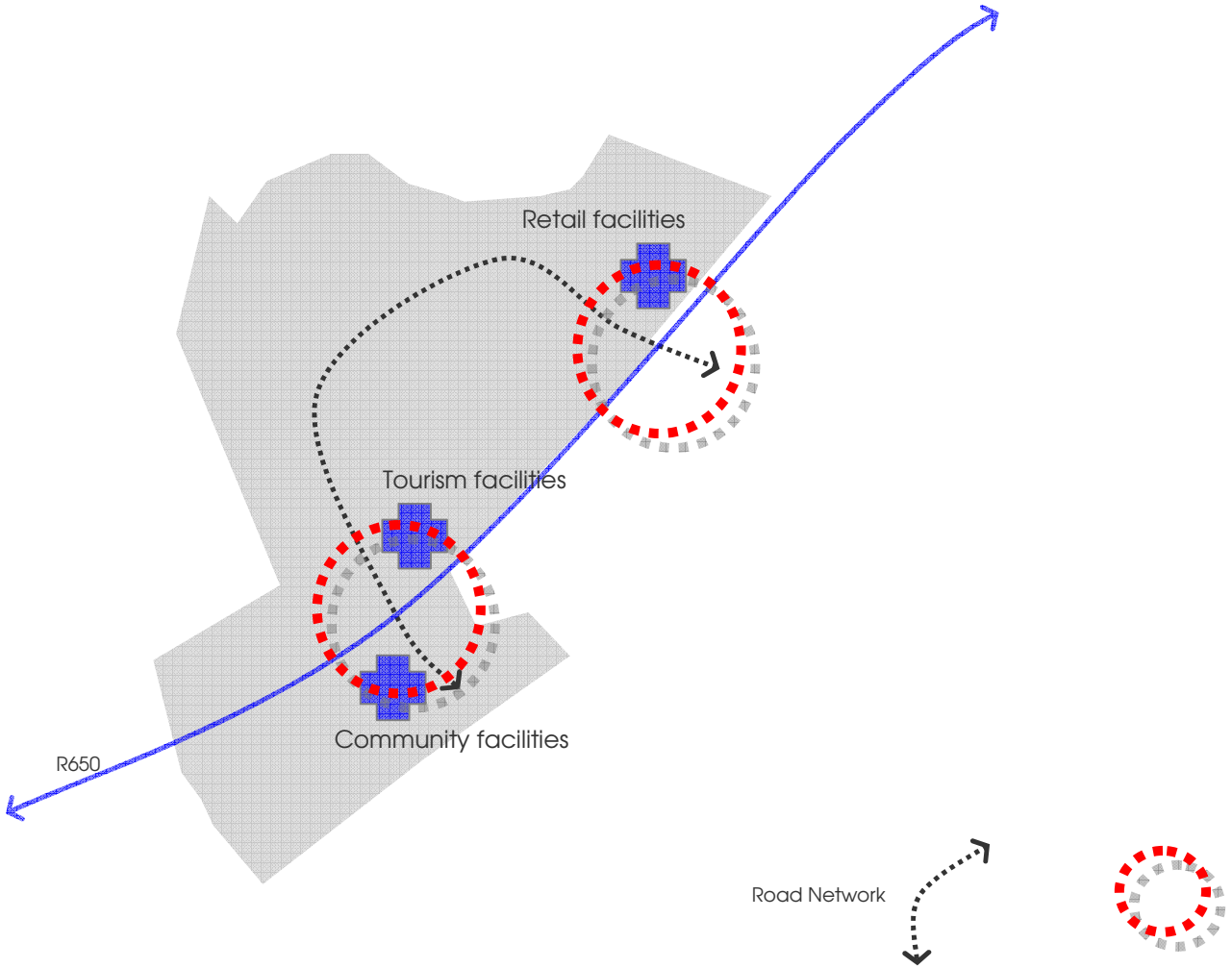


DIAGRAM 29: HEKPOORT RURAL NODE ROAD AND NODAL STRUCTURE

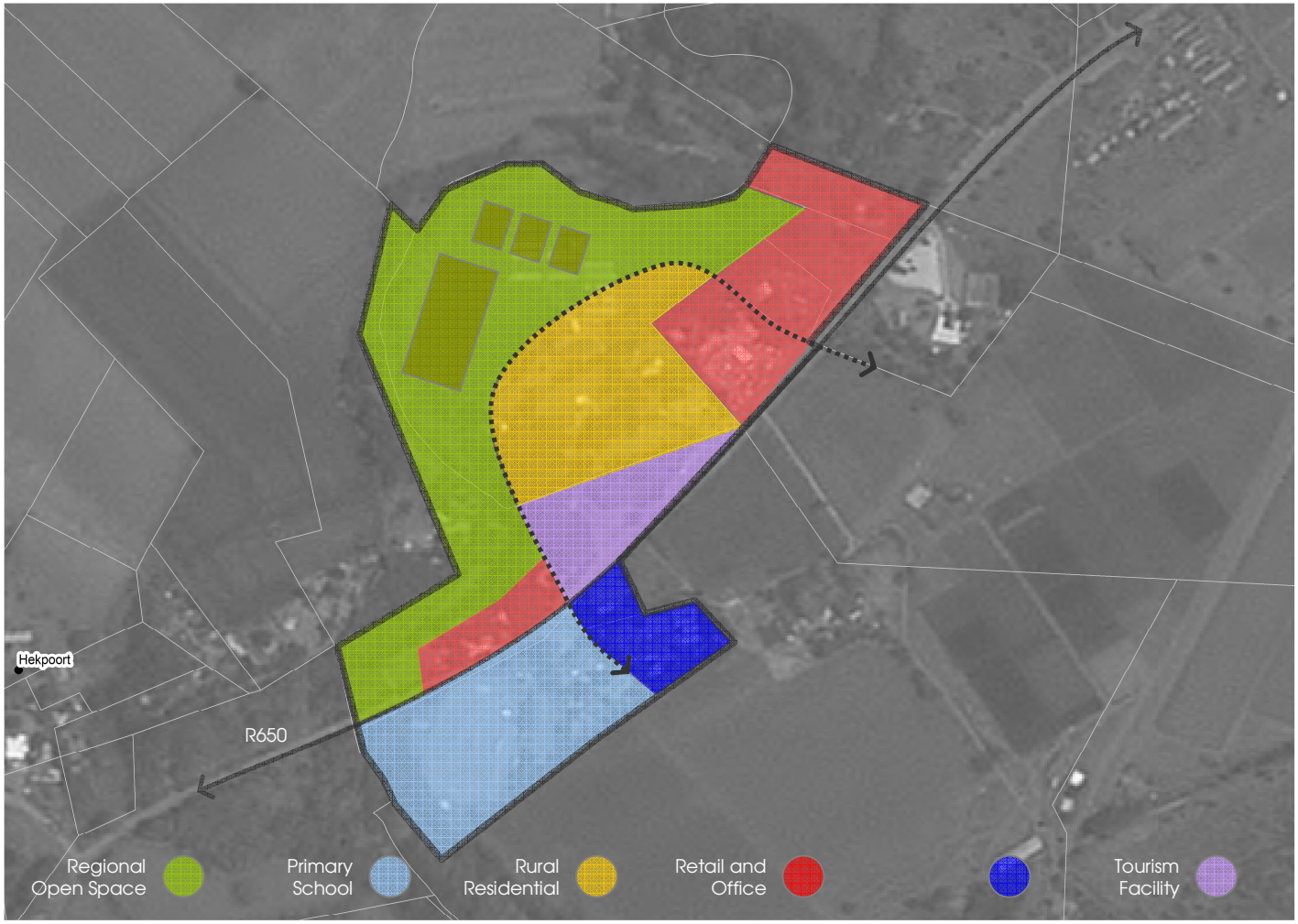


DIAGRAM 30: HEKPOORT RURAL NODE LAND USE COMPOSITION

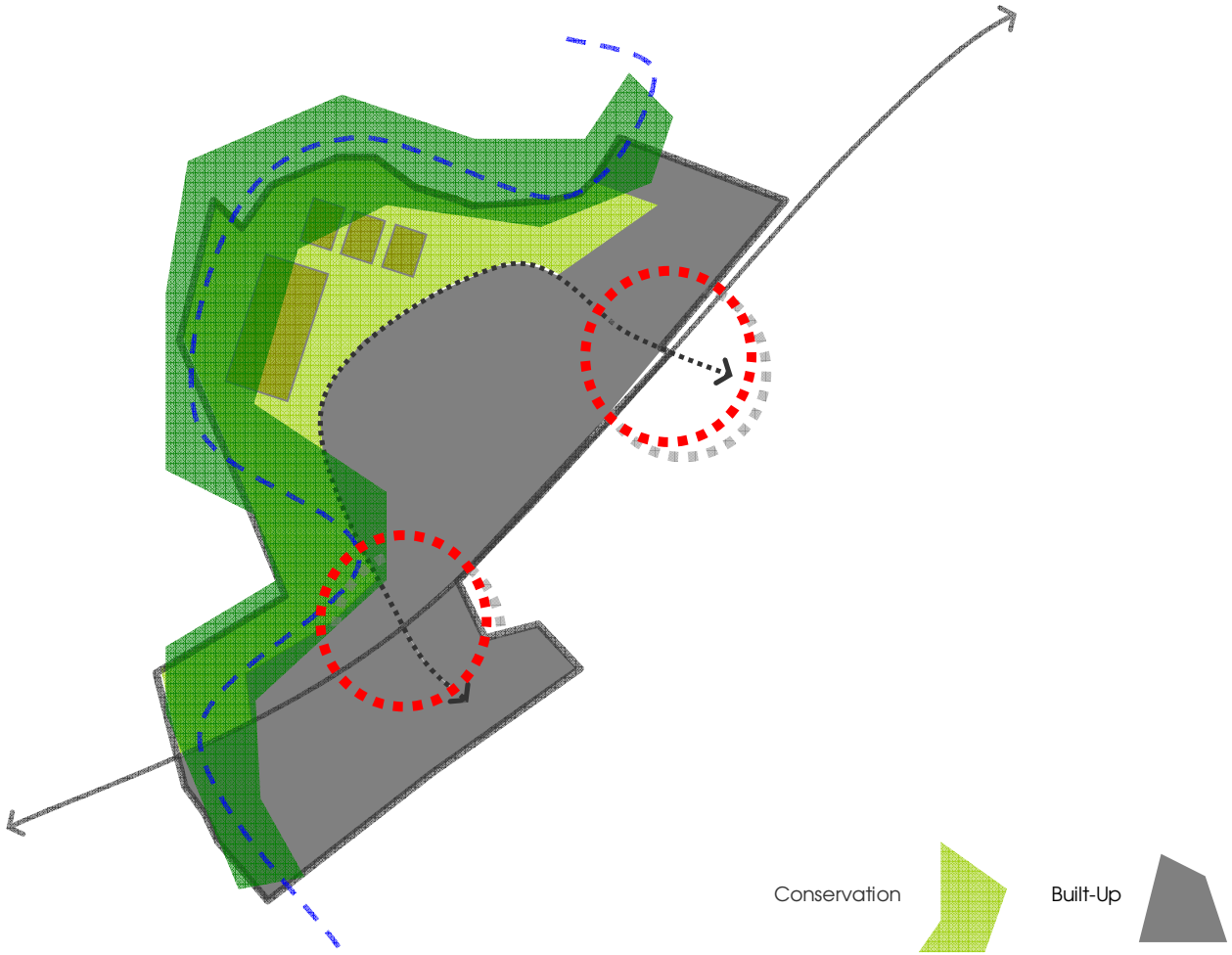


DIAGRAM 31: HEKPOORT RURAL NODE COMPILATION

Principle 5: Develop economic facilities

To ensure the sustainability, it is important that economic opportunities are provided within the Hekpoort Rural Node. The Hekpoort Rural Node currently contains a retail shopping centre of approximately 2000m2 in size. However, this is shopping centre is not sufficient to support the Study Area's population. Thus additional shopping centres can be added to the Hekpoort Rural Node. It is important that these additional centres are located on intersection on the R560 to ensure suitable accessibility to and from these shopping centres.

Local tourist facilities can also be developed within the Hekpoort Rural Node, which can provide economic opportunities for the location population. For example, **the municipal-owned site located opposite the Thusong community centre can be developed by the Municipality as a multi-purpose tourism facility**, which can be designed in such a way that it can be interchangeably be used as a farmers market and a cultural market. It is also important that the necessary pedestrian links between these economic facilities and the other land uses within the Hekpoort Rural Node in order to integrate these economic facilities with the other land uses within the Hekpoort Rural Node.

Principle 6: Apply appropriate architecture

Buildings developed within the Hekpoort Rural Node must take cognisance of the rural setting within which it is located. In other words, the design of the nodal buildings must create an architectural dialogue that accentuates the rural realm within which the Hekpoort node is located. Buildings must also aim to strengthen the nodal configuration, as opposed to creating a strip development. This involves positioning buildings so that they are linked and oriented towards each other, rather than closed off to one another. In addition, building must be varied in building design, height and orientation in order to prohibit the development of a sterile nodal environment.

Principle 7: Provide rural housing

Rural housing must be developed using a mix of housing typologies that catering for the different needs of various rural households. To do this, it is necessary to provide a range of housing typologies within the nodal area. This rural housing development must be linked to the community facilities and shopping opportunities located within the Hekpoort Rural Node. The proposed collector road can be used to good effect in this regard. Rural housing within the Hekpoort Rural Node will also provide a more diverse and suitable nodal environment and will provide substance to a node that is currently sparsely developed.

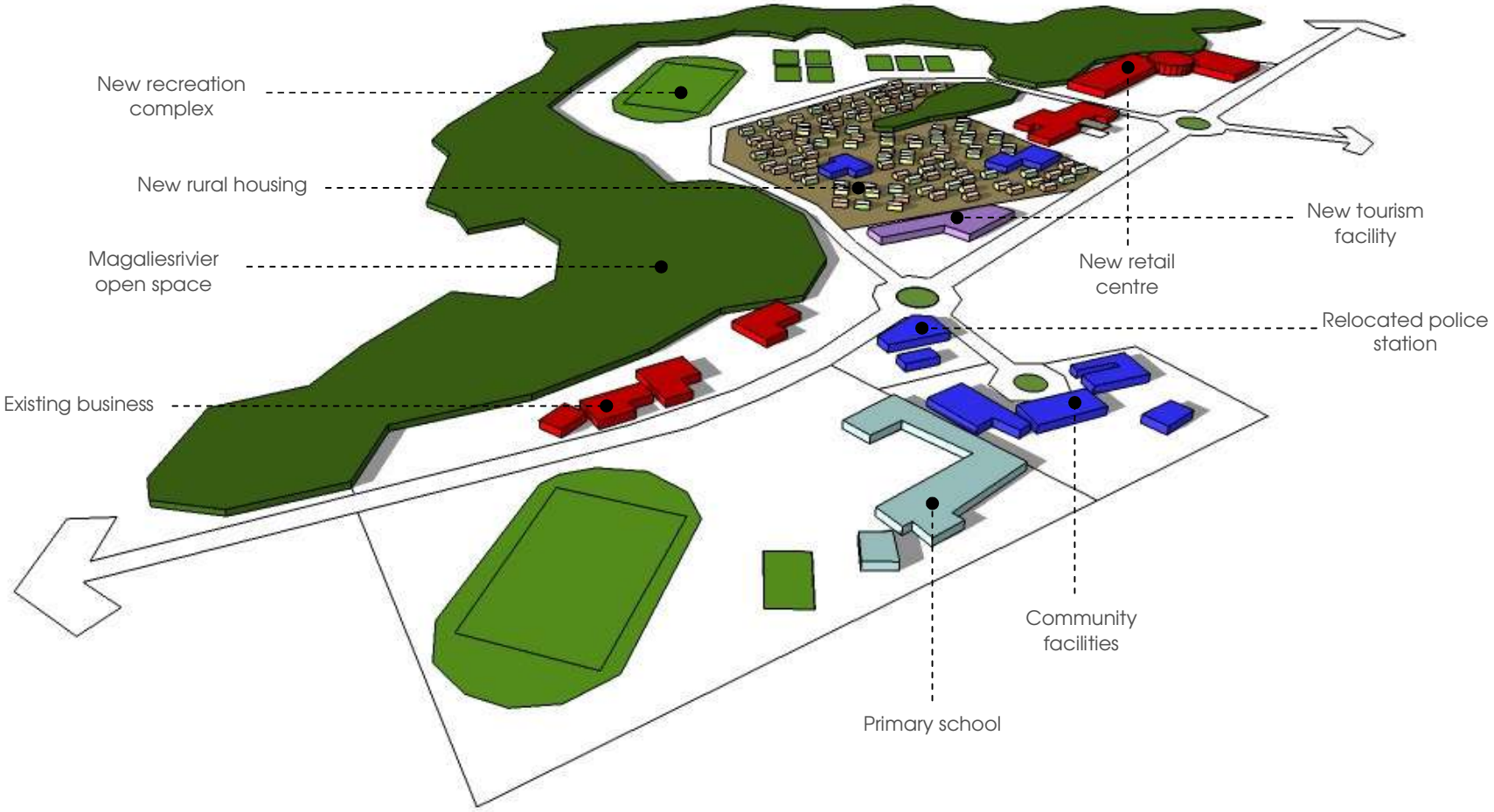
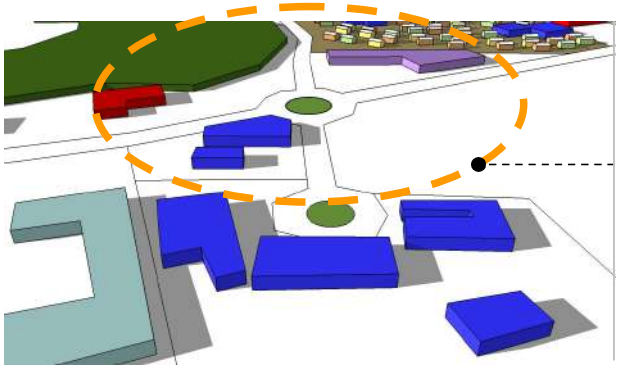
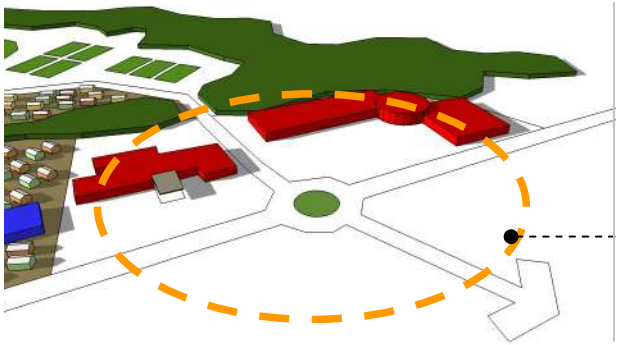


DIAGRAM 32: PROPOSED HEKPOORT RURAL NODE PERSPECTIVE



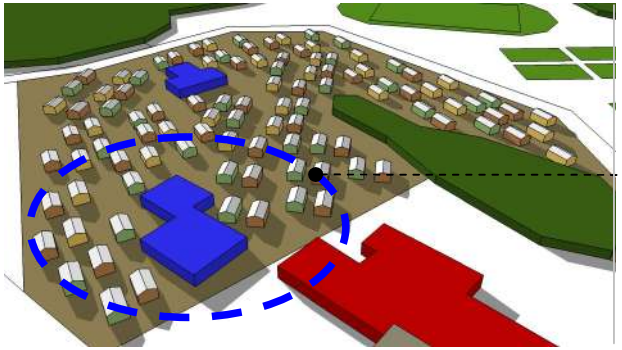
COMMUITY NODE

Centre community and tourism facilities on intersection



BUSINESS NODE

Centre retail and office facilities on intersection



RURAL SETTLEMENT

Convert existing farm buildings into community facilities, such as a crèche or community hall

DIAGRAM 33: HEKPOORT RURAL NODE DESIGN GUIDELINES

The conceptual design of the Hekpoort Rural Node provides guidance for the possible future development of this rural node. However, the approval of land use rights, even if in accordance with the conceptual design, needs to adhere to specific conditions for the approval of these rights. Approval of land use rights within the Hekpoort Rural Node must be subject to the following conditions:

- Piped water is provided to the development by a relevant authority, such as Rand Water;
- There is sufficient water capacity to serve the new development;
- The development will not pose any pollution problems related to sanitation, and
- The road infrastructure can handle the increased traffic volumes that result from the new development.

5.3.3. BUSINESS ACTIVITY

It is important that land use strategies are developed that recognize the need to stimulate economic growth and job creation within the Hekpoort Study Area. These land use strategies must focus institutional support and private sector spending to achieve the aforementioned. In turn, this will creates economic potential and provide opportunities for local communities to participate in local economic development. Agricultural and tourism development, which are the primary economic sectors of the Study Area, are dealt with in a following section of this report. This section of the report deals specifically with the retail aspects of economic development.

5.3.3.1. BUSINESS CENTRE HIERARCHY

Business activities should be concentrated, rather than dispersed in order to stimulate the viability of these activities. To achieve this, business activity should be clustered within nodes. The following Table provides the proposed composition of each business node within the business node hierarchy proposed for the Hekpoort Study Area.

a. Primary business node

A primary business node is a node of region-wide significance and can therefore develop a strong retail and office component. The retail component can accommodate a community shopping centre or retail floor area equaling that of a community shopping centre. In addition, a primary business node can accommodate entertainment venues, such

as restaurants, as well as a cluster of office buildings, which can provide office space catering for businesses operating at a regional level.

TABLE 12: BUSINESS NODES AND COMPOSITION

Node hierarchy	Total retail area	Total office area	Minimum trade area	Minimum access requirements	Composition
Primary business node	15,000-30,000m^2	5,000 - 9,000m^2	14km	Access to distributor road and major public transport route	A community shopping centre or a total retail floor area of similar size Entertainment venues of regional significance. A cluster of office buildings catering for regional businesses
Secondary business node	<15,000m^2	<5,000m^2	7km	Access to major distributor road and minor public transport route	A neighbourhood shopping centre or a total retail floor area of similar size Entertainment venues of local significance Office buildings catering for local businesses

Source: Urban Dynamics Gauteng, 2011

b. Secondary business node

A secondary business node will require a neighbourhood shopping centre or a total retail area similar to that of a neighbourhood shopping centre. In addition, a secondary business node can accommodate entertainment venues, such as restaurants, as well as office buildings that provide office space for local businesses, such as a veterinary practice.

5.3.3.2. BUSINESS CENTRE DEVELOPMENT

To ensure the viability of proposed business activities within the Hekpoort Study Area, it is important to (a) develop a business node to ensure the orderly and logical development of retail and office space within the Hekpoort Study Area, and (b) link the retail and office space estimates presented in Section 3 of this report.

TABLE 13: PROPOSED RETAIL AND OFFICE FLOOR AREA ALLOCATION

Item	Retail Centre Classification	Existing Retail	Allocation 2010-2020	Available Retail 2010-2020
Retail floor space	Community shopping centre	1700m²	24553m²	22853m²
Office floor space		510m²	7366m²	6856m²
Total retail and office allocation		2210m²	31919m²	29709m²

Source: Urban Dynamics Gauteng, 2011

Retail Centre Classification:

Classification	Size (m²)
Local centre	1000-5000
Neighbourhood centre	5000-15000
Community Centre	15000-30000
Small Regional Centre	30000-60000
Regional Centre	60000-100000
Super-Regional Centre	>100000

According to the Table above, the Hekpoort Study Area could potential accommodate a total of 23,000m² of retail floor area. This retail floor area needs to be developed within the proposed secondary business node located on the intersection of the R560 and the R563. This retail floor area can either be developed as a single community shopping centre or it can constituted a number of smaller retail outlets with a combined retail floor area of 23,000m². The latter approach is the desired approach, because it will enable the development of a nodal area, in stead of merely developing a stand-alone shopping centre. **It has to be stressed that granting the right for a community shopping centre must only be done based on the recommendations of detailed retail study that accompanies the application for the land use rights needed to developed the community shopping centre.**

The location of the retail and office components in the proposed secondary business node located near the intersection of the R560 and the R563 will ensure that these land uses are centrally located within the Hekpoort region and will therefore be accessible to the Study Area population. In addition, this business node is located on a public transportation route situation on the R563 distributor road. This public transportation spine will ensure good access to this business node for all the Study Area residents. The proposed Hekpoort business node also has the necessary access requirements, as it is located near the intersection of the R560 and the R563 distributor roads. In general it can be said that this proposed Hekpoort business node will certainly have many positive spin-offs for the Hekpoort Study Area; stimulating diversified economic development within the Study Area and sustainably support the rural residential component of the Study Area. In addition, the development of this business node will, if dealt with correctly, enhance the character and spatial identity of the Hekpoort Study Area.

5.3.4. COMMUNITY FACILITIES

Rural residential areas require the support of other land use types, such as schools and clinics, in order to create sustainable rural living environments. It is imperative that community facilities, as proposed out in the Land Use Budget (Section 3), be located in such a way that they are accessible to the communities they serve. This is best achieved using the community nodes proposed for the Hekpoort Study Area.

5.3.4.1. COMMUNITY FACILITY HIERARCHY

The composition of the proposed community nodes in terms of community facilities have been designed to suite the Hekpoort Study Area and should serve as a guideline for the design and development of these nodes. The proposed composition of each community node within the community node hierarchy is depicted in the Table below.

TABLE 14: COMMUNITY NODES AND COMPOSITION

Nodal Hierarchy	Service Area Radius	Size	Proposed composition
Primary community node	14km	15ha	1 secondary school 1 clinic 1 post office 1 library 1 community hall 1 police station 1 emergency service centre
Secondary community node	7km	10ha	1 secondary school 1 primary school 1 community hall

Source: Urban Dynamics Gauteng, 2011

a. Primary community node

A primary community node, providing higher-order community services, serves an entire rural region. A primary community node should contain all those community facilities of which on one in require within the rural area applicable. These include the rural area's clinic, post office and library. Other community facilities to be provided in such a node include a community hall, police station and emergency service centre. These facilities are all highest-order facilities when compared to similar facilities provided in lower-order nodes.

b. Secondary community node

A secondary community should provide low-order community services to subareas within the rural region. A secondary community node should comprise a primary school, but can also contain a secondary school and a community hall.

5.3.4.2. COMMUNITY FACILITY DEVELOPMENT

The Land Use Budget (Section 3) determined that the Hekpoort Study Area currently contains all the community facilities required to support existing population and the envisaged population increase within the Study Area up to the year 2020.
The Hekpoort Rural Node is the primary community node serving the Study Area and it should therefore contain all those community facilities of which only one in requires within the Hekpoort Study Area, such as a clinic and police station. Therefore, this node is intended to serve Study Area as a whole. This node is centrally located within the Hekpoort Study Area and is therefore located within an accessible distance of the rural households living within the Study Area. This allows this node to also function as a central or focal point within the Study Area, giving the Study Area is identity. According to the Land Use Budget, Hekpoort primary rural node has all the necessary community facilities needed for the Hekpoort Study Area, such as a clinic, a community hall and the library. These community facilities are all located within the Thusong Services Centre situated within this Rural Node. **To further strengthen the Hekpoort Rural Node, it is proposed that the existing Hekpoort police station, which is located on the R563, be relocated to the Hekpoort Rural Node, next to the municipal services centre. This facility can be used as a catalyst project within the Hekpoort rural node in order to stimulate the future development of this nodal area**.

Community facilities necessary to support the rural residential component of the Study Area can be located within the proposed secondary community nodes. These nodes, with the exception of the nodes located on the R400 and R540, have been located at existing schools within the Study Area. These secondary community nodes are all located in positions which

allow them to serve specific quadrants of the Hekpoort Study Area. The nodes located on the R400 and R540 have been proposed specifically to serve the planned rural housing settlements at these located: the Vogelsang rural settlement of the relocated Kromdraai/ Tweefontein settlements. These community nodes can each contain a primary school and possibly a clinic. **However, it should be noted that neither of these settlements have the household thresholds needed to support these community facilities. Such facilities will only be provided to locate such facilities within walking distance of each of the proposed rural settlements**.

There was mention that there is a need for a secondary community school within the Hekpoort Study Area, due to the overcrowding of the Schaumburg Primary and Secondary School and due to the influx of learners into the Hekpoort Study Area from neighbouring rural areas. The establishment of rural housing within the Hekpoort Study Area will only increase the need to the establishment of a new secondary school within the Hekpoort Study Area to accommodate the additional children in need of such a facility. If such a secondary school were to be considered for the Hekpoort Study Area, one the proposed community nodes or the Hekpoort Rural Node can be considered for the location of such a facility.

In order to develop the community infrastructure required within the Hekpoort Study Area, Mogale City will have to work in close relationship with the Provincial governmental bodies concerned with the development and management of community facilities, such as the Gauteng Department of Health and Welfare, and Department of Education. The responsibility of Mogale City will be to ensure that the necessary stands for community facilities are provided and that these stands are strategically placed within community nodes. The construction and management of the relevant buildings will be the responsibility of the provincial government departments concerned.

5.3.5. OPEN SPACE & RECREATION

Open space and recreation within the Hekpoort Study Area can be divided into 2 categories: passive and active open space. Passive open space consists of land that is unsuitable or undesirable for development due to topographical, ecological constraints or for flood protection purposes. Active open space involves the recreational component of the open space system. It provides recreation and sport facilities throughout a rural area for use by local residents, sports clubs and schools. Passive open space is dealt with in a previous section of the report and active open space is dealt with below.

5.3.5.1. ACTIVE OPEN SPACE DEVELOPMENT PRINCIPLES

Formulating principles for the development of active open spaces can help ensure that standards of quality and usefulness are achieved in the planning, design and management of such spaces. The following development principles need to be taken into account when developing active open spaces:

a. Linking a use to open space

Active open spaces that do not have a deliberate use connected to them are often not of value to a local community and often become dumping ground as a consequence. It is therefore imperative that a use be linked to an active open space to ensure the utilization of these spaces. One of the best ways of utilizing active open spaces within urban areas is to develop recreational facilities or sports facilities on these spaces.

b. Type of facilities provided

When planning active open spaces, it is important that appropriate recreation (or sport) facilities are provided. Often recreational facilities are provided that do not fulfill the needs of the community, usually because they are not the preferred recreational types. To prevent the provision of inappropriate recreational facilities, the recreational preferences of a local community must be established before planning and developing a recreational facility.

c. Maintenance of active open spaces

An important factor in determining the success of active open spaces is the maintenance thereof. Past experience has proved that active open spaces that are not maintained often lose their practical value to local residents. Therefore, it can be argued that larger and fewer active open spaces that are maintained are more useful than smaller, more numerous active open spaces that are not.

d. Accessibility of active open spaces

When locating active open spaces, it is important to ensure that these spaces are accessible to the community it serves. This implies locating an active open space within walking distance of most of the people living within a community.

Locating an active open space centrally will also ensure the continued presence of people in the vicinity of such a facility, which would protect such space from vandalism.

e. Urban form and function

In order to enhance the focal function of active open spaces, it is imperative that attention is given to the design of these active open spaces. For example, the planting of trees along the periphery of an active open space will enhance the identity and attractiveness of this space. If active open spaces are integrated through design with surrounding facilities, it will enhance the usage of these spaces. For example, placing an active open space next to or close to a primary school will allow the space to supplement school sport facilities.

5.3.5.2. ACTIVE OPEN SPACE HIERARCHY

The limited funds available for the construction of active open spaces necessitate a critical appraisal of the generally accepted standards and norms applicable to active open space development. An approach based on practical considerations rather than on accepted norms should be followed. One of the most practical ways of utilizing open spaces is to use these spaces as sport or recreation facilities. This connects a deliberate use to open spaces, ensuring they serve a specific community need.

Taking into account the above, a 2-tier recreational node hierarchy can be proposed. The composition of these recreational nodes should serve as a guideline for the design and development of active open spaces within the Study Area, but can differ depending on the recreational preferences of local communities. The proposed recreational node hierarchy and its composition are depicted in the Table below.

a. Primary recreational node

A Primary recreational node should provide recreation facilities that are significant on a regional level, usually with a rugby or soccer field comprising the central facility within such a node. In addition to the rugby or soccer, such a node should contain other high-order recreation facilities, such as a cricket oval, tennis courts and a multi-purpose indoor sports centre. Such an active open space must also include a parking area and must have access to a public transportation route. Such a recreational facility can function as the base of a regional sports club.

TABLE 15: ACTIVE OPEN SPACE COMPOSITION

Nodal Hierarchy	Service Area Radius	Size	Proposed composition
Primary recreational node	14km	20ha	1 rugby or soccer field and athletics track 2 practice rugby or soccer fields 1 cricket oval 6 tennis courts 4 netball courts Multi-purpose indoor sport centre
Secondary recreational node	7km	10ha	1 rugby or soccer field and athletic track 4 tennis courts 2 netball courts Children's playground

Source: Urban Dynamics Gauteng, 2011

b. Secondary recreational node

A secondary recreational node should provide sport facilities that serve subareas within the rural area. Such a facility can comprise local recreational facilities, such as a rugby or soccer field and a few tennis courts. These recreational facilities can supplement the recreation facilities of schools and should therefore be located in close proximity of schools.

5.3.5.3. ACTIVE OPEN SPACE DEVELOPMENT

A secondary recreational node is proposed and located at the Hekpoort rural node. This will allow this recreational node to serve the entire Hekpoort Study Area, as it is located in a central and accessible location within the Study Area. This proposed recreation node requires the development of recreational facilities, as set out in the Table above. **Although no additional recreational nodes are identified and proposed in this report, recreational facilities can be located at existing and planned schools in order to supplement school facilities were necessary**.

5.4. CONSERVATION AND TOURISM

Tourism development areas must adhere to two central principles: quality and accessibility. Quality refers to aspects such as environmental management, availability of municipal services infrastructure, land use management and architectural standards. Accessibility refers to the availability of and quality of transportation infrastructure, such as roads and railway lines, as well as the availability of public transport services. Attempts are made in this section to address these principles and proposed ways in which tourism development can be encouraged within the Hekpoort Study Area.

5.4.1. LEGISLATIVE CONTEXT

As mentioned above, environmental management is a primary aspect of providing quality tourism destinations. Without beautiful, protected and well-managed natural environment, the tourism potential on any region will be severely diminished. With regard to the protection or conservation of the natural environment, two legislative documents are of relevance.

a. National Environmental Management Act (NEMA) (Act 107 of 1998)

The key objective of NEMA is to give effect to environment rights expressed in the Constitution and require all organs of state to take these rights into account when undertaking actions that could have a significant impact on the environment.

An important aspect of NEMA is that it empowers the National Ministers and MECs to compile 'information and maps that specify the attributes of the environment in particular geographical areas, including the sensitivity, extent, interrelationship and significance of such attributes which must be taken into account by every competent authority'. This aspect has been catered for in the EIA Regulations in the form of Environmental Management Frameworks (EMFs). Once adopted by the National Minister or MEC, an EMF must be adhered to by environmental and planning authorities when making land use and development decision within the area covered by the EMF.

NEMA principles need to be considered in decision-making involving tourism development and the conservation of natural areas, such as the Magaliesberg, located within the Hekpoort Study Area. In other words, the Mogale City Local

Municipality needs to ensure that environmental protection is given high priority within the Hekpoort Study Area in order to further encourage tourism development within the Study Area.

b. National Environmental Management and Biodiversity Act (NEMBA) (Act 10 of 2004)

The main objectives of the Biodiversity Act are to manage and conserve biological diversity and to provide for the sustainable use of local resources. One of the key features of the Act is that it recognises that planning is a central feature of biodiversity management. The primary planning instrument is the National Biodiversity Framework, prepared by the National Minister, which must identify priority areas for the establishment of areas where conservation needs to take place.

Bioregional plans are another category of planning that is covered in the Act. In terms of this provision the National Minister or provincial MEC may identify an area as a bioregion. A bioregional plan can be to manage biodiversity within a particular region. Another type of plan is a biodiversity management plan. Such plans may be prepared by any organ of state, but are subject to the approval of the National Minister. A biodiversity management plan can be prepared for specified ecosystems, indigenous species or migratory species not been listed as threatened in terms of the Act. NEMBA specifically prohibits conflict between, on the one hand, the National Biodiversity Framework, a bioregional plan and a biodiversity management plan and, on the other hand, any IDPs, SDFs or EMPs. In Mogale City, the guidelines of NEMBA need to be taken into account in order to ensure that both biodiversity and tourism needs are considered in land use planning and development in the Hekpoort Study Area.

5.4.2. CONSERVATION

Conservation areas fulfill a number of functions. These functions include hazard avoidance, resource conservation, ensuring community well-being and educational (see Table below). With regard to hazard avoidance, conservation areas can include land that is unsuitable or undesirable for development due to topographical constraints, ecological constraints or for flood protection reasons.

TABLE 16: FUNCTIONS OF CONSERVATION AREAS

Hazard avoidance	Resource conservation	Recreational and psychological	Educational
Conservation areas must reserve flood prone areas. Conservation areas must reserve steep slopes and geologically unstable ground. Conservation areas should protect drinking water sources from being contaminated.	Conservation areas must protect water sources. Conservation areas must protect linked areas of conservable indigenous vegetation.	Conservation areas must provide space for recreational and eco-tourism purposes. Conservation areas must provide symbols of community identity. Conservation areas must be protected for relief from psychological stresses.	Conservation areas must be protected for environmental education purposes.

Source: Urban Dynamics Gauteng, 2011

5.4.2.1. CONSERVATION AREAS

Typically, there are two environmental features that that need to be conserved: ridges of mountainous areas and rivers systems. Both these environmental features are usually of ecological significance and, importantly, often function as continuous and connected natural corridors, which allow the migration of differed animal species. The environmental features need to be identified and protected within the Hekpoort Study Area. Ridges are essentially protected by the GDART Ridges Policy of 2001, which restricts land use on such areas. In addition, the ecological integrity of the conservation network must be maintained as far as possible to allow for connectivity between conservation areas.

The Hekpoort Study Area contains a number of mountains and ridges and the conservation of the mountains and ridges are of utmost importance for a number of ecological reasons. Apart from these ecological reasons, these mountains and ridge also provide the Hekpoort Study Area with and character, spatial identity and natural beauty, which in turn forms the bases of tourism development within the Study Area. The Magaliesberg, which is located on the northern boundary of the Study Area, is most prominent topographical feature traversing the Study Area and is a high-priority ridge in Gauteng as a whole. The Magaliesberg mountain range is identified as both ecologically and culturally significant in the West Rand District Municipality SDF. Even though large parts of this mountain range are privately owned, large parts of this mountain range is protected as conservation areas in which species diversity is protected. The Witwatersberg is also a high-priority ridge traversing Gauteng and the southern reaches of the Hekpoort Study Area. This ridge traverses the southern reaches of the Study Area. No development

is permitted on these ridges. If a developer wishes to develop of these ridges, a full EIA with a full set of specialist reports in required, including an ecological study that addresses the following:

- A Red Data study for both fauna and flora
- An invertebrate study
- A hydrological/ geo-hydrological study
- A geotechnical study
- A pollution study, including both air and water pollution
- A social study, including cultural, historical and open space value aspects
- A visual study
- A study of service provision and access

A small number of low-priority ridges are found within the Hekpoort Study Area. These ridges are all deemed sensitive until verified by GDACE. Low-impact developments on these must only be considered on these ridges on submission of a full EIA report and specialist studies. Any proposed developments must include a management plan to maintain the ecological integrity of the ridges.

The conservation of water bodies is also of specific importance. The Hekpoort Study Area is endowed with a river and a number of tributaries, which need to be protected to the benefit of the municipal area as a whole. The river that flows through the Study Area is the Magaliesriver, which flows into the Hartebeespoort Dam. The natural drainage channels and banks of the Magaliesrivier and its tributaries need to be protected up to the 100-year flood line. This will protect the Hekpoort communities from flooding and ensure the protection of the ecological status of the river embankments.

5.4.2.2. CRADLE OF HUMANKIND WORLD HERITAGE SITE

The Cradle of Humankind World Heritage Site is a major provincial conservation initiative of international importance, linked to the presence of pre-historic hominoids and cultural artifacts. A number of smaller nature reserves are located within the Cradle of Humankind and include the Rhino Lion Private Nature Reserve, the Plovers Lake Nature Reserve and Natural Heritage Site, and the Isaac Stegmann Private Nature Reserve.

The Environmental Management Framework for the Cradle of Humankind World Heritage Site (2008) is a report that will manage all spatial development within and bordering the Cradle of Humankind World Heritage Site. The Hekpoort SDF will need to comply with the development controls proposed by this Environmental Management Framework. Inevitably, the development controls put in place by the Environmental Management Framework will have a significant impact on the types of land uses and developments that may occur in the vicinity of the Cradle of Humankind World Heritage Site.

In addition, the Cradle of Humankind World Heritage Site covers a significant part of the Hekpoort Study Area. The Cradle of Humankind Management Framework stipulates the nature and intensity of land uses which can be accommodated in this area. The Cradle of Humankind covers most of the ridges mentioned in a previous section of this report, thus providing an additional mechanism to protect of these ridges located within the southern half of the Hekpoort Study Area.

All applications for land use change and the subdivision of farmland under the jurisdiction of Mogale City Local Municipality, which is located within the Cradle of Humankind, are submitted to the Mogale City Local Municipality for approval. Such applications are submitted to the Gauteng Department of Agriculture and Rural Development (GDARD) for comments only. **However, despite the aforementioned, Mogale City should be committed to implement the Environmental Management Framework of the Cradle of Humankind World Heritage Site, which was prepared by GDART. Thus, all applications for land use change and the subdivision of farmland under the jurisdiction of Mogale City Local Municipality, which fall in the Cradle of Humankind, must be strictly evaluated according to the Environmental Management Framework of the Cradle of Humankind World Heritage Site**.

The Cradle of Humankind World Heritage Site and its conservation areas can to a large extent drive tourism development within the Hekpoort Study Area. This would involve identifying tourism development opportunities in close proximity to the Cradle of Humankind World Heritage Site. Typical tourism facilities that could supplement the Cradle of Humankind World Heritage Site could include guest houses and lodges, cultural villages, environmental education centres, restaurants, tea gardens, wellness centres and spas.

5.4.3. ACCOMMODATION

The areas identified on Figure 19 should be utilized for development of agri-tourism, ecotourism, adventure-tourism and other tourism categories. The potential for tourism development can be based on the extraordinary natural resources of the Hekpoort valley. Tourism development can potentially create job and investment opportunities within the Hekpoort Study Area and stimulate the economic development of the Study Area. However, this will require investment by Mogale City in the upgrading

and maintenance of the rural dirt road network serving these proposed tourism areas, as was mentioned in a previous section of this report.

The development of accommodation establishments is central to tourism development within the Hekpoort Study Area and thus needs to be done according to a unified set of criteria that is applicable to the Study Area environment. This needs to be done to ensure a quality tourism environment is created within the Study Area on the one hand, which at the same time addresses the needs of the Study Areas residents for local economic and employment opportunities associated with the guest accommodation sector.

5.4.3.1. ACCOMMODATION TYPOLOGIES

Different guest accommodation establishment categories can be identified and are set out in the Table below. Such a classification allows a set of guidelines to be developed, which can be used to evaluate and regulated the tourist accommodation sector.

TABLE 17: ACCOMMODATION TYPOLOGIES

Typology	*Description*	*Uses Included*
Camping and Caravanning	A property used for erection of tents or other temporary structures for temporary accommodation for visitors or holiday-makers, which includes ablution, cooking and other facilities that are related to camping. This includes a caravan park, whether publicly or privately owned.	• Tents • Caravans • Communal Ablution Facilities
Bed and Breakfast Establishment	A dwelling house or second dwelling in which the owner of the dwelling supplies lodging and meals to guests who have permanent residence elsewhere; provided that the primary use of the dwelling-house concerned remains for the living accommodation of a single family.	• Second Dwelling • Residential Building
Guesthouse	A dwelling house or second dwelling which is used for the purpose of supplying lodging and meals to guests in an establishment which exceeds the single-family house restriction of a bed and breakfast establishment. A guesthouse may also have meeting and function rooms.	• Second dwelling • Cottages • Self-catering units • Meeting / Function Rooms • Residential Building
Backpackers Accommodation	A building where lodging is provided, and may incorporate cooking, dining and communal facilities for the use of lodgers. It includes a building in which rooms or beds are rented for residential purposes, such as a boarding house or youth hostel.	• Backpackers Lodge • Boarding House • Youth Hostel
Self-catering	A building or group of buildings consisting of separate accommodation units, each	• Self-catering units

Typology	*Description*	*Uses Included*
Units	incorporating a kitchen facility, and which may include other communal facilities for the use of guests, which are rented for residential purposes. It may include holiday flats.	• Communal Facilities • holiday flats
Hotel	A property used as a temporary residence for guests, where lodging and meals are provided. It may include restaurants, conference and entertainment facilities that are ancillary to the primary use as a hotel.	• Restaurant or bar • Conference Facilities • Entertainment Facilities • Wellness Centre and Spa
Resort or Lodge	Guest accommodation is subsidiary to the main use, which is of a recreational nature. The main use could be a golf course or similar recreational use.	• Clustered dwelling units • Restaurant or bar • Wellness Centre and Spa
Game Farm	Guest accommodation is subsidiary to the main use, which is for the keeping of certain wild animal species. Game farming is further controlled by environmental and tourism legislation.	Clustered dwelling units Restaurant or bar Wellness Centre and Spa

Source: Urban Dynamics Gauteng, 2011

5.4.3.2. IMPLEMENTATION GUIDELINES

Guidelines for the development of tourist facilities within the Hekpoort Study Area can be an effective mechanism to manage the development of tourism facilities within the Study Area and provide guidance when considering applications for such activities. These guidelines are based on the following underlying principles:

- Addressing the need for access to economic opportunities by supporting the guest accommodation industry
- Promoting a responsible and sustainable approach to guest accommodation development
- Promotion and safeguarding of the quality of life enjoyed by local residents
- Clearly stating the land use requirements for establishing guest accommodation

The following guidelines are proposed for use by land use planners in dealing with applications relating guest accommodation related to the tourism industry:

a. Camping and caravanning

Camping and caravanning sites are usually located in a unique and attractive natural environment. As such, a camping and caravanning site should be developed as a low impact and low intensity use that is in keeping with the context of the area and its surrounding character. A camping and caravanning site can consist of multiple free standing or linked structures of a temporary nature, and may include caravans and tents. Day visitors may be permitted and facilities for their use can be provided. The enterprise may be either in public or private ownership.

b. Bed and breakfast

Part of a dwelling house or second dwelling can be converted to accommodate guests. Breakfast is usually served to residents. Guests may share communal facilities, such as bathroom facilities, or it may be en-suite and private. The architectural appearance and scale of the single residential dwelling unit must be maintained in order to continue to fit the character and context of surrounding residential environment. The Bed and Breakfast Facility may have a minimum of 3 and a maximum of 6 bedrooms.

c. Guesthouses

Guesthouses may be part of a larger single family dwelling house or second dwelling converted to accommodate guests. Part of the dwelling may be provided in a second dwelling. Buildings can be free standing or linked structures. Council may restrict the number of rooms per establishment to mitigate the impact of the establishment on the surrounding residential area. Breakfast is usually served to guests. Guests may share communal facilities or may have en-suite facilities. The guesthouse may have a minimum of 4 and maximum of 12 bedrooms

d. Backpacking and youth hostels

Backpacking and youth hostels provide low cost accommodation to travelling persons whose primary need is for a sleeping facility. Backpacking and youth hostels may contain communal areas, such as kitchen and dining areas and meeting rooms for the exclusive use of lodgers. A kitchen is available for self-help, but no meals are provided for guests. All facilities are communal. Usually there are no restrictions on the number of rooms or beds, but these must be appropriate for the building and surrounding area. However, Council may restrict the number of beds or rooms per establishment in cases and lay down conditions necessary to mitigate the impact of the establishment on the surrounding residential areas.

e. Self-catering apartments

Self-catering apartments is located in a building or a group of buildings consisting of separate accommodation units rented for residential purposes. Each unit incorporates a kitchenette and an ablution facility. The establishment may also provide meals communally to guests. There are usually no restrictions on number of rooms or beds. However, Council may restrict the number of beds or rooms per establishment in cases where it is necessary to mitigate the impact of the establishment on the surrounding residential environment.

f. Hotels

Hotels are purpose built building, which may consist of multiple free standing structures or a multiple storey single structure. These establishments provide separate rooms with at least one communal dining facility. Breakfast lunch and dinner is served. No provision is made for self-catering. All provided facilities are for the exclusive use of the residing guests. No restrictions are placed on the number of rooms or beds. Council may, however, restrict the number of beds or rooms per establishment to mitigate the impact of the establishment on the surrounding areas. Proximity to major transport routes is an advantage.

g. Lodges and resorts

Lodges and resorts are purpose built and designed guest accommodation units for short term occupancy or use on time sharing basis. Such developments are often located in a unique environment. It can consist of multiple free standing, linked or single structures. Lodges and resorts may include ancillary facilities which are related to the establishment, such as ablution facilities, tourist facilities, recreation facilities, sports facilities, lecture rooms, restaurants, conference facilities, spa and wellness centre, caravan park and camping site. The scale of development is to be determined by contextual information, such as the environmental sensitivity of the area in which it is located, scenic or panoramic views, the carrying capacity for the environment, etc.

h. Game farms

Game farms are purpose built and designed guest accommodation units for short term occupancy or use on time sharing basis for holiday or recreational purposes. It is always located in a unique environment related to wildlife preservation, hunting or fishing recreation. It may include ancillary facilities that are related to the game farm, such as

ablution facilities, tourist facilities, recreation facilities, sports facilities, and restaurants. A game farm consists of multiple free standing dwelling units that may or may not be linked to each other. All of the dwelling units must be clustered together and must not deter from the main function of the game farm. The density and design of the game farm must be determined by contextual information, such as environmental sensitivity, scenic views, and the carrying capacity for the natural environment.

In addition to the above, it is proposed that a Site Development Plan be submitted prior to the approval of any consent use and rezoning right for the establishment of guest accommodation. Paved and demarcated parking areas must be provided at a ratio of 1 parking bay per unit and 3 parking bays per 100m2 of public area for all accommodation typologies, except backpacker lodges. Backpacker lodges must provide 1 parking bay per five beds provided for.

The above is an attempt to provide a uniform approach to the management of guest accommodation across all accommodation typologies within the Hekpoort Study Area. It attempts to provide assessment criteria for each of the eight accommodation typologies that can be used to approve consent use and rezoning applications for the establishment of guest accommodation.

5.4.4. TOURISM FACILITIES

Apart from tourist accommodation, tourism facilities can be developed within the Hekpoort Study Area that specifically aims to provide services and goods to tourists visiting the Hekpoort area. Tourism facilities can include cultural villages, farmers markets, information centre, etc. Importantly, tourism facilities must aim to depict the culture, activities and artifacts of the particular region in which it is located. A tourism facility may be registered as a business in the form of a Private Limited Company or Close Corporation. However, if the project is a community initiative, for example a cultural village established by a rural community, it should be registered as a Community Trust or a Section 21 Company. The following guidelines should inform the establishment of tourist facilities:

a. Space and infrastructure

The amount of space needed for the envisaged buildings and visitor facilities of a tourism facility needs to be assessed before the approval of land use rights. Assess to municipal water and electricity capacity and adequate road access also needs to be determined before granting land use rights for the establishment of a tourism facility.

b. Parking

Sufficient parking needs to be provided to cater for tourists that arrive in their own transport. It is thus important to estimate beforehand the number of visitors that are envisaged. Importantly, parking for tour buses must be provided if tourist groups are to visit the tourism facility.

c. Amenity value

The location of tourism facilities must be such that the attractiveness of the surrounding area enhances the value of the tourist facility for visitors and tourists. For example, the site for the tourist facility must be free from unpleasant odours often associated with commercial farming practices.

d. Roads and accessibility

The location of tourism facilities must be such that it is easy for tourists using their own transport to find the facility. Thus the tourism facility should preferably be located within reasonable distance of a main road that is frequented by tourists. Permission must be obtained from the Provincial Department of Transport to construct new access points onto main roads.

e. Signage

Permission must be obtained for the erection of any signs advertising the location of a tourism facility. To erect a road sign in the road reserve (as distinct from on your own property) to advertising a tourism facility will require approval from the Department of Transport in the case of national roads, the Provincial Department of Transport in the case of secondary roads, and the Local Municipality in the case of local roads.

f. Zoning

Where the tourism facility will be substantially change the currently land use, application must be made for a change in land use. Any special environmental, mining or other zones that could conflict with the intended tourism facility should be determined before granting land use rights for the development of tourism facilities.

g. Licensing and registration

The tourism facility may need to be registered as a business with the Local Municipality. If the tourism facility intends to serve meals, a trading license will need to be purchased. If liquor is to be sold on the establishment, application will need to be made to the Liquor Board at the Department of Arts, Culture and Tourism for a liquor license in terms of the Liquor Act (27 of 1989).

h. Employment and partnerships

It is important to establish partnerships with neighbouring communities in order for them to have a sense of ownership in the tourism facility. The promotion of such partnerships is advocated in the White Paper on the Development and Promotion of Tourism in South Africa. As such, it is important for local people to be employed in the operation, in stead of employing people from other areas. The adequate training of tourism facility staff is also vitally important.

Based on the guidelines set out above, it is proposed the local tourist facilities be development along the R560. The R560 connects to the Magaliesburg tourism area, as well as to the Hartbeespoort Dam tourism area, thus making this road a suitable location of tourism facilities. These tourist facilities must aim to provide economic opportunities for the location population and can include farmers markets and cultural villages. Three potential sites can be identified for the development of local tourist facilities along the R560. The first site is a municipal-owned site located opposite the Thusong Community Centre. The site can be developed be the Municipality and can be designed in such a way that it can be interchangeably be used as a farmers market and a cultural/ curio market. These second site is located on the intersection of the R560 and the R401 and is a planned cultural villages located within the planned Vogelsang Rural Settlement Development. The third site is a planned cultural villages located on the intersection of the R560 and the R465. This cultural village will form part of the Plumari Game Reserve development.

5.5. AGRICULTURE

The aim of this section of the report is to ensure that high agricultural land is adequately preserved and made accessible to both commercial and community-based commercial farmers. Even though agriculture is the responsibility of national and provincial government, local government still has a role to play in terms of land use management and the facilitation of investment opportunities to increase agricultural activities and production where possible.

The Hekpoort Study Area is an important agricultural region within Gauteng, with both extensive and intensive farming constituting the agricultural sector within the Study Area. Therefore, there is a need to protect the high potential agricultural land found within the Study Area, provide mechanisms and incentives for the promotion of agricultural development, and determine the most appropriate subdivision criteria for agricultural land so as to ensure sustainability within the agricultural sector.

5.5.1. LEGISLATIVE CONTEXT

Over the past decade agricultural development and protection has found expression in a range of acts, policies, strategies, and development planning instruments aimed at ensuring that agricultural resource allocation and utilization takes place in an integrated, efficient and sustainable manner. There are 3 legislative documents that are of relevance to agriculture worth mentioning. The legislative documents are briefly addressed.

a. Subdivision of Agricultural Land Act (SALA) (Act 70 of 1970)

The Subdivision of Agricultural Land Act controls the subdivision of agricultural land. The National Department of Agriculture is responsible for the Act and therefore deals with the subdivision of agricultural land. The Act defines what land is covered by this Act and it prescribes what actions can only take place with the written consent of the National Minister of Agriculture these actions include the following:

- Subdivision of agricultural land
- Transfer and registration of shares in agricultural land
- Lease of agricultural land for 10 years or longer
- Sale of a portion of agricultural land
- Sale or transfer of an agricultural right
- Inclusion of agricultural land in a development

The Minister is required to consult with the Premier of the Province when considering an application relating to agricultural land in that province. In turn, this consultation is forwarded to the Municipality by Province for comments on the application. The Register of Deeds can only act upon the decision of the Minister and can only register the deed of a farm or farm portion if the written consent of the Minister has been submitted.

b. Conservation of Agricultural Resources Act (CARA) (Act 43 of 1983)

The Conservation of Agricultural Resources Act provides control over the use of agricultural land in order to promote the conservation and ensure the use of agricultural soils, water resources and vegetation. The Act allows the Minister to implement control which may relate to the utilization and protection of land which is cultivated, the utilization and protection of vegetation, and the protection of the grazing capacity of farmland. Other aspects covered by the Act include weed control, soil conservation, conservation of natural agricultural resources and assistance schemes. Furthermore, the Act makes provision for the Department of Agriculture to issue directives to landowners, to rectify situations where their practices impact negatively on the production of agricultural land. The Conservation of Agricultural Resources Act is therefore essentially a tool that the Department of Agriculture has to assist in preserving South Africa's natural agricultural resources, such as the quality of agricultural land.

c. National Water Act (NWA) (Act 36 of 1998)

In terms of the National Water Act, the National Government is the public trustee of the country's water resources. National Government manages water resources and determines the availability of water for various uses, including agriculture. Requirements for obtaining a license and registering water uses are covered in the Act.

Various water uses are defined in the National Water Act, which include taking water from a water resource, storing water, discharging waste water into a water resource, and disposing of waste in any other manner that may detrimentally impact on the quality of a water resource. In addition, the National Water Act emphasises demand management as a means of conserving water resources.

Agriculture is a major water user in the country and therefore the sustainability of water resources is critical to this sector. There are cases where water rights for irrigation associated with agricultural activities are being bought to cater for the needs of non-agricultural uses (e.g. irrigation of golf courses). This poses a threat to the availability of water for agricultural purposes.

5.5.2. AGRICULTURAL DEVELOPMENT

The areas identified as suitable for agricultural use on Figure 19 should be utilized for agriculture, whether is be for irrigated cultivation, dry-land cultivation or for grazing purposes. The area set out for agriculture is located on high-potential agricultural soils and it is imperative that these soils be protected for future generations. This is despite the fact that there is no longer enough water in the Magaliesriver to conduct irrigation farming within Hekpoort Study Area, because the water of the Magaliesrivier is mostly used up upstream in the Tarlton area by irrigation farmers. Where irrigation farming is no longer possible, dry-land cultivation or grazing should be considered on these high-potential agricultural soils until such time that the water shortage issue is addressed.

Over the past decade, sustainable agriculture has been gaining increasing support and acceptance within the agricultural sector, because it is seen as a means of addressing the many environmental concerns that have arisen in relation to agricultural practices, including water shortage. Agriculture is critical to advancing sustainable development since it is directly linked to food security. Since agriculture is a primary economic activity within the Hekpoort Study Area, means that the mismanagement of agricultural resources within the Study Area can have an adverse effect on the Study Area economy. The need for on the preservation and sustainable development of agricultural land in the Hekpoort Study Area is driven by the following overarching factors:

a. Agricultural land is a limited natural resource

There is limited agricultural in South Africa. South Africa has 122 million hectares of land surface, but only 82 million hectares is used for agriculture, of which most is used for grazing purposes. It is estimated that only 16 million hectares can be used for crop production and that only 3 million hectares of this land can be classified as high potential agricultural land. Only 1.3 million hectares of this land is irrigated.

b. Food security

Food security exists when a country's people have access to sufficient food products to meet their dietary needs. Therefore, food security is not only dependant on how much food is available, but it is also dependant upon the range of food products needed by dietary requirements. A productive and diverse agricultural production sector is therefore fundamental to the food security of a country.

c. Climate change and desertification

Climate change, which is causing changes in the environment, is occurring at an ever increasing rate. Data shows that Southern Africa is experiencing longer dry seasons and rainfall that is becoming less reliable year-on-year. Such climatic factors will influence agricultural production over the long run. Consequently, there will be an increasing need to preserve land for the purpose of food production and to ensure food security.

Based on the principles of sustainable agricultural development, a number of objectives can be set to guide sustainable agricultural development within the Hekpoort Study Area. These objectives are as follows:

- **Preserve land with high-potential agricultural solids to ensure food security, even if such land is not currently used for agricultural purposes**.
- Build awareness and knowledge about the value of agricultural land and the need to preserve it.
- Provide a high level of certainty to landowners, decision makers and other stakeholders with regard to the status and future of agricultural land.
- Promote efficiency in decision-making on applications relating to the subdivision of agricultural land and the change in use of agricultural land.
- Promote investment into sustainable agricultural practices for the benefit of the rural economy.

5.5.3. GUIDELINES FOR LAND USE CHANGE

Land use change refers to applications which will result in farming activities ceasing and alternative uses brought about on land that is currently used for agricultural purposes. The following activities are typically considered agricultural land uses or activities:

- Agriculture: The cultivation of land for crops or the grazing and breeding of animals.
- Agri-Industry: An enterprise for the processing of agricultural products, such as wineries, farm pack stores, etc.
- Agri-Village: A rural settlement situated within an agricultural area and where residence is restricted to farm workers and their dependents.
- Agri-Tourism: A type of tourism in which tourists experience the activities and lifestyles of people living and working in the agricultural sector.

Illegal land uses on farm portions, such as industrial and commercial developments that have no direct relation to agriculture, should be eradicated and moved to the urban areas or the rural towns. However, there are non-agricultural uses that can be considered for the Hekpoort Study Area. These are as follows:

a. Rural residential development or smallholding area

The use of agricultural land for rural residential or smallholding purposes would require an application for the subdivision of farmland. When considering such an application, the focus should be on the potential impact of such a development on agricultural resources. Potential impacts to consider when assessing a land use application for rural residential development should include the following:

- The irreversible loss of high potential agricultural land
- The fragmentation of agricultural areas, which limits the ability to expand farming operations
- Loss of employment opportunities for people currently employed in the agricultural sector
- The potential impacts of agricultural operation, such as crop spraying, noise or unpleasant smells, on the proposed residential development
- Increased competition for water resources for purpose other than agriculture, such as the irrigation of golf courses
- An increase in traffic which may impact on roads used to transport agricultural produce
- An increase in land value based on expectations of development rights due to approved residential developments in the area

Based on the above, rural residential development within the Hekpoort Study Area should not be allowed to result in reducing the quality and viability of valuable agricultural land, the location of the rural residential area should not result in the establishment of a new node over time, and the development should not result in the use of water reserved for agricultural purposes for other purposes.

b. Mining, waste disposal sites and large-scale infrastructure

Mining, waste disposal sites and other large scale infrastructure could have severe impacts on agricultural activities within the Hekpoort Study Area. These could include damage to crops and livestock as a result of increased dust and ground water pollution, increased heavy vehicle traffic that damages roads, the fragmentation of farm land, and the impact on the long term desirability of farming in the area. Thus, considering applications to allow for mining, waste disposal; sites and other large scale infrastructure within the Hekpoort Study Area must require an impact assessment to

determine the impact of these uses on agriculture within the Study Area. In addition, a set of conditions will be required regarding the mitigation of such impacts. No such development should be allowed on high potential agricultural land. Although the approval of mining operations is not a function of municipal government, but a function of national government, Mogale City should aim to be clear on there stand with regard to an application for mining rights and Mogale City should as far as possible aim to influence the National Department of Minerals and Energy in this regard.

c. Nature reserves and resorts

Applications for land use change to allow for nature reserves and resort type developments, does pose certain concerns. Of greatest concern with such developments is that permission for land use is often initiated with the view to obtaining more land use rights in future, typically to allow for low-density residential development in the future. Thus land use change to nature reserves and resorts should only be considered under the following conditions:

- Resorts must not be permitted on high potential agricultural land or agricultural land that is irrigated agricultural
- Only a fixed number of accommodation units may be allowed and accommodation units should be clustered.
- Developers should indicate how potential impacts on adjacent agricultural land will be mitigated
- No water reserved for agricultural purposes may be used to serve the resort development
- The potential to re-establish the natural habitat where a nature reserve is being proposed must be demonstrated.

d. Game farms

A switch from livestock to game farming does not require permission for land use change, except where tourist accommodation is provided, and also does not require consent, except where veterinary permits are needed for the importation and keeping of certain animal species. With regard to accommodation for tourists or hunters, the criteria for resort developments should be made applicable.

Secondary activities on game farms, such as farm stalls and function venues, can have potential impacts on surrounding agricultural activities, which should be taken into account. These could include noise and other types of pollution, additional non-farm related traffic volumes, and a general impact on the long-term desirability of agriculture in the area.

5.5.4. SUBDIVISION OF FARMLAND

The subdivision of farmland is largely underpinned by the principle of retaining viable economic farm units, because farm units that are too small are not able to provide a sufficient and sustainable income. Aspects that need to be considered when determining the viability of a farm unit in terms of its size, is the capacity of natural resource, particularly water, to support viable farming, and the yield potential of the agricultural soils. Based on the aforementioned as the basic point of departure, the following rural subdivision typologies can be identified and densification allowed accordingly, subject to the approval of the Department of Agriculture:

a. Rural residential areas earmarked for rural lifestyle living

Such rural residential areas provide a rural lifestyle for those families who wish to adopt such a lifestyle and are usually functionally already part of a rural settlement, such as Magaliesburg. In addition, when viewing such areas within the context of the larger municipal area, they fill in a characteristic residential gap within the larger municipal area. An important factor in defining these areas is the availability of bulk water, electricity and sewer.

The primary aim of these rural residential areas must be to maintain and enhance the rural character of the rural areas. Applying appropriate residential densities is central to maintaining such a rural character. Conventionally, a minimum subdivided stand size of 1 hectare should be supported within such rural residential areas. The subdivision of farms to stand sizes of between 0.8 and 4 hectare must be subject to the following conditions:

- Piped water is provided by a relevant authority, such as Rand Water;
- That the subdivision will not pose any pollution problems related to sanitation, and
- That the road infrastructure can handle the resulting increased traffic volumes.

b. Small farms earmarked for intensive farming purposes

In these rural areas, densities need to be much lower than those used for rural residential purposes, partly because of the limited capacity of transport, utility and social infrastructure, but in many cases also because of the need to protect natural and rural landscape from the encroachment of higher-density developments. Typically, such rural areas have stand sizes of between 4 and 20 hectare in size. The subdivision of farms to small farming units of between 4 and 20 hectare is size must be subject to the following conditions:

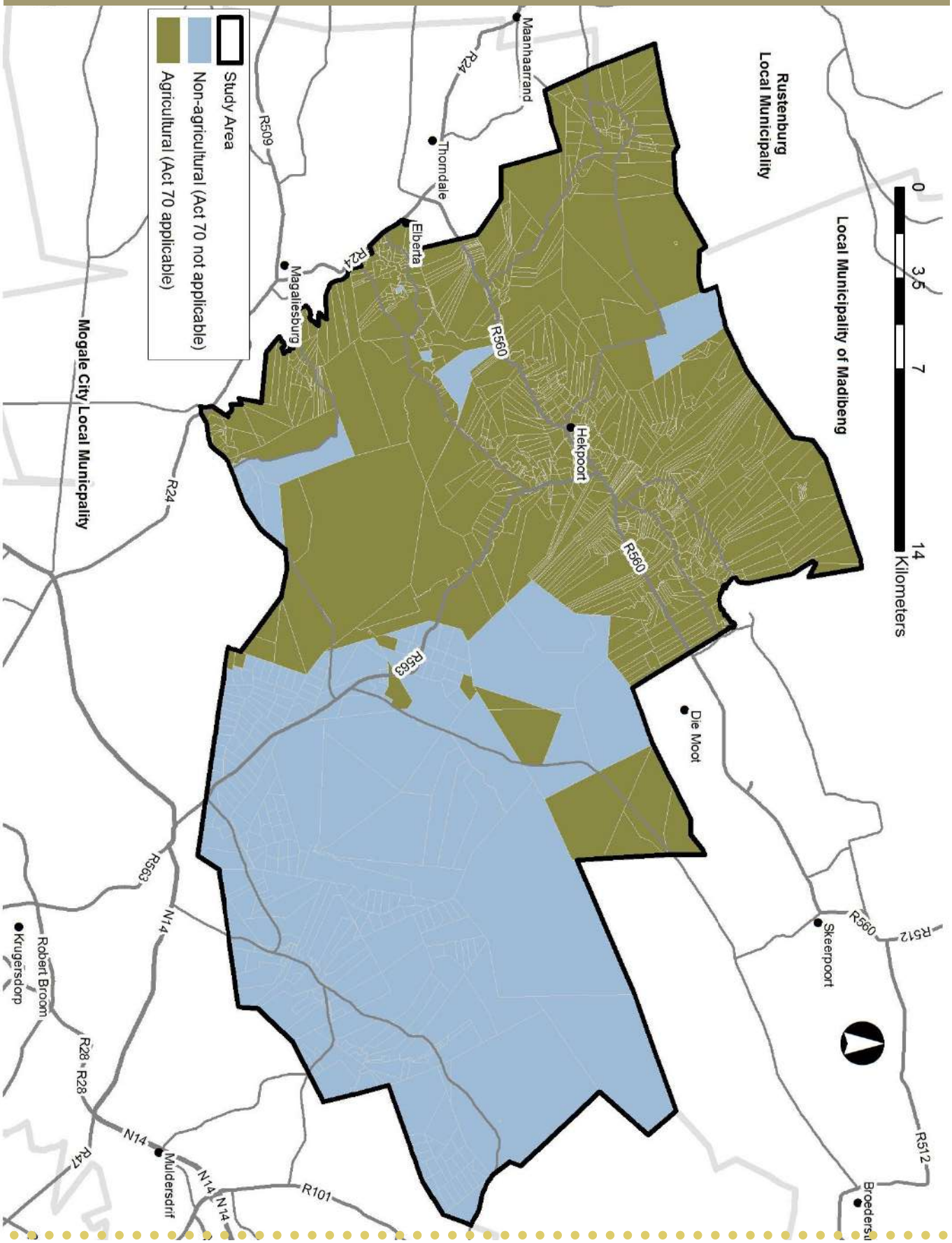


FIGURE 22
ACT 70 AGRICULTURAL LAND

FIGURE 22
ACT 70 AGRICULTURAL LAND

- The owner can prove to have adequate water supply from local sources, such as boreholes;
- That the subdivision will not pose any pollution problems related to sanitation, and
- That the road infrastructure can handle the resulting increased traffic volumes.

c. Commercial farms earmarked for extensive farming purposes

Commercial farms consisting of large cadastral units larger the 20 hectares should be retained as such. The status quo of such areas in terms of farms unit size and land use should thus be maintained, except in the following cases:

- Subdivision needed for infrastructure development, such as a road or railway line.
- Subdivision needed for existing or proposed community facilities, such as community halls, churches and schools.
- Subdivisions in order to consolidate to create more functional agricultural units.

As was mentioned before, the Subdivision of Agricultural Land Act (Act 70) controls the subdivision of agricultural land and the National Department of Agriculture is responsible for the Act and therefore deals with the subdivision of agricultural land. The Act defines what land is covered by Act 70. The land within the Hekpoort Study Area that is covered by Act 70 is depicted on Figure 22. Land within the Hekpoort Study Area that does not fall under Act 70, fall within the jurisdiction of Mogale City, except for such land that falls under the control of the Cradle of Humankind World Heritage Site Environmental Management Framework. Where land is not under the jurisdiction of Mogale City, the Municipality by Province can make comments on the applications for subdivisions, based on the guidelines set out in this Hekpoort Precinct Plan.

5.5.5. COMMUNITY-BASED COMMERCIAL AGRICULTURE

South African agriculture is increasingly export-orientated. Despite this, there is a need to focus on local autonomy, local markets and to allow rural communities to be able to produce food locally. Thus, the following proposal to introduce and promote community-based commercial agriculture within the Hekpoort Study Area is based on the premise that food products currently sold within Hekpoort are produced elsewhere to be sold locally by small, privately owned shops at exorbitant prices and that the lack of transport forces the poorest sector of the Hekpoort community to spend their limited funds on these products, exacerbating poverty. Furthermore, it rests on the fact that although small-scale farming may not be profitable due to economies of scale, that is does not imply that large-scale intensive farming cannot be done on small land parcels, as many agricultural models have shown in Europe and elsewhere.

The Mogale City Municipality obtained several properties in the Hekpoort area. Many of these, if managed correctly as viable commercial concerns, could be used for food production to be sold locally with surplus to be sold elsewhere. Such projects would offer a source of locally produced food, serve as source of employment for the local community and could be used as agricultural training centres. The project should be run under the guidance of experienced managers, possibly retired farmers, who could serve as mentors. The project should be run with a profit motive in mind but with such profit ploughed back into either the project itself or to fund further projects of its kind within the community. Community-based commercial agriculture can have many benefits, which include:

- Expanding the economic base of rural areas through production, processing, packaging, and marketing of consumable products.
- Increasing entrepreneurial activities and the creation of job opportunities.
- Rural areas with agricultural potential are used for agriculture production.
- Local production of food allows savings in transportation costs and storage.

TABLE 18: ADVANTAGES AND DISADVANTAGES OF HYDROPONICS

Advantages	*Disadvantages*	*Opportunities for Hekpoort*
• Suitable soil need not be present • Water use is conserved • Pests and diseases can be better controlled without the use of harsh chemicals • Weed problems are lessened • Hydroponic nutrients are recyclable • Significant reduction in space requirements • Growing time is often lessened • Heavy manual work is reduced • Better control of environmental factors, e.g. lighting, temperature, humidity and irrigation. • Higher yields and higher quality produce • Crop rotation is not necessary	• Hydroponic production is management, capital and labour intensive • System setup cost can be high • Pests and disease can spread quickly to plants using shared nutrient solutions • Not all plant varieties are suitable for hydroponics • Expert skills and knowledge are usually needed to operate at commercial production	• There is an opportunity for smaller size farms to explore hydroponics as an alternative income source. • Once established, the yields of hydroponics are higher than conventional farming, which can assist rural communities financially. • Substantial, skilled employment opportunities can be created – it can be linked to a skills training programme • There is a market for vegetable hydroponics and this market can include the tourism industry in the region. • Donor funding in terms of poverty alleviation grants is available to fund hydroponics.

Source: Urban Dynamics Gauteng, 2011

Figure 19 depicts the areas within the Hekpoort Study Area that is considered suitable for intensive, community-based commercial farming. This land is located on high-potential agricultural soils and therefore has a high-yield capacity, and it has access to the Magaliesrivier, which makes irrigation farming potentially possible. Note that the municipal-owned land that is earmarked for the Hartebeesfontein East rural settlement has been set aside for community-based commercial farming purposes. There is no demand for this land for settlement development and it can therefore be used as the community-based commercial agriculture. If the decision is made not to use the Hartebeesfontein West land for the development of a rural settlement, but rather to opt for the purchase of the Engelbrecht land for rural settlement purposes (as was mentioned previously), then this land should also be used for community-based commercial agriculture. Part of the Vogelsang affordable housing development is earmarked for community-based commercial farming enterprises. The parcel of Vogelsang located south of the R560 is the portion of the property earmarked for this purposes. Creating community-based commercial farming enterprises linked to affordable housing development within the Hekpoort Study Area is a desirable approach and should also be used in the development of other rural settlements within the Study Area.

Hydroponics is a farming method that can be considered for community-based commercial agriculture, especially where land available for community-based commercial agriculture is small, thus not allowing the necessary economies of scale to be achieved using conventional commercial farming methods. Hydroponics is a method of growing plants without soil in nutrient solutions. Conventional farming practices are often unpredictable and often have a diverse range of problems, such as a loch of available nutrient supply and disease control issues. Hydroponics alleviates some of these problems, thus giving the community-based commercial farmer more control of the agricultural process. In addition, a community-based commercial farmer using hydroponics can produce more produce and extend the agricultural season. The aforementioned reduces the risk of farming, which is to the benefit of rural households who cannot afford losses on their investments.

There is often funding and training opportunities available for hydroponic farming, which should be considered by rural communities within Hekpoort. The Municipality can possibly facilitate investment into hydroponics within the Hekpoort Study Area on behalf of rural communities. It is proposed that the viability of hydroponics be explored in the Hekpoort Study Area as a pilot project; possibly at the Vogelsang rural settlement development. If successful, this pilot project should be extended to other rural settlements within the Study Area.

5.5.6. AGRI-INDUSTRY

Agri-industry refers to buildings and infrastructure that are required to accommodate the processing of agricultural products. In fact, a very large part of agricultural production undergoes some degree of transformation between harvesting the agricultural products and final use. It includes industries that are engaged in the initial processing of agricultural commodities, such as rice and flour milling, leather tanning, cotton ginning, oil pressing, saw milling and fish canning. It also includes industries that undertake further manufacturing operations on products made from agricultural materials, such as bread, biscuit and noodle making, textile spinning and weaving, paper production, clothing and footwear manufacturing. According to the traditional classification of the United Nations, agri-industrial production is present in the following manufacturing sectors:

- Manufacture of food, beverages and tobacco
- Textile, wearing apparel and leather industries
- Manufacture of wood and wood products, including furniture
- Manufacture of paper and paper products, printing and publishing
- Manufacture of rubber products

5.5.6.1. PROMOTING AGRI-INDUSTRY

The best way of promoting agri-industry within the Hekpoort Study Area would be to select those agri-industry activities that will induce further progress elsewhere. Thus, an activity that shows a high degree of interdependence, as measured by the proportion of output sold to or purchased from other industries, can provide a strong stimulus to economic growth within the Study Area.

Another important feature of the agri-industry is the degree to which it is able to generate demand for the products of its industries. The close proximity of large markets associated with Johannesburg and Pretoria are particularly helpful in this regard. The development of agri-industries can also have many beneficial feedback effects on agriculture itself. The most direct one is, of course, the stimulus it provides for increased agricultural production through market expansion. The provision of transport, power and other infra-structural facilities required for agri-industries also benefits agricultural production.

The promotion of agri-industries usually facilitates a substantial increase in employment opportunities. Even if the agri-industrial process is itself capital-intensive, considerable employment may be generated. Agri-processing industries (food and beverages) typically employ around 20 to 30 percent of the total labour force employed in manufacturing in developing countries.

The developments in international agri-industry have implications for developing countries and the possibility of developing their agri-industrial sectors. Thus, the need to adapt production to the increasingly sophisticated and demanding requirements of these international markets often pose challenges to both agriculture and agri-industry in developing countries. In fact, the success of a number of developing countries in expanding agri-industrial production and exports has to a large extent depended on their ability to meet the requirements of the developed countries markets.

In most cases, it is domestic agriculture which is the main supplier of raw materials to agri-industry. For this reason, increasing the efficiency of local agriculture production is an important aspect of promoting agri-industrial development in general. At the same time, agri-industrial processing activities can themselves have a positive impact on the efficiency in agriculture production, promoting technological innovation and stimulating competition within the sector.

5.5.6.2. LOCATION OF AGRIC-INDUSTRY

The location of agri-industries in developing countries is largely linked to the relative abundance of agricultural raw materials and low-cost labour. In turn, the most suitable agri-industries are those that make relatively intensive use of these abundant raw materials and unskilled labour and relatively less intensive use of capital and skilled labour. Many of the industries using agricultural raw materials have in fact those characteristics, which make them particularly suitable as a developmental tool in developing countries. Where the raw material represents a large amounts, its availability can often offset such disadvantages as a lack of infrastructure or skilled labour.

Other factors also determine the economic location for an agri-industry. Generally transport is a primary factor. Most agricultural products either lose weight and bulk in processing, meaning they can be transported more cheaply after they have been processed, or they are perishable and so can be more easily transported in processed form. The situation is also affected by the availability of power and other infrastructure, but agri-industries can usually be set up in most rural areas where the raw material is produced.

One further aspect of importance for the location of agri-industries is the possible existence of economies of scale. Where there are considerable economies of scale, large markets are essential. However, although in most agri-industries average costs of production can be reduced as the scale of plant is increased, the importance of economies of scale should not be exaggerated. Based on the above, the following location criteria should apply when evaluating an application for the establishment of an agri-industry:

- To be located near the agricultural product to be processed
- To be located near an unskilled labour market
- Access to a major road network. This requires careful consideration in order to avoid overloading and traffic congestion.
- Access to electrical power infrastructure and capacity and in selected cases abundant water sources
- Aim to group similar agri-industries in order to achieve economies of scale
- Agri-industries may not be established on productive agricultural land and should preferably not be located on high-potential agricultural soils

5.5.6.3. LIMITING ENVIRONMENTAL POLLUTION

Despite their important contribution to overall and agricultural development, agri-industries can also give rise to undesirable environmental side-effects. Left unchecked, like any other industry, agri-industry can create environmental pollution through the discharge of organic or hazardous wastes into water supplies or the emission of dust or gases that could affect air quality and produce toxic substances.

The risks of pollution are smaller at the initial stages of processing, but they tend to increase with the level of physical and chemical alteration, particularly in the industries using outdated equipment and technologies. The size of the industry could also be an important factor. Smaller industries often tend to be more polluting than larger agri-industries. This is often so because small industries often lack the financial resources to use modern and clean technologies.

Controlling environmental pollution cause by agri-industries largely depends on the efficiency of the legislative environment and regulatory action taken to protect the environment. Anti-pollution regulation can be an important contributor, not only to reducing the release of pollutants, but also to encourage agri-industries to use modern and clean technologies.

Another form of pollution is visual pollution. This type of pollution occurs where an unsightly building in places in a scenic environment. This type of pollution can have many negative impacts, such as impacting on the tourism potential of an area or reducing the value of neighbouring residential properties. Taking into account that the Hekpoort Study Area is an important tourist destination, the visual pollution of agri-industrial buildings should be avoided at all costs. To this end, the following guidelines should be flowed when establishing agri-industries:

- Agri-industries must not be located in gateway positions
- Agri-industries must not be near tourist attraction and facilities, such as guest lodges
- Agri-industries must not be located within or near tourist nodes
- Agri-industries must not be located along scenic routes or tourism routes
- Agri-industries must not be located in highly visual positions which disrupt view of the natural scenery

SECTION 6: IMPLEMENTATION FRAMEWORK

6.1 CAPITAL INVESTMENT PROGRAMME

A capital investment programme (CIP) was prepared for the implementation of the Hekpoort Precinct Plan proposals. This capital investment programme consists of the following components:

a. Cost estimate

Key projects to be implemented by Mogale City and other governmental organizations were identified in the development framework of the Hekpoort Precinct Plan. The cost estimate thus focuses on the public sector investment needed to unlock the development potential of the Study Area. The projects were listed and a cost estimate was prepared for each of these projects. **It is important to note that the cost estimated reflect currently prices and that inflationary effects will most likely increase these cost over time. This implies that the costs involved to implement the longer-term projects will be higher than presented in this report. Also, it is important to state that the cost presented in this report are only rudimentary costs and that during implementation the more detailed calculation of these cost may result in significant changes in to the costs presented in this report**.

b. Development programme

The public sector projects identified in the Hekpoort Precinct Plan was phases over a 10 year period. This development programme aims to guide the township establishment process relating to the development of rural settlements. In other words, this programme will enable the planning of the roads, bulk municipal services infrastructure and community facilities that needs to coincide with the development of each rural settlement proposed. This phasing programme will thus enable the planning of rural settlement development and the provision of the necessary community facilities.

6.1.1. COST ESTIMATE

Public investment in Hekpoort is essential in order to create a sustainable and equitable rural environment and to provide the appropriate environment for private investment in to the area. Investment by the public sector should, amongst others, include the provision of community and recreational facilities, the provision of public transport service and the provision of municipal services infrastructure to support rural settlement development.

TABLE 19: PROJECT COST ESTIMATE

Project	Project Detail	Implementing Agent	Budget			
			Unit	Unit Cost	No. of Units	Current Price
Bulk water infrastructure:	VRS bulk water infrastructure	MCLM/ MIG	R/unit	R 7,000.00	222	R 1,554,000.00
	HWRS bulk water infrastructure	MCLM/ MIG	R/unit	R 7,000.00	540	R 3,780,000.00
	HRN bulk water infrastructure	MCLM/ MIG				
Bulk sewer infrastructure:	VRS waste water treatment plant	MCLM/ MIG	R/unit	R 700,000.00	1	R 700,000.00
	HWRS waste water treatment plant	MCLM/ MIG	R/unit	R 700,000.00	1	R 700,000.00
	HRN waste water treatment plant	MCLM/ MIG	R/unit	R 700,000.00	1	R 700,000.00
	VRS bulk sewer infrastructure	MCLM/ MIG	R/unit	R 7,000.00	222	R 1,554,000.00
	HWRS bulk sewer infrastructure	MCLM/ MIG	R/unit	R 7,000.00	540	R 3,780,000.00
	HRN bulk sewer infrastructure	MCLM/ MIG	R/unit	R 7,000.00	70	R 490,000.00
Bulk electricity infrastructure:	VRS electrical transformer	MCLM/ MIG	R/unit	R 500,000.00	1	R 430,000.00
	HWRS electrical transformer	MCLM/ MIG	R/unit	R 500,000.00	1	R 430,000.00
	HRN electrical transformer	MCLM/ MIG	R/unit	R 500,000.00	1	R 430,000.00
	VRS bulk electrical infrastructure	MCLM/ MIG	R/unit	R 10,000.00	222	R 2,220,000.00
	HWRS bulk electrical infrastructure	MCLM/ MIG	R/unit	R 10,000.00	540	R 5,400,000.00
	HRN bulk electrical infrastructure	MCLM/ MIG	R/unit	R 10,000.00	70	R 700,000.00
Transportation:	R1676 public transport infrastructure	MCLM	R/km	R 7,980,000.00	7	R 55,860,000.00
	HRN collector road	MCLM	R/km	R 7,980,000.00	1	R 5,586,000.00
	Storm water drainage system	MCLM	R/km	R 700,000.00	10	R 7,000,000.00
Township establishment[1]:	VRS township	MCLM/ MIG	R/stand	R 31,000.00	222	R 6,882,000.00
	HWRS township	MCLM/ MIG	R/stand	R 31,000.00	540	R 16,740,000.00
	HRN township	MCLM/ MIG	R/stand	R 31,000.00	70	R 2,170,000.00
Affordable housing:	VRS affordable housing units	DoH	R/unit	R 54,000.00	222	R 11,988,000.00
	HWRS affordable housing units	DoH	R/unit	R 54,000.00	540	R 29,160,000.00
	HRN affordable housing units	DoH	R/unit	R 54,000.00	70	R 3,780,000.00
Social infrastructure:	VRS primary school	DoPW	R/facility	R 16,350,000.00	1	R 16,350,000.00
	HRN police station relocation	DoPW	R/facility	R 13,160,000.00	1	R 13,160,000.00

Project	Project Detail	Implementing Agent	Budget			
			Unit	Unit Cost	No. of Units	Current Price
Active open space[2]:	HRN recreation node	MCLM	R/ha	R 1,260,000.00	12	R 15,120,000.00
Agriculture[3]:	VRS subsistence agriculture	MCLM/ DoA	R/unit	R 15,500,000.00	1	R 15,500,000.00
	HWRS subsistence agriculture	MCLM/ DoA	R/unit	R 15,500,000.00	1	R 15,500,000.00
TOTAL COST						R 237,664,000.00

Source: Urban Dynamics Gauteng, 2011

Notes:

[1] Includes survey, township establishment and municipal services connection

[2] includes recreation infrastructure proposed for a secondary recreation node

[3] Includes 300 tunnels and all related equipment and buildings

[4] Includes pay point and informal trading area

Abbreviations:

VRS: Vogelsang Rural Settlement

HWRS: Hartebeesfontein West Rural Settlement

HRN: Hekpoort Rural Node

MCLM: Mogale City Local Municipality

MIG: Municipal Infrastructure Grant

DoH: Gauteng Department of Housing

DoPW: Department of Public Works

DoA: Department of Agriculture

Key projects to be implemented by Mogale City and other governmental organizations were identified and are listed in the Table abovew. This Table only gives a rudimentary indication of the cost to implement the various public projects proposed in the Hekpoort Precinct Plan. It is important to note that the cost given for each project is only an indication. The actual cost of such a project is subject to many other variables that can only be determined once the project is at the point of implementation. Variables such as inflation and unforeseen project detail can impact on the final cost of a project. Consequently, Urban Dynamics Gauteng cannot be held accountable for the final cost incurred to implement the Hekpoort Precinct Plan proposals.

As depicted by the Table above, the total budget needed to implement the public projects of the Hekpoort Precinct Plan amounts to approximately R237 million. As depicted by the Diagram below, the highest cost item is the construction of the

transportation infrastructure, of which most is allocated to the public transportation route along the R1676. Transportation infrastructure development will require 28.8% of the budget. **It is important to note that the expenditure on the public transportation route will only occur if the Hartebeesfontein West rural settlement is development, instead of the community proposed alternative proposal for the development of the 'Engelbrecht' land.**

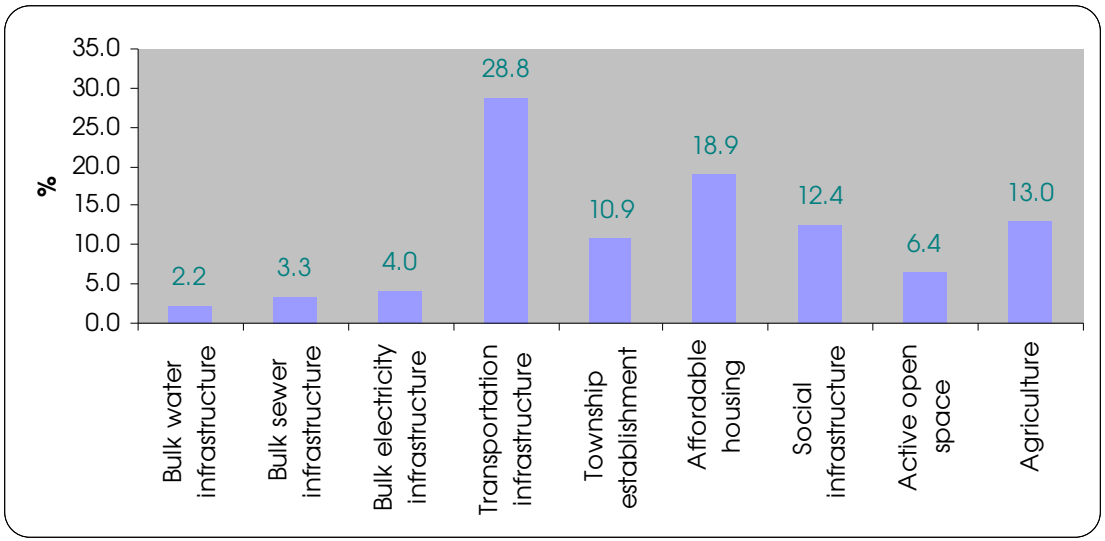


DIAGRAM 34: DISTRIBUTION OF COST PER ITEM

Affordable housing units are the second largest cost item, using 18.9% of the budget. Added to this should be the other items that make up a settlement, such as bulk municipal services infrastructure required to support the residential component. These items use between 2.2% and 4.0% of the budget each. A relatively high percentage (12.4%) of the budget also goes to the development of community facilities, such as the construction of the primary school at the planned Vogelsang rural settlement.

6.1.2. DEVELOPMENT PROGRAMME

The implementation of the public projects proposed for the Hekpoort Study Area needs to be structured in such a way that certain targets can be met within certain timeframes, and each small achievement contributes over the long run towards the ultimate goal of developing the Hekpoort Study Area. Short term targets should focus on immediate needs, such as providing affordable housing to rural communities and infrastructure provision. Longer term targets can aim to increase standard of living within the Hekpoort Study Area as a whole.

The projects proposed for the development of the Hekpoort Study Area was divided over a 9-year period (2011-2020), as set out in the Table above. This will ensure the logical implementation of the development programme, spread implementation funds over a period to relieve funding pressures on any given time, ensure that catalyst projects are developed prior to non-catalyst project, and ensure the viable implementation and operation of each project. These projects can be divided into 3 groups based on the following rationale:

Group 1: Development of Vogelsang rural settlement

- Development of the Vogelsang rural settlement will firstly involve establishing the township and surveying the township layout
- It will then involve providing the bulk infrastructure and connecting the individual stands to the bulk municipal services network.
- The development of top structure can then commence.
- Before the all the top structures have been completed, the tarring of the R1676 will need to commence to ensure the settlement has access to public transport once it is fully development.
- Once the housing units are developed, the construction of the planned primary school can commence to provide community access to this necessary community facility.

TABLE 20: PROJECT PROGRAMME

Project	Project Detail	Implementing Agent	Implementation Year									
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Bulk water infrastructure:	VRS bulk water infrastructure	MCLM/ MIG		•								
	HWRS bulk water infrastructure	MCLM/ MIG					•					
	HRN bulk water infrastructure	MCLM/ MIG									•	
Bulk sewer infrastructure:	VRS waste water treatment plant	MCLM/ MIG		•								
	HWRS waste water treatment plant	MCLM/ MIG					•					
	HRN waste water treatment plant	MCLM/ MIG									•	
	VRS bulk sewer infrastructure	MCLM/ MIG		•								
	HWRS bulk sewer infrastructure	MCLM/ MIG					•					
	HRN bulk sewer infrastructure	MCLM/ MIG									•	
Bulk electricity infrastructure:	VRS electrical transformer	MCLM/ MIG		•								
	HWRS electrical transformer	MCLM/ MIG					•					
	HRN electrical transformer	MCLM/ MIG									•	
	VRS bulk electrical infrastructure	MCLM/ MIG		•								
	HWRS bulk electrical infrastructure	MCLM/ MIG					•					
	HRN bulk electrical infrastructure	MCLM/ MIG									•	
Transportation:	R1676 public transport infrastructure	MCLM			•							
	HRN collector road	MCLM		•								
	Storm water drainage system	MCLM		•	•	•						
Township establishment[1]:	VRS township	MCLM/ MIG	•									
	HWRS township	MCLM/ MIG				•						
	HRN township	MCLM/ MIG								•		
Affordable housing:	VRS affordable housing units	DoH			•	•						
	HWRS affordable housing units	DoH						•	•	•		
	HRN affordable housing units	DoH										•
Social infrastructure:	VRS primary school	DoPW				•						
	HRN police station relocation	DoPW			•							
Active open space[2]:	HRN recreation node	MCLM						•				
Agriculture[3]:	VRS subsistence agriculture	MCLM/ DoA					•					
	HWRS subsistence agriculture	MCLM/ DoA								•		

Source: Urban Dynamics Gauteng, 2011

Group 2: Development of Hartebeesfontein West (or 'Engelbrecht') rural settlement

- Development of the Hartebeesfontein West (or 'Engelbrecht') rural settlement will firstly involve establishing the township and surveying the township layout.
- It will then involve providing the bulk infrastructure and connecting the individual stands to the bulk municipal services network.
- The development of top structure can then commence.

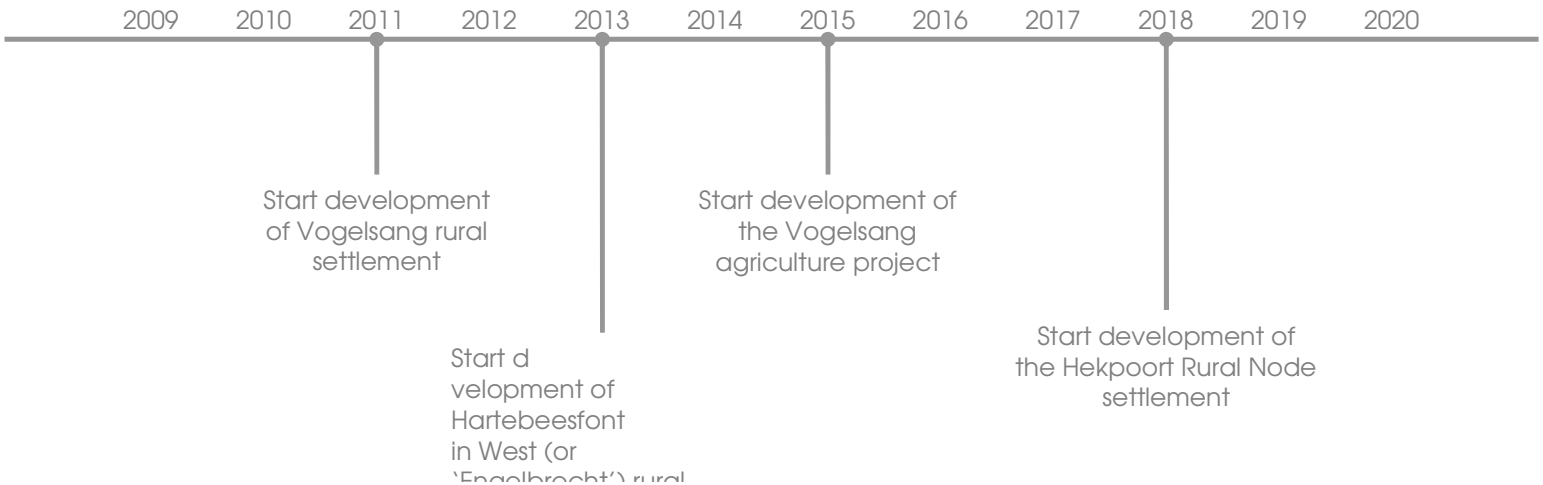


DIAGRAM 35: IMPLEMENTATION TIMELINE

Group 3: Development of Hekpoort rural node

- Firstly, it is essential the relocate the existing Hekpoort police station to the Hekpoort Rural Node. This will strengthen the node and could provide a catalyst for the further development of this node.
- It will then be necessary to construct the proposed collector road, which will open up the remaining portion of the Hekpoort Rural Node needed for rural housing and the proposed recreation complex.
- The proposed a recreation complex can be developed next within the Hekpoort rural node to complete the community facilities need the support the Hekpoort rural community.
- Finally, the proposed rural settlement within the Hekpoort Rural Node can be developed. This will require that appropriate land parcels for this purpose has already been secured by Mogale City. In addition, the development of this rural settlement will require the township establishment and the surveying the township layout, the construction of the necessary bulk infrastructure and connecting the individual stands to the bulk municipal services network, and the development of top structures.

The Diagram above provides a timeline for the development of the key or catalyst project identified for the Hekpoort Study Area. However, it has to be noted that the implementation of these public projects will be a dynamic process that may change as the needs at implementation and construction level dictates. The programme for the implementation of the Hekpoort Study Area proposals should therefore only be considered a guide and should not be considered a fixed or rigid programme to adhere to. The Diagram above illustrates the proposed timeline for the implementation of the Hekpoort Study Area development.

6.2. INSTITUTIONAL ARRANGEMENTS

A key issue with the implementation of the Hekpoort Precinct Plan will be how to ensure that the implementation of the Precinct Plan proposals can be aligned at the different spheres of municipal government. Primarily, this will require processes that will assist with alignment, but it will also require ensuring that the different spheres of municipal government manage their interrelationships effectively. Effective processes require that resource allocation is aligned with strategic development priorities, as is set out in the Hekpoort Precinct Plan. This can largely be done by absorbing the Hekpoort Precinct Plan proposals into the Integrated Development Plan (IDP). Based on the above, the relationships between the different spheres of municipal government and the alignment of the tasks of these different spheres of municipal government, should address the following:

- All spheres of municipal government should promote coordination and integrated planning
- All spheres of municipal government and other stakeholders (internal and external) must reach a shared understanding and agreement on the tasks required by the Hekpoort Precinct Plan
- Each sphere of municipal government needs to take responsibility for its own planning-related task of the Hekpoort Precinct Plan
- The necessary alignment between strategic planning guidelines, sectoral planning requirements, local needs, and available resources must be reached through cooperative spheres of municipal governance, whereby the plans of one sphere should support those in another
- All spheres of municipal government and other stakeholders (internal and external) must commit to the prioritization and implementation schedule relating to the Hekpoort Precinct Plan tasks
- The Hekpoort Precinct Plan proposal must be absorption into IDPs and these proposals must be included into each update of the IDP
- A mutual assessment framework should be used to monitor the extent to which the Hekpoort Precinct Plan proposal are implemented

6.2.1. SECTOR INTEGRATION

The Hekpoort Precinct Plan enables the bridging of the gap between understanding the developmental issues relating to the Hekpoort Study Area and contribution specific proposals or task to the IDP for budgeting and implementation. The Hekpoort Precinct Plan can also facilitate integration and coordination amongst the different spheres of municipal government. The Table below indicates how the Hekpoort Precinct Plan proposals impacts on the responsibilities of the different spheres of municipal government and how the Hekpoort Precinct Plan can support addressing key developmental issues within the Hekpoort Study Area.

TABLE 21: SECTOR ALIGNMENT AND INTEGRATION

Spatial Guidelines	Affordable Housing Development	Municipal Services Development	Integrated Transport Development	Environmental Management	Local Economic Development	Health and Education Development	Issues
Rural settlement and housing	●	●	●	●		●	o Decent affordable housing must be provided to households that cannot afford formal housing o Alternative rural housing options ought to be investigated o Municipal service of a sufficient quality must be provided to rural settlements o Rural settlement must have access to well planned and managed public transportation to ensure sufficient accessibility o Development should be sustainable by addressing needs relating to health, education and recreation o Rural settlement development must not degrade environmental sensitive areas o The size of rural settlements must be managed to ensure that these settlements do not become urban areas located outside the Urban Development Boundary
Social services	●		●			●	o All rural households must have reasonable access to health and

Spatial Guidelines	Affordable Housing Development	Municipal Services Development	Integrated Transport Development	Environmental Management	Local Economic Development	Health and Education Development	Issues
							educational facilities o Public transport must provide rural communities access the health and educational facilities o Avoid the duplication of community facilities or the oversupply of community facilities o Rural communities should share community facilities if possible
Municipal and transportation infrastructure	•	•	•				o Municipal service infrastructure investment must be provided to rural settlements, but must not enable urban sprawl o Public transportation should service existing and planned rural settlements o Mobility and accessibility are important principles that need to influence the planning and design of rural settlements
Agricultural development	•			•	•		o High-potential agricultural soils need to be protected at all costs. o Community-based commercial agriculture can contribute to economic growth and assist with poverty alleviation. o Development management guidelines need to be followed to ensure that inappropriate agri-industrial activities do not occur o This sector is dependent on sustainable water provision and the protection of water sources and quality should thus be pursued
Tourism development		•	•	•	•		o Scenic environmental features and areas must be protected to retain tourist appeal o Avoid the inappropriate location of agri-industries that would visually impact of tourist facilities and areas o Service provision and transportation network development should be geared towards the needs of the tourism industry
Economic development		•	•		•		o The development in the Hekpoort rural node must comply with a set of development and design guidelines. o Service provision should be geared towards the development of the

Spatial Guidelines	Affordable Housing Development	Municipal Services Development	Integrated Transport Development	Environmental Management	Local Economic Development	Health and Education Development	Issues
							Hekpoort rural node o The Hekpoort rural node must to be served by a well-planned and maintained road network and public transportation system that connects the nodes to surrounding communities o Marketing efforts should aim to attract the businesses to the Hekpoort rural node o Economic development in Hekpoort should be according to a comprehensive LED strategy that focuses on the tourism and agricultural sectors.
Open space conservation	•	•	•	•	•		o Protect the environmental sensitive areas and water bodies against degradation and pollution. o Rural settlement must have access the full municipal services infrastructure to avoid pollution of water sources o Rural settlement, agri-industries and tourism facilities must be developed in terms of clear environmental management guidelines

Source: Urban Dynamics Gauteng, 2011

It should be recognised that the different spheres of municipal government will each play a vital role in the achievement of the overall strategic objectives of the Hekpoort Precinct Plan. This will include putting in place processes and systems to implement the Precinct Plan proposals, allocating the appropriate human resources and skills to implement the proposals, alignment all actions with other spheres of municipal government and diligently conducting performance monitoring in order to ensure projects are realized.

In addition to the above, the implementation of the Hekpoort Precinct Plan will require participation and partnership building amongst the different spheres of municipal government and the Hekpoort community. Such partnerships are needed to

address the variety spatial, environmental, social and economic issues that are faced within the Hekpoort area. This collaboration between these parties must be a deliberate action.

6.2.2. EVALUATION AND MONITORING

To measure the performance of the implementation process whereby the Hekpoort Precinct Plan proposals are implemented needs to be measured against a clear and comprehensive set of indicators. The Table below indicates possible indicators that can be used to measure the Hekpoort Precinct Plan implementation process.

TABLE 22: EVALUATION AND MONITORING

Theme	Outcome	Indicators
Economic	To encourage sustainable economic development	• Establishment of tourism facilities • Protection of agriculture • Establishment of agri-industries
Employment	To encourage a variety of employment opportunities	• Level and type of employment • Variety of employment sectors • Level of income • Proximity of employment to rural communities
Housing	To develop sufficient and suitable rural housing	• Number of informal housing units • Number of affordable housing units • Suitability of rural housing typologies applied
Social	To ensure all households have access to basic health and education opportunities	• Level of education • Social facility to population ratio
Recreation	To ensure that adequate space is provided for recreational purposes	• Supply of suitable recreational facilities • Accessibility of recreational facilities of parks to density. • Proximity of recreational facilities to rural communities
Environment	To promote a sustainable environment	• Conservation of open spaces • Levels of water, air and visual pollution
Access	To ensure accessibility and choice of travel modes	• Availability and frequency of public transport • Distribution of modes of travel amongst population • Proximity of social and recreation facilities to rural settlements • Proximity of employment opportunities to rural settlements

Source: Urban Dynamics Gauteng, 2011

Central to measuring the performance of the implementation of the Hekpoort Precinct Plan proposals will be access to quality and updated information, such as levels of employment and levels of education. Part of this information should become available in due courts via the SA Census process. Other information, such as the availability and frequency of public transport, will need to be obtained from other sources, such as the Mogale City Integrated Transport Plan (ITP). Information not available from ready sources will need to be collected using community surveys or having consultative meeting with key community stakeholders. Ensuring that the collection of information is accurate and well maintained will be essential. This is not only relevant for land use data, but also for information pertaining to transportation, infrastructure and municipal services provision.

6.3 ADMINISTRATIVE MEASURES

The implementation of the Hekpoort Precinct Plan must be based on municipal statutory powers, as well as on administrative measures. The statutory power explicitly sets guidelines for the approval or rejection of applications for land use change. The administrative measures can include best practices and incentive mechanism to encourage sustainable rural development within the Hekpoort Study area.

6.3.1. BEST PRACTICES

As mentioned above, administrative measures employed to encourage sustainable rural development within the Hekpoort Study area can include best practices. There are a number of good planning practices and approaches that can be considered:

a. Highlight public involvement

Good community relations are part of any successful development or initiative. The local community and interested individuals and organizations should be invited to participate in the planning of new developments or initiatives. A variety of methods can be used to this end, which can include involving the community in information meetings and workshops, distributing information newsletters or website links, and conducting community surveys.

b. Recognize and address misconceptions

It is important to realize that any new development or initiative can substantially change the spatial environment of a rural area and will therefore affect its residents. Consequently, there can often be understandable public apprehension around new development proposals or initiative and their perceived impacts. For example, establishing a new rural settlement or agri-industrial facility near tourism facilities may be met with considerable community apprehension. Such fears need to be address through open and flexible community consultation, whereby misconceptions are addressed.

c. Innovate and seek alternative funding

Funding should always to central to development, especially in rural areas where both public and private funding in often limited. However, funding sources do exist that can be considered. For example, nodal areas, such as the proposed Hekpoort Rural Node, may be able to apply for special grant funding from the Neighbourhood Partnership Development Grant (NPDG). Alternatively, it may also be possible to partner with, or get private developers involved in the development of community facilities, such as the development of the shopping centre in the proposed Hekpoort Rural Node.

6.3.2. INCENTIVE MECHANISMS

Apart from the best practices set out above, incentive mechanism can effectively be used to encourage development within the Hekpoort Study Area. The following incentive mechanisms can be considered to leverage investment and entice developer and entrepreneurs to invest within the Hekpoort Study Area:

a. Financial Incentives

Local authorities internationally frequently use reduced rates as an incentive to encourage investment in their areas of jurisdiction. Such incentives are typically given to promote the development of innovative public transport features, non-conventional affordable housing typologies, and mixed-use nodal areas.

b. Infrastructure concessions

Infrastructure concessions, such as the Municipal Infrastructure Grant (MIG), are often used to develop infrastructure and services in selected areas in response to the needs of prospective investors. Such funds could potentially be used to develop the Hekpoort Rural Node of the rural settlement proposed for the Hekpoort Study Area.

c. Regulatory reform

These concessions involve special efforts by the local authority to reduce constraining regulation and zoning that may stand in the way of potential business development. This aspect implies an accurate and speedy system to supply information relating to the approval of potential developments.

d. Approval Process

One of the most basic incentives involves facilitating prompt decision making, such as the approval of building plans and rezoning applications. Prospective investors will lose interest if local authorities take too long to approve plans and applications. The establishment of a one-stop centre could facilitate this process more efficiently.

SECTION 7: STAKEHOLDER PARTICIPATION

7.1. CONSULTATION PROCESS

First and foremost, gratitude needs to be extended to a number of Hekpoort community members, who provided useful insights into the issues and challenges facing the Hekpoort Study Area. These include, but are not limited to, Deon Greyling, Elsabe Steyn and Willem Prinsloo.

It was considered essential to obtain buy-in into the Hekpoort Precinct Plan. To achieve this, Urban Dynamics Gauteng prepared the Hekpoort Precinct Plan through an inclusive stakeholder participation process. In total, 3 broad stakeholder groups were identified and liaised with. These stakeholder groups are listed in the Table below. The stakeholder groups provided inputs into the formulation of the status quo, as well as the formulation of the Precinct Plan proposals.

TABLE 23: CONSULTATION PROCESS

Stakeholders	Inception meeting	Status quo and vision	Precinct plan proposals	Implementation framework
Project manager and project team	Yes	Yes	Yes	Yes
Technical steering committee	No	Yes	Yes	Yes
Community stakeholders	No	Yes	Yes	No

Source: Urban Dynamics Gauteng, 2011

A number of meetings were held with the municipal project manager and the core municipal project team, who will be responsible for the management and implementation of the Hekpoort Precinct Plan. This enabled the project manager and project team to keep up to date with the progress of the Hekpoort Precinct Plan project.

A meeting was also held with the Technical Steering Committee, which included relevant municipal technical representatives from all the relevant municipal departments of the Municipality. Technical meetings were convened and chaired by the Municipality. Comments and proposals made by this Technical Steering Committee were incorporated into the Hekpoort Precinct Plan.

Urban Dynamics Gauteng consulted with key local stakeholders in the Study Area. A meeting was held to the Hekpoort Community Centre and was convened by the local Ward Councilor. This meeting included a wide range of stake holders, some of which had a good understanding of the spatial configuration Hekpoort Study Area, as well as having the necessary experience of and exposure to town planning and town planning principles. This included local communities, environmental action groups, property owners, and developers. The issues raised at the community meeting were drawn into the Hekpoort Precinct Plan, where these comments were relevant and applicable and where these comments were in line with sound planning principles. The Table below list all the meeting and presentations held as part of the Hekpoort Precinct Plan process.

TABLE 24: STAKEHOLDER MEETINGS, PRESENTATIONS AND PARTICIPATION

Date	Location	Organization or Designation	Addressee	Purpose
5 November 2010	Mogale City municipal office	Rural Development	• Shimi Phate • Thoriso Maimane	Inception meeting
1 December 2010	Mogale City municipal office	Rural Development	• Thoriso Maimane	Status quo presentation
23 February 2011	Mogale City municipal office	Rural Development and other relevant municipal departments	• All	Presentation of status quo and proposals
15 March 2011	GIP Office, Cresta	GIP Developers	• Gizeppe Humari • E Erasmus (Plan-Enviro)	Discussion of planned Humari Ranch Eco Reserve and impact of Hekpoort Precinct Plan
5 April 2011	Mogale City municipal office	Rural Development and other relevant municipal departments	• All	Presentation of status quo and proposals
8 April 2011	Thusong Community Centre	Hekpoort Conservancy	• Deon Greyling	Presentation of status quo and proposals
21 April 2011	Mogale City municipal office	Rural Development and Development Planning departments	• All	Presentation of status quo and proposals
7 May 2011	Thusong Community Hall, Hekpoort	Hekpoort community and businesses	• All	Presentation of status quo and proposals
23 November 2011	Mogale City municipal office	Local Economic Development Forum	• All	Presentation of status quo and proposals

Source: Urban Dynamics Gauteng, 2011

7.2. COMMENTS ON DRAFT REPORT

The Hekpoort Precinct Plan was presented to municipal officials and public stakeholders. During the stakeholder process, a number of comments were made with regard to the project. The key comments that were made were as follows:

a. Hekpoort Urban Development Boundary

Mention was made that a Council decision was made to demarcate an Urban Development Boundary around each rural node within Mogale City. Consequently, it was requested that such an Urban Development Boundary be demarcated around the Hekpoort Rural Node. However, others in Council objected to the demarcation of such a boundary, explaining that it would limit and even make impossible the establishment of rural settlements within the Hekpoort Study Area. Consequently, an Urban Development Boundary was not demarcated. Only the Hekpoort Rural node extent was indicated, which includes all the existing community and retail facilities currently found within the Hekpoort Rural Node, but also allows for the future northward expansion of the node up to the Magaliesrivier. This will allow additional land uses to be developed within the Hekpoort Rural Node, which will enable the node to develop into a more substantial nodal area serving the Hekpoort Study Area.

b. Vogelsang bicycle lane

The West Rand District Municipality indicated that they were currently investigating the feasibility of providing Bicycle infrastructure within the rural areas of Mogale City in order to promote this mode of transportation. We identified the route between the Hekpoort Rural Node and the proposed Vogelsang and Hartbeesfontein rural settlements as an ideal location for a bicycle lane. This bicycle land can be implemented as part of the proposed bus route to be developed along the R1676.

c. Lack of irrigation water

The Hekpoort community stated that there is no longer enough water in the Magaliesriver to conduct irrigation farming in Hekpoort. The water is mostly used up upstream in the Tarlton area by irrigation farmers. High-potential agricultural soils are now used for grazing. Concern was raised on the potential pollution risk that a package plant sewerage system for rural housing will have for boreholes situated in close proximity to these planned rural settlements.

d. Concentration of rural settlement at Vogelsang

The Hekpoort community was is agreement of informal households living within Hekpoort need to be housed formally within Hekpoort. The Hekpoort community also agreed that the development of the currently planned Vogelsang rural settlement is in order. However, the Hekpoort community stated that all additional rural settlement should be consolidated directly south of the Vogelsang settlement, by buying up the 'Engelbrecht' land for this purpose. It was consequently decided to write in Hekpoort Precinct Plan that this suggestion would be the preferred scenario, provided that the Municipality would be able to obtain the Engelbrecht land at a reasonable cost. Consolidating rural settlement at Vogelsang will have infrastructure cost savings, which could in part be used to finance the purchase of the 'Engelbrecht' land. For example, it would not require the tarring of R1676 to serve the proposed Hartebeesfontein West rural settlement.

e. Commercial agriculture

The Hekpoort community proposed that the Hartebeesfontein West land and Hartebeesfontein East land be used for community-based commercial farming purposes, instead of rural settlement development.

f. Maintenance of rural road

The Hepoort community stated that the rural roads within Hekpoort do not need to be tarred, but must be maintained to stimulate tourism development within the Study Area. The current state of the roads within the Study Area made it difficult of tourist to reach the tourist accommodation facilities, especially during bad-weather conditions. Many roads located near the Magaliesrivier experience serious drainage problems during the rainy summer months. This makes access to neighbouring properties often almost impossible. It is often impossible to use heavy vehicles on these roads in the rainy season. This requires the construction of storm water draining systems along roads that are located near the Magaliesrivier.

g. Secondary school

The Hepoort community stated that Schaumburg Primary and Secondary School is over-crowded and is therefore totally inadequate for the number of children that it needs to accommodate. To a large extent this has to do with the fact that the neighbouring informal settlement has expanded considerably in recent year, dramatically increasing the need for

secondary educational facilities. The establishment of rural housing within the Hekpoort Study Area thus requires the establishment of a new secondary school to accommodate the additional children in need of such a facility. Mention was made to use the Vogelzang municipal-owned property for the establishment of a secondary school within the Hekpoort Study Area, instead of using it for rural housing as is planned currently. It was said that a school on this property will provide easy access to children from neighbouring Hekpoort properties and that it will provide easier access for busses, taxis and cars to off-load children safely.

h. Subsistence agriculture

The contention that subsistence agriculture should be promoted within the Hekpoort Study Area was questioned. It was argued that in South Africa we are in the fortunate position of having a strong social safety net in the form of grants. These grants take care of the most basic need level, which is the level where subsistence farming is most relevant. The existence of the grant system therefore makes subsistence farming largely redundant; as the practice of this form of agriculture, very prevalent in the Apartheid era in rural areas, was previously driven by necessity in the absence of social safety nets. It was thus argued that most families who could benefit from subsistence farming to boost their nutritional levels, do not make use of this emergency coping strategy as their most basic needs are already met through the provision of grants. Where the most basic need is already met by the grant system, the next level of development must be addressed by education and the creation of employment. Thus, a focus on subsistence farming will not address the primary problems in the Hekpoort Study Area.