The Spatial Development Concept

1. Introduction

The spatial development concept provides strategic guidance for the spatial restructuring of the municipal area. Having determined what the objectives for spatial development in Mogale City are, the following phase is the formulation of those development proposals and strategies which are essential to achieve the objectives.

The spatial development concept therefore indicates the desired spatial distribution of various land uses and activities across Mogale City. It indicates where certain types of developments should or could take place, how these areas relate to other areas, and what development standards should apply.

2. Constructing the Spatial Development Concept

The spatial development concept is based on a system of interrelated and integrated spatial elements which together make up the desired spatial development form for the municipal area. These spatial elements are made up of nodes, networks, and surfaces.

The essence of development in this system is the movement of people, goods and services that produces the basic impetus for developing functional relationships between otherwise independent and unrelated elements. The movement of people, goods and services are channelled along specific routes that describe a network of interaction. Where networks intersect the opportunity for people, goods and services to interact develop and this gives rise to activity nodes. The intensity of interaction gives rise to the development of a hierarchy of nodes of different sizes depending on the level of interaction taking place in a node. This system of networks and nodes are tied together through surfaces that fill the areas between the nodes and networks.

![Figure 3: The development concept](image-url)
The spatial elements are dealt with according to a layering approach, where different elements build onto one another based on the reciprocal relationships between these elements, namely:

- The spatial development concept starts by identifying the **natural structuring elements** that exist in Mogale City and adjoining municipalities. These constitute pre-existing conditions in the municipal area which to a large extent dictate spatial form and development patterns because of the restrictions that these elements often place on development. The natural structuring elements include physical barriers such as mountains, ridges, and rivers or natural resources such as conservation areas.
- Secondly, the spatial development concept looks at the division between **urban and rural environments** through the application of an urban development boundary.
- The spatial development concept will subsequently address the urban and rural environments in terms of the nodes, networks and surfaces that apply to those environments.
- Finally, the spatial development concept looks at the **movement network** that exists that connects the different elements, and how this should be strengthened to enhance the interaction between the various elements.
- The spatial development finally concept also deals with certain non-spatial issues such as cultural heritage and city identity.

The spatial development concept follows a focused and strategic approach in identifying development opportunities. This means that, taking into consideration current growth dynamics, it is better to make a few key development proposals that will focus development energy to areas where agglomeration advantages can be achieved and a difference can be made in the spatial structure as opposed to identifying every possible development opportunity and never reaching critical mass with any of those.

It should be borne in mind that the Mogale City Spatial Development Framework remains a broad strategic planning framework due to the large geographic space that it covers. It cannot therefore make detail proposals for specific areas. For that purpose, local spatial development frameworks must be drafted.

### 3. Natural Structuring Elements

Natural open space consists of areas or physical elements that have valuable ecological characteristics and include -

- Mountains and ridges
- Rivers and dams
- Nature reserves and environmentally sensitive areas
- Wetlands
- Drainage lines
- Riparian zones

The protection and management of Mogale City’s natural environment is important for the following reasons –

- The ecological integrity of the natural open space system is important in order to maintain natural ecological systems and processes.
- The proximity of the Cradle of Humankind World Heritage Site to Mogale City means that the management of the municipality’s natural environment is of importance to protect the internationally significant cultural heritage found in the area.
- The protection of the natural visual quality of the area increases the attractiveness, liveability and investment potential of the area.
- The natural open space system plays an important role in the social, mental and physical well-being of residents.
- 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.

The table below sets out the natural structuring elements of municipal and regional importance.
<table>
<thead>
<tr>
<th>Natural Structuring Element</th>
<th>Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mountains and Ridges</td>
<td>Magaliesberg, Witwatersberg, Protea Ridge</td>
</tr>
<tr>
<td>Rivers, drainage lines, dams, wetlands and Riparian zones</td>
<td>Crocodile River, Jukskei River, Skeerpoort River, Magalies River, Klein River, Bloubank River, Wilge Spruit, Honingklip Spruit, Nooitgedacht Spruit, Muldersdrift Spruit, Rietspruit, Hekpoort Spruit, Doring Spruit, Roosloot Spruit, Swart Spruit, Hugenote Spruit, Wonderfontein Spruit, Tweelopies Spruit, Blauwbank Spruit</td>
</tr>
<tr>
<td>Nature reserves, conservancies and environmentally sensitive areas</td>
<td>Krugersdorp Nature Reserve, Hartbeesfontein Conservancy, Magaliesrivier Conservancy, Lammermoor Conservancy, Urban Wildlife Reserve, Blougat Reserve</td>
</tr>
</tbody>
</table>

The Mogale City Environmental Management Framework is the main tool the municipality has at its disposal to manage the natural environment in its area of jurisdiction, and as such all development proposals should be evaluated against this framework.

"The main purpose of an EMF is to proactively identify areas of potential conflict between development proposals and critical and sensitive environment. It assists in focussing EIAs and other decision-supporting instruments on the most important issues by pro-actively ‘red-flagging’ areas of high environmental importance"  

The following generic principles should apply to the natural open space system:

- The natural open space system should be protected from intrusive, irresponsible and ad hoc developments that damage the ecological integrity as well as visual quality of these areas. These include urban development, mining activities and agriculture.
- A continuous open space system must be developed in Mogale City. This means that in certain areas where natural open space is currently affected by activities the municipality must intervene in order to ensure that ecological corridors can be created and are able to function appropriately.
- Focus should be placed on and resources allocated to those consolidated natural open space areas where long term ecological sustainability can be achieved.

Although the Spatial Development Framework aims to make development proposals that respect the ecological integrity and environmental sustainability of the area, it has been necessary in certain instances to re-evaluate environmental potential against development potential in order to achieve the truly sustainable development of the area. Two specific areas that have been looked at in this regard are the following:

- The Cradle of Humankind World Heritage Buffer Zone on the western side of the N14, between Hendrik Potgieter Road and Malibongwe Drive has been evaluated in terms of the impact it has on the inherent development potential of the area. Two specific areas that have been looked at in this regard are the following:
- The Lanseria Airport Node development

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6 Source: Mogale City Environmental Management Framework, 2003
7 "Sustainable development" means the integration of social, economic and environmental factors into planning, implementation and decision making so as to ensure that development serves present and future generations. Source: National Environmental Management Act, 1998
- The development of a corridor along the N14 of approximately 600 metres wide on the western side of the N14
- The development of nodes around the intersection of the N14 and Hendrik Potgieter Road.

- The Muldersdrift area to the east of the N14 has been indicated as an urban development area, notwithstanding the presence of isolated pockets of environmentally sensitive land in this area. These pockets of land are not contributing to a larger ecological system (with the exception of watercourses that run through the area). Measured against the inherent development potential of this area, these pockets of land should be re-evaluated and reconsidered in terms of the triage principle of allocating resources to those areas where a difference can be made.
4. Growth Management

4.1 Introduction

In terms of the Development Facilitation Act, 1995’s Chapter 1 General principles for land development, “policy, administrative practice and laws should promote efficient and integrated land development in that they.... discourage the phenomenon of urban sprawl in urban areas and contribute to the development of more compact towns and cities”.

South African urban areas are characterised by urban sprawl (i.e. urban areas that are spread out). “This means that people have to spend a lot of time and money travelling long distances to work, shops, schools and social facilities. It also means that local authorities must spend large amounts on providing and maintaining excessive amounts of infrastructure”.  

In order to deal with this undesirable development pattern, a key consideration of the spatial development framework must be growth management. One of the strategies typically employed in the South African context to deal with growth management is the demarcation of an urban growth boundary (or urban edge). There however exist a number of other supporting strategies that collectively form a package of interventions for growth management.

4.2 Understanding the Urban Edge

The urban edge can be defined as an institutional boundary within the municipality with the sole purpose of containing physical development and sprawl and re-directing growth towards a more integrated, compact and efficient urban form. The urban edge clearly demarcates the boundary between urban and rural development.

Peripheral locations such a Mogale City are, due to their location on the edge of the larger urban complex, the recipients of continuous outward development pressures and are typically seen as the perpetrators of sprawl. The delineation of an urban edge for Mogale City is vital for achieving an efficient and sustainable municipality through -

- Containment of urban sprawl;
- Intensification of development;
- Integration of urban areas;
- Protection of valuable agricultural, natural and cultural resources;
- The optimum use of existing resources in established urban areas, such as bulk service infrastructure, roads and public facilities; and
- Reducing the need for commuting as well as commuting distances.

The delineation of the urban edge for the purpose of the Mogale City Spatial Development Framework takes a long term, strategic approach, looking at potential future pressure areas, provincial growth directions, population projections and strategic value of certain locations. The value of having a long term urban development boundary for the municipality is that –

- It enables long term, focused planning for infrastructure and service delivery;
- It provides certainty in the market; and
- It enables integrated, pro-active long term spatial planning that can direct and manage growth and development.

Having determined the edge from such a strategic perspective, the municipality should not entertain ad hoc, short term proposals for the amendment of the urban edge, unless a strategic change has taken place in the municipal and provincial context.

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4.3 Boundaries of the Urban Edge

In terms of the Gauteng Spatial Development Framework, 2000, the provincial urban edge in Mogale City was identified as:

"... thence northwards along the boundary of Randfontein and Krugersdorp around the Krugersdorp Nature Reserve, and following the Krugersdorp Ridge to the N14, thence following the R28 in a northerly direction up to the R512 meeting the boundary of the WGSC and following it around Lanseria and the Diepsslote Nature Reserve ..."

During subsequent revisions of the urban edge by the Gauteng Provincial Government, the urban edge in the Muldersdrift area was however pushed back to the Johannesburg municipal boundary, and the area around Lanseria airport was demarcated as an island of urban development. The current provincial urban edge in Mogale City is drawn around existing urban environments and does not make provision for any urban expansion. One of the key tasks of this Spatial Development Framework is to investigate the feasibility of the current urban edge and to make recommendations regarding an amendment of this edge to accommodate development pressure in Mogale City and long term potential development needs in the province as a whole.
Future growth opportunities in the major urban area were investigated from a provincial and structural perspective as opposed to looking at individual pockets of development pressure.

In this regard, the area that presents the most meaningful opportunity for future development is the area to the east of the N14, between Hendrik Potgieter Road in the south and the R512 in the north. This section of the N14 is seen as one of the next major provincial development corridors, spurred on by the development proposals currently taking shape around Lanseria Airport. This amendment was discussed with the Gauteng Provincial Government and it was agreed that the urban edge as proposed in this SDF is an ideal long term development boundary for the province in general.

Other amendments to the urban edge include those around the rural towns of Hekpoort, Magaliesburg and Tarlton. Again, a long-term view was taken of future development potential and needs and the urban edges were demarcated accordingly (as opposed to drawing lines around existing built-up areas).

It should be noted that the urban edges around Hekpoort, Magaliesburg and Tarlton were demarcated from a strategic perspective. Detailed refinement of the urban edge should take place during more specific planning exercises for these areas.

4.4 Supporting Strategies for Growth Management

The urban edge is not an isolated management tool, but rather part of a package of urban growth management tools that all need to be employed equally vigorously by the local authority in order to achieve desired, sustainable and efficient urban growth management.

Internationally, a sustainable approach to growth management aptly called “smart growth” is seen as the most efficient way of developing urban areas. Smart Growth is a collection of urban development strategies aimed at reducing sprawl and promoting growth that is balanced and fiscally, environmentally and socially responsible. Smart Growth tries to promote growth and development in areas with optimal opportunity, and offers an antidote to the sprawl that has resulted from unlimited low-density development further and further away from the urban centres. Rather than simply restricting development, smart growth is focussed on how and where new development should be accommodated.

The principles of smart growth are –

- New growth and development must be leveraged to improve existing areas of opportunity.
- Redevelopment of existing areas must be promoted rather than abandoning existing infrastructure and facilities only to rebuild it farther out.
- Development must be “town-centre”, transit and pedestrian oriented.
- Integrated, mixed-land uses must be promoted in strategic locations.

To support the successful implementation of the urban edge, the municipality must also focus on employing the following strategies:

- Management Zones along the urban edge. Well functioning urban environments are structured around zones of diminishing intensity as it moves away from areas of highest opportunity. Typically the fringe of urban areas are characterised by what is termed the urban-rural transition zone, comprising low density urban development, low intensity, extensive land uses and semi-rural activities such as nurseries. The urban edge should therefore not denote a clear divide between urban and rural, but rather include management zones along the edge that make provision for a gradual transition from an urban to a rural environment. The area directly inside the urban edge should look at lower urban intensities, while the areas directly outside the urban edge should make provision for semi-rural and rural residential activities.

In this regard the proposed Muldersdrift Spatial Development Framework should provide specific guidance with regard to various intensities of land uses, the nature of the corridor along the N14 and the transition of the urban environment into the Cradle of Humankind World Heritage Site Buffer Zone. Likewise, the Buffer Zone should make provision for transitional land uses along the N14 corridor.
• **Promoting Infill development** refers to the identification of vacant land parcels within the demarcated urban areas, amongst existing developments, and developing these parcels of land according to their optimal development potential.

• **Promoting Densification in and around strategic locations** is an important antidote to urban sprawl as it looks at providing high numbers of housing units in strategic, highly accessible locations with high levels of access to economic and social opportunities. If the housing demand, or part thereof, can be satisfied through centrally located, high quality, higher density residential development then there will be less demand for low density residential developments on the periphery. The secret to success for stimulating a demand for higher density residential living is the quality of the urban environment in which these developments are located. These areas should therefore be focus areas for public investment in infrastructure, social services, streetscape and urban design, open spaces and general high quality, positive performing urban environments.

• **Managed expansion** refers to the gradual and incremental outward growth of a settlement (i.e. the so-called ripple effect), but within demarcated urban development boundaries (or urban edge), as opposed to leap frog developments that are not physically and functionally integrated with the main urban area. This approach is of particular importance for future urban development in the Muldersdrift area. Because of the size of the area, it will take a number of years for development to fill this area. What should not happen is a scattering of developments throughout the area which have no linkages with each other or the main urban activity areas. The Muldersdrift Spatial Development Framework should therefore indicate the phased development of the area through an incremental development approach. Leap frog development should not be permitted in the area.

5. **Urban Areas**

For the purpose of the Mogale City Spatial Development Framework, Urban Areas are defined as those areas that are characterised by large concentration of activity and built-up areas. The typical activities found in urban areas include residential development, business and administrative functions, social services and infrastructure, industrial and commercial developments etc. The urban areas should comprise a range of services and facilities that are required to achieve a sustainable, efficient, convenient and liveable environment.

The following section deals specific with the urban environment and its main elements, namely –

- Future of mining land adjacent to urban areas
- Activity Network
- Densification Priority Areas
- Residential Settlements
- Urban Open Space System

### 5.1 Activity Network

The ‘activity network’ can be defined as the manner in which economic and mixed-use activity (as opposed to purely residential use) is arranged and connected in a particular area. This arrangement is mostly either nodal (concentration of activity at a particular point) or linear (concentration of activity along a linear element such as a street or a river) but can also take place in districts (such as an industrial area).

The activity network that have been identified as part of the spatial development concept are focussed on the following –

- Strengthening the Krugersdorp **Central Business District**
- Creating a network of interlinked **activity nodes** that ensure an equitable distribution of services and facilities throughout Mogale City. One of the aspects that was identified in the previous spatial development framework is the fact that Mogale City lacks an effective and functionally defined hierarchy of nodes.
• Utilising the energy created by major movement infrastructure and public transport networks to create activity spines. These spines are especially focussed on linking up with activity areas to the east of Mogale City to ensure functional integration with the Johannesburg activity network.

• Utilising the development potential of the N14/R28 to create a development corridor.

• Creating opportunities for specialised activity areas.

5.2 Activity Nodes

Urban activity nodes are concentrations of economic and social activity located at accessible locations such as modal interchanges and the intersections of public transport routes. These nodes should be positive performing environments that are able to attract business and economic developments to these points. Well-functioning urban nodes are vibrant areas comprising shopping, work, social and cultural opportunities and public transport facilities in a high quality, safe public environment.
From an urban efficiency and functionality perspective, the clustering of community, social and business facilities in nodes around points of highest accessibility is of vital importance, i.e.

- By clustering facilities, a high quality node can be created that can serve as the heart of communities and promote social interaction.
- Multiple neighbourhoods can be served by social services in central points.
- The sharing of facilities between various services (e.g. buildings, logistics, parking etc.) can take place.
- Central clusters ensure enhanced accessibility and convenience for residents.

The Krugersdorp Central Business District (CBD) is the main business, social and administrative centre in Mogale City and fulfils a regional function. As with most CBD’s of towns and cities around the country, this area has seen a gradual decline in the character, attractiveness and demand for business space over the last few decades. Suburban retail and office developments are in many instances now more preferable locations for businesses. The CBD however still remains the administrative centre of Mogale City and as such have an important function to play. Urban regeneration initiatives in many CBDs around the country and internationally have seen the successful reversal of urban decline, with these areas once again becoming desired destinations and locations. With this aim in mind Mogale City has appointed service providers to do an Urban Design Framework for the Krugersdorp CBD.

The following general principles apply to the development and management of nodes:

- In order to support the effective development of nodes in Mogale City, the development of urban non-residential land uses, such as business, retail, community facilities, and social services should be restricted to areas demarcated as nodes in the SDF.
- Nodes should typically be located at the main access points in urban areas, typically at the intersection of a major mobility route and the major collector route or around public transport facilities such as train stations and bus termini.
- These nodes should show a large degree of public investment in infrastructure, public domain and social services.

- Nodes must be characterised by mixed-use, high intensity activity and higher density residential development (maximum FSRs, coverage and height should not be restricted).
- The manner in which parking in the nodal areas are treated is of importance. Large parking lots adjacent to streets should not be promoted. Buildings should be placed as close to street boundaries as possible to facilitate pedestrian movement and to define and shape the public space.
- Extroverted as opposed to introverted development patterns and typologies must be promoted.
- Site layouts and building designs of individual developments must take cognisance of and support public transport and pedestrian movement.
- Urban design frameworks must be formulated for each of the nodes.

The following hierarchy of nodes can be found in or are proposed for the Mogale City Urban Areas:
**Table 25: Hierarchy of Activity Nodes**

<table>
<thead>
<tr>
<th>Hierarchy of Node</th>
<th>Characteristics and Guidelines</th>
</tr>
</thead>
</table>
| **Primary Node**               | • Prime location for higher order office and retail development  
• A variety of goods, services and speciality products are offered  
• Higher density residential development should form an integral part of the environment. However, residential development in the CBD must comprise business development on ground floor.  
• Investment in the quality of the public environment and good urban management are key to retaining existing and attracting new high order business activities.  
• Public transport movement and infrastructure must be an integral part of the CBD. |
| ![Krugersdorp CBD](image)      | ![Krugersdorp CBD](image)                                                                                                                                                                                                       |

| **Secondary Nodes**            | • The secondary nodes serve specific sub-municipal regions  
• Secondary nodes should comprise mixed land uses, including higher density residential land uses  
• Where possible, the nodes should be structured around major public transport facilities |
| Emerging Hendrik Potgieter Node| ![Emerging Hendrik Potgieter Node](image)                                                                                                                                                                                          |
| Emerging Leratong Node         | ![Emerging Leratong Node](image)                                                                                                                                                                                                     |

From a municipal investment perspective, the first priority is investment in the Hendrik Potgieter Road node and the Leratong node, as these are existing development initiatives where a certain degree of development energy already exists.
<table>
<thead>
<tr>
<th>Hierarchy of Node</th>
<th>Characteristics and Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Local Nodes</strong></td>
<td></td>
</tr>
<tr>
<td><img src="image1" alt="Kagiso Local Node" /></td>
<td>• The Local Development Nodes serve one or more neighbourhoods.</td>
</tr>
<tr>
<td><img src="image2" alt="Munsieville Local Node" /></td>
<td>• Nature of land uses are focused on local business development and the provision of local community and social services.</td>
</tr>
<tr>
<td></td>
<td>• Higher density residential development should be provided around the nodes.</td>
</tr>
<tr>
<td></td>
<td>• A focus should be on the creation of small business opportunities for local entrepreneurs.</td>
</tr>
<tr>
<td></td>
<td>• Because these nodes are the focus centres in local neighbourhoods, they should also fulfill the function of centres of socialisation for the local population. As such, each node should be structured around a public open space such as a square or park.</td>
</tr>
<tr>
<td></td>
<td>• The nodes should be integrated with major public transport facilities, and should as far as possible be located in such a manner that it is within walkable distance from a large section of the local population.</td>
</tr>
<tr>
<td></td>
<td>• Main routes linking the nodes with the internal neighbourhood should have a strong pedestrian focus.</td>
</tr>
<tr>
<td>The locations of the Munsieville and Kagiso nodes as indicated on the spatial development framework map are only indicative. The most viable location for the development of new economic and social nodes can only be determined through a more detailed investigation such as a township regeneration strategy.</td>
<td></td>
</tr>
</tbody>
</table>
5.3 Activity Spines

The network of activity nodes is reinforced by a system of activity spines which connect with these nodes. Activity spines can be defined as concentrated urban development along movement routes which are typically also major public transport routes. Development can either take the form of continuous linear development or a series of nodes along the activity spine.

The criteria for identifying the activity spines in Mogale City were –

- The activity spines must be linked to major public transport routes in order to support public transport.
- The activity spines must reinforce the strong urban linkages with the City of Johannesburg and must connect to that activity network.
- The activity spines must have a functional relationship with the nodes in Mogale City, with the nodes typically acting as destinations on the activity spines.
- The activity spines must be linked with the N14/R28 Corridor.
- The activity spines must have a degree of demonstrated development potential, either in Mogale City or in neighbouring City of Johannesburg.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>The activity spines must be linked to major public transport routes</td>
<td>✔</td>
</tr>
<tr>
<td>The activity spines must reinforce the strong urban linkages</td>
<td>✔</td>
</tr>
<tr>
<td>The activity spines must have a functional relationship with the nodes</td>
<td>✔</td>
</tr>
<tr>
<td>The activity spines must be linked with the N14/R28 Corridor</td>
<td>✔</td>
</tr>
<tr>
<td>The activity spines must have a degree of demonstrated development</td>
<td>✔</td>
</tr>
</tbody>
</table>

Based on the above criteria, the following activity spines have been identified:

- Ontdekkers Road/Voortrekker Road
- Main Reef/R24/Coronation Road
- Beyers Naudé Drive

Although there are other high order roads (such as Randfontein Road and Hendrik Potgieter Road) that could in theory also qualify as activity spines, it is important to rather focus development energy to specific areas (see principle of focused and strategic development under “Constructing the Spatial Development Concept”).

The activity spines should be characterised by the following –

- High intensity, mixed land uses that are oriented towards the street space.
- High density residential development, either directly adjacent to the street or within a distance of 500m from the activity spines.
- The activity spines can be developed as continuous linear development areas or in the “beads-on-a-string” form. The nature of public transport and the length of the route should determine the development pattern. The longer the street and the less frequent stops are made by public transport, the more the development pattern should focus on the beads-on-a-string form. Shorter distances or where frequent stops are made by public transport are more conducive to continuous linear development.
- Activity spines should show a large degree of public investment in infrastructure and the public domain.
- Large parking lots adjacent to streets should not be permitted. Buildings should be placed as close to street boundaries as possible to facilitate pedestrian movement and to define and shape the public space. Land uses on the ground floor of buildings must have an extroverted public facade (e.g. shops, restaurants etc.)
- Site layouts and building designs of individual developments must take cognisance of and support public transport and pedestrian movement.
• Activity spines must achieve a balance between promoting access, creating pedestrian friendly environments, and accommodating mobility.

5.4 N14/R28 Development Corridor

5.4.1 Characteristics of a development corridor

A development corridor can be defined as “… a linear strip of land or area, connecting large activity nodes, traversing urban or inter-urban areas, surrounding a major transport facility or facilities providing an appropriate regional level of mobility and accessibility to adjacent areas, and containing a high concentration of population and mixed land uses” and “… accommodate major linear transport routes like heavy and light rail and/or freeways, large shopping concentrations etc., social, cultural and sporting facilities as well as a large amount of residential accommodation”. 9

The typical elements of a development corridor are –

• Major movement infrastructure such as a railway line or highway acting as the spine of the corridor.
• Supporting movement infrastructure such as local access roads that will provide access for land uses situated adjacent to the main movement spine (typically the main movement line provides a high level of visibility to land uses while adjacent roads provide access to land uses).
• The main movement spine should preferably act as a conduit of public transport, with public transport facilities located along the corridor.

• Forces of attraction along the corridor, such as major destination points along the corridor, which creates the development impetus for eventual linear development along the corridor.
• High intensity land uses along the length of the corridor.

The West Rand District Municipality’s Spatial Development Framework, 2008 has identified the N14 as a linkage with “high level of development potential”. The N14/R28 development corridor between Lanseria Airport and Randfontein is seen as one of the province’s future development focus areas, given the current development impetus around the Lanseria Airport.

5.4.2 Morphology of the N14/R28 Development Corridor

The proposed N14/R28 development corridor currently contains the following elements that already begin to define the physical make-up of the corridor:

• The N14/R28 movement route, acting as the spine of the corridor.
• Lanseria Airport, Krugersdorp CBD and Randfontein as major destinations on the corridor, acting as forces of attraction.
• The Hendrik Potgieter Road, Beyers Naudé Drive, R512 (Malibongwe Drive), Randfontein Road and Ontdekkers Road/Voortrekker Road intersections on the N14/R28 which provide opportunities for the development of strong nodes (or beads) along the corridor.
• The R114 road between Beyers Naudé Drive and R512 (Malibongwe Drive) which provides local access to land uses along the corridor in the short term.

One of the aspects that need attention and a great deal of public (or private) sector investment to unlock the development potential of the corridor is the development of local access routes to provide access to land uses along the corridor. Direct access to land uses is not possible from the N14 or the section of the R28 which runs through Krugersdorp onto Randfontein.

Land uses along development corridors are associated with a mixture of land uses such as residential and higher order commercial, retail, offices, sport and recreational, public facilities

9 Andersen and Burnett in National Department of Transport: An Integrated Urban Corridor Assessment and Strategy Development Process
and manufacturing activities. In the case of the N14/R28 Development Corridor, it is envisaged that certain parts of the corridor will comprise certain land use characters, depending on the specific context of that part of the corridor.

The corridor also need not take the form of a continuous band of activity. At points of highest access along the central spine development will be more intense and of a higher order while at locations of lower access, lower intensity development or even part of a natural open space network may be found. Some preliminary proposals with regard to potential land use zones are:

- The section directly south of Lanseria Airport will have a more commercial, high-tech industrial nature linked to the airport, and also focusing strongly on job creation for the nearby Cosmo City and its future expansions.
- The section between Beyers Naudé Drive and Hendrik Potgieter Road should also focus on high-tech industries, but can also begin to include office, motor showrooms and other high order business activities.
- The intersection of Hendrik Potgieter Road and the N14 could begin to play a regional recreational/entertainment function, building further on the existing Silverstar Casino.
- The section through Krugersdorp (i.e. to the south of Robert Broom Drive) will show the typical urban/sub-urban land-uses of retail, offices, residential and social facilities.
- The section through the mining belt onto Randfontein will focus strongly on commercial and industrial type uses and, if the rehabilitation of the mining land permits it, residential.

Note: The above land use proposals are merely indicative and do not at this point in time constitute potential land use rights in this area.

The ultimate aim is to create a high quality, well-functioning development corridor. Developments should submit to strict architectural and urban design controls to ensure a positive built environment is created. An urban design framework should be drafted which will guide development along the corridor.

One of the aspects that the urban design framework must incorporate into the design is the creation of visual corridors towards the Cradle of Humankind along the length of the N14 development corridor, but in particular at points where vistas currently exist due to topography.

5.4.3 Phasing of the N14/R28 Developing Corridor development

Because of the extent of the investment in road infrastructure that is required to support the development of the corridor, a phased development approach is proposed:

| Phase 1 | Development of the eastern part of the development corridor between Lanseria airport and Beyers Naudé Drive, along the R114. |

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Note: The above land use proposals are merely indicative and do not at this point in time constitute potential land use rights in this area.
**Phase 2**
Developing the node around the intersection of Hendrik Potgieter Road and the N14, with either private sector or public sector investment in road infrastructure to provide access to land immediately adjacent to the intersections.

**Phase 3**
Developing road infrastructure along the western side of the N14 between Beyers Naudé Drive and the R512 and promoting development along this section of the corridor.

**Phase 4**
Developing road infrastructure along the eastern and western side of the N14 between Hendrik Potgieter Road and Beyers Naudé Drive and promoting development along this section of the corridor.

**Phase 5**
Developing supporting road infrastructure along the R28 through Krugersdorp and the mining belt where necessary and possible to provide access to high intensity land uses through the area.

### 5.5 **Lanseria Aerotropolis**

The area around the Lanseria Airport, stretching up to the R512 intersection on the N14, has been earmarked as a major development focus area (also known as the Lanseria Aerotropolis). This forms part of a greater regional development focus around the airport.

*Major airports are key nodes for global production and enterprise systems offering them speed, agility, and accessibility. They are also powerful engines for local economic*
development attracting aviation-linked businesses of all types to their environs. These include, among others, time-sensitive manufacturing and distribution; hotel, entertainment, retail, and exhibition complexes; and office buildings that house regional corporate headquarters and air-travel intensive professionals.

As aviation-oriented businesses cluster around these airports and along transportation corridors radiating from them, a new urban form is emerging — the Aerotropolis — stretching up to 20 miles (25 kilometres) outward from the airports. Similar in shape to the traditional metropolis made up of a central city core and its commuter-linked suburbs, the Aerotropolis consists of an airport city core and outlying corridors and clusters of aviation-linked businesses.

The Lanseria Aerotropolis development needs to support Lanseria Airport and its planned growth in terms of passenger and cargo traffic. Currently, the airport is located far from industrial, warehousing and commercial land uses. By locating these facilities close to the airport, the distances for freight transport to and from the airport will be greatly reduced.

Some of the potential land uses envisaged in this area includes tourism facilities such as hotels and visitors centres, warehousing, commercial uses (including small scale storage facilities) and industries related to aviation as well as a measure of high density residential development.

However, at this point in time the demarcation of the Lanseria Aerotropolis in the Mogale City Spatial Development Framework is merely conceptual in nature. Because of the fact that this area overlaps with the proposed buffer zone around the Cradle of Humankind World Heritage Site, more detailed investigations are required.

A Spatial Development and Urban Design Framework is required for this area in order to identify land use precincts and make more specific land use and development proposals. The formulation of the development framework should be a joint initiative between Gauteng Provincial Government, the City of Johannesburg, and Mogale City. Development and design proposals for this area should take cognisance of the environmentally sensitive land to the west thereof, and ensure that suitable interfaces and transition zones are created.

### 5.6 Specialised Activity Areas

Specialised activity zones are those areas that cater for a specific land use type that is not necessarily found in or considered desirable as part of mixed-use activity areas such as nodes and activity spines. Examples of specialised activity areas include industrial areas, educational campuses, larger institutional complexes, large sport and recreational complexes and any other economic or social activities that require large specialised areas.

In Mogale City, the following industrial areas exist:

- Chamdor
- Boltonia
- Factoria
- Delporton
- Fariaville

The existing industrial areas should be intensified before new expansion is permitted. In order to attract new development and encourage the renewal of existing development, the municipality should focus on urban renewal programmes in the existing industrial areas. Once these areas are fully and optimally developed, the industrial areas can expand if land is available.

The following new specialised industrial areas are proposed:

- The area around the Lanseria Airport as part of the Lanseria Aerotropolis development. The nature of the industrial development in this area should be determined by an Urban Development Framework for the Aerotropolis, but should not include noxious industries.
- High tech, clean-industrial development can take place along the proposed N14 Development Corridor.

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*Source: [http://www.aerotropolis.com/aerotropolis.html](http://www.aerotropolis.com/aerotropolis.html)*
The following guidelines apply to developments in the industrial areas:

- The focus should be on industrial land uses, warehouses and commercial uses such as transport depots.
- Small scale storage facilities that are typically found in the more rural areas should be located in the industrial areas.
- Supporting facilities, such as convenience shops, restaurants / canteens, support businesses (such as printers, stationers, day-care and banks), can be provided within the industrial area, provided that the scale of such a development is restricted to that of an ancillary use that does not and will not attract the general public.
- Offices shall be restricted to administrative offices belonging to or directly linked to the activities established in the area.

5.7 Densification

As set out in paragraph 4.4, one of the supporting strategies for growth management is "Promoting Densification in and around strategic locations."

Densification is not an end in itself, but a means to achieve more efficient utilisation of public transport, the creation of the necessary population thresholds to support community and business facilities and to prevent low-density outward expansion and development on land which is valuable from an ecological or agricultural perspective. The two most important rules that should apply to densification are the following:

- Higher density development should be focused around and within walking distance from major activity areas and transport services.
- Densities should decrease as the distance away from major activity areas increases. Higher densities in the wrong locations or which are removed from major activity areas and transport routes can be harmful to urban efficiency and sustainability.

The following strategic densification priority zones have been identified:

- Around the Krugersdorp CBD.
- Along Voortrekker Road/Ontdekkers Road Activity Spine.
- Along Main Reed Road/R24/Coronation Road Activity Spine.
- Around the Leratong Node.
- Adjacent to the Beyers Naudé Drive Activity Spine.
- In the south-eastern quadrant of the intersection of R512 with the N14, up to the proposed PWV3. This area links up with high density proposals made in the adjacent City of Johannesburg as well as the Lanseria Aerotropolis.

These densification priority zones relate to the major activity areas as proposed by the Spatial Development Framework and is aimed at creating a synergy between economic activity and densification.

The following table sets out density guidelines for different parts of the urban areas. It should be noted that these densities are merely general guidelines and should not be rigidly employed. Deviations are possible depending on the design of a particular development and local conditions. Aspects that may influence the level of densification in a particular local context include –

- availability of infrastructure and services which can support higher density residential development.
- heritage aspects.
- socio-economic characteristics.
- topography.
### Table 26: Density Guideline

<table>
<thead>
<tr>
<th>Residential Typology</th>
<th>In densification priority zones</th>
<th>Within 600 metres from a node or activity spine</th>
<th>Adjacent to major public transport facilities such as railway stations</th>
<th>On the edges of the Urban Areas, directly adjacent to the rural environment</th>
<th>Internal residential neighbourhoods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium-rise apartments</td>
<td>Medium-rise apartments</td>
<td>Duplex Residential and two storey walk-ups</td>
<td>Duplex Residential and Two to three storey walk-ups</td>
<td>Single residential developments</td>
<td>Single residential developments and townhouses</td>
</tr>
<tr>
<td>Duplex Residential and two storey walk-ups</td>
<td>40 - 60 dwelling units per hectare</td>
<td>40 - 80 dwelling units per hectare</td>
<td>10 dwelling units per hectare and less</td>
<td>10 to 40 dwelling units per hectare (different densities will be applicable in different residential neighbourhoods based on the above-mentioned factors)</td>
<td></td>
</tr>
</tbody>
</table>

- **Examples**

![Examples](image1.png) ![Examples](image2.png) ![Examples](image3.png) ![Examples](image4.png)