PREPARATION OF THE
MPUMALANGA NORTHERN
FUNCTIONAL AREA PLAN AND
DRAFT SCHEME, INCLUDING THE
MR385 EAST CORRIDOR
PRECINCT PLAN: WARDS 4, 5, 7
AND 91

Functional Area Plan
1N-30465

The Planning Initiative and Team

June 2018
PREPARATION OF THE MPUMALANGA NORTHERN FUNCTIONAL AREA PLAN AND DRAFT SCHEME, INCLUDING THE MR385 EAST CORRIDOR PRECINCT PLAN: WARDS 4, 5, 7 AND 91

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PREPARED BY THE PLANNING INITIATIVE AND TEAM

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The Planning Initiative and Team
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1 INTRODUCTION

1.1 OVERVIEW OF PROJECT

The eThekwini Municipality has appointed The Planning Initiative and team to develop a Functional Area Plan and Corridor Plan for the northern part of Mpumalanga and the MR385 east corridor as well as a Draft Scheme for the study area. It is noted that the Mpumalanga Local Area Plan has been prepared and it is this document that provides the overall framework under which this project falls.

It is stressed that this project is about strategically assessing the potential of the Study Area and clearly identifying what interventions, investments and land use scheme controls are required in order to ensure that it can respond appropriately, innovatively and sustainably to the pressures and changes affecting the area and local communities, businesses and other stakeholders. The work therefore focuses on:

- Creating a framework at the functional planning level created by the conceptual road and open space framework within which development can infill over time.
- Creating a toolkit of draft Scheme mechanisms from which the Municipality can draw when applications from private developers are submitted.

The purpose of this report is to present the Functional Area Plans for the study area. The plan has been prepared by The Planning Initiative team on behalf of the eThekwini Municipality.

The Municipal Systems Act, Act No 32 of 2000 requires Municipalities to prepare a Spatial Development Framework (SDF) as part of their Integrated Development Plan (IDP), which gives guidance on the preparation of a Land Use Management System (LUMS) for the area. In accordance with these requirements the eThekwini Municipality has prepared their IDP and SDF. They have proceeded further to develop a package of plans to assist in land use management and decision making including Spatial Development Plans, Local Area Plans, Functional Area Plans and Land Use Schemes. It is noted that whilst the current eThekwini Bylaw has in effect removed Functional Area Plans from the hierarchy of plans, such plans can still be prepared and offer guidance to the Municipality in decision making.

These are then used to manage development within the Municipality through a number of mechanisms including Schemes as illustrated in the following diagram:
PREPARATION OF THE MPUMALANGA NORTHERN FUNCTIONAL AREA PLAN AND DRAFT SCHEME, INCLUDING THE MR385 EAST CORRIDOR PRECINCT PLAN: WARDS 4, 5, 7 AND 91

Strategic Planning and Policy Development
- Long Term Plan
- Integrated Development Plan
- Spatial Development Framework
- Spatial Development Plan
- Local Area Plan
- Functional Area Plan

Implementation and Management
- Rates Policy
- 5 year plans - Project identification and budgets
- Infrastructure Implementation
- Infrastructure Management
- Other
- Scheme

FIGURE 1: PACKAGE OF PLANS AND CITY MANAGEMENT (PRIOR TO BYLAW)

FIGURE 2: PACKAGE OF PLANS AND CITY MANAGEMENT (SUBSEQUENT TO BYLAW)

Effectively, this FAP sits here
The project methodology is set out in Table 1. This report covers the completion of the FAP phase of the project (Phase 2).

**TABLE 1: PROJECT METHODOLOGY**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Key Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>0. Inception Report</td>
<td>• Inception Report</td>
</tr>
<tr>
<td>1. Sector Studies and Situational Analysis</td>
<td>• Situational Analysis Report (including Sector Study Reports/ baseline studies)</td>
</tr>
<tr>
<td>3. Precinct Plans and Urban Design Guidelines for the Corridor</td>
<td>• Draft Corridor Plan Report</td>
</tr>
<tr>
<td>4. Draft Land Use Scheme</td>
<td>• Draft Land Use Management Plan Report and associated maps</td>
</tr>
<tr>
<td>5. Budget and Implementation Plan</td>
<td>• Key Implementable Projects, Budget and Implementation Plan Report, including Monitoring and Review Plan</td>
</tr>
<tr>
<td>6. Closeout</td>
<td>• Final Functional Area Plan, Corridor Plan and Draft Land Use Management Plan Report</td>
</tr>
<tr>
<td></td>
<td>• Summary Report of Public Participation</td>
</tr>
<tr>
<td></td>
<td>• Closeout Report</td>
</tr>
<tr>
<td></td>
<td>• Project Summary</td>
</tr>
</tbody>
</table>

1.2 PROJECT AIMS AND OBJECTIVES

The primary aim of this project is to take the work that has already been completed, whilst also considering work that is currently in progress, forward in a manner that will ensure that the Municipality is well prepared to facilitate future development opportunities and manage land use in the best interests of the public. To this end the project is essentially aimed at translating the work that has already been undertaken into a tool box of planning, engineering, transportation and environmental information that will allow the Municipality to respond efficiently, effectively and appropriately to development proposals put to them by private developers. It is important to understand that much of the land within the study area is privately owned and as such, the Functional Area Plan cannot create fixed road alignments (other than those already developed or planned) or block layouts- the FAP will give the tool to enable the Municipality to respond to applications that address these.
The final product delivered here is intended to offer a framework of adequate flexibility to allow for future proposals to respond to market trends and shifts over time. The work therefore needs to focus on:

- Working with existing plans and planning processes (such as proposed Provincial Road Alignments, neighbouring Municipal plans) to ensure a product that aligns with other regional plans.
- Creating a framework at the functional planning level created by the conceptual road and open space framework within which development can infill over time.
- Creating a toolkit of draft Scheme mechanisms from which the Municipality can draw when applications from private developers are submitted.

The objective of this project is therefore:

- To propose a conceptual plan and design proposals over parcels of land identified that aligns with broader spatial plans and translates these into more detailed plans, guidelines and projects.
- Consider how and where housing development should be developed in the area, including mixed income, social and GAP housing.
- To evaluate the implications for the environment, services, transport infrastructure and associated phasing of development in consultation with stakeholders.
- To prepare draft land use controls in accordance with the type and intensity of development envisaged through the conceptual framework plan process and translate it into a Draft Scheme tool kit and map. The draft scheme tool kit should consider directives for energy efficiency, use of energy efficient materials for sustainable buildings, rain water harvesting, etc. The process will also include consideration of innovative and best practice mechanisms for Scheme management.
- To undertake a stakeholder engagement and public process throughout the project.

Following the preparation of the FAP, Phase 3 will then involve the preparation of precinct plans for 2 identified precincts. Subsequent to that, a toolkit of Land Use Scheme mechanisms that would be incorporated into the Outer West Consolidated Scheme will be prepared. In Phase 5 the team will prepare Preliminary Budgets for projects identified and a Phasing Plan to guide investment decisions.
2 DEVELOPMENT CONTEXT

2.1 PLANNING CONTEXT

The Mpumalanga Northern Functional Area and the MR385 east corridor are situated in a strategic location along the N3 Corridor (SIP2 national priority corridor) and at the interface with the Mpumalanga town centre, settlement area and the Hammarsdale industrial area. This functional area is under substantial development pressure and also presents significant opportunities for integrating the Mpumalanga/Hammarsdale area with development along the N3 corridor and generating local employment opportunities together with improvements in access, services, housing, amenities and environmental quality, amongst others.

The project falls within the broader Mpumalanga Local Area Plan (LAP) area, which includes the northern functional area extending northwards to the N3 together with a southern functional area extending southwards to the uMlaas River. The Mpumalanga LAP provides the overall land use framework for the area and will accordingly provide a key informant to guide the preparation of the FAP and corridor plan. The Mpumalanga Town Centre Precinct Plan (TCPP) prepared for the Mpumalanga town centre precinct will also be a key consideration for the FAP in terms of assessing key linkages with the town centre precinct and developing complementary proposals in the FAP, corridor plan and associated precinct plans.

The eThekwini Municipality has, through the identification of this project, indicated that it recognises that significant development pressure and change is occurring in and around the study area and that it needs to urgently develop more detailed planning across all built environment sectors so that development can be facilitated in a prioritised and phased manner and in accordance with a clearly articulated development vision and proposals for the Study Area.

Accordingly, this project is about strategically assessing the potential of the Study Area and clearly identifying what interventions, investments and land use scheme controls are required in order to ensure that it can respond appropriately, innovatively and sustainably to the pressures and changes affecting the area and local communities, businesses and other stakeholders.

The Municipality needs to be able to balance market forces, natural growth and demand on the one hand, with the realities of servicing limitations, issues relating to sprawl, the impact of new housing developments, amenity and so forth on the other. This can only be done through appropriate planning both at a policy/strategic level and at the scheme level.

There has been considerable work undertaken in and around the study area, which will help in providing much of the base information necessary for the project, and provide an overall guiding framework for the plan. These include:

- Mpumalanga Local Area Plan and Implementation Plan, 2014
- Mpumalanga Town Centre Precinct Plan, 2015
- Mpumalanga / Hammarsdale Township Regeneration Strategy, 2009
- Sankontshe Development Framework Plan, 2010
- Outer West Corridor Conceptual Spatial Framework, 2010
PREPARATION OF THE MPUMALANGA NORTHERN FUNCTIONAL AREA PLAN AND DRAFT SCHEME, INCLUDING THE MR385 EAST CORRIDOR PRECINCT PLAN: WARDS 4, 5, 7 AND 91

- Outer West Spatial Development Plan, 2015
- eThekwini Spatial Development Framework, 2016
- Outer West Zoning Scheme
- Hammarsdale Industrial Precinct Road Access Pre-Feasibility Study, 2012
- Cato Ridge Local Area Plan and Precinct Plans, 2012
- Shongweni Local Area Plan, 2010

The following figure represents how the plan fits in both at the Municipal and Provincial and National government levels.

![Planning Alignment Diagram]

FIGURE 3: PLANNING ALIGNMENT
2.2 Location of the Study Area

The Mpumalanga Northern Functional Area and MR385 Corridor is located on the South-Western side of the N3 in the outer west region of the eThekwini Municipality. The study area is bounded by Cato Ridge and the N3 to the north, to the east by Shongweni, to the south by Mophela and Mpumalanga South, and the west by Camperdown Rural. Primary access to and through the site is via the N3, on to MR385 which runs through the study area. The study area forms part of the N3 corridor that extends from the Durban CBD and harbour through Pietermaritzburg up to Johannesburg. Major points of interest in close proximity to the site include Cato Ridge, Shongweni, south of Mpumalanga and Camperdown.

FIGURE 4: LOCALITY PLAN
2.3 **Key Issues and Themes Identified from Sector Studies**

A number of sector assessments have been prepared to inform the project. These sector assessments will inform both the Functional Area Plan and the Scheme work undertaken as part of the project. The following sections highlight the *key issues* from the sector assessments as well as the recommended performance indicators. For further details, refer to the full sector reports that were prepared in July 2017:

- Planning, Urban Design and Housing Assessment
- Economic Assessment
- Environmental Sector Report
- Infrastructure Status Quo Report
- Traffic and Public Transport Status Quo

In order to synthesise and consolidate the findings, a SWOT analysis has been conducted based on the information obtained by the different disciplines. This work will guide the future phases of the project by basing the design work on a sound understanding of the study area.

The SWOT Analysis looks at the Strengths, Weaknesses, Opportunities and Threats. Through a vigorous team workshop, this analysis was undertaken and then categorised according to broad discipline (i.e. Spatial, Economic, Environmental, Engineering and Transport). Significant cross cutting
issues were also identified and are included. The following is the SWOT analysis based on the Status Quo work undertaken.

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Economic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spatial (Planning, Urban Design and Housing)</strong></td>
<td><strong>Economic</strong></td>
</tr>
<tr>
<td>1. Topography- flat in parts, especially along the corridor.</td>
<td>1. Labour supply function</td>
</tr>
<tr>
<td>2. Reasonably well-developed set of facilities, even if missing a few</td>
<td>2. Just to South isMpumalanga Township and associated buying power. Also creates housing pressure.</td>
</tr>
<tr>
<td>3. Potential for cheap accommodation-advantage at Metro scale.</td>
<td>3. Industrial development component that has happened</td>
</tr>
<tr>
<td>4. Major nodes are established already.</td>
<td>4. Availability of land and labour (and associated skills)</td>
</tr>
<tr>
<td>5. Lots of plans already prepared</td>
<td>5. People are spending some money in the area.</td>
</tr>
<tr>
<td>6. Forms part of BEPP- should get investment at least on the eastern arm of the MR 385.</td>
<td></td>
</tr>
<tr>
<td>7. Well established settlements</td>
<td></td>
</tr>
</tbody>
</table>

**Environmental**

<table>
<thead>
<tr>
<th>Environmental</th>
<th>Engineering and Transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Natural systems- can create a viable Open Space in association with right development.</td>
<td>1. Internal road system in place</td>
</tr>
<tr>
<td>2. Key High value conservation areas that EPCPD has purchased.</td>
<td>2. Geometric Design for widening of MR 385- will help resolve access and pedestrianization. Design still under way but is confirmed.</td>
</tr>
<tr>
<td>3. High level environmental services.</td>
<td>3. Links into Cato Ridge Logistics Hub.</td>
</tr>
<tr>
<td>4. Some open landscapes and agricultural quality.</td>
<td>4. Links into IRPTN proposals</td>
</tr>
</tbody>
</table>

**Cross Cutting**

<table>
<thead>
<tr>
<th>Cross Cutting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Location- Proximity to freeway and associated linkages</td>
</tr>
<tr>
<td>2. Low density</td>
</tr>
<tr>
<td>3. Stable population- limited migration</td>
</tr>
<tr>
<td>4. Feels like a community- potential to consolidate over time. Feels like there is investment/“ownership”</td>
</tr>
<tr>
<td>5. Constraints= potential for innovation and densification.</td>
</tr>
<tr>
<td>6. Streets are well used.</td>
</tr>
<tr>
<td>7. Driven/ committed officials.</td>
</tr>
<tr>
<td>8. Largely undeveloped</td>
</tr>
</tbody>
</table>
## Weaknesses

<table>
<thead>
<tr>
<th>Spatial (Planning, Urban Design and Housing)</th>
<th>Economic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Legibility issues in places</td>
<td>1. Doesn’t massively contribute to economy</td>
</tr>
<tr>
<td>2. Location and Disconnection/ issues of definition of space</td>
<td>2. Low rates base</td>
</tr>
<tr>
<td>3. Fragmentation- topography and apartheid planning</td>
<td>3. Low buying power</td>
</tr>
<tr>
<td>4. Lack of control/ enforcement- Some low levels of urban management</td>
<td>4. Lack of diversity in economy- ties into issues with regards to buying power. No office facilities, government facilities etc.</td>
</tr>
<tr>
<td>5. Public Realm not well developed.</td>
<td>5. Lack of skills- outflow to other areas for employment.</td>
</tr>
<tr>
<td>6. Old buildings in need of maintenance.</td>
<td>6. Low income rates</td>
</tr>
<tr>
<td>7. Lack of cemetery facilities</td>
<td>7. Fairly homogenous socio-economic profile- need higher income groups/ outside investment. There is also a gap of middle income residents.</td>
</tr>
<tr>
<td>8. Sourcing finances for densification.</td>
<td>8. Limited real opportunities for real tourism</td>
</tr>
<tr>
<td>9. Shopping centre lack of integration</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental</th>
<th>Engineering and Transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Not great opportunities for agriculture (crop and grazing in particular)</td>
<td>1. Building in road reserve/ edge of pavement/ on curves of road. Safety.</td>
</tr>
<tr>
<td>2. Environmentally degraded areas</td>
<td>2. Pedestrian infrastructure very poor</td>
</tr>
<tr>
<td>3. Water quality poor</td>
<td>3. Operational capacity of road</td>
</tr>
<tr>
<td>4.</td>
<td>4. Road quality poor for MR 385.</td>
</tr>
<tr>
<td>5.</td>
<td>5. Insufficient bus service.</td>
</tr>
<tr>
<td>6.</td>
<td>6. Very limited sewerage. Hammarsdale WWTW operating much lower than what it is designed for (issues with regards to industrial effluent quality). Need to optimise works. Mpumalanga WWTW has been capped- the aim is to pump to Hammarsdale WWTW.</td>
</tr>
</tbody>
</table>

### Cross Cutting

1. Land Ownership is difficult
2. Implementation of plans and policies
3. Land use management/ land tenure/ lack of co-ordination between departments and ITB.
4. Lack of high order facilities e.g. hospitals. A lot of people go to Hillcrest/ Pinetown for work.
5. 2-hour railway ride to get from Mpumalanga to Pinetown.
6. Lots of information is out of date.
Opportunities

<table>
<thead>
<tr>
<th>Spatial (Planning, Urban Design and Housing)</th>
<th>Economic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Low density- opportunities for densification</td>
<td>1. Going through change. Corridor should strengthen fairly rapidly considering its recently dormant state.</td>
</tr>
<tr>
<td>2. Space for accommodation- can tie in with employment</td>
<td>2. Opportunities for industry in particular- employment</td>
</tr>
<tr>
<td>3. Bartletts estate- potential node to bring in investment</td>
<td>3. Emerging business and SMME development</td>
</tr>
<tr>
<td>4. Provision of public spaces should be well used.</td>
<td>4. Demand for building materials/ scrap yards etc.</td>
</tr>
<tr>
<td>5. Areas of development pressure.</td>
<td></td>
</tr>
<tr>
<td>6. Opportunities for brownfields redevelopment.</td>
<td></td>
</tr>
<tr>
<td>7. Opportunities for prime industrial real estate at Keystone.</td>
<td></td>
</tr>
<tr>
<td>8. Drive for logistics</td>
<td></td>
</tr>
<tr>
<td>10. Need for cemetery- plenty space, major corridor</td>
<td></td>
</tr>
<tr>
<td>11. All the projects planned e.g. New Town Centre, Thusong centre, fire station upgrade etc.</td>
<td></td>
</tr>
<tr>
<td>12. Leisure opportunities- amphitheatre tied into park</td>
<td></td>
</tr>
</tbody>
</table>

Environmental

<table>
<thead>
<tr>
<th>Engineering and Transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Opportunities around intensive agriculture (tunnels etc), market gardening</td>
</tr>
<tr>
<td>2. Large part of study area still under sugarcane which eventually will fall away- what to do with those areas?</td>
</tr>
<tr>
<td>3. Natural systems</td>
</tr>
<tr>
<td>4. Turning Dam back to Wetland (in progress).</td>
</tr>
<tr>
<td>5. Lots of drainage systems in the area- capacity to help with engineering solutions?</td>
</tr>
<tr>
<td>6. EPCPD large area recently purchased- what are the sustainable uses?</td>
</tr>
</tbody>
</table>

Cross Cutting

| 1. Location- Proximity to freeway and all associated linkages. |
| 2. Sterkspruit industrial area- perception of crime |
### Threats

<table>
<thead>
<tr>
<th>Spatial (Planning, Urban Design and Housing)</th>
<th>Economic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Land Issues not resolved/ released in an informal way would be a problem.</td>
<td>1. Further closure of existing industry.</td>
</tr>
<tr>
<td>2. Plans that are done are not being followed.</td>
<td>2. General economic threats related to Macro level policy/ feelings etc.</td>
</tr>
<tr>
<td>3. Delays in providing pedestrian sidewalks</td>
<td></td>
</tr>
<tr>
<td>1. Poor land use management practices</td>
<td></td>
</tr>
<tr>
<td>2. Lack of appropriate development around shopping centre or it will die.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental</th>
<th>Engineering and Transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Backyard burials</td>
<td>1. Upgrade of the sewer situation- if its delayed there will be an impact.</td>
</tr>
<tr>
<td>2. Environmental constraints (and associated EIA’s) may impact timing of engineering solutions.</td>
<td>2. Delays in IRPTN- very long term. Needs interim solution.</td>
</tr>
<tr>
<td>3. Inadequate funding to manage areas EPCD have secured</td>
<td>3. Slow rail line</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cross Cutting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Inconsistencies/ issues between plans/ depts.</td>
</tr>
<tr>
<td>2. Lack of implementation- projects getting stuck</td>
</tr>
<tr>
<td>3. Poor co-ordination between spheres of government and departments. Silo thinking.</td>
</tr>
<tr>
<td>4. Accountability of stakeholders and officials</td>
</tr>
<tr>
<td>5. Each department has its own legislation to follow- tends to lead to blinkered approach.</td>
</tr>
<tr>
<td>6. Lack of Budgets to implement.</td>
</tr>
<tr>
<td>7. Stakeholder engagement that happens is too ad-hoc. No proper forum.</td>
</tr>
<tr>
<td>8. If the station doesn’t move then the MTCPP will not be maximised. Ownership issues and geometry need to be resolved.</td>
</tr>
<tr>
<td>10. Delays in upgrading MR 385</td>
</tr>
<tr>
<td>11. Role of MR385- mobility vs direct access vs pedestrians. Barrier that divides area up but provides access- how to deal with this. If BRT- huge road reserve. Huge contradictions.</td>
</tr>
</tbody>
</table>
3 DEVELOPMENT VISION AND CONCEPT

3.1 INTRODUCTION

A Functional Area Plan is intended to:

- Be a conceptual layout plan to guide the implementation of municipal infrastructure projects and the planning of future housing projects and the assessment of development applications by the private sector i.e. it is not a master plan or a definitive plan.
- Focus on the basic skeleton of development – roads and open space and possible land uses.
- Estimate potential development floor areas and number of housing units and associated social facilities and bulk infrastructure required (later phase of work).
- Suggest phasing of infrastructure provision and land release (later phase of work).
- Focus on performance criteria, i.e. if a plan is submitted that does not look exactly like the FAP it may still be acceptable if it meets the agreed performance criteria.

Conceptually the Mpumalanga FAP is structured around a set of principles established through an understanding of the status quo and consideration of the role that the study area will play. The FAP is also based on an understanding of the potential economic trends and take-up rates of development within the region. This conceptual framework is intended to create a flexible framework for guiding both public and private investment decisions rather than a definitive framework such as a master plan would be.

3.2 VISION FOR THE STUDY AREA

The vision for the study area as reflected in the Mpumalanga LAP is as follows:

Mpumalanga will be a balanced and viable town with a thriving town centre integrated with the industrial area and major new economic investment areas that will not only generate local employment but will also collectively enable the town to develop into an important sub-regional development node in the polycentric spatial structure and economic development of the Outer West region and metro area. The area will provide a quality living environment that supports a range of urban, suburban and rural/traditional lifestyle options for local communities with supporting services, facilities and amenities and that protects the environmental resources associated with the uMlazi and Sterkspruit River catchments.

The FAP supports this vision for the overall LAP area with the main focus of the FAP on the following elements of the vision:

- Thriving town centre – Mpumalanga town centre precinct
- Regenerated industrial area – Hammarsdale / Sterkspruit industrial area
- Major new economic investment areas – Keystone Park development
• Quality living environments – including urban living environments (town centre precinct, residential growth areas between Hammers Estate and the N3 corridor), suburban living environments (Mpumalanga township areas, Hammers Estate), and peri-urban / rural / traditional living environments (Moya, Georgedale, Sankontshe)
• Environmental resources – primarily associated with the Sterkspruit River catchment, as well as grasslands.

Considering the above, the vision for the Mpumalanga FAP has been simplified as follows:

“Mpumalanga North will have a thriving town centre, with the Industrial node of Hammersdale being regenerated to meet new demands and provide local employment and fulfil the role of sub-regional development node. The area will provide a quality living environment supporting a range of lifestyle options, and all the necessary services and environmental resources to provide for the residents both within and outside the study area.”

3.3 DEVELOPMENT OBJECTIVES

The development objectives for the FAP are to:

• Support the vision of the Mpumalanga LAP to develop Mpumalanga into a balanced and viable town with a thriving town centre, regenerated industrial area, economic investment areas and local employment opportunities, quality living environments and protected environmental resources.
• Support the vision of the Mpumalanga TCPP to develop the town centre precinct into an urban hub with mixed use development, a responsive urban structure and public realm and improved public transport and NMT access.
• Develop the full potential of the MR385 corridor as a mobility, accessibility and development corridor that provides regional connectivity and local access, that provides a key structuring element for the sustainable development of Mpumalanga and that contributes to the functional and spatial integration of the area.

3.4 SPATIAL PRINCIPLES

3.4.1 SPLUMA PRINCIPLES

All planning should respond to the SPLUMA Principles for development. These are:

• The principle of spatial justice. This principle seeks to address past spatial and other development imbalances through improved access to and use of land.
• The principle of spatial sustainability. This principle seeks to promote land development that is within the financial, institutional and administrative means of South Africa. It also seeks to protect prime and unique agricultural land, comply with environmental laws and limit urban sprawl.
• The principle of efficiency. Land development must optimise the use of existing resources and infrastructure. Decision making procedures must be designed to minimise negative impacts.
• The principle of spatial resilience. This principle promotes flexibility in plans to adjust to changes in demand, economy, trends, use etc.
• The principle of good administration. This promotes an effective and efficient government system to ensure that the correct decisions are made.

It is imperative that these principles are borne in mind when any planning takes place in Mpumalanga. However, it is also important to consider more detailed principles when focussing on a specific area so as to ensure that nuances are taken into account. As such, specific principles have been developed for Mpumalanga North over and above the SPLUMA principles.

3.4.2 MPUMALANGA NORTH SPATIAL PRINCIPLES

When preparing a Functional Area Plan, it is critical to respond to the vision by identifying the key spatial principles on which the plan rests. In effect these principles are borne in mind when preparing the plan, and are a useful means to ensure that the FAP responds to the vision and needs of the area. The four spatial principles as they relate to the study area are:

• A Sound Open Space Network
• A Functional Movement Network
• Sustainable Land Use and Settlements
• A vibrant and Functional Urban Structure and Public Realm

The following sections identify how these spatial principles should be achieved.

3.4.2.1 A SOUND OPEN SPACE NETWORK

• Maintain an integrated open space system that supports a sustainable living and working environment for the inhabitants and downstream users who depend on the services and value generated in this area, and specifically:
  o Protects the high value biodiversity assets through direct protection and buffering. The recreational and amenity value of these systems need to be optimized to support their maintenance.
  o Securing and buffering the aquatic corridors traversing the area to maintain ecological and ecosystem functioning.
  o Improving the condition of the open space system to enhance the functional value provided by these systems and buffer people against risks of climate change.

3.4.2.2 A FUNCTIONAL MOVEMENT NETWORK

• Develop an integrated movement system that provides improved regional linkages and local access, that prioritises NMT and public transport and that supports and structures the development of land uses and activities.
• Balance the mobility and access function / linkage and place function of the MR385 corridor.

3.4.2.3 A SUSTAINABLE LAND USE AND SETTLEMENT PATTERN

• Develop the land use and settlement pattern to reflect the local context, character and development potential of the different parts of the study area and to provide a range of living and working environments and opportunities.
• Facilitate the spatial and functional integration of the land uses and settlement patterns within the study area.
• Promote the development of sustainable and integrated human settlements with a range of housing options and typologies with equitable access to social facilities, economic opportunities, services, etc.
• Promote the integration of land use and transport and support transit oriented development within easy walking distance of the main public transport hubs.
• Encourage a greater mix and intensity of land uses around development nodes, activity spines and public transport hubs.

3.4.2.4 A VIBRANT AND FUNCTIONAL URBAN STRUCTURE AND PUBLIC REALM
• Develop a more intensive urban structure and responsive public realm through investments in public space, improved NMT infrastructure, appropriate built form treatments, etc.
• Promote a fine-grained urban block structure in new mixed use and residential settlement areas that supports permeability, walkability and local development opportunities.
• Develop an interconnected public space network with pedestrian linkages connecting key public spaces such as civic spaces, parks and sports fields.
• Utilise landscaping to reinforce the urban structure and to contribute to the local character of neighbourhood areas, public spaces and linkage elements.
• Encourage new development to address, respond to and activate adjoining public spaces and streets.

3.5 DEVELOPMENT SCENARIOS
The Mpumalanga study area is currently undergoing a process of change due to growth trends and associated development processes at work within the Outer West Region and in the broader study area. As the Outer West Region grows, the role of the area is changing from a peripheral/urban edge dormitory area to a more integral part of the metro’s spatial structure and economy. The broader area is already starting to play a more significant role in terms of logistics and industrial development and there are plans and proposals for significantly increasing logistics and industrial development in the area.

The development scenarios of the study area need to respond to the changing circumstances, roles, needs and potential of the area from both an economic growth and economic development perspective. The economic growth perspective refers to the response to Provincial and District economic drivers and priorities to capitalise on the strategic growth opportunities affecting the area. The economic development perspective refers to the response to the socioeconomic development and environmental management needs of residents and to connect residents more effectively into the metro systems of opportunity.

3.5.1 DEVELOPMENT SCENARIOS
This section explores several scenarios for the development of the study area to guide the visioning and planning process. The basic premise of the scenario process is that long range development scenarios should focus on elements and events in the development environment with high levels of impact which have high or varying levels of certainty. Other elements and events that have more certainty are not ignored in the process, but can be planned for more easily irrespective of their anticipated level of impact.
In formulating the development scenarios, the changing circumstances, roles, needs and potential of the study area from both an economic growth and economic development perspective has been considered. Furthermore, the development scenarios draw from and aligned with the Mpumalanga Local Area Plan and Implementation and the Mpumalanga Town Centre Precinct Plan.

3.5.2 DRIVERS OF CHANGE

Key events, interventions and developments which could have a significant impact on or influence the structure and/or operation of the study area have been identified in the generation of the development scenarios. These are the existing or emerging drivers of change that should be accommodated in the planning horizon of the project, i.e. what issues are likely to result in changed behaviours and/or changed circumstances for the residents of the study area. The table below provides an overview of the key drivers of change.

**TABLE 2: KEY DRIVERS OF CHANGE**

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>KEY DRIVERS OF CHANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social</td>
<td>• Population growth (including in-migration/natural/migration)</td>
</tr>
<tr>
<td></td>
<td>• Demographic profile (poor, young, uneducated, low skilled)/household formation/HIV/Aids</td>
</tr>
<tr>
<td></td>
<td>• Social justice/social expectations/basic needs provision/ survival tactics of poor/lifestyle choices that drive the way</td>
</tr>
<tr>
<td></td>
<td>• Low skills base/human resources development (lack of education)</td>
</tr>
<tr>
<td></td>
<td>• Business and government responds to security and social cohesion</td>
</tr>
<tr>
<td>Economic</td>
<td>• Economic base structure and poverty</td>
</tr>
<tr>
<td></td>
<td>• Land use change from agricultural to logistics and industrial hub</td>
</tr>
<tr>
<td></td>
<td>• Strategic Infrastructure Project 2 (SIP), logistics and industrial development linked to N3 corridor and associated requirements</td>
</tr>
<tr>
<td></td>
<td>• Global and local economic climate fluctuations</td>
</tr>
<tr>
<td></td>
<td>• Emerging local economic development/ emerging market</td>
</tr>
<tr>
<td>Environmental</td>
<td>• Smarter resource utilisation/water scarcity</td>
</tr>
<tr>
<td></td>
<td>• Climate change/vulnerability, floods, drought</td>
</tr>
<tr>
<td></td>
<td>• Increase environmental awareness (social movement)</td>
</tr>
<tr>
<td></td>
<td>• Water availability</td>
</tr>
<tr>
<td>Institutional</td>
<td>• Public sector Institutional capacity/systems/bureaucracy constraints</td>
</tr>
<tr>
<td></td>
<td>• Private sector influence – market forces of dominant landowners, developers and businesses</td>
</tr>
</tbody>
</table>
Population and economic growth have been identified as the primary drivers of change. These drivers will impact on the rate and nature of growth and development and will result in associated changes in the demographic profile and economic structure and the associated demand for land, facilities, infrastructure, jobs, etc. The drivers listed in Table 2 are already impacting on the study area and placing pressure for further changes.

The area is experiencing significant pressure for development due to the growth of the metro, the area’s strategic location along the high priority N3 corridor and the rail corridor, the availability of large parcels of undeveloped land in the area, the shortage of such parcels elsewhere in the metro and the low land prices relative to many other areas. Thus, at a local level, the pressure on the study area to move from agricultural to industrial/logistic hub. Furthermore, major infrastructure and development proposals have also been identified as key local drivers of change. These drivers will have a significant impact on the spatial location, extent, intensity and distribution of land use development in the study area.

At a local level, some of the key pressures and changes that are already occurring or are likely to emerge include are illustrated in the table below.

**TABLE 3: KEY PRESSURES AND CHANGES**

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>KEY PRESSURES AND CHANGES</th>
</tr>
</thead>
</table>
| Housing    | • Demand for public sector housing projects, including upgrading of informal settlements and greenfield housing projects, mainly in and around the existing Mpumalanga, Geogedale and Sankontshe areas.  
• Need for a diverse household income groups  
• Demand for larger residential sites and regional educational facilities near the N3 mobility corridor. |
<p>| Agricultural | • Impact of the closure of Rainbow Chicken on employment and land use                   |</p>
<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>KEY PRESSURES AND CHANGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial</td>
<td>• Growing demand for larger sites for logistics, industrial and warehousing developments, particularly in areas with good access to the N3 and the interchanges with MR385</td>
</tr>
<tr>
<td></td>
<td>• The establishment of large warehousing has also increased the demand for smaller/medium size industrial properties to accommodate support services. All current available industrial zoned land is being targeted for logistical warehousing thus leaving no space for smaller/medium size light industry activities.</td>
</tr>
<tr>
<td></td>
<td>• Recent developments in Hammarsdale Industrial Park and Keystone could promote further investment to the study area.</td>
</tr>
<tr>
<td>Emerging market</td>
<td>• Demand for general business zones, e.g. for Cash and Carry type developments, rather than more limited/less flexible industrial zones.</td>
</tr>
<tr>
<td></td>
<td>• The New Town Centre has concentrated shopping within the central areas and there is some subjective evidence that this has adversely affected small shops and businesses outside these areas.</td>
</tr>
<tr>
<td></td>
<td>• Public investment in the town centre is starting to improve the attractiveness of these areas for private investment but there is still reluctance by businesses to invest south of Sterkspruit River.</td>
</tr>
<tr>
<td></td>
<td>• Demand for sites/buildings for smaller businesses/shops within/serve the residential settlement areas.</td>
</tr>
</tbody>
</table>

Development scenarios can be identified and explained based on strategic and local change drivers.

### 3.5.3 Development Scenarios

Development scenarios are based on the existing development patterns, current and proposed plans and are primarily concerned with the rate of population and economic growth and the associated demand for development lands, housing, community facilities, employment opportunities, etc.

Development/growth scenarios provide information on how much land and which land is likely to be redeveloped given market conditions, development constraints, in-migration and the current level of investment in properties and recent development trends. The growth scenarios are as follows:

- Growth Scenario 1 – High Population Growth and High Economic Growth
- Growth Scenario 2 – High Population Growth and Low Economic Growth
- Growth Scenario 3 – Low Population Growth and High Economic Growth
- Growth Scenario 4 – Low Population Growth and Low Economic Growth

The figure below indicates the possible growth scenarios identified.
FIGURE 6: POSSIBLE GROWTH SCENARIOS

Growth scenarios 1 and 2 will be explored with the aim of assessing the impact that high population growth coupled with high economic growth and high population growth coupled with low economic growth will have on the developmental needs of the study area. Considering the potential implications on how the FAP will assist in outlining focused developments that will promote:

- A safe and healthy community
- Housing needs of the community
- Encourage business growth and retention
- Adequate social spaces and public facilities

3.5.1.1 POPULATION GROWTH

For this assessment population growth has been projected as a base case scenario at a rate of 0.5% (the average population growth rate over the study area based on 2011 census and eThekwini’s growth rate) up to 2022 and from then onwards up to 2037 (although this plan may indeed only realise its full potential sometime after this date). It is assumed that the population growth rate will align with eThekwini’s growth rate of 1.1%. As per scenario 1 and 2, high population growth has been assumed to more likely based on the following considerations and assumptions:

- The average population growth for the 9 sub-places reviewed showed negative growth rate trend over 10 years based on the 2001 and 2011 census data. Given the undertaking of economic and social developments that have occurred in the broader study area since 2011, its assumed that this trend is unlikely to continue;
- The Outer West’s movement towards a more developed urban area with nodes such as Hillcrest and Pinetown will impact growth developments for the study area;
- Migration trends based on 2011 census over a ten-year period, have had a minute impact on population growth and housing demand. Given the undertaking of economic and social developments that have occurred in the broader study area since 2011, its assumed that this trend is unlikely to continue; and
• Adverse impact of HIV/AIDS on mortality and life expectancy will continue to affect the Province and the study area however improvements and advances in access to treatment will assist in prolonging life expectancy.

The above assumptions, baseline status quo, and implications for population growth for the study area indicate that the projected population in the study area is projected to increase from around 61 899 in 2017 to 71 566 in 2027, and 79 839 in 2037. The additional population growth will generate demands for housing, community facilities, services, infrastructure, employment opportunities and associated development land requirements.

Demographic trends in the study area indicate that housing demand will be driven by natural population growth experienced in the study area and surrounding areas as well as a change in current extended household structures. Growth pressures will lead to a relocation of existing population to areas within the study area which have more social facilities. Furthermore, economic growth pressures and the current expansion and growth of logistics and warehousing in the study area has the potential to attract housing demand from higher income groups. Noting that there is a need to attract middle and high-income households into the study area to support economic growth and development.

3.5.1.2 Economic Growth
Economic growth in the study area has been driven and is likely to be driven by the industrial and logistics sector, which plays a significant role in the Outer West and within the study area. Major economic developments such as Keystone Industrial Park, which have the potential to generate much needed employment within the broader area, resulting in the potential increase in household income and spending power, and is also likely to make the area more attractive for further development in the future. There is also potential for smaller scale local economic developments within the Mpumalanga area through public sector initiatives and investments and through private sector developments.

Low economic growth will have significant impacts on the study area. It is likely such a situation will threaten the economic profile of the study area and hinder the current progress that has taken place and contribute towards the study area remaining underdeveloped and characterized by high unemployment with a substantially high economically active population seeking employment, remaining unemployed. Thus, resulting in a population mostly made up of low-income earners. Low economic growth would perpetuate this trend within the study area.

3.5.1.3 Land Demand
The population and economic growth estimates have been used, together with other assumptions and information, to estimate the land demand to 2037, as outlined in the tables below. It is stressed that these figures refer to a 20-year time horizon, however in all likelihood the ultimate development as reflected in the FAP will take much longer to achieve.

**TABLE 4: ESTIMATED NEW LAND DEMAND TO 2037 FOR KEY LAND USES**

<table>
<thead>
<tr>
<th>LAND USE</th>
<th>AREA</th>
<th>BASIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>153ha</td>
<td>Refer to Table 5: Population Growth and Residential Land Demand</td>
</tr>
<tr>
<td>Industry</td>
<td>359ha</td>
<td>Refer to</td>
</tr>
</tbody>
</table>
TABLE 5: POPULATION GROWTH AND RESIDENTIAL LAND DEMAND

<table>
<thead>
<tr>
<th>POPULATION</th>
<th>MPUMALANGA (LAP)</th>
<th>STUDY AREA MFAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status Quo</td>
<td>Mpumalanga LAP area population was 117 836 in 2011 (20.4% of OW population) (derived from Census 2011 Small Area Statistics)</td>
<td>Mpumalanga MFAP area population is estimated to be 61,899 in 2017.</td>
</tr>
<tr>
<td>Assumptions</td>
<td>Mpumalanga LAP area will absorb approximately 30% of OW population growth</td>
<td>Population growth projected at a rate of 0.5% up to 2022 and from then onwards up to 2037, it is assumed that the population growth rate will align with eThekwini’s growth rate of 1.1%.</td>
</tr>
</tbody>
</table>
| Implications | • Mpumalanga population will increase from 117 836 in 2011 to 148 709 in 2025 (additional population of 30 873)  
• Mpumalanga population will increase from 148 709 in 2025 to 173 547 in 2035 (additional population of 24 839)  
• Based on an average occupancy ratio of 4 persons/unit and an average density of 30du/ha, the additional population by 2025 will require 257.3ha of additional residential land and by 2035 a further 207ha will be required | • MFAP study area population will increase from 61 899 in 2017 to 71 561 in 2027 (additional population of 9 662)  
• MFAP study area population will increase from 71 561 in 2037 to 79 839 in 2035 (additional population of 8 278)  
• Based on the household densities per sub place in the study area and proposed densities for available land, the additional population by 2027 will require 82 ha of additional residential land and by 2037 a further 153ha will be required |

TABLE 6: ECONOMIC GROWTH AND INDUSTRIAL LAND DEMAND

<table>
<thead>
<tr>
<th>INDUSTRIAL</th>
<th>MPUMALANGA</th>
<th>STUDY AREA MFAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status Quo</td>
<td>148.5ha (55.4%) taken up of total 268ha of zoned industrial land in Hammarsdale, leaving 119.5ha unoccupied</td>
<td>Existing general and light industrial land in the study area is 301.7 ha.</td>
</tr>
</tbody>
</table>
| Assumptions| Mpumalanga LAP area will absorb approx. 30% of OW industrial land takes up | • Based on short run (2011-2016) average historical growth rates for building plans approved in Mpumalanga (Stats SA building statistics data) the following growth scenarios for industrial developments can be assumed:  
  • Low growth – 2%-3%  
  • Average growth 4%-5%  
  • High growth 6%  
  Industrial activity and developments in the study area in the form of logistics/light industry and general industry are likely to experience continued growth until a certain |
In accommodating population and economic growth and land use demand, it is important to consider the necessity that economic growth will need to be coupled with economic development. As indicated in the 2035 Provincial Growth and Development Strategy, the Strategic Development Principles are as follows:

- Creation of infrastructure for economic development;
- Improvement and support new livelihood choices;
- Develop skills for the future economic sectors;
- Promote small and medium enterprise;
- Secure resources for future industrial development e.g. land;
- Retain businesses and promote expansion;
- Develop key economic sectors; and
- Develop priority nodes and corridors

The table below provides an overview of economic development considerations which should be considered in the study area which will assist in promoting economic development. Highlighting the

<table>
<thead>
<tr>
<th>INDUSTRIAL</th>
<th>MPUMALANGA</th>
<th>STUDY AREA MFAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implications</td>
<td>Mpumalanga industrial development land take up will be 4.2ha pa, which equates to 54.6ha from 2012-2025 or 96.6ha from 2012 to 2035</td>
<td>By 2037 expected new demand for industrial land will grow to will be 359 ha in total for logistics/light industry and general industry. Excess demand may be accommodated outside of the study area.</td>
</tr>
</tbody>
</table>

**TABLE 7: ECONOMIC GROWTH AND COMMERCIAL LAND DEMAND**

<table>
<thead>
<tr>
<th>COMMERCIAL</th>
<th>MPUMALANGA</th>
<th>STUDY AREA MFAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status Quo</td>
<td>Mpumalanga New Town Centre has GLA of approx. 19 000m² (1.9ha) According to Shongweni LAP, Mpumalanga has additional retail space requirement of 46 132m² based on additional population of 219 676</td>
<td>Mpumalanga New Town Centre has GLA of approx. 19 000m² (1.9ha) Existing commercial property concentrated within the study area is 30,42 ha.</td>
</tr>
<tr>
<td>Assumptions</td>
<td>Mpumalanga LAP area will absorb approx. 30% of OW commercial land take up (based on Mpumalanga’s share of population growth, increasing incomes in the area and additional significant development and greater middle income housing)</td>
<td>• It is likely there will be limited commercial demand in the study area (based on the growing demand for office space in the Western Suburbs and limited commercial demand in the study area as expressed by property agents) • Potential development of service sector to service industrial nodes could be simulated by industrial developments • Increased demand for office space, facilities, formalized areas of operation for the emerging market/informal sector</td>
</tr>
<tr>
<td>Implications</td>
<td>Mpumalanga commercial land take up will be 5ha from 2014 to 2025</td>
<td>• New Commercial land take up is estimated to be 25ha from 2017 to 2037.</td>
</tr>
</tbody>
</table>
need for skills development, promotion of small and medium enterprise, securing resources for future industrial development and the need for businesses retention and promotion expansion in the study area.

**TABLE 8: ECONOMIC DEVELOPMENT CONSIDERATIONS**

<table>
<thead>
<tr>
<th>FOCUS AREAS</th>
<th>ECONOMIC DEVELOPMENT CONSIDERATIONS</th>
</tr>
</thead>
</table>
| Human Capital Development        | • Promote SMME and entrepreneurial development;  
                                  | • Promote youth, gender and disability advocacy and the advancement of women                                         |
| Emerging market (SMME’s and informal market) | • The promotion of SMME and entrepreneurial development through comprehensive support programmes;  
                                  | • Dedicated programme of support to new or young businesses as they are more vulnerable than larger older established businesses to shocks and harsh economic conditions;  
                                  | • Aligning participants in the emerging market with relevant opportunities such as the Department of Trade and Industry’s Black Industrialist Programme which could assist in supporting local suppliers and small business;  
                                  | • Provision and access to work spaces and basic resources to emerging market participates;  
                                  | • Provision of quality affordable zoned land with the appropriate level of infrastructure and maintain good service provision when sites are occupied;  
                                  | • Promote inclusive participation of woman and youth in proposed developments and in emerging market                                                                                                           |
| Business Retention and Expansion | • There is a need for a programme linked to an early warning system which encourages the retention and expansion of existing business to ensure that the domestic market has the right capabilities and opportunities, which will stimulate economic activity, as well as sustainable and broad base job creation    |
| Community Development            | • Provision of social facilities and recreational areas  
                                  | • The use of Community Based Planning (CBP) to ensure that people are active and involved in managing their development. Municipality’s CBP is aimed at linking communities with existing local government systems. Thus, supporting the participatory objectives of the IDP by supporting local governance through effective linkages with communities  
                                  | • Enhance the health of communities and citizens through re-engineer Primary Health Care including community and facility-based services and programmes                                                                 |
FOCUS AREAS | ECONOMIC DEVELOPMENT CONSIDERATIONS
---|---
Enhance Spatial Economic Development | • Enhancing spatial economic development to create opportunities for inclusive economic growth and facilitates investment growth

3.6 DEVELOPMENT CONCEPT
The development concept for the FAP is informed by the spatial concepts that form part of approved local plans currently in place for the study area together with a review, application, integration and updating of these concepts to the northern functional area.

3.6.1 MPUMALANGA LAP AND TCPP SPATIAL CONCEPTS
The Mpumalanga Local Area Plan (LAP) and the Mpumalanga Town Centre Precinct Plan (TCPP) include spatial concepts that will need to be considered in developing a conceptual framework/functional area plan and precinct plans for the study area. However, these also fall within a broader concept for Mpumalanga as it fits within the Metropolitan scale of planning.

3.6.1.1 MPUMALANGA PRIMARY CONCEPT
Mpumalanga falls within the node that has evolved around Cato Ridge. It effectively forms a key node in the loop along the MR385 that forms off the N3. Whilst it is a key node in its own right, it also links by road and rail to Pinetown (and by extension, the Durban CBD) as well as Pietermaritzburg.

3.6.1.2 MPUMALANGA LAP
The Mpumalanga LAP provides a spatial development concept focused around the following five pillars:

- Develop Mpumalanga into a viable and balanced town
- Develop a network of economic and social activities
- Strengthen regional, metropolitan and local connectivity and access
- Support strategic development and investment

Establish a sustainable urban/agricultural/rural/natural interface. Figure 7 indicates the spatial development concept for the Mpumalanga LAP.
The Mpumalanga Town Centre Precinct Plan (MTCPP) provides a spatial development concept that aims to utilise the town centre precinct as an opportunity to create a new civic and commercial heart for Mpumalanga that integrates the northern and southern settlements of Mpumalanga through appropriate mixed use development infill, the development of new north-south linkages and by pulling development over the southern ridge and down into the valley towards MR385, the rail line and Sterkspruit River to the north.
Figure 8 indicates the spatial concept for the Mpumalanga Town Centre Precinct.

**FIGURE 8: MPUMALANGA TCPP – SPATIAL CONCEPT (MPUMALANGA TCPP, 2015)**
3.6.2 Spatial Concept Review

The spatial concept and the land use plan for the Mpumalanga LAP have been reviewed to give consideration to emerging development trends and more recent planning undertaken in the study area and wider context, including the Mpumalanga TCPP and Cato Ridge FAP. Table 9 indicates the key aspects of the review and Figure 9 shows the affected site locations in relation to the Land Use Management Plan from the Mpumalanga LAP.

**Table 9: Spatial Concept Review**

<table>
<thead>
<tr>
<th>NO.</th>
<th>LOCATION</th>
<th>CHALLENGES AND OPPORTUNITIES</th>
<th>POTENTIAL RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MR385 East</td>
<td>• Mixed use area between MR385 and power station affected by environmental areas and electricity power line servitudes</td>
<td>• Mixed use area reduced in extent to reflect environmental areas and electricity power line servitudes</td>
</tr>
</tbody>
</table>
| 2   | Hammarsdale / Sterkspruit | • Closure of Rainbow Chickens  
• Pressure for industrial/business land demand and expansion to south and southeast of Hammarsdale | • Potential for agri-industrial lands to southeast to be developed for industrial and business park development as an expansion of Hammarsdale |
| 3   | Town Centre Precinct | • More detailed and recent precinct plan undertaken for the town centre with proposed: land uses, rail station, hospital / CHC, etc. | • Update land use, transport and social facility proposals for the FAP to include the key provisions within the TCPP |
| 4   | Moya / Georgedale | • LAP provides broad guidance  
• Encroachment of development onto MR385 and other roads and mobility and safety issues | • FAP will need to address these areas in greater detail, including additional guidance with regard to land uses, densities and mobility/access |
| 5   | Sankontshe        | • LAP provides broad guidance  
• Sankontshe Precinct Plan recommends higher densities along main road to east and lower densities to west, which is considered an appropriate response given existing context | • FAP will need to address these areas in greater detail, including additional guidance with regard to land uses, densities and mobility/access  
• Differentiate between density intentions for east and west parts of Sankontshe by revising land use designations |
<p>| 6   | Proposed Cemetery Site | • Proposed cemetery site is unsuitable for burials due to | • Consider proposed cemetery site for low impact residential and low impact agriculture expansion uses to complement existing residential to |</p>
<table>
<thead>
<tr>
<th>NO.</th>
<th>LOCATION</th>
<th>CHALLENGES AND OPPORTUNITIES</th>
<th>POTENTIAL RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>MR385 West</td>
<td>geotechnical and wetland constraints</td>
<td>Review role of MR385 west corridor and introduce light industrial use designation at northern end as an extension of the Cato Ridge FAP industrial proposals</td>
</tr>
</tbody>
</table>

- Act 70 of 70 approved for lands to northwest adjoining southern edge of MR385 west
- Closure of Rainbow Chickens
- Cato Ridge LAP and FAPs indicates Light Industrial along MR385 west

|   |   | south and proposed residential to east and to act as a grassland buffer. | Retain an intervening area of agriculture uses to provide a buffer between industrial and residential/commercial uses
|   |   | Longer term potential for the agricultural use area to be converted into industrial uses subject to phasing and servicing |
3.6.3 Spatial Concept for the Northern Functional Area

Figure 10 indicates the spatial development concept for the northern functional area. This seeks to achieve the following:

- Update the Mpumalanga LAP spatial development concept to incorporate strategic elements of the Mpumalanga TCPP spatial development concept (e.g. urban hub, interchange zone, public transport proposals, etc.)
- Focus on the area of the FAP and the MR385 corridor and highlight the key spatial / land use proposals along the corridor
- Incorporate revised proposals to address the new and emerging issues that emerged from the situational analysis and stakeholder engagement

The spatial development concept for the northern functional area is focused on the following key aspects:

1.Primary Network / Regional Linkages and Opportunities

Strengthen the primary movement network that provides regional linkages connecting the northern functional area to the broader metro area and associated socio-economic opportunities. Key elements include:
• MR385 and N3 and associated road-based public transport (including the proposed future IRPTN trunk corridor and stations) that connect Mpumalanga to Pinetown and Durban and other key urban and employment centres
• Rail corridor with its associated stations that connects Mpumalanga to Durban and Cato Ridge
• Proposed interchange zone at the New Town Centre where the primary network and secondary networks intersect.

FIGURE 10: SPATIAL DEVELOPMENT CONCEPT FOR PRIMARY NETWORK

2. MR385 Mixed Use Development Corridor and Opportunities
Develop the MR385 as a mixed-use development corridor that structures and integrates the main economic centres and residential areas along the corridor, including the Mpumalanga New Town Centre, Hammarsdale industrial area, Keystone Park investment area and the adjoining residential areas. The MR385 corridor provides the interface between the primary / regional movement network connecting Mpumalanga to the broader metro area and associated opportunities and the secondary / local movement network connecting local residential neighbourhoods to the nodes, facilities and opportunities along the corridor. Key elements include:

• Industrial, logistics and business opportunities associated with Hammarsdale / Sterkspruit, Keystone Park and Cato Ridge.
• Mixed use commercial / residential /social facility opportunities associated with the Mpumalanga New Town Centre / urban hub and the proposed urban development nodes located at key intersections along the corridor.
• Agricultural / agri-industrial opportunities between the industrial and mixed use / residential areas along MR385 west.
3. Secondary Network / Local Linkages and Opportunities

The MR385 development corridor needs to be functionally integrated with the existing settlement areas and future growth potential areas to the north and south of the corridor via a secondary network/local linkage. Key opportunities include:

- Sustainable urban expansion and infill development in the northern areas, which will help to integrate Mpumalanga with the N3 corridor.
- Consolidation, infill and upgrading in the southern residential areas with improved integration and access to the MR385 corridor.
- Industrial/business expansion to the southeast as an extension of the Hammarsdale/Sterkspruit industrial area.
- Consolidation, infill and upgrading of the residential areas to the southwest with improved integration and access to the MR385 corridor.
- Industrial/business expansion to the northwest as an extension of the industrial growth of the Cato Ridge area.
FIGURE 12: SPATIAL DEVELOPMENT CONCEPT FOR NORTHERN FUNCTIONAL AREA

**Development Nodes**
- Town Centre Urban Hub / Interchange Zone
- Urban / Economic Node
- Local / Neighbourhood Node

**MR385 Mixed Use Development Corridor**
- Develop Town Centre Mixed Use
- Develop Mixed Use / Commercial Node
- Regenerate / Expand Industrial Area
- Develop Logistics / Warehousing Area
- Consolidate / Upgrade Suburban Settlement

**Settlement and Activity Pattern**
- Regenerate / Expand Industrial Area
- Develop Logistics / Warehousing Area
- Consolidate Suburban Settlement
- Upgrade Informal / Peri-Urban Settlement
- Maintain Peri-Urban / Rural Settlement
- Develop Urban Settlement
- Strategic Reserve / Agricultural / Future Hub / Logistics / Mixed Use
- Agricultural / Strategic Reserve Area
- Open Space / River Systems / Amenity Areas

**Movement Network**
- N3 Corridor
- MR385 Corridor
- Main Linkages / Activity Spines
- Local Linkages / Spines
- Future Linkages / Spines
- Rail Line
- Existing Rail Station
- Proposed Rail Station
- Proposed IRPTN / PT Corridor
- Proposed IRPTN / PT Hub

**Study Area**
- Mpumalanga FAP Boundary

The Planning Initiative and Team
4 DEVELOPMENT FRAMEWORK

4.1 INTRODUCTION

The following section provides the detail for the Functional Area Plan, culminating in the actual FAP. This section includes descriptions of:

- The Open Space and Environmental Framework
- The Access and Mobility Framework
- The Land Use and Activity Framework
- The Service Infrastructure Framework
- The Public Space, Landscaping and Built Form Framework
- A description of the surrounding plans
- The Functional Area Plan (which is a culmination of this section of work)

4.2 OPEN SPACE AND ENVIRONMENTAL FRAMEWORK

4.2.1 INTRODUCTION

The following summarizes the conservation value, state, and role of the natural systems within the planning area and their influence on and importance to adjoining areas. It also documents the current state, potential and future role of agricultural in the area. This serves as the context for planning objectives, principles and guidance that follows. The following key conclusions regarding the area were established in the status quo assessment:

- **High Value Terrestrial Biodiversity** – The protection of the conservation significant grassland types (KwaZulu-Natal Sandstone Sourveld) and associated species is a non-negotiable requirement of the FAP. Securing these areas and sustaining their quality and functionality requires the following:
  - Securing the grasslands themselves, which EPCPD is in the process of doing.
  - Securing the corridors between them to enable ecological process to take place. These corridors include both grassland and riparian/wetlands systems.
  - Appropriate buffering of both the key grassland areas and connecting systems is required. Given the importance of the systems occurring in this area, traditional, standard buffers are inadequate.

- **Poor State of Aquatic Systems** – The poor state of the wetlands and river systems and declining water quality trends:
  - Emphasize the need to prevent further loss of grassland.
  - Requires appropriate buffering of these systems.
  - Requires the inclusion of requirements for rehabilitation of wetland and riparian habitats in planning conditions - because improvement in aquatic health is required and this cannot be achieved through maintaining the status quo.

- **Topography** – forms a further major development constraint in the certain portions of the project area. In many areas the topography is the reason the natural systems are still intact. But development is encroaching in steeper areas (of valleys) and needs to be halted due to the associated risks to the biodiversity and potential for degradation.
- **Ecosystem Services** – The planning area forms a significant portion of the Sterkspruit River catchment and the Umlazi River. It is also located in the upper reaches of the Metro planning extent. It consequently provides important catchment area for the city downstream.

- **Role of Agricultural in the Study Area** – The limited agricultural potential and negative impact of further cropping and grazing on the important biodiversity means that commercial cultivation is not supported, and grazing opportunities are limited. Opportunities for agricultural are limited to intensive production activities such as tunnel farming and market gardening to support household /local food security. These activities must be located sensitively in relation to the natural systems and issues described above, with water quality management being a significant consideration given the effluent that is discharged from certain intensive agricultural activities in the form of nutrients and bacteria.

### 4.2.2 Policy Context

The eThekwini Municipality has a well-developed policy context with respect to the role of biodiversity in securing a sustainable future for the Metropolitan area. This policy framework, has in combination with the outcomes of the status quo assessment, informed the development of principles which have been translated into land-use layouts and in turn supported by guidance to support detailed planning and conditions of approval. Relevant national and provincial policy and legislation has also been referenced.

#### 4.2.2.1 Durban Climate Change Strategy

The Durban Climate Change Strategy (DCCS) was developed in response to the key challenges of climate change. The broad approach (of adapting to and mitigation of climate change) to implementation entails the EPCPD being responsible for mainstreaming the climate change strategy by promoting the introduction of climate change content into the Long-Term Development Plan of the Municipality including FAPs and draft schemes, as well as the relevant sectoral plans and policies of other municipal departments. Projected changes in Durban’s climate generally involve increased temperatures, increased rainfall overall with greater variability and intensity events. This translates to impacts such as increased potential of flooding and risks of erosion. The policy establishes the following goals, objectives and response terms of biodiversity and food security, which form two of the core themes within the strategy:

**BIODIVERSITY**

<table>
<thead>
<tr>
<th>Goal:</th>
<th>Durban’s biodiversity and associated natural capital are protected and enhanced to deliver ecosystem services that facilitate protection from and mitigation of climate change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective:</td>
<td>Ecosystem functioning and connectivity are enhanced through integrated planning and effective action to reduce climate change impacts on biodiversity and maximise the delivery of ecosystem services</td>
</tr>
<tr>
<td>Response:</td>
<td>Durban’s biodiversity and associated natural capital are protected and enhanced to deliver ecosystem services that facilitate protection from and mitigation of climate change.</td>
</tr>
</tbody>
</table>

Adopt and enforce integrated planning approaches and development controls that protect the integrity and enhance the functionality and resilience of Durban’s biodiversity and natural capital to withstand climate change impacts.
Ensure that linkages between open spaces are conserved and maintained to allow for poleward and altitudinal movement of plant and animal populations to ensure that gene flow and diversity are maintained, and that species are able to adapt to climate change impacts where such potential exists.

Restore and manage degraded natural open spaces through government, business and community efforts to improve resilience of ecosystems to climate change impacts.

Prioritise the restoration, protection and management of habitats and ecosystems that are most vulnerable to the effects of climate change.

**FOOD SECURITY**

<table>
<thead>
<tr>
<th>Goal:</th>
<th>Durban has a robust and resilient food security system that ensures availability, equitable access to and efficient utilisation of food in the context of both climate variability and climate change.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective:</td>
<td>Durban has robust local food production systems that are able to withstand future climate threats and provide for the poor.</td>
</tr>
<tr>
<td>Response:</td>
<td>Develop and enforce polices and by-laws that reserve space for local food production.</td>
</tr>
</tbody>
</table>

- Localise food production and distribution through the establishment and preservation of agricultural hubs and small scale local community farming efforts.
- Encourage innovative local food production within urban development projects.
- Promote ecological and sustainable farming practices as an overarching approach to protecting local food production against climate change impacts.

A cross-sectoral approach was adopted in the implementation of the Climate Change Strategy, with the Land-use Planning being identified as being a key mechanism for promoting protection from climate change impacts by adopting and enforcing a risk-averse approach to spatial, land use and infrastructure planning and development controls that support these.

4.2.2.2 Durban Metropolitan Open Space System

D’MOSS is a layer that overlies the underlying scheme zoning. It is not a zone. It is a controlled area wherein, despite the underlying zoning, development may not occur without having first obtained the necessary environmental authorisation or support from the EPCPD, which may or may not be given. Where it is given it is likely to be subject to significant controls to ensure that the biodiversity and/or the ecosystem services of the designated land is not deleteriously affected. Where developments/land uses are proposed within a D’MOSS controlled area, they will be subject to the D’MOSS provisions in the Outer West Scheme (or any subsequent amendment or scheme).

4.2.2.3 eThekwini Environmental Services Management Plan

The EESMP is a legal mandate aimed to protect and utilise our biodiversity sustainably to ensure a continued supply of high quality environmental goods and services. However, most of the land in this plan is not owned by government and is zoned for other uses. Implementation includes acquisition where possible for conservation purposes and environmental servitudes.
4.2.2.4 eThekwini Agricultural Management Unit Strategic Plan, 2010
The policy promotes integrated, coordinated and sustainable agricultural development in rural areas. It also focuses on the Environment, providing guidance specifically on integrating the conservation of the environment and the promotion of agricultural production.

4.2.2.5 Legislation
The following national legislation has also been considered in informing the

- The National Environmental Management Act (Act 107 of 1998) (NEMA)
- The National Environmental Management: Biodiversity Act, NEM:BA (Act 10 of 2004)
- The National Environmental Management: Protected Areas Act, NEM:PA (Act 57 of 2003)
- National Forest Act (Act 84 of 1998)
- The Conservation of Agricultural Resources Act (Act No. 43 of 1983)

4.2.3 Open Space Network Role and Performance Objectives
In view of the status quo assessment and policy direction established above, the role and performance objectives are established for the open space system depicted in Figure 13. The key components of the OSS, their role and performance objectives are summarized in Table 10 below.

<p>| TABLE 10: DESCRIPTION, ROLE AND PERFORMANCE OBJECTIVES OF COMPONENTS OF THE OPEN SPACE SYSTEM |</p>
<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Role &amp; Performance Objective</th>
</tr>
</thead>
</table>
| A | These natural systems occur in the steeper areas along the northern boundary of the study area comprise grassland and scarp forest in good condition that represent high value biodiversity. Notably the grassland type, KZN Sandstone Sourveld, is a one of the most threatened vegetation types in the eThekwini Metro. The parcel of land indicated as A++ represents the best example of this vegetation type and has been purchased by the Metro in order to establish a grassland reserve to achieve conservation targets. Area A+ is small section of grassland that forms part of a larger high value grassland area that extends north into the adjacent Cato Ridge planning precinct. | PRIMARY ROLE: Biodiversity Conservation
These systems represent some of the last remaining examples of the associated biodiversity and must be conserved. SECONDARY ROLE: Provision of Ecosystem Services. Their good condition and position in the catchment means that these grasslands in particular, perform important catchment functions. Maintenance of these services requires that these areas are maintained in their good state and as open space. PERFORMANCE OBJECTIVE: Protection
Through formal protection in the case of the grassland reserve and appropriate management thereof, appropriate buffering through DMOSS and appropriate land use planning in the case of the other areas. |
<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Role &amp; Performance Objective</th>
</tr>
</thead>
</table>
| **B** | Previously cultivated areas that are now secondary grassland. Given the proximity to the grassland reserve in A+, the Metro has also purchased much of this land in order to secure the grassland. | **PRIMARY ROLE:** *Biodiversity Conservation*
While these areas are disturbed, they are largely natural and provide an important role in buffering the grassland reserve from infrastructure and settlement to the west and south.  
**SECONDARY ROLE:** *Provision of Ecosystem Services*
These areas provide a relatively large extent of natural land cover which, in combination with the adjacent reserve, provide important catchment services (capture, infiltration and management of rainfall). Area B1 is also located along the floodplain.  
**PERFORMANCE OBJECTIVE:** *Protection Support*
As buffer areas to the grassland reserve. This requires they remain as open space. To effectively achieve this role, it is critical that strict controls are applied to any land-use proposed in these areas. The aim being to curb ‘urban creep’ and associated degradation of the grassland reserves. |
| **C** | These natural areas comprise systems with lower biodiversity value than the areas A. They are also more disturbed. | **PRIMARY ROLE:** *Ecosystem Function*
These areas provide important ecosystem services - notably the capture and infiltration of run-off from what are steep sections of the catchment. They also serve to support the drainage network (refer to D) in providing water quality and flood attenuation services.  
**PERFORMANCE OBJECTIVE:** *Maintain Resilience in the System*
These areas need to be maintained in order to continue to provide these services. |
<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Role &amp; Performance Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>A series of rivers, streams and wetlands that drain off the high lying northern sections in a southerly direction across the study where they feed into the main river that forms the southern boundary to the FAP area. This drainage network runs through the primary settlement areas and connects the high value biodiversity in the north with that in the south, and the river.</td>
<td><strong>PRIMARY ROLE: Ecosystem Function</strong>&lt;br&gt;This system performs important ecosystem function in the forms of water distribution, and water quality and flood attenuation. The water quality ‘treatment’ services are particularly important given the current poor state of water quality and the inability of hard infrastructure to address the situation. The fact that these systems drain through the dense semi-formal settlement and urban industrialised areas mean they play an important supplementary process in addressing water quality.&lt;br&gt;&lt;br&gt;<strong>SECONDARY ROLE: Biodiversity Processes</strong>&lt;br&gt;This network provides important linkages through the landscape, providing linkages through the develop settlement and industrial areas to the open space occurring along the south-eastern boundaries. These corridors provide for movement of wildlife between these areas and other ecological processes.&lt;br&gt;&lt;br&gt;<strong>PERFORMANCE OBJECTIVE: Maintain Resilience in the System</strong>&lt;br&gt;With the increased development pressure and impacts of climate change, it is essential to retain these open areas within the landscape in order that they continue to provide the services and buffer residents and business within and downstream of the area from these impacts.</td>
</tr>
</tbody>
</table>
FIGURE 13: OPEN SPACE SYSTEM CONCEPT
4.2.4 GUIDELINES
The following set of guiding planning principles serves to support achievement of the role and performance objectives of the open space system.

4.2.4.1 Mapping the Open System and Applying Appropriate Buffers
Planning is founded on spatial definition. Defining the extent of the open space system is a primary requirement in building it into the FAP. The existing DMOSS was updated during the status quo assessment, in terms of both the extent and condition/health of the systems. This was achieved via improved mapping supported by ground truthing. This process resulted in the addition of various areas to the initial DMOSS layer.

The second component in developing the OSS is defining appropriate buffers given the role of buffers explained in the text box below.

Buffer widths\(^1\) have been tailored according to various considerations as follows, and integrated as a core layer in structuring the FAP.

i) **Sensitivity** - of the system the buffer aims to protect. The higher the conservation value and health, the greater the sensitivity.

ii) **Risk** – arising from the land-use proposed on or adjacent to a natural system. Risk also relates to uncertainty, or lack of understanding which is the basis for application of the ‘precautionary principle’ in environmental management.

iii) **Thresholds** - as established based on science, and or policy. Examples being the (Wetland Buffer Guideline), and in the case of the latter, the EIA or WULA regulations which assign a buffer of 32metres from watercourses.

<table>
<thead>
<tr>
<th>Environmental element</th>
<th>Buffer width in (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grasslands (Conservation areas)</td>
<td>40 m as a minimum (But significantly greater surrounding the grassland reserve)</td>
</tr>
<tr>
<td>Forests ridges</td>
<td>40 m</td>
</tr>
<tr>
<td>Streams (lower order streams/tributaries to the main rivers referred to below).</td>
<td>30 m</td>
</tr>
<tr>
<td>Main rivers (highest order tributaries to Umlazi River)</td>
<td>50 m (given their greater role in terms of corridor services)</td>
</tr>
<tr>
<td>Wetlands</td>
<td>30 m (as a minimum)</td>
</tr>
<tr>
<td>General Open space</td>
<td>15 m</td>
</tr>
</tbody>
</table>

\(^1\) Precautionary principle: Where information is lacking or little information is available to inform the establishment of a buffer zone, a cautious approach has been applied, one that recognizes the potential shortfalls and inaccuracies of the assessment.
It must be noted that these buffers require refinement at the scale of a specific application, using appropriate policy and guidance. An example, the National Wetland Buffer Guideline must be applied in support of any application for a Water-Use License in terms of the National Water Act, or Environmental Authorisation as required by the NEMA EIA Regulations.

4.2.4.2 Planning Guidance
The following guidance serves to give effect to the open space principles established in section 3.4 and repeated below:

### OPEN SPACE PRINCIPLES

Maintain an integrated open space system that supports a sustainable living and working environment for the inhabitants and downstream users who depend on the services and value generated in this area, and specifically:

- **Protects the high value biodiversity assets** through direct protection and buffering. The recreational and amenity value of these systems need to be optimized to support their maintenance.
- **Securing and buffering the aquatic corridors** traversing the area to maintain ecological and ecosystem functioning.
- **Improving the condition of the open space system** to enhance the functional value provided by these systems and buffer people against risks of climate change.

4.2.4.3 Protection
- Protect the high conservation value grassland and forest systems. All development proposed within these areas and associated buffers must be subjected to review by the EPCPD.
- Optimize the value of the recreational and amenity value of high conservation value systems:
  - The systems should generate income to support their value.
  - Such areas are of value if people are able to access and enjoy them. This requires establishing a carrying/use capacity and developing a management plan to control whatever activities/use is established.
- Create awareness and educate users of the value of these systems.
- Strictly enforce buffers to these areas.

4.2.4.4 Maintain Connectivity
The drainage network comprising wetland and river serves as the primary link through the landscape between terrestrial components in the landscape. The connectivity provided needs to be maintained by applying/considering the following:

- Aquatic systems (wetlands, rivers, streams) are all linked via the drainage network and form one contiguous system. It is therefore essential that the system is linked if it is to function effectively. The value of rehabilitating and protecting wetlands in a landscape is reduced if they are then isolated from the downstream drainage network by development.
- Function needs to be restored to each sub-catchment. This is necessary to ensure integrity of the system across the entire catchment. It means that no single drainage area should be
The Planning Initiative and Team

4.2.4.5 Improved Functionality

The ability of all natural systems to sustain biodiversity and the associated processes that generate at ecosystem services depends on the health of systems. Apart from the grassland reserve, many of the other terrestrial systems and particularly the wetland and river/stream, systems are in poor condition. If these systems are to support built infrastructure in performing flood avoidance, water regulation and supply, erosion control, waste treatment and nutrient cycling and food production, their health needs to be improved.

- The open space system should not be reduced but should be protected and upgraded to provide environmental services to surrounding intensive developments via planning and development application assessments via relevant regulatory processes. The inclusion of conditions to restore natural systems on a site and for a management plan for these areas, should be a condition of approval for new development.
- No net loss of environmentally sensitive areas. In the event there is unavoidable residual impact, offsets must be considered under guidance from EPCPD.
- Improve the management of natural habitats (such as wetlands, grasslands, rivers and forests) to increase these habitats’ ability to supply services such as. This should be achieved through
- Apply sustainable design principles to new infrastructure, such as Sustainable Urban Storm-water Design Principles.
4.2.4.6 Slope
- No development in slopes < 1:3.
- In steeper areas (slopes above 20 degrees) the full extent of systems needs to be zoned as OSS and rehabilitated i.e. loss is not an option.

4.3 Access and Mobility Framework
The Access and Mobility Framework incorporated in the Mpumalanga FAP comprises several designated routes which define the roles that the roads and right of way system need to perform:

- **Mobility**: MR385 performs a critical role as the main mobility corridor within the study area.
- **Access**: There is a need to provide additional access points onto the MR385 to service the development of adjacent lands.

4.3.1 Road Network

4.3.1.1 Existing Road Network
The Mpumalanga study area is located to the south of the N3 Freeway, and is served by Provincial Road MR385 via the N3 Hammarsdale interchange as well as the N3 Cato Ridge interchange. The Provincial Road Network is shown in Figure 14.
The following table identifies the different types of roads forming part of this hierarchy accommodated in the *Access and Mobility Network*. Note should be taken that Provincial District Roads are typically classified as Class 4 Collector Roads, whereas numbered routes are typically mobility routes.

**TABLE 11: ACCESS AND MOBILITY NETWORK**

<table>
<thead>
<tr>
<th>Road</th>
<th>Classification</th>
<th>Basic Function</th>
<th>Intersection Spacing</th>
<th>Direct Access Allowed</th>
<th>Road Reserve Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>N3 Freeway</td>
<td>Class 1 Rural Freeway</td>
<td>Mobility</td>
<td>N/A</td>
<td>No</td>
<td>60-120m</td>
</tr>
<tr>
<td>MR385</td>
<td>Class 3 Minor Arterial</td>
<td>Mobility</td>
<td>600m ±20%</td>
<td>No</td>
<td>25-62m*</td>
</tr>
<tr>
<td>D657</td>
<td>Class 2 Road Reserve Maximum Width</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D816</td>
<td>Van Eck Avenue</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kelly Road</td>
<td>Buckman Boulevard</td>
<td>Class 4 Collector Road</td>
<td>Access</td>
<td>&gt;150m</td>
<td>Yes</td>
</tr>
<tr>
<td>400 122 Street</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kunene Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A3608 Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Class 2 Road Reserve Maximum Width

Note should be taken that the road reserve width requirements of individual road links would be subject to approval by ETA and KZN DoT, the latter until such time as the ownership of MR385 is transferred to ETA. The approved intersection spacing along MR385 would be forthcoming from the ETA geometric design, and any suggestions made with reference thereto should merely be seen as informative at this point in time.

It should also be noted that areas within an existing planning scheme are classified as urban while those outside of a formal planning scheme are considered rural. The road junction spacing requirement for a Class 2 rural road is 800m (+- 15%) and for a Class 3 urban road is 600m (+- 20%), as per the SA RCAM Manual. The lands along MR385 east corridor will accordingly need to be incorporated into an urban planning scheme before the road junction spacing of 600m (+- 20%) for urban areas can be applied to service future urban development on these lands. The requirements of Act 70 of 70 will also need to be complied with in relation to the incorporation of the MR385 east corridor into the planning scheme.
4.3.1.2 Road Network Requirements

a) Trip Generation

The land use bulks forming part of the Mpumalanga Functional Area Plan are shown below.

**TABLE 12: LAND USE BULKS (SOURCE: TPI)**

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Likely Bulks</th>
<th>GLA (sqm)</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial</td>
<td></td>
<td>148 000</td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td></td>
<td>437 700</td>
<td></td>
</tr>
<tr>
<td>Agricultural</td>
<td></td>
<td>313 800</td>
<td></td>
</tr>
<tr>
<td>Industrial</td>
<td></td>
<td>598 600</td>
<td></td>
</tr>
<tr>
<td>Residential</td>
<td></td>
<td></td>
<td>6 111</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>1 498 100</td>
<td>6 111</td>
</tr>
</tbody>
</table>

* Industrial FAR = 0.5

The anticipated trip generation calculation based on the Land Use and Activity Framework and associated potential development yields for the Mpumalanga study area are shown below.

**TABLE 13: TRIP GENERATION (SOURCE: SMEC)**

<table>
<thead>
<tr>
<th>Traffic Analysis Zone</th>
<th>Trip Generation (pcph)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM In</td>
</tr>
<tr>
<td>109</td>
<td>664</td>
</tr>
<tr>
<td>110</td>
<td>902</td>
</tr>
<tr>
<td>111</td>
<td>328</td>
</tr>
<tr>
<td>203</td>
<td>516</td>
</tr>
<tr>
<td>204</td>
<td>62</td>
</tr>
<tr>
<td>209</td>
<td>481</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2 953</td>
</tr>
<tr>
<td></td>
<td>5 438</td>
</tr>
</tbody>
</table>
b) Trip Distribution

Trip distribution is the process where the trips generated at the production and attraction ends are linked to provide actual trips. The trip distribution for the Mpumalanga land use bulks was derived from current traffic patterns as well as known traffic generators. A gravity model was applied to determine the attractiveness of surrounding traffic generators, based on its size and distance from the planned development. Population numbers were obtained from Stats SA, making use of their 2011 Census Data.

**TABLE 14: GRAVITY MODEL Trip DISTRIBUTION (SOURCE: SMEC)**

<table>
<thead>
<tr>
<th>Location</th>
<th>Population (2011)</th>
<th>Distance (km)</th>
<th>Distance (min)</th>
<th>Factor</th>
<th>Percent</th>
<th>New Trips</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uthweba</td>
<td>3351</td>
<td>18</td>
<td>23</td>
<td>10</td>
<td>0.5</td>
<td>13</td>
<td>NW</td>
</tr>
<tr>
<td>Ntukuso</td>
<td>3446</td>
<td>21</td>
<td>26</td>
<td>8</td>
<td>0.3</td>
<td>10</td>
<td>NW</td>
</tr>
<tr>
<td>Msunduzi SP</td>
<td>6058</td>
<td>22</td>
<td>25</td>
<td>13</td>
<td>0.6</td>
<td>16</td>
<td>NE</td>
</tr>
<tr>
<td>Inchanga</td>
<td>1008</td>
<td>14</td>
<td>23</td>
<td>5</td>
<td>0.2</td>
<td>7</td>
<td>NE</td>
</tr>
<tr>
<td>Ximba</td>
<td>1587</td>
<td>22</td>
<td>28</td>
<td>3</td>
<td>0.1</td>
<td>4</td>
<td>NE</td>
</tr>
<tr>
<td>Mpumalanga Town</td>
<td>62406</td>
<td>8</td>
<td>10</td>
<td>975</td>
<td>42.9</td>
<td>1 266</td>
<td>S</td>
</tr>
<tr>
<td>Cato Ridge</td>
<td>3874</td>
<td>14</td>
<td>14</td>
<td>20</td>
<td>0.9</td>
<td>26</td>
<td>NW</td>
</tr>
<tr>
<td>Botha’s Hill</td>
<td>9398</td>
<td>20</td>
<td>25</td>
<td>23</td>
<td>1.0</td>
<td>31</td>
<td>NE</td>
</tr>
<tr>
<td>Pinetown</td>
<td>144026</td>
<td>31</td>
<td>26</td>
<td>150</td>
<td>6.6</td>
<td>195</td>
<td>NE</td>
</tr>
<tr>
<td>Pietermaritzburg</td>
<td>223448</td>
<td>38</td>
<td>32</td>
<td>155</td>
<td>6.8</td>
<td>201</td>
<td>W</td>
</tr>
<tr>
<td>Imbali</td>
<td>30157</td>
<td>41</td>
<td>35</td>
<td>18</td>
<td>0.8</td>
<td>23</td>
<td>W</td>
</tr>
<tr>
<td>Northdale</td>
<td>54822</td>
<td>42</td>
<td>36</td>
<td>31</td>
<td>1.4</td>
<td>40</td>
<td>W</td>
</tr>
<tr>
<td>Durban</td>
<td>595061</td>
<td>48</td>
<td>38</td>
<td>258</td>
<td>11.4</td>
<td>335</td>
<td>E</td>
</tr>
<tr>
<td>Queensburgh</td>
<td>54846</td>
<td>39</td>
<td>35</td>
<td>36</td>
<td>1.6</td>
<td>47</td>
<td>E</td>
</tr>
<tr>
<td>Newlands</td>
<td>113193</td>
<td>51</td>
<td>42</td>
<td>44</td>
<td>1.9</td>
<td>57</td>
<td>E</td>
</tr>
<tr>
<td>Edendale</td>
<td>140891</td>
<td>46</td>
<td>41</td>
<td>67</td>
<td>2.9</td>
<td>86</td>
<td>W</td>
</tr>
<tr>
<td>Chatsworth</td>
<td>196580</td>
<td>45</td>
<td>42</td>
<td>97</td>
<td>4.3</td>
<td>126</td>
<td>E</td>
</tr>
<tr>
<td>Ntuzuma</td>
<td>125394</td>
<td>44</td>
<td>48</td>
<td>65</td>
<td>2.8</td>
<td>84</td>
<td>E</td>
</tr>
<tr>
<td>Richmond</td>
<td>65793</td>
<td>56</td>
<td>46</td>
<td>21</td>
<td>0.9</td>
<td>27</td>
<td>E</td>
</tr>
<tr>
<td>Inanda</td>
<td>158619</td>
<td>62</td>
<td>50</td>
<td>41</td>
<td>1.8</td>
<td>54</td>
<td>W</td>
</tr>
<tr>
<td>KwaMashu</td>
<td>175663</td>
<td>45</td>
<td>46</td>
<td>87</td>
<td>3.8</td>
<td>113</td>
<td>E</td>
</tr>
<tr>
<td>Phoenix</td>
<td>176989</td>
<td>65</td>
<td>50</td>
<td>42</td>
<td>1.8</td>
<td>54</td>
<td>E</td>
</tr>
<tr>
<td>Umlazi</td>
<td>404811</td>
<td>62</td>
<td>51</td>
<td>105</td>
<td>4.6</td>
<td>137</td>
<td>E</td>
</tr>
</tbody>
</table>

The trip distribution of development trips is summarised below.

**TABLE 15: SUMMARISED TRIP DISTRIBUTION (SOURCE: SMEC)**

<table>
<thead>
<tr>
<th>Direction</th>
<th>Percentage</th>
<th>New Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>NE</td>
<td>8.5</td>
<td>252</td>
</tr>
<tr>
<td>NW</td>
<td>1.7</td>
<td>49</td>
</tr>
<tr>
<td>E</td>
<td>33.2</td>
<td>980</td>
</tr>
</tbody>
</table>
PREPARATION OF THE MPUMALANGA NORTHERN FUNCTIONAL AREA PLAN AND DRAFT SCHEME, INCLUDING THE MR385 EAST CORRIDOR PRECINCT PLAN: WARDS 4, 5, 7 AND 91

<table>
<thead>
<tr>
<th>Direction</th>
<th>Percentage</th>
<th>New Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>42.9</td>
<td>1266</td>
</tr>
<tr>
<td>W</td>
<td>13.7</td>
<td>405</td>
</tr>
</tbody>
</table>

The trip matrices associated with the SATURN model were developed in passenger car units, thus mode split does not apply. Trip reduction factors were, however, calculated to determine the anticipated reduction in vehicular traffic to account for the use of rail-based and road-based public transport.

Taking into consideration the type, extent and combination of land use parcels forming part of the development, the socio-demographic composition of the local labour force, as well as the location of existing and planned public transport facilities, it was considered reasonable to apply trip reduction factors to account for the site-specific conditions, as shown below.

**TABLE 16: TRIP REDUCTION FACTORS (SOURCE: SMEC)**

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Mixed Use</th>
<th>Vehicle Ownership</th>
<th>Transit Corridors</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office</td>
<td>20%</td>
<td>30%</td>
<td>15%</td>
<td>0.48</td>
</tr>
<tr>
<td>Retail</td>
<td>10%</td>
<td>60%</td>
<td>15%</td>
<td>0.31</td>
</tr>
<tr>
<td>Industrial</td>
<td>5%</td>
<td>30%</td>
<td>15%</td>
<td>0.57</td>
</tr>
<tr>
<td>Warehousing</td>
<td>5%</td>
<td>30%</td>
<td>15%</td>
<td>0.57</td>
</tr>
<tr>
<td>Residential</td>
<td>10%</td>
<td>70%</td>
<td>15%</td>
<td>0.23</td>
</tr>
</tbody>
</table>

The trip generation calculations provided previously, already account for the trip reduction factors set out above.

d) Traffic Assignment

The assignment of trips to the road network is based on Stochastic User Equilibrium assignment, which assumes that traffic arranges itself on congested networks such that the routes chosen by individual drivers are those with the minimum perceived cost; routes with perceived costs in excess of the minima are not used. It is therefore more likely that “perceived costs” would influence route choice as opposed to pure generalized costs as used in an equilibrium assignment algorithm. The estimated auto O-D trip matrix was assigned on the established road network to derive link volumes and intersection turning volumes.

e) Forecasting

Following discussions with SANRAL, a compound annual growth rate of 2.46% was applied to the external zones of the SATURN model representing the N3 Freeway. In order to forecast Internal-
External and External-Internal trips, the trip generation potential of planned developments within the study area were assigned onto the modelled road network. This allowed for the addition of development-specific traffic flows to the respective trip matrices, in addition to the aforementioned growth rates.

Taking into consideration the strategic nature of the envisaged road improvements, as well as the planned build-out of Mpumalanga FAP, a 20 year planning scenarios formed part of the assignment.

A graphical representation of the Traffic Analysis Zones with relation to the surrounding road network is provided below.

FIGURE 15: MODELLED ROAD NETWORK (SOURCE: SMEC)
FIGURE 16: 2037 LINK FLOWS (SOURCE: SMEC)

FIGURE 17: ROAD LINK V/C RATIO (SOURCE: SMEC)
The Mpumalanga FAP provides for new road linkages along MR385 to service future development west of Hammarsdale and Keystone Park. This includes a new road link servicing the industrial lands west of Hammarsdale, and two new road links servicing the proposed mixed use node west of Keystone Park as well as the future residential development area west of this mixed use node.

With reference to the proposed mixed use node west of Keystone Park, the a level traffic assessment undertaken for the project has confirmed that the estimated development bulks within the area could be accommodated through the provision of one signalised intersection at the northern entrance and one left-in, left-out intersection at the southern entrance thereof. Nonetheless, in order to reduce the turning demand and associated turning lanes required, at the northern entrance, and to provide a higher level of access to the proposed mixed use node, it would be advantageous for both the intersections to be signalised intersections instead. It is recommend that a project be undertaken to assess the feasibility, alignment, safety and capacity of the proposed road junctions along the MR385 east corridor. In the event that this assessment indicates that any changes are needed to the road junctions and layout and/or that this requires changes to the proposed land use bulks, this will need to be addressed as part of a review of the FAP.

The Saturn model makes provision for a new road link to be constructed parallel and to the west of the N3 Freeway, from MR385 to the planned Cato Ridge Logistics Hub interchange. This road link is imperative to provide road capacity parallel to the N3 Freeway, since it is not feasible to widen Thousand Hills Street from the N3 Hammarsdale interchange to the R102 due to topography.

It is concluded that the proposed regional road network would be sufficient to accommodate the anticipated ultimate 2037 development trips at an acceptable Level of Service. Note should be taken that the Saturn model only contained one access serving to Mpumalanga Town, and therefore shows it to be strained by 2037.

The lane configuration of the proposed road network is shown below.
4.3.1.3 Road Reserve Encroachments

Within Mpumalanga there are a few instances of encroachment into the road reserve. This is especially problematic along the MR385 as this is a mobility route with relatively high vehicular speeds. Many of these encroachments are long-standing, however they do present safety concerns. See photographs below of encroachment into the MR385.

In terms of addressing the road reserve encroachments within the study area, the following must be considered:

- Strict enforcement to ensure no future development within the road reserve. It is recommended that eThekwini Municipality adopt a policy on how to address road reserve
PREPARATION OF THE MPUMALANGA NORTHERN FUNCTIONAL AREA PLAN AND DRAFT SCHEME, INCLUDING THE MR385 EAST CORRIDOR PRECINCT PLAN: WARDS 4, 5, 7 AND 91

encroachments of this nature. This is an issue that is not only found within Mpumalanga, and whilst this is a serious problem from a safety perspective, there are also social and legal implications to addressing encroachments.

- Buildings encroaching into the road reserve should be relocated as a matter of urgency.
- In order to prevent jaywalking, it might be required to erect hard barriers along MR385 in order to funnel pedestrians toward safe crossing locations, be it signalised intersections or pedestrian bridges.
- The provision of pedestrian sidewalks along the outer edges of the MR385 road reserve might assist in creating a defined road reserve, thereby limiting the potential for future encroachments into the road reserve.

4.3.2 PUBLIC TRANSPORT NETWORK

4.3.2.1 RAIL Network

The sub-report on Public Transport and Passenger Rail (July 2017), mentioned the consequences for the desired (re-)location of a railway station near the new Town Centre: “Technically, this is difficult, as the rail line has a steep geometry, while a station requires a flat rail section”. This sub-report expands further on these consequences.

Current Rail Alignment

There are 3 railway stations in the Mpumalanga study area: Georgedale, KwaTandaza and Hammersdale, with Cliffdale just outside the study area:

- Georgedale is situated at the edge of low-income residential area, and rural agricultural land north of the station;
- KwaTandaza is situated centrally within the same low-income residential area;
- Hammersdal is situated next to an industrial node north of the station, with low-income residential south and west of the station.

In order to accommodate the new Town Centre, at the southern section of the MR385, it was suggested to move the existing KwaTandaza Station, or develop a new station along the rail line. Technically, this is difficult, as the rail line has a steep geometry, while a station requires a flat rail section.

Station spacing

Ideally passenger railway stations should be more than 2 or 3 km apart, in order to increase train speeds between the stations and make the stations accessible from the surrounding areas without overlapping influence areas. Developing a new station at the new Town Centre, would be 1 km east of current KwaTandaza station (which is too close), and 2½ km from Hammersdale (acceptable).

Opening an additional station would increase train times by 1½ minute per trip. The current rip time is already long (2 hours between Cato Ridge and Durban) and slow (35 km/h). For that reason it is recommended not to propose a ‘new’ station, but to suggest to ‘move’ the existing KwaTandaza station. However, the current KwaTandaza station is centrally located in its influence area. Moving this station would reduce its accessibility for the Georgedale area west of the station.
Steep alignment

It should be noted that, because of the topography in the Outer West region, the current rail alignment is steep. Transnet, for their General Freight operations, requires a maximum gradient of less than 1½ % or 1 : 60. Ideally, as Transnet also operates some heavy bulk trains (e.g. coal) on this line, the gradient should preferably be at a max of 1%, or 1 : 100. Especially in the section near the new Town Centre, the max gradient of 1½ / 1 : 60 % is used, with some additional cuts and embankment to accommodate the topography (see fig 1 below).

![Current Rail Alignment Between Georgedale and Hammarsdale](image)

**FIGURE 19: CURRENT RAIL ALIGNMENT BETWEEN GEORGEDALE AND HAMMARDALE**

Developing a new railway station, would require a section of >300m being flat 0%, to accommodate stopping trains without the risk of them running away while stopping. Implementing such a flat section in the current alignment would result in a long re-alignment, with other sections being too steep with > 2% to compensate for the re-alignment height differences, which is unacceptable.

It could, however, be negotiated with PRASA (the passenger rail operator) and Transnet (the infrastructure provider) to accept this station being in a steep gradient. This would, however, have serious safety and operation consequences. Alternatively, with closing of the current KwaTandaza station, the re-alignment could take place including the current KwaTandaza station, thereby keeping the total rail alignment at a max gradient of 1½ %. This would result in a re-alignment of 1½ km, lowering the existing alignment by some 5m (see fig 2 below).

This can only be constructed as a new alignment next to the current alignment. On first sight, there seems to be space for this, in between the current rail line and the MR385, although 2 road-over-rail crossing should be adapted as well. This re-alignment would, however, come at a great cost.
The rail infrastructure is owned by Transnet. They would need to be compensated for this realignment, as there is no benefit for them. Transnet would be very reluctant to facilitate this, as reconstructing the rail alignment would hinder their current operations.

Planned Medium/Long-term improvements of Rail infra

In the long-term, Transnet’s capacity for freight rail is limited, and a new freight corridor is suggested between (south of) Durban Port and the Cato Ridge area, with gentler curves and gradients. This infrastructure is only planned for after 2030. The existing rail corridor would then function as a backup route for freight services, and additional container and cargo shuttle trains between the Port and Cato Ridge.

After realising this new freight corridor, it is assumed that the existing rail corridor would come available for passenger service mostly. This would allow for PRASA’s Modernisation program, and ideally, the ownership of the line should then be transferred from Transnet to PRASA. This will be a lengthy and long term process. As the corridor would be passenger rail operations mostly, the maximum allowable gradient can be increased, and opening of a new station would require less of realignment.

4.3.2.2 Public Transport accessibility of the New Town Centre

As opening of a new railway station at the new Town Centre is problematic and costly, alternatively the new Town Centre can be accessed by road based Public Transport (PT).

To accommodate the new Town Centre, it is suggested to develop a new PT facility, with stopping facilities for all PT routes passing the southern section of the MR385, as well as being a future IRPTN (BRT) station. It could also be suggested to extend the IRPTN (BRT) route beyond the New Town Centre towards Cato Ridge. With this, there is a better connectivity between the existing railway stations and the new Town Centre. The current KwaTandaza station is situated 1 km from the new Town Centre, and pedestrian routes between both places could be optimised.

4.3.2.3 Bus and Taxi Network

According to the Current Public Transport Record (source: CPT, 2012), there is one main public transport facility in Mpumalanga: the Mpumalanga / Hammarsdale Rank (close to the Hammarsdale Railway Station), south of the industrial area. There are plans in place to improve passenger and informal trader facilities at this rank.

There are multiple smaller PT facilities in and just outside the study area; in the CPT called ‘rank’, but not much more than an on-street space as end-points of bus and minibus-taxi services, without any
additional passenger facilities. According to the CPTR there are bus routes, between Mpumalanga (and surrounding residential areas) and Pinetown.

Minibus-taxis offer services between Mpumalanga and:

- Cato Ridge in the northwest (also by rail), via the western section of the MR385;
- Inchanga, Hillcrest and Pinetown in the northeast, via the eastern section of the MR385;
- Surrounding residential areas in the south.

Each of these routes offers a decent PT service in peak hours, but an infrequent service off-peak. Given the current operations of buses and minibus-taxis, there is little opportunity to improve their service.

Although most areas fall outside of a 500 to 1000m radius from the nearest public transport facility, the PT services do pick-up and drop-off passengers along their route, and most of the study area is within walking distance of a public transport route, and therefore most of the study area is covered by PT services. The area between the Mpumalanga residential development and the N3 is not covered by PT, but there are hardly any activities, apart from some farms.

Currently there are urban and industrial developments, recently implemented or planned, along the southern and eastern sections of the MR385. These are within walking distance of the current PT routes, and additional pedestrian links are recommended in these development plans. It is anticipated that the current PT operators will increase their service frequency to accommodate the passengers to/from these developments. The relevant Transport Authority should support this service increase with sufficient additional Operating Licenses.

To accommodate the new Town Centre, at the southern section of the MR385, it is suggested to develop a new PT facility, with stopping facilities for all PT routes passing the southern section of the MR385, as well as being a future IRPTN (BRT) station. The NMT facilities towards the railway stations and PT stops could be improved. This will be further explored in the Traffic report.

4.3.3 NON-MOTORISED TRANSPORT

4.3.3.1 NMT NETWORK

Pedestrian linkages and infrastructure in the study area are limited and there are issues of pedestrian safety, particularly along MR385 between Hammarsdale and Mpumalanga. Local non-motorised paths are required in order to serve both walking and cycling, thereby linking public transport nodes with everyday connectivity needs and recreational opportunities. Cycling and walking opportunities need to be built into the right of way system where appropriate in support of public transport accessibility.

Currently there are urban and industrial developments, recently implemented or planned, along the southern and eastern sections of the MR385. These are within walking distance of the current PT routes, and additional pedestrian links are recommended in these development plans.

The Mpumalanga Local Area Plan defined the following NMT projects:
• Improve pedestrian linkages between Hammarsdale and Mpumalanga, including sidewalks along the eastern side of MR385 between Kelly Road and the Hammarsdale rail station and between Hammarsdale/rail station and Mpumalanga, including a pedestrian bridge over the Sterkspruit River; and
• Develop a road and pedestrian linkage from Hammers Estate to MR385 to connect the local community to Hammarsdale and to unlock industrial lands west of MR385.

The Mpumalanga Town Centre Precinct Plan identified the following NMT interventions:

• Establish a prioritised pedestrian network connecting the interchange zone and town centre, the main development axes and local urban nodes, existing and proposed PT facilities and the settlement areas to the north and south of the town centre;
• The prioritised pedestrian network should be supported by local pedestrian linkages and paths within and connecting neighbourhoods and local facilities;
• Develop cycling linkages connecting the town centre and the main PT facilities along MR385, Shezi Main Road and the Kunene Road north-south linkage and connecting to surrounding local nodes and residential areas; and
• A cycle path will be required along MR385 and either cycle paths or lanes could be considered along the other routes.

4.3.3.2 COMPLETE STREETS
In the eThekwini Complete Streets Guide, compiled by SMEC South Africa, Complete Streets is defined as roads designed to accommodate diverse modes, users and activities including walking, cycling, public transport, automobiles, nearby businesses and residents. Such street design helps create more multi-modal transport systems and more liveable communities.

The general principles associated with complete streets are as follows:

• Balance the needs of all users of the public right-of-way by providing safe and convenient travel and access for cyclists, public transport users and operators, heavy vehicle and car drivers, and people of all ages and abilities;
• Contribute to liveable communities by providing public open space that integrates amenities including street trees and landscaping, street and sidewalk lighting, public transport facilities, street furniture, water features, and public art work;
• Promote neighbourhood vitality through infrastructural improvements that attract private investment and encourage pedestrian activity;
• Promote active living by providing safe and attractive conditions for walking and biking.
• Provide safe and comfortable access for persons with disabilities;
• Improve local air quality by reducing car use (emissions) and incorporating trees and vegetation.
• Improve water quality through the integration of low impact development techniques that both reduce storm water runoff and remove pollutants;
• Promote the use of public transport modes by improving the efficiency of public transport systems and creating safe, attractive walking environments;
Universal access is a term which describes the design of road infrastructure to accommodate the most vulnerable road users, being pedestrians, cyclists, children, the elderly and infirm. Nowadays it has become commonplace to incorporate Universal Access design principles into any road infrastructure design project. The extent of the design principles incorporated is dependent on the socio-economic characteristics of the community in which the road project resides as well as budgetary constraints.

The intention of this chapter is to set out a minimum number of Universal Access design principles which should be incorporated in any road design project, with a focus on road safety and equity for all road users. It is our submission that the following Universal Access design principles should be considered for implementation:

4.3.3.3 PEDESTRIAN WALKWAYS
All transport trips start and end with pedestrian movements in one form or another. It is thus imperative that the most basic form of transport be provided for. Pedestrian walkways need to be continuous, linking origins and destinations. It should be comfortable, providing smooth surfaces to walk on, free from obstructions or water ponding. The pedestrian infrastructure should be clear, preferably with street lighting and signage. It should also provide safe crossings for pedestrians, providing priority above vehicular traffic.
4.3.3.4 Kerb Ramps
Kerb ramps should be provided at all intersections, providing an opportunity for the disabled to cross the road more easily, especially wheelchair users, people pushing prams, pushchairs, etc. It is good practice to align the kerb ramps with the pedestrian crossings and walkways, along the most direct path of travel, thus promoting use thereof. It would be advantageous to at least provide blister blocks along the kerb ramp drop-down, creating a surface with increased traction as well as guiding the visually impaired.

Associated with the use of kerb ramps is the provision of refuge islands as well as accommodating pedestrians across median islands.

4.3.4 Freight Network
The N3 corridor has been identified in national, provincial and municipal planning, transportation and economic policy as a major strategic initiative in terms of regional mobility, freight movement and economic development, including major infrastructure, logistics and industrial development. For example, the SIP2 (Durban-Free State-Gauteng Logistics and Industrial Corridor) project aims to strengthen the logistics and transport corridor between South Africa’s main industrial hubs, to improve access to Durban’s export and import facilities and to integrate surrounding industrial/logistic activities and rural production centres with the corridor. Local municipalities along the corridor are also responding by revising their land use planning and transportation planning to capitalise on the opportunities created by this corridor.

4.3.5 Performance
The Movement Network should meet a number of performance criteria:

4.3.5.1 Operational Level of Service
The road infrastructure and transit services provided would need to be planned in accordance with the roll-out of the land use plan, thereby ensuring that the necessary transport capacity is available to serve the anticipated travel demand at any point in time.

4.3.5.2 Road Safety
It is imperative to ensure the suitable separation of pedestrians and motor vehicles, especially when significant speed differentials apply. Pedestrians should for instance be separated from vehicles travelling along a mobility corridor, be it laterally, vertically or by means of crash barriers.

4.3.5.3 A Functional and Legible Hierarchy
The hierarchy of roads should balance each other in terms of function, thereby creating a high level of user choice, both in terms of modality and paths taken.

A range of road typologies with roads playing diverse roles in response to scale and context. Development intensity within the Functional Area is directly tied into the road hierarchy and network of roads.
A clearly legible hierarchy with roads designed to serve different functions, including prioritised routes for dedicated public transport and freight routes to facilitate quick access to regional mobility routes and to keep freight and heavy traffic out of local residential areas and urban cores.

A road hierarchy that facilitates the expansion of an integrated public transport system that operates at both the metropolitan-wide and local scales. Different roads in the system need to complement each other in terms of function, so that limited access mobility roads are complimented by roads designed for slower speeds and with greater land use diversity, offering access to adjacent land uses.

Mobility roads need to be complimented with local access roads, operating adjacent and sometimes even in parallel. At the scale of the FAP, the mobility roads are conceptual and detailed design is required at the appropriate time.

4.3.5.4 AN INTEGRATED SYSTEM
The network of mobility and access routes should maximise choice of movement across the system by creating well defined routes to allow for efficient access from local roads to mobility arterials via collector roads.

An Integrated public transport system which maximises on linkages between routes and different transport modalities.

A right of way network that functions as part of a public space network and integrates with the open space system. Roads (and especially local roads) and public transport nodes, need to be seen as part of the public space network and should be designed accordingly. In appropriate places the right of way should allow for non-motorised transport (walking, cycling and other), as well as other activities such as markets, play, pedestrian staging and so on.

4.3.6 FUTURE PLANNING AND PHASING- TRANSPORT
Phasing of the road network would be dependent on the build-out of individual land parcels. The development of land parcels in close proximity to the MR385 would limit road infrastructure costs in the short term. It should however be ensured that infrastructure roll-out ties in with the ultimate transport master plan.
FIGURE 21: ACCESS AND MOBILITY FRAMEWORK
4.4 LAND USE AND ACTIVITY FRAMEWORK

4.4.1 INTRODUCTION

The Mpumalanga FAP attempts to translate the intentions established through the Mpumalanga Local Area Plan (MLAP) while responding to a higher detail of input derived from the identification of opportunities and constraints related to the unique characteristics of the site and site context. The spatial frameworks generated here aim, at a sufficient level of detail, to guide planning and investment decisions while at the same time being flexible enough to respond to market shifts.

A Functional Area plan is intended to:

- Be a conceptual layout plan to guide the implementation of municipal infrastructure projects and the planning of future housing projects and the assessment of development applications by the private sector i.e. it is not a master plan or a definitive plan.
- Focus on the basic skeleton of development – potential roads and open space and possible land uses.
- Estimate potential development floor areas and number of housing units and associated social facilities and bulk infrastructure required (later phase of work).
- Suggest phasing of infrastructure provision and land release (later phase of work).
- Focus on performance criteria i.e. if a plan is submitted that does not look exactly like the FAP it may still be acceptable if it meets the agreed performance criteria.

A primary objective of the FAP is to unlock land use potential on land located that is on the periphery of eThekwini, and to ensure that proposals align appropriately Mpumalanga LAP an appropriate mix of land uses should be accompanied by a set of strategic spatial structuring tools and associated development controls to promote the development of an efficient and sustainable transit oriented development and urban form. The sections that follow reflect the land use elements of the Mpumalanga Local Area Plan as well as the implications from a residential yields and bulk floor area perspective.

4.4.2 CURRENT LAND USES

The following figure reflects the broad land uses within the study area based on the land use survey undertaken on 9th of June 2017.

The following is a summary of existing land uses within the study area precincts:

Precinct B1 (North East Precinct –1 195 Ha):

This precinct consists of commercial agricultural activity (North West of the Precinct), environmentally sensitive areas under MOSS (South West of the Precinct), and the new Keystone development (light industrial – to the West of the Precinct).

This Precinct also provides the main access point into the study area (MR385 and N3 intersection) and a key intersection point giving the study area access to the rest of eThekwini Municipality.

Precinct B2 (North West Precinct –1 119 Ha):
The precinct consists of mixture of uses characterised by environmental constraints – streams and erodible areas, scattered farm structures, an established and productive commercial agricultural area, and a growing peri-urban residential area.

**Precinct A3 (West Precinct – 1 143 Ha):**

The precinct consists of predominantly peri-urban/rural residential settlements with a limited number of social facilities. There are also environmental constraints within the area.

**Precinct A1 (Central East Precinct -1 267 Ha):**

The Precinct consists of a mix of commercial, industrial, community, residential and open space uses including the key Hammarsdale Industrial Node and Mpumalanga Town Centre Precinct.

**FIGURE 22: CURRENT LAND USE**

**4.4.3 FUTURE LAND USES**

**4.4.3.1 INTRODUCTION**

The future (proposed) land uses within the study area respond to the Mpumalanga Local Area Plan, although amendments have been made through a workshop engagement with the client team, an initial stakeholder needs meeting, as well as ground truthing of various sites.

Figure 23 reflects the proposed land uses for the study area.
FIGURE 23: FUTURE LAND USE PLAN
4.4.3.2 Future Land Uses Described per Precinct

**Precinct B1 (North East Precinct –1 195 Ha):**

Precinct B1 will be a mixed-use precinct with a range of existing and proposed land uses. The existing land uses include; Logistics; Existing Road; and Environment Management / Service (approximately 65% already developed).

The proposed land uses comprise of residential uses (low and medium intensity), mixed use (low and medium impact) and agriculture (medium impact). It is stressed that the intensity of the land uses will be dependent on the ability to obtain sufficient access into the area. This is dealt with further in section 4.8.

There exists within the precinct key natural assets including grasslands and scarp forests forming part of the environmental management/services which can be utilised for recreational purposes. Major infrastructural elements within the precinct include the MR385 linking to the N3 corridor. There is also a proposed road linkage in this precinct connecting the MR385 to the proposed land uses and Cato Ridge (see full Functional Area Plan – Figure 31)

**Precinct B2 (North West Precinct –1 119 Ha):**

Precinct B2 can be defined as largely pristine grassland, providing important environmental services for the area. The proposed land uses mainly include low impact residential land use; low and high impact agriculture; mixed use development; and light industry. The residential component depicts potentially a low density eco estate, low impact residential, to the north of the study area maximizing the natural beauty that surrounds this parcel of land.

Mixed-use development is proposed along the MR385 corridor to cater for the existing surrounding transitional settlements. The MR385 corridor cuts through the middle of the precinct providing access to the proposed land uses. The proposed road linkage in this precinct will serve mainly the low impact residential block to the north east of the site.

The future of the precinct is one that can be described as mixed-use development, particularly along the MR385 corridor and the proposed road linkage to the north east of the site. The precinct will remain predominantly as environmental management/services with existing open spaces as potential recreational spaces to serve the surrounding transitional settlements.

**Precinct A3 (West Precinct –1 143 Ha):**

Precinct A3 is located to the south west of the study area and consists primarily of residential development and environmental management areas. The transitional settlements and rural/tradition settlements within the study area are located in this precinct and constitute approximately 50% of the precinct area. The MR385 runs in the middle of the precinct providing a linkage between rural and transitional settlements and the surrounding precincts as well as the N3 corridor.

The identified emerging activity spines in the study area are both located in Precinct A3 which directly give access to the rural and transitional settlements (see full Functional Area Plan)
Existing grasslands within the precinct also create an opportunity for a sustainable open space system. Furthermore, there are existing streams/rivers in the precinct that should continue to flow and development around these is to be restrained to ensure the sustainability of these environmental assets.

The transitional and rural settlements indicate a need for upgrade, particularly the informal settlements. The future of this precinct is one that can be noted as a residential/urban service precinct, that will cater for the mixed-use core developments in the Mpumalanga Town Centre Precinct.

Precinct A1 (Central East Precinct – 1 267 Ha):

Precinct A1 is predominantly industrial with the existing Hammarsdale industrial hub located along the MR385 corridor. There are areas of environmental management/services, particularly along the existing aquatic system. Grasslands in the Town center precinct also present an opportunity for recreational open spaces to cater for the surrounding residential settlements and future high and medium impact residential area.

The future of the precinct is one that includes the expansion of the Industrial hub to the west of the MR385 and the development of the Mpumalanga Town Centre Precinct which includes a mixture of land uses – mixed use core, residential low and medium impact, and civic and social. Light industry (with limited impact on the waste water treatment plant) is also proposed to the south of the study area, previously used by Rainbow Chickens.

4.4.4 Major Differences to the Mpumalanga LAP

The following are the variations from the Mpumalanga LAP (MLAP) as reflected in the FAP. These variations result from a more detailed analysis of trends, changing circumstances (such as Rainbow Chickens disinvesting in the area) as well as ground truthing of certain uses.

1. Agricultural land located North West Corner of the study area is now reflected as Industrial. Through the Cato Ridge LAP, as well as engagement with the community and key Municipal officials, this parcel of land has been identified as being better used for industrial land. However, this will likely need to be in the long term due to costs of servicing.

2. Agricultural and General Industrial land to the South East of Hammarsdale now reflected as industrial. The rainbow chicken farms were originally used as agri industry (which allows industrial use), however it is felt that a clearer industrial intention is required to be reflected in the plan. It is envisioned that these parcels should be developed as low impact industrial (e.g. mini factories) or industrial-business parks. This also helps take some of the pressure off of the open space systems.

3. Rural/ Traditional Settlement at Bux Farm now shown as Extractive Industry. A detailed analysis of the site shows that this is not suitable for residential and forms a functional part of the quarry.

4. Mixed Use node on MR385 North of Hammarsdale amended to have more environmental space. A detailed assessment of these parcels reflects a need to alter the size of the mixed-use node due to powerline servitudes.

5. Due to the results of detailed studies, the Cemetery as originally shown in the LAP has been removed. Detailed studies have shown that the cemetery site is unsuitable for such as use
PREPARATION OF THE MPUMALANGA NORTHERN FUNCTIONAL AREA PLAN AND DRAFT SCHEME, INCLUDING THE MR385 EAST CORRIDOR PRECINCT PLAN: WARDS 4, 5, 7 AND 91 (and has in fact been purchased by EPCPD), and as such this is now shown as predominantly environmental services as well as a large portion of low impact agriculture (which acts as a buffer between development and open space). There is also a small residential component. Detailed studies are required to determine an appropriate place for a regional cemetery, however, this will be difficult to locate within this study area.

6- **An Amended Open Space Network**- Detailed studies as well as engagements with EPCPD have resulted in an amended Open Space Network.

7- **An Amended Movement Network**- Through the amendments to the Land Uses, as well as through further detailed analysis and the latest information from eThekwini, the Movement Network has been amended to reflect the latest thinking. This is described further in 4.3.

### 4.4.5 Description of Proposed Land Uses

In order to ensure alignment with the Mpumalanga LAP, the FAP has used the same broad land uses. It is noted that whilst the MLAP does provide the overall framework for this LAP, there are a few deviations from the LAP which are described in section 4.4.5. The table that follows summarises the broad land uses as reflected in the LAP. These reflect both existing and proposed broad uses. The table further describes the land uses both in terms of the overall intent of the land use, as well as the maximum development bulks as well as the assumptions applied to these which have resulted in the development yields.

It is stressed that these figures are **ultimate yields**. Considering the growth projections reflected in section 3.5, these figures are likely to only occur well outside of the 2035 timeframe.
### TABLE 17: DESCRIPTION OF LAND USES

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Gross Area (ha)</th>
<th>% of Study Area</th>
<th>Intention</th>
<th>Maximum FAR</th>
<th>Dwelling Units Per Hectare</th>
<th>Notes regarding calculating development yields</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture High Impact</td>
<td>98.3</td>
<td>3</td>
<td>This refers to higher intensity agricultural activities which include intensive and agri-business uses. The built form within these should be along main routes.</td>
<td>0.35</td>
<td>NA</td>
<td>Residential is permitted for residents of farm. For purposes of calculating development impact this hasn’t been included.</td>
</tr>
<tr>
<td>Agriculture Medium Impact</td>
<td>78.4</td>
<td>2</td>
<td>Low to medium intensity agricultural activities – expansive agricultural uses such as cultivation and crop production, intensive agricultural uses and related activities, small holdings and ancillary activities. Built form to consolidate near areas of common boundary at interface with key routes.</td>
<td>0.2</td>
<td>NA</td>
<td>Residential is permitted for residents of farm. For purposes of calculating development impact this hasn’t been included.</td>
</tr>
<tr>
<td>Agriculture Low Impact</td>
<td>112.5</td>
<td>3</td>
<td>Low intensity and/or sustainable agricultural uses, including “traditional” and/or subsistence agricultural practices on communal land or between urban and environmental areas.</td>
<td>0</td>
<td>NA</td>
<td>Residential is permitted for residents of farm. For purposes of calculating development impact this hasn’t been included.</td>
</tr>
<tr>
<td>Civic and social</td>
<td>52.8</td>
<td>1</td>
<td>Full range of public and private health and welfare facilities, municipal and government administration and services, institutions and places of worship.</td>
<td>0.6</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Land Use</td>
<td>Gross Area (ha)</td>
<td>% of Study Area</td>
<td>Intention</td>
<td>Maximum FAR</td>
<td>Dwelling Units Per Hectare</td>
<td>Notes regarding calculating yields</td>
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<tr>
<td><strong>Education</strong></td>
<td>25.9</td>
<td>1</td>
<td>A full range of educational facilities including, infants, pre-</td>
<td>0.4</td>
<td>NA</td>
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<td></td>
<td></td>
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<td>primary, primary, secondary, tertiary and adult education and</td>
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<td>training with associated buildings and recreational facilities.</td>
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<tr>
<td><strong>Environmental Management/Services</strong></td>
<td>1194.1</td>
<td>32</td>
<td>Establishment of a functional open space system that enables the</td>
<td>NA</td>
<td>NA</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>ecosystems contained to operate effectively and in a sustainable</td>
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<td></td>
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<td>manner in order to deliver services that benefit the local and</td>
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<td></td>
<td></td>
<td></td>
<td>broader community. Limited development. Need to be sensitive to the</td>
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<td></td>
<td></td>
<td></td>
<td>visual impact. This is found throughout.</td>
<td></td>
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<tr>
<td><strong>Extractive Industry</strong></td>
<td>34.3</td>
<td>1</td>
<td>Medium to high impact processes such as mining, winning or</td>
<td>0</td>
<td>NA</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>quarrying of raw materials from the ground, including gravel, sand</td>
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<td></td>
<td></td>
<td></td>
<td>and stone and includes buildings connected with such operations and</td>
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<td></td>
<td></td>
<td></td>
<td>crushing plant.</td>
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</tr>
<tr>
<td><strong>General Industry</strong></td>
<td>318.7</td>
<td>9</td>
<td>High impact industrial and business development, including general,</td>
<td>1.5</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>light and service industry and business.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Light Industry</strong></td>
<td>89.3</td>
<td>2</td>
<td>Low to medium impact industrial and business development that permits</td>
<td>1</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>manufacturing uses that are compatible with land uses permitted in</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>adjacent sensitive land use zones, such as residential, mixed use and</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>open space zones, i.e. manufacturing activities that usually do</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
### Land Use

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Gross Area (ha)</th>
<th>% of Study Area</th>
<th>Intention</th>
<th>Maximum FAR</th>
<th>Dwelling Units Per Hectare</th>
<th>Notes regarding calculating development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logistics</td>
<td>111.6</td>
<td>3</td>
<td>Low impact logistics, light industrial and warehousing development. The built form is to respond positively to adjoining major routes and vegetation to be used for screening where appropriate.</td>
<td>0.7</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Mixed Use Core</td>
<td>16.9</td>
<td>0</td>
<td>High Intensity mixed use development with a strong sub-regional focus of development, including retail, office, commercial, civic and social facilities and medium density residential development and a strong focus on the quality of the public environment and visual appropriateness of built form.</td>
<td>1.5</td>
<td>80</td>
<td>Within this use- 75% Commercial (offices and retail), 25% Residential split applies. Within the Commercial category, this is further split at 80% commercial, 20% Education and Social. Residential component at 80 DU/ HA.</td>
</tr>
<tr>
<td>Mixed Use Low Impact</td>
<td>103.4</td>
<td>3</td>
<td>Low to medium intensity mixed use development with a strong focus on providing local social facilities and shops to support local residential thresholds in the area, a high quality of the public environment and visual appropriateness of built form.</td>
<td>0.5</td>
<td>40</td>
<td>Within this use- 50% Commercial (offices and retail), 50% Residential split applies.</td>
</tr>
</tbody>
</table>
### Land Use

<table>
<thead>
<tr>
<th>Land Use</th>
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<th>Notes regarding calculating development yields</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed Use Medium Impact</td>
<td>60.5</td>
<td>2</td>
<td>Medium intensity mixed use development with a mix of business, institutional, civic and social uses and medium density residential development and a strong focus on the quality of the public environment and visual appropriateness of built form.</td>
<td>1</td>
<td>60</td>
<td>Within the Commercial category, this is further split at 80% commercial, 20% Education and Social. Residential component at 60 DU/ HA.</td>
</tr>
</tbody>
</table>
### Land Use

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Gross Area (ha)</th>
<th>% of Study Area</th>
<th>Intention</th>
<th>Maximum FAR</th>
<th>Dwelling Units Per Hectare</th>
<th>Notes regarding calculating development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Space (amenity and system)</td>
<td>14.1</td>
<td>0</td>
<td>Provides for sporting and recreational needs, including active and passive recreation such as sports fields, formal and informal parks and a limited range of associated facilities and development. This is found throughout.</td>
<td>NA</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Residential High Impact</td>
<td>12.9</td>
<td>0</td>
<td>Contains all types of residential development, generally medium to high densities with the provision of a wide range of services and activities but excludes industrial and trade uses.</td>
<td>NA</td>
<td>40 – 80</td>
<td>Average of 60 Dwelling Units per Hectare applied to assumptions</td>
</tr>
<tr>
<td>Residential Medium Impact</td>
<td>271.2</td>
<td>7</td>
<td>A high incidence of residential land uses, generally at a medium density, with an increasing number of appropriate ancillary land uses to satisfy local demands and convenience and excludes industrial and trade uses.</td>
<td>NA</td>
<td>20-40</td>
<td>Average of 30 Dwelling Units per Hectare applied to assumptions</td>
</tr>
<tr>
<td>Residential Low Impact</td>
<td>327.59</td>
<td>9</td>
<td>Promotes the development of primarily residential uses with a low density, including detached and semi-detached units. There is also a limited number of compatible ancillary uses with a non-disruptive impact on neighbourhood amenity may be allowed.</td>
<td>NA</td>
<td>10-20</td>
<td>Average of 15 Dwelling Units per Hectare applied to assumptions</td>
</tr>
<tr>
<td>Rural/Traditional Settlement</td>
<td>176.5</td>
<td>5</td>
<td>This includes the low intensity peri-urban/rural/traditional settlement where the primary land use is residential settlement, with supporting</td>
<td>NA</td>
<td>1-15</td>
<td>Average of 8 Dwelling Units per Hectare applied to assumptions</td>
</tr>
</tbody>
</table>
### Land Use Table

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Gross Area (ha)</th>
<th>% of Study Area</th>
<th>Intention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transitional Settlement</strong></td>
<td>558.4</td>
<td>15</td>
<td>This includes informal and peri-urban settlements generally adjacent or near to formal urban areas.</td>
</tr>
<tr>
<td><strong>Utilities and Services</strong></td>
<td>59.1</td>
<td>2</td>
<td>Provides for utilities and services, such as electricity substations (ESS), water treatment works (WTW), sewage disposal sites/ wastewater treatment works (WWTW), public utilities, pump stations, bulk stormwater, refuse sites and landfill sites.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maximum FAR</th>
<th>Dwelling Units Per Hectare</th>
<th>Notes regarding calculating development yields</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA</td>
<td>15-40</td>
<td>Average of 30 Dwelling Units per Hectare applied to assumptions</td>
</tr>
</tbody>
</table>

Note: Services and social facilities, on land that is in rural/peri-urban locations.
4.4.6 **NEW DEVELOPMENT YIELDS**

The following table reflects the development yields based on the future land use plan as described above.

**TABLE 18: GREENFIELDS RESIDENTIAL AND DEVELOPMENT YIELDS**

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Total Area (Ha)</th>
<th>NETT Area*</th>
<th>F A R</th>
<th>Floor Area (ha)</th>
<th>Commercial Floor Area (ha)</th>
<th>Education and Social Floor Area (ha)</th>
<th>Agricultural Floor Area (ha)</th>
<th>Industrial Floor Area (ha)</th>
<th>DU/HA</th>
<th>DU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture High Impact</td>
<td>137</td>
<td>110</td>
<td>3</td>
<td>38</td>
<td>0</td>
<td>0</td>
<td>38</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Agriculture Low Impact</td>
<td>73</td>
<td>59</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Agriculture Medium Impact</td>
<td>112</td>
<td>90</td>
<td>2</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Civic and Social</td>
<td>53</td>
<td>42</td>
<td>13</td>
<td>25</td>
<td>0</td>
<td>0</td>
<td>25</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>26</td>
<td>21</td>
<td>2</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Environment Management/Services</td>
<td>2025</td>
<td>1108</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Existing Road</td>
<td>242</td>
<td>242</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Extractive Industry</td>
<td>34</td>
<td>27</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Land Use</td>
<td>Total Area (Ha)</td>
<td>NETT Area*</td>
<td>F A R</td>
<td>Floor Area (ha)</td>
<td>Commercial Floor Area (ha)</td>
<td>Education and Social Floor Area (ha)</td>
<td>Agricultural Floor Area (ha)</td>
<td>Industrial Floor Area (ha)</td>
<td>DU/HA</td>
<td>D U</td>
</tr>
<tr>
<td>-------------------</td>
<td>----------------</td>
<td>------------</td>
<td>------</td>
<td>-----------------</td>
<td>-----------------------------</td>
<td>--------------------------------------</td>
<td>----------------------------</td>
<td>----------------------------</td>
<td>-------</td>
<td>----</td>
</tr>
<tr>
<td>General Industry</td>
<td>316</td>
<td>253</td>
<td>29</td>
<td>380</td>
<td>304</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>380</td>
<td>304</td>
</tr>
<tr>
<td>Light Industry</td>
<td>89</td>
<td>71</td>
<td>3</td>
<td>71</td>
<td>57</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>71</td>
<td>57</td>
</tr>
<tr>
<td>Logistics</td>
<td>112</td>
<td>89</td>
<td>1</td>
<td>63</td>
<td>50</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>63</td>
<td>50</td>
</tr>
<tr>
<td>Mixed Use Core</td>
<td>17</td>
<td>14</td>
<td>23</td>
<td>20</td>
<td>16</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>80</td>
<td>40</td>
</tr>
<tr>
<td>Mixed Use Low Impact</td>
<td>55</td>
<td>44</td>
<td>5</td>
<td>22</td>
<td>18</td>
<td>9</td>
<td>7</td>
<td>2</td>
<td>40</td>
<td>44</td>
</tr>
<tr>
<td>Mixed Use Medium Impact</td>
<td>56</td>
<td>45</td>
<td>14</td>
<td>45</td>
<td>36</td>
<td>25</td>
<td>17</td>
<td>6</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>Open Space Amenity</td>
<td>14</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Railway Reserve</td>
<td>39</td>
<td>31</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Residential High Impact</td>
<td>13</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>60</td>
<td>49</td>
</tr>
<tr>
<td>Residential Low Impact***</td>
<td>449</td>
<td>335</td>
<td>0</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>15</td>
<td>40</td>
</tr>
</tbody>
</table>

** Ma** - Maximum, **Likely** - Likely
## Land Use

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Total Area (Ha)</th>
<th>Nett Area*</th>
<th>F A R</th>
<th>Floor Area (ha)</th>
<th>Commercial Floor Area (ha)</th>
<th>Education and Social Floor Area (ha)</th>
<th>Agricultural Floor Area (ha)</th>
<th>Industrial Floor Area (ha)</th>
<th>DU/HA</th>
<th>DU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Medium Impact</td>
<td>148</td>
<td>118</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>30</td>
<td>28</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>42</td>
</tr>
<tr>
<td>Rural/Traditional Settlement</td>
<td>176</td>
<td>141</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>26</td>
</tr>
<tr>
<td>Transitional Settlement</td>
<td>522</td>
<td>447</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>30</td>
<td>13</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>39</td>
</tr>
<tr>
<td>Utilities and Services</td>
<td>59</td>
<td>47</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Grand Total</td>
<td>4768</td>
<td>3356</td>
<td>93</td>
<td>709</td>
<td>553</td>
<td>46</td>
<td>92</td>
<td>83</td>
<td>56</td>
<td>45</td>
</tr>
</tbody>
</table>

*Assume Nett reduction in Land Use Area of 20% to accommodate internal roads, undevelopable land etc.

** Maximum Floor Area in Hectares based on FAR multiplied by FAR. Likely floor area addresses fact that most development, in particular industry does not reach full FAR and therefore a 20% reduction is applied and reflected in the likely column (throughout table)

*** For the Residential categories, 20% of the Nett floor area has been allocated to education and social facilities. The remainder is allocated to residential at the DU/HA factor.

**** A Nett Area reduction of 30% instead of 20% was applied to the Precinct B1 Residential as this has a very hilly topography and no road infrastructure
4.4.7 Social Facility Requirements

Based on the FAP prepared, as well as Table 18, the following section reflects the social facility requirements that result from the quantum’s developed.

It is noted that in terms of the Status Quo work undertaken as part of this project, certain Social Facilities were identified as being required at present. Furthermore, based on the Land Uses proposed, an additional 6500 households is possible, and these will also require social facilities. Based on the number of additional households, the population is likely to increase by approximately 27 300 people (based on the assumption of 4.2 people per household). Therefore, considering the current shortfall as well as the proposed growth within the area, the following table reflects the social facility requirements within the study area.

It is stressed that these figures reflect an ultimate demand and do not relate to a specific timeframe. Development within the study area is likely to be long term (outside the typical lifespan of an FAP which is normally between 10 and 20 years).

**TABLE 19: SOCIAL FACILITY REQUIREMENTS**

<table>
<thead>
<tr>
<th>Social Facility Type</th>
<th>Standard (1: x people)</th>
<th>Current Shortfall</th>
<th>Additional Facilities required based on increased population</th>
<th>Total Facilities required</th>
<th>CSIR standards for Minimum Space</th>
<th>Space requirements based on CSIR standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary School</td>
<td>7,000</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>2.8 ha</td>
<td>16.8ha</td>
</tr>
<tr>
<td>Secondary School</td>
<td>12,500</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>4.8 ha</td>
<td>19.2ha</td>
</tr>
<tr>
<td>Fire station</td>
<td>60,000-100,000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.3 ha</td>
<td>0</td>
</tr>
<tr>
<td>Community Sports Field</td>
<td>15,000</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>0.21 ha</td>
<td>1.05ha</td>
</tr>
<tr>
<td>Community Health Clinic*</td>
<td>between 1:24,000 and 1:70,000</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1.5 ha</td>
<td>1.5ha</td>
</tr>
<tr>
<td>Library</td>
<td>70,000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.05 ha</td>
<td>0</td>
</tr>
<tr>
<td>Community Hall</td>
<td>60,000</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0.2 ha</td>
<td>0.4ha</td>
</tr>
</tbody>
</table>

*- through engagements with the community, it was stressed that there is a need for a very large clinic or small hospital to cater for the community needs. Currently the community has to travel in to Durban in order to obtain government medical care. This is an issue that requires attention from eThekwini and the KZN Department of Health.

**- it is suggested that in order to maximise space as well as to ensure sustainability of facilities, where possible appropriate social facilities can be clustered or even share a site. For example, a community hall and library could share a site. Community Sports fields can be shared with both Primary and Secondary Schools. This also ensures that the use of space, as well as implementation budgets are maximised.
4.5 Service Infrastructure Framework

4.5.1 Introduction

In general, the level of services and infrastructure established is sufficient to provide services of good quality and consistency to the existing developments. Nevertheless, capacity is at its limits and there is little spare capacity to service any future expansion requirements.

Refer to Table 20 and Table 21 below for wastewater generation parameters and future water and wastewater demands on preliminary land use information provided in Section 4.4.6.

### Table 20: Wastewater Generation Parameters

<table>
<thead>
<tr>
<th>Land Use Type</th>
<th>Wastewater Generation Per Land Use Type</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>750</td>
<td>ℓ/day/du</td>
</tr>
<tr>
<td>Industrial General/Heavy/Logistics</td>
<td>45 000</td>
<td>ℓ/day/ha floor area</td>
</tr>
<tr>
<td>Industrial Light</td>
<td>20 000</td>
<td>ℓ/day/ha floor area</td>
</tr>
<tr>
<td>Commercial</td>
<td>15 000</td>
<td>ℓ/day/ha floor area</td>
</tr>
<tr>
<td>Social</td>
<td>40 000</td>
<td>ℓ/day/ha floor area</td>
</tr>
<tr>
<td>Education</td>
<td>40 000</td>
<td>ℓ/day/ha floor area</td>
</tr>
</tbody>
</table>

### Table 21: Future Wastewater Generation and Water Demands

<table>
<thead>
<tr>
<th>Land Use Type</th>
<th>Max Floor Area (Ha)</th>
<th>No. Of Dwellings</th>
<th>Total Wastewater To MI/Day</th>
<th>Likely: Total Wastewater MI/Day</th>
<th>Total Water Demand MI/Day</th>
<th>Likely: Total Water Demand Based On 48hr Storage MI</th>
<th>Total Water Demand Based On 48hr MI</th>
<th>Likely: Total Water Demand Based On 48hr MI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civic and Social</td>
<td>25.4</td>
<td>1.014</td>
<td>0.812</td>
<td>1.268</td>
<td>1.014</td>
<td>2.536</td>
<td>2.029</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>8.3</td>
<td>0.332</td>
<td>0.266</td>
<td>0.415</td>
<td>0.332</td>
<td>0.830</td>
<td>0.664</td>
<td></td>
</tr>
<tr>
<td>General Industry</td>
<td>379.7</td>
<td>17.085</td>
<td>13.668</td>
<td>21.356</td>
<td>17.085</td>
<td>42.712</td>
<td>34.169</td>
<td></td>
</tr>
<tr>
<td>Light Industry</td>
<td>71.5</td>
<td>3.216</td>
<td>2.573</td>
<td>4.020</td>
<td>3.216</td>
<td>8.041</td>
<td>6.433</td>
<td></td>
</tr>
<tr>
<td>Logistics</td>
<td>62.5</td>
<td>2.813</td>
<td>2.250</td>
<td>3.516</td>
<td>2.813</td>
<td>7.032</td>
<td>5.626</td>
<td></td>
</tr>
<tr>
<td>Mixed Use Core</td>
<td>20.3</td>
<td>0.609</td>
<td>0.548</td>
<td>0.761</td>
<td>0.685</td>
<td>1.522</td>
<td>1.370</td>
<td></td>
</tr>
<tr>
<td>Mixed Use Low Impact</td>
<td>22.2</td>
<td>0.554</td>
<td>0.510</td>
<td>0.693</td>
<td>0.637</td>
<td>1.385</td>
<td>1.274</td>
<td></td>
</tr>
<tr>
<td>Mixed Use Medium Impact</td>
<td>44.7</td>
<td>1.230</td>
<td>1.066</td>
<td>1.538</td>
<td>1.333</td>
<td>3.075</td>
<td>2.665</td>
<td></td>
</tr>
<tr>
<td>Residential High Impact</td>
<td>494</td>
<td>0.412</td>
<td>0.412</td>
<td>0.515</td>
<td>0.515</td>
<td>1.029</td>
<td>1.029</td>
<td></td>
</tr>
<tr>
<td>Rural/Traditional Settlement</td>
<td>1126</td>
<td>0.845</td>
<td>0.845</td>
<td>1.056</td>
<td>1.056</td>
<td>2.112</td>
<td>2.112</td>
<td></td>
</tr>
</tbody>
</table>
### Transitional Settlement

<table>
<thead>
<tr>
<th>Land use</th>
<th>Max Floor Area (Ha)</th>
<th>No. Of Dwellings</th>
<th>Total Wastewater To ML/Day</th>
<th>Likely: Total Wastewater ML/Day</th>
<th>Total Water Demand ML/Day</th>
<th>Likely: Total Water Demand ML/Day</th>
<th>Total Water Demand Based On 48hr Storage MI</th>
<th>Likely: Total Water Demand Based On 48hr MI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grand Total</td>
<td>708.8</td>
<td>23535</td>
<td>45.143</td>
<td>39.965</td>
<td>56.428</td>
<td>49.957</td>
<td>112.856</td>
<td>99.913</td>
</tr>
</tbody>
</table>

**NOTES:**

- Parameters applied: Water Demand is 125% of Wastewater Generation
- Above table is including developed areas
- standard demand parameters have applied to developed areas

The likely demand is based on 80% potential development being constructed and/or water reuse initiatives. In the residential areas we expect less water reuse initiatives. In the residential areas we expect less water reuse initiatives, therefore little or no reduction of water demand.

From the above Table 21, The total wastewater generated is approximately 45.1Mℓ based on a maximum density and most likely to be at 39.9Mℓ. The water demand, based on eThekwini’s 48-hour storage requirement, is estimated at 112.8Mℓ (includes developed areas) and in the likelihood of 99.9Mℓ.

#### 4.5.2 Wastewater (Bulk)

##### 4.5.2.1 Infrastructure Network

Waste water disposal has been tagged as the most significant challenge of the study area. The existing sewerage infrastructure includes the Hammarsdale Wastewater Treatment Works (WWTW) along the Sterkspruit River, the Mpumalanga WWTW along the Upper uMlazi River and Waterborne sewers limited to the main town areas.

**TABLE 22: MPUMALANGA AND HAMMARSDALE WWTW**

<table>
<thead>
<tr>
<th>WWTW</th>
<th>DESIGN CAPACITY</th>
<th>EFFECTIVE CAPACITY</th>
<th>CURRENT LOADING</th>
<th>SPARE CAPACITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mpumalanga WWTW</td>
<td>6Ml/day @ 750mg/l COD</td>
<td>4.5Ml/day @ 1 000mg/l COD</td>
<td>3.6Ml/day @ 1 000mg/l COD</td>
<td>0.9Ml/day @ 1 000mg/l COD to 1.3Ml/day @ 700mg/l COD</td>
</tr>
<tr>
<td>Hammarsdale WWTW</td>
<td>27Ml/day @ 815mg/l COD</td>
<td>11Ml/day @ 1 992mg/l COD</td>
<td>11Ml/day @ 1 992mg/l COD</td>
<td>0Ml/day</td>
</tr>
<tr>
<td>TOTAL</td>
<td>33Ml/day</td>
<td>15.5Ml/day</td>
<td>12.3Ml/day</td>
<td>0.9Ml/day – 1.3Ml/day</td>
</tr>
</tbody>
</table>

Note: Current COD concentration for Mpumalanga WWTW is unknown and has been estimated using an assumed COD concentration for the design capacity and effective capacities. As stipulated in 2012 Mpumalanga LAP, it has been confirmed by eThekwini officials in July 2017 that the WWTW’s are currently operating at these capacity levels and is very much still strained today due to the nature of
The city plans to regionalise the Hammarsdale WWTW, and convert the Mpumalanga WWTW to a pump station and transfer its load to Hammarsdale WWTW, which will be upgraded by 15Mℓ/day to have a total capacity of 42Mℓ/day. Currently the wastewater treatment facility is operating at no spare capacity, due to the high COD level, hence further upgrades will be required to treat the flows reflected in Table 21. However, should the likelihood of the efficiency of the operational capacity be increased to function at design capacity, the added 15 Mℓ upgraded facility will then be able to cater for the likely flow of 39.9 Mℓ (Ultimate FAP). In addition to this, there might possibly be a requirement for further upgrades of a larger capacity that will be able to accommodate flows from other developments such as Cato Ridge Areas and other outer lying areas not included in this study.

It has been recognized by the city that for a long while the outer lying communities have had little or no sewer removal and are generally served by pit latrines. Efforts are underway to provide these communities with an improved level of service by means of projects such as the SAN3 project. This incorporates the installation of community ablution facilities which will be later converted to fully upgraded and extended to provide individual erf connections water-borne sewerage system, which will be ultimately transferred to the regional works, Hammarsdale WWTW.

4.5.2.2 PERFORMANCE/CAPACITY

Refer to Estimated Water & Wastewater Demands calculated above for further detail.

Details of the Hammarsdale WWTW are as follows:

- Design Capacity - 27 Mℓ/day
- Operational Capacity - 11 Mℓ/day; Due to nature of effluent-Industrial
- Current Usage - 11 Mℓ/day
- Spare Capacity - 0 Mℓ/day

The required capacity from the high-level analysis is 45.1 Mℓ (this includes the flow from the areas that transfers load to Mpumalanga WWTW, which will later be directed to Hammarsdale Regional WWTW).

Infrastructure is required to be installed to service the upper portions of the study area. Plans are in place to install trunk sewers and upgrades to the Hammarsdale WWTW.

4.5.2.3 FUTURE PLANNING AND PHASING

Whilst the spare capacity at present, of the wastewater treatment plants is limited, plans are in place by eThekwini to increase this.

It should be noted that the flows into the Hammarsdale WWTW will include the Mpumalanga WWTW flow as this will be converted to a pumping system as part of the eThekwini’s regionalisation strategy.

Key projects and initiatives include:
PREPARATION OF THE MPUMALANGA NORTHERN FUNCTIONAL AREA PLAN AND DRAFT SCHEME, INCLUDING THE MR385 EAST CORRIDOR PRECINCT PLAN: WARDS 4, 5, 7 AND 91

- Hammarsdale Wastewater Pollution Reduction - due to the nature of the effluent, this aims at reducing the loads and concentration of industrial discharges the WWTW’s.
- Upgrading of the Hammarsdale WWTW – an additional capacity of 15Mℓ/day will be added as part of the WWTW’s regionalisation studies of eThekwini.
- Rehabilitation of the Sterkspruit Dam – A Department of Water and Sanitation Initiative to rehabilitate the Dam as a wetland system
- Georgedale Bulk Sewer – referred to as SAN 3 project is currently phased and portions are in design and construction.

4.5.3 WATER (BULK AND RETICULATION)

4.5.3.1 INFRASTRUCTURE NETWORK

**Bulk Water Network**

eThekwini is currently facing supply limitations i.e. supply versus demand is currently strained. The recent commissioning of the Phase 2b of the Mooi-Mgeni Transfer Scheme (MMTS-2) is sufficient to service the Outer West Areas of eThekwini in the short to medium term. However, in the medium to long term the uptake on demand to the outer west area is dependent on the commissioning of the western aqueduct which is due to be operational in 2018 as well as the completion of Umgeni Water’s Umkhomazi project which will transfer water from the Umkhomazi catchment into current Mooi-Mgeni system to further augment supply.

From Table 21 above it can be seen that the Functional Area requires a storage volume of approximately 112Mℓ maximum based on 48-hour storage, however this is more likely to be at 99.9 Mℓ. The current existing system is only capable of supplying 22.73Mℓ of storage with the existing demand of 15Mℓ/day and thus requires upgrades.

The city is also considering other methods of water saving, initiatives such as water conservation/ water demand management (WC/WDM) initiatives, which is can be considered at a later stage.

The city is faced with ageing infrastructure and there are programmes in place to replace infrastructure as part of EThekwini’s maintenance programme. It would be appropriate to upgrade pipe diameters to meet future demands as part of the replacement programme.

**Water Reticulation Network**

The existing internal water infrastructure involves a network of mPVC pipes ranging in diameter from 50 mm to 375 mm. The pipes sizes should comply with the required standard instantaneous peak flows and velocities of 0.6 – 1.2 m/s (as per the Guidelines for Human Settlement Planning and Design/CSIR Red Book). During the detailed design phase, a model will need to be developed in order to simulate fire flow, and peak minimum pressure scenarios. This model can be used to optimise the internal pipe infrastructure to ensure efficient water supply and minimal pressure losses. The positioning of the pipes should be to avoid pipe clashes with other services, which will need to be finalised during the detailed design phase. It is recommended that a concept Master Plan Model of the Network be generated which will assist with future planning of the system.
4.5.3.2 Performance/Capacity

Refer to Estimated Water & Wastewater Demands calculated above for further detail.

Whilst the bulk water supply system in the Upper uMgeni catchment is constrained, there is sufficient bulk water supply capacity to service future development within the Mpumalanga study area over the short term, subject to some planned infrastructure upgrades. The extension/upgrade of the water supply network to service new developments and settlement upgrades. New developments and settlement upgrades will still need to be considered on their merits and will require consultation with eThekwini Municipality and, where appropriate, Umgeni Water.

In the medium to long term, the bulk water supply infrastructure will need to be substantially upgraded to service future development within the area and to cater for significant growth in the Cato Ridge and other surrounding areas.

eThekwini regularly engage with Department of Water and Sanitation (DWS) and Umgeni Water and have plans in place to ensure supply to the Mpumalanga and Cato Ridge Areas, since Cato Ridge has been earmarked as a logistics hub and catalytic project.

4.5.3.3 Future Planning and Phasing

In light of the limitations on water supply, emphasis should be placed on water conservation, reuse and recycling, as well as measures to reduce water losses. Items such as water efficiency and reduction in water loss can be addressed at the scale of the Functional Area, however issues such as water recycling and alternative sources such as desalination are best addressed at a more regional scale in close conjunction with Department of Water Affairs and Umgeni Water.

With reference to figure 24, it should be noted that the proposed reservoir that is located just outside of the upper end of the study boundary will be key to unlock the zones within Precinct B1. Looking at a high-level analysis of Top Water Levels, it can be seen that the Command Reservoir Georgedale reservoir will not be able to supply developments with ground levels greater than 660m within this precinct.

Augmentation off the Western Aquaduct to a new reservoir is proposed and thus will further enable supply to the study area.

There are 2 proposed reservoirs situated outside the study area that may possibly be required to service portions of the study area.
4.5.4 Electricity

4.5.4.1 Infrastructure Network

The supply of electricity to the area is partly owned between Eskom and eThekwini. The eThekwini Electricity area of supply in Mpumalanga is currently supplied from the Mpumalanga Main Intake Substation, a 132/11 kV substation in which Eskom owns the 132 kV side and eThekwini Electricity owns the 11 kV side. There is currently no spare capacity.

Eskom’s bulk lines 400 to 275 kV lie in the north of the study area. Eskom’s network is classed in availability categories:

- Not constrained – up to 100 kVA applications can be connected without reference to Network Planning.
- Slightly constrained – very limited capacity remains.
- Constrained – no additional connections accepted except schools and clinics.

The areas in the study area fall into the following categories:

- Hammarsdale Industrial – Not constrained, capacity is available for development – minor improvements may be required
- Mophela – Constrained
- Sankontshe – Not constrained

Additional capacity will be available when the Royal (Sterkspruit) 132/11 kV 2 x 40MVA Substation is commissioned. The project status is at ERA (ERA is described as Execution Release Approval) namely design stage and then followed by construction stage.

4.5.4.2 Performance/Capacity

Existing information informs that the Electricity Infrastructure is at capacity and future planning is required to supply the study area.

This will be further investigated during the next phase of the project at detailed precinct plan level.

4.5.4.3 Future Planning and Phasing

The upgrading of the bulk electricity infrastructure will need to be undertaken in co-ordination with Eskom. According to Eskom’s infrastructure plan the new Royal Substation, which will provide an additional capacity of 2 X 40 MVA transformers when commissioned. Note; one of these transformers is standby. Construction is currently delayed and the timings of this project is to be confirmed. There are only an additional supply of 40MVA available.

The commissioning and handover of the Royal Substation “which will be Form Status FRA according to Eskom’s Infrastructure Plan and Progress Presentation” there will be additional capacity in the area which will unlock current constrained networks and provide for the constrained areas within the study area such as Mpumalanga and Mophela. It must also be noted that the utilisation of any form of renewable energy should be promoted to service future development and reduce demand for bulk electricity infrastructure provision.
4.5.5 Solid Waste

4.5.5.1 Infrastructure Network
All solid waste from the existing Mpumalanga area is transported to the Marion Hill Landfill Site. The Marion Hill Site is currently strained with approximately 12 months of lifespan left, since the Bisasar Road Landfill Site is reaching capacity with approximately 2 years’ life left.

The existing Hammarsdale Transfer Station (TS) is serving the west area, with no upgrades/modifications in terms of capacity planned (other than maintenance/refurbishments etc.). The TS is at present handling roughly 60 cubic meters of waste per day, with Wednesdays achieving roughly 120 cubic meters of waste. Hence, the Hammarsdale Transfer Station has the capacity to handle 120 cubic meters per day. The Transfer Station has a remaining lifespan of 10 years.

4.5.5.2 Performance/Capacity
In communicating with eThekwini, there are major capacity constraints of the Mariannhill Landfill site, which is not sufficient to cater for additional waste, and is soon nearing its lifespan. Alternatives and timing of the precinct plans phasing needs to be carefully looked at and should be workshopped with EThekwini.

4.5.5.3 Future Planning and Phasing
It was planned that there would be a new Shongweni Landfill site, which was to be up and running by 2018. This has unfortunately still not been approved. In reality the delay is going to negatively impact waste disposal for the west as waste will then have to be hauled to the North Buffelsdraai Landfill. eThekwini officials informed that they can realistically see Shongweni Landfill only coming on board in a minimum 4 years from date of the Approval of Appeal for a waste management license and environmental assessment. A further factor that should be considered is that community in the west are also reluctant to have another landfill in the area, following the odour and other issues associated with the existing Shongweni Landfill Site.

4.5.6 Surface Water Drainage

4.5.6.1 Infrastructure Network
The Mpumalanga area was inherited by eThekwini. The storm water infrastructure in the area is considered to be basic, with the bulk of the infrastructure likely to be designed with the “Red Book”, (Guidelines for Human Settlement Planning and Design)/ eThekwini stormwater design manual and its predecessors. There are a number of river and drainage crossings of Provincial and National Roads that will not accommodate increased runoff rates, any new crossings and attenuation facilities, will have to be designed in accordance with KwaZulu-Natal Department of Transport Standards.

4.5.6.2 Performance/Capacity
The current stormwater drainage system is working adequately at present, however as development increases this will affect surface runoff and will be required to be looked at further at the precinct plans phase of the project.

The following guidelines should be applied when dealing with provision of stormwater drainage systems:
• All internal stormwater reticulation should be designed according to an approved Stormwater Management Plan (SWMP) per development and relevant eThekwini Municipality Coastal, Stormwater and Catchment Management guidelines.
• The use of the proposed municipal road network will act as the primary stormwater collector, with organized discharge into attenuation ponds.
• Piping and channels will be designed to accommodate the 1:5 year peak flow, as per eThekwini standards.
• Attenuation ponds will be used to restrict runoff into the natural drainage system to the pre-development 1:10 year flood flow event capacity, with any increased runoff attenuated on site. Sizing of the ponds will cater for the 1:50 year flood flow, as per eThekwini standards.
• To cater for stormwater runoff generated by the proposed developments, it is necessary that attenuation ponds be constructed at suitable positions.
• The use of sustainable urban drainage mechanisms to reduce the required stormwater attenuation pond volumes is encouraged.
• Detailed analysis should be carried out and presented for approval to the relevant authorities at the detailed design stages.

It should be noted that infrastructure requirements for surface water(stormwater) drainage is highly sensitive to site characteristics, and should be analysed from site to site per development proposed and hence comments and proposals at this stage can only be at a very broad high level, and will require to be further investigated and confirmed at detail design phases during the development of the study area.

4.5.6.3 Future Planning and Phasing
Any future developments will be required to have a Storm Water Drainage Plan approved by the Coastal and Drainage Section.

All new developments will need to be designed in accordance with eThekwini Stormwater design guidelines. In particular, stormwater facilities will be required to prevent increased runoff and associated flooding of lower lying areas. For major systems the return periods are 1:50 or 1:100, and minor systems 1:5 to 1:20, depending on importance.
4.6 **PUBLIC SPACE, LANDSCAPING AND BUILT FORM FRAMEWORK**

4.6.1 **INTRODUCTION**

The Public Space, Landscaping and Built Form Framework outlines the key design objectives and guidelines for the functional area. This builds on the guidelines contained within the Mpumalanga LAP and TCPP (refer to Section 6.1 in the Annexures- Mpumalanga LAP Public Space, Landscaping and Built Form Guidelines, which outlines the complementary public space, landscaping and built form guidelines set out under the Mpumalanga LAP).

4.6.2 **DESIGN OBJECTIVES**

The northern functional area is currently spatially fragmented, poorly connected to surrounding settlement areas and the broader metro area and with a public space network that is poorly developed and defined by adjoining built form and landscaping treatments. The public space, landscaping and built form framework seeks to address these challenges by focusing on the following key design objectives:

1. **Legible, Walkable and Supportive Spatial Structure**
   Establish a legible, flexible, walkable and functional spatial structure for the functional area that can provide the basis for developing a vibrant, intensive and mixed-use town centre, a mixed use MR385 development corridor and associated residential neighbourhoods and economic investment areas with improved accessibility, connectivity and service provision.

2. **Intensive, Mixed Use Activity Network**
   Develop an intensive activity network to ensure that land use activities are directed into appropriate locations to concentrate activities in nodes and spines and generate thresholds to support public transport, commercial development and social facilities. Ensure that higher order facilities and more intensive mixed-use development are located in the New Town Centre and mixed-use hubs/nodes with more local-level facilities clustered in the local/neighbourhood nodes.

3. **Integrated Public Space and Pedestrian Network**
   Develop a public space network with a range of quality public spaces connected by safe and attractive urban streets and pedestrian linkages that together support and facilitate daily public life, social engagement, economic exchange and pedestrian movement. The public space and pedestrian network should provide sufficient quality public spaces and pedestrian linkages to support the activity network.

4. **Responsive Built Form**
   Encourage medium to higher density development to support the main urban nodes, activity spines, public transport hubs and public spaces and provide increased thresholds to support public transport, social facilities, efficient infrastructure provision, walkable neighbourhoods, etc. Ensure that development responds appropriately to the activity and public space networks by helping to spatially define, accentuate and activate adjoining public spaces and urban streets, particularly around the main nodes, spines, hubs and public spaces.
5. **Distinctive Local Character Areas**
Reinforce and enhance the character of local areas to create distinctive and attractive residential neighbourhoods, development nodes and economic investment areas.

6. **Complementary Landscaping Structure**
Ensure that landscaping treatments complement and reinforce the spatial structure, activity network, public space network and local character areas within the study area.

Figure 25 indicates the activity network identified for northern functional area, including the MR385 activity corridor, the New Town Centre and a number of activity nodes and spines. Figure 26 indicates the public space and pedestrian network identified for the northern function area. Figure 27 indicates the built form density guidelines proposed for the functional area as part of the land use and residential typology guidelines.
FIGURE 25: ACTIVITY NETWORK
FIGURE 26: PUBLIC SPACE AND PEDESTRIAN NETWORK
FIGURE 27: DENSITY GUIDELINES
4.6.3 Design Guidelines

The following design guidelines have been identified for the key spatial elements within the study area in order to achieve the design objectives outlined above:

4.6.3.1 N3 Mobility / Development Corridor

Context and Challenges

The N3 corridor is the main mobility route that connects the functional area to the broader metro area and region and which forms the northern boundary to the functional area. The N3 is a limited access route with interchanges at MR385 east (Hammarsdale) and west (Cato Ridge) and creates a significant physical barrier with limited cross-linkages between the Mpumalanga/Camperdown Rural area to the south and the Cato Ridge/Harrison Flats/Inchanga area to the north. The N3 (SIP2) route is planned as a major development corridor connecting eThekwini and Gauteng with increasing pressure for urban and industrial development along the corridor, including within the Mpumalanga and Cato Ridge areas.

Objective and Guidelines

Protect the strategic mobility function of the N3 corridor, capitalise on the significant development opportunities at accessible locations along the corridor and retain and enhance the scenic attractiveness of this gateway to the eThekwini/coastal areas from the west and the inland/Drakensberg areas from the east:

- Promote the development of a “green” corridor along the N3 route to enhance the scenic attractiveness of this gateway to the metro area. This could be achieved through retaining existing open spaces and agricultural lands where appropriate, removing alien vegetation, providing appropriate landscaping for new developments and creating view “corridors”.
- New development along and visible from the N3 must be appropriately sited, designed and landscaped to avoid undue visual obtrusion and to provide quality built form along the corridor. Edges and interfaces with the N3 should be landscaped and/or architecturally treated to reduce visual impact and contribute to the experience of the road users. No service areas should face on to the N3 unless adequately and appropriately screened.
- Avoid development within the road reserve and setback for new development along the N3 corridor.
- Encourage the development of cross-linkages / bridges over the N3 at appropriate location/s to reduce the physical, spatial and functional barrier effect of the N3 and to facilitate greater integration between the Mpumalanga area and the areas north of the N3.

4.6.3.2 MR385 Activity Corridor

Context and Challenges

The MR385 corridor is the main arterial route and connecting public space element within the study area for regional connectivity, public and private transport, access to key urban nodes, economic centres and public transport facilities and pedestrian movement. The mobility function of the route, large development setbacks and block structure, the generally poor relationship with adjoining developments and the lack of safe pedestrian sidewalks result in a poorly functioning public space corridor.
Objective and Guidelines
Upgrade, improve and develop MR385 to perform as the primary public transport, regional connectivity and public space corridor that spatially and functionally connects and integrates the northern functional area and the broader Mpumalanga, Hammarsdale and Cato Ridge areas.

- Encourage an appropriate mix of land uses and activities along MR385 in accordance with the Land Use Framework to create a range of economic and social opportunities with a high level of public transport and NMT access along the corridor.
- Improve the visual character of the MR385 corridor through appropriate landscaping and the avoidance of continuous/undifferentiated ribbon development along the route. Edges and interfaces with MR385 should be landscaped and/or architecturally treated to reduce visual impact and contribute to the experience of the road users. No service areas should face on to MR385 unless adequately and appropriately screened.
- Ensure that future upgrades of MR385 include public space and landscaping improvements to make the route safe, convenient and attractive for pedestrian use.
- Develop continuous safe pedestrian sidewalks along MR385 extending from Keystone Park in the northeast to Georgedale in the northwest.
- Provide safe pedestrian crossings at regular intervals along MR385 to connect adjoining development on either side of the arterial route, such as pedestrian bridges and signalised pedestrian crossings.
- Encourage built form to respond to and, where feasible, front onto MR385 and associated public transport hubs and pedestrian cross-linkages.
- Establish landmark/gateway features at the main junctions along MR385 that provide access to the town centre, the mixed-use hubs and the economic investment areas accessible from the corridor.

4.6.3.3 Urban Hub / New Town Centre

Context and Challenges
The Mpumalanga TCPP sets out a vision, spatial concept and guidelines for the development of the New Town Centre as an urban hub that provides the primary mixed-use node for the broader Mpumalanga area. A key component of the urban hub is the development of an interchange zone, which is the primary public transport interchange and focal point proposed as part of the Mpumalanga New Town Centre development, which will need to be supported through a range of land use, transport and urban design interventions. The precinct is currently largely undeveloped with the notable exception of the new shopping centre and significant public investment will be required to develop the main structuring elements, the interchange zone, key public facilities and medium to higher density housing developments within the New Town Centre and provide a catalyst for private investment.

Objective and Guidelines
Support the development of the Mpumalanga New Town Centre as the primary mixed-use node/spine within the Mpumalanga area that will accommodate retail, commercial and informal trading activity, higher order social facilities, medium to higher density housing and intermodal facilities for local bus and taxi transfers from/to rail and the future IRPTN.
• The town centre will focus on the proposed civic services centre, business centre and public park together with associated commercial activities and residential development. The town centre, together with the adjacent shopping centre, will form the western anchor to the Mpumalanga High Street.

• The entrance into the town centre and Kunene Avenue off MR385 should be developed as a gateway using appropriate public space, building and landscaping treatments. This would include a treed avenue extending along Kunene Avenue, dual-fronted development facing onto the treed avenue at the front and urban wetland park area to the rear and parking provision using on-street parking and on-site parking lanes perpendicular to the street.

• Adopt a consistent landscaping and public space treatment for routes and spaces within the interchange zone to provide an identifiable character for this strategic zone within the town centre. Utilise high quality and durable materials and planting treatments for routes and public spaces to accentuate the importance of this gateway zone and to respond to the high levels of movement and public use within this zone.

• Public spaces should be created at the frontage of the civic services buildings with the public street to provide for civic engagement, trading facilities and building access.

• Buildings should adjoin and face onto public streets to define the street edge and provide passive surveillance of the street space. The main high street should accommodate mixed uses with responsive ground floor uses to encourage activity and animate the street space.

• Built form should respond appropriately to streets parallel with the contours and streets perpendicular to the contours. Built form should step down the hill along the perpendicular streets to retain a human scaled streetscape. Built form should respond to the slope along parallel streets to ensure that buildings address the street level.

• Along the lower edge of the new high street, buildings should be encouraged to incorporate a lower/basement level to ensure that the first floor of the building is at street level. On the upper side of the new street, buildings should be encouraged to be cut into the slope to ensure that the ground floor of the building is at street level. The upper floor can potentially open onto the ground level to the rear of buildings.

4.6.3.4 Activity Nodes and Spines

Context and Challenges
There are a number of existing, emerging and proposed activity nodes within the functional area that provide locations for the concentration of economic activities, social facilities, higher density housing and public transport and NMT access. There are also a number of existing, emerging and proposed activity spines within the functional area that connect and provide access to a number of local nodes, economic activities, social facilities and residential areas, including: Shezi Main Road, Kunene Avenue and the proposed High Street in Mpumalanga; MR431 in Georgedale; MR430 in Sankontshe; and Kelly Road in Hammarsdale.

Objective and Guidelines
Reinforce and develop activity nodes as the main locations for more intensive socio-economic development with high levels of public transport and NMT access and a supportive public realm, landscaping and built form. Strengthen the role of activity spines as public transport connectors,
Preparation of the Mpumalanga Northern Functional Area Plan and Draft Scheme, Including the MR385 East Corridor Precinct Plan: Wards 4, 5, 7 and 91 collector routes and activity streets supporting a number of activity nodes, a range of more intensive socio-economic activities and medium to higher density residential development.

- Encourage a greater intensification and mix of land use activity and development along activity spines with high levels of connectivity and access to public transport facilities and services along the spines.
- Support the development of a fine-grained urban block structure and responsive built form and complementary landscaping within activity nodes and along activity spines that promotes permeability, connectivity, walkability, social interaction and passive surveillance.
- Support the provision / improvement of public spaces within activity nodes and at public transport hubs to provide places of gathering and interaction for residents and other users.
- Improve the pedestrian infrastructure and public realm along activity spines through upgrading of sidewalks, provision of public lighting, appropriate landscaping and responsive built form.
- Encourage the development of a boulevard/avenue treatment along the main activity spines within the functional area.

4.6.3.5 Open Space / Amenity Nodes

Context and Challenges
The functional area has limited provision of open spaces and amenities for local communities and the key existing facilities include the Mpumalanga sports stadium, the Hammarsdale public park and sports fields associated with existing schools.

Objective and Guidelines
Retain, improve and expand the provision of open spaces and amenities within the functional area to provide opportunities for active and passive recreation, social interaction and civic engagement:

- **Town Centre Park** – develop an urban wetland park at the interface between the civic services centre and the new gateway along Kunene Avenue as the main focal civic and recreational space within the town centre.
- **Sports Complex** – upgrade the sports complex (including the stadium and associated existing/new facilities) and reinforce the linkage to the town centre park along Kunene Avenue.
- **Public Park** – maintain and upgrade access to the existing public park and play facilities in Hammarsdale.
- **Local Amenity Spaces** – develop local amenity spaces along the stream corridors to provide outdoor recreation and children play areas for adjoining residential areas. This amenity and play spaces should be accessible from the adjoining pedestrian links and residential streets.

4.6.3.6 Urban Street Network

Context and Challenges
The functional area has reasonably good road infrastructure in the developed areas but the existing network is coarse-grained, which reduces access, permeability and walkability. In the new development areas associated with the town centre precinct and northern expansion areas, the hilly
PREPARATION OF THE MPUMALANGA NORTHERN FUNCTIONAL AREA PLAN AND DRAFT SCHEME, INCLUDING THE MR385 EAST CORRIDOR PRECINCT PLAN: WARDS 4, 5, 7 AND 91

topography and significant environmental resources will shape the road alignments and street network patterns that can be achieved.

**Objective and Guidelines**

Develop an interconnected network of urban streets that provides structure and access to development areas in the new development areas associated with the town centre precinct and the urban expansion areas to the north:

- The needs for mobility and access will need to be balanced appropriately to ensure that the urban street network can perform effectively both as a movement link and a place for more intensive activities to concentrate.
- Urban streets will also function as local level public spaces to provide places for people to meet and children to play.
- Streets should be defined by adjoining built form to create spatial definition, enclosure and activation of the street space and to provide overlooking and passive surveillance.
- Main streets and activity spines should be landscaped to create a recognisable local character along the route.

### 4.6.3.7 Pedestrian Network

**Context and Challenges**

The functional area has limited pedestrian facilities and there is a lack of adequate and safe pedestrian infrastructure linking the main development nodes, public transport facilities and settlement areas. There is a lack of pedestrian infrastructure along MR385 and many of the other main roads within the functional area and high levels of vehicular and pedestrian conflicts, particularly along the higher order roads. The majority of the existing pedestrian paths are informal dirt tracks with no public lighting. The existing spatial structure and built form, including low development densities, large block sizes, spatial fragmentation, dispersed settlements, steep topography, etc., also undermines the creation of a supporting pedestrian environment by increasing walking distances, reducing overlooking of pedestrian routes, etc.

**Objective and Guidelines**

Develop walkable communities with a network of priority pedestrian routes linking the New Town Centre and interchange zone, the main development axes and nodes, the public transport hubs and facilities and the settlement and investment areas along the MR385 corridor and supported by a more fine-grained spatial structure and responsive built form:

- Encourage the development of a more fine-grained urban fabric with smaller development blocks that will facilitate pedestrian access and movement.
- Pedestrian routes should wherever possible be overlooked by adjoining adjacent development to provide passive surveillance and improve security.
- Pedestrian routes should have suitable surface treatments, public lighting and landscaping to provide durable and safe routes.
4.6.3.8 CHARACTER AREAS / SUB-PRECINCTS

**Context and Challenges**

The functional area contains a range of different local character area types, including formal residential areas, established industrial areas, newer logistics/business park areas, informal and peri-urban residential areas, rural/agricultural areas, etc. The key character areas have been identified and outlined in the tables and figures below.

**TABLE 23: LOCAL CHARACTER AREAS**

<table>
<thead>
<tr>
<th>Character Area</th>
<th>Key Features / Precinct Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mpumalanga</td>
<td>• New Town Centre and formal and informal residential settlement area</td>
</tr>
<tr>
<td></td>
<td>• Part of Precinct A1 in Mpumalanga LAP</td>
</tr>
<tr>
<td></td>
<td>• Includes Sub-Precincts A1, A2, A3 and B4 in Mpumalanga TCPP</td>
</tr>
<tr>
<td>Georgedale</td>
<td>• Formal and informal residential settlement area</td>
</tr>
<tr>
<td></td>
<td>• Part of Precinct A3 in Mpumalanga LAP</td>
</tr>
<tr>
<td>Hammers Estate</td>
<td>• Formal and informal residential settlement area</td>
</tr>
<tr>
<td></td>
<td>• Part of Precinct A3 in Mpumalanga LAP</td>
</tr>
<tr>
<td>Sankontshe</td>
<td>• Formal and informal residential settlement area</td>
</tr>
<tr>
<td></td>
<td>• Part of Precinct A3 in Mpumalanga LAP</td>
</tr>
<tr>
<td>Hammarsdale</td>
<td>• Industrial and formal residential area</td>
</tr>
<tr>
<td></td>
<td>• Part of Precinct A1 in Mpumalanga LAP</td>
</tr>
<tr>
<td>Key Stone Park</td>
<td>• Business park estate with logistics / warehousing development</td>
</tr>
<tr>
<td></td>
<td>• Part of Precinct B1 in Mpumalanga LAP</td>
</tr>
<tr>
<td>Rural / Agricultural</td>
<td>• Rural / agricultural area</td>
</tr>
<tr>
<td></td>
<td>• Part of Precinct B1 and Precinct B2 in Mpumalanga LAP</td>
</tr>
</tbody>
</table>
Objective and Guidelines
Develop recognisable and distinctive local character areas with their own unique character based on the land use activities, public realm, landscaping and built form treatments appropriate for each area. Table 24 indicates the guidelines for each local character area.

**TABLE 24: LOCAL CHARACTER AREA GUIDELINES**

<table>
<thead>
<tr>
<th>Character Area</th>
<th>Urban Design / Built Form Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mpumalanga Town Centre Precinct</td>
<td>Develop the town centre precinct as a vibrant and intensive mixed use urban hub with a permeable and fine-grained urban block structure in accordance with the provisions of the Mpumalanga TCPP.</td>
</tr>
<tr>
<td>Georgedale</td>
<td>Facilitate the intensification of complementary mixed uses along the MR431 activity spine, including higher density housing and local commercial activities and social facilities. Ensure that new development does not encroach into the road reserve and that buildings respond positively to the activity street. Upgrade the existing unsurfaced access routes and provide improved pedestrian sidewalks.</td>
</tr>
<tr>
<td>Hammers Estate</td>
<td>Maintain Hammers Estate residential area and improve road and pedestrian linkages with the new town centre and PT hub to the south, Hammarsdale and</td>
</tr>
<tr>
<td>Character Area</td>
<td>Urban Design / Built Form Guidelines</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Moya / Thandaza</td>
<td>Upgrade and develop the Moya / Thandaza residential areas through housing development, infrastructure upgrading and the provision of an urban street structure with pedestrian sidewalks and linkages to surrounding development nodes and public transport hubs. Facilitate the expansion of Moya / Thandaza to the north along a new linkage street and with more intensive urban housing options.</td>
</tr>
<tr>
<td>Sankontshe</td>
<td>Facilitate the intensification of complementary mixed uses along the MR430 activity spine, including higher density housing and local commercial activities and social facilities. Ensure that new development does not encroach into the road reserve and that buildings respond positively to the activity street. Formalise and upgrade the emerging activity node along the MR430 activity spine through public space, pedestrian, taxi rank and landscaping improvements. Maintain lower residential densities in the western parts of Sankontshe and upgrade access roads and pedestrian linkages.</td>
</tr>
<tr>
<td>Hammarsdale / Sterkspruit</td>
<td>Maintain and expand the Hammarsdale / Sterkspruit industrial areas through appropriate urban management, development of infill sites and expansion to the southeast and northwest. Promote the development of the Sterkspruit industrial area to provide for light industrial, warehousing, mini-factories and other small business opportunities. This will require a range of site and building size options, improved access and appropriate security solutions and estate management to create an attractive location for industrial and business investment.</td>
</tr>
<tr>
<td>Key Stone Park</td>
<td>Support the completion of the logistics/business park development with suitable landscaping along the edges with MR385 and internal road accesses.</td>
</tr>
<tr>
<td>MR385 West</td>
<td>Support the phased development of a new light industrial area at the northwest end of MR385 as an extension of the industrial growth of Cato Ridge village from the north. Create identifiable industrial neighbourhoods within each development block tied together by consistently landscaped linkage roads and pedestrian sidewalks.</td>
</tr>
<tr>
<td>Camperdown Rural / Agricultural</td>
<td>Develop a new urban street network to support the development of mixed uses and residential areas supported by open space amenities and social facilities. Encourage a finer grain of residential development along the existing and potential road linkages with medium densities and buildings located to define the street. Create identifiable neighbourhoods within each development block tied together by consistently landscaped linkage roads and pedestrian sidewalks. Ensure that building forms are appropriately sited and designed to avoid the creation of obtrusive developments within the landscape. Maintain the open space system and provide open space amenities at the interface between the open space system and development areas.</td>
</tr>
</tbody>
</table>
4.6.4 Residential Typologies

One of the stated objectives of the FAP is to propose how and where housing provision should happen. Population growth has been identified as one of the primary drivers of change in the area.

The SWOT analysis identified that at a Metro scale, the study area provides relatively affordable housing opportunities, although travel distances to other parts of the metro are lengthy. However, should the local economy grow as hoped, through proposed industrial development in particular, the attractiveness of the area as a residential location will increase.

Currently, the demographic profile of residents is fairly homogenous, and the majority of demand is projected to be within the public-sector housing spectrum. Existing settlements are stable in terms of population, and the projected demand is mostly in the form of demand for upgrading of existing settlements, new household formation from within the existing settlements, as well as similarly generated demand from the surrounding areas in the Outer West, particularly if infrastructure and service delivery in the study area is improved – which it will significantly, as the development of the proposed town Centre Precinct is implemented. The area is currently at a low average density with potential for densification and intensification of some existing areas, as well as green-field development potential on vacant land. It must be noted that the Mpumalanga LAP vision states that a range of lifestyle options, from semi-rural to urban, is retained as the area is developed.

A large proportion of the available land falls under the authority of the ITB, including a large portion of the Town Centre Precinct. This may be a challenge going forward, however the spatial development principles, in this and other previously adopted plans for the area, should apply whoever the landowner or developer is.

There is some existing demand in the GAP and middle-income markets from people employed in the industrial areas, however this will also increase with economic growth in the area, especially if the high road scenario is achieved. Demand for middle and upper income residential will mostly be for particular life-style options that may be offered through the private development of the conveniently located (close to the N3) Bartlett Estate lands.

There will be some implementation challenges in achieving medium and higher densities in public sector developments due to the policy and subsidy constraints, however these proposals are appropriate and defensible from the perspective of this FAP as a spatial plan. The implementation challenges will be addressed in later phases of the planning process.

Proposed residential densities and typologies respond to projected demand, proposed spatial principles, efficiency in terms of infrastructure provision, and specific character areas that comprise the study area. The proposed typologies and the rationale, are described in detail in the table below.

Figure 29 reflects the spatial location of the residential typologies described in Table 25.
FIGURE 29: RESIDENTIAL TYPOLOGIES LOCATIONS
### TABLE 25: RESIDENTIAL TYPOLOGIES

<table>
<thead>
<tr>
<th>SUBURB</th>
<th>RESIDENTIAL AREA</th>
<th>EXISTING SETTLEMENT PATTERN</th>
<th>EX DENSITY</th>
<th>PROPOSED LAND USE</th>
<th>TYPOLOGY</th>
<th>POTENTIAL BUILT FORM RESPONSES</th>
<th>TARGET USER GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ezintendeni</td>
<td>Mpumalanga</td>
<td>Low density single storey residential. Established substantial houses, as well as new building activity. Rural in character with traditional buildings on many sites. Level of services tbc.</td>
<td>17 du/ha (gross)</td>
<td>Transitional Settlement Consolidation over time Net density range – 15 – 40 du/ha</td>
<td>1-2 storey detached semi-detached, and row house type single residential houses with frontage onto the street, or panhandle, and private backyard Serviced plots for Incremental housing – extendable or adaptable units</td>
<td><img src="image1" alt="Image" /></td>
<td><img src="image2" alt="Image" /></td>
</tr>
<tr>
<td>Moya</td>
<td>Mpumalanga</td>
<td>Low density single storey residential. Established substantial houses, as well as new building activity. Rural in character with traditional buildings on many sites. Level of services tbc</td>
<td>9.4 du/ha (gross)</td>
<td>Low Impact Residential Existing Net density range is already at the proposed - between 10 and 25 du/ha Unlikely to intensify in the medium term</td>
<td>1-2 storey detached and semi-detached single residential houses Medium to wide frontage onto street, or panhandle, with private backyard</td>
<td><img src="image3" alt="Image" /></td>
<td><img src="image4" alt="Image" /></td>
</tr>
<tr>
<td>Thandaza</td>
<td>Mpumalanga</td>
<td>Dense, well established settlement. Informal in character, although there are substantial houses. Some traditional structures present. Level of service tbc</td>
<td>33.9 du/ha (gross)</td>
<td>Transitional Settlement Consolidation over time. Net density range – 15 – 40 du/ha</td>
<td>1-2 storey detached semi-detached, and row house type single residential houses with frontage onto the street, or panhandle, and private backyard Serviced plots for Incremental housing – extendable or adaptable units</td>
<td><img src="image5" alt="Image" /></td>
<td><img src="image6" alt="Image" /></td>
</tr>
<tr>
<td>SUBURB</td>
<td>RESIDENTIAL AREA</td>
<td>EXISTING SETTLEMENT PATTERN</td>
<td>EX DENSITY</td>
<td>PROPOSED LAND USE</td>
<td>TYPOLOGY</td>
<td>POTENTIAL BUILT FORM RESPONSES</td>
<td>TARGET USER GROUP</td>
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</tr>
<tr>
<td>Town Centre</td>
<td>Mpumalanga</td>
<td>Mostly vacant land</td>
<td>0 du/ha</td>
<td>Low Impact Residential</td>
<td>1-2 storey detached and semi-detached single residential houses. Individual street frontage with private backyard</td>
<td></td>
<td>A range of income groups from R1500pm upwards.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Medium Impact Residential</td>
<td>2-3 storey duplex, row house or townhouse. Attached and semi-detached buildings with shared street frontages and private or backyards.</td>
<td></td>
<td>BNG, GAP, middle income.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High Impact residential</td>
<td>2-4/5 storey walk-up apartments</td>
<td></td>
<td>New household formation from existing settlements, new households from the broader Mpumalanga area, new Mpumalanga residents from outside the area attracted by job opportunities.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EX DENSITY</th>
<th>PROPOSED LAND USE</th>
<th>TYPOLOGY</th>
<th>POTENTIAL BUILT FORM RESPONSES</th>
<th>TARGET USER GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 du/ha</td>
<td>Low Impact Residential</td>
<td>1-2 storey detached and semi-detached single residential houses. Individual street frontage with private backyard</td>
<td>A range of income groups from R1500pm upwards.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medium Impact Residential</td>
<td>2-3 storey duplex, row house or townhouse. Attached and semi-detached buildings with shared street frontages and private or backyards.</td>
<td>BNG, GAP, middle income.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High Impact residential</td>
<td>2-4/5 storey walk-up apartments</td>
<td>New household formation from existing settlements, new households from the broader Mpumalanga area, new Mpumalanga residents from outside the area attracted by job opportunities.</td>
<td></td>
</tr>
<tr>
<td>SUBURB</td>
<td>RESIDENTIAL AREA</td>
<td>EXISTING SETTLEMENT PATTERN</td>
<td>PROPOSED LAND USE</td>
<td>TYPOLOGY</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Medium Impact Mixed use</td>
<td>land uses with a target of 30% residential</td>
</tr>
<tr>
<td>SUBURB</td>
<td>RESIDENTIAL AREA</td>
<td>EXISTING SETTLEMENT PATTERN</td>
<td>EX DENSITY</td>
<td>PROPOSED LAND USE</td>
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</tr>
<tr>
<td>Camper-Down</td>
<td>Bartlett Estate</td>
<td>Rural / agricultural area.</td>
<td>0.3 du/ha</td>
<td>Medium Impact Residential within 200 m of a neighbourhood feeder road.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Extremely low density residential associated with farming activity.</td>
<td></td>
<td>Net density range</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bet between 20 and 40 du/ha</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Low Impact Residential</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Net density range</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bet between 10 and 20 du/ha</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mixed Use</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>40-80 du/ha</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2-4 storey walk-up buildings with min 50% residential</td>
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<tr>
<td>SUBURB</td>
<td>RESIDENTIAL AREA</td>
<td>EXISTING SETTLEMENT PATTERN</td>
<td>EX DENSITY</td>
<td>PROPOSED LAND USE</td>
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</tr>
<tr>
<td>Cemetery site</td>
<td>Vacant</td>
<td></td>
<td></td>
<td>Low Impact Mixed Use</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Medium Impact Residential</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Net density range</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Between 20 and 40 du/ha</td>
</tr>
<tr>
<td>SUBURB</td>
<td>RESIDENTIAL AREA</td>
<td>EXISTING SETTLEMENT PATTERN</td>
<td>EX DENSITY</td>
<td>PROPOSED LAND USE</td>
</tr>
<tr>
<td>----------------</td>
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<td>---------------------------------------------------------------------------------------------</td>
<td>------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>Georgedale</td>
<td>Formal and informal residential settlement area. Part of Georgedale was an in-situ upgrading project, and has been formalized to an extent. Future in-situ upgrading phases are proposed. Density varies across the area. Parts are dense, and many houses appear to have additional rooms, possibly for rent. Mixed use commercial activity is evident along the main roads.</td>
<td>16.03 du/ha (gross)</td>
<td>1-2 storey detached semi-detached, and row house type single residential houses with frontage onto the street, or panhandle, and private backyard. Serviced plots for Incremental housing – extendable or adaptable units.</td>
<td>Low impact Mixed use along the main access spine.</td>
</tr>
<tr>
<td>SUBURB</td>
<td>RESIDENTIAL AREA</td>
<td>EXISTING SETTLEMENT PATTERN</td>
<td>PROPOSED LAND USE</td>
<td>TYPOLOGY</td>
</tr>
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<td>-----------------</td>
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<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Hammers Estate</td>
<td>Town Centre</td>
<td>Formal and informal residential settlement area.</td>
<td>Low Impact Residential&lt;br&gt;Net density range&lt;br&gt;Bet ween 10 and 20 du/ha</td>
<td>1-2 storey detached and semi-detached single residential houses. Individual street frontage with private backyard</td>
</tr>
<tr>
<td>Hammers Estate</td>
<td>Mini Town</td>
<td>Part of Hammers Estate was an in-situ upgrading project, and has been formalized. Future in-situ upgrading phases are proposed. Likely to intensify in the medium term. Existent density varies across the area. Parts are extremely low density and rural in character. Level of service varies. Informal areas not subject to upgrading assumed to have be unserviced</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUBURB</td>
<td>RESIDENTIAL AREA</td>
<td>EXISTING SETTLEMENT PATTERN</td>
<td>EX DENSITY</td>
<td>PROPOSED LAND USE</td>
</tr>
<tr>
<td>-----------------</td>
<td>------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
<td>------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Sankontshe</td>
<td>Eastern</td>
<td>Formal and informal residential settlement area.</td>
<td>7.77 du/ha</td>
<td>Transitional Settlement</td>
</tr>
<tr>
<td></td>
<td>Western</td>
<td>Part of Sankontshe has been formalized to an extent via in-situ upgrading. Future in-situ upgrading phases are proposed.</td>
<td></td>
<td>Consolidation over time. Net density range – 15 – 40 du/ha</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Density varies. The upgraded part is denser than the informal parts. Some parts are extremely low density and rural in character.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>The land is very steep. Level of service varies. Informal areas not subject to upgrading are un-serviced.</td>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Notes:**
- **Sankontshe:** A range of income groups from R1500pm upwards.
- **BNG, GAP, middle income:** Mostly existing population, including new household formation from the broader Mpumalanga area
- **A range of income groups from R1500pm upwards:** Mostly existing population, including new household formation
<table>
<thead>
<tr>
<th>SUBURB</th>
<th>RESIDENTIAL AREA</th>
<th>EXISTING SETTLEMENT PATTERN</th>
<th>EX DENSITY</th>
<th>PROPOSED LAND USE</th>
<th>TYPOLOGY</th>
<th>POTENTIAL BUILT FORM RESPONSES</th>
<th>TARGET USER GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mpumalanga</td>
<td>Hammarsdale</td>
<td>Established formal residential areas associated with the Hammarsdale Industrial area. Range of typology, density and values. Mostly single storey with limited double storey development. Existing Net density range Bet ween 10 and 15 du/ha.</td>
<td>2.02 du/ha (gross)</td>
<td>Low Impact Residential Proposed density between 10 and 25 du/ha</td>
<td>1-2 storey detached and semi-detached single residential houses. Individual street frontage with private backyard</td>
<td>1-2 storey duplex, row house or townhouse. Attached and semi-detached buildings with shared street frontages and private or backyards.</td>
<td>A range of income groups from GAP to middle and high income. R5000 upwards</td>
</tr>
</tbody>
</table>

| | | | | Low Impact Residential Proposed density between 10 and 25 du/ha | | | | |
| | | | | Medium Impact Residential Proposed Net density range Bet ween 20 and 40 du/ha | | | | |
4.7 INCORPORATING THE SURROUNDING PLANS

This Functional Area Plan falls under the greater Mpumalanga Local Area Plan as reflected previously in this report. However, the Mpumalanga Local Area is not the only space that has received attention from the Municipality in recent years. The following plans have been prepared and link into the Study area.

- Cato Ridge LAP (CRLAP)
- Cliffdale Framework Plan

In terms of the above, the Cato Ridge LAP is in the process of finalisation and as such we are unable to include a final version of this in this report. However, a draft version of the plan has been made available and there are no contradictions between these plans. Whilst this report is unable to reflect the Cato Ridge LAP at this stage, the following plan reflects the overall land uses as comments based on the latest information. It is noted that the area adjacent to Mpumalanga FAP seen as primarily industrial and open space, and that there are no contradictions between the LAP and the MLAP. The plan below will be amended based on the final CRLAP to ensure consistency.

With regards to the Cliffdale Framework Plan, this has been captured based on the GIS information received in July 2017. There is in fact an overlap between the Cliffdale plan and the Mpumalanga Functional Area Plan- specifically at Keystone Industrial Park. However, the overlap does not reflect a contradiction in uses.
Cato Ridge LAP-
Area adjacent to Mpumalanga FAP seen as primarily industrial and open space

FIGURE 30: CONTEXTUALISING THE FAP AGAINST OTHER PLANS
4.8 Functional Area Plan

Figure 31 indicates the Functional Area Plan for the Northern Functional area. This is a culmination of the key features from the Land Use Framework, Access and Mobility Framework and Open Space and Environmental Framework in a consolidated conceptual framework plan. It is noted that it does not necessarily include all of the elements described in throughout the report. As such, the plan needs to be understood in relation to the various other issues and concepts described throughout this report, and in particular sections 4.2 to 4.6.

It is of particular importance to note the following:

- The Open Space network shall be groundtruthed further at the development application stage, and may be subject to change.
- The plan should be read with DMOSS as an approved spatial overlay.
- The interface between the Open Space and built environment shall be carefully managed to ensure minimal impact on the environment.
- The Road network is subject to detailed design and all necessary authorisations or approvals.
- With regards to the Medium Impact Residential lands proposed south of the Uitkomst Conservation Area, the following applies:
  - Any development in this area must be done in such a manner that prevents any encroachment into the adjacent properties. This could be through active enforcement of the boundaries, appropriate hard structures, e.g. suitable fencing.
  - It is advisable that the development of the area be proceed with in a manner that takes into consideration the needs of the surrounding community and the adjacent critically endangered ecosystems. Impacts are to be minimised and carefully planned. Any development plans and layout must be supported by eThekwini’s Environmental Planning and Climate Protection Department.
  - It is further advised that development must follow a phased approach that looks holistically at the broader area. There can be significant densification of the surrounding properties to meet housing needs before undertaking the development of this particular site.

With regard to the proposed road linkages from MR385 to facilitate development to the west of Hammarsdale and Keystone Park, these will be subject to the following provisions and requirements:

- The FAP provides for new road linkages along MR385 to service future development west of Hammarsdale and Keystone Park. This includes a new road linkage servicing the industrial lands west of Hammarsdale and two new road linkages servicing the proposed mixed use node west of Keystone Park and the future residential development area west of this mixed use node.
- The high level traffic assessment undertaken for the project has confirmed that the estimated development bulks within the area could be accommodated through the provision of one signalised intersection at the northern entrance and one left-in, left-out intersection at the southern entrance. Nonetheless, in order to reduce the need for right turning lanes at the
northern entrance and to provide a higher level of access to the proposed mixed use node, the preference would be to obtain two signalised intersections instead.

- It should also be noted that areas within an existing planning scheme are classified as urban while those outside of a formal planning scheme are considered rural. The road junction spacing requirement for a Class 2 rural road is 800m (+- 15%) and for a Class 3 urban road is 600m (+- 20%), as per the SA RCAM Manual. The lands along MR385 east corridor will accordingly need to be incorporated into an urban planning scheme before the road junction spacing of 600m (+- 20%) for urban areas can be applied to service future urban development on these lands. The requirements of Act 70 of 70 will also need to be complied with in relation to the incorporation of the MR385 east corridor into the planning scheme.

- It is also recommended that a project be undertaken to assess the feasibility, alignment, safety and capacity of the proposed road junctions along the MR385 east corridor. In the event that this assessment indicates that any changes are needed to the road junctions and layout and that this requires changes to the land use proposals, this will need to be addressed as part of a review of the FAP.
All proposed new road alignments are subject to detailed design and all necessary authorisations.

Open Space System subject to change on detailed assessment.

FIGURE 31: MPUMALANGA NORTHERN FUNCTIONAL AREA PLAN
5 CONCLUSION AND WAY FORWARD

The Mpumalanga North Functional Area Plan is intended to provide a framework for guiding optimal development related to the strategic opportunities of the growth of the region. The FAP has responded to environmental constraints and opportunities as a primary determining factor in defining the suitability of land for development due to the poor environmental quality of both the aquatic network and the need to service a projected population increase with adequate environmental services and amenity. The mobility and access frameworks respond to the significant mobility proposals emanating from the Mpumalanga Local Area Plan and IRPTN. The proposals have been interpreted and incorporated with some adjustments recommended in terms of alignment and updating and with an attempt being made to build on this work by refining an understanding of the functional roles the different components of this network will play.

It is noted that there are a number of potential initiatives being worked on through various entities that may affect the plan. These include but are not limited to:

1. eThekwini Road Alignment upgrades of the MR385
2. IRPTN Proposals
3. EPCPD projects in the study area

It is also stressed that the relocating of the kwaThandaza railway station needs further detailed investigation in terms of undertaking a thorough cost-benefit analysis. Whilst the relocating of the station may be a costly exercise (as noted in section 4.3.), it would play a role in improving the urban fabric, connectivity and access and help create the town centre. In terms of the Mpumalanga Town Centre Precinct Plan, this station is reflected as relocated. However, this requires further engagement with Transnet in order to fully understand the financial implications. It is thus recommended that further work be undertaken in order to reach a sound conclusion to this issue. The Functional Area Plan is flexible enough to accommodate the relocation or non-relocation of the station.

Once the above (and other potential projects) are completed, there may be a need to refine the Functional Area Plan if there are significant changes to the current information available. However, if the changes are not significant enough to warrant a change, then the high level/strategic nature of the plan should be sufficient to assist the Municipality in assessing development applications (which is the key aspect of the FAP and draft Scheme Toolkit).

The proposed land uses respond to the primary demands for Housing on one hand and Industrial and related land uses, including business, warehousing and logistics on the other. The distribution of these land uses responds to the need to maximise on the opportunities for mobility and access. Projected population figures have been estimated and an assessment of social facility requirements generated from this. Potential floor areas have been projected based on indicative land uses and provisional land use controls. The information generated and the lessons learned will carry through into the preparation of the corridor plan as well as the Draft Scheme (both as subsequent phases of the project). The phasing, infrastructure requirements and project plan which will be prepared to ensure that the proposals that emanate from the FAP are implementable.
The development of future residential areas, mixed use nodes and/or industrial/business parks in different parts of the functional area will need to be guided by appropriate urban design guidelines to ensure that both the built form and landscape can be designed to facilitate the creation of human-scale, attractive, safe and integrated human settlements. The Mpumalanga LAP provides the following guidelines for these areas:

6.1.1 Residential Areas

1. Layout and Character (Block and Subdivision Layout and Land Use)

   1. Residential areas should be designed as **neighbourhoods that form part of an identifiable “village”** (urban or suburban) and which has a distinctive character. The character should be determined by the type and scale of streets, mix of building typology, landscaping, and by a mix of residential densities.

   2. The character of residential areas/neighbourhoods or parts thereof should reflect the location of the neighbourhood in the precinct in which it is situated, and it should display clearly its urban and/or suburban features.

   3. Residential areas should be structured by a hierarchical road and pedestrian network.

   4. The structure of residential areas should be articulated by the location of community facilities and public places in central and or accessible locations which provide landmarks and legibility to the neighbourhood.

   5. The structure of residential areas should be articulated by the shape, extent and potential use of the proposed open space network of the precinct within which it falls i.e. active open space or natural open space.

   6. Higher density areas should be located in and around mixed-use nodes and along public transport routes. Lower density areas should be located adjacent to rivers, streams and valleys, on steeper slopes, i.e. adjacent to the proposed open space system. Densities should align with the Land Use Framework and be sensitive to the local context, available infrastructure and services, etc.

   7. The layout of residential areas should respond clearly to important view sheds and vistas.

   8. Wherever possible existing vegetation or distinctive site features should be incorporated into the layout of the area. Landscaping should be indigenous in keeping with the sub-tropical character of the area.

2. Public Realm

   1. Streets, squares and parks should generally be treated as part of the overall open space system to provide linkage and structure to neighbourhoods.
2. Lower order streets and streets serving higher densities should be designed as multifunctional spaces to accommodate parking, play spaces etc.
3. Streets and spaces should accommodate pedestrian activity in accordance with the role of the road/street in the overall precinct movement network.
4. Streets and public spaces should incorporate facilities for public transport and provision for disabled persons.
5. Landscaping should provide protection from climatic conditions of wind and sun and create street character and identity.
6. Lighting should be commensurate with the function of a street and/or public space.
7. Access and circulation networks and infrastructure for pedestrians and vehicles should be clearly differentiated.
8. Pedestrian route design should be integrated with overall neighbourhood design to ensure comfort and convenience for pedestrians and appropriate linkage with surrounding neighbourhoods.

3. Built Form

1. Building massing, and hence density, should conform to the density distribution guidelines in the Land Use Framework and be responsive to local circumstances.
2. Built form in higher density areas should be medium rise in accordance with location to other uses and activities in the area and should be used to define the character of the neighbourhood.
3. Building frontages, particularly in medium and high-density typologies, should contribute to the public nature of streetscape. This can be accomplished through locating entrances at street level and through ensuring maximum surveillance of the street from units facing the street.
4. Building forms (in conjunction with the use of appropriate material, colours and textures) should be articulated and modulated to ensure a human scale and to merge in with surrounding landscape.
5. Built form in low density areas should be conceived of as “elements in the landscape” and should be unobtrusive in terms of massing, colours and materials.
6.1.2 MIXED USE NODES

1. Layout and Character (Block and Subdivision Layout and Land Use)

   1. Nodes should be designed and developed as “village or town centres” which display an integrated and cohesive character including a “high street”, public squares and spaces, fine grain block and subdivision pattern, fine grain building scale, identifiable townscape/landscape character, extensive tree planting, high levels of pedestrian orientation, mixes of building type and activity, including residential, and provision for public transport. The character should reflect its role in the municipal area and/or the surrounding settlement, i.e. urban, local, etc.

   2. Node developments should include a landmark element(s) that indicates its location in the district or neighbourhood in which it is located. This could be in the form of an appropriately scaled tower building, flagpole or gateway structure/feature.

   3. Node gateways/entrances should be clearly visible and celebrated through the use of landmark landscaping elements (planting or structural) and/or through the appropriate siting of buildings.

   4. Node edges should include interfaces that are integrated with and sympathetic to surrounding residential areas in terms of access and movement, scale of built form, scale and type of landscaping.
5. Edges and interfaces with limited access roads should be landscaped and/or architecturally treated to contribute to the experience of the road users. No service areas should face on to these roads unless adequately and appropriately screened.

6. Service areas should be hidden from view and should not impact on public spaces or on adjacent development or roads by way of noise, visual intrusion, smell, etc.

7. Views lines in and out of the node onto landmark features or of special features/viewsheds of the node or of its surroundings should be accommodated in the layout of the node so as to encourage integration with the surroundings.

8. Land use mixes should reflect the role and hierarchy of the node.

9. Wherever possible existing vegetation or distinctive site features should be incorporated into the layout of the node. Landscaping should be indigenous in keeping with the sub-tropical character of the area.

2. Public Realm

1. Streets, squares and parks should generally be treated as part of an integrated open space system to provide “linkage and structure” to the node, but also as the spaces in which public life occurs.

2. Streets and spaces should accommodate pedestrian activity in accordance with the role of the road/street in the overall precinct movement network.

3. Streets and public spaces should incorporate facilities for public transport and provision for disabled persons.

4. Hard (square) and soft (parks) public spaces and parking areas should be designed as focal points within the open space system linked together with streets as part of the overall public space system.

5. Street and public place design including landscaping should reflect a community/public character and scale.

6. Landscaping should provide protection from climatic conditions of wind and sun and create street character and identity.

7. Lighting should be commensurate with the function of a street and/or public space.

8. Access and circulation networks and infrastructure for pedestrians and vehicles should be clearly differentiated. Pedestrian routes should be designed to ensure comfort and convenience for pedestrians and should not be provided as an afterthought.

9. Pedestrian movement should be integrated with surrounding areas and landscaping should contribute to movement hierarchy and to protection from sun and wind and should contribute to safety and security through lighting and appropriate route location.

10. Parking areas should be integrated with the node fabric as public space. They should be landscaped to prevent heat build-up, to attenuate storm water and to integrate building clusters.
3. **Built Form**

1. Built form in nodes should be concentrated and compact so as to define public spaces and places between them and so as to convey their public status in the landscape.

2. Built form should be fine “grain” and human scale – either as a collection of small buildings grouped tightly together or as larger buildings with fine grain modulation of facades and elevations.

3. Buildings should accentuate the role and character of the node with respect to scale and building typology.

4. Building massing and its articulation should be used to integrate nodes with surrounding residential areas. There should be no “back of building” conditions.

5. Built form should be used to articulate and/or celebrate gateways and intersections and should provide landmark features within the overall settlement fabric.

6. Ground floor uses of buildings should be pedestrian oriented uses that provide interest, generate street activity and ensure surveillance of the street or public place onto which they face.

7. Roofs should be integrated with surrounding buildings and environments in terms of shapes and sizes, elevations, colours and textures so as to create an unobtrusive but interesting contribution to the landscape.

![Figure 33: Potential Mixed Use Built Form Response](image-url)
6.1.3 **INDUSTRIAL/BUSINESS PARKS**

1. **Layout and Character (Block and Subdivision Layout and Land Use)**
   
   1. Industrial/Business Parks should be designed and developed to display an integrated and cohesive character. The character should reflect its role in the municipal area and/or the surrounding settlement, i.e. urban, local etc.
   
   2. Although Industrial/Business Parks will predominantly consist of general industrial, light industrial, warehousing, logistics and office uses, it should also accommodate other support uses, including commercial, recreation, social and high density residential components, to create an environment that meets a range of employees’ needs (e.g. restaurants, shops, child care facilities, gyms/recreation centres), facilitates a more vibrant atmosphere, and allows for 24 hour use of the area, improving security and safety.
   
   3. Industrial/Business Park layout should provide for human-scale public squares and spaces, a fine grain block and subdivision pattern, fine grain building scale, identifiable townscape/landscape character, extensive tree planting/landscaping, high levels of pedestrian orientation, mixes of building type and activity, including residential, and provision for public transport.
   
   4. Industrial/Business Park developments should include a landmark element(s) that indicates its location in the district or neighbourhood in which it is located. This could be in the form of an appropriately scaled tower building, flagpole or gateway structure/feature.
   
   5. Industrial/Business Park gateways/entrances should be clearly visible and celebrated through the use of landmark landscaping elements (planting or structural) and/or through the appropriate siting of buildings.
   
   6. Wherever possible existing vegetation or distinctive site features should be incorporated into the layout of the Industrial/Business Park. Landscaping should be indigenous in keeping with the subtropical character of the area.
   
   7. Industrial/Business Park edges should be integrated with, and sympathetic to, surrounding and internal residential areas and developments in terms of access and movement, scale of built form, and scale and type of landscaping.
   
   8. Site design should ensure compatible transition from light industrial/warehousing uses to less intensive land uses, using streets, landscape features, open space/recreation areas or landscaping to effectively buffer uses.
   
   9. Sites used for light industrial and warehousing purposes should be orientated towards access roads, and should not be accessible through residential streets.
   
   10. Edges and interfaces with limited access roads (e.g. N3/MR385) should be landscaped and/or architecturally treated to reduce visual impact and contribute to the experience of the road users. No service areas should face on to these roads unless adequately and appropriately screened.
   
   11. Service areas should be hidden from view and should not impact on public spaces or on adjacent development or roads by way of noise, visual intrusion, odour, etc.
12. Views lines in and out of the Industrial/Business Park onto landmark features or of special features/views of the Industrial/Business Park or of its surroundings should be accommodated in the layout of the Industrial/Business Park so as to encourage integration with the surroundings.

13. A mix of site sizes should be provided to allow for a range of development options.

14. A land use mix on large sites should be encouraged to blend industrial, warehouse and office uses with supporting uses creating a more human-scale and employee-friendly environment (multipurposed facilities).

2. Public Realm

1. Streets, squares and parks should generally be treated as part of an integrated open space system to provide “linkage and structure” to the node, but also as the spaces in which public life occurs.

2. Streets and spaces should accommodate pedestrian activity in accordance with the role of the road/street in the overall precinct movement network.

3. Streets and public spaces should incorporate facilities for public transport and provision for disabled persons.

4. Hard (square) and soft (parks) public spaces and parking areas should be designed as focal points within the open space system linked together with streets as part of the overall public space system.

5. Street and public place design including landscaping should reflect a community/public character and human scale.

6. Landscaping should provide protection from climatic conditions of wind and sun and create street character and identity.

7. Lighting should be commensurate with the function of a street and/or public space.

8. Access and circulation networks and infrastructure for pedestrians and vehicles should be clearly differentiated. Pedestrian movement should be integrated with surrounding areas, and pedestrian routes should be designed to ensure comfort and convenience for pedestrians and should not be provided as an afterthought.

9. Landscaping should contribute to the movement hierarchy, to protection of pedestrians from sun and wind and should contribute to safety and security through lighting and appropriate route location.

10. Public parking areas should be integrated with the Industrial/Business Park developments as public space. They should be landscaped to prevent heat build-up, to attenuate storm water and to integrate building clusters. Extensive parking areas in front of buildings should be broken up into smaller components and/or placed behind buildings to improve the human scale and the integration of elements within the Industrial/Business Park.
3. **Built Form**

1. Built form in Industrial/Business Parks should be as concentrated and compact as possible (within the limitations of the type of use) so as to define public spaces and places between them, and to create a human scale.

2. Built form should be fine “grain” and human scale – either as a collection of small buildings grouped tightly together or as larger buildings with fine grain modulation of facades and elevations.

3. Buildings should accentuate the role and character of the Industrial/Business Park through building design, scale and typology.

4. Built form should be used to articulate and/or celebrate gateways and intersections and should provide landmark features within the overall settlement fabric.

5. Building orientation and massing should be used to integrate the Industrial/Business Park with surrounding residential areas and other uses. Large and bulky industrial buildings and ancillary structures should be oriented away from residential development/areas to avoid a negative visual impact.

6. A back-to-back relationship between light industrial and residential buildings is preferable where transitional uses are not in place, but may require substantial screening of unsightly views to ensure compatibility.

7. Buildings (including main entrances and pedestrian access) should be oriented towards the street. There should be no “back of building” conditions, or if this is unavoidable appropriate screening should be used to ensure no negative visual impact to adjacent uses.

8. Ground floor uses of commercial or mixed-use buildings should be pedestrian oriented uses that provide interest, generate street activity and ensure surveillance of the street or public place onto which they face.

9. Roofs should be integrated with surrounding buildings and environments in terms of shapes and sizes, elevations, colours and textures so as to create an unobtrusive but interesting contribution to the landscape.
FIGURE 34: POTENTIAL INDUSTRIAL/BUSINESS PARK BUILT FORM RESPONSE