uMGUNGUNDLOVU
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DISTRICT MUNICIPALITY
DISTRIK MUNISIPALITEIT

ENVIRONMENTAL MANAGEMENT FRAMEWORK FOR THE UMGUNGUNDLOVU DISTRICT MUNICIPALITY

Environmental Management Framework Report

JULY 2017

Institute of Natural Resources

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Prepared For

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Project Steering Committee (PSC) Members.

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EXECUTIVE SUMMARY

INTRODUCTION

The uMgungundlovu District Municipality (uMDM) has set as its long term vision the following: "*The uMDM will evolve into a dynamic metropolitan area, spreading its vibrant economic benefits to its citizens and places and will, through concerted integrated development and service delivery, realise improvement in the overall quality of life" (uMDM, 2016)*[1]

The uMDM has further adopted the seven strategic goals of the Provincial Growth and Development Plan (PGDP) to guide the District's response to key challenges to fulfilling this vision. These include "*Goal 5: Environmental Sustainability*". The vision and goals are further supported by five pillars that include the 3rd Pillar "*Balanced and sustainable development, green economy and a garden-city model that is in harmony with nature*".

The uMDM commissioned the development of a Strategic Environmental Assessment and Management Plan (SEA & SEMP)[2] to serve as a tool for giving effect to these environmental sustainability goals. The SEA & SEMP was completed in 2013. The uMDM together with the KwaZulu-Natal Department of Economic Development and Tourism (EDTEA) identified the need to build on the outcomes of the SEA & SEMP by translating the outcomes into an Environmental Management Framework (EMF).

PURPOSE OF AN EMF

The EMF Regulations of 2010 promulgated under the National Environmental Management Act (Act No 107 of 1998) defines an EMF as "*the study of the biophysical and sociocultural systems of a geographically defined area to reveal where specific land uses may best be practiced and to offer performance standards for maintaining appropriate use of such land".*

PURPOSE OF AN ENVIRONMENTAL MANAGEMENT FRAMEWORK

The EMF regulations, 2010 (Section 2) list the purpose of the regulation as: *Compilation of information and maps specifying the attributes of the environment in a particular geographical area:*

a) *For such information to inform environmental management, and*
b) *For such maps and information to be used as environmental management frameworks in the consideration of applications for environmental authorisations in or affecting the geographical areas to which those frameworks apply.*

Section 2 (3) further explains that EMFs are aimed at:

a) Promoting sustainability.
b) Securing environmental protection.
c) Promoting cooperative environmental governance.

[1]Integrated Development Plan for uMgungundlovu District Municipality. The Comprehensive 2017/12018 – 2021/22 Five Year IDP – 4th Generation. Accessed on 9 May 2017 from http://www.umdm.gov.za/Official_Site/index.php/idp/draft-comprehensive-idp-2017-2018-to-2021-2022

[2]Umgungundlovu District Municipality. December 2012. Strategic Environmental Assessment Report: for the Umgungundlovu District Municipality Strategic Environmental Assessment and Management Plan. Isikungusethu Environmental Services (Pty) Ltd and Zunckel Ecological and Environmental Services, Pietermaritzburg.

EMF PROCESS

The EMF guidelines summarize the steps, process and outputs required for an EMF to be gazetted. The guideline further recognises that the nature of the EMF is context specific. An important aspect of the pre-inception phase is therefore defining the terms of reference or scope of work. This step is particularly important in the case of the uMDM given that the various phases of the EMF process were completed under two separate contracts over a period of 5 years extending from 2012 to 2017. These phases, the responsibility, timing and outputs are summarized in the following Table.

Summary of EMF Phases, Outputs, Responsibilities and Timing

PHASE	PURPOSE & OUTPUTS	RESPONSIBILITY	TIMING
1. Pre-EMF Phase	▪ Achieve delegated responsibility for the initiation of the EMF process. ▪ ToR for the EMF based on a review of the SEA & SEMP process and outcomes.	▪ EDTEA and DEA ▪ EDTEA, UMDM and key government sector departments.	▪ Letter of delegation issued in 2016 ▪ ToR Issued in 2015
2. Inception Phase	▪ Establish common understanding of the desired outcomes, approach and methods for achieving these & project management systems.	▪ INR	▪ Final inception report - August 2016
3. Status Quo Assessment	▪ Map, classify and define conservation value and sensitivity of environmental systems & features, environmental quality and dev drivers in terms of: o Natural Capital (topography, climate, geology and land types, hydrology and water resources, and air quality; biophysical environment (vegetation and habitat types, species of special concern, protected areas and other conservation areas, biological corridors, sensitive ecosystems and the Biodiversity Sector Plan) o Cultural Heritage. o Socio-economic environment; o Agriculture and land use. o Planning framework.	▪ Isikungusethu Environmental Services (IES) Ltd & Zunckel Ecological and Environmental Services (ZEES)	▪ Status Quo Report February 2012
4. Desired Future State	▪ Undertake a strategic assessment to identify key sustainability issues. ▪ Establish the Desired Future state in terms of the sustainability issues identified. The DSF is provided in the form of a sustainability framework that sets out a vision, sustainability objectives, indicators and targets for each issue.	IES & ZEES	Strategic Environmental Assessment and DFS Report - September 2013
5. Strategic Environmental Management Plan (SEMP)	▪ Define the strategies and actions required to give effect to the sustainability objectives established for each Strategic Priority defined in the SEA/DFS process.	IES & ZEES and Departmental Task team.	SEMP - September 2013
6. Draft Environmental Management Framework	▪ Environmental Management Framework Report (this document) and supporting documents/tools including: o Volume I: SEA & SEMP o Volume II: Environmental Sensitivity Zones and Guidelines	Institute of Natural Resources (INR) including PPP Report. o Vol I: EIS and ZEES o Vol II:INR o VolI: INR o Vol IV INR o Vol V: INR and IES.	Finalised July 2017.

		○ Volume III: Environmental Guideline for Development Planning ○ Volume IV: Decision Support Tool		
7.	**Gazetting the EMF**	▪ This final step falls outside the scope of the INR appointment.	▪ EDTEA, UMDM and DEA.	▪ To be confirmed.

OVERVIEW OF THE EMF

The EMF study is comprised of several volumes and tools that fulfil the requirements of the EMF Regulations, 2010 and the purpose of the EMF.

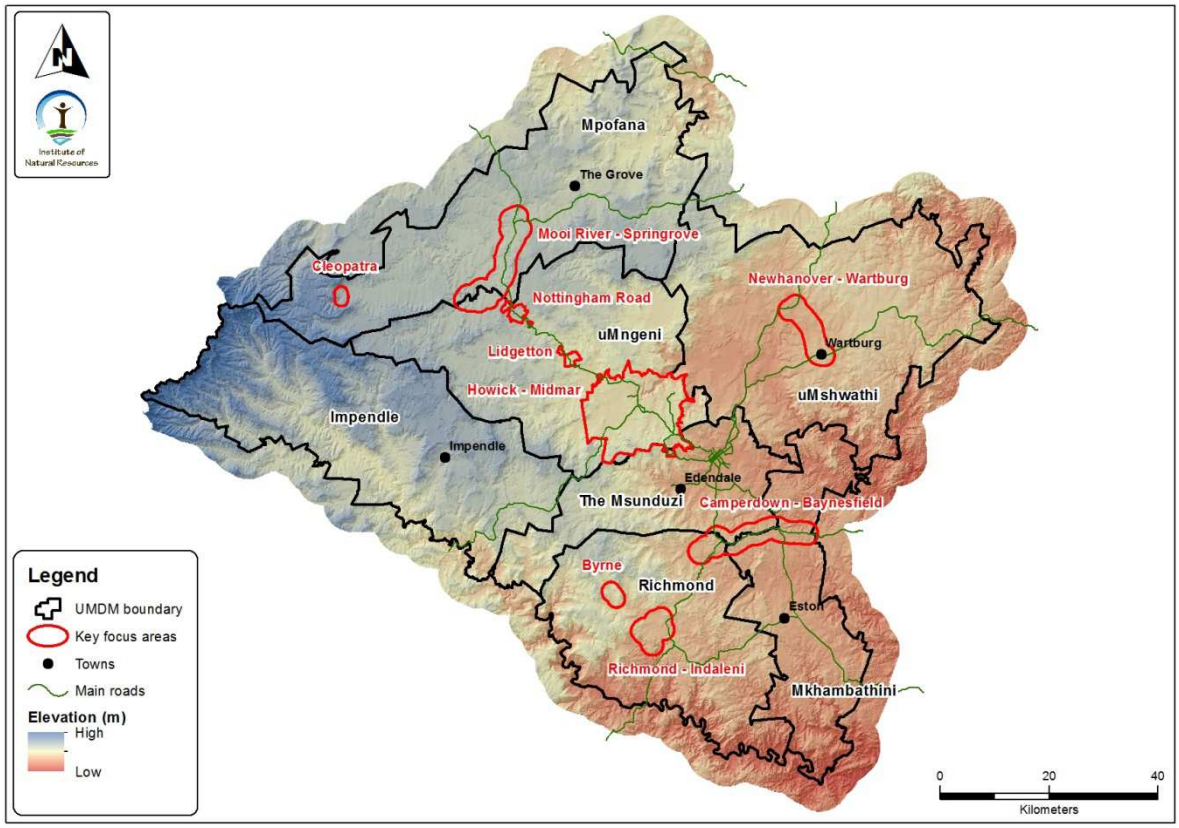
PURPOSE OF THIS REPORT

This document is the overarching EMF report which: summarises the various phases, the purpose, the outputs of each and guidance on how to use them, as well as the relationship between the various outputs

PROJECT AREA

The Project area is the entire extent of the uMgungundlovu District Municipality Boundary, noting the following exclusions and areas of focus. The uMsunduzi local Municipality is exclude due to the fact that a high resolution, gazetted EMF exists for this area. Increased attention has been allocated to mapping and defining environmental features in several Key Focus Areas in the District. This is because these areas are receiving higher development pressure than the remainder of the District and the aim is to increase confidence in decision making in these KFAs. These Key Focus Areas (KFAs) are indicated with red boundaries and text in Figure 3 and include:

- Midmar;
- Howick and Hilton area;
- The small outlying towns of Mooi River/Nottingham Road; Richmond/Byrne; and, New Hanover/Wartburg,
- A small area in the upper Kamberg Valley titled 'Cleopatra".



STATUS QUO PHASE

Headline findings from the status quo process are summarized as follows:

- ***Natural Capital:***

  Terrestrial Systems

  - A conservative estimate of the current situation may be that more than 50% of the pristine natural land cover of the uMDM has been lost to a combination of transformation and degradation.
  - In conjunction with this has been a decrease in the cover of natural vegetation, primarily grasslands, and an increase in that which is considered degraded
  - There is a scattering of a variety of protected areas throughout the uMDM that range in size and status from a sizable portion of the uKhahlamba Drakensberg Park World Heritage Site. The 33 protected areas make up close to 110,000 hectares which is 11.5% of the uMDM area. Based on the international target of 10%, this coverage appears to be impressive.
  - However, the Biodiversity Sector Plan for the uMDM and the Protected Area Expansion Strategy for the province indicate that the current protected area coverage is not meeting the biodiversity conservation targets for the uMDM, and that additional coverage is required

  Aquatic Systems

  - The upper reaches of the catchments that provide the water are in a poor condition with alien plant infestations accounting for losses in water production together with incompatible land uses and degradation contributing to both a decrease in water production capacity as well as quality.
  - Intensive agricultural practices such as dairies, poultry batteries and piggeries all contribute to releasing pollutants into the system in the upper reaches of the catchments, while the urban centres all contribute industrial and human waste.
  - In the lower reaches of the catchments other agricultural activities such as sugar cane production contribute to reduced water quality through the leaching of agricultural chemicals.

  In summary, aquatic systems in the uMDM are extremely stressed due to the fact that demand far exceeds supply which exacerbates the water quality issues described above

- ***Cultural Heritage***
  - One thousand and fifty heritage sites were identified but most of these are architectural in nature and are concentrated in the urban areas.
  - The issue therefore is the lack of information regarding the broader suite of heritage resources.

- ***Agriculture***
  - The district is inclusive of rich agricultural resources
  - These resources are under threat in the District particularly in and around the nodal areas and the major transportation corridors.
  - These agriculture and natural resources have not been assigned a realistic value by society.

- ***Socio-economic Environment***

Demographics

- The population demonstrates a youthful age-gender profile with the emphasis on the younger working-age groups and a dominance of females in the older age groups.
- This profile has implications for HIV-Aids infection levels and the negative impact that this could have on the economy and the younger generations.

Spatial distribution

- The highly concentrated nature of settlement in the primary and secondary centres of the district (particularly Pietermaritzburg) poses challenges in terms of the level of services provision and the quality of operation and maintenance of these services.
- The scattered nature and extent of rural settlement in the district poses a range of challenges for different reasons to the urban areas. These relate to sustainability in terms of the provision of services in terms of logistics, costs and availability of natural resources (e.g. water and suitable land). This is particularly pertinent in the light of findings from the Land Use report where historic trends indicate an increase in areas under rural settlement and subsistence production, particularly in the traditional areas of the district.

Employment

- Unemployment has increased between 2001 and 2007, and still remains high.
- Despite high levels of unemployment, levels of employment are higher than those experienced in the province as a whole.
- The majority of the semi-skilled, skilled and professional employment opportunities are located in the districts' urban centres in secondary and tertiary sectors whilst the unskilled and semi-skilled employment is mainly located in rural areas in the primary sector.

Education

- Access to education between 2001 and 2007 improved for households in the district.
- Access to education has improved in urban areas particularly for senior schooling and post school educational facilities. Access in rural areas remains a challenge.

Services

- Access to essential services in the district appears to be above those for the province.
- The type and level of services (infrastructure and social) provided in the district varies according to the following Order of urban centre; Rural or urban location.
- The implication of this is that the more accessible rural settlements will generally have access to services at RDP level. In contrast services in urban areas will tend to be at a higher then RDP level depending upon the level of centre.

Land Use

Based on a comparison of data from 2005 and 2008 the following land use trends were noted:

- The majority of the local municipalities recorded transformation in land use
- In the case of land under sugarcane it appears that there was only an increase in one municipality while in the remaining four (where sugar is cultivated) the area decreased.

- Commercial agriculture (vegetables, fruit etc.) increased in five municipalities and decreased in the remaining two.
- Subsistence agriculture increased throughout the district with four municipalities experiencing major increases and two dramatic increases.
- Land under grasslands in good condition decreased throughout the district.
- Land under natural vegetation (forests, bushlands etc.) was subject to limited losses in six municipalities.
- Land areas under urban and rural settlement increased throughout the district up to the 10% level.

- ***The Planning Framework***
  - Inclusion of environmental issues and considerations into the spatial planning processes of the municipalities has proven to be limited thus far.
  - There are differing interpretations in the spatial plans in relation to: zoning, nodes, corridors and environmental issues. Meaningful alignment these aspects of the spatial plans need to be given common definitions at district level and then applied to local plans.
  - The distribution of natural resources is not confined to municipal boundaries and hence differential land use management between municipalities could result in depletion and attendant consequences.
  - It appears that none of the plans reviewed account for the environmental 'limits' to development in each of the municipalities.
  - Interpretation of national and provincial planning policies for application at local level is important since there are instances where 'blind' application of these policies can have negative implications for both communities and the environment (Isik 2009).
  - Bulk infrastructure in the form of water supplies and transportation routes in spatial plans do not always align from one municipality to the next.

STRATEGIC ENVIRONMENTAL ASSESSMENT AND DESIRED FUTURE STATE

This phase involved undertaking a strategic environmental assessment of the information collated in the status quo to identify key sustainability issues. It further established a desired future state in the form of sustainability goals for each of the issues identified. The objectives are supported by a sustainability framework which encapsulates five strategic priorities which were selected and defined to align with relevant national and provincial strategies.

Key Sustainability Issues

In the SEA the issues were analysed in the form of a table where they are identified, interpreted and aligned with those of the Forum and then assessed in terms of their impact on the balance between the three capitals of sustainability. The analysis is presented in a format that makes for easy reading the various environmental issues were been grouped in the following broad categories:

- ***Governance and planning:***
  Limited capacity and systems for integrated planning and implementation to achieve sustainable development – Inadequate intergovernmental co-operation and co-ordination for effective environmental governance; Poor monitoring and evaluation systems to assess progress towards sustainability; Insufficient resources and capacity made available for environmental management; Limited integration of sustainability into development planning

- ***Land degradation:***
  The degradation of land and natural resources – Inappropriate land use and poor land management is resulting in land degradation, the loss of natural resources and reduced potential for the provision of ecosystem goods and life support services. This includes the loss of agriculturally productive land and a decline in biodiversity which has significant social and economic impact.

- ***Water demand and supply;***
  Excessive water demand exceeds available supply - Current water demand from the uMngeni catchment area is exceeding sustainable levels and is stressing the aquatic ecosystems. Rapid urban & industrial expansion and population growth is increasing demands and this is compounded by inefficient water use and wastage. Degraded catchments and aquatic ecosystems diminish the ability of the natural systems to sustainably supply water. Dams and interbasin-transfer schemes increase costs of providing water to the consumers and negatively impact on overall river health and natural systems.

- ***Water quality;***
  Reduced water quality – Land degradation, Industrial effluent, and, poor sewerage, solid waste and storm-water management are impacting on water and aquatic ecosystem quality. This is resulting in declining social and economic conditions including increased health risks and costs; decreased river health; increased water treatment costs; increased risk of liability to the Municipality; increased water charges; and, decreased investor interest.

- ***Green economy;***
  Economic growth that is not linked to sustainable resource use and environmental impact - Resource and ecosystem degradation due to over-exploitation of natural capital. Persistent poverty, unemployment, social dependency and inequality. An economy that is based on intensive resource consumption is depleting non-renewable and renewable resources beyond sustainable levels.

- ***Sustainable communities;***

  Inefficient spatial planning and urban design – Rapid population growth and urbanisation increases pressures on Municipalities to sustainably supply services. A large number of poverty stricken people live in informal settlements which are detrimental to their health and well-being. Safe, clean and pleasant environments are not being provided. Increased demand for development is placing pressure on the optimal use of land and the provision of sustainable services and infrastructure. Urban design does not optimise resources efficiency particularly in relation to electricity usage, water and sewer provision, waste management and accessibility of public transport.

  Inadequate provision of basic services including water, sanitation and waste management - The lack of equitable and universal access to basic services such as effective waste removal and the provision of appropriate sanitation and water services impact on human health and well-being and result in a deterioration of the quality of life. Waste recycling initiatives are not easily accessible to the majority of people in the District.

  Inadequate recognition of Cultural Heritage – Limited recognition of both natural and social heritage resources and of the spiritual, cultural and economic value of cultural heritage sites. Eurocentric biased knowledge of cultural heritage and insufficient data for all elements of cultural heritage undermines social cohesion and understanding.

Sustainability Framework

Based on consultation the following sustainability vision was developed. The various components of the vision are explained in more detail in the SEA report.

It is the vision of the UMDM and its Strategic Partners that by 2040 the District will be recognised as one within which sustainability is at the core of all planning and decision-making thus ensuring that its natural capital is restored and managed so as to optimally contribute to the wellbeing of its people and the resilience of the economy.

The framework further comprises of the following elements required to support the achievement of the vision:

- *Sustainability Objective* - provide clear statements of intent and indicate the desired direction to achieve the vision.
- *Sustainability Criterion* & Indicators - These are tools which can be used in the conceptualisation of environmentally sustainable development and the monitoring of progress towards achieving sustainability in its broadest sense. Sustainability Criteria define the essential components of the social, economic, natural and governance environments. Collectively, Sustainability Criteria provide an implicit, generally agreed-upon definition for the desired state of the environment.

Tis framework was populated for each of the following five strategic priorities which were selected and defined to align with relevant national and provincial strategies. The sustainability objective is provided for each. The report provides further detail on the framework for each.

1. Enhancing systems for integrated planning and implementation;

Key Environmental Issue: Limited capacity and systems for integrated planning and implementation to achieve sustainable development
Insufficient intergovernmental co-operation and co-ordination for effective environmental governance; Poor monitoring and evaluation systems to assess progress towards sustainability; Insufficient resources and capacity made available for

environmental management; Limited integration of sustainability into development planning.
Sustainability Objective
Enhanced and effective environmental governance, institutional structures and systems to achieve integrated planning and implementation.

2. **Sustaining our ecosystems and using natural resources efficiently;**

Key Environmental Issue: The degradation of land and natural resources
Inappropriate land use and poor land management is resulting in land degradation, the loss of natural resources and reduced potential for the provision of ecosystem goods and life support services. This includes the loss of agriculturally productive land and a decline in biodiversity which has significant social and economic impact.
Sustainability Objective
The use of natural capital is compatible with the maintenance of ecosystem functionality and natural resources are protected and restored.

3. **Towards a green economy;**

Key Environmental Issue: Economic growth that is not linked to sustainable resource use and environmental impact
Resource and ecosystem degradation due to over-exploitation of natural capital. Persistent poverty, unemployment, social dependency and inequality. An economy that is based on intensive resource consumption is depleting non-renewable and renewable resources beyond sustainable levels.
Sustainability Objective
Economic goals based on ecological sustainability and built on a culture that recognises that socio-economic systems are dependent on and embedded in ecosystems.

4. **Building sustainable communities;**

Key Environmental Issue: Inefficient spatial planning and urban design; inadequate provision of basic services including water, sanitation and waste management; and, insufficient recognition of Cultural Heritage
Rapid population growth and urbanisation increases pressures on Municipalities to sustainably supply services. A large number of poverty stricken people live in informal settlements which are detrimental to their health and well-being. Safe, clean and pleasant environments are not being provided. Increased demand for development is placing pressure on the optimal use of land and the provision of sustainable services and infrastructure. Urban design does not optimise resources efficiency particularly in relation to electricity usage, water and sewer provision, waste management and accessibility of public transport. The lack of equitable and universal access to basic services such as effective waste removal and the provision of appropriate sanitation and water services impact on human health and well-being and result in a deterioration of the quality of life. Waste recycling initiatives are not easily accessible to the majority of people in the District. Limited recognition of both natural and social heritage resources and of the spiritual, cultural and economic value of cultural heritage sites. Eurocentric biased knowledge of cultural heritage and insufficient data for all elements of cultural heritage undermines social cohesion and understanding.
Sustainability Objective
Environmentally sustainable communities are established where development is informed by social needs and the improvement of the quality of life and does not compromise the natural environment and cultural heritage.

5. **Responding effectively to climate change.**

Key Environmental Issue: Localised poor air quality and greenhouse gas emissions contributing to Climate Change
Poor air quality issues localised within the Msunduzi and N3 corridor area is resulting in increased human health and well-being risks. Greenhouse gas emissions contribute to global climate change. A decrease in natural capital diminishes the District's ability to sequestrate carbon and mitigate predicted climate change impacts.
Sustainability Objective
Air quality is significantly improved, Greenhouse gas concentrations are reduced and there is resilience to climate change within communities and ecosystems.

EMF VOLUME I: STRATEGIC ENVIRONMENTAL MANAGEMENT PLAN

The detailed SEMP and its action plans form Volume I of the EMF suite of tools developed to achieve the stated Sustainability vision and objectives. As demonstrated in the example below, the action plans include primary and secondary responsibility, required resources, timeframes and an indicator of success. The full list of actions detailed action plans is outlined in the SEMP.

Strategic Priority 1: Enhancing Systems for Integrated Planning and Implementation

Actions	Responsible individual	Collaboration with	Resource requirements	Timing/ (by when/how often)	Indicator of success
STRATEGIC PRIORITY 1: ENHANCING SYSTEMS FOR INTEGRATED PLANNING AND IMPLEMENTATION					
Sustainability Objective: 1.1 Enhanced and effective environmental governance, institutional structures and systems to achieve integrated planning and implementation.					
Sustainability Strategy: 1.1.1 Establish effective co-operative environmental governance structures and institutional mechanisms between key environmental authorities.					
UMDM Planning and Development Cluster to have ToR and membership reviewed in the light of the SEA and SEMP and in accordance with the Inter-Governmental Framework Act.	Chairperson of Planning & Development cluster	Cluster members plus other environmental and development agencies, e.g. Umgeni Water, DWA, DAEA, and CoGTA.	Internal	Within three months	Reviewed ToR and membership

EMF VOLUME II: ENVIRONMENTAL SENSITIVITY ZONES AND ASSESSMENT GUIDELINE

The EMF regulations define an EMF as the "***Compilation of information and maps*** specifying the ***attributes of the environment*** in a particular geographical ***area***: and for such maps and information to be used in the ***consideration of applications for environmental authorisations*** in or affecting the geographical areas to which those frameworks apply".

This guideline responds directly to this requirement by providing guidance on the scope and level of environmental assessment considered appropriate for the different levels of sensitivity within the zones identified through the EMF process.

Environmental Sensitivity

Four categories of sensitivity have been defined and mapped for each of the following environmental features identified as important to development decision making in the district. Flood Risk, Wetlands, Agricultural Resources, Water Quality, Water Production Areas, Biodiversity, Infrastructure

4 Very high
3 High
2 Moderate
1 Low

The motivation for categorising the sensitivity and the methodology applied in mapping them is provided in specialist reports which are included as appendices to the guideline. The report itself

provides guidance as to where in the EIA process the information provided in this and accompanying Volumes is relevant in the EIA process.

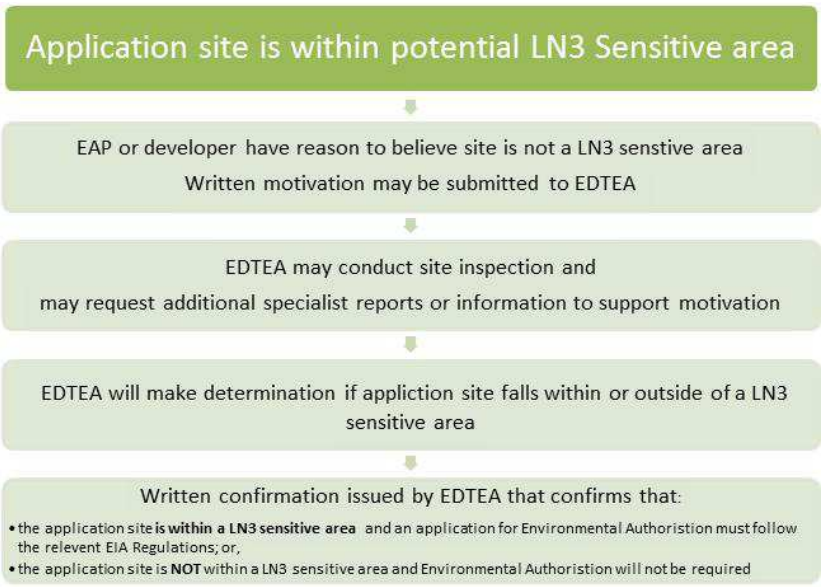
It then provides specific guidance for each environmental component in the form of:

- ***Status quo statement*** – the state of each component, the cause and the implications thereof.
- ***A sustainability objective*** - reflecting the desired future state, against which development planning and decision making should be guided or assessed against.
- ***Specific guidance as to the level of specialist investigation*** - required for each of the four sensitivity categories for each environmental component as well as the relevant method, tools and legislation.

The final focus of the guidance is on EIA: Listing Notice 3 activities triggered by the EMF sensitivity zones as summarized in the table below.

	Listing Notice 3 Activities		
	Map 1	Map 2	n/a
Environmental Constraint Layer	Activities: 1; 2; 3; 5; 8; 9; 11; 12; 13; 16; 20; 21; 24; 25	Activities: 4; 6; 7; 10; 17; 18; 19; 22	Activities: 14; 15; 23
High Biodiversity Area (CBA's and Agro-biodiversity zones)	No	Yes	No
Flood risk / Riparian Area (1:100 year flood risk area)	Yes	Yes	No
Wetland footprint and 32m buffer area	Yes	Yes	No

The aim of the EMF is to limit the number of EIA applications and streamline the process. In recognition of the limitations of certain data sets used to define the location and extent of these sensitive features, a screening process is provided as summarised below. Additional guidance is provided for each step in the screening process.



Sensitivity Patterns

Analysis of the individual sensitivity layers confirmed the following which are relevant in terms of presenting development constraints.

i. The ***District is endowed with valuable agricultural resources***. As emphasized in the SEA, these resources are not necessarily adequately valued in S.A. and the ongoing transformation of high potential agriculture land to other land-uses represents one the most significant sustainability issues in the Province. Consequently high value agricultural land represents a significant constraint to other land uses which will result in their permanent loss for agricultural production and grazing. These represent a high constraint to any other use with consequent requirements in the EIA process and various agricultural legislation (see Volume II), to confirm the agricultural value of the land in question.

ii. Large areas identified as of '***Very High' sensitivity for agricultural purposes are also deemed to be 'highly' sensitive from a biodiversity***.

iii. The untransformed areas noted in i and ii above are also critical from a water resources delivery point of view. Given that the District incorporates the key economic hubs of the greater Pietermaritzburg-Durban area, and the stressed nature of water resources documented in the status quo and SEA, the transformation of these catchments will place further stress on social well-being and economic productivity in the catchment.

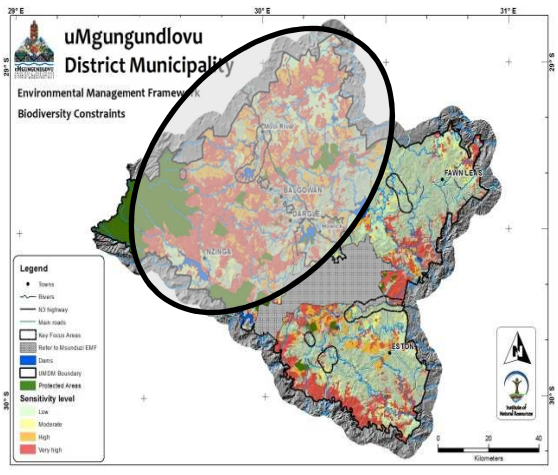
iv. ***There is a clear link between the high urbanised and industrialised sections of the catchment and the water quality sensitivity zones***, which is exacerbated with Pietermaritzburg and its waste water treatment plant being located on major river systems. The agricultural production in the midlands is putting pressure on the quality of water in the major impoundments – namely Spring Grove, Midmar and Albert Falls Dams.

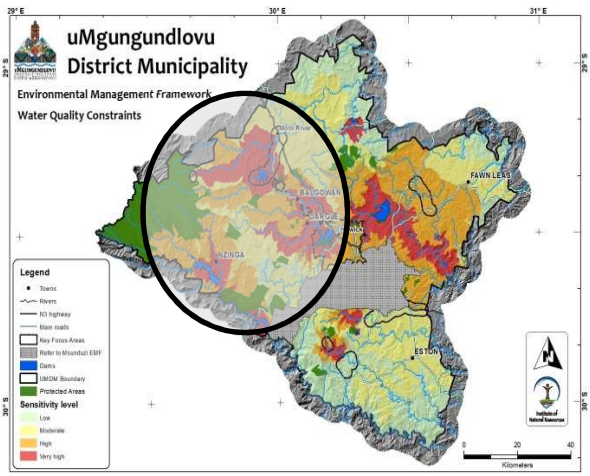
v. The ***high density of wetlands in priority water quality catchments is another key factor to consider given the role that wetlands play*** in ameliorating poor water quality, attenuation floods and regulating streamflow. The ***poor condition of wetlands*** discussed in the SQ and SEA, ***emphasize the need for attention in protecting and reinstating wetland function***.

vi. The areas of ***high infrastructure constraint occur in areas key to biodiversity, water production and agricultural*** i.e. areas sensitive to transformation through the development of infrastructure.

The cumulative value the midlands region of the district for biodiversity, water production, wetlands, water quality and agriculture is emphasized by considering these layers in combination below. This highlights the risk to the people and economy of the District from:

- Transforming the natural systems, notably grassland and wetlands in the region.
- Failing to address water quality through appropriate design and planning requirements related to water quality management.





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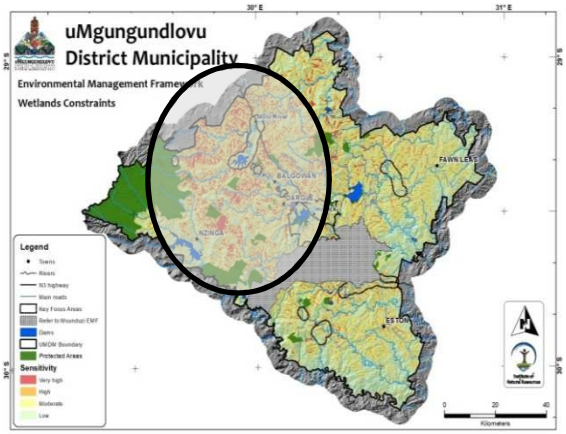
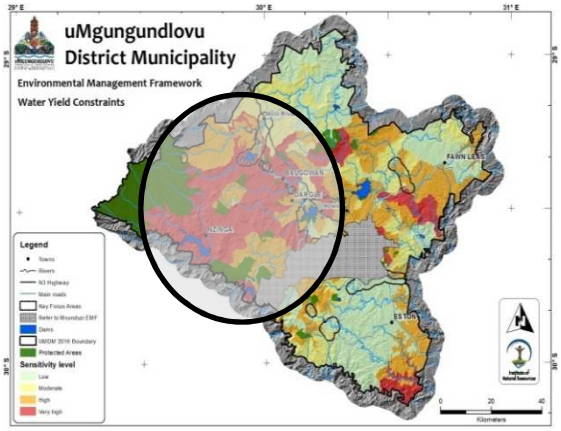




EMF VOLUME III: ENVIRONMENTAL GUIDELINES FOR DEVELOPMENT PLANNING

Purpose of the Guideline

The purpose of this guideline is to ***inform development planning*** by indicating where the environmental constraints on different types of land use are highest in terms of both:

a. *Number of constraints* – how many environmental features defined in Volume II which include among others; wetlands, air quality, flood zones, occur on a land parcel proposed for development.
b. *Level of constraint* – whether the proposed land use (and/or the ancillary activities and outputs such as effluent) will impact the environmental feature. The higher the level of sensitivity, the higher the higher the level of development constraint because it will likely demand:
    - A range of authorisation and licensing processes which,
    - Have time and cost implications, and
    - Increases the risk of a development proposal not being authorised

Defining Land Use Types

The aim is to provide guidance for the full range of land use types that already exist, or are likely to be developed within the District. The starting point for defining land uses were the categories and definitions provided in the "*KwaZulu-Natal land use management system guidelines for the preparation of schemes for municipalities – update 2011".* The eight main categories of land use established in the guideline are summarised in the adjacent list. The titles and colour scheme for these main land use categories are the same as that used in the provincial LUMS guidelines. This will make it simpler to align the outputs of this development guideline with the municipal LUMS when they are developed. The main categories then include subcategories. The full list of over 50 sub-categories provided in the LUMS guidelines was refined to 32 for the EMF by grouping land-uses that have similar development sensitivity.

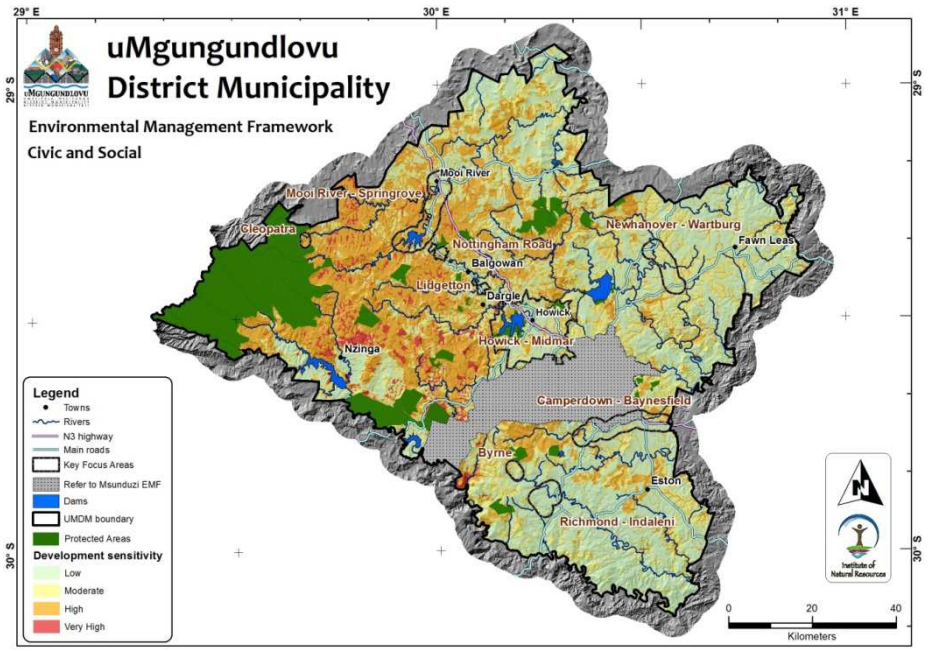
AGRICULTURE
CIVIC AND SOCIAL
MIXED USE
RESIDENTIAL
TOURISM
INFRASTRUCTURE AND SERVICES
CONSERVATION AND OPEN SPACE
INDUSTRY

Defining and Mapping Development Sensitivity per Land Use Type

4 Very high
3 High
2 Moderate
1 Low

Volume II of the EMF defined a sensitivity layer for each of the seven environmental features which have sub categories or components of sensitivity. As an example, a wetland body is allocated a 'Very High' sensitivity ranking, while the wetland buffer is assigned a 'High' level of sensitivity. The sensitivity layers were then assessed against the 32 land use types. The impact of each development typology was scored against each of the components' sensitive categories using a scoring system of 1 – 4 with 4 being the highest sensitivity/impact and thus posing the highest constraint to a development of that kind and 1 being the lowest sensitivity / lowest constraint to a development of that kind. An example of this process is shown in the adjacent table for 'Intense Mixed Use". Each of the components' sensitivity layers contains such an attribute table of scores reflecting the impact potential of each of the 32 land use types on the features identified by for the environmental feature. These sensitivity categories were mapped so they have a spatial footprint resulting in a map for each of the 32 development types indicating where in the District is most suitable to locate them. The maps are accompanied by an explanation of the impact of the land-use on the environmental sensitivity zones and recommendations for mitigating these.

Environmental Features	Components	MIXED USE 8. Intense Mixed Use
Wetlands	Wetland Footprint	4
	32m Buffer	3
	500m Buffer	2
	> 500m from a wetland	1
Agriculture	High potential (Category A&B)	4
	Moderate potential (Category C)	4
	Restricted potential (Category D)	3
	Very restricted potential (Category E)	1
Infrastructure	High service Provision	1
	Moderate Service Provision	3
	Low Service Provision	3
	Very Low/No Service Provision	4
Water Quality		
Quinnary Catchments containing key water supply features	All such quinnaries	4
Proximal catchments influencing key supply features	with measured elevated pollutant concentrations	3
	with high potential for elevated pollutant concentrations	3
Distal catchments influencing key supply features	with measured elevated pollutant concentrations	2
	with high potential for elevated pollutant concentrations	2
	with low pollutant concentrations	1
Catchments not influencing key supply features	with measured elevated pollutant concentrations	2
	with high potential for elevated pollutant concentrations	2
	with low pollutant concentrations	1
Flood zones	1:100 yr flood	4
Biodiversity	Protected area	4
	Critical Biodiversity Area (CBA)/Agro-Biodiversity Zone	4
	Ecological Support Area (ESA)/Environmental Management Zone	4
	Untransformed/Other natural areas	3
Water Yield	Very high water yield	3
	High water yield	2
	Moderate water yield	1



DECISION SUPPORT TOOL

The DST provides the mechanism through which all the information and guidance generated in each phase of the EMF is accessed. It is a web based tool that can be accessed via. Section 5 of this report provides guidance on how to use the DST via a range of graphics that demonstrates the DST in operation.

IMPLEMENTATION OF THE EMF

The EMF is only valuable if the information provided is utilised by the range of roleplayers that include, regulators, municipal officials, Environmental assessment Practitioners, developers and the public in general. The final section of the report provides guidance on this aspect with a focus on how to institutionalize the tool within the District and the associated Local Municipalities for whom the product has been developed.

This section concludes by providing guidance on the gazetting and revision of the EMF, which is a legal requirement on a 5 yearly basis once an EMF has been gazetted.

TABLE OF CONTENTS

TABLE OF FIGURES

TABLE OF TABLES

GLOSSARY

AgroBiodiversity Zone: A type of designation for an area in terms of both its agricultural and biodiversity value.

AgroEcological Zones: A land resource mapping unit where climate, landform and soils and/or land cover were sufficiently similar that a specific range of potential and constraints for land use could be estimated.

Agricultural Potential: Any assessment of potential agricultural use that includes arable use (the growing of the widest possible range of annual crops), horticulture (perennial crops in general, and fruit trees in particular), pastoral use (grassland and fodder crops) and silviculture (commercial growing of trees)

Bioresource Unit: Land with soils, vegetation, climate and terrain form which are sufficiently similar to provide for similar recommendations in terms of agricultural land management.

Critical Biodiversity Area: An area required to meet biodiversity targets as identified in a systematic biodiversity plan.

Desired Future State: Is a sustainability objective that sets out a vision, goals, indicators and targets for each key strategic issue.

Ecological Infrastructure: Ecological features that deliver valuable services to people.

Ecological Support Area: An area that is not critical for meeting biodiversity targets but plays an important role in supporting the ecological health of Critical Biodiversity Areas and/or delivering ecosystem services.

Ecosystem Goods And Services: All the benefits for human livelihoods arising from the ecological functions of ecosystems.

Environmental Management Framework: is a legislated tool developed in terms of the National Environmental Management Act, 107 of 1998 (NEMA) which supports sustainable development and provides legal standing to the information and tools generated.

Environmental Management Zone: Areas that have a 'low' agricultural potential that also support important biodiversity patterns and processes.

Key Focus Area: The predefined areas of high development pressure within the uMgungundlovu District Municipality.

Land Use Management Scheme: A tool used by municipalities to guide development according to the vision, strategies and policies of the Integrated Development Plan (IDP) and Spatial Development Framework (SDF).

Protected Areas: all areas as referred under Section 9 of the National Environmental Management: Protected Areas Act (Act 57 of 2003), which are protected by law for the purpose of conserving biodiversity. These include nature reserves and protected environments, with their management assigned to a competent authority of the region.

Service Infrastructure: Is infrastructure that delivers utility services such as electricity, reticulated water, waterborne sewage, waste disposal, and transport infrastructure.

Surface Water Resource: Surface water is water on the surface of the planet such as in a river, lake, wetland, or ocean. It can be contrasted with groundwater and atmospheric water. Sources of water that is potentially useful for human consumption and use

ACRONYMS

ABZ	AgroBiodiversity Zone
AEZ	AgroEcological Zones
ACRU	Agricultural Catchments Research Unit
AFDN	Albert Falls Development Node
AIA	Agricultural Impact Assessment
BA	Basic Assessment
BRU	Bioresource Unit
BSP	Biodiversity Sector Plan
CARA	Conservation of Agricultural Resources Act
CBA	Critical Biodiversity Area
CBD	Central Business District
CE	Critically Endangered species
COGTA	Department of Cooperative Governance and Traditional Affairs
DAQMP	District Air Quality Management Plan
DD	Data Deficient species
DEA	Department of Environmental Affairs
DFS	Desired Future State
DM	District Municipality
DMR	Department of Mineral Resources
DRDLR	Department of Rural Development and Land Reform
DST	Decision Support Tool
DTI	Department of Trade and Industry
DTM	Digital Elevation Model
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
EA	Environmental Assessments
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIES	Ecological Importance and Ecological Sensitivity
EIMS	Environmental Information Management System
EKZNW	Ezemvelo KZN Wildlife
EMF	Environmental Management Framework
EMP	Environmental Management Programme
EMPr	Environmental Management Plan report
EMZ	Environmental Management Zones
EN	Endangered species
ESA	Ecological Support Area
ESZ	Environmental Sensitivity Zones
FRIS	Flood Risk Information System
GEV	General Extreme Value
GIS	Geographic Information System
ICMP	Integrated Catchment Management Plans.
IDP	Integrated Development Plan
INR	Institute of Natural Resources
IUCN	International Union for Conservation of Nature
KFA	Key Focus Area
KZN DARD	KwaZulu-Natal Department of Agriculture and Rural Development
KZN SALGA	KwaZulu-Natal Department of Local Government and Traditional Affairs
KZN EDTEA	KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs

LM	Local Municipality
LUMS	Land Use Management Scheme
MAP	Mean Annual Precipitation
NALR	National Agricultural Land Register
NEES	National Energy Efficiency Strategy
NEMA	National Environmental Management Act
NFA	National Forests Act
NLC	National Land Cover
NSSD	National Strategy for Sustainable Development
NT	Near Threatened species
NWA	National Water Act
PA	Protected Area
PAA	Protected Area Act
PAMP	Protected Area Management Plan
PDALF	Preservation and Development of Agricultural Land Framework
PES	Present Ecological State
PGDP	Provincial Growth and Development Plan
PPP	Public Participation Process
PSC	Project Steering Committee
RQO	Resource Quality Objective
RRAMS	Rural Roads Assets Management System
SACNASP	South African Council for Natural Scientific Professions
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SEMP	Strategic Environmental Management Plan
SIPs	Strategic Infrastructure Projects
SO	Sustainability Objective
SoER	State of the Environment Report
SUDS	Sustainable Urban Drainage Systems
SWR	Surface Water Resources
TOR	Terms of Reference
UDDT	Urine Diversion Dehydration Toilets
UDPWHS	Ukhlahamba Drakensberg Park World Heritage Site
uMDM	uMgungundlovu District Municipality
UW	Umgeni Water
VIP	Ventilated Improved Pit Toilet
VU	Vulnerable species
WMST	Wetland Management Series Tools
WSA	Water Services Authority
WSDP	Water Services Development Planning
WULA	Water Use Licence Application
WWTW	Wastewater Treatment Work
WWW	Waste Water Works

1. INTRODUCTION

1.1 Background and Motivation for the EMF

The uMgungundlovu District Municipality (uMDM) has set as its long term vision the following: "*The UMDM will evolve into a dynamic metropolitan area, spreading its vibrant economic benefits to its citizens and places and will, through concerted integrated development and service delivery, realise improvement in the overall quality of life" (uMDM, 2016)*[3]

The UMDM has further adopted the seven strategic goals of the Provincial Growth and Development Plan (PGDP) to guide the District's response to key challenges to fulfilling this vision. These include "*Goal 5: Environmental Sustainability*". The vision and goals are further supported by five pillars that include the 3rd Pillar "*Balanced and sustainable development, green economy and a garden-city model that is in harmony with nature*".

The UMDM commissioned the development of a Strategic Environmental Assessment and Management Plan (SEA & SEMP)[4] to serve as a tool for giving effect to these environmental sustainability goals. The SEA & SEMP was completed in 2013. The UMDM together with the KwaZulu-Natal Department of Economic Development and Tourism (EDTEA) identified the need to build on the outcomes of the SEA & SEMP by translating the outcomes into an Environmental Management Framework (EMF). An EMF is a legislated tool developed in terms of the National Environmental Management Act, 107 of 1998 (NEMA) which supports sustainability and provides legal standing to the information and tools generated, something that is not achieved through the SEA & SEMP.

The uMDM commissioned the Institute of Natural Resources NPC (INR), to build on the SEA & SEMP in developing the EMF. This report summarizes the process and outcomes of the EMF. The report is designed and structured to meet the requirements of the EMF regulations and associated guidelines in order that the package of deliverables can be gazetted[5].

1.2 Legal Context and Purpose of an EMF

1.2.1 Legal Provision for an EMF

The legal basis for an EMF is provided in Section 24 (2) and (3) of NEMA, and Government Notice R385 which stipulates in regulation 70 (1) that the Minister, and every MEC, with the concurrence of the Minister may identify geographical areas:

[3]Integrated Development Plan for uMgungundlovu District Municipality. The Comprehensive 2017/12018 – 2021/22 Five Year IDP – 4th Generation. Accessed on 9 May 2017 from http://www.umdm.gov.za/Official_Site/index.php/idp/draft-comprehensive-idp-2017-2018-to-2021-2022

[4]Umgungundlovu District Municipality. December 2012. Strategic Environmental Assessment Report: for the Umgungundlovu District Municipality Strategic Environmental Assessment and Management Plan. Isikungusethu Environmental Services (Pty) Ltd and Zunckel Ecological and Environmental Services, Pietermaritzburg.

[5]The gazetting process is not covered by the INR appointment.

- In which specified activities may not (2 b) commence without environmental authority from the competent authority, and
- Where specified activities may commence without environmental authority from the competent authority (2 c).

The 2010 EMF Regulations[6] were promulgated in terms of Section 24 (5) of NEMA which provides for the Minister and every MEC to develop regulations that "*lay down the procedure to be followed for "the preparation, evaluation and adoption of prescribed environmental management instruments, including environmental management frameworks*". The EMF has been developed to comply with the provisions of the regulations and in accordance with the guideline. Table 1 summarizes the "Table of Contents" (TOC) for an EMF report as provided by the DEA in support of the EMF guideline. It shows where the various aspects in the guideline are catered for in this report structure.

Table 1 Description of where the Requirements of theEMF Guideline Table of Contents are met within the EMF Report

GUIDELINE ITEM	LOCATION IN THIS DOCUMENT
INTRODUCTION AND LEGAL FRAMEWORK	Section 1.2.2
DESCRIPTION OF STUDY AND ASSOCIATED	Section 1.6
ENVIRONMENTAL STATUS QUO	Section 2
DESIRED STATE	Section 3.2
ENVIRONMENTAL MANAGEMENT ZONES	Section 4.3
STRATEGIC ENVIRONMENTAL MANAGEMENT PLAN	Section 4.2
LIST OF ACTIVITIES LINKED TO EMZs	Section 4.2
SUSTAINABILITY CRITERIA	Section 3.1
INFORMATION GAPS	Specialist reports - Appendix to Environmental Sensitivity Zones
IMPLEMENTATION	Section 5
IMPLEMENTATION STRATEGY AND ACTION PLAN	Section 5

1.2.2 Legal and Policy Framework

There is a broad suite of policy and specific acts which have bearing on the different environmental features (wetlands, terrestrial biodiversity, and so on) and environmental quality aspects (water, air quality) being considered in the EMF. These acts and their supporting regulations set requirements in terms of process, standards and general guidance which require consideration in the development of the EMF. The detailed policy and legal framework is included as Appendix 1. The framework includes a range of instruments which serve different purposes in guiding and regulating development in terms of environmental sustainability.

a) *Regulatory Processes* – several Acts define listed activities for which a license or authorisation is required before the specified activities can be undertaken. Examples include the Environmental authorisation under the EIA regulations, Water-use License in terms of the National Water Act, and Air Emissions License in terms of the NEMA:Air Quality Act. These acts also prescribe the process to follow in making application and providing information to make an informed decision.

[6]Government Notice R 547. Gazette 3306, 18 June 2010.

b) *Norms and Standards* - set thresholds which need to be considered in terms of defining levels of sensitivity, sustainability and or constraints. These can be related environmental quality such as water quality standards or spatially defined limits such as buffers to wetlands or rivers.
c) *Guidelines* – to assist in assessing specific impacts e.g. minimum standards for undertaking biodiversity assessments or developing a biodiversity offset.

1.3 Purpose of the EMF

Like most Environmental Management tools an EMF is designed to support the overall achievement of 'sustainable development'. The specific purpose of an EMF is summarized in the text box below.

PURPOSE OF AN ENVIRONMENTAL MANAGEMENT FRAMEWORK

The EMF regulations, 2010 (Section 2) list the purpose of the regulation as: *Compilation of information and maps specifying the attributes of the environment in a particular geographical area:*

c) For such information to inform environmental management, and
d) For such maps and information to be used as environmental management frameworks in the consideration of applications for environmental authorisations in or affecting the geographical areas to which those frameworks apply.

Section 2 (3) further explains that EMFs are aimed at:

d) Promoting sustainability.
e) Securing environmental protection.
f) Promoting cooperative environmental governance.

To fulfil this purpose, the EMF guidelines further explain that an EMF should meet the following objectives:

- Make ***significant and detailed information*** available before development proposals are generated.
- Contribute to environmentally sustainable development by anticipating impacts and by ***providing early warnings in respect of thresholds, limits and cumulative impacts***, and by identifying already existing impacts to be addressed.
- S***upport the undertaking of environmental impacts assessments*** in the area by indicating the scope of potential impacts and information needs that may be necessary for environmental impact assessments: and
- ***Support the process of delineating geographical areas*** within which ***additional specific activities*** are to be ***identified*** in terms of NEMA;
- ***Support the process of delineating geographical areas within which activities*** listed in terms of NEMA ***may be excluded*** by identifying areas that are not sensitive to the potential impacts of such activities.

An EMF has the following benefits in relation to the EIA process:

- Provides applicants with an ***early indication*** of ***where*** it would be appropriate to ***locate a certain development*** activity or land-use.

- An EMF ***consolidates existing information and informs decision makers what additional information*** is ***required to consider*** a development ***application*** in a specific location during the EIA process.
- ***Provides for integrated assessment*** by ***considering the implications*** of a development application for the ***social, cultural, economic and biophysical components*** of the receiving environment.
- Provides for the ***assessment of cumulative issues*** which is not possible at project level by establishing targets and levels of permissible change for the geographical area for which the EMF has been developed.

Given the strong spatial focus of an EMF, the GIS based Decision Support Tool (DST) provides the system through which the information and understanding generated in the EMF process is made available to support EIA decision making and inform municipal planning. The DST is the key output for ensuring that an EMF is useful and provides these benefits in a useable output.

1.4 EMF Process and Phases

The EMF guidelines[7] summarize the steps, process and outputs required for an EMF to be gazetted. The guideline further recognises that the nature of the EMF is context specific. An important aspect of the pre-inception phase is therefore defining the terms of reference[8] or scope of work. This step is particularly important in the case of the UMDM given that the various phases of the EMF process were completed under two separate contracts over a period of 5 years extending from 2012 to 2017. These are summarized in the following Table 1.

As an overview of the distribution of the work across the two contracts and the relationship to the EMF processes and phase:

i. The uMDM appointed Isikungusethu Environmental Services (IES) Ltd & Zunckel Ecological and Environmental Services (ZEES) to undertake a Strategic Environmental Assessment and Management Planning process in 2011. This covered phases and deliverables 3, 4 and 5 in (light grey shading in Table 1). There was a process of public participation undertaken across these phases.
ii. Based on the outcomes of the SEA & SEMP the uMDM in collaboration with EDTEA developed terms of reference for translating the SEA & SEMP into an EMF.
iii. The INR was appointed in 2016 to respond to these terms of reference for the EMF.

Table 2 Summary of EMF Phases, Outputs, Responsibilities and Timing

PHASE	PURPOSE & OUTPUTS	RESPONSIBILITY	TIMING
8. Pre-EMF Phase	▪ Achieve delegated responsibility for the initiation of the EMF process. ▪ ToR for the EMF based on a review of the SEA & SEMP process and outcomes.	▪ EDTEA and DEA ▪ EDTEA, UMDM and key government sector departments.	▪ Letter of delegation issued in 2016 ▪ ToR Issued in 2015
9. Inception Phase	▪ Establish common understanding of the desired outcomes, approach and methods for achieving these & project management systems.	▪ INR	▪ Final inception report - August 2016

[7]Section 4.2: Determination of the context of an EMF
[8]Section 5.1: Pre-EMF development matters.

10. Status Quo Assessment	▪ Map, classify and define conservation value and sensitivity of environmental systems & features, environmental quality and dev drivers in terms of: o Natural Capital (topography, climate, geology and land types, hydrology and water resources, and air quality; biophysical environment (vegetation and habitat types, species of special concern, protected areas and other conservation areas, biological corridors, sensitive ecosystems and the Biodiversity Sector Plan) o Cultural Heritage. o Socio-economic environment; o Agriculture and land use. o Planning framework.	▪ Isikungusethu Environmental Services (IES) Ltd & Zunckel Ecological and Environmental Services (ZEES)	▪ Status Quo Report February 2012
11. Desired Future State	▪ Undertake a strategic assessment to identify key sustainability issues. ▪ Establish the Desired Future state in terms of the sustainability issues identified. The DSF is provided in the form of a sustainability framework that sets out a vision, sustainability objectives, indicators and targets for each issue.	IES & ZEES	Strategic Environmental Assessment and DFS Report - September 2013
12. Strategic Environmental Management Plan (SEMP)	▪ Define the strategies and actions required to give effect to the sustainability objectives established for each Strategic Priority defined in the SEA/DFS process.	IES & ZEES and Departmental Task team.	SEMP - September 2013
13. Draft Environmental Management Framework	▪ Environmental Management Framework Report (this document) and supporting documents/tools including: o Volume I: SEA & SEMP o Volume II: Environmental Sensitivity Zones and Guidelines o Volume III: Environmental Guideline for Development Planning o Volume IV: Decision Support Tool	Institute of Natural Resources (INR) including PPP Report. o Vol I: EIS and ZEES o Vol II:INR o VolI: INR o Vol IV INR o Vol V: INR and IES.	Finalised July 2017.
14. Gazetting the EMF	▪ This final step falls outside the scope of the INR appointment.	▪ EDTEA, UMDM and DEA.	▪ To be confirmed.

An important component and legal requirement in terms of the EMF regulations is the need to conduct a Public Participation Process (PPP). A comprehensive PPP was run throughout both contracts. A detailed PPP report is included as Appendix 2 to this report. It summarizes the process and activities undertaken across all phases under both.

1.5 Terms of Reference

The ToR for the EMF was developed through a review of the SEA & SEMP by representatives of key regulatory and planning authorities. The TOR[9] is very specific for the UMDM and required the following:

i. Building on the work undertaken in the SEA & SEMP to develop an EMF that may be gazetted in terms of the regulations.

[9]The full terms of reference are included as Appendix 3.

ii. Improve the definition of the environmental features/issues that are key to decision making in the District. These formed the focus of the work and included:
    a. Surface Water Resources including:
        - Water Production
        - Water Quality
        - Wetlands
        - Flood Zones
    b. Biodiversity and Natural Resources
    c. Agricultural Potential
    d. Service Infrastructure
iii. Consider and account for the existing EMFs (Msunduzi LM and Albert Falls Development Node EMF) in integrated outcomes of the EMF.
iv. Refine the boundaries of the Key Focus Areas and provide a higher level of accuracy in terms of the key issues/environmental features.
v. Develop an Environmental Information Management System (Decision Support System) that makes the information available in a user friendly GIS format that is integrated into the Municipal GIS system and accessible to a range of users including (planners, decision makers, developers and environmental assessment practitioners).
vi. The EMF must specifically include:
    a. An environmental constraints and opportunities map.
    b. State the conservation status and environmental management priorities in the area and identified parts;
    c. Indicate what type of activity or land-uses would be un/desirable in the area or in specific parts of the area;
    d. Based on the above define environmental control zones in a manner that will identify:
        - Area in which undertaking land use/activities is preferred.
        - Areas where undertaking certain activities will may only be considered subject to acceptable levels of impact assessment
        - Area in which undertaking land use/activities is not preferred.
vii. Draft Land-use management guidelines for use in and incorporation in Municipal Land-use Management Systems.

In summary, the ToR were focussed on improving the resolution of spatial information relating to key environmental features, specifically in the KFAs, and pulling the information and tools generated across the two contracts, supported by a Decision Support Tool and into a consolidated EMF package to enable gazetting.

The inception report detailing the approach and outcomes to delivering on the ToR was presented to the PSC and signed off in October 2016. The inception report formed the basis for the INR proceeding with developing the EMF.

1.6 Project Area

The uMgungundlovu District Municipality (UMDM) is one of 10 District Municipalities in KwaZulu-Natal. It is located in the Midlands on a major transport route or movement corridor (N3) which serves as link between KwaZulu-Natal and Gauteng (Figure 1). It is bordered by the Ethekwini Metropolitan Municipality, Illembe and Ugu Districts to the East, Umzinyathi to the north, and Uthukela to the west and Sisonke to the south.

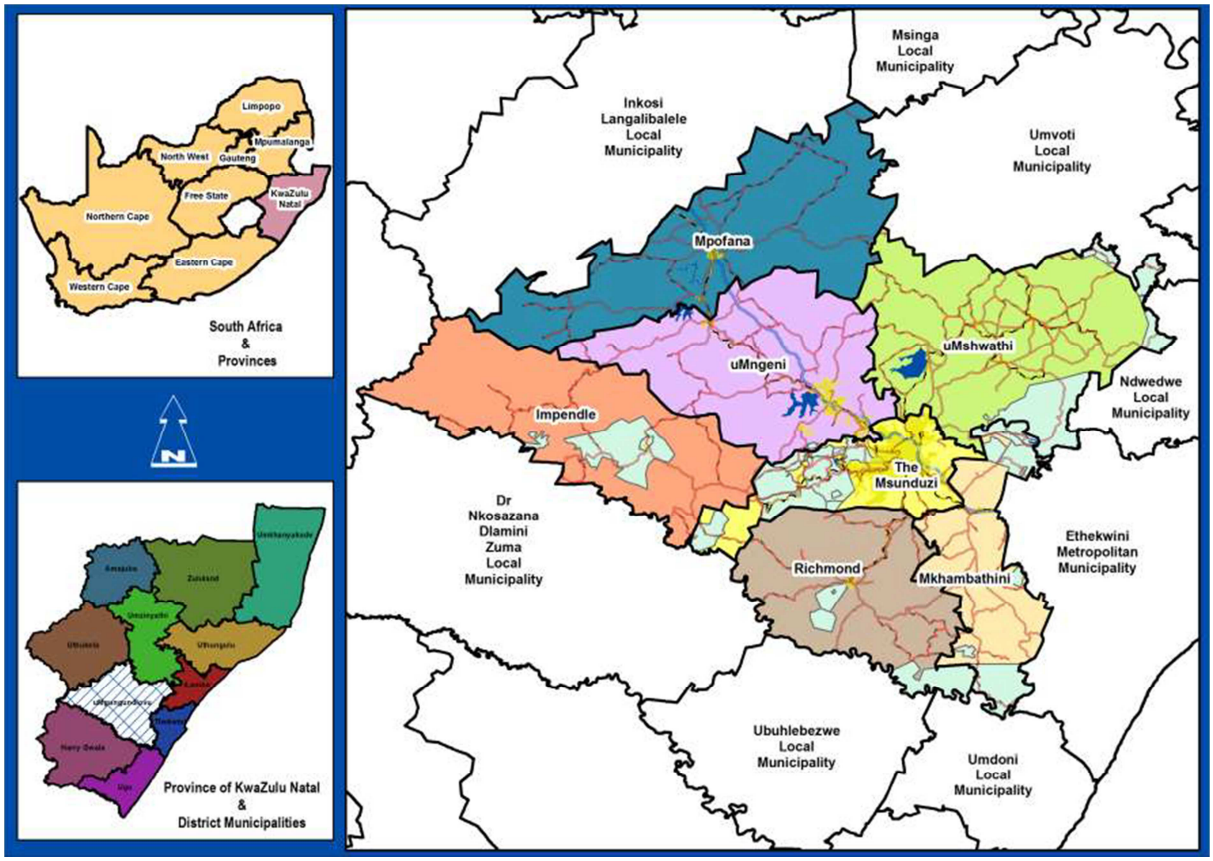


Figure 1 Locality of the uMgungundlovu District wihtin the Province and the Local Municipalities wihtin the District

Several refinements have been made to the focus of the EMF area within the District based on consideration of existing EMFs and development pressure as explained below.

Consideration of Existing EMFs

The District comprises of seven local municipalities (LMs), with a rural-urban mix including uMngeni, uMshwathi, uMzinyathi, Mpofana, Impendle, Richmond and Mkhambathini. Of the LMs, uMsunduzi has a gazetted EMF which is the process of being updated. The decision was taken to defer decision making to the uMsunduzi EMF based on the fact that the:

- Resolution of the information generated at the LM scale is higher than at the District scale,
- The EMF is Gazetted, and
- The EMF includes a specific information management and reporting system.

The implications of this is that for all spatial queries in the District EMF Decision Support System made within uMsunduzi, the response will provide a link to the local EMF, and responsible contacts.

A high resolution EMF has also been developed for the Albert Falls Development Node (AFDN) within uMshwathi Local Municipality (Figure 2). The decision was taken to include this area within the uMDM based on the following points:

- The EMF has not been gazetted.
- The approach to developing the sensitivity assessments and EMF outputs is the same as that for the UMDM EMF, and was developed by the INR.

So in developing the District EMF, the AFDN will be included, integrating the higher resolution information for this EMF in the process.

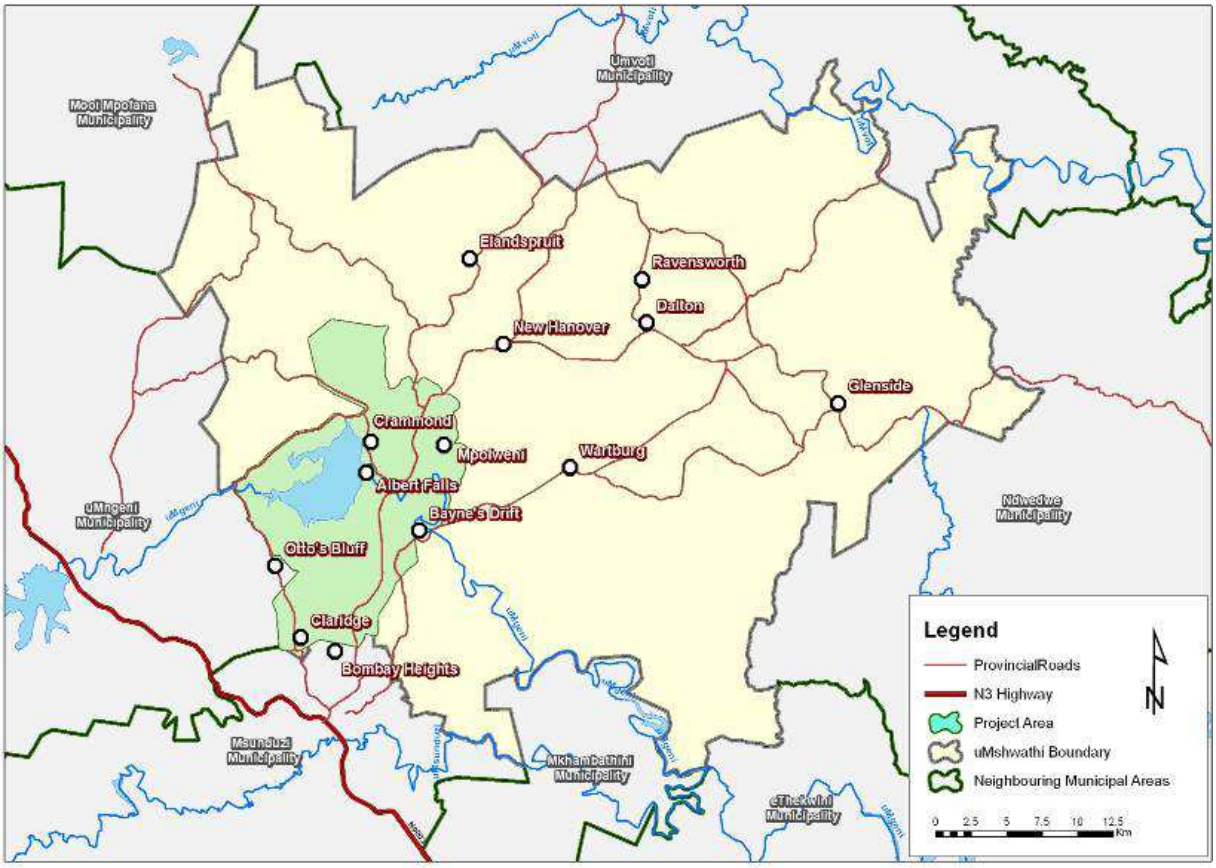


Figure 2 Location of the Albert Falls Development Node wihtin the uMshwathi Local Municipality

Consideration of Development Pressure

The uMDM has identified areas under significant development pressure. Several of these are located along the N3 corridor and other routes such as the R103 along which the Midlands Meander Tourism Route are clustered. The others KFAs are associated with small outlying towns. These Key Focus Areas (KFAs) are indicated with red boundaries and text in Figure 3 and include:

- Midmar;
- Howick and Hilton area;
- The small outlying towns of Mooi River/Nottingham Road; Richmond/Byrne; and, New Hanover/Wartburg,
- A small area in the upper Kamberg Valley titled ‘Cleopatra”.

The implications of the KFAs in the final EMF products, is that while they received increased attention in developing the EMF, in the form of more detailed mapping and ground-truthing, they will not be highlighted in the final EMF products.

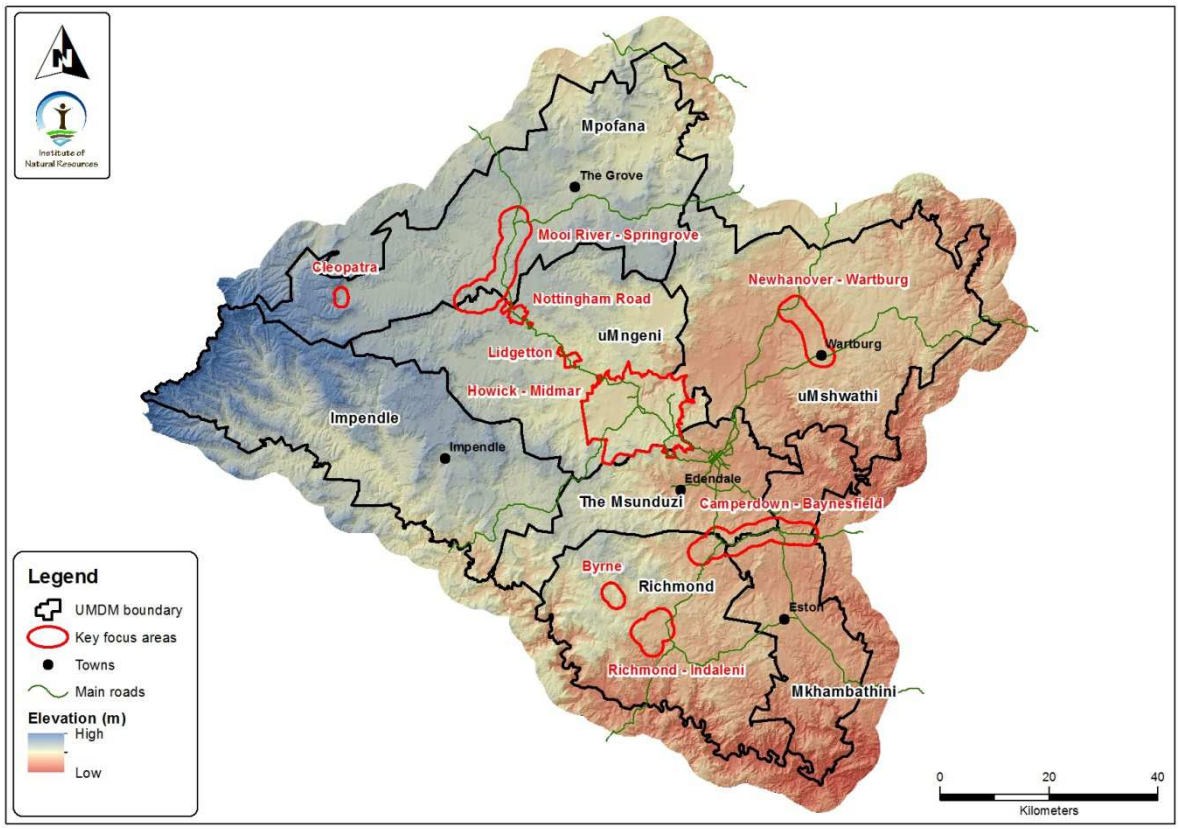


Figure 3 Spatial extent of the Umgungundlovu District and Key Focus Areas identified for specific attention in the EMF

In summary, the Project area is the **entire extent of the uMgungundlovu District** Municipality Boundary, **excluding the uMsunduzi** local Municipality, with **higher confidence** data informing the outputs in the **KFAs**.

2. STATUS QUO PHASE

The status quo [10]process involved the investigation of the current state of the District in terms of the following components: Natural Capital, Cultural Heritage, Socio-economic Environment, Land-use and Land Reform. The conclusions of this investigation are summarised below.

2.1 Status Quo Findings

The locality of the uMDM is inclusive of a number of strategic features from the natural, economic and socio-economic perspectives. It is positioned between the water supply areas for the cities of Pietermaritzburg and Durban. The N3 highway enters the municipality at Camperdown and exits west of Mooi River after traversing major centres such Pietermaritzburg and Howick. These features reflect both natural infrastructure, and built infrastructure that have significant bearing on the economic activities and livelihoods of the people in the uMDM, in the eThekwini Metro, and beyond. They reflect an inter-relatedness that needs to be well understood by decision-makers in order to ensure that the influences of one are not allowed to have detrimental impacts on the other. This concluding summary is a synthesis of the summaries from each of the chapters of the Status Quo report that provides the reader with a final and overall view of the status quo or state of the environment in the uMDM.

2.1.1 Natural Capital

2.1.1.1 The Terrestrial Environment

According to the 2005 land cover data for the uMDM just over 57% was considered to be in a natural state with 1.6% being degraded natural cover and the just less than 41% being transformed. The 2008 land cover data reflects a negative trend in that approximately 51% was considered untransformed and still in relatively good condition with a significant increase to 4.5% of degraded natural cover and the area under transformed land increased to 44.5%. Considering the trends reflected in this data, a ***conservative estimate of the current situation may be that more than 50% of the pristine natural land cover of the UMDM has been lost*** to a combination of transformation and degradation. This has occurred as a result of all forms of agriculture, except sugar, increasing in their cover, and growth and expansion of both urban and rural settlement. ***In conjunction*** with this ***has been a decrease in the cover of natural vegetation, primarily grasslands***, and an increase in that which is considered degraded. It is important to note that the land cover data includes both aquatic and terrestrial categories.

There is a scattering of a variety of protected areas throughout the uMDM that range in size and status from a sizable portion of the uKhahlamba Drakensberg Park World Heritage Site, i.e. almost 67000 hectares, to the 530 hectares of the proposed Biodiversity Stewardship site known as Hopedale. These 33 protected areas make up close to 110,000 hectares which is 11.5% of the uMDM area. Based on the international target of 10%, this coverage appears to be impressive.

[10]uMgungundlovu District Municipality. December 2012. Strategic Environmental Assessment Report: for the uMgungundlovu District Municipality Strategic Environmental Assessment and Strategic Environmental Management Plan. Isikhungusethu Environmental Services (Pty) Ltd and Zunckel Ecological + Environmental Services, Pietermaritzburg.

However, the Biodiversity Sector Plan for the uMDM and the Protected Area Expansion Strategy for the province indicate that ***the current protected area coverage is not meeting the biodiversity conservation targets for the uMDM***, and that additional coverage is required.

Although the two planning tools referred to above are bio-centric, it is important to understand that inherent within their outcomes are significant anthropogenic benefits. In other words, the biodiversity and ecosystem features that have been used to generate these targets all represent strategically valuable natural capital which produces ecosystem goods and services that underpin the socio-economic activities within and beyond the uMDM. This situation raises the issues of resilience and vulnerability in the sense that the more transformation that occurs, the more resilience is lost and vulnerability increases. While a climate change response strategy has been developed for the District, it was considered important to note that the consequences of this loss of resilience and increased vulnerability are in themselves significant and become even more relevant as the potential consequences of climate change become clearer.

2.2.1.2 The Aquatic Environment

The above discussion generally reflects the situation with regard to the terrestrial environment although mention has been made of the water sources for uMgungundlovu and eThekwini. More specifically the aquatic environment within the uMDM has become significantly compromised. The primary reasons for this relate to both the quantity of water in the systems and the quality of this resource, and the relationship between these factors exacerbate the situation, i.e. quantity is required to help address quality and the greater the demand on the systems, the more significant the reduced capacity to deal with the quality issues.

Essentially the ***aquatic systems in the uMDM are extremely stressed*** due to the fact that ***demand far exceeds supply*** to the extent that inter-basin transfer schemes have been introduced, are under construction and are planned to help meet the demand and augment the storage capacity of the four major dams already in the uMgeni system. Additional strategies such as water conservation and water demand management, and waste water recycling are also being implemented and considered respectively.

The ***upper reaches of the catchments*** that provide the water ***are in a poor condition*** with alien plant infestations accounting for losses in water production together with incompatible land uses and degradation contributing to both a decrease in water production capacity as well as quality. ***Intensive agricultural practices*** such as dairies, poultry batteries and piggeries all ***contribute to releasing pollutants*** into the system in the upper reaches of the catchments, while the ***urban centres all contribute industrial and human waste***. ***In the lower reaches*** of the catchments other agricultural activities such as ***sugar cane production contribute to reduced water quality*** through the leaching of agricultural chemicals.

2.2.1.3 Air Quality

Although the ***uMDM generates the third highest level of atmospheric pollution in the province***, this ***level is relatively low***. The ***aspect of primary concern*** though is the combination of the topographical and atmospheric conditions, and the ***concentration of pollution sources in the Msunduzi Local Municipal area***. The daily development of a strong and shallow surface

temperature ***inversion layer in winter traps pollutants causing an exceedance of ambient air quality standards***. The density of industrial activities in the other local municipal areas is much lower than in Msunduzi and the sources are predominantly domestic and agricultural, but are at levels that do not cause undue concern.

2.1.2 Cultural Heritage

One thousand and fifty heritage sites were identified but ***most*** of these are ***architectural*** in nature and are ***concentrated in the urban areas***. In addition to these some historical and cultural resources were also recognised. Importantly these features are those that are on existing databases and the budget limitations did not allow any field work for the identification of sites that are currently unrecorded. This report states that the latter is a significant omission and that the UMDM is rich in cultural heritage resources. The issue therefore ***is the lack of information regarding the broader suite of heritage resources.***

2.1.3 The Socio-Economic Environment

2.1.3.1 Demographics

A review of the demographic data indicates a population increase of 1.1% per annum in the district from 2001 to 2007. The population demonstrates a youthful age-gender profile with the emphasis on the younger working-age groups and a dominance of females in the older age groups. This profile has implications for HIV-Aids infection levels and the negative impact that this could have on the economy and the younger generations.

2.1.3.2 Spatial distribution

The ***highly concentrated nature of settlement in the primary and secondary centres of the district*** (particularly Pietermaritzburg) ***poses challenges in terms of the level of services provision and*** the ***quality of operation and maintenance*** of these services. Where services are poorly maintained, then problems arise in relation to human health and safety and these also have an impact on biodiversity. An example here is poorly maintained reticulated sewerage systems resulting in blockages which in turn lead to effluent leakage into river systems. Owing to the scale and density of population in urban areas services failure has a much greater impact on the residents and environment than in scattered rural areas where people are largely self-sufficient and densities are substantially lower.

The ***scattered nature and extent of rural settlement in the district poses a range of challenges for different reasons to the urban areas***. These relate to sustainability in terms of the provision of services in terms of logistics, costs and availability of natural resources (e.g. water and suitable land). This is particularly pertinent in the light of findings from the Land Use report where historic trends indicate an increase in areas under rural settlement and subsistence production, particularly in the traditional areas of the district.

2.1.3.3 Employment

- ***Unemployment has increased*** between 2001 and 2007, and still remains high.
- Despite high levels of unemployment, levels of employment are higher than those experienced in the province as a whole.
- The majority of the semi-skilled, skilled and professional employment opportunities are located in the districts' urban centres in secondary and tertiary sectors whilst the unskilled and semi-skilled employment is mainly located in rural areas in the primary sector.

2.1.3.4 Education

- ***Access to education between 2001 and 2007 improved for households*** in the district, however less than 30% of the population has matriculation or higher levels of qualification.
- ***Access to education has improved in urban areas*** particularly for senior schooling and post school educational facilities.
- It is assumed that senior ***education in rural areas is less accessible*** than in urban areas based on findings from related projects in the district.
- Access to primary education in rural areas tends to be within reasonable distance of larger settlements accessible by 'D' roads.

2.1.3.5 Services

- ***Access to essential services in the district appears to be above those for the province***.
- The type and level of services (infrastructure and social) provided in the district varies according to the following:
    - Order of urban centre;
    - Rural or urban location.

  The implication of this is that the more accessible rural settlements will generally have access to services at RDP level. In contrast services in urban areas will tend to be at a higher then RDP level depending upon the level of centre.
- It is assumed that ***the majority of backlogs for water, sanitation and electricity exist in isolated rural areas***.

2.1.3.6 Land Use

Land use trends were noted according to the following categories:

- Limited increase/decrease less than 10%;
- Increase/decrease up to 50%;
- Major increase/decrease 50-100%; and
- Dramatic increase/decrease above 100%.

Based on a comparison of data from 2005 and 2008 the following land use trends were noted:

- The majority of the local municipalities recorded transformation in land use (i.e. changes away from the original BRGs for the area). Only one of these was limited whilst the remainder recorded an increase.
- The same trend applies to commercial timber in the district.
- In the case of land under sugarcane it appears that there was only an increase in one municipality while in the remaining four (where sugar is cultivated) the area decreased.

- Commercial agriculture (vegetables, fruit etc.) increased in five municipalities and decreased in the remaining two.
- Subsistence agriculture increased throughout the district with four municipalities experiencing major increases and two dramatic increases.
- Land under grasslands in good condition decreased throughout the district.
- Land under natural vegetation (forests, bushlands etc.) was subject to limited losses in six municipalities.
- Land areas under urban and rural settlement increased throughout the district up to the 10% level.

In addition to the above trends 24% of the district is under land claim of which the majority was historically under commercial agriculture. The effect is that much of the land on these farms has been left fallow and in some cases, settled by beneficiaries.

2.1.3.7 The Planning Framework

The following is a list and brief discussion of the main issues pertaining to the planning framework relevant for the SEA in which it can be seen that there is a need for increased consideration of the natural environment in planning mechanisms and that these need to be aligned at the local level.

- ***Inclusion of environmental issues and considerations into the spatial planning processes*** of the municipalities has proven to be ***limited thus far***. Interventions are required to achieve progressive inclusion of environmental issues in the interests of sustainability.
- There are differing interpretations in the spatial plans in relation to: zoning, nodes, corridors and environmental issues. To achieve meaningful alignment these aspects of the spatial plans need to be given common definitions at district level and then applied to local plans. Common definitions would serve to standardise the type and level of node, corridor etc. anticipated in the plans and the context in which they are located. This in turn would allow for the standardisation of environmental input required in the planning process to ensure sustainability. For example, rural nodes could have negative impacts on biodiversity (i.e. transformation) and positive social and economic impacts. In contrast urban nodes are likely to have limited negative impacts on biodiversity and positive impacts on social, economic and cultural aspects of a municipality.
- The distribution of natural resources is not confined to municipal boundaries and hence differential land use management between municipalities could result in depletion and attendant consequences.
- It appears that ***none of the plans reviewed account for the environmental 'limits' to development in each of the municipalities***. This involves taking into account the types, quantity and quality of environmental goods and services that can be delivered in a municipality, the limits to the provision of such goods and services and the threats associated therewith. Examples of goods and services[11] here include: clean water, clean air, agricultural products, and mineral resources. There are direct and indirect costs associated with exceeding the limits of available local resources. Direct costs involve importation of scarce resources at additional costs to the end user (e.g. water transfer schemes). Indirect costs involve for example negative impacts on community health e.g. Msunduzi air quality.

[11] A good produced by the environment could for example include indigenous timber. A service could include water and air purification through wetlands and indigenous vegetation.

- Interpretation of national and provincial planning policies for application at local level is important since there are instances where 'blind' application of these policies can have negative implications for both communities and the environment (Isik 2009).
- Bulk infrastructure in the form of water supplies and transportation routes in spatial plans do not always align from one municipality to the next. An example of this is that Impendle is suggesting the downgrading of the Himeville to Nottingham Road scenic route whilst uMngeni is promoting the route for tourism development.

2.1.3.8 Agriculture

The indications are that ***agricultural resources are under threat in the Umgungundlovu district particularly in and around the nodal areas and the major transportation corridors***. In this context agricultural resources include: (i) areas suited to cultivation; and (ii) natural grasslands (mainly used for livestock production). The indications from this project are that the district is inclusive of rich agricultural resources which have, in the past, been used to supply market demand in the district in the form of foodstuffs and raw materials for industry. However, as noted above, the resource is under threat.

Based on the findings of the land use report, some of the threats to agriculture in the district derive from urban 'sprawl', poor land use management by municipalities, economic recession and land reform. A further issue noted in this project was that ***agriculture and natural resources have not been assigned a realistic value by society***. In other words the costs associated with the continued loss of both natural and agricultural resources in the district have not been fully quantified. One example is that this will mean that a greater proportion of our locally produced foodstuffs, building materials, etc. will have to be imported into the area at a greater cost to the end user. This view is supported by EKZNW at the recent launch of the Environmental Programme where it was noted that "...our natural environment (KwaZulu-Natal) is transforming so rapidly that unless we re-evaluate our management of it and begin to understand the economic value of the resources that sustain our society we are facing daunting costs replacing them" (Witness Saturday 5th November 2011).

Whilst it is noted that the future of agriculture is closely related to market forces, it is also noted in this project that in order for the resources and the sector to survive, there is an urgent need for the recognition of its importance by the state, associated provincial and local government agencies, the private sector and traditional institutions. Such recognition should provide the point of departure for the sector to tackle many of the serious challenges which it currently faces. In the process it is suggested that this would result in the apportionment of realistic values to agricultural resources which in turn would stimulate the need for the establishment of an effective regulatory framework for land use management and administration in rural areas of the district

3. STRATEGIC ENVIRONMENTAL ASSESSMENT

This SEA was based on an analysis of the Status Quo findings and on the perspectives provided by the uMgungundlovu Environmental Forum. The assessment generated a set of key sustainability issues, and the establishment through a consultative process of a sustainability framework which represents the Desired Future State for the District i.e. where we need to move to achieve a sustainable district.

3.1 Key Sustainability Issues

In the SEA the issues were analysed in the form of a table where they are identified, interpreted and aligned with those of the Forum and then assessed in terms of their impact on the balance between the three capitals of sustainability. The analysis is presented in a format that makes for easy reading the various environmental issues were been grouped in the following broad categories:

- Governance and planning;
- Land degradation;
- Water demand and supply;
- Water quality;
- Green economy;
- Sustainable communities; and
- Climate change and air quality.

These categories have not been prioritised but are listed so as to reflect the strategic priorities of the NSSD1, and therefore carry the national strategy context through to the District. The issues relevant to the above categories are explained within the analysis together with the identification of a series of 'drivers and pressures', i.e. causes; followed by a series of 'impacts'. This format provides the reader with a clear and detailed picture of the status quo and a platform from which the sustainability objectives have been formulated.

Table 3 Summary of Sustainability Issues established through teh STrategic Environmental Assessment

GOVERNANCE & PLANNING		
Key Environmental Issue (KEI)	**Drivers & Pressures (Causes)**	**Impacts**
Limited capacity and systems for integrated planning and implementation to achieve sustainable development – Inadequate intergovernmental co-operation and co-ordination for effective environmental governance; Poor monitoring and evaluation systems to assess progress towards sustainability; Insufficient resources and capacity made available for environmental management; Limited integration of sustainability into development planning.	• Inadequate capacity and financial resources within government structures • Lack of awareness of the importance of sustainability and environmental governance • Environmental issues are not considered a priority • Multiple authorities responsible for environmental management and implementation of complex legal frameworks • Lack of co-ordination and co-operation between different organs of state • Duplicated and inefficient use of state resources • Limited access to environmental information	• A lack of integrated planning is resulting in uninformed and poor decision making • Ineffective environmental compliance and enforcement undermines environmental governance • Inconsistency in governance promotes inequality and injustice • Inadequate capacity and financial resources is resulting in the deterioration of environmental resources and their quality • Inappropriate land use and planning is leading to environmental degradation, unequal access to resources and the perpetuation of poverty • Poor understanding of the importance of ecosystem goods and services is leading to a decrease in sustainability

		and quality of life • Lack of transparent, clear and defensible decision making which undermines the right to a clean and healthy environment
LAND DEGRADATION		
Key Environmental Issue (KEI)	**Drivers & Pressures (Causes)**	**Impacts**
The degradation of land and natural resources – Inappropriate land use and poor land management is resulting in land degradation, the loss of natural resources and reduced potential for the provision of ecosystem goods and life support services. This includes the loss of agriculturally productive land and a decline in biodiversity which has significant social and economic impact.	• A lack of awareness of the importance of natural land cover for the production of natural life support services and their role in sustaining human populations and the economy. • Poor land use planning and limited integration of natural resource protection into strategic and spatial planning • Historic land policies, inequitable land distribution, land tenure systems and population densities promote land degradation. • Limited capacity and financial resources to implement and manage land use. • Poor cooperative governance mechanisms and strategies. • Increased demand on natural resources for economic growth and development • Population growth places pressure on the natural systems to sustain livelihoods. • Poverty and unemployment results in the exploitation of resources as a livelihood strategy • Unsustainable agricultural practices by both commercial and subsistence farmers. • Unsustainable grazing management causing over grazing on communal lands • Invasive alien species diminish the productive use of land	• Urban expansion and poorly considered land use planning results in the permanent loss of high potential agricultural land. • Loss of agricultural production potential and increased risks for food security • Increased economic costs of development to engineer the ecosystem goods and life support services that have been lost through land degradation • Unsustainable land use practices increase invasive alien species which decreases land productivity and potential use • Increased run-off, erosion and sedimentation impacts on water quality and reduces the sustainable lifespan of water supply and irrigation dams. • Increased social and economic risks of disasters such as floods, landslides and fires • A decrease in natural capital diminished the District's ability to sequestrate carbon and mitigate predicted climate change impacts. • Degraded land diminishes the aesthetic appeal of the landscape and potential for economic benefit from recreation and tourism • Loss of opportunities to enhance sustainable communal livelihood strategies for vulnerable communities that are reliant in natural resources for survival • A lack of natural resources to sustain livelihoods increases social dependency and poverty, and results in a decline in human health, well-being and quality of life
WATER DEMAND & SUPPLY		
Key Environmental Issue (KEI)	**Drivers & Pressures (Causes)**	**Impacts**
Excessive water demand exceeds available supply - Current water demand from the uMngeni catchment area is exceeding sustainable levels and is stressing the aquatic ecosystems. Rapid urban & industrial expansion and population growth is increasing demands and this is compounded by inefficient water use and wastage. Degraded catchments and aquatic ecosystems diminish the ability of the natural systems to sustainably supply water. Dams and interbasin-transfer schemes	• The degradation of catchment due to poor land use management and the loss of wetland functionality and natural riparian vegetation. • Social and economic growth is exceeding the capacity of the natural systems to sustainably provide water. • Inefficient use of water and water wastage increases consumption and demand. • Land transformation and inappropriate land use planning	• The natural system has become significantly modified through land degradation, inter-basin transfers and the construction of dams which has diminished the natural systems ability to deliver sustained quantities of both surface and groundwater. • Water losses and inefficiencies increase the economic cost of the delivery of services • Reduced water available for ecosystem functioning and the ecological reserve degrades aquatic ecosystem health and the ability of the aquatic systems to

increase costs of providing water to the consumers and negatively impact on overall river health and natural systems.	diminishes water production potential • A lack of awareness and recognition of catchment management and water conservation	provide water and other services • Degraded catchments and reduced sustainable water supply increases water costs for all users • Degraded aquatic systems increase the flood risk of vulnerable communities • There is conflict for a finite resource between alternative water users such as agriculture and urban uses • Alien invasive species and inappropriate land uses within the upper catchments significantly reduce water availability for downstream users and natural systems. • A decrease in the aesthetic appeal of catchments and aquatic ecosystems reduce their ability to accommodate recreational and tourism activities and sporting events
WATER QUALITY		
Key Environmental Issue (KEI)	**Drivers & Pressures (Causes)**	**Impacts**
Reduced water quality – Land degradation, Industrial effluent, and, poor sewerage, solid waste and storm-water management are impacting on water and aquatic ecosystem quality. This is resulting in declining social and economic conditions including increased health risks and costs; decreased river health; increased water treatment costs; increased risk of liability to the Municipality; increased water charges; and, decreased investor interest	• Industrial and economic activity concentrated in the Howick-Msunduzi-Camperdown corridor • Limited waste water treatment capacity • Insufficient maintenance and upgrading of sewerage, storm-water and solid waste infrastructure • Insufficient financial and human resources allocated to infrastructure maintenance and manage effluent discharges and solid waste • Limited capacity to monitor and enforce water pollution legislation • Often an un-coordinated approach to dealing with emergency water pollution issues due to a lack of clarity on roles and responsibilities • Service delivery backlogs in sanitation and adequate housing resulting in a high proportion of people living in un-serviced informal settlements • Population growth, high urbanisation and migration rates • Inefficient and inappropriate land us and management • The loss of catchment integrity, specifically wetlands and natural riparian vegetation • Limited awareness of the value of natural areas to deliver water shed services • Increased nutrient and bacterial loads in river systems from agricultural land uses, including both cultivation and intensive animal production	• The loss of catchment integrity and the loss of wetlands, riparian vegetation and floodplains decreases the ability of the natural environment to provide water purification services • Increased water treatment costs have direct economic impacts and act as a disincentive for economic investment • Poor water quality detracts from the aesthetic qualities necessary to attract tourism and major sporting events, i.e. Duzi Canoe Marathon and Midmar Mile • Increased eutrophication of water resources leading to a proliferation of aquatic alien invasive plants and increased water treatment costs, as well as damage to ecosystems through reduced sunlight and oxygen. • Increased healthcare costs through the increased risks of communicable water borne disease and a decline in human health and wellbeing • The high cultural and spiritual significance of fresh water systems to communities is compromised • Increased levels of water pollution, reduces the ability for the use the water for irrigation and food production.

GREEN ECONOMY		
Key Environmental Issue (KEI)	**Drivers & Pressures (Causes)**	**Impacts**
Economic growth that is not linked to sustainable resource use and environmental impact - Resource and ecosystem degradation due to over-exploitation of natural capital. Persistent poverty, unemployment, social dependency and inequality. An economy that is based on intensive resource consumption is depleting non-renewable and renewable resources beyond sustainable levels.	• High poverty and unemployment rates • Unequal distribution of wealth, land and resources • Unsustainable exploitation of natural resources to support economic growth • Depleted and stressed ecological systems • Consumption patterns exceeding supply • The economy is highly energy, carbon and resource intensive • Development pressure in the primary urban nodes and along the N3 corridor • Lack of integration of natural capital and ecosystem goods and services into economic and development decision making • Limited awareness of the importance of the natural environment in supporting socio-economic development	• Ecosystem failure will compromise the ability to address socio-economic priorities. • Resource and ecosystem degradation is resulting from the over-exploitation of natural capital • Poverty, unemployment and inequality remains persistent particularly in marginalised and vulnerable communities • There is an increase in social dependency due to the loss of natural resources that support sustainable livelihoods • Unequal distribution of wealth, land and resources promote environmentally harmful practices that increase environmental and resource degradation • Resource intensive consumption patterns are depleting non-renewable and renewable resources beyond sustainable levels
SUSTAINABLE COMMUNITIES		
Key Environmental Issue (KEI)	**Drivers & Pressures (Causes)**	**Impacts**
Inefficient spatial planning and urban design – Rapid population growth and urbanisation increases pressures on Municipalities to sustainably supply services. A large number of poverty stricken people live in informal settlements which are detrimental to their health and well-being. Safe, clean and pleasant environments are not being provided. Increased demand for development is placing pressure on the optimal use of land and the provision of sustainable services and infrastructure. Urban design does not optimise resources efficiency particularly in relation to electricity usage, water and sewer provision, waste management and accessibility of public transport. **Inadequate provision of basic services including water, sanitation and waste management** - The lack of equitable and universal access to basic services such as effective waste removal and the provision of appropriate sanitation and water services impact on human health and well-being and result in a deterioration of the quality of	• Rapid population growth and the migration of people into urban areas. • Historic land use planning and the legacy of inequitable and unsustainable allocation and use of land • Insufficient financial and human resource capacity allocated to the provision and maintenance of basic services and infrastructure • Limited awareness and knowledge of waste minimisation, recycling and alternative technologies. • Insufficient incentives for society to manage their environmental impacts and resource use more efficiently • Poverty, inequality and unemployment • Dependency on depleted natural resources for survival of marginalised communities	• Inadequate provision of basic services results in environments that are harmful to human health and well-being. • Limited access to acceptable waste collection services, inefficient waste disposal, limited recycling opportunities, and poorly managed landfill sites create significant water and air pollution impacts. • Littering and illegal dumping creates aesthetic and environmental impacts that detract from potential economic investments, while causing flood risks and infrastructure damage when washed into Stormwater drains. • The degradation of the natural environment is undermining food security and access to natural resources support livelihoods and self-sufficiency. • The limited recognition of the spiritual, cultural and economic value of cultural heritage sites results in these sites being lost. • The potential economic opportunities associated with natural and cultural heritage sites may be diminished in the sites are not recognised and protected.

life. Waste recycling initiatives are not easily accessible to the majority of people in the District. **Inadequate recognition of Cultural Heritage –** Limited recognition of both natural and social heritage resources and of the spiritual, cultural and economic value of cultural heritage sites. Eurocentric biased knowledge of cultural heritage and insufficient data for all elements of cultural heritage undermines social cohesion and understanding.		

3.2 Desired Future State

3.2.1 Sustainability Framework

The sustainability framework represents the Desired Future State for the District i.e. the change in the state, from the current situation (documented in the status quo) in order that we establish a sustainable natural environmental and quality that supports human well-being and economic prosperity. The framework was compiled in direct response to the sustainability issues documented above. It also drew from a number of relevant strategies at the national, provincial and local level. Key examples of these strategies are as follows:

- The National Strategy for Sustainable Development and Action Plan 2011 to 2014;
- The National Waste Management Strategy 2011;
- The National Heritage and Cultural Tourism Strategy Version III 2011;
- The Water Reconciliation Strategy Study for the KwaZulu Natal Coastal Metropolitan Areas 2009;
- The National Ambient Air Quality Standards 2009;
- The KZN Provincial Growth and Development Strategy 2011;
- The KZN Provincial Growth and Development Plan 2012; and
- The Integrated Development Plan for uMgungundlovu District Municipality 2012.

The vision, sustainability objectives, indicators and targets that are captured in the sustainability framework either reflect those that are already in the above strategies, or set more relevant targets that are in excess of the reference documents. The sustainability framework is thus relevant within the context set by these strategies while still addressing local conditions and dynamics.

3.2.2 Sustainability Vision

The vision developed in the SEA was the result of a number of iterations that were reviewed and contributed to by the project team, the project steering committee and stakeholders. In this process existing visions that were formulated by the District and Local Municipalities were reviewed and it was deemed necessary to formulate a specific vision for the SEA as it introduces the concept of sustainability in a much stronger way, as well as the role of natural capital in social wellbeing and economic resilience. The vision has been articulated within the context of relevant national and provincial strategies as discussed above. The vision for the SEA reads as follows:

It is the vision of the UMDM and its Strategic Partners that by 2040 the District will be recognised as one within which sustainability is at the core of all planning and decision-making thus ensuring that its natural capital is restored and managed so as to optimally contribute to the wellbeing of its people and the resilience of the economy.

The various components of the vision are explained in more detail in the SEA report.

3.2.3 Detailed Framework

The framework comprises of the following elements:

- *Sustainability Objective* - provide clear statements of intent and indicate the desired direction to achieve the vision.
- *Sustainability Criterion* & Indicators - These are tools which can be used in the conceptualisation of environmentally sustainable development and the monitoring of progress towards achieving sustainability in its broadest sense. Sustainability Criteria define the essential components of the social, economic, natural and governance environments. Collectively, Sustainability Criteria provide an implicit, generally agreed-upon definition for the desired state of the environment.

Each criterion relates to a key element of sustainability, and may be characterised by one or more quantitative, qualitative, or descriptive indicators. Through the measurement and monitoring of these indicators, the overall effects of environmental management interventions, or non-intervention, can be assessed and evaluated, and action can be adjusted to meet stated aims and objectives more effectively.

These are aligned to national and provincial strategies (see Section **Error! Reference source not found.**). Of greatest relevance is the National Strategy on Sustainable Development and Action Plan 2011 – 2014 (NSSD1). In order to demonstrate the extent to which the sustainability objectives set for the UMDM relate to the NSSD1, a numbering system has been introduced which reflects the NSSD1 Strategic Priorities that are relevant within each sustainability objective. The five Strategic Priorities are listed below:

6. Enhancing systems for integrated planning and implementation;
7. Sustaining our ecosystems and using natural resources efficiently;
8. Towards a green economy;
9. Building sustainable communities;
10. Responding effectively to climate change.

Each sustainability objective is followed by a series of numbers from 1 to 5 which reflects the above and their relevance to the objective and vice versa. The purpose of this exercise is to demonstrate the extent to which each sustainability objective bears relevance to the national perspective as reflected in the NSSD1.

In conclusion, the sustainability framework serves as a basis for providing detail on the DFS of the environment, and point of departure for the development of the SEMP, which includes the programmes, projects and plans for moving towards the DFS.

3.2.3.1 Integrated Planning

NSSD 1 Strategic Priority 1: Enhancing systems for integrated planning and implementation

Key Environmental Issue:	**Limited capacity and systems for integrated planning and implementation to achieve sustainable development**
Insufficient intergovernmental co-operation and co-ordination for effective environmental governance; Poor monitoring and evaluation systems to assess progress towards sustainability; Insufficient resources and capacity made available for environmental management; Limited integration of sustainability into development planning.	
Sustainability Objective	
Enhanced and effective environmental governance, institutional structures and systems to achieve integrated planning and implementation.	
Sustainability Criteria	
Environmental sustainability criteria are integrated into Policies, Plans, Projects and decision making.	
Co-operative environmental governance structures and mechanisms promote integrated planning and ensure efficient and effective implementation of environmental functions and responsibilities.	
Financial resources and capacity enable the implementation and management of environmental functions and responsibilities.	
Municipal Capital investment projects comply with relevant environmental legislative requirements.	
Communities are informed, empowered and involved in the process of democratic environmental governance.	
Access to environmental information is facilitated and encouraged.	
Monitoring and evaluation systems assess and report on the progress towards sustainability.	
Indicators	**Targets**
% of Policies, Plans and Projects assessed using sustainability appraisal	100% of all Policies, Plans and Projects approved by council
% of Municipal Budget allocated to environmental mandates	Baseline and target to be determined
Number of environmental non-compliance issues identified for capital investment projects	Nil
Environmental awareness index	Baseline and target to be determined (Environmental awareness survey to be undertaken as part of SoER process?)
District Municipality State of Environment Report (SoER)	SoER complied every 5 years
Sustainability Strategies	
Establish effective co-operative environmental governance structures and institutional mechanisms between key environmental authorities.	
Integrate the sustainability criteria and environmental sensitivity information of the SEA into all municipal planning.	
Ensure all UMDM projects comply with all relevant environmental legislation, regulations, policies and guidelines.	
Environmental issues and priorities must be embedded into the Performance Management System and Key Performance Areas of all components of the Municipality.	
Build capacity in environmental compliance monitoring and enforcement through increasing the numbers of Environmental Management Inspectors.	
Develop a sustainability appraisal tool to be used for the evaluation of Policies, Plans and Projects.	
Develop a monitoring, evaluation and reporting mechanism to facilitate continual assessment towards achieving sustainability.	
Undertake a District SoER every five years and use the outcomes to revise and update the SEA and SEMP.	
Develop and implement a sustainability awareness and environmental capacity building campaign to empower all relevant role-players, including a monitoring and evaluation survey framework linked to the SoER.	
Develop and implement skills development strategies to promote integrated planning and enhance environmental management.	
Promote access to environmental information that is easily available to all sectors of society through various information media.	

3.2.3.2 Ecosystems & Natural Resources

NSSD 1 Strategic Priority 2: Sustaining our ecosystems and using natural resources efficiently

Key Environmental Issue:	**The degradation of land and natural resources**
Inappropriate land use and poor land management is resulting in land degradation, the loss of natural resources and reduced potential for the provision of ecosystem goods and life support services. This includes the loss of agriculturally productive land and a decline in biodiversity which has significant social and economic impact.	
Sustainability Objective	
The use of natural capital is compatible with the maintenance of ecosystem functionality and natural resources are protected and restored.	
Sustainability Criteria	
Areas identified as being essential for the persistence of biodiversity and for the provision of ecosystem goods and services are valued, protected and continually enhanced.	
Degraded areas are identified, rehabilitated and managed to promote land productivity.	
High potential agricultural land is protected and rehabilitated for sustainable agricultural production.	
Agricultural production is enhanced and increased through environmentally sustainable agricultural practices.	
Areas of geotechnical, geological or instability risks are identified and avoided in land development.	
Compact land development patterns use land efficiently.	
Indicators	**Targets**
% decrease in the Provincial Land Degradation index for the District	2015 0% No nett increase/ 2020 15% decrease/ 2025 30% decrease/ 2030 50% decrease
% land transformation of areas identified as being essential for the persistence of biodiversity and for the provision of ecosystem goods and services	Not exceeding connectivity thresholds (i.e. 75% of land in identified planning units remains untransformed)
% land transformation of high potential agricultural land to non-agricultural uses	No nett loss
Sustainability Strategies	
Sustainability objectives and criteria must be integrated into all relevant policies, programmes and plans.	
Integrate the uMgungundlovu biodiversity sector plan into all municipal spatial and land-use plans.	
Integrated and coordinated land use management through cooperative structures and strategies.	
Incentives for sustainable agriculture land management practices that are within acceptable norms and standards.	
Implement land care and rehabilitation (including wetlands, alien species and erosion) projects aimed at green job creation and restoring land and natural resources.	
Develop and implement a community based natural resource management strategy.	
Implement a protected area expansion strategy to create a network of protected areas representative of the District's biodiversity.	
Strengthening Biodiversity Stewardship programmes.	
Establish urban open space and conservation plans.	
Communicate all spatial products to relevant stakeholders such as Estate Agents and ensure that same is freely available in easy access formats.	

Key Environmental Issue:	Excessive water demand exceeds available supply
Current water demand from the uMngeni catchment area is exceeding sustainable levels and is stressing the aquatic ecosystems. Rapid urban & industrial expansion and population growth is increasing demands and this is compounded by inefficient water use and wastage. Degraded catchments and aquatic ecosystems diminish the ability of the natural systems to sustainably supply water. Dams and interbasin-transfer schemes increase costs of providing water to the consumers and negatively impact on overall river health and natural systems	
Sustainability Objective	
The ability of aquatic resources to provide water is maintained within the limits of sustainability.	
Sustainability Criteria	
Wetland areas, streams and rivers are protected, rehabilitated and managed to maintain ecological functioning.	
Flood prone areas are managed to promote ecosystem goods and services, to minimise flood risks and impacts.	
Water demand management results in minimised water loss and optimised water conservation.	
Everyone has access to the minimum supplies of potable water needed to maintain their health and well-being.	
Catchment and river management policies and guidelines integrated into land use and development planning.	
Equitable and fair access to water supplies is provided for all water users.	
Indicators	**Targets**
Municipal water loss %	Less than 15%
Per capita consumption	Consumption ≤ 200 l/capita/day
% households with access to a minimum of 75 litres of water per person per day	100%
Wetland and riparian area functional loss	No net loss of wetland and riparian functionality
Reduction of water demand	15% reduction as determined in the water reconciliation strategy
Sustainability Strategies	
The restoration and sustainable management of water catchments.	
Policies and measures implemented to significantly reduce levels of water consumption and demand through water use efficiencies.	
Determination and maintenance of the ecological reserve for key rivers.	
Coordinate and integrate strategies and programmes to ensure sustained implementation of alien plant control and rehabilitation.	
Coordinate and integrate strategies and programmes for wetland and riparian area rehabilitation.	
Implement a water loss and wastage management plan.	
Develop policies and strategies for the more efficient and effective management of farm dams and irrigation systems.	

Key Environmental Issue: **Reduced Water Quality**	
Land degradation, Industrial effluent, and, poor sewerage, solid waste and storm-water management are impacting on water and aquatic ecosystem quality. This is resulting in declining social and economic conditions including increased health risks and costs; decreased river health; increased water treatment costs; increased risk of liability to the Municipality; increased water charges; and, decreased investor interest.	
Sustainability Objective	
Water quality in all aquatic ecosystems in the District is significantly improved and maintained.	
Sustainability Criteria	
Bacteria and pathogens in all aquatic systems do not pose a significant risk to health and wellbeing.	
Nutrient concentrations and loads in all aquatic systems reverse current unacceptable trends of eutrophication.	
Aquatic ecosystems are in a functional and healthy state.	
Indicators	**Targets**
Faecal coliform / *E. coli* concentrations	Not to exceed the limits determined in Integrated Catchment Management Plans (or relevant DWA Water Quality Standards)
Nitrate and Phosphate ratio Nitrate and Phosphate concentrations / load Electrical conductivity Turbidity pH (NH3, Total Organic Carbon /other additional indicators as may be needed for monitoring specific pollution types in relevant areas)	Not to exceed the limits determined in Integrated Catchment Management Plans (or relevant DWA Water Quality Standards)
SASS5, Mini-SASS and Benthic Diatom scores	SASS5, Mini-SASS and Diatom scores meet and exceed river health classes determined in Integrated Catchment Management Plans
Sustainability Strategies	
Development of Integrated Catchment Management Plans.	
Develop and implement a scheduled maintenance and upgrade programme of all sewerage infrastructure and wastewater treatment works.	
Develop a water pollution emergency response protocol.	
Develop an integrated water quality and river health monitoring system.	
Develop an incentive scheme designed to improve water quality.	
Integrate the costs of restoration and sustainable management of catchments into the water reconciliation and pricing strategy.	
Ensure adequate resources and capacity for the compliance monitoring and enforcement of relevant water legislation.	
Develop policies for improved /efficient technologies at the points of waste generation and effluent treatment in order to reduce impacts.	
Implement and ensure compliance with an integrated waste discharge-charge system.	

3.2.3.3 Green Economy

NSSD 1 Strategic Priority 3: Towards a Green Economy

Key Environmental Issue:	**Economic growth that is not linked to sustainable resource use and environmental impact**
Resource and ecosystem degradation due to over-exploitation of natural capital. Persistent poverty, unemployment, social dependency and inequality. An economy that is based on intensive resource consumption is depleting non-renewable and renewable resources beyond sustainable levels.	
Sustainability Objective	
Economic goals based on ecological sustainability and built on a culture that recognises that socio-economic systems are dependent on and embedded in ecosystems.	
Sustainability Criteria	
An environmentally sustainable economy promotes distributional equity, is resource efficient and provides for the rehabilitation and sustainable management of natural capital.	
Absolute poverty is eradicated and the wealth gap is reduced.	
A low-carbon economy that relies on clean, renewable and efficient energy sources and transport options.	
A resource efficient economy that optimises its use of water while significantly reducing waste generation.	
An equitable and broad range of employment opportunities exist that provide people with an income to support themselves and their families.	
Indicators	**Targets**
Unemployment rates	<5% of economically active people
Share of income earned by poorest 60%	>20%
% of households in absolute poverty (No. of households whose per capita expenditure is below the national Food Poverty Line)	0%
Number of green jobs created within the District	15000
Number of green technology businesses established within the District	50
Sustainability Strategies	
Develop and implement a green economy strategy and programmes for the District.	
Implement skills development in the green economy sector.	
Develop incentives for the production of environmentally friendly products.	
Establish investment incentives to support and promote green industries and developments in the District.	
Implement programmes to ensure the rehabilitation and sustainable management of natural assets and ecosystem services.	
Create opportunities for training and job creation in green economy programmes (carbon sequestration; rehabilitation of degraded areas; alien invasive species management; waste management & recycling; and, urban greening).	
Promote self-sufficiency, food security and sustainable livelihoods.	

3.2.3.4 Sustainable Communities

NSSD 1 Strategic Priority 4: Building Sustainable Communities

Key Environmental Issue: **Inefficient spatial planning and urban design; inadequate provision of basic services including water, sanitation and waste management; and, insufficient recognition of Cultural Heritage**	
Rapid population growth and urbanisation increases pressures on Municipalities to sustainably supply services. A large number of poverty stricken people live in informal settlements which are detrimental to their health and well-being. Safe, clean and pleasant environments are not being provided. Increased demand for development is placing pressure on the optimal use of land and the provision of sustainable services and infrastructure. Urban design does not optimise resources efficiency particularly in relation to electricity usage, water and sewer provision, waste management and accessibility of public transport. The lack of equitable and universal access to basic services such as effective waste removal and the provision of appropriate sanitation and water services impact on human health and well-being and result in a deterioration of the quality of life. Waste recycling initiatives are not easily accessible to the majority of people in the District. Limited recognition of both natural and social heritage resources and of the spiritual, cultural and economic value of cultural heritage sites. Eurocentric biased knowledge of cultural heritage and insufficient data for all elements of cultural heritage undermines social cohesion and understanding.	
Sustainability Objective	
Environmentally sustainable communities are established where development is informed by social needs and the improvement of the quality of life and does not compromise the natural environment and cultural heritage.	
Sustainability Criteria	
Environmental sustainability and ecosystem goods and services are integrated into development planning.	
Sustainable municipal bulk service infrastructure and facilities are available, maintained and managed, to sustainably meet the needs of residents and business.	
All residents have appropriate, secure and affordable housing and access to basic services in order to meet their basic needs and to live with dignity.	
Communities vulnerable to environmental risk are identified and strategies are in place to minimise these risks.	
Environmental justice and equity must be pursued so as to ensure that environmental impacts do not unfairly discriminate against any person or community.	
Community services, facilities, community parks and open spaces are accessible to all people.	
An efficient, safe, integrated and convenient network of public transport, bicycle routes and pedestrian access is provided.	
Safe, clean and pleasant environments are provided to protect and enhance human health and well-being and improve overall quality of life.	
Resources use is minimised through energy efficiency, reduced water demand, efficient waste management and the provision of accessible public transport.	
Cultural and natural resources and sense of place are protected and maintained.	
Indigenous ecological and cultural knowledge is developed and integrated into planning and management processes.	
Indicators	**Targets**
Domestic Waste collection standards (GN R21 of 21 January 2011)	100% adherence to standards for levels of service, waste collection and recycling centres
% of households with access to sufficient, clean potable water (Min 75L/person/day)	100%
% of households with sanitation to MIG standards	100%
% of households with a source of electrical supply	100%
Blue drop score	Greater than 80% compliance
Green drop score	Greater than 80% compliance

Sustainability Strategies
Sustainability objectives and criteria must be integrated into all relevant policies, programmes and plans, particularly municipal spatial and land-use plans.
Fast-track the equitable and universal access to acceptable standards of basic services.
Undertake municipal infrastructure capacity and status assessments and implement upgrade and maintenance interventions to ensure the provision of sustainable services.
Undertake environmental vulnerability assessment to identify communities at risk and develop appropriate strategies to minimise risks and promote human well-being.
Green design policies and standards are developed for spatial planning and developments in order to promote environmental efficiency and minimise use of resources.
Develop and implement IWMPs that meet and exceed the standards set by the National Waste Management Strategy and waste collection standards.
Undertake an extensive cultural heritage resource identification and classification programme.
Establish community based tourism opportunities linked to cultural heritage sites to support their protection and management.

3.2.3.5 Climate Change

NSSD 1 Strategic Priority 5: Responding effectively to climate change

Key Environmental Issue:	**Localised poor air quality and greenhouse gas emissions contributing to Climate Change**
Poor air quality issues localised within the Msunduzi and N3 corridor area is resulting in increased human health and well-being risks. Greenhouse gas emissions contribute to global climate change. A decrease in natural capital diminishes the District's ability to sequestrate carbon and mitigate predicted climate change impacts.	
Sustainability Objective	
Air quality is significantly improved, Greenhouse gas concentrations are reduced and there is resilience to climate change within communities and ecosystems.	
Sustainability Criteria	
Ambient air quality standards for the protection of human health and well-being and natural systems are maintained.	
A low-carbon economy is achieved through energy efficiency, the use of alternative technology and reducing the dependence on fossil fuels.	
Greenhouse Gas emissions are reduced to levels in line with Cabinet approved targets.	
Natural systems are restored and maintained to be suitable for the sequestration of carbon and mitigate for climate change.	
Climate change adaptation strategies effectively build and sustain social, economic and environmental resilience to climate change.	
Indicators	**Targets**
Ambient air quality monitoring of SO_2 and PM10	No exceedance of ambient air quality standards
% reduction in Greenhouse gas emissions (metric tons CO_2 equivalent)	2020 34% below business-as-usual baseline / 2025 42% below business-as-usual baseline
% of households with access to electricity	100%
Units of energy saved through energy efficient interventions	Target to be established
Sustainability Strategies	
Develop a District Air Quality Management Plan, including comprehensive ambient air quality standards, and air quality monitoring, evaluation and reporting protocols.	
Establish the financial and human resources to manage and monitor air quality in the District.	
Decrease greenhouse gas emissions to levels in line with Cabinet approved targets.	
Promote efficient and clean public transport systems.	
Develop and implement a climate change response and adaptation strategy.	

Update disaster management plans to include pro-active response to climate change.
Restore and maintain indigenous woodlands, forests and other areas suitable for the sequestration of carbon.
Promote urban greening initiatives for the role it plays in mitigating air pollution and in carbon sequestration.
Reducing household indoor combustion of wood and coal by increasing access to electricity.
Develop and implement increased standard design specifications for key infrastructure to cater for extreme climatic events.
Develop incentives for energy efficiency and air pollution reduction and abatement.

The work to this point (Status Quo, SEA/Desired Future State and SEMP) in the process was undertaken as part of the SEA & SEMP contract and that UMDM and EDTEA decided to commission additional work to build on the SEA & SEMP contract in order to arrive at a Draft EMF. This ToR described in section 1.5 detailed in Appendix III was developed. The following section describes this 'additional work' in terms of the EMF phase outputs.

4. EMF STRUCTURE AND PURPOSE

4.1 Overview of EMF Components

The purpose of the Environmental Management Framework (EMF) is to support the achievement of the sustainability vision developed in the SEA process. Figure 4 shows the suite of four tools designed to support the UMDM and its partners in achieving this vision and meet the legal requirements of an EMF in terms of the regulations. The specifics of how they were developed, how they should be interpreted and applied is discussed in more detail in this section.

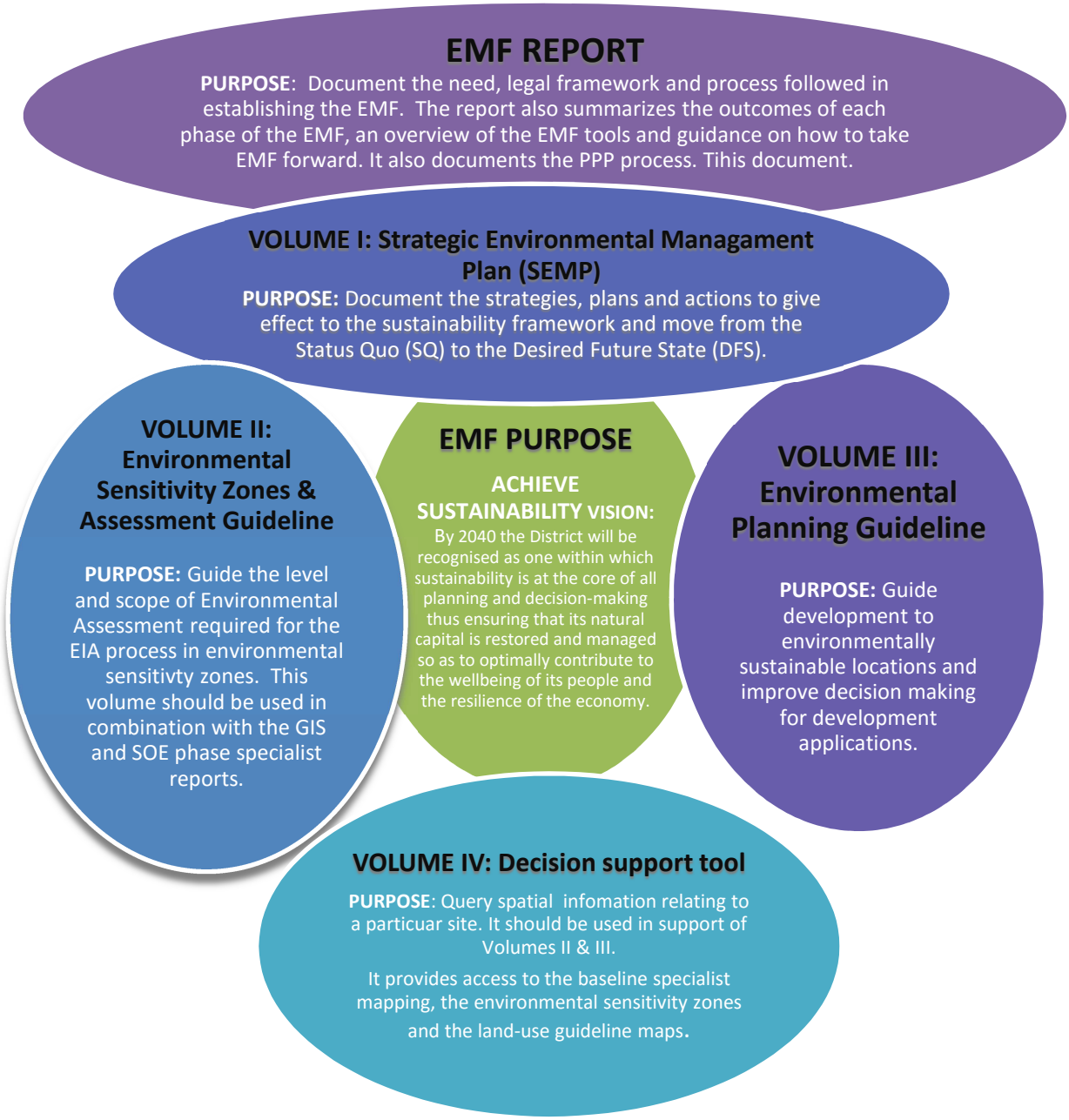


Figure 4 Structure and components of the EMF

4.2 Strategic Environmental Management Plan

The point of departure for the SEMP was the Sustainability Framework as captured in the SEA Report. On the basis of this framework a series of action planning templates were drawn up to accommodate a series of actions for each of the Sustainability Strategies listed under each of the Sustainability Objectives listed under each Strategic Priority. This hierarchy of management statements was derived from the National Strategy for Sustainable Development (NSSD1) as compiled by the National Dept. of Environment Affairs (DEA, 2011).

The development of the SEMP involved a series of workshops scheduled with officials from the uMDM and its strategic partners, specifically targeted for the contribution they could make. Preceding this though was a workshop with the Project Steering Committee where the Sustainability Strategies for each Strategic Priorities were reviewed, rationalised and prioritised in terms of implementation urgency given the five year time frame of the SEMP. For this reason the SEMP does not exactly reflect the Sustainability Strategies that are captured in the Sustainability Framework in the SEA. Further rationalisation took place as the Sustainability Strategies were unpacked into the necessary actions and it was possible to recognise where aspects had already been covered elsewhere in the SEMP.

With a view to streamline the workshops Strategic Priorities 1 and 4, and 3 and 5 were combined; while Strategic Priority 2 was recognised as being complex enough to cover on its own.

The detailed SEMP and its action plans form Volume I of the EMF suite of tools developed to achieve the stated Sustainability vision and objectives. As demonstrated in the example below, the action plans include primary and secondary responsibility, required resources, timeframes and an indicator of success. The full list of actions detailed action plans is outlined in the SEMP.

Strategic Priority 1: Enhancing Systems for Integrated Planning and Implementation

Actions	Responsible individual	Collaboration with	Resource requirements	Timing/ (by when/how often)	Indicator of success
STRATEGIC PRIORITY 1: ENHANCING SYSTEMS FOR INTEGRATED PLANNING AND IMPLEMENTATION					
Sustainability Objective: 1.1 Enhanced and effective environmental governance, institutional structures and systems to achieve integrated planning and implementation.					
Sustainability Strategy: 1.1.1 Establish effective co-operative environmental governance structures and institutional mechanisms between key environmental authorities.					
UMDM Planning and Development Cluster to have ToR and membership reviewed in the light of the SEA and SEMP and in accordance with the Inter-Governmental Framework Act.	Chairperson of Planning & Development cluster	Cluster members plus other environmental and development agencies, e.g. Umgeni Water, DWA, DAEA, and CoGTA.	Internal	Within three months	Reviewed ToR and membership

4.3 Environmental Sensitivity Zones and Guidelines

4.3.1 Purpose of the Guideline

The EMF regulations define an EMF as the "***Compilation of information and maps*** specifying the ***attributes of the environment*** in a particular geographical ***area***: and for such maps and information to be used in the ***consideration of applications for environmental authorisations*** in or affecting the geographical areas to which those frameworks apply".

This guideline responds directly to this requirement by providing guidance on the scope and level of environmental assessment considered appropriate for the different levels of sensitivity within the main environmental zones identified through the EMF process. The guideline can, and should be applied to all development applications – not only those that require authorisation in terms of the EIA regulations.

4.3.2 Guideline Structure

The sensitivity zones in this EMF have been defined according to the environmental components that formed the specific focus of the ToR and are as follows:

- Wetlands
- Water Quality
- Water Yield
- Flood Risk
- Biodiversity
- Agricultural Resources
- Infrastructure Services

The following is provided for each environmental feature:

i. A summary of the current status of the environmental system or feature that defines the zone, and its subcomponents.
ii. The key sustainability issues and objective.
iii. A definition and background to the sensitivity levels used [the thresholds that have been used to define the sensitivity levels].
iv. A map showing the spatial extent of the sensitivity levels.
v. Recommendations for undertaking EIA in these zones in terms of the nature and scope of specialist investigations required, including references to best practice tools and norms and standards.

This guideline is supported by specialist reports that summarize the data used to define the sensitivity zones, the process followed and any assumptions and limitations that should be considered in interpreting the information and understanding generated. They also explain the difference in the approach adopted in the KFAs, to provide a higher resolution of information and accuracy in the spatial definition, and thereby greater confidence in decision making.

4.3.3 Overview of Sensitivity Patterns

The following provides a graphic summary of the sensitivity zones of the various environmental features, which translate into development constraints. The analysis revealed the following:

vii. The ***District is endowed with valuable agricultural resources*** as indicated in Figure 5. As emphasized in the SEA, these resources are not necessarily adequately valued given that S.A. and the ongoing transformation to other land-uses represents one the most significant sustainability issues in the Province. This is the basis for productive land forming a key focus of the EMF scope of work. Consequently high value agricultural land represents a significant constraint to other land uses which will result in transformation. These represent a high constraint to any other use with consequent requirements in the EIA process to confirm the agricultural value of the land in question.

viii. Large areas identified as of '***Very High' sensitivity for agricultural purposes are also deemed to be 'highly' sensitive from a biodiversity perspective*** - evident when one compares Figure 5 and 6.

ix. The ***untransformed areas*** noted in i and ii above are also cr***itical from a water resources delivery*** point of view (Figure 10). Given that the District incorporates the key economic hubs of the greater Pietermaritzburg-Durban area, and the stressed nature of water resources documented in the status quo and SEA, the transformation of these catchments will place further stress on social well-being and economic productivity in the catchment.

x. ***There is a clear link between the high urbanised and industrialised sections of the catchment and the water quality sensitivity zones***, which is exacerbated with Pietermaritzburg and its waste water treatment plant being located on major river systems. The agricultural production in the midlands is putting pressure on the quality of water in the major impoundments – namely Spring Grove, Midmar and Albert Falls Dams.

xi. The ***high density of wetlands (Figure 11) in these priority wetland and water quality catchments is another key factor to consider given the role that they play*** in ameliorating poor water quality, attenuation floods and regulating streamflow. The ***poor condition of wetlands*** discussed in the SQ and SEA, ***emphasize the need for attention in protecting and reinstating wetland function***.

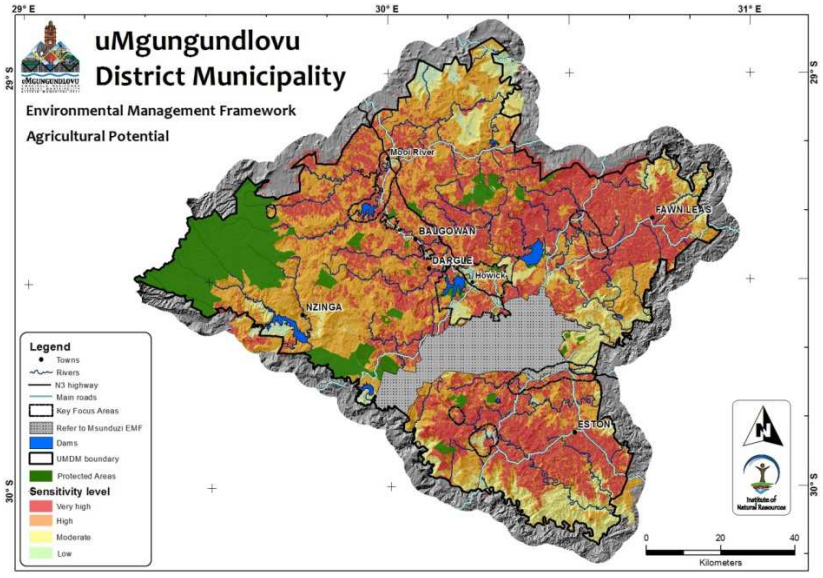


Figure 5 Agricultural Sensitivity Zones Map

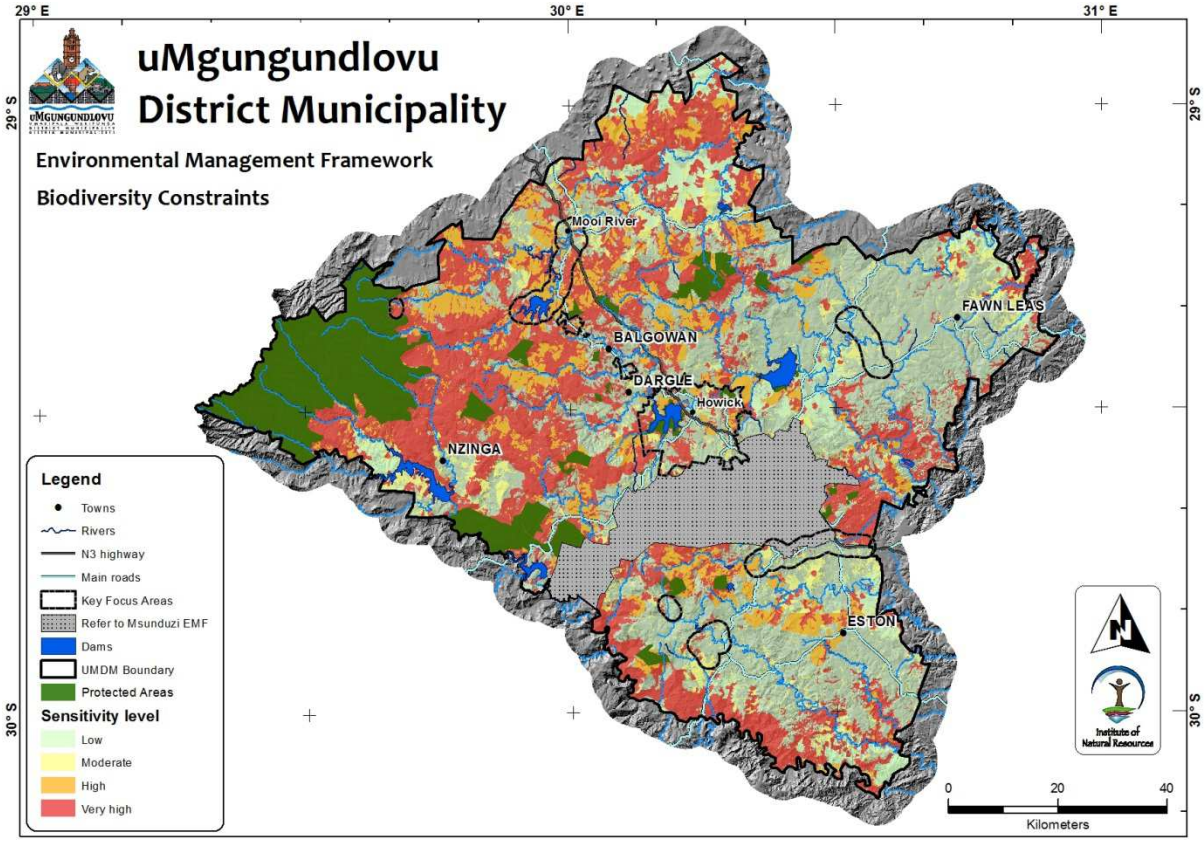


Figure 6 Biodiversity Sensitivity Zone Map

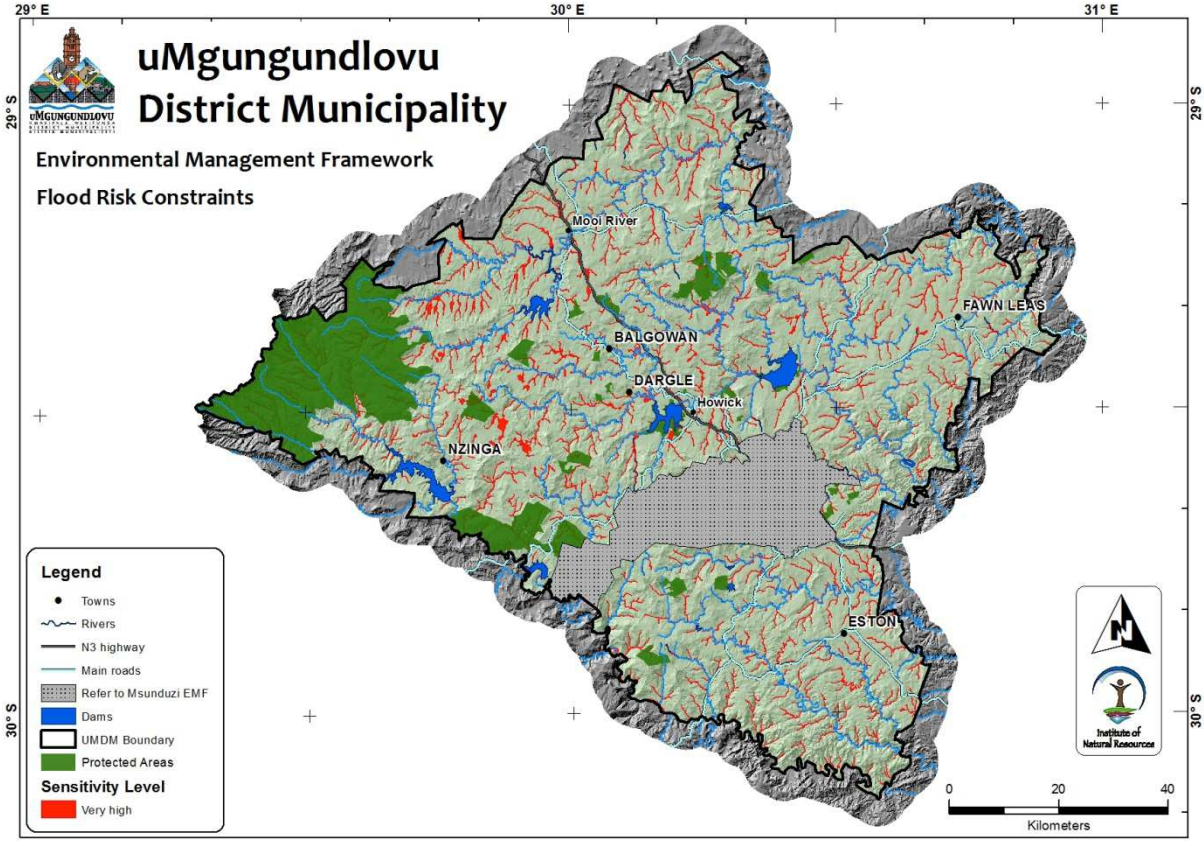


Figure 7 Flood Risk Sensitivity Zone Map

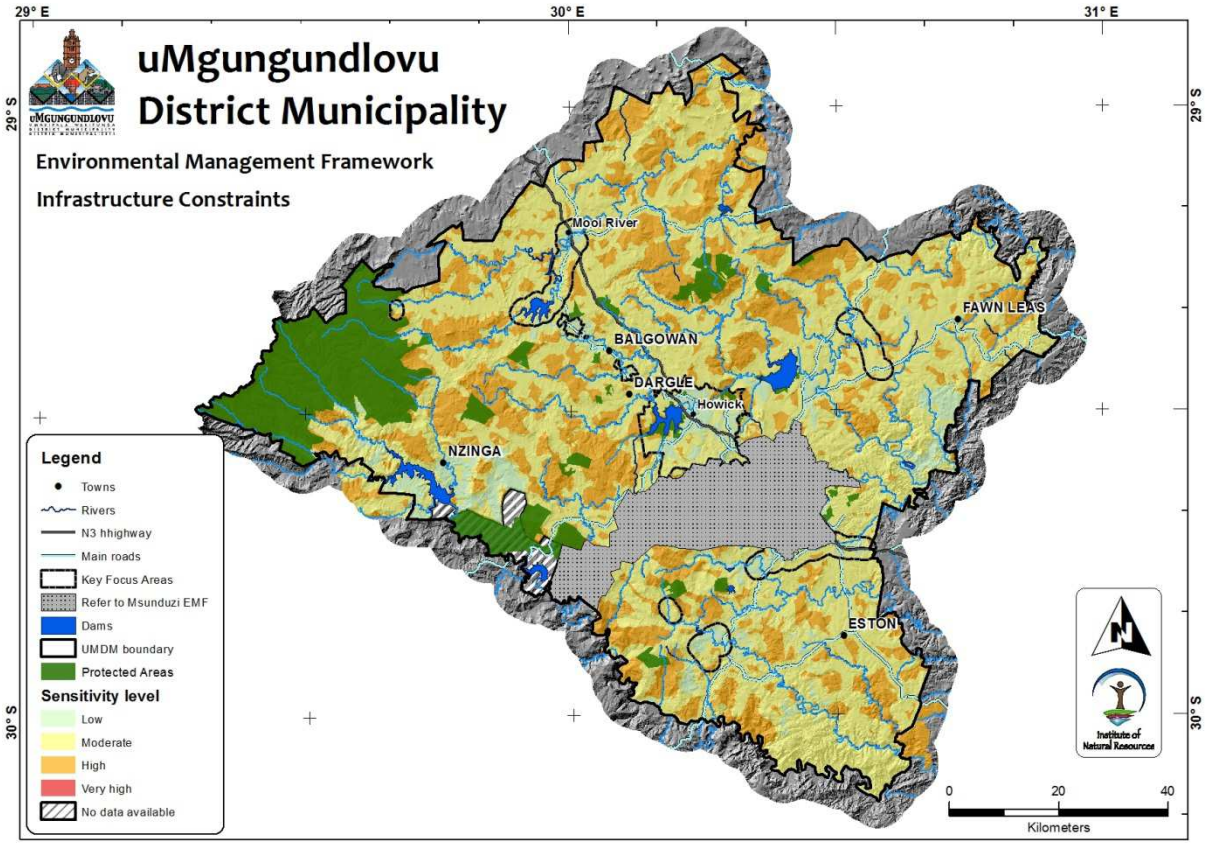


Figure 8 Infrastructure Sensitivity Zone Map

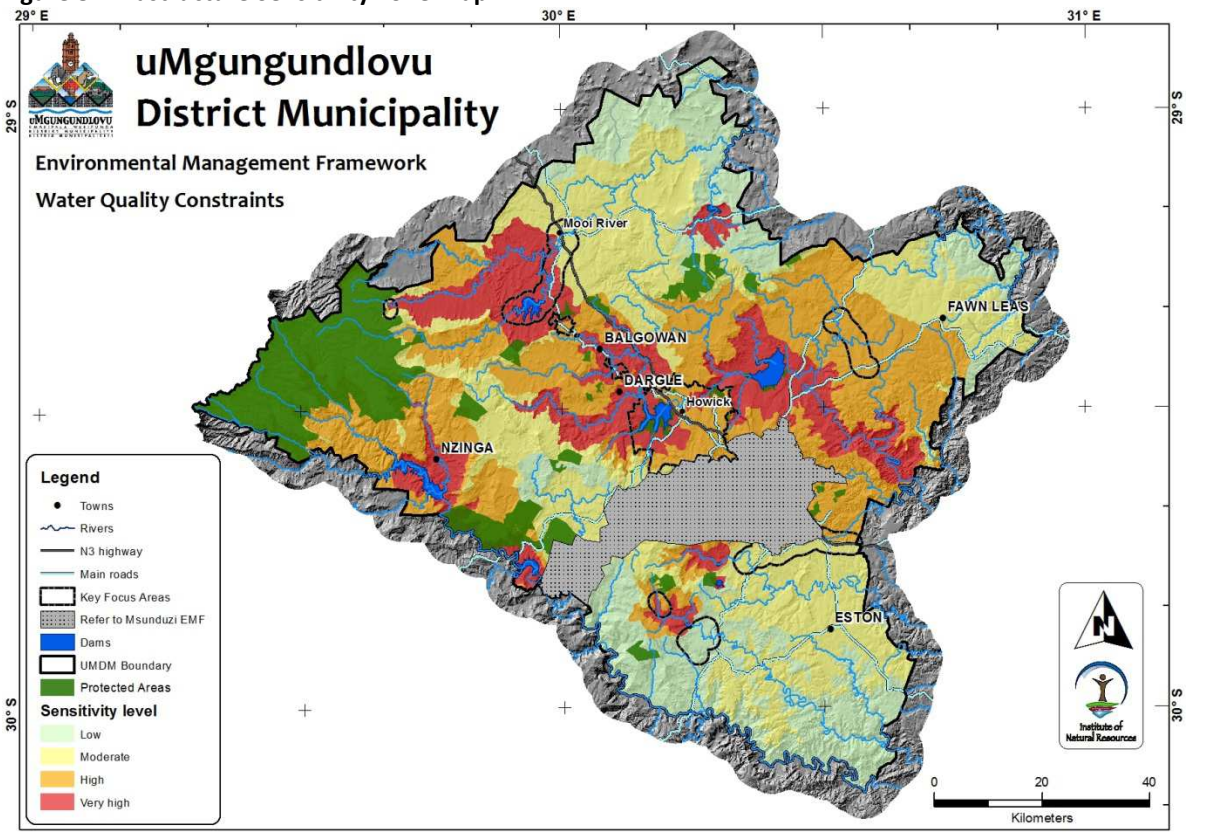


Figure 9 Water Quality Sensitivity Zone Map

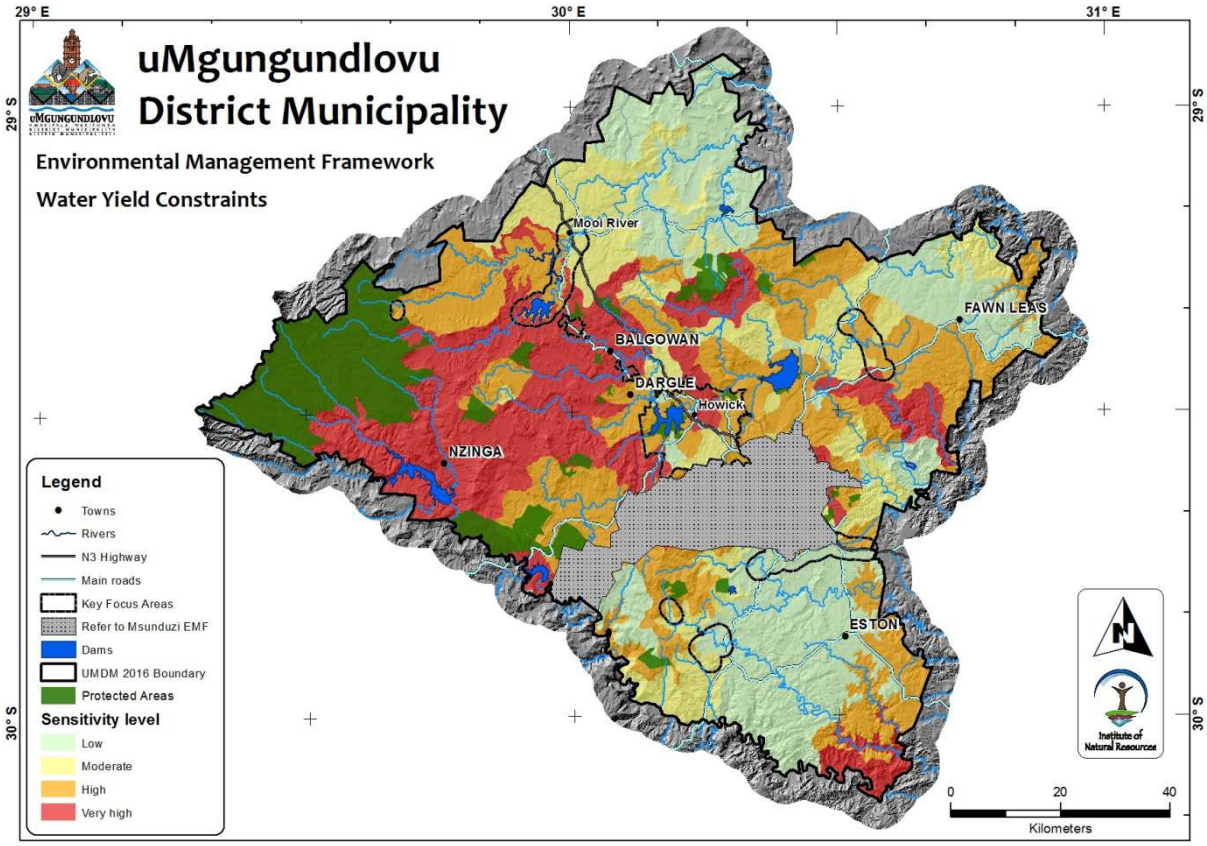


Figure 10 Water Yield Sensitivity Zone Map

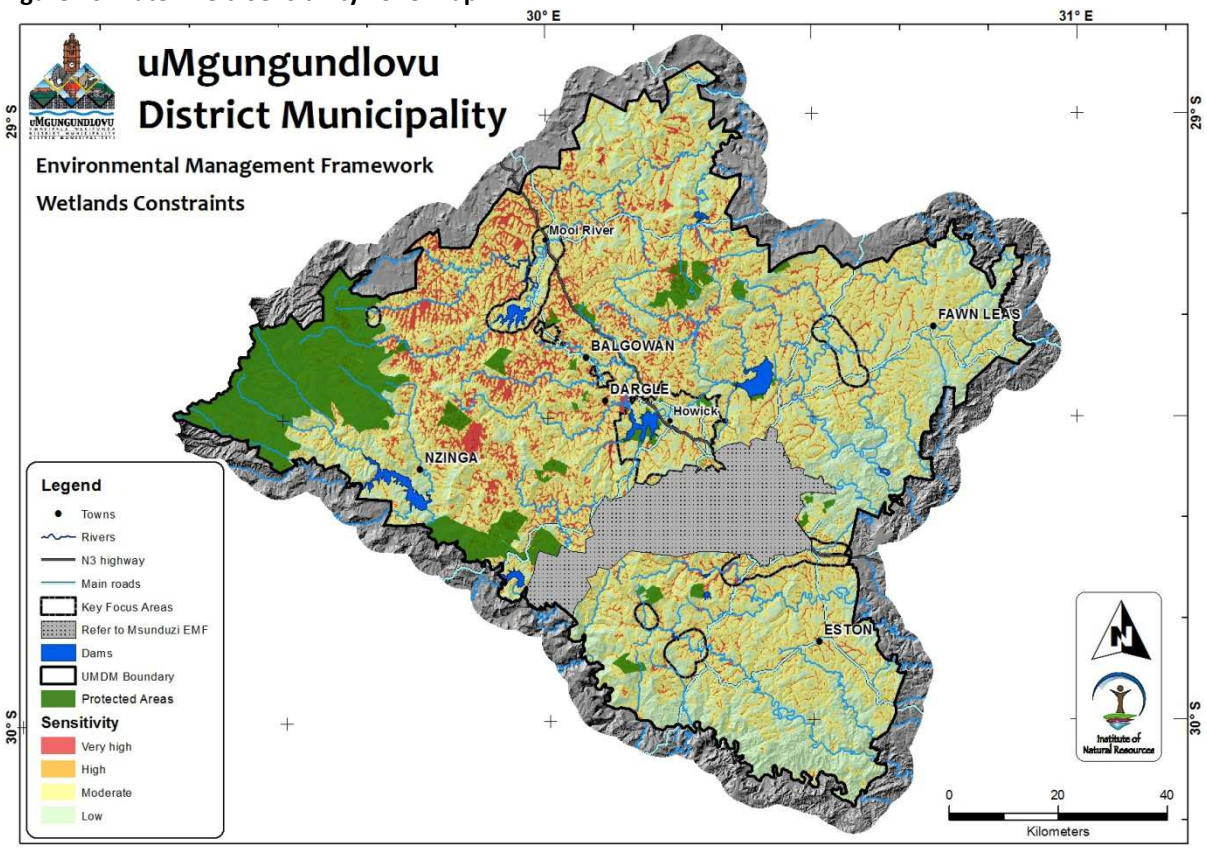
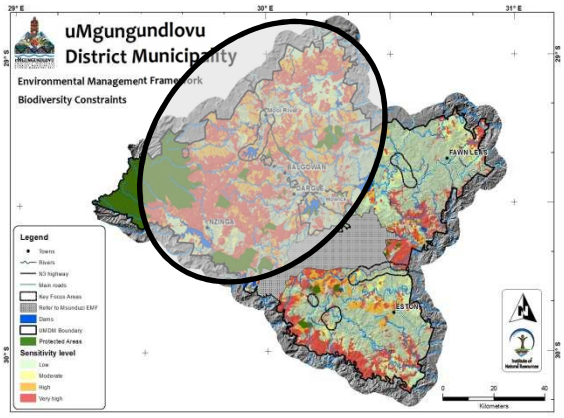


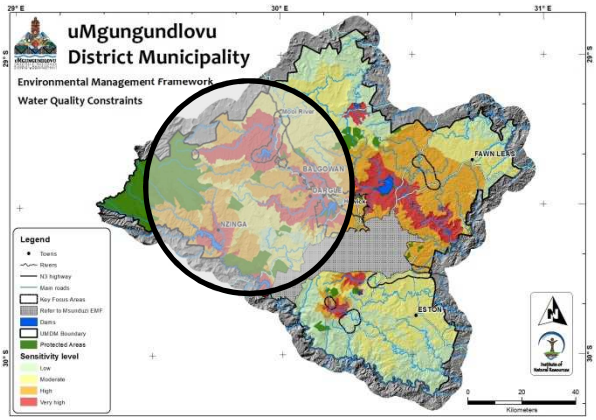
Figure 11 Wetland Sensitivity Zone Map

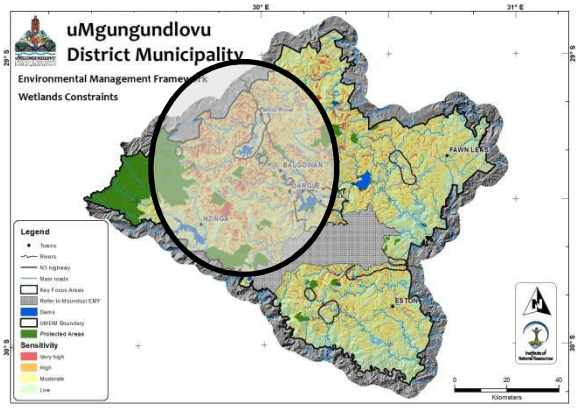
The cumulative value the midlands region of the district for biodiversity, water production, wetlands, water quality and agriculture is emphasized by considering these layers in combination below. There are other areas of the district in which are highly sensitive for each of these features. For example the well-developed sugar-cane growing areas in the Wartburg and Eston/Richmond areas are an important for agriculture. However, the midlands region is highly sensitive to all. This highlights the risk to the people and economy of the District from:

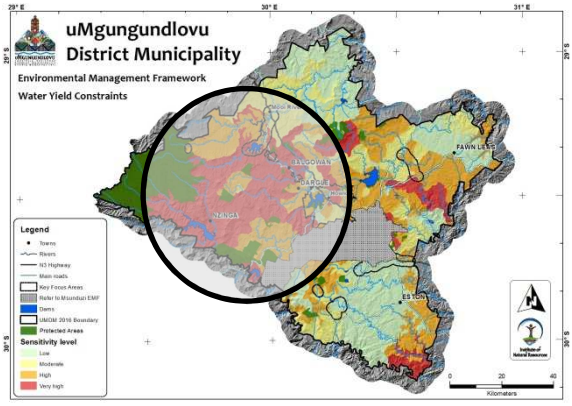
- Transforming the natural systems, notably grassland and wetlands in the region.
- Failing to address water quality in development planning and authorisation processes.

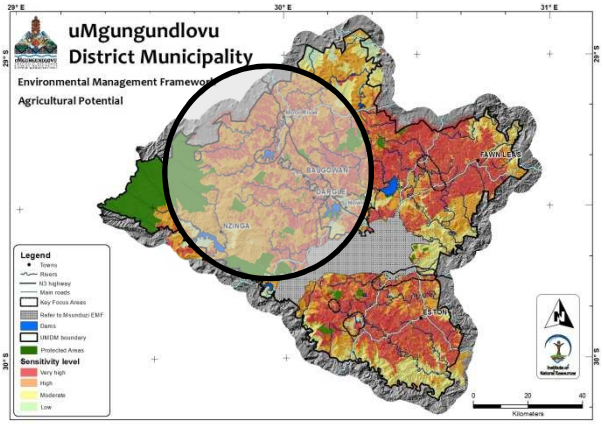
These patterns are translated into development constraints in the Volume III: Environmental Guidelines for Development Planning which is presented in Section 5.











4.3.4 EIA Regulations and Process

The NEMA: EIA regulations[12] define activities for which environmental authorisation is required and the process to be followed in arriving at a decision by the competent authority as to whether the project may proceed or not.

The Regulations[13] include three listing notices which define activities for which environmental authorisation is required and one of two processes that must be followed in support of the application:

- ***Listing Notice 1***: Activities for which the Basic Environmental Assessment (BAR) process must be followed.
- ***Listing Notice 2***: Activities which trigger the need for the Environmental Scoping and Impact Report Process (S&EIR).
- ***Listing Notice 3***: Defines geographical areas within which specific activities trigger the need for environmental assessment according to the BAR process. One of the specific identified geographic areas defined in these regulations are "*sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority*". The uMDM EMF identified three zones as being "sensitive" in relation to specific Listing Notice 3 activities. These are documented in section 11 of the report.

It is possible that a development proposal will trigger activities in one or more of the listing notices. In the event LN 2 activities are triggered, it will be necessary to follow the S&EIR process.

Basic Environmental Assessment Process (BAR)
The BAR process is required for activities defined in Listing Notices I and III. The process is limited to one phase and must be completed within a period of between 197 and 247 days.

Scoping and Environmental Impact Report Process (S&EIR)
The more comprehensive S&EIR process required in terms of Listing Notice II is required where the extent of the impacts are likely to be more significant than activities defined in LN I and III due to the scale of the project and/or the associated outputs, such as levels of pollution. This process therefore comprises two phases. The initial scoping phase is used to identify the full range and nature of impacts, and how they will be investigated and assessed. The Environmental Impact Report phase involves documenting the outcomes of the detailed investigation and conclusions in terms of the project's sustainability. Due to S&EIR process involving two phases, a longer maximum period of 300-350 days from the date of application is provided for completing the process.

[12] Published in GN R.982 of 4 December 2014, (as amended)

[13] R. 983 do.: Listing notice 1: List of activities and competent authorities identified in terms of sections 24 (2) and 24 D 38282
R. 984 do.: Listing notice 2: List of activities and competent authorities identified in terms of sections 24 (2) and 24 D 38282
R. 985 do.: Listing notice 3: List of activities and competent authorities identified in terms of sections 24 (2) and 24 D 38282

Despite the difference in the number of phases and timing, both the BAR and S&EIR processes require certain fundamental steps and outputs. The followings section explains these components and how the guideline can be applied to support the process.

4.3.5 Applying the EMF Guidance to the Development Planning and EIA Process

While the two EIA regulated processes (BAR and S&EIR) differ in some ways they both involve the fundamental steps, specific activities and associated requirements summarised in Table 1 below. The table shows how the information provided in this guideline supports the steps and requirements in the EIA process. It should be noted that while the EMF regulations require the EMF to support the EIA process, the earlier that environmental opportunities and constraints are considered in the development planning process the better. The table has therefore been expanded to include the planning or feasibility phases of the project development life cycle.

Table 4 Application of the Environmental Sensitivity guideline in the Development Planning and EIA Process

DEVELOPMENT PLANNING & EIA PROCESS Steps, Activities and Output Requirements	**APPLICATION OF ENVIRONMENTAL SENSITIVITY GUIDELINE INFORMATION**
Project Feasibility and Planning Developers consider a wide range of factors that influence the location, layout and design of the project, the ancillary infrastructure and activities. Developers seldom adequately consider environmental aspects in the planning stages. This may lead to increased time delays and costs when an ill-conceived and planned project is taken into the EIA process.	The consideration of the information in this guideline during feasibility level assessments and planning has the following benefits. • ***Legal & Institutional Framework*** The legal and institutional framework described in the EMF Report is a useful tool for ensuring that all regulatory processes relevant to a particular application are identified early. The developer is then able to build in the associated time and costs requirements of the EIA and any other regulatory processes identified. This is in keeping with the design of the EIA process to facilitate co-ordination across the other primary environmental regulatory processes. • ***Environmental Constraints*** Understanding the location and nature of sensitive systems such as wetlands, or features that impact infrastructure like flood risk areas assists in achieving appropriate developments layouts. • ***Consideration of Alternatives*** It is a legal requirement of the EIA regulations that applicants propose and undertake a comparative assessment of a range of feasible alternatives with the preferred option. These alternatives include alternative site, activities, layout, design and technologies. Consideration of environmental aspects in initial planning demands that these alternatives are investigated. The process and outcomes of considering alternatives can then be documented and fed through into the EIA process to demonstrate compliance with this requirement. In summary, this guideline provides information that enables developers to effectively integrate environmental constraints into planning from the outset so that the project eventually applied for is environmental appropriate, and has far greater likelihood of being authorised.
Pre- Application Consultation This is an optional step which involves the Environmental Assessment Practitioner meeting with the competent authority to define the listed activities, the likely specialist investigations required and the focus of these investigations.	The environmental sensitivity information generated through the DST report can serve as a screening report to inform the pre application consultation process. This assist in defining which EIA process (BAR or S&EIR) that should be followed.

Application A mandatory requirement involving the completion of a form and supporting information including maps.	The information provided, including maps can be used to populate and support the formal application.
Specialist Investigations Based on the screening process (in the case of the BAR process), and the scoping process (in the case of the S&EIR process) the EAP is required to define the number and scope of specialist investigations. In the case of the S&EIR process a terms of reference must be developed and include in the Environmental Scoping Report for sign off by the Competent Authority.	The guidelines inform the range of specialist investigations required and the focus of these. Narrowing the focus of the specialist investigations alleviates the commissioning of a wide range of unnecessary studies that have time and cost implications for the applicant and detract from analysis of the key issues.
Public Participation Public participation is a legal requirement of the regulations, and the process must comply with a range of specific steps and activities in order to meet the legal requirement.	***Stakeholder Database*** The stakeholder lists generated in the EMF process, provides a starting point for developing an I&AP database for specific projects to take place within the development node. The public participation report is appended to EMF Report.
Reporting The EIA regulations (Appendices) stipulate various information requirements and components a Basic Assessment and Environmental Impact Report which include amongst others: • The environmental attributes associated with the development footprint i.e. the nature and sensitivity of environmental features. • The relevant legal and policy framework. • Alternatives considered. • Impacts assessed, including cumulative impacts. • Assessment framework – the EIA must provide a method for assessing the impact.	The information provided in this guideline assist in meeting various aspects required in EIA reporting as follows: • The specialist information can be used to illustrate the location and extent of sensitive features in relation to the development footprint. • The relevant legal and policy framework is provided in the EMF report and in the specialist reports appended to this guideline. • As described above, consideration of the sensitive environmental features defined in the development planning process will require the consideration of alternatives. Documenting these will assist in meeting this EIA reporting requirement. • Thresholds of concern and standards are built into the sensitivity categories allocated to the environmental features defined. This accounts at a level for the cumulative impact of a project. • The sustainability objective provides a very good measure against which to assess the impact of the project. This is because it has been informed by an assessment of cumulative impact within the SEA undertaken for the EMF. The assessment accounts for the relationship between natural, economic and social systems. This framework therefore holds much greater value than developing a project specific assessment framework i.e. the impact assessment should be made against the sustainability objectives.

To optimize the benefit of the Volume II guideline, it must be applied in conjunction with the following resources and outputs developed during the EMF process:

- Status quo specialist reports.
- Specialist reports (appended).
- Legal and policy framework provided in the EMF report, and the reference to regulatory processes specific to certain systems noted in the appended specialist reports.

4.3.6 Listing Notice 3 Guidance

In terms of Regulation 5(2) of the Environmental Management Framework Regulations (GN R547 of 18 June 2010) an Adopted Environmental Management Framework must be taken into account in the consideration of applications for environmental authorisation in or affecting the geographical area to which the framework applies.

The EIA Regulations Listing Notice 3 of 2014 (GN R985 of 4 December 2014 (as amended)) identifies activities where environmental authorisation is required prior to commencement of that activity within specific identified geographic areas. One of the specific identified geographic areas defined in these regulations are "*sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority*".

The uMgungundlovu Environmental Management Framework identifies the following areas as being regarded as "sensitive" in relation to specific Listing Notice 3 activities, due to their environmental attributes and sensitivities. Listing Notice 3 activities triggered by the EMF sensitivity zones as summarized in the table below.

Table 5 Listing notice III actvities triggered in EMF sensitivity zones

	Listing Notice 3 Activities		
	Map 1	Map 2	n/a
Environmental Constraint Layer	Activities: 1; 2; 3; 5; 8; 9; 11; 12; 13; 16; 20; 21; 24; 25	Activities: 4; 6; 7; 10; 17; 18; 19; 22	Activities: 14; 15; 23
High Biodiversity Area (CBA's and Agro-biodiversity zones)	No	Yes	No
Flood risk / Riparian Area (1:100 year flood risk area)	Yes	Yes	No
Wetland footprint and 32m buffer area	Yes	Yes	No

In recognition of the limitations of certain data sets used to define the location and extent of these sensitive features, a screening process is provided as summarised below in Figure 12. Additional guidance is provided for each step in the guideline.

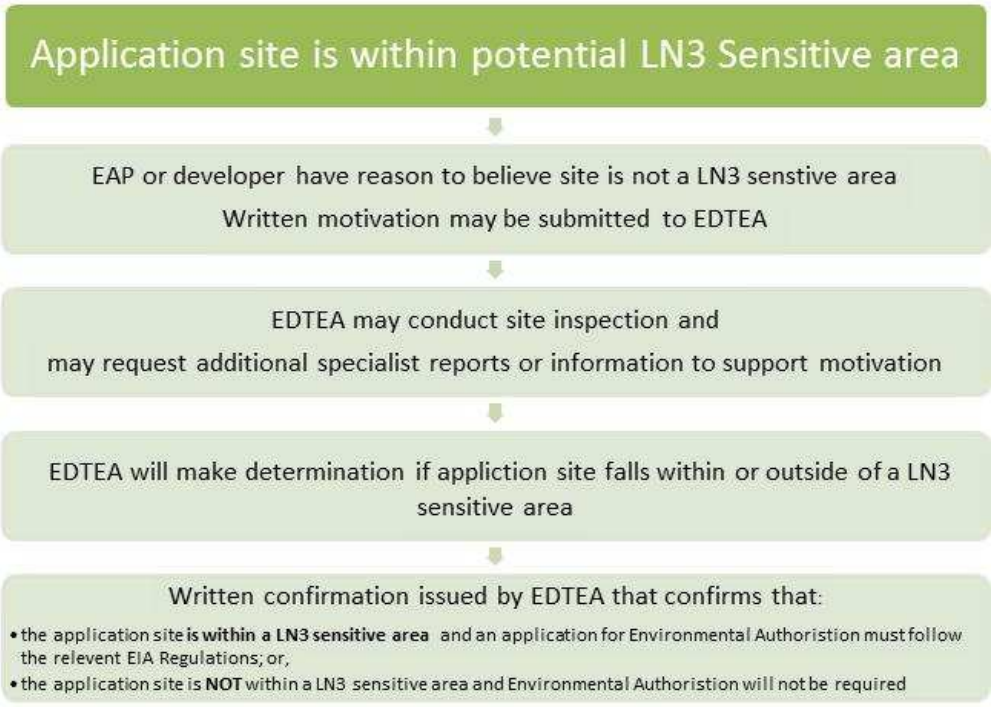


Figure 12 Overview of the Listing Notice 3 Screening Process

4.4 Development Planning Zones and Guidelines

4.4.1 Purpose of the Guideline

The purpose of this guideline is to ***inform development planning*** by indicating where the environmental constraints on different types of land-use are highest in terms of both:

c. Number of constraints –how many environmental features e.g. wetlands, air quality, flood zones occur on a specific land parcel proposed for development.

d. Level of constraint – what sensitivity zones within each environmental the proposed land-use (or ancillary activities) will impact the feature, because the higher the sensitivity, the higher the level of constraint.

4.4.2 Who Should Use the Guideline?

The guideline aims to assist both the municipality and developers in the following ways:

- *Developers* - The guideline allows for a level of risk assessment by developers because the higher the number and level of environmental constraints indicated at a selected site, the higher the development costs and the lower the chances and/or, longer it will take to secure the various licences and authorisations required to proceed with the development. To optimise its value in assessing risk, the guideline should be applied at the earliest stages of development planning i.e. when selecting a site.

- *Municipality* – the municipality plays a variety of roles in relation to development planning and applications, with the guideline providing a useful tool in each.
    - *Development planning* – The municipality should consider the environmental constraints established in the guideline to inform the spatial planning tools, namely the Integrated Development Plan, Spatial Development Framework (SDF) and the Land-use Management Scheme (LUMS). By entrenching the environmental constraints in these spatial tools they will proactively promote sustainable development by guiding development to environmentally appropriate locations. A further benefit of the tool is that it can be used to market the area to prospective developers who are seeking to invest i.e. the Municipality can show that they have undertaken a high level of environmental assessment that improves the likelihood of the relevant authorisations being secured, and at a lower cost.
    - *Development applications* – The tool provides guidance to the municipality when commenting on projects proposed by private or public developers in the District. The recommendations for addressing the impacts of different land-use on sensitive environmental features can be included as conditions of planning authorisation.

The approach used in developing the guideline is provided below as context for understanding the detail that follows.

4.4.3 Approach to Developing the Guideline

4.4.3.1 Defining Land-Use Types

The aim is to provide guidance for the full range of land use types that already exist, or are likely to be developed within the District. The starting point for defining land uses were the categories and definitions provided in the "*KwaZulu-Natal land use management system guidelines for the preparation of schemes for municipalities – update 2011".* The eight main categories of land use established in the guideline are summarised in the adjacent list. The titles and colour scheme for these main land use categories are the same as that used in the provincial LUMS guidelines. This will make it simpler to align the outputs of this development guideline with the municipal LUMS when they are developed. The main categories then include subcategories. For example, the Agriculture includes amongst others the subcategories: forestry, crop production and animal production. The full list of over 50 sub-categories provided in the LUMS guidelines was refined to 32 for the EMF by grouping land-uses that have similar development sensitivity. The following is provided for each land-use types in the guideline:

AGRICULTURE
CIVIC AND SOCIAL
MIXED USE
RESIDENTIAL
TOURISM
INFRASTRUCTURE AND SERVICES
CONSERVATION AND OPEN SPACE
INDUSTRY

i. ***Definition*** - of the land-use with examples.
ii. ***Map*** - indicating the most appropriate areas for the land-use i.e. where constraints are lowest.
iii. ***Development Constraints and Guidelines*** – a description of how the land-use impacts the different environmental sensitivity features described, with guidelines provided for addressing these impacts either in the planning and/or authorisation of the land-use in question.

4.3.3.2 Defining Environmental Constraints per Land-Use Type

4 Very high
3 High
2 Moderate
1 Low

Volume II of the EMF defined a sensitivity layer for each of the seven environmental features which have sub categories or components of sensitivity. As an example, a wetland body is allocated a 'Very High' sensitivity ranking, while the wetland buffer is assigned a 'High' level of sensitivity. The sensitivity layers were then assessed against the 32 land use types. The impact of each development typology was scored against each of the components' sensitive categories using a scoring system of 1 – 4 with 4 being the highest sensitivity/impact and thus posing the highest constraint to a development of that kind and 1 being the lowest sensitivity / lowest constraint to a development of that kind.

An example of this process is shown in the Table 6 for 'Intense Mixed Use". Each of the seven environmental sensitivity layers contains such an attribute table of scores reflecting the impact potential of each of the 32 land use types on the features identified by for the environmental component. These sensitivity categories were mapped so they have a spatial footprint.

All seven environmental component's sensitivity layers were Unioned to generate an integrated sensitivity layer containing the spatial distribution data for each sensitivity feature and their sensitivity score for each of the land use types. The output of this process is an additive score of sensitivity for each polygon in the sensitivity layer, but weighted by the number of "Very high sensitivity" features located at that site. The overall scores have been grouped to provide 4 categories of constraint – ranging from Very High to Low. An example is provided in Figure for 'Intensive Mixed Use'.

Table 6 Example of sensitvty mapping to establish development constraint maps for land-use types

Environmental Features	Components	Mixed use 3. Intense Mixed Use
Wetlands	Wetland Footprint	4
	32m Buffer	3
	500m Buffer	2
	> 500m from a wetland	1
Agriculture	High potential (Category A&B)	4
	Moderate potential (Category C)	4
	Restricted potential (Category D)	3
	Very restricted potential (Category E)	1
Infrastructure	High service Provision	1
	Moderate Service Provision	3
	Low Service Provision	3
	Very Low/No Service Provision	4
Water Quality		
Quinnary Catchments containing key water supply features	All such quinnaries	4
Proximal catchments influencing key supply features	with measured elevated pollutant concentrations	3
	with high potential for elevated pollutant concentrations	3
Distal catchments influencing key supply features	with measured elevated pollutant concentrations	2
	with high potential for elevated pollutant concentrations	2
	with low pollutant concentrations	1
Catchments not influencing key supply features	with measured elevated pollutant concentrations	2
	with high potential for elevated pollutant concentrations	2
	with low pollutant concentrations	1
Flood zones	1:100 yr flood	4
Biodiversity	Protected area	4
	Critical Biodiversity Area (CBA)/Agro-Biodiversity Zone	4
	Ecological Support Area (ESA)/Environmental Management Zone	4
	Untransformed/Other natural areas	3
Water Yield	Very high water yield	3
	High water yield	2
	Moderate water yield	1

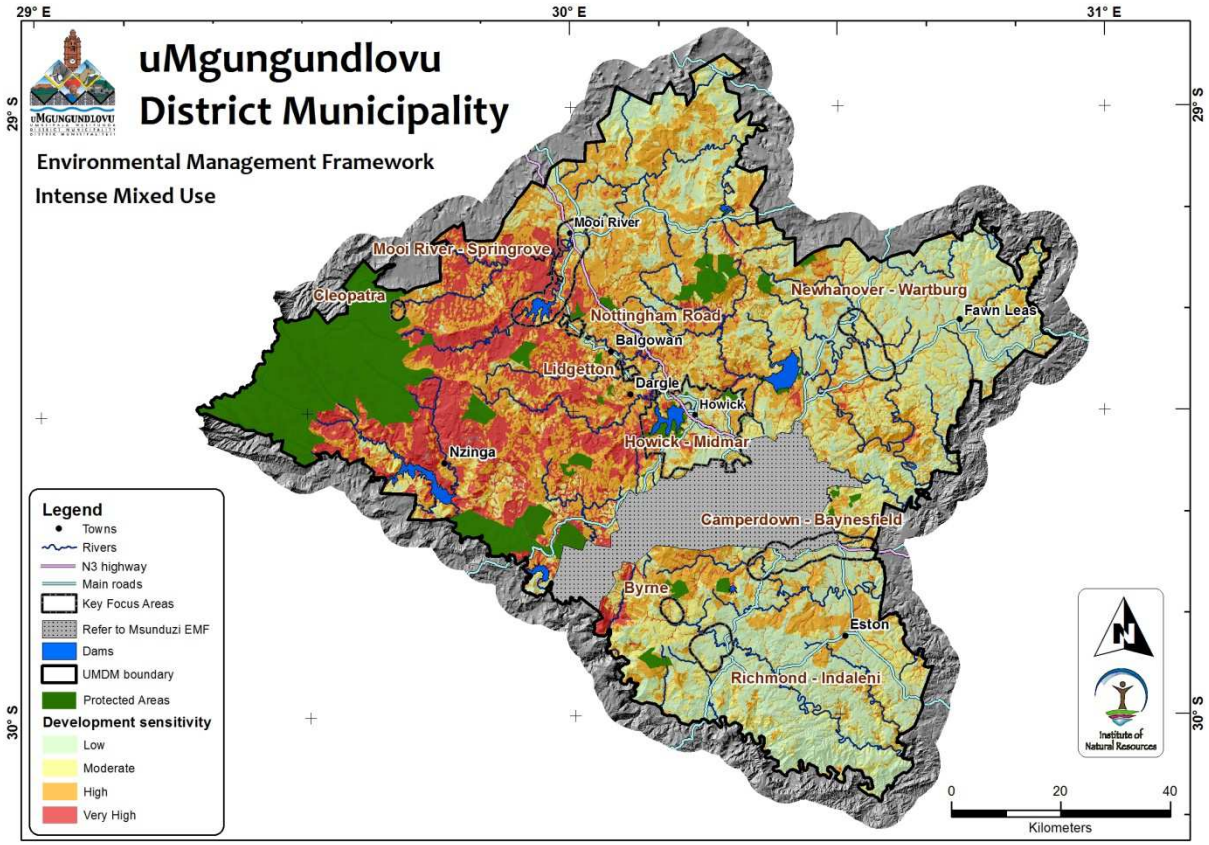


Figure 13 Development constraint map - Intesive Mixed Use

The map shows that the constraints for mixed use are high in the western areas of the District. This is because mixed-use involves the permanent transformation of natural systems and productive agricultural land which occurs in the midlands regions as summarized in section 4.3.3. IN addition to the table and map provided above the Volume III guideline explains the nature of the impact of the development type on the various environmental sensitivity features and provides recommendations for mitigating these.

4.4.4 Considerations when Applying the Guideline

The following needs to be considered when using the guideline:

- The ***constraints map shows the highest aggregated level of constraint at every point in the study area***. So there may be areas where the constraint level is shown as low, but where a particular land-use still impacts an environmental feature with a very high sensitivity value. This understanding is accessible from querying the Decision Support Tool which allows the user to query an area to establish all the constraints that occur on a particular land parcel.

- For some of the main land use categories, ***the impact of the land use on the different environmental features is similar*** so that there is only one constraints map for all the sub categories e.g. residential. But there are categories such as agriculture, where the impact is quite different across the subcategories and specific maps have been compiled for each.

- There is ***a two way relationship between land uses and environmental sensitivity***. The first is where the land use will negatively impact the environmental feature. For example, the loss of natural habitat when converted to urban infrastructure. The other situation is where the environmental feature or condition places a constraint on the development. For example, flood risk areas increase the costs of risk to developing in such areas.

- It is also important to understand that ***a high level constraint does not mean that the land uses in question cannot be developed at this location*** i.e. it is not a fatal flaw. Rather, it means that:
    - It should rather be developed at an alternative location if the municipality is to move towards a sustainable development.
    - The higher the number of constraints and the higher the level of the constraint, the higher the likely costs and time frame for securing the required licences and authorisation. The mitigation measures required to reduce the impact on sensitive features is also likely to increase the costs of development within environmental sensitivity zones. For example, if there is a wetland, high potential agriculture and high value biodiversity several authorisations and associated studies will be required.

5 DECISION SUPPORT TOOL

5.1 Background

The DST is the key output of the EMF in terms of making the information and outputs available. The purpose of the DST is to disseminate the EMF and to provide users with in-depth information with respect to areas they are interested in. This is primarily a spatial output and must be available to a variety of different users including internal UMDM staff as well as stakeholders involved in any form of land development or activities requiring an environmental authorization. An online GIS application is thus the technology that is being used to publish the data and information.

The primary aim of the EMF layers is to house spatially referenced information regarding environmental features which can be used to inform planning related decisions. This information includes:

- Baseline layers that have informed the development of the environmental sensitivity zones.
- The environmental sensitivity zones
- The development planning layers.

According to the requirements of the terms of reference, the DST will, at a minimum, provide the user with the functionality to spatially query the EMF data through the intersection of a user defined polygon with the EMF data. Additional query mechanism options such as using a point feature with a user specified buffer or using the user's current location as a query point will be explored and incorporated if possible.

This query will allow the user to retrieve EMF information regarding environmental features spatially co-incident with the area of interest. This information will also link to information / guidelines concerning the potential constraints or opportunities for development related to the area of interest.

5.2 How to Operate the EMF DST

5.2.1 Important notes

Perhaps one of the most important things to note when using the DST is that the spatial data being provided is complex and the volume of data being transferred over your internet connection is therefore relatively large. The loading of maps and the querying of the data may therefore take some time, especially if you are working through a slow connection. It is important to be patient and, once you have clicked on/selected a map item, not to then click multiple times thinking that your click instruction has not registered or that something has 'frozen'. This is particularly true the first time you load a particular layer as, once loaded, the data is cached on the local drive and loads far quicker from then on.

5.2.2 Recommended use specifications

The DST has been developed using Mozilla Firefox version 54 and Google Chrome version 59 browsers. It has been tested using Internet Explorer version 11. It is therefore recommended that this website be viewed in one of the following browsers:

1. Google Chrome version 59 (or later)
2. Mozilla Firefox version 54 (or later)
3. Internet Explorer version 11 (or later)

A screen resolution of 1366 x 768 is recommended, but a resolution of at least 1280 x 720 should be used.

5.2.3 Landing page

The DST landing page consists of a title banner, a tool bar and a map window as is illustrated in Figure 14. These components are discussed in more detail in the following sections.

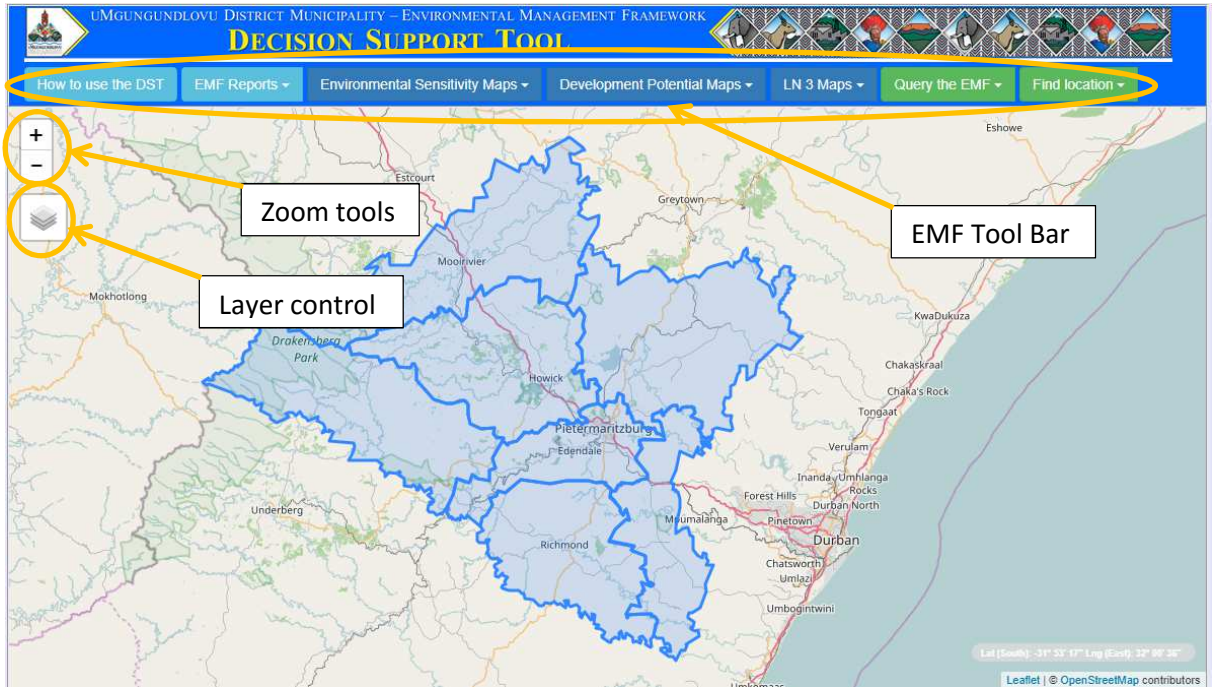


Figure 14: The EMF DST landing page showing the various interactive components

5.2.4 Map Tools

5.2.4.1 Zoom and Pan Options

The map is in 'pan mode' by default and the user can at any point change the position of the map by panning. Pan around the map by clicking and holding the left mouse button and 'dragging' the map so as to locate the area of interest.

You can zoom to the scale you wish to work at by using one of the following options:

1. By clicking the '+' (zoom in) button or '– ' (zoom out) button repeatedly until the desired scale is reached
2. By positioning the cursor over the area of interest and rolling the mouse wheel forward to zoom in to this area or backwards to zoom out away from the area

3. By holding down the shift key, clicking and holding down the mouse button and dragging the cursor to create a rectangle around the area of interest. When you release the mouse button, you will zoom into the area of the rectangle

5.2.4.2 Base Map Options

There are two base map options available in the DST. These are:

1. Open Street Map Topographical Map and
2. Google Earth Satellite Imagery

To toggle between these, click on the layer control icon in the top left of the map window (below the zoom in/out buttons) and select the option you wish to use in the layer control box. The layer control also allows you to switch two other contextual layers on and off i.e. the Local Municipality boundaries and the Surveyor General (SG) cadastre boundaries. It is important to note that these layers are not visible at all scales and the SG layer is only available when zoomed in to village / neighbourhood scale and the local municipality boundary layer is only visible when zoomed out to District scale.

Figure 15: The layer control box

5.2.5 EMF Tool Bar

The EMF tool bar consists of seven buttons as is illustrated in Figure 16 below. Each of these are described individually below.

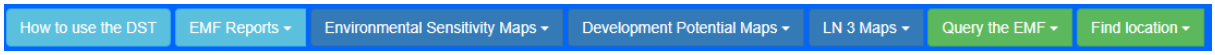


Figure 16: The EMF Tool Bar

5.2.5.1 EMF Reports

All of the EMF project reports are available through the DST. By clicking on the "EMF Reports" button, the user is provided with a list of the project reports, any of which can be downloaded by clicking on the particular report's name (Figure 17). This list includes the project's various specialist reports.

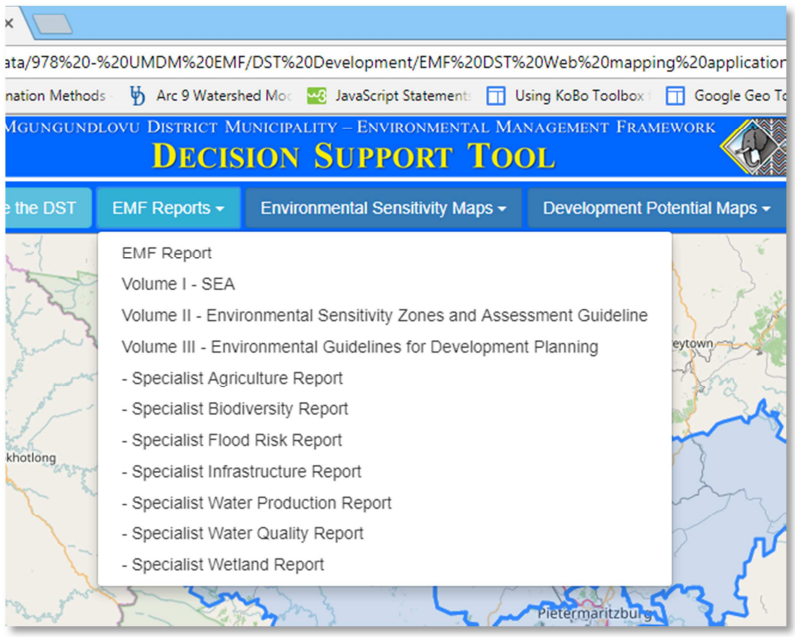


Figure 17: The project reports are all available for download through the EMF Reports dropdown list

5.2.5.2 Environmental Sensitivity Maps

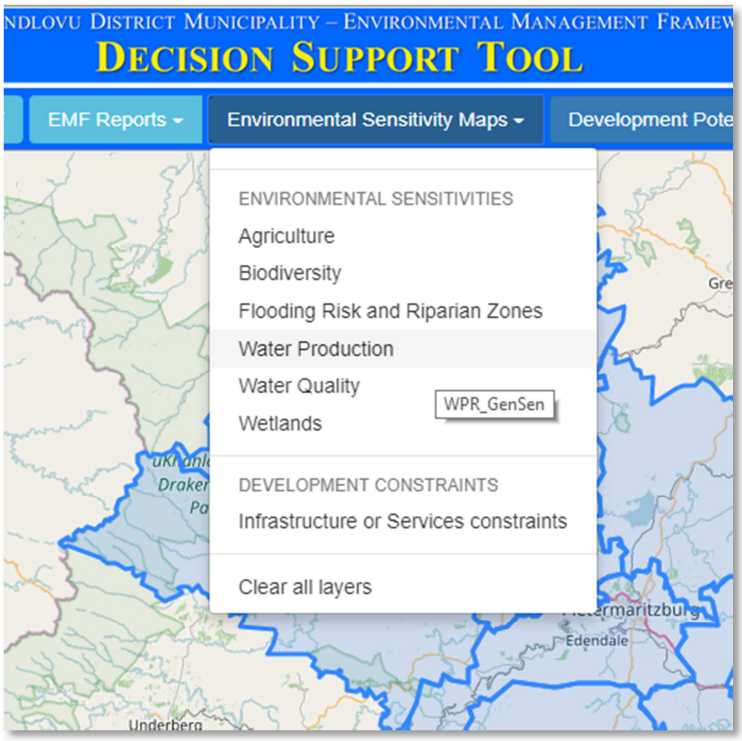


Figure 18: Dropdown list of environmental sensitivity layers

The Environmental Sensitivity Maps dropdown list allows the user to view the various sensitivity components' spatial layers. By clicking on any of the layers listed in the dropdown list, the map of that component is loaded into the map window as a semi-transparent overlay on top of the base map. It is important to remember that some of these layers are very complex spatial files and will take a while to load (sometimes several minutes if using a slow internet connection). Users will be reminded of this when selecting one of the following large layers:

1. Biodiversity
2. Wetlands
3. Agriculture

Please do be patient and allow the data to load without repeatedly clicking the layer or clicking on other buttons.

Only one layer can be viewed at a time and if another layer is selected the first layer will be switched off and replaced by the next selection. Any sensitivity layer can be removed from the map without replacing it with another by clicking on the "Clear all layers" option at the bottom of the dropdown menu. The sensitivity layers all use the same colour coding for four categories of sensitivity. This colour scheme is shown in Figure 19.

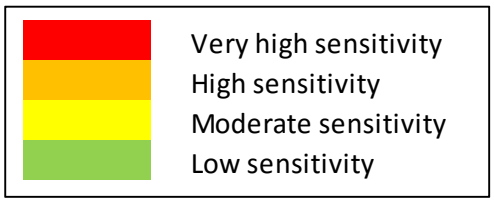


Figure 19: Colour coding for sensitivity mapping

5.2.5.3 Development Potential Maps

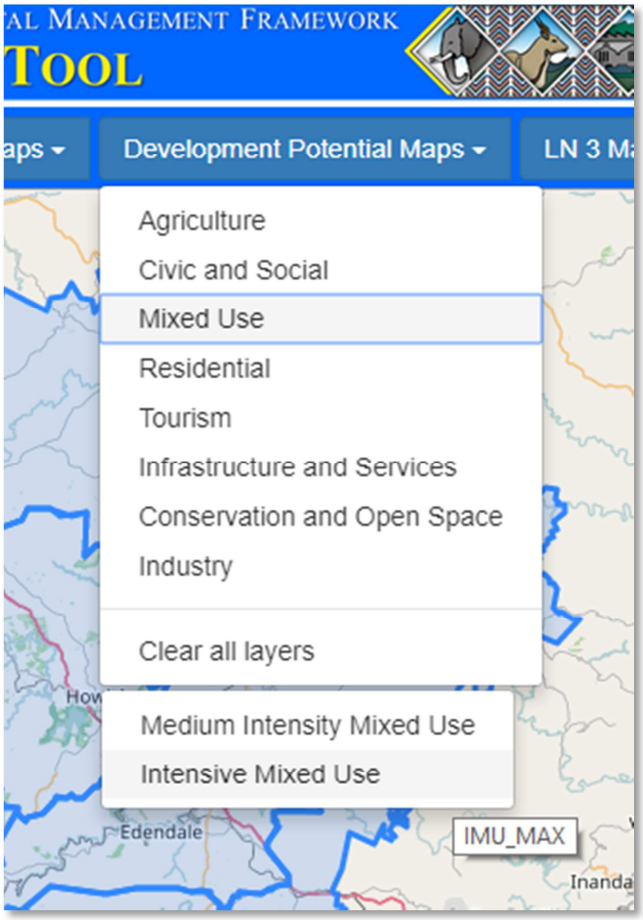


Figure 20: Development Potential Maps dropdown

The Development Potential Maps dropdown list provides access to the spatial component of the development potential assessment. Each of 32 different development typologies (based on planning categorisations) has been assessed against the various environmental sensitivities, and parcels of land categorised according to suitability for that particular development type. The dropdown list is a two level list with the first level providing a generalised list of development type categories. When clicking on an item in the first tier (e.g. "Mixed Use" as in Figure 7), a second tier will open below the list allowing a more specific development type to be selected (e.g. "Medium Intensity Mixed Use" or "Intensive Mixed Use" as in Figure 7).

As with the sensitivity layers, the development potential maps are loaded as a transparent overlay on top of the selected base map. They are symbolised using the same colours as the sensitivity maps but in this case they represent constraints to the development type being considered. This scheme is shown in Figure 21. Importantly, the transparency of the layer means that the colour of the background will influence the appearance of the layer colour. This should be taken into consideration when viewing the data.

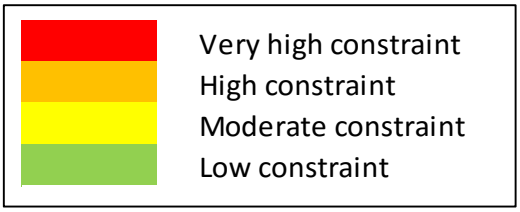


Figure 21: Colour coding for development constrains

5.2.5.4 Listing Notice 3 Maps

Listing Notice 3 requires that if the listed set of activities impact areas identified as sensitive in an accepted EMF, this triggers the requirement for an impact assessment. As part of the EMF study, all activities identified in the LN 3 regulations have been assessed and clustered into two groups based on their general impacts. Spatial layers have then been developed identifying areas which have been determined to be very highly sensitive and which are not covered by any of the other LN 3 triggering categories. Two separate layers have been

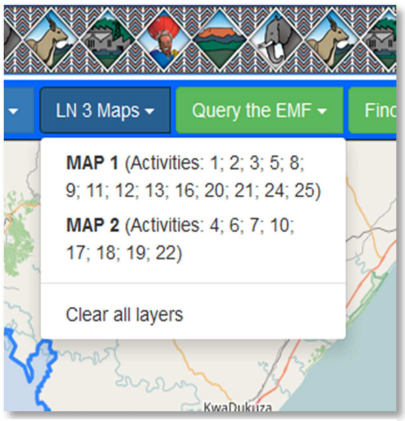


Figure 22: Listing Notice 3 Maps

developed which effectively cover the impacts associated with two groups of activities. The grouping of activities is shown in Table 7 and the respective spatial layers simply labelled Map 1 and Map 2. Three activities are not applicable in Umgungundlovu District Municipality. These layers are accessible through the "LN 3 Maps" button (Figure 22).

Table 7: Listing Notice 3 activities grouped and allocated to an LN 3 map layer

	Listing Notice 3 Activities		
	Map 1	Map 2	n/a
Environmental Constraint Layer	Activities: 1; 2; 3; 5; 8; 9; 11; 12; 13; 16; 20; 21; 24; 25	Activities: 4; 6; 7; 10; 17; 18; 19; 22	Activities: 14; 15; 23
High Biodiversity Area (CBA's and Agro-biodiversity zones)	No	Yes	No
Flood risk / Riparian Area (1:100 year flood risk area)	Yes	Yes	No
Wetland footprint and 32m buffer area	Yes	Yes	No

5.2.5.5 Navigating To a Specific Location

Navigating to a specific location in the DST can be achieved in multiple ways.

1. The easiest way is (if you are familiar with the location) to zoom in to an appropriate scale and pan to the location using the base map to orientate yourself.
2. If you are unfamiliar with the location, but have geographic coordinates, you can use the "Find Location" button to select either the Decimal Degrees option or the Degrees Minutes and Seconds option for entering coordinates. Once selected, a dialogue box will appear (Figure 23) allowing you to enter the Latitude and Longitude. Once coordinates are entered, zoom to the location by clicking the "Zoom to Coordinates" button. A locational marker will mark the position and will be labelled with the coordinates entered (Figure 24). All locational markers can be cleared using the "Clear all marked locations" option in the "Find Location" dropdown list.

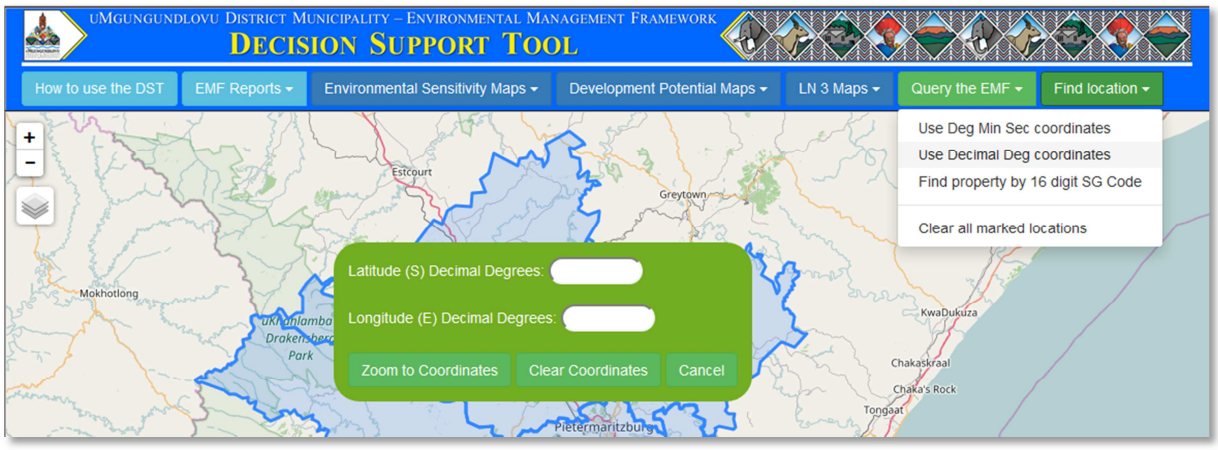


Figure 23 Find a location using geographic coordinates

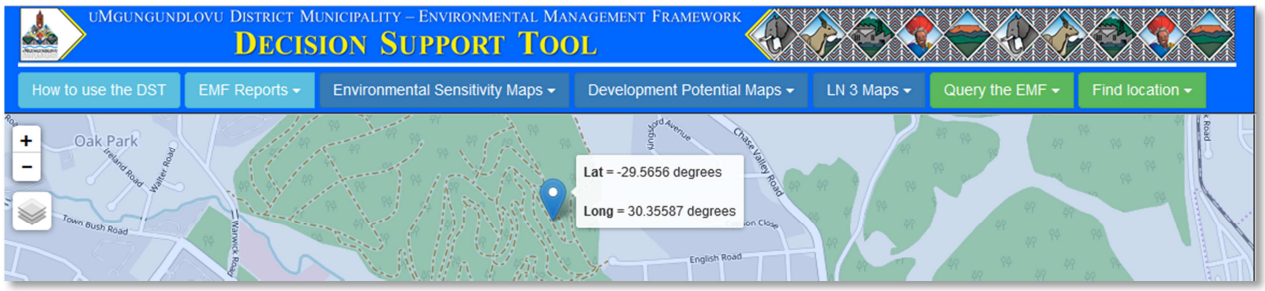


Figure 24: Location marker with coordinates labelled.

3. The third way to find a location is to use the Surveyor General's 16 digit identifier (starts with N0FT000…) to locate a surveyed property boundary. This option is also found under the "Find Location" button and clicking it will make a magnifier glass icon appear. Click on this to open a text box into which you can enter the 16 Digit SG code of the property you are interested in. If given a little time, matching suggestions are provided after the user types in the first few digits and after entering sufficient digits, the user can simply click on the correct code when it appears (Figure 25).

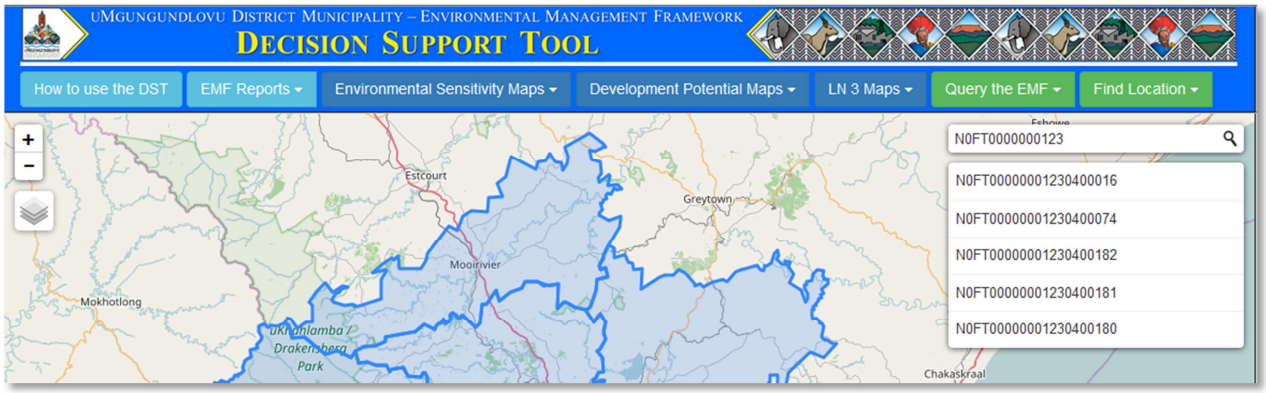


Figure 25: Searching for a location using a 16 digit SG code with suggestions provided.

5.2.5.6 Querying the EMF

A key aim of the DST is to provide a summarised output of the sensitive environmental features that are found in a stipulated area. This is achieved using a spatial intersect query whereby the user defines the area of interest using a set of drawing tools and the DST retrieves EMF information regarding that area. The drawing tools are exposed when the user selects the "Query EMF by user defined area" option in the "Query the EMF" dropdown list (Figure 13). The user can then select to draw either a line feature (for linear developments such as powerlines, pipelines, roads etc.), a polygon feature including a circle, square or multiple side/freehand polygon feature (for non-linear developments) or a point feature (for developments with a small footprint such as cell phone towers).

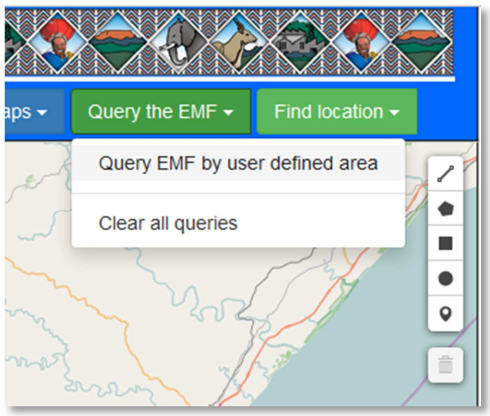


Figure 26: Querying the EMF using a set of shape drawing tools.

When drawing a line feature:

1. Select the line drawing tool (top icon).
2. Click on the map to place points at the start of the line, at each point where the line you wish to draw changes direction, and at the end of the line.
3. To finish the line feature, click again on the last point. The DST will then automatically begin the query process.

When drawing a polygon (multi-sided) feature:

1. Select the multi-sided polygon drawing tool (second from top).
2. Trace the boundary of the area you are interested in by clicking on the map.
3. Finish the polygon feature by clicking again on the first point to close the polygon and begin the query process.

When drawing a square feature:

1. Select the square drawing tool (third from top).
2. Click on the map where one of the corners of your square area will be located and hold down the mouse button.
3. Drag the cursor towards where the opposite corner will be.
4. When the square covers the area of interest, release the mouse button and the square will be completed and the query process begun.

When drawing a circle feature:

1. Select the circle drawing tool (fourth from top).
2. Click on the map where the centre of the circle will be and hold the mouse button down.
3. Drag the cursor away from the centre point to enlarge the circle to the required radius.
4. Release the mouse button when the required radius is reached to complete the circle and initiate the querying process.

When drawing a point feature:

1. Select the point drawing tool (bottom icon).
2. Simply click on the map at the location of interest to initiate the query process at that point.

5.2.5.7 Applying a buffer to a drawn query feature

Once the query feature has been drawn and the query process has been automatically initiated, the user will be asked if they wish to apply a buffer to the query feature they have just drawn. If so, the user can enter a buffer distance (in metres) into the dialogue box. If not, the default value of zero metres can be left unchanged.

In Figure 27, a line feature is drawn and a buffer of 50m is applied. Figure 28 shows the buffered output of this option.

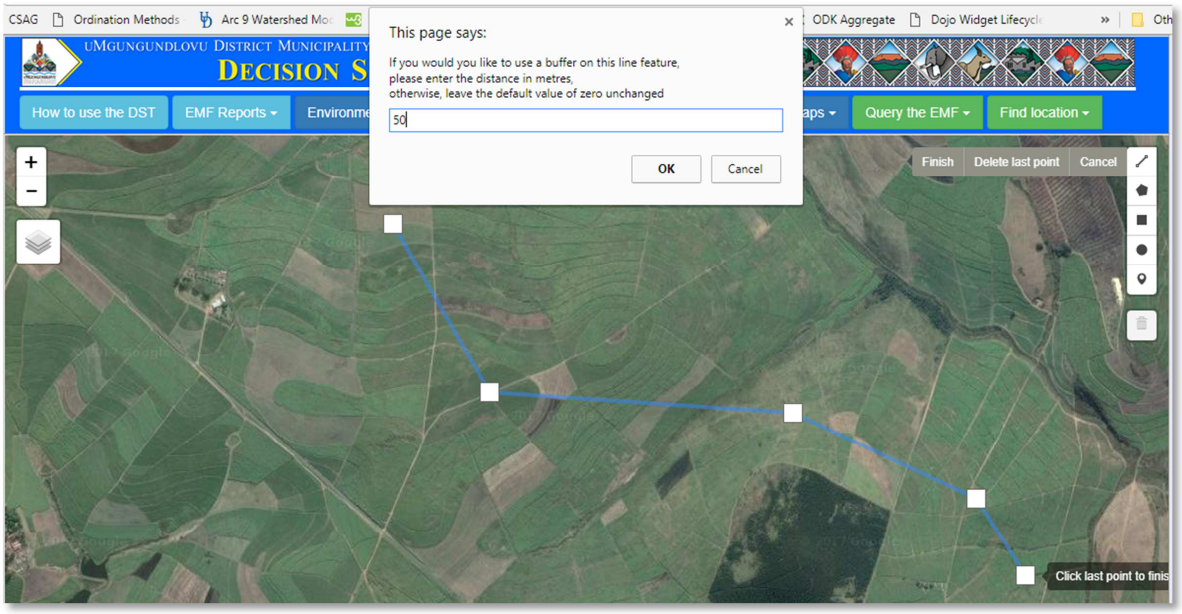


Figure 27: Querying the EMF using a line feature and applying a buffer of 50m.

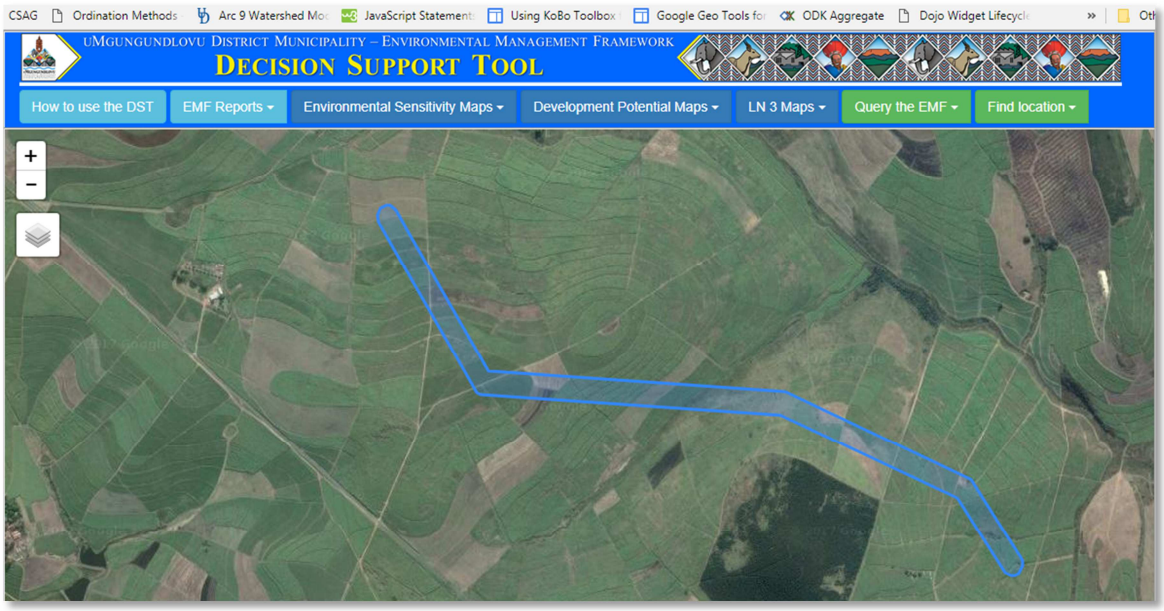


Figure 28: Output of buffering the line feature by 50m

5.2.6 Output report

Once the query process has been initiated, the DST queries the EMF GIS database stored on ESRI servers. This process can take some time and the user should be patient while the results are retrieved, especially if they are using a slow internet connection.

Once the results are retrieved, they are loaded into a frame located above the map window. The output report documents the sensitive environmental features that are intersected by the query area. Importantly, although more than one of the same environmental feature type (e.g. High production water yield area or Critical Biodiversity Area) may have been intersected, these are only

reported once. The report also provides development planning objectives for that feature type together with EIA guidelines. A link to a guidance document for each feature type is also provided.

A date stamp and a replication of the map window are also included in the output to provide the spatial and temporal context of the query.

Two buttons will allow the user to:

1. Export the output to PDF
2. Close the output window

It is important that the user uses the “Close” button and does not use the “Back” button in the browser in an attempt to return to the DST, as the report is in fact not a new webpage, but is embedded in the DST page and this will result in the browser exiting the DST altogether and returning to the previous webpage visited.

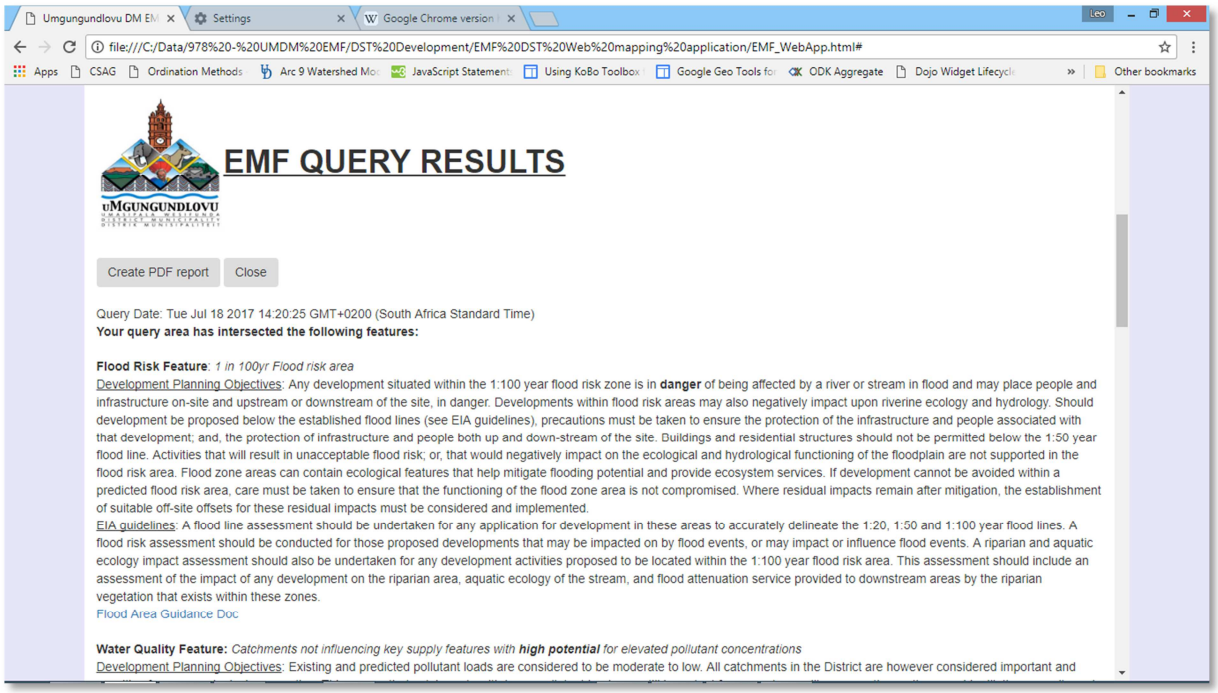


Figure 29: Image of the output report documenting sensitive features, development goals and EIA guidelines

6. IMPLEMENTING THE EMF

The development context is dynamic as data, legislation, policy and natural systems change over time. As a primary decision support tool, it is therefore necessary that the EMF is updated on a regular need to be updated more regularly. A summary of implementation is provided below: basis. The EMF guidelines policy requires a 5 year update time frame. Where possible the different elements

- **Gazetting**
  The value of the EMF is significantly enhanced if gazetted because this provides the various outputs legal standing and can be used with greater confidence in decision making. The responsibility for gazetting the Draft EMF rests with uMDM the KZNEDTEA and National DEA. The Gazetting process should commence as soon as possible.

- **Strategic Environmental Management Plan (SEMP)**
  The SEMP includes short medium and long term activities in the form of programmes and projects. The time frame and the responsibilities are defined in the SEMP in terms of lead responsibility and partners. Implementation is very dependent on ensuring that the projects are built into the IDP to ensure that municipal funding is allocated to activities where appropriate. While the actions in the SEMP have been prioritised to a degree this is limited and the actions have not been costed. Effective implementation therefore requires:
    - Ongoing prioritization in line with funding cycles and costing of priority projects in order that they can be integrated into the IDP.
    - It should also be noted that there is external funding available through various funding agencies, provincial and national programmes and agencies that have finance outside of the local government budgets. Pursuing alternative funding requires good working relationships with these role-players.

  It is also important to note that environmental management is a collective responsibility and that in several instances; the lead responsibility for actions rests with other role-players. However as this is the Municipalities tool, they need to work with the role-players to ensure that the actions are taken forward.

- **Spatial Data**
  Given the importance of the spatial data in defining the outputs (environmental sensitivity etc.) and how these influence decision making, the spatial layers in the DST need to be updated as often as possible. The DST has been designed so that the underlying layers can be updated as new versions become available. The responsibility rests with the uMDM (Environmental management/planning in partnership with the IT/GIS section) to ensure that they understand workings of the DST and source of underlying data in order that these updates take place as data is updated.

- **Institutionalizing and Revising the EMF**
  As the primary environmental management tool available within the District, the uMDM need to institutionalize the EMF. As such it has value beyond consideration in land use

planning and decision making. It should be considered and utilized in the range of different strategic plans such as the Water Services Development Planning, LED projects development. This requires that awareness is created of the availability of this information and the importance of it for integration in development strategies and plans – this speaks to the EMF Vision "integrating the EMF into Municipal Planning".

The formal adoption of the EMF via a gazetting process formalises the need to consult with the EMF and consider the information developed and presented via the reports and spatial data tool. An adopted EMF imposes an obligation to consider the guidance from the EMF during EIA evaluation processes on the decision-making authorities. While the EMF gazetting process rests with the uMDM, the need to keep the EMF current and relevant is important and this is accomplished through regular review, monitoring and revision of the EMF.

Once an EMF is formally gazetted and adopted, the revision timeframe needs to align with the IDP and SDF revision process as closely as possible. These occur every 5 years and therefore the EMF should likewise be reviewed every 5 years based on changes relevant at the time of review. The EMF regulations, 2010 make clear the requirement for the public participation requirements necessary in such a revision process.

In recommending a revision schedule, it is important to note the requirement of the Decision Support Tool to be regularly updated and monitored. Related to this, is the need to address maintenance and updating of the spatial development tool, in order to continually improve functionality and ease of use for decision making. These should remain ongoing and based on a spatial data tool maintenance agreement with the uMDM.

Section 5 of National Environmental Management Act: EMF Regulations, 2010

(5) Environmental management frameworks adopted as provided in subregulation (1) must be implemented and monitored on a regular basis to ensure that it achieves its purpose and goal.
(6) Environmental management frameworks adopted as provided in subregulation (1) may from time to time, on the initiative of the Minister or an MEC in concurrence with the Minister, or as specified in the revision schedule of the environmental management framework, be revised, on condition that such revision is subject to a public participation process similar to that envisaged in regulation 3(4).

(7) When an environmental management framework has been revised as provided in subregulation (6), notice must be given in the Government Gazette or the official Gazette of the relevant province of-

(a) The revision of the environmental management framework; and
(b) The place where the revised environmental management framework is available for public scrutiny.

APPENDIX 1
Policy & Legal Framework

Policy and Legal Review

In line with the need for the EMF to facilitate development planning and decision making being 'legally compliant", a legislation and policy review has been undertaken. At this point, the review lists relevant policy and Acts, categorizing them according to National, Provincial and Local levels of governance. The intention is that this baseline is built on by defining what the specific requirements or implications of the policy/act are for the development and/or outcomes of the EMF. In addition to the references provided in the TOR and listed below, Table 2 summarizes the initial policy and legal review.

Relevant Legislation

- DEAT Guideline: Strategic Environmental Assessment in South Africa, February 2007.
- The National Environmental Management Act (Act 107 of 1998, 'NEMA')
- The NEMA EIA and EMF Regulations (2010).
- NEM: Biodiversity Act (Act 10 of 2004)
- NEM: Air Quality Act (Act 39 of 2004)
- NEM Waste Act (Act 59 of 2008)
- Spatial Planning and Land use Management Act, 2013
- Provincial, National and Local air quality intervention strategies
- KwaZulu-Natal Planning and Development Act (2009)
- Municipal Systems Act (Act 32 of 2000)
- National Water Act (Act 36 of 1998)
- The Water Services Act (Act 108 of 1997)
- Conservation of Agricultural Resources Act (Act 43 of 1983)
- Provincial legislations and ordinances

Provincial and Municipal Documentation / Studies:

- uMgungundlovu District Status Quo, SEA and SEMP Reports (2012 – 2013);
- Msunduzi EMF and associated Reports;
- uMshwathi - Albert Falls EMF and associated Reports;
- The uMgungundlovu District municipality Integrated Development Plans (2015/16 Review) and Spatial Development Plans (2014)& Local Municipal plans
- uMgungundlovu Climate Change Response Strategy
- KZN Conservation planning outputs
- Draft Biodiversity Sector Plan for uMgungundlovu
- Umgeni Water's Infrastructure Master Plan (annual review)
- Water Reconciliation Study (Department of Water and Sanitation)
- Research works, studies, reports and investigations available from sources within the University of KwaZulu-Natal and other parastatals
- Provincial and National State of the Environment Reports
- Relevant Provincial and National spatial mapping and strategic infrastructure projects (SIP's)
- National Protected Area Expansion Strategy, DEAT/SANBI, 2008
- All relevant Information from SANBI's Biodiversity GIS programme

Policy Level			
Assessment issue	**International**	**National**	**Provincial/Local**
Water Yield & Water Quality		▪ National Water Act (NWA) (Act 36 pf 1998) ▪ Mountain Catchment Areas Act (MCAA) (Act 63 of 1970)	▪ KZN Provincial Strategy ▪ DWS Resource Quality Objectives ▪ Msunduzi EMF
Wetlands	▪ The Ramsar Convention ▪ Convention on Biological Diversity (CBD) ▪ The United Nations Convention to Combat Desertification (UNCCD) ▪ New Partnership For Africa's ▪ Development (NEPAD) ▪ The World Summit On Sustainable Development (WSSD)	▪ National Environmental Management Act (NEMA), 1998. ▪ EIA regulations (2014) and listing notices (GN 983-985) ▪ National Water Act (NWA), 1998 ▪ Conservation of Agricultural Resources Act (CARA), 1983 (National Environmental Management: Protected Areas Act, 2003 (Act 57 of 2003). ▪ National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004). ▪ National Forests Act, 1998. ▪ Draft Offsets Guideline	▪ Msunduzi EMF
Agricultural Resources		▪ Strategic Plan for South African Agriculture (SPSAA) – 2012/13-2016/17 ▪ Agricultural Policy Action Plan (APAP) 2015-2019 ▪ The white paper on sustainable forest development in South Africa 1997 (SFDSA) ▪ National Policy on Food and Nutrition Security (NPFNS 2013) ▪ Conservation of Agricultural Resource Act (Act 43 of 1983 - CARA) ▪ Subdivision of agricultural land act 70 of 1970 ▪ Draft policy document on the Preservation and Development of Agricultural Land	▪ KwaZulu-Natal Policy for Agricultural Land Potential, Development Rights and Application Processes, 2015 ▪ KZN DARD Strategic Plan 2015-2022 ▪ KZN 2030 Provincial Growth and Development Plan (2015)
Infrastructure & Services		▪ The National Development Plan (2012) ▪ The National Infrastructure Plan (2012) ▪ Water Services Act, 1997 ▪ NEM: Waste Act, 2008 ▪ Municipal Systems Act, 2000 ▪ KZN PGDS(2011) and PGDP (2015) ▪ Local Municipal SDFs and IDPs	▪ UMDM Integrated Development Plan(2016/2017 Review) ▪ UMDM Spatial Development Framework 2014 ▪ SIP 2: Durban-Free State-Gauteng logistics and industrial corridor. ▪ KZN Growth and Provincial Development Strategy (2011)
Biodiversity	▪ Convention on Biological Diversity (CBD) (ratified in 1995) ▪ Convention on Conservation of Migratory Species of Wild Animals (Bonn Convention) (1991)	▪ National Environmental Management: Biodiversity Act (NEMBA) (Act 10 of 2004) ▪ National Environmental Management: Protected Areas Act (NEMPA) (Act 57 of 2003) ▪ National Veld and Forest Fire Act (NVFFA) (Act 101 of 1998)	▪ KwaZulu-Natal Nature Conservation Management Act (KNCMA) (Act 9 of 1997) ▪ KwaZulu-Natal Nature Conservation Act (KNCA) (Act 29 of 1992) ▪ Natal Nature Conservation
	▪ Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (1973)	▪ National Forests Act (NFA) (Act 84 of 1998) ▪ Mountain Catchment Areas Act (MCAA) (Act 63 of 1970) ▪ National Environmental Management Act (Act 107 of 1998) ▪ World Heritage Convention Act (No 49 of 1999) ▪	Ordinance (NNCO) (Act 15 of 1974) ▪ KZN Provincial Growth and Development Strategy (2011)
Public Participation		▪ NEMA EMF Regulation, 2010 ▪ NEMA EMF Guideline Series 6, 2012 ▪ National Environmental Management Act (107 of 1998)	
Development Planning		▪ National Development Plan, Vision 2030 (NDP) ▪ The Constitution of the Republic of South Africa Act 108 of 1996 (The Constitution) ▪ KZN Heritage Act, 1997 ▪ Spatial Planning and Land use Management Act (Act No 16 of 2013)	▪ KwaZulu-Natal Planning and Development Act, 2008 (Act No. 6 of 2008) ▪ KZN Provincial Growth & Development Plan Vision 2030 ▪ SIP 2 Project Reports
Decision Support Tool (DST)		▪ The Spatial Data Infrastructure Act, 2003 (Act No. 54 of 2003) ▪ Policy on Pricing of Spatial Information Products and Services ▪ Base Data Set Custodianship Policy (Government Gazette No. 38474, 16 February 2015)	

APPENDIX 2
Public Participation Report

APPENDIX 3
Terms of Reference

1.REQUEST FOR PROPOSAL

The objective of this request for proposal is to appoint a suitably experienced, qualified and independent service provider to develop an Environmental Management Framework (EMF) for the uMgungundlovu District Municipality (UMDM).

2. SCOPE AND EXTENT OF WORK

The appointed service provider is to assist the UMDM and the Department of Economic Development, Tourism and Environmental Affairs (DEDTEA), as well as other sector departments to develop an EMF for the district of uMgungundlovu. The study area has been divided into Key spatial focus areas aligned with the main N3 corridor between Ethekwini and Pietermaritzburg (including linkage to Baynesfield); the Midmar, Howick and Hilton area; and, the small outlying towns of Mooi River/Nottingham Road; Richmond/Byrne; and, New Hanover/Wartburg where finer resolution assessment and mapping will be required. The surrounding district area may be assessed and mapped at a broader scale. The study area and defined key focus areas are depicted in the attached Map as **Annexure A** of the tender document.

The District Municipality covers an area of approximately 9 514 square Kilometres and the Key focus areas cover an area of approximately 600 square Kilometres. The final boundaries of these defined key focus areas may be adjusted slightly for practical environmental or development planning requirements that may emerge during the EMF process.

2.1 BACKGROUND OF THE STUDY AREA

The study area for the project is the uMgungundlovu District Municipal area which incorporates seven Local Municipalities namely the uMshwathi, uMngeni, Mpofana, Impendle, Msunduzi, Mkhambathini and Richmond Local Municipalities. The uMgungundlovu District plays a pivotal role in socio-economic development within the Province, and hosts a wide range of environmental resources that are of strategic importance locally, regionally, provincially and nationally. The district has areas which are considered to have the highest agricultural potential in the country and is the source catchment for water supplies to the greater Durban-Pietermaritzburg economic Centre. To ensure sustainable social and economic development within KwaZulu-Natal it is essential that these critical natural resources are utilized and managed sustainably.

The proposed EMF stems from the outcomes of a Strategic Environmental Assessment that was completed by the District Municipality in 2013. The Strategic Environmental Assessment included the development of a Status Quo Assessment, the creation of a Sustainability Framework that forms the Desired State, and a Strategic Environmental Management Plan that identifies the actions needed to achieve the Desired State.

The District Municipality wishes to enhance the products of the Strategic Environmental Assessment and to develop an Environmental Management Framework that may be Gazetted in terms of the relevant Environmental legislation so as to strengthen the legal framework and enhance environmental management and decision making in the District.

In addition to the existing work within the uMgungundlovu SEA, two fine scale EMF's have been completed for the Msunduzi Municipality and the Albert Falls area of the uMshwathi Municipality. These strategic planning tools must be effectively considered and the outcomes integrated into the District EMF. An environmental scoping process has been conducted to consider the need for the EMF and to establish which environmental attributes are of the greatest importance for decision making and environmental management within the study area.

2.1.1 SOCIAL, ECONOMIC & ENVIRONMENTAL ISSUES

The uMgungundlovu District Municipality is experiencing high economic growth rates. The Municipality is actively promoting social and economic development for the benefit of the people within the district, however development needs to be balanced with the need to ensure a healthy environment and the maintenance of

environmental services. The area faces a wide range of environmental issues including water quality impacts; waste management issues; the transformation and degradation of environmental resources and biodiversity; the loss of high potential agricultural land; and, the need to respond effectively to climate change.
To promote sustainable development it is critical to ensure that clear environmental policies and strategies are put in place and that development is directed to areas where there is minimal environmental impact with maximum social and economic gain. There is a need for a comprehensive policy framework to protect, manage and optimize the environment. The uMgungundlovu District can act as a Provincial flagship for sound environmentally sustainable development.

2.2. PROJECT STEERING COMMITTEE

Following the appointment of the service provider, relevant officials from the UMDM and DEDTEA will meet with the service provider to establish a Project Steering Committee [PSC] responsible for the management of this project's progress towards achieving the Terms of Reference. The PSC must include representatives from the UMDM, DEDTEA, the local Municipalities and other relevant authorities. The service provider/ consultants will be responsible for convening and providing secretarial services for the steering committee.

2.3 LITERATURE REVIEW

All relevant legislation and guideline documents are to be considered by the service provider, these must include but not be limited to:
Generic Environmental Legislation and policies:

- DEAT Guideline: Strategic Environmental Assessment in South Africa, February 2007.
- The National Environmental Management Act (Act 107 of 1998, 'NEMA')
- The NEMA EIA and EMF Regulations.
- NEM: Biodiversity Act (Act 10 of 2004)
- NEM: Air Quality Act (Act 39 of 2004)
- NEM Waste Act (Act 59 of 2008)
- Spatial Planning and Land use Management Act, 2013
- Provincial, National and Local air quality intervention strategies
- KwaZulu-Natal Planning and Development Act (2009)
- Municipal Systems Act (Act 32 of 2000)
- National Water Act (Act 36 of 1998)
- The Water Services Act (Act 108 of 1997)
- Conservation of Agricultural Resources Act (Act 43 of 1983)
- Provincial legislations and ordinances

Provincial and Municipal Documentation / Studies:

- uMgungundlovu District Status Quo, SEA and SEMP Reports;
- Msunduzi EMF and associated Reports;
- uMshwathi - Albert Falls EMF and associated Reports;
- The current Integrated Development Plans and Spatial Development Plans for the
- uMgungundlovu District municipality and its family of local municipalities
- uMgungundlovu Climate Change Response Strategy
- KZN Conservation planning outputs
- Draft Biodiversity Sector Plan for uMgungundlovu
- Umgeni Water's Infrastructure Master Plan (annual review)
- Water Reconciliation Study (Department of Water and Sanitation)
- Research works, studies, reports and investigations available from sources within the University of KwaZulu-Natal and other parastatals;
- Provincial and National State of the Environment Reports
- Relevant Provincial and National spatial mapping and strategic infrastructure projects (SIP's)

- National Protected Area Expansion Strategy, DEAT/SANBI, 2008
- All relevant Information from SANBI's Biodiversity GIS programme

2.4 ENVIRONMENTAL MANAGEMENT FRAMEWORK REPORT

2.4.1 INCEPTION REPORT

The appointed service provider/ consultants will need to prepare a detailed Inception Report that includes:

- a detailed project work plan with specific actions and date-specific time frames of the project;
- a Gantt chart with associated budget breakdowns;
- a literature and spatial information review in order to identify available information, the suitability of the available spatial information for the EMF and to identify gaps that will need to be filled;
- Method statements for the collection, analysis and presentation of information for the process and specialist studies for the further phases of the project; and
- A public participation and consultation process for the EMF development.

2.4.2 ENVIRONMENTAL MANAGEMENT FRAMEWORK

- Develop an Environmental Management Framework [EMF] for the study area in accordance with the requirements of the NEMA: EMF Regulation, 2010.
- Review, update and enhance where necessary the existing spatial environmental constraints and opportunities maps from the uMgungundlovu SEA project;
- Divide the study area into suitable hydrological sub-catchments at a resolution suitable to align with the available biodiversity planning and land use mapping units. Finer resolution mapping units will be required within the defined key focus areas and broader mapping units may be used in the surrounding district in order to achieve the intended outcomes of the EMF in respect of Scope and Extent.

- Undertake a surface water resource assessment for the uMgungundlovu district that must:

  i. Assess water productivity from each sub-catchment and its predicted contribution to sustainable water supply i.e. where are the important water generating areas and produce geo-referenced spatial layers (aligned with the methodology and data of the existing PhD study being undertaken by UKZN) ;
  ii. Assess the sub-catchments likely nutrient loading and water quality pollution based on current land use and produce geo-referenced spatial layers;
  iii. Map wetland areas within key spatial focus areas using recent aerial photography and other appropriate wetland mapping processes and selectively ground truth the mapping within the key spatial focus areas ;
  iv. Use existing predictive modelling of wetland areas in the broader district combined with existing wetland mapping;
  iv. Map flood risk areas and riparian zones within key spatial focus areas using appropriate flood risk modelling processes;
  v. Define management guidelines and land use controls for sub-catchments in respect of water quality and maintaining sustainable supplies of water; wetlands and their buffers; riparian areas; and, predicted flood risk areas.
- Undertake a Biodiversity and natural resource assessment for the uMgungundlovu District that must:

  i. Assess and analyse the existing spatial mapping from the biodiversity sector plan in order to simplify and develop spatial layers suitable for development planning;
  ii. Include selective ground truthing of the mapping within the key spatial focus areas;
  iii. Define management guidelines and land use controls for sub-catchments in respect of the protection and maintenance of biodiversity and natural resources.

- Undertake an Agricultural potential assessment for the uMgungundlovu District that must:

  i. Assess and analyse the existing spatial mapping from the Agricultural Potential layers in order to develop spatial layers suitable for development planning;
  ii. Facilitate selective ground truthing of the mapping within the key spatial focus areas by the Natural Resources component of the Department of Agriculture and Rural Development;
  iii. Define management guidelines and land use controls for sub-catchments in respect of the protection and maintenance of high potential agricultural land.

- Undertake an Service Infrastructure capacity assessment for the uMgungundlovu District that must:
  i. Assess and analyses the existing spatial mapping from existing strategic planning processes and existing data from service providers on Roads/Water supplies/Sanitation/Electricity in order to develop spatial layers suitable for development planning within the Key Spatial Focus Areas;
  iii. Define management guidelines and land use controls for sub-catchments in respect of opportunities and constraints of Service Infrastructure within the Key Spatial Focus Areas.

- Undertake a Use of Land assessment for the uMgungundlovu District that must:
  i. Assess and analyses the existing spatial mapping with updating from recent aerial photography in order to develop spatial layers suitable for development planning;
  ii. Undertake selective ground truthing of the mapping within the key spatial focus areas;

- The EMF must include:
  I. Environmental constraints and opportunities maps of the key environmental issues within the study area;
  II. State the conservation status and environmental management priorities in the area and in the identified parts;
  III. Indicate what kind of activities or land uses would be undesirable/desirable in the area or in specific parts of the area;
  IV. Based on the spatial component of the desired state of the environment and environmental constraints and opportunities, the study area must be divided into environmental control zones. The purpose of such strategic environmental zoning would be to facilitate future decision-making on environmental requirements and acceptability of development applications. This must include a spatial representation of such zoning within the area in respect of one or more activities in a manner that will identify:

     a. areas in which the undertaking of specific activities are preferred land uses;
     b. areas in which the undertaking of specific activities may only be allowed subject to acceptable levels of environmental impact being identified in detailed environmental impact assessment processes; and
     c. Areas in which the undertaking of specific activities are not preferred.

  V. Draft environmental land use controls and guidelines for use with and incorporation into Municipal Land Use Management Systems [LUMS].

- Establish an electronic **Environmental Information Management System (Decision Support System)** to be used for decision making for EIA and development applications (Interactive GIS based system) and ensure that the system can be fully integrated with the uMgungundlovu Municipal GIS. The Environmental Information Management System must:
  i. be designed to be able to establish a report based on a query for a specific parcel of land and provide relevant environmental information to inform decision making;
  ii. Have the functionality to query the data on a Property Description; 21 digit code; or, the selection of a user defined polygon;
  iii. Have the functionality to provide for forward planning by allowing for the identification of land parcels suitable for specific developments, based on user defined criteria;

iv. Be designed to be accessible and usable by various stakeholders.

2.4.3 PUBLIC PARTICIPATION

Public Participation must form an integral part the project in order to achieve a practical approach to the provision of people's needs. To achieve the development of an EMF that has a support of all stakeholders, the whole process will need to involve an extensive consultative and public participation process, which must include, consultation with relevant NGO's, CBO's, civil society structures, parastatals and Provincial and National Departments and agencies with environmental and development mandates. Particular attention must be given to including and incorporating Traditional Authorities within the consultation process.

2.5 DELIVERABLES

- Inception Report
- Draft Environmental Management Framework.
- Final Environmental Management Framework (EMF)
- Interactive Environmental Information Management System (Decision Support Tool) with a user friendly guideline document (A copy of any Code developed or used in the development of the Decision Support Tool must also be provided)
- A non-technical summary of the EMF report and outputs in English and isiZulu.
- The service provider is required to provide electronic copies and hard copies of all draft reports and final reports/documents to DEDTEA and UMDM
- All spatial information must be provided in a GIS format in compliance with the standards of the uMgungundlovu Municipality and DEDTEA and in accordance with the Spatial Data Infrastructure Act (No. 54 of 2003)
- All spatial information must be provided with metadata in accordance with the templates to be provided to the service provider.

2.6 PROJECT DATA STANDARDS

All hard copy maps must be at a resolution of 300 dots per inch (dpi) or greater and also supplied in an electronic Adobe PDF format. All ArcMap documents (.mxd) map document formats used in final map production are also required for delivery with accompanying data in a stand-alone directory structure. Map document formats also need to be configured to use relative paths.
All GIS files to must have spatial reference information that describes the projection, datum, and where applicable the collection or compilation methods. The data must be submitted in a projected coordinate system, Transverse Mercator in Hartebeesthoek 1994 datum WGS84, central meridian 31 degrees east. All shape files or feature classes should have attributes with attribute name definitions included in the metadata.

Delivery Requirements and Standard Organizational Structures
Electronic data is to be delivered on CD-ROM, DVD, USB or external hard drive.
Directory structure and readme text file in the upper level directory that describes the structure are required. A suggested directory structure is as follows:
Project_Name
Docs (reports, correspondence, metadata, and other such documents)
Images (aerial photos, satellite imagery, logos, DEMs, and other raster type data)
Maps (MXDs and PDFs.)
Layer Files (layer files for each theme)
Shapes (new geodatabases or shape files)
Source (original unmodified data that may have been acquired from external/internal sources)
Tables (spreadsheets, delimited text files, or other such tabular data not stored in a geodatabase)

File naming conventions should be logical, consistent, and contain no spaces or special characters. An underscore may be used in lieu of a space.

3. TIMEFRAMES

All activities are to be carried out within a maximum of 12 (twelve) months of appointment and in accordance with the time frames agreed upon by the PSC.

4. PROJECT QUOTATION AND PERFORMANCE MEASURES

A detailed project budget must be provided. Each proposed project activity should be analyzed in terms of the required inputs and these inputs must be costed.

5. REPORTING

The service provider/s will submit monthly progress reports to the UMDM, within 4 working days after the end of each month for the entire duration of the project.

6. THE PROJECT TEAM:

The project team shall comprise of the following specialist:

i) Hydrology
ii) Biodiversity
iii) Bio- regional Planning
iv) Agriculture (Natural resources)
v) Geographic Information Systems (minimum 5 years of experience)

7. CONTINUITY AND PROFILE OF SENIOR STAFF ON THE PROJECT

The Service provider shall ensure that it appoints a senior project team member to be present at and in charge of all work throughout the duration of the contract. If, during the period of the contract, it is necessary to substitute any project team member, including a senior project team member, the Consultant shall appoint a project team member of the same level of qualification and experience as the member being substituted to the satisfaction of the PSC. The Service provider shall also ensure that the substitute project team member shall work with the member being substituted for a period of one month so that the skills and knowledge of the project is transferred to the substitute project team member.

8. OWNERSHIP

All documents, materials, data and information irrespective of format will be the property of the uMgungundlovu District Municipality and the DEDTEA.