BOJANALA PLATINUM DISTRICT MUNICIPALITY ENVIRONMENTAL MANAGEMENT FRAMEWORK

Final EMF report

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Bojanala Platinum District Municipality
Environmental Management Framework

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Department:
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North West Provincial Government
REPUBLIC OF SOUTH AFRICA

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To all stakeholders, we thank you for your continued participation and interest in this project.

EXECUTIVE SUMMARY

Background to the project

The Bojanala Platinum District Municipality (BPDM) is located on the eastern part of the North-West Province. It covers an area of approximately 18 333 km2 and as a category C municipality, it comprises of five local municipalities: Kgetlengrivier, Madibeng, Moretele, Moses Kotane and Rustenburg Local Municipalities. It is bordered by the Waterberg District Municipality (Limpopo Province) to the north, the City of Tshwane Metropolitan Municipality (Pretoria) and West Rand District Municipality to the east and south-east respectively (Gauteng Province), as well as the Dr Kenneth Kaunda District Municipality to the south and Ngaka Modiri Molema District Municipality to the west (North-West Province). The main economic sectors of the BPDM are mining, tourism, agriculture, enterprise development, manufacturing utilities, infrastructure and construction and financial services.

The population of the Bojanala Platinum District is estimated to be 1 323 921, which is approximately 38 % of the total population of the North-West province. The majority of the area can be classified as rural with very low densities that makes the provision of basic services very difficult and expensive. The more formal urban areas are located in the southern side of the district. These include Rustenburg and Brits, which are vibrant economic nodes.

A need was identified for the development of an environmental decision support tool in the BPDM, to facilitate a consolidated and inclusive approach for the management of this area. This need arises from the following:

- the number and nature of development applications in the BPDM area received for environmental authorisation, indicating that there is severe development pressure in the district area;
- the complexities around competing land uses in the area;
- the need to align spatial plans affecting the area.

Three EMF's have already been developed for different parts of the BPDM area, i.e. for the Magaliesberg Protected Environment EMF, as well as the Rustenburg and Madibeng local municipalities. Some of these area are older than the 5 year EMF review cycle recommended in the 2010 EMF Regulations, or close to that. The review of these EMFs on an individual basis, would prove to be financially unviable for READ. The BPDM EMF will replace and incorporate these existing EMFs, but will also include information for the, thereby creating for a single EMF that will encompass the whole BPDM area.

An all-encompassing updated, district wide EMF that reviews and incorporates the existing 3 EMFs and includes the Moses Kotane and Kgetlengrivier municipal areas that currently are not included in an EMF, will allow for a more cost efficient 5 year review cycle in future.

In order to address all the above considerations, the Centre for Environmental Management (CEM) was appointed by the North West Department of Rural, Environment and Agricultural Development (READ) to draft an Environmental Management Framework (EMF) for the Bojanala Platinum District Municipality (BPDM).

The envisaged EMF must inform both project level decision making by the North West provincial government (i.e. EIA authorizations) and the BPDM, as well as the five local municipalities

(Kgetlengrivier, Madibeng, Moretele, Moses Kotane and Rustenburg) in the district (i.e. land use authorizations), as well as strategic spatial planning, primarily reflected in the Spatial Development Framework (SDF) of the BPDM and the five local municipalities.

Policy and legal mandate

The legal and institutional frameworks regulating the BPDM EMF are complex and multifaceted, spanning over several sectors and across all three spheres of government.

Section 24 of the Constitution stipulates that all South Africans have a right to an environment that is not harmful to their health or well-being and to have the environment protected for the benefit of present and future generations. The Constitution compels everybody to take reasonable steps to prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources.

In the context of this project, the two most important laws, laying the foundation for the responsible management of the area, is the National Environmental Management Act 107 of 1998 (NEMA) and the Spatial Planning and Land Use Management Act 16 of 2013 (SPLUMA). The NEMA provides for the compilation of information and maps, by the Minister of Environmental Affairs or an MEC, that specify the attributes of the environment in particular geographical areas, including the sensitivity, extent, interrelationship and significance of such attributes, which must be taken into account by every competent authority. The SPLUMA requires the development of municipal Spatial Development Frameworks (SDFs) that must include a strategic assessment of the environmental pressures and opportunities within the municipal area, including the spatial location of environmental sensitivities and high potential agricultural land where applicable.

Key regulatory instruments, other than those mentioned above, that are to be considered in the management of the BPDM include inter alia the Mineral and Petroleum Resources Development Act 28 of 2002, National Water Act 36 of 1998, the National Environmental Management Biodiversity Act 10 of 2004, National Environmental Management Waste Act 59 of 2008, National Environmental Management: Air Quality Act 39 of 2004, Local Government Municipal Systems Act 32 of 2000 and the National Heritage Resources Act 25 of 1999. These regulatory instruments provide for both strategic and project level considerations that must be taken into account in the management of the BPDM. It must be noted that alignment and co-operative governance is a crucial imperative across the regulatory regime governing the BPDM, at both a strategic and project level.

The South African National Development Plan (NDP) aims to eliminate poverty and reduce inequality by 2030. According to the plan, South Africa can realise these goals by drawing on the energies of its people, growing an inclusive economy, building capabilities, enhancing the capacity of the state, and promoting leadership and partnerships throughout society. The South African government adopted a management for outcomes approach as basis for the government performance monitoring and evaluation system. This approach clarifies what government expects to achieve, how they expect to achieve it and how they will know when they have achieved it.

The approach consists of 14 outcomes that collectively address the main strategic priorities of government as a key focus of its work. Each outcome has a number of measurable outputs with targets, is linked to a set of activities that will help achieve the targets and contribute to the outcome and also has delivery agreements which in most cases involve all spheres of government and a range of partners outside government. Combined, these agreements reflect government's delivery and implementation plans for its foremost priorities.

Outcome 10 envisions a South Africa where environmental assets and natural resources are well protected and continually enhanced. It is supported by 5 sub-outcomes. One of the key actions/activities under sub-outcome 1 (Ecosystems are sustained and natural resources are used efficiently) is the integration of ecological infrastructure considerations into spatial/land-use planning and decision-making about new developments, i.e. to ensure that greater alignment of sustainability principles in all levels of integrated and spatial planning, as well as in project formulation.

Purpose of the EMF

EMFs are part of the suite of Integrated Environmental Management (IEM) tools that can be used to support informed decisions regarding the management of environmental impacts that arise out of human activities and developments. They provide a compilation of information and maps, illustrating attributes of the environment for a specific geographical area that becomes useful in a diverse field of environmental applications, including EIA processes, but also other planning processes, such as the development of IDPs, SDFs and other open space planning applications.

Ultimately, an EMF is a decision support tool, which ensures that the competent authority has sufficient information to guide EIA authorization decisions within a specific geographical area. It functions as support mechanism in the Environmental Impact Assessment (EIA) process in the evaluation and review of development applications, as well as in decision making.

Although the legal mandate for EMFs is vested with the EIA authorities and not directly with the local municipality responsible for land use management in municipal areas, the SPLUMA requires SDFs to take cognisance of any environmental management instrument adopted by the relevant environmental management authority.

EMF phasing

The methodology for the execution of the project covers nine phases, which is briefly described below.

Phase 1: Inception phase

- The purpose of this phase is to confirm the scope of work for the project, the project plan and the time frames for the deliverables, establish a Project Management Team (PMT) and a Project Steering Committee (PSC), as well as the public participation strategy and the extent of public coverage and consultation.
- The output of this phase is an inception report and detailed amended Plan of Study (project work plan).

Phase 2: Stakeholder participation and communication strategy

- As required in the EMF regulations, the execution of the project will be informed and supported by an extensive consultative and public participation process to achieve a practical approach to the provision of people's needs and ensure that the development of the EMF is supported by all stakeholders.
- This phase is a core activity to the whole EMF process that require the development of a detailed stakeholder participation and communication strategy to ensure that there is maximum involvement of all stakeholders in the planning, implementation and outcome of the project.
- The output of this phase is a standalone Public Participation Strategy report.

Phase 3: Status Quo report

- The Status Quo report is a spatial representation of the status quo of the biophysical environment. The Status Quo report forms the basis of consultation to establish the desired state of the environment and develop strategies to be implemented in order to guide development in the study area.
- The deliverables of this phase is a set of maps and summary descriptions of the various components of the resource inventory. The *Status Quo* report specifies the attributes of the environment in the area, including the sensitivity, extent, interrelationships and significance of those attributes. It also includes a brief interpretation of these components and the relevance thereof in terms of opportunities and constraints for future development. The results of this phase is summarised in Section 5 of this report.

Phase 4: Desired State of the Environment

- The purpose of this phase is to establish and clearly describe the future Desired State of the Environment through a consultative public participation process, based on the information in the Status Quo report.
- The Status Quo Report will be used to facilitate a consultative process through which the desired state of the environment for the area will be established. The desired state will be spatially represented in the same format as the status quo report to enable comparison.
- The deliverables include a detailed development vision for the area, as well as comprehensive set of development objectives related to the desired future state relating to the priority environmental issues within the area.
- The Desired State of the Environment is included in this report as Section 6.

Phase 5: Environmental Management Zones

- The purpose of this phase is to divide the study area into environmental management zones, based on the environmental constraints dataset developed during the status quo phase and updated during the desired state of the environment, and the bio-physical constraints and opportunities identified. These environmental management zones will facilitate future decision making on environmental requirements and acceptability of development applications.
- The deliverables that will emanate from the Environmental management zones part of this phase will be a spatial representation (GIS dataset) showing the different environmental management zones and their criteria. The dataset will be linked to a decision support matrix that will allow for easy interpretation as to the compatibility (desirable, conditional and undesirable) of an activity in terms of its geographic location as well as in relation to the set environmental objectives.
- The results of this phase is summarised in Section 7 of this report.

Phase 6: Strategic Environmental Management Plan (SEMP)

- The SEMP is the tool that must ensure that the EMF is implemented. It outlines the strategic management approach for the implementation of the EMF.
- The Strategic Environmental Management Plan is included in this report as Section 8.

Phase 7: Develop an Environmental Management Framework

- The purpose of this phase is to combine the information from phases four, five and six into the final environmental management framework, further expanding on the decision support matrix.
- The final deliverable is an interactive GIS EMF system that delivers the following:
  - the geographical area to which it applies;
  - the environmental and socio-cultural attributes and conservation status of the area;
  - the environmental management priorities of the area;
  - the kind of developments or land uses that would have a significant impact on those attributes and those that would not;
  - the kind of developments or land uses that would be undesirable in the area or in specific parts of the area;
  - inclusion and exclusion areas (if deemed feasible/necessary), or areas of particular sensitivity in terms of the proposed NEMA EIA Regulations list of activities.

Phase 8: Develop an EMF GIS tool/viewer

- To further assist users of the EMF a spatial screening tool automating the extraction of spatial data and assisting in the interpretation thereof will be developed. This will ensure that the EMF GIS layers and supporting information are easily accessible, especially by municipalities with limited GIS capacity.
- The GIS tool/viewer will be made available on DVD to easily access the EMF information, especially by users with limited GIS capacity, for use in stand-alone GIS software applications.

Phase 9: Finalization and training

- During this phase the EMF and all associated documentation will be finalized. A training manual will be developed and GIS training provided to all relevant officials involved. The skills development process will ensure that skills development and transfer is achieved within the municipalities and READ.
- The deliverables that will emanate from this phase will be:
  - Final hardcopies and electronic copies of all reports;
  - Spatial datasets, accompanied by a decision support matrix and spatial screening tool;
  - A training manual accompanied by a user friendly GIS training tutorial video clips to ensure that officials unable to attend the GIS training will also be able to use the software; and
  - A PowerPoint presentation of the final results and outcomes of the project.

This report includes the deliverables of **phases 3-7**, and must be read with the project inception, *status quo* and public participation strategy reports, in which the results of **phases 1, 2 and 3** are documented.

Desired state of the BPDM environment

The analysis and evaluation of the base line information, issues raised through the public participation process, and authority requirements and policies identify and provide the basis for establishing environmental priorities, related to critical environmental issues and environmental sensitivities, in the EMF development process. The key issues, opportunities and threats were classified under three main headings i.e. legal and institutional framework, natural environment and socio-economic environment. These environmental priorities has been used to develop a

vision and strategic objectives for the Desired State of the Environment. Strategic objectives were established for all the key natural and socio-economic environmental issues, i.e. hydrology and water resources, land use, agricultural potential, socio-economic development, physical infrastructure and built structures, biodiversity and conservation, heritage resources, air quality, tourism and mining potential.

Sensitivity mapping and Environmental management zones

An EMF should, amongst others, indicate specific environmental attributes and environmental management priorities in the area that may be sensitive to certain types of activities. This requirement is realized through the mapping of environmental sensitivities, the spatial desired state of the environment and the delineation of environmental management zones.

Environmental sensitivity refers to the manner in which a feature in the environment may or may not be affected by specific types of activities or land uses. Sensitivity maps were developed for specific key environmental attributes in terms of their relative sensitivity to impacts that might negatively affect them. These form the baseline for the environmental constraints dataset. Sensitivity was evaluated for the following possible constraints in the environment: agricultural land, biodiversity, surface and groundwater, as well as topographical and heritage (socio cultural) features.

Except for the constraints, opportunities in the area that should be prioritised to stimulate sustainable development were also considered. The opportunities that were considered are housing and commercial development, industrial, and mining development opportunities.

To aid strategic environmental management in the area, environmental management zones were delineated by grouping areas which share the same characteristics together. Areas were grouped based on their current use (e.g. Agriculture, Residential, Natural, etc.) and their sensitivity to different types of activities. Using this approach, the study area was divided into the following eight environmental management zones: agriculture 1 (cropland), agriculture 2 (other agricultural land), biodiversity, development 1 (housing and commercial), development 2 (industrial), development 3 (mining), sensitive topography and Magaliesberg Protected Environment zones.

Environmental management guidelines

Environmental management guidelines were developed for each of the environmental management zones. General environmental guidelines were developed, which is meant to guide the overall management of development in each zone, as well as specific management guidelines for specific activities in each zone. In some zones, specific NEMA listed activities have been identified, which may be considered to be excluded from the requirement to obtain an environmental authorisation from the competent authority within such management zone. These exclusions will be subject to specific environmental management guidelines pertaining to such activities in the environmental management zone.

EMF Decision support tool

To facilitate the use of the EMF and interpret the sensitivity of the management zone in relation to specific activities a decision support matrix was developed. The matrix can be viewed as the link between the spatial datasets, the activities and/or land uses considered and the strategic objectives for the area.

Development of a spatial screening tool

Once the EMF was finalised a spatial screening tool, assisting in the extraction of spatial data and the interpretation thereof, was developed. The tool allows users to select a specific portion or parcel of land and generate a report specifying the environmental sensitivities, environmental management zone, compatibility of the proposed development, as well as environmental management guidelines for that land. All of this information should be used to inform decision making.

How to use the EMF

The management guidelines, decision support matrix and spatial screening tool are the key components of the EMF. The EMF will assist relevant authorities in the management of the area and give effect to the three main objectives of the EMF, which are to:

- serve as a spatial screening mechanism for EIA;
- provide strategic context for EIA applications in the area; and
- inform strategic spatial planning.

Objective one is achieved through the environmental sensitivity dataset (Addendum 15), which indicates the issues that should be investigated in more detail during the EIA process, while objectives two and three are achieved through the environmental management zones dataset (Addendum 18).

For objective two, the environmental management zones dataset will indicate, through the decision support matrix and accompanying management guidelines, whether an envisaged activity is compatible in a specific area/zone or not, viewed from a strategic perspective.

For objective three, the environmental management zones dataset should be used to inform the review of the MMM Spatial Development Framework (SDF), which is responsible for strategic spatial planning and guiding of land use management in the area.

To achieve objectives one and two, the EMF is applied by following four steps (Figure 10) that guide the user through the use of the decision support matrix, environmental constraints dataset and environmental management zones dataset.

Strategic Environmental Management Plan (SEMP)

Environmental management programmes/plans aim to provide arrangements/guidelines to prevent undue adverse impacts and enhance the positive aspects of a project on the environment. Where an EMF exists, a Strategic Environmental Management Plan (SEMP) helps to establish a sound planning and management framework to guide development planning and decision-making to reach certain environmental targets. It provides the means to incorporate environmental objectives into development decision-making processes and may prescribe standard approaches to project design and mitigation through environmental guidelines and monitoring requirements, reducing the scope of work for individual EIAs and detailed EMPs for projects.

Strategic environmental management planning is an on-going process that is initiated with the identification of a strategic objective. Once this strategic objective has been identified, different strategies or targets are planned so as to give effect to the identified objective. The implementation of the different strategies so as to achieve the targets is accompanied by monitoring and corrective measures to ensure continuous improvement. The identified and implemented strategies should be routinely revisited so as to ensure that the identified strategic objective will be met.

The BPDM EMF SEMP is the actual implementation component of the EMF. It focusses on the identified desired state themes and consists of the strategic objectives that originate from the *Status Quo* and Desired State of the Environment analysis, and intervention strategies or action plans that are required to achieve a consistent and effective implementation of the environmental management zones, as well as the responsible organisations (institutional framework) for achieving the targets. Furthermore, it contains management guidelines for the implementation of the EMF, linked to a system of KPIs to evaluate, monitor and report on progress made towards meeting the Desired State of the Environment strategic objectives.

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ABBREVIATIONS AND ACRONYMS

Abbreviation or Acronym	Description
ARC	Agricultural Research Council
AQMP	Air Quality Management Plan
BCA	Biodiversity Conservation Assessment
BPDM	Bojanala Platinum District Municipality
CARA	Conservation of Agricultural Resources Act 43 of 1983
CBA	Critical Biodiversity Area
CEM	Centre for Environmental Management
CSIR	Centre for Scientific and Industrial Research
DAFF	Department of Agriculture Forestry and Fisheries
DEA	Department of Environmental Affairs
DMR	Department of Mineral Resources
DRDLR	Department of Rural Development and Land Reform
DWAF	Department of Water Affairs and Forestry (old)
DWS	Department of Water and Sanitation
ECA	Environment Conservation Act 73 of 1989
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMP	Environmental Management Plan
ESA	Ecological Support Area
GDP	Gross Domestic Product
IAP	Invasive Alien Plant
IDP	Integrated Development Plan
IWMP	Integrated Waste Management Plan
KLM	Kgetlengrivier Local Municipality
LGMSA	Local Government: Municipal Systems Act 44 of 2003
LUMS	Land Use Management Scheme
MaLM	Madibeng Local Municipality
MBMA	Magaliesberg Biosphere Management Authority

Abbreviation or Acronym	Description
MEC	Member of the Executive Committee
MKLM	Moses Kotane Local Municipality
MoLM	Moretele Local Municipality
MPE	Magaliesberg Protected Environment
MPRDA	Mineral and Petroleum Resources Development Act 28 of 2002
MTSF	Medium Term Strategic Framework
NBA	National Biodiversity Assessment
NBF	National Biodiversity Framework
NCSC	National Crop Statistics Consortium
NDP	National Development Plan
NEMA	National Environment Management Act 107 of 1998
NEMAQA	National Environmental Management Air Quality Act 39 of 2004
NEMPAA	National Environmental Management Protected Areas Act 57 of 2003
NEMWA	National Environmental Management Waste Act 59 of 2008
NFEPA	National Freshwater Ecosystem Priority Areas

1 READING THIS REPORT

1.1 How to use this report

This report contains a number of sections, namely introduction, approach and methodology, desired state and strategic environmental management plan. Figure 1 indicates the purpose of the chapters and the information contained in each.

Figure 1. Various chapters of this report and information contained in each, as well as their relationship with the standalone Public Participation Strategy report.

2 BACKGROUND TO AND PURPOSE OF THE BOJANALA PLATINUM DISTRICT MUNICIPALITY ENVIRONMENTAL MANAGEMENT FRAMEWORK

Since the turn of the 20th century the way human beings endeavoured to achieve economic growth and spatial development has caused irreparable damage to the environment and the suffering of billions of people, particularly in the least developed countries. The environmental crisis compelled the need to reconcile the concepts of development and the environment. Development is about meeting the material needs of our people, while environmental protection is our moral obligation to future generations and other species with which we share the earth's space.

Section 24 of the Constitution stipulates that all South Africans have a right to an environment that is not harmful to their health or well-being and to have the environment protected for the benefit of present and future generations. The Constitution compels everybody to take reasonable steps to prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources.

To ensure adequate protection of the natural resource base in South-Africa, in line with the principles of the National Environmental Management Act (NEMA), 107 of 1998 (as amended), strategic environmental information in an area needs to be integrated with strategic and project level decision making. One of the principles in the NEMA stipulates that "the use and exploitation of non-renewable resources (must be) responsible and equitable, and take(s) into account the consequences of the depletion of the resource". This principle is also reflected in the Bojanala Platinum District Municipality's Mission Statement:

"Bojanala Platinum District Municipality, through shared services, will coordinate, facilitate and support local municipalities by equitable sharing of resources and maximising community benefit of natural resources in a safe and healthy environment" - BPDM 2012/17 IDP

The South African government recently adopted a management for outcomes approach as basis for the government performance monitoring and evaluation system. This approach is designed to ensure that government is focussed on achieving the expected real improvements in the life of all South Africans. It consists of 14 outcomes that collectively address the main strategic priorities of government as a key focus of its work.

Outcome 10 envisions a South Africa where environmental assets and natural resources are valued, protected and continually enhanced. Simultaneously, the NDP 2030 Vision for Environmental Sustainability and Resilience, as documented in the MTSF, is that by 2030, South Africa's transition to an environmentally sustainable, climate-change resilient, low-carbon economy and just society will be well under way. In order to realise this vision, there are a number of immediate constraints that must be addressed to address the challenge of deteriorating environmental quality due to pollution and natural resource degradation, destruction and/or depletion.

One of these constraints is the fact that spatial planning and spatial development decisions in South Africa are fragmented. There is a need to address competing land uses and ensure that industry and infrastructure development programmes support the long term sustainability of natural systems and the environment.

EMFs have been identified as part of the suite of Integrated Environmental Management (IEM) tools that can be used to support informed decisions regarding the management of environmental impacts that arise out of human activities and developments (DEA, 2012).

Legally, EMFs are identified as environmental management instruments for which the Minister/MEC may make regulations laying down the procedure to be followed for the preparation, evaluation, adoption and review thereof (NEMA section 24(5)(bA)(i)). The EMF development process should meet the requirements of the provisions contained in the NEMA and the 2010 NEMA EMF Regulations that were promulgated on 18 June 2010, under Sections 24(5) and 44 of NEMA.

The Spatial Planning and Land Use Management Act (SPLUMA) 16 of 2013 ascribes to the principle of spatial sustainability, whereby spatial planning and land use management systems must uphold consistency of land use measures, in accordance with environmental management instruments (such as EMFs). In addition, SPLUMA encourages environmentally sustainable land development practices and processes (Section 3(1)(c)(iii) of the Act), requires sustainable land development at the required scale by encouraging the sustained protection of the environment (section 3(1)(h)(iii) of the Act) and states that in setting land development objectives, the "sustained utilization of the environment" must be taken into account (Section 28(b) (ii) of the Act).

It is against this general backdrop that the READ is assisting the BPDM municipality with the compilation of the EMF, to ensure that credible spatial planning tools are developed. The Centre for Environmental Management (CEM) was appointed by the READ to draft the EMF for the BPDM.

2.1 Need for an Environmental Management Framework for the Bojanala Platinum District Municipality (BPDM)

In addition to the general background provided above, there is a need for the development of an environmental decision support tool in the BPDM, to facilitate a consolidated and inclusive approach for the management of this area.

This need arises from the following:

- the number and nature of development applications in the BPDM area received for environmental authorisation, indicating that there is severe development pressure in the district area;
- the complexities around competing land uses in the area;
- the need to align spatial plans affecting the area.

Three EMF's have already been developed for different parts of the BPDM area. These are:

- The Magaliesberg Protected Environment EMF (NWPG 2009.
- The Rustenburg Local Municipality EMF (NWPG 2013a).
- The Madibeng Local Municipality EMF (NWPG 2013b).

Some of these EMFs area are older than the 5 year EMF review cycle recommended in the 2010 EMF Regulations, or close to that. The review of these EMFs on an individual basis, would prove to be financially unviable for READ. The BPDM EMF will replace and incorporate these existing EMFs, but will also include information for the, thereby creating for a single EMF that will encompass the whole BPDM area.

An all-encompassing updated, district wide EMF that reviews and incorporates the existing 3 EMFs and includes the Moses Kotane and Kgetlengrivier municipal areas that currently are not included in an EMF, will allow for a more cost efficient 5 year review cycle in future.

It is important to note that an EMF has also been developed for the Dinokeng project area (the Cradle of Humankind) (GDED, 2010), but was incorporated into the Gauteng Provincial EMF (GP 2015). The part of the buffer area to the Cradle of Humankind in the BPDM that is included in the Gauteng Provincial EMF will be excluded from the BPDM EMF.

2.2 Purpose of EMFs

An Environmental Management Framework (EMF) is a tool that could guide development in such a way so as to ensure sustainable development to the benefit of current and future generations. This tool is being promoted for providing guidance during environmental authorisation applications, streamlining administrative processes and permitting the delegation of authority. It could also guide potential developers to the constraints facing proposed developments and identifies projects that are either compatible with the environmental constraints and desired state of the environment, or compatible under certain conditions, or undesirable.

The legal status for EMFs is provided by Chapter 5 of the National Environmental Management Act (NEMA) 107 of 1998, which aims to promote the integration of the principles of environmental management into the making of all decisions which may have a significant effect on the environment; ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them; and ensure the consideration of environmental attributes in management and decision-making which may have a significant effect on the environment. Section 24 allows the Minister and/or MEC to compile information and maps that specify the attributes of the environment in particular geographical areas, including the sensitivity, extent, interrelationship and significance of such attributes that must be taken into account by every competent authority. It further specifies criteria that must be taken into account by competent authorities when considering environmental applications in terms of section 24, and dictates that such authority must take into account all relevant factors, which may include information and maps compiled in terms of the NEMA, including any prescribed environmental management frameworks, to the extent that such information, maps and frameworks are relevant to the application.

According to the 2010 NEMA EMF Regulations (No. R. 547 in Government Gazette No. 33306), an EMF should serve as a tool to support project level decision making and inform higher level development plans and programmes. EMFs should be aimed at promoting sustainability, securing environmental protection and promoting cooperative environmental governance.

The above should be achieved by adhering to the following objectives:

- Supporting the process of delineating geographical areas within which additional specified activities are to be identified in terms of NEMA;
- Supporting 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;
- Supporting informed and integrated decision-making by making significant and detailed information about an area available before activity proposals are generated;

- Contributing to environmentally sustainable development by anticipating potential impacts and by providing early warnings in respect to thresholds, limits and cumulative impacts; and
- Supporting the undertaking of environmental impact assessments in the area by indicating the scope of potential impacts and information needs that may be necessary for environmental impact assessments.

The EMF will address the need to integrate strategic environmental information with project level and strategic decision making in the municipality, to ensure adequate protection of the natural resource base in line with the principles of the NEMA, as well as that the concepts of development and environmental management are reconciled. The EMF will therefore inform project level authorisation decision making (i.e. EIA and land use management), as well as strategic spatial planning, mainly reflected by the spatial development framework (SDF) that will be developed through another project during the same time period.

2.3 The scope of the BPDM EMF project

To allow for a consolidated and inclusive approach for the management of this area, it is therefore envisaged that the outputs of the EMF would ultimately be integrated in a future updates of the municipal Spatial Development Frameworks (SDFs) and provide a basis for the integration of environmental factors in municipal plans such as Land Use Schemes (LUS), Integrated Development Plans (IDP) etc.

The aim of this project, as articulated in the Terms of Reference (TOR), can consequently be defined as follows:

To develop an EMF for the Bojanala Platinum District Municipality in terms of the provisions contained in the National Environmental Management Act (NEMA), Act 107 of 1998 (as amended) and the 2010 NEMA EMF Regulations.

The envisaged EMF must inform both project level decision making by the North-West provincial government (i.e. EIA authorizations) and the BPDM (i.e. land use authorizations), as well as strategic spatial planning, primarily reflected in the Spatial Development Framework (SDF) of the province, as well as district and local municipalities.

2.4 Overview of the Bojanala Platinum District Municipality (BPDM)

The Bojanala Platinum District Municipality (BPDM) is located on the eastern part of the North-West Province. Informed by its constitutional mandate and functions, the BPDM as a district municipality does not provide basic services to communities, but coordinates support to the local municipalities within its boundaries, in line with section 88(2) the Local Government: Municipal Structures Act 117 of 1998.

The BPDM covers an area of approximately 18 333 km^2 and comprises of the following five local municipalities:

- Kgetlengrivier Local Municipality (KLM)

  The KLM is situated in the south western part of the BPDM, bordering RLM in the east. The KLM covers roughly 3 973 km² in area, which is approximately 21.7% of the total area of the BPDM. KLM is mainly rural in nature, with 3 smaller urban areas, namely Swatruggens/Borolelo, Koster/Reagile and Derby. The administrative centre of the municipality is in the town of Koster.

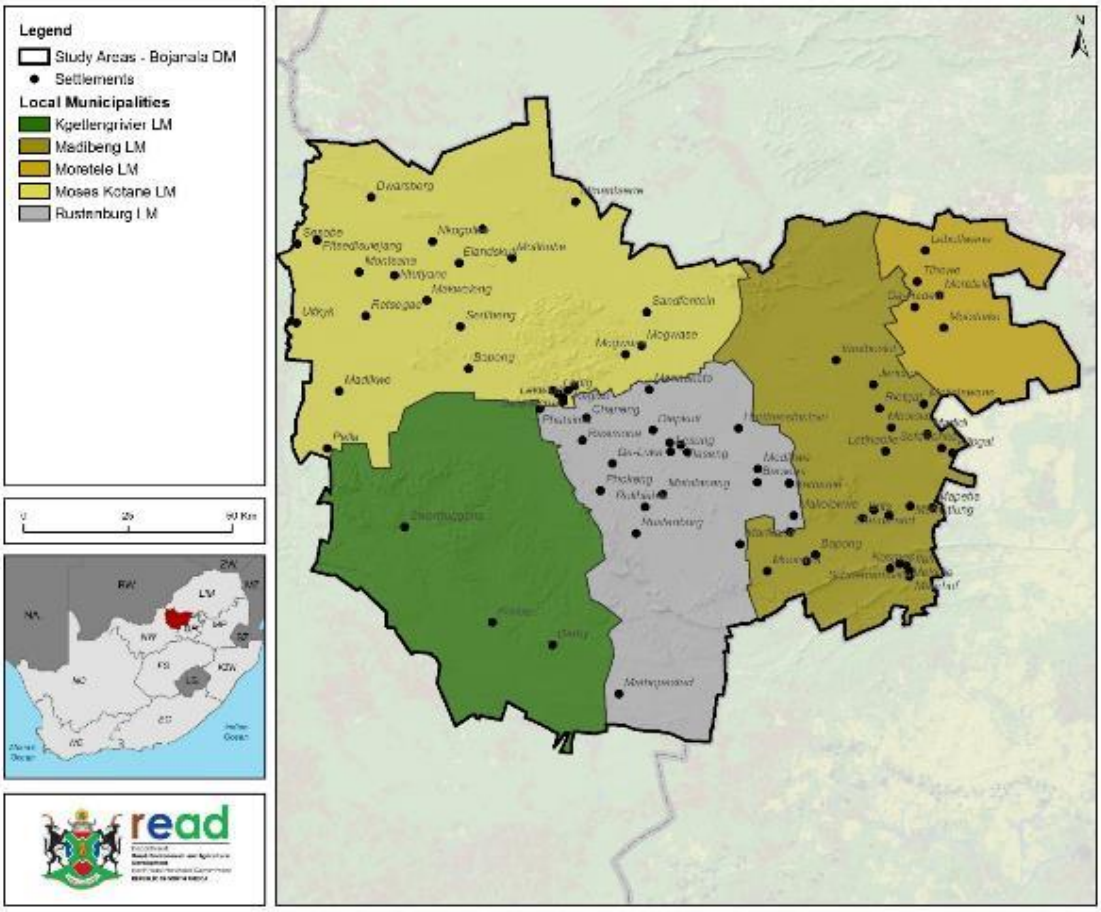


Figure 2. Municipal boundaries in the BPDM

- Madibeng Local Municipality (MaLM)

  The MaLM is situated in the north eastern part of the BPDM, bordering MoLM. It covers roughly 3 839 km² in area, which is approximately 20.9% of the total area of the BPDM. The MaLM consists of several urban and rural areas, villages, farm portions, as well as a properly established and serviced industrial areas. However, it remains largely rural in nature. The administrative centre of the municipality is in the town of Brits.

- Moretele Local Municipality (MoLM)

  The MLM is situated in the eastern part of the BPDM. It covers roughly 1 379 km² in area, which is approximately 7.5% of the total area of the BPDM, with vast tracts of land that can be used for agriculture and other development opportunities. The administrative centre of the MoLM is in the town of Makapanstad.

- Moses Kotane Local Municipality (MKLM)

  The MKLM) is situated in the north-western part of the BPDM, bordering onto KKLM and RLM to the south and MaLM to the east. The MKLM covers roughly 5 719 km² in area, which is approximately 31.1% of the total area of the BPDM, and is the largest LM in the district by area. MKLM has been identified as a 'poverty pocket' in the district. The administrative centre of the municipality is in the town of Mogwase.

- Rustenburg Local Municipality (RLM)

  The RLM is situated in the central part of the BPDM, bordering MaLM to the east, as well as MKLM to the north and KLM to the west. It covers approximately 3 423 km² in area, which is approximately 18.7% of the total area of the BPDM. The RLM is one of South Africa's fastest growing urban areas, due to it being the home to four of the world's largest platinum mines, namely Impala Platinum, Xstrata, Sibanye-Stilwater and Lonmin. This in turn means that the RLM is one of the largest employers in the region. The administrative centre of the municipality is in the town of Rustenburg.

The BPDM is bordered by the Waterberg District Municipality (Limpopo Province) to the north, the City of Tshwane Metropolitan Municipality (Pretoria) and West Rand District Municipality to the east and south-east respectively (Gauteng Province), as well as the Dr Kenneth Kaunda District Municipality to the south and Ngaka Modiri Molema District Municipality to the west (North-West Province). The main economic sectors of the BPDM are mining, tourism, agriculture, enterprise development, manufacturing utilities, infrastructure and construction and financial services (LGH, 2012).

The population of the Bojanala Platinum District is estimated to be 1 323 921, which is approximately 38 % of the total population of the North-West province. The majority of the area can be classified as rural with very low densities that makes the provision of basic services very difficult and expensive. The more formal urban areas are located in the southern side of the district. These include Rustenburg and Brits, which are vibrant economic nodes. There are other small noticeable nodes in the southern area located in the Kgetlengrivier Municipality namely Koster and Swartruggens (NWPG, 2017).

Key environmental features within this district include the Magaliesberg Mountains, Cradle of Humankind, the Pilanesberg, as well as the platinum mines and the Hartbeespoort Dam.

The Magaliesberg Mountain Range, named after an early African Chief named Mogale, is the most prominent topographical feature of the province. It is geologically unique and scenically spectacular, and stretches for about 120 km from north of Rustenburg to Bronkhorstspruit Dam east of Pretoria. Consisting of sediments laid down 3 billion years ago, it is one of the oldest mountain ranges in the world. The importance of the Magaliesberg lies in its ecological value and cultural heritage, and is considered incalculable. Its ecology includes bushveld, highveld and montane habitats. It is home to a vast diversity of plant and animal species, including several which are endemic to the Magaliesberg (NWPG, 2014).

Humankind has been an inhabitant of this region for millions of years and archaeological sites reveal ample evidence of Stone Age and Iron Age cultures. As such, the South African government submitted an application to the United Nations Educational, Scientific and Cultural Organisation (UNESCO) to have the Magaliesberg area recognised as a site of Outstanding Universal Value, thereby to be declared as a Biosphere Reserve.

The Pilanesberg is an extraordinary geological feature and an icon of the North West province. This ancient volcanic structure that formed as a result of a volcanic eruption that took place about 1.2 billion years ago is located north of the town of Rustenburg, just beyond the north-western tip of the Magaliesberg. Spherical in shape, the mountain range rises from the level surrounding plains shaped by three concentric ridges or rings of rocky hills, forming an outermost diameter of 24km. The structure is conserved in one of South Africa's most well-known nature reserves, namely the Pilanesberg National Park (NWPG, 2014).

3 EMF APPROACH AND METHODOLOGY

3.1 Legal requirements

According to regulation 3 of the 2010 EMF Regulations, the development of an environmental management framework must include an assessment of -

- the need for an environmental management framework;
- the *status quo* of the geographical area that forms the subject of the environmental management framework;
- the desired state of the environment (DSoE); and
- the way forward to reach the desired state.

Regulation 4 of the 2010 EMF Regulations specifies that a draft environmental management framework must -

- identify by way of a map or otherwise the geographical area to which it applies;
- specify the attributes of the environment in the area, including the sensitivity, extent, interrelationship and significance of those attributes;
- identify any parts in the area to which those attributes relate;
- state the conservation status of the area and in those parts;
- state the environmental management priorities of the area;
- indicate the kind of developments or land uses that would have a significant impact on those attributes and those that would not;
- indicate the kind of developments or land uses that would be undesirable in the area in specific parts of the area;
- indicate the parts of the area with specific socio-cultural values and the nature of those values;
- identify information gaps;
- indicate a revision schedule for the environmental management framework;
- include any other matters that may be specified.

3.2 Project phasing

The methodology for the execution of the project covers nine phases and is described in the following sections. For a conceptual illustration of the project methodology and deliverables see Figure 3 and Table 1: 1.

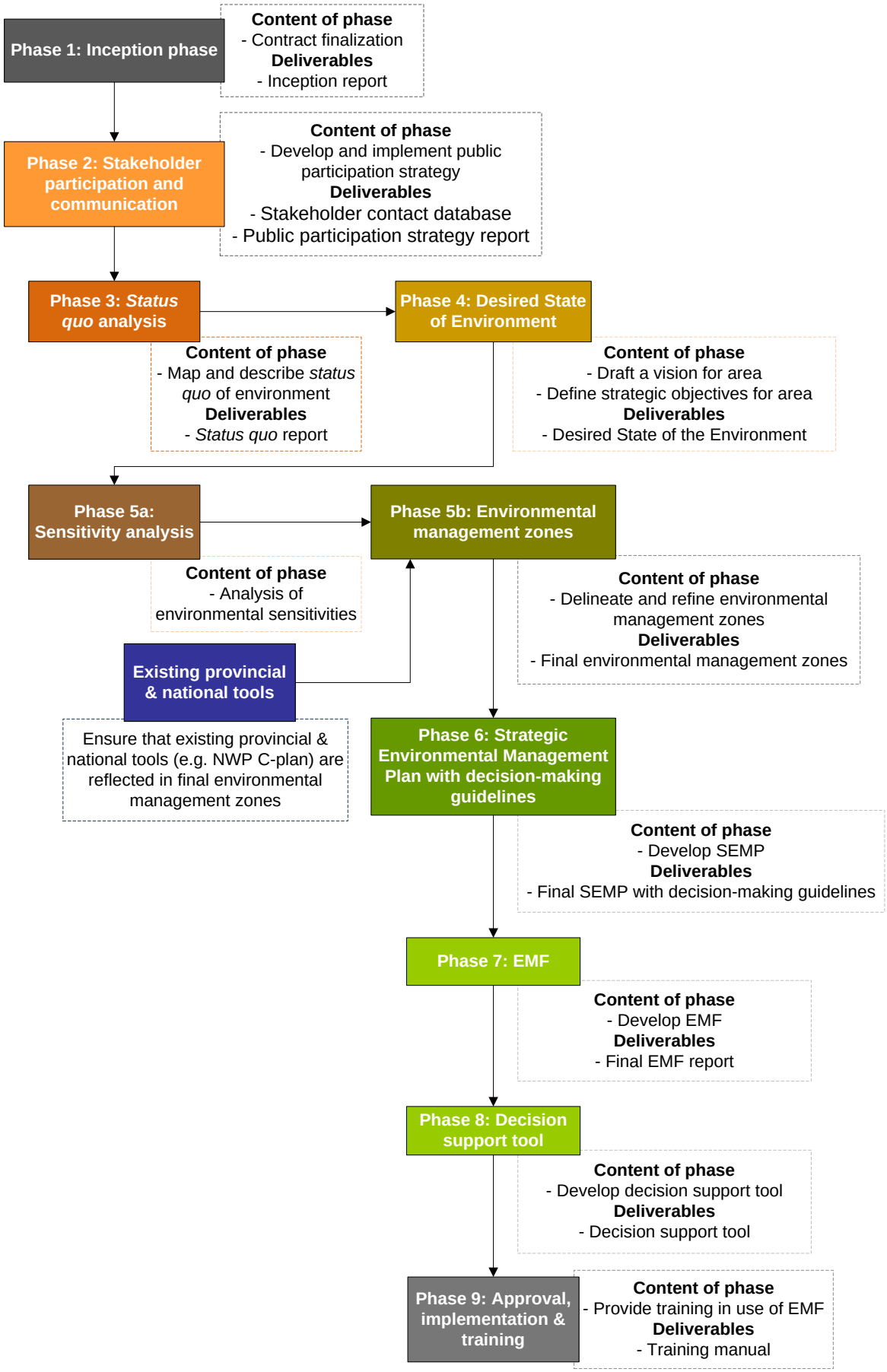


Figure 3. EMF project execution methodology and deliverables

Table 1: Project phases and deliverables

Phase	Description	Deliverable
1	Project Inception	Detailed Inception Report
2	Stakeholder participation and communication	Standalone public participation strategy report, including copies of attendance registers, minutes etc. Contact database of all stakeholders in Microsoft Excel.
3	Status Quo report	Draft Environmental *Status Quo* report Final Environmental *Status Quo* report
4	Desired State of the Environment	Draft Desired State of the Environment. Final Desired State of the Environment.
5	Environmental Management Zones	Draft Environmental Management Zones report Final Environmental Management Zones report
6	Strategic Environmental Management Plan	Draft Strategic Environmental Management Plan Final Strategic Environmental Management Plan with decision-making guidelines
7	Environmental Management Framework	Draft Environmental Management Framework Final Environmental Management Framework with Spatial Screening Tool, Decision Support Matrix
8	EMF GIS tool/viewer	GIS tool viewer to provide easy access to the EMF
9	Project finalisation and training	

This report includes the deliverables of **phases 3-7**, and must be read with the project inception, *status quo* and public participation strategy reports, in which the results of **phases 1, 2 and 3** are documented.

4 POLICY AND LEGAL FRAMEWORK AND INSTITUTIONAL ARRANGEMENTS

This section provides a brief overview of the legal mandate and institutional arrangements that were identified and investigated during the development of the BPDM EMF.

The legal and institutional frameworks regulating the BPDM EMF are complex and multifaceted, spanning over several sectors and across all three spheres of government. **Figure 4** aims to conceptually illustrate the legal status, as well as legally mandated powers and functions within the BPDM.

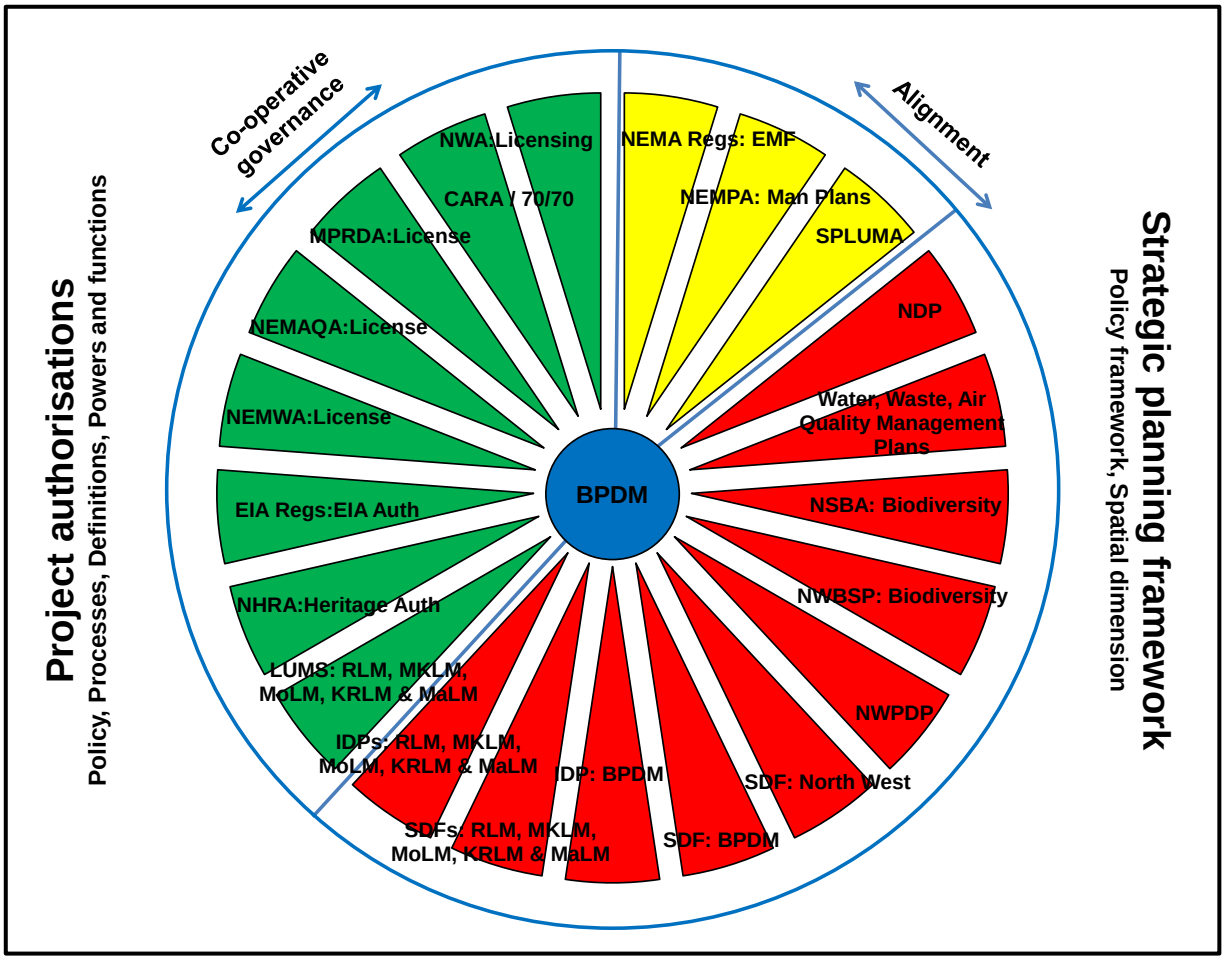


Figure 4. Legal mandate and institutional arrangements for the BPDM EMF

4.1 Institutional arrangements

The BPDM falls under the jurisdiction of a range of national, provincial and municipal institutions. It is important that the goals and visions of these institutions be aligned spatially to allow for effective management of the area.

In terms of environmental and development related aspects, the BPDM falls under the jurisdiction of the national departments of Environmental Affairs; Water and Sanitation; Agriculture, Forestry and Fisheries; Mineral Resources; Rural Development and Land Reform; as well as Human Settlements. With regard to the same aspects, it also falls under the jurisdiction of the following North West Province departments: Rural, Environment and Agriculture Development; Tourism, as well as Local Government and Human Settlements.

The BPM also falls within the jurisdictional areas of five local municipalities, i.e. Kgetlengrivier, Madibeng, Moretele, Moses Kotane and Rustenburg Local Municipalities. The tribal areas also fall under the jurisdiction of the Department of Rural Development and Land Reform.

4.2 Overview of the policy and legal framework

Section 24 of the Constitution stipulates that all South Africans have a right to an environment that is not harmful to their health or well-being and to have the environment protected for the benefit of present and future generations. The Constitution compels everybody to take reasonable steps to prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources.

In the context of this project, the two most important laws, laying the foundation for the responsible management of the area, is the National Environmental Management Act 107 of 1998 (NEMA) and the Spatial Planning and Land Use Management Act 16 of 2013 (SPLUMA). The NEMA provides for the compilation of information and maps, by the Minister of Environmental Affairs or an MEC, that specify the attributes of the environment in particular geographical areas, including the sensitivity, extent, interrelationship and significance of such attributes, which must be taken into account by every competent authority. The SPLUMA requires the development of municipal Spatial Development Frameworks (SDFs) that must include a strategic assessment of the environmental pressures and opportunities within the municipal area, including the spatial location of environmental sensitivities and high potential agricultural land where applicable.

Key regulatory instruments, other than those mentioned above, that are to be considered in the management of the BPDM include *inter alia* the Mineral and Petroleum Resources Development Act 28 of 2002, National Water Act 36 of 1998, the National Environmental Management Biodiversity Act 10 of 2004, National Environmental Management Waste Act 59 of 2008, National Environmental Management: Air Quality Act 39 of 2004, Local Government Municipal Systems Act 32 of 2000 and the National Heritage Resources Act 25 of 1999. These regulatory instruments provide for both strategic and project level considerations that must be taken into account in the management of the BPDM. It must be noted that alignment and co-operative governance is a crucial imperative across the regulatory regime governing the BPDM, at both a strategic and project level.

4.2.1 The National Development Plan (NDP) policy framework

The importance and role of the South African National Development Plan (NDP), the management for outcomes approach as basis for the government performance monitoring and evaluation system, as well as the NDP 2030 Vision for Environmental Sustainability and Resilience has already been discussed in the introduction to the project earlier in this report.

4.2.2 Legal mandate of EMF

In order to provide an understanding of the legal intricacies surrounding the institutional and legal context, it is pertinent to consider the legislative mandate of EMF as described in NEMA. Furthermore it is important to reflect on the legal status and prescribed contents of EMFs to ensure that the EMF adheres to minimum requirements.

4.2.2.1 National Environmental Management Act 107 of 1998

Environmental Management Frameworks (EMFs) have been identified in the National Environmental Management Act (NEMA), 107 of 1998 as part of the suite of Integrated Environmental Management (IEM) tools that can be used to support informed decisions regarding the management of environmental impacts that arise out of human activities and developments (DEA, 2010). These are compilations of information and maps that specify the attributes of the environment in particular geographical areas, including the sensitivity, extent, interrelationship and significance of such attributes, which must be taken into account by every competent authority when making decisions.

The legal status for EMFs is provided by the NEMA in terms of Section 24 of which states:

(2) The Minister, and every MEC with the concurrence of the Minister, may identify—	
(b)	geographical areas based on environmental attributes in which specified activities may not commence without environmental authorisation from the competent authority;
(c)	geographical areas based on environmental attributes in which specified activities may be excluded from authorisation by the competent authority;
(3) The Minister, and every MEC with the concurrence of the Minister, may compile information and maps that specify the attributes of the environment in particular geographical areas, including the sensitivity, extent, interrelationship and significance of such attributes which must be taken into account by every competent authority.	
(4) Procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment –	
(b)	must include, with respect to every application for an environmental authorisation and where applicable—
(vi)	consideration of environmental attributes identified in the compilation of information and maps contemplated in subsection (3);
(5) The Minister, or an MEC with the concurrence of the Minister, may make regulations consistent with subsection (4) -	
(bA)	laying down the procedure to be followed for the preparation, evaluation, adoption and review of prescribed environmental management instruments, including—
(i)	environmental management frameworks;

Section 24 O of NEMA states the criteria to be taken into account by competent authorities when considering environmental applications in terms of sec 24, and dictates that inter alia

(1) If the Minister, the Minister of Minerals and Energy, an MEC or identified competent authority considers an application for an environmental authorisation, the Minister, Minister of Minerals and Energy, MEC or competent authority must	
(b)	take into account all relevant factors, which may include

(v)	any information and maps compiled in terms of section 24(3), including any prescribed environmental management frameworks, to the extent that such information, maps and frameworks are relevant to the application

4.2.2.2 NEMA Environmental Management Framework Regulations

The purpose of the Environmental Management Framework Regulations published under NEMA as GNR 547 in GG 33306 of 18 June 2010 is to

2(1) provide	
(a)	for the Minister or MEC with concurrence of the Minister to initiate the compilation of information and maps referred to in section 24(3) of the Act [NEMA] specifying the attributes of the environment in particular geographical areas;
(b)	for such information to inform environmental management; and
(c)	for such information and maps to be used as environmental management frameworks in the consideration, as contemplated in section 24(4)(b)(vi) of the Act, of applications for environmental authorisations in or affecting the geographical areas to which those frameworks apply.

Regulation 2(3) further stipulates that EMFs are aimed at promoting sustainability, securing environmental protection and promoting cooperative environmental governance.

Regulation 3 sets out the process for developing EMFs, while regulation 4 lists the necessary contents thereof:

4 A draft environmental management framework must	
(a)	identify by way of a map or otherwise the geographical area to which it applies;
(b)	specify the attributes of the environment in the area, including the sensitivity, extent, interrelationship and significance of those attributes
(c)	identify any parts in the area to which those attributes relate;
(d)	state the conservation status of the area and in those parts;
(e)	state the environmental management priorities of the area;
(f)	indicate the kind of developments or land uses that would have a significant impact on those attributes and those that would not;
(g)	indicate the kind of developments or land uses that would be undesirable in the area or in specific parts of the area;
(h)	indicate the parts of the area with specific socio-cultural values and the nature of those values;
(i)	identify information gaps;
(j)	indicate a revision schedule for the environmental management framework; and

(k)	include any other matters that may be specified.

After an EMF is adopted, regulation 5(2) requires that such EMF be "taken into account in the consideration of applications for environmental authorisation in or affecting the geographical area to which the framework applies".

4.2.2.3 DEA 2012 EMF guidelines

According to the DEA 2012 EMF guidelines published on 10 October 2012 in GN 806 in GG 35769, the purpose of EMF is:

- to function as a support mechanism in the environmental impact assessment process in the evaluation and review of development applications,
- to inform decision making regarding land-use planning applications.

EMFs provide a compilation of information and maps, illustrating attributes of the environment for a specific geographical area that becomes useful in a diverse field of environmental applications, including EIA processes, but also other planning processes, such as the development of IDPs, SDFs and other open space planning applications.

EMFs that have been adopted by the Minister can be used to facilitate the compilation and consideration of applications for environmental authorisation in terms of the EMF regulations. In this regard -

- EMFs provide applicants with an early indication of the areas in which it would be potentially appropriate to undertake an activity;
- Co-operative government is facilitated through the identification of different regulatory responsibilities and recommending mechanisms for addressing the needs of the relevant authorities; and
- The competent authority has information which will guide and inform decision-making.

The objectives for EMFs include:

- Support informed and integrated decision-making by making significant and detailed information about an area available before activity proposals are generated;
- Contribute to environmentally sustainable development by anticipating potential impacts and by providing early warnings in respect of thresholds, limits and cumulative impacts, and by identifying already existing impacts to be addressed;
- Support the undertaking of environmental impact 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 specified 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.

Ultimately, an EMF is a decision support tool, which ensures that the competent authority has sufficient information to guide environmental authorization decisions

within a specific geographical area. An EMF must be adopted by the relevant MEC and published in the Government Gazette.

What is clear is that the legal mandate for EMF is vested with the EIA authorities and not directly with the local municipality responsible for land use management in the area. Therefore efforts should be made to ensure integration of processes and co-operative management between the environmental authorities and the BPDM, as well as the Kgetlengrivier, Madibeng, Moretele, Moses Kotane and Rustenburg local municipalities.

The EMF guidelines also indicate that the process to compile an EMF should include an assessment of the status quo in respect of environmental resources, determination of EMF 'parameters' and a public participation process.

4.2.3 Legal mandate for a strategic assessment of the environmental pressures and opportunities of SDFs

4.2.3.1 Spatial Planning and Land Use Management Act 16 of 2013

The Spatial Planning and Land Use Management Act (SPLUMA) No. 16 of 2013 was promulgated to amongst other objectives provide for a uniform, effective and comprehensive system of spatial planning and land use management for the Republic; as well as the sustainable and efficient use of land. It provides a framework for policies, principles, norms and standards for spatial planning and land use management in South Africa and defines the relationship between the spatial planning and the land use management system and other kinds of planning.

The SPLUMA requires the national government to develop mechanisms to support and strengthen the capacity of provinces and municipalities to adopt and implement an effective spatial planning and land use management system and also to provide support and assistance in the performance of its land use management functions and related obligations to any province or municipality, within the constraint of available resources.

Spatial Development Frameworks (SDFs) at national, provincial and municipal spheres of government are important implementing mechanisms in the SPLUMA. In terms of section 12(1)(m) of SPLUMA, the national, provincial and municipal spheres of government must each prepare a spatial development framework (SDF). A SDF adopted in terms of this Act must guide and inform the exercise of any discretion or of any decision taken in terms of the SPLUMA or any other law relating to land use and development of land. Municipal SDFs must assist in integrating, coordinating, aligning and expressing development policies and plans emanating from the various sectors of the spheres of government, as they apply within the municipal area.

SDFs must also, amongst others, "take cognisance of any environmental management instrument adopted by the relevant environmental management authority". The inclusion of EMF as one such an environmental management instrument becomes apparent in section 21(j) of the Act, which requires that a municipal SDF includes "a strategic assessment of the environmental pressures and opportunities within the municipal area, including the spatial location of environmental sensitivities, high potential agricultural land and coastal access strips, where applicable".

In the implementation of the SPLUMA, a mechanism must be developed that integrates spatial planning and land use management with strategic IEM tools to ensure the synchronization of spatial tools with strategic environmental management tools.

4.2.4 Legal mandate for the protection of areas of special environmental importance

4.2.4.1 National Environmental Management: Protected Areas Act (57 of 2003) (NEMPAA)

The NEMPAA introduced the concept of "protected environments" (PEs), which allows for the declaration of areas of special environmental importance in terms of the act, through the publication of notices to that effect in the Government Gazette. On private land, such notices can only be issued, if the owner has requested or consented to such a declaration.

In terms of section 28 of the NEMPAA, this may be done for the following reasons:

(a) to regulate the area as a buffer zone for the protection of a special nature reserve, world heritage site or nature reserve;

(b) to enable owners of land to take collective action to conserve biodiversity on their land and to seek legal recognition therefore;

(c) to protect the area, if the area is sensitive to development due to its biological diversity; natural characteristics; scientific, cultural, historical, archaeological or geological value; scenic and landscape value; or provision of environmental goods and services;

(d) to protect a specific ecosystem outside of a special nature reserve, world heritage site or nature reserve;

(e) to ensure that the use of natural resources in the area is sustainable; or

(f) to control change in land-use in the area, if the area is earmarked for declaration as, or inclusion in, a nature reserve.

Before issuing a notice under section 29 of the act, the Minister or MEC may follow such a consultative process, as may be appropriate in the circumstances, but the Minister's consultation must meet the minimum requirements for consultation specified in section 31 of the act, while an MEC's consultation must meet the minimum requirements for consultation specified in section 32 of the act. In addition, the Minister or the MEC must also follow a process of public participation in accordance with section 33 of the act.

Chapter 4 of the NEMPAA regulates the management of protected areas that are special nature reserves, nature reserves or protected environments.

Section 38 specifies that the Minister or an MEC may assign the management of a protected environment to a suitable person, organization or organ of state, provided that the owner and lawful occupier have requested or consented to such assignment, and the Minister/MEC has given the owner and lawful occupier notice in writing in terms of section 33. The person, organisation or organ of state to whom the management of a protected area has been assigned, is the management authority of such area for the purposes of this Act.

In terms of section 39 of the act, such assignment may only be done with the concurrence of the prospective management authority. Once this has been done, the management

authority must, within 12 months of the assignment, submit a management plan for the protected area to the Minister or the MEC for approval. When preparing a management plan for a protected area, the management authority concerned must consult municipalities, other organs of state, local communities and other affected parties that have an interest in the area. Such a management plan must take into account any applicable aspects of the integrated development plan of the municipality in which the protected area is situated.

Section 41 of the act states that the object of a management plan is to ensure the protection, conservation and management of the protected area concerned, in a manner which is consistent with the objectives of the NEMPAA and for the purpose it was declared. It also specifies the minimum content requirements for the management plan, as well as other matters that may be included in such plan. Section 40 states that the management authority must manage the area in accordance with the management plan, as well as relevant national, provincial and local legislation.

5 *STATUS QUO*: PURPOSE AND SUMMARY (PHASE 3)

5.1 Purpose of the *status quo* assessment

The *status quo* report mapped and discussed the status of various environmental attributes in the BPDM, while also evaluating the importance of individual attributes to the area.

The *status quo* analysis consisted of two distinct sub-phases, namely:

- A gap analysis in which the availability and quality of existing data related to relevant attributes were determined; and
- An analysis of this data as part of and parallel to the 'desired state of the environment' analysis (Phase 2).

5.2 Summary of the *status quo* assessment

The *status quo* analysis provided the opportunity to source all available data for the various aspects of the BPDM, evaluate these and provide an overview of the current status of a range of parameters related to:

- Strategic planning issues;
- Biophysical issues, including geology, topography and climate, biodiversity and conservation, hydrology and water resources, air quality and agricultural potential;
- Socio-economic issues, including socio-economic profile, infrastructure development, land use, heritage resources, tourism and mining.

From the *status quo* analysis it was clear that a vast volume of data was potentially available for use in the development of an EMF for the BPDM. The greatest challenge was in relating specific spatial datasets to relevant sensitivities associated with certain activities, in a methodologically justifiable and valid manner. Table 3 presents an overview of the key environmental and socio-economic parameters considered during the *status quo* analysis and indicates their possible implications for environmental sensitivity.

Table 1: *Status quo* summary

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
Strategic planning issues		
North West Provincial Development Plan (Table 4.2.1)	The North-West Provincial Development Plan 2030 (NWPDP) was drafted to translate the NDP to a provincial level. Seven of the priorities identified in the NDP were identified as key focus areas for the NWPDP, representing the main challenge areas hampering growth in the province. Particular focus will be placed on the rural economy and on the provisioning, upgrading and maintenance of economic infrastructure as the precondition of overall economic growth and development, as well as its significant potential to create employment. The province will also prioritise the transformation of human settlements. Despite the natural environment not featuring directly in the list of developmental priorities, the PDP recognises that in order to achieve a strong, growing, sustainable economy, it must take care of the natural environment that it depends on. Some of the key findings related to the natural environment are: • Water is central to growth and development, and requires a particular focus on efficiency of use (and re-use), as well as on efficient management of resources; • Renewable energies, especially solar and waste/biomass to energy initiatives will play an	The execution of the NWPDP places a strong focus on developing society and planning for a sustainable future reliant on healthy, functioning ecosystems. Priorities through which to achieve environmental sustainability in North West include: effective land-use policies, protection of biodiversity, the protection of the freshwater eco-systems and water, Critical Biodiversity Areas, effective waste management, reduction in carbon emissions, responding effectively to climate change, identification and protection of Resource Critical Areas, sustaining ecosystems and using natural resources effectively, building sustainable communities, climate change preparedness and managing a just transition to an environmentally sustainable, low-carbon economy. The NWPDP states that EMFs should ideally inform SDFs. SDFs and EMFs must be aligned in municipalities to provide for an integrated approach in building environmental sustainability. Ideally therefore, all municipalities must have an up to date EMF in place. In this regard the NWPDP also emphasises the need for capacity building in municipalities to develop EMFs, especially in rural areas.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	increasingly important role in the provincial energy consumption; • The effects of climate change is a reality in the North West province and if development challenges are not addressed in a manner that builds resilience to climate change, communities could be exposed to these effects, especially poorer communities. Environmental sustainability is also addressed with the following key considerations: • The transition to a low carbon future can be aided by the rich endowment of natural resources and mineral deposits, if responsibly used; • Consumer awareness initiatives and sufficient recycling infrastructure must be made a priority in the province; • Development of environmentally sustainable green products and services, including renewable energy technologies should be prioritised.	The EMF should not only consider, but also reflect the key findings identified as closely as possible, in order to support the NWPDP.
North West Provincial Rebranding, Repositioning and Renewal (RRR) Strategy (Table 4.2.2)	The North West Provincial Rebranding, Repositioning and Renewal (RRR) Strategy aims to support the successful implementation of the National Development Plan (NDP). It contributes expressively to the NDP objectives and strives to bring about the desired socio-economic transformation to the people within the province. The Rebranding, Repositioning and Renewal (RRR) provincial strategy is anchored by five concretes, focusing on:	The RRR approach provides strategic directives to District and Local Municipalities in formulating their more detailed IDPs and SDFs. The successful implementation of the RRR approach depends mainly on the cooperation between government and its social partners. Local government, as the sphere of government at the coal face of service delivery, is critical in this regard.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	1. Agriculture, Culture and Tourism (ACT) and its tributaries This concrete is the anchor of economic growth, especially in rural areas where poverty, unemployment and inequality is at the highest. **2. Villages, Townships and Small Dorpies (VTSD)** This concrete aims to address the skewed economic landscape in the province, by ensuring that the villages, townships and small dorpies are developed and economically vibrant. **3. Reconciliation, Healing and Renewal (RHR)** This concrete seeks to bring together the people of the province to become involved and deal with moral and social issues. **4. The Setsokotsane Approach** This concrete places focus on the VTSDs, promotes the multi-sectoral partnership and encourages a spirit of cooperation, in improving the lives of all people within the province. **5. The Saamtrek-Saamwerk Philosophy** This concrete promotes the multi-sectoral partnership and encourages a spirit of cooperation in improving the lives of the people of Province.	The EMF should not only consider, but also reflect the key findings identified as closely as possible, in order to support the RRR approach.
North West Province Setsokotsane Programme 2015 (Table 4.2.3)	Implementation of the Setsokotsane programme is based on 3 pillars, namely: • Community and intergovernmental relations objectives;	The Bojanala DM is earmarked for the fourth and final phase of the Setsokotsane programme, which is a partnership between government and business

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	• Interventionist objectives; • Performance monitoring and evaluation objectives. These pillars are supported by a number of objectives for delivery, outlined as follows: • Address the backlog of service delivery; • Obtain feedback from the public and present government plans to communities; • Promote partnerships; • Strengthen intergovernmental relations; • Strengthen corporate governance; • Promote and infuse activism across government; • Facilitate performance monitoring and evaluation by the premier's office. The objectives of Setsokotsane will be achieved through outreach programs viz. • **Kago** – with activities such as painting of schools and housing for the poor; • **Tlhaboloso** – with activities such as planting of trees and revival of recreational facilities; • **Tlhokomelo** – including registering children and senior citizens for grants as well as distributing sanitary products and toiletries to girls in disadvantaged schools; • **Botsalano** – this will promote the province through various musical plays and celebrate traditional music, drama and story-telling; **Dikotla** – which will operate a feeding and nutritional kitchen throughout the province, targeting homeless	in the province, with a view to addressing some of the core issues facing the area. The EMF should consider the programme, in order to support it where possible.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	people, children, the elderly and affected groups. It will include activities such as training programs on food security and subsistence farming for young people.	
North West Province Environmental Outlook (Table 4.2.4)	The NWEO reports on the current state of environmental resources, providing a mechanism to reflect on the drivers and pressures causing environmental change. It also attempts to understand how environmental challenges will evolve in the near future, in order to inform response actions, with the aim of achieving environmental sustainability in the North West Province. Key concerns are the following: • The rate of transformation of land cover in the province remains a threat to sensitive and valuable environmental resources. There is also concern that land use conflicts could compromise the sustainable utilisation of natural resources. • The number of threatened species and ecosystems has increased and the condition of most of the watercourses remains particularly poor. At the same time, there is minimal overlap between protected areas and ecological resources highlighted as critical to conservation. • The quality of water supplied to people in the province is up to standard, but there are serious concerns about the availability of water going into the future, and the persistent problem of eutrophication of water bodies.	Although the NWEO reflects on the status of environmental resources in the whole province, it includes the BPDM. Environmental concerns raised in the NWEO should be reflected upon critically in the development of the BPDM EMF, in order to reflect the local realities.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	• The living conditions of the majority of the population have improved in respect of access to services and rollout of formal housing, but concerns about the maintenance of service infrastructure and the lack of basic services in informal and rural settlements, remain. • The ambient air quality is good, but regional circulation patterns are likely to impact the situation negatively. The air quality in settlements, as well as elevated levels of pollution in the immediate proximity of main pollution sources are major concerns. • There has been a transformation in terms of the general approach to waste management, but technical limitations still limit the effectiveness of interventions and roll-out of waste removal services to rural settlements.	
North West Province Biodiversity Sector Plan (Table 4.2.5)	The NW BSP integrates the best available knowledge on the environment and biodiversity in the province to identify a province-wide network of Critical Biodiversity Areas and Ecological Support Areas for land and water. The NWBSP reached the following conclusions: • Approximately 35% of the province's natural ecosystems have been converted to other land uses, requiring appropriate management of increasing development pressures on biodiversity and the remaining natural ecosystems;	The NWBSP is a forward planning tool that helps government and society to better consider and incorporate environmental considerations into development planning and execution, by identifying the minimum area necessary to conserve and maintain biodiversity and major ecological infrastructure in the province. The NWBSP must be integrated into Environmental Management Frameworks, Spatial Development Frameworks and Integrated Development Plans as the primary information layer on biodiversity.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	• Thirteen of the vegetation types in the province are considered threatened ecosystems, due to the amount of habitat converted to other land uses, while eight are endemic to the province; • Aquatic biodiversity is high, but 52% of the wetland types and 80% of the river types classified as threatened; • Three Important Bird Areas of South Africa fall entirely within the province, and another three fall partially within the province; • Several relatively pristine dolomitic eyes (springs) are supported in the province and a number of freshwater springs, lakes and waterfalls that have created very unique tufa systems are recognised to be of international importance; • The North West is home to the Magaliesberg Biosphere Reserve, as well as the Taung Skull Fossil Site, the Cradle of Humankind and the Vredefort Dome World Heritage Sites; • The total area under conservation, i.e. validated protected areas and conservation areas amounts to 236 339 ha (2.25%) of the province.	It must also be used for informing development applications through the environmental impact assessment (EIA) process.
North West Province Air Quality Management Plan (Table 4.2.6)	The NWAQMP identifies the following important sources of atmospheric emissions: • Point source emissions from listed, scheduled industrial processes using fuel burning appliances;	The AQMP is the starting point in ensuring cleaner air in the North West Province. It is one of the tools that the NWPG and all stakeholders can use to promote sound air quality management practices within the province. It does not only provide a number of intervention strategies that need to be

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	• Point source emissions from non-listed, non-scheduled processes using fuel burning appliances, including eateries, spray-painting, standby generators and dry cleaners; • Fugitive emissions from mining processes; • Fugitive emissions from domestic fuel (wood, coal and paraffin) burning for cooking and heating purposes; • Fugitive transport emissions; and • Fugitive emissions from agricultural activities, such as the cultivation of land and the burning of firebreaks. The objectives of the AQMP are to: • Improve air quality in the Province; • Identify and reduce the negative impact on human health and the environment of poor air quality; • Address the effects of emissions from the use of fossil fuels in residential applications; • Address the effects of emissions from industrial sources; • Address the effects of emissions from any point or non-point source of air pollution other than residential applications and industrial processes; • Implement South Africa's international obligations relating to air quality; • Give effect to best practice in air quality management; and • Provide a framework for the district municipalities to develop their own air quality management plans.	implemented by relevant parties, but also provide a framework for the district and local municipalities to develop their own AQMPs. The implementation of the AQMP requires building air quality management planning capacity at provincial and local levels, as well as raising public awareness of environmental issues in general, and air quality management in particular. The latter is critical in guaranteeing meaningful participation of all stakeholders. Although the NWAQMP reflects on the status of air quality in the whole province, it includes the BPDM. Air quality concerns raised in the NWAQMP should be reflected upon critically in the development of the BPDM EMF, in order to reflect the local realities.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	The following overarching goals are identified by the AQMP: • Goal 1: To develop and maintain institutional arrangements that support sound air quality management and governance in the Province; • Goal 2: To reduce the negative impact on human health and environment of poor air quality; • Goal 3: To reduce impacts of fossil fuels in residential applications; • Goal 4: To address the effects of emissions from industrial sources; • Goal 5: To quantify and reduce transport air emissions within the Province; • Goal 6: To ensure effective communication and public participation in pursuant to legal requirements.	
North West Province Integrated Waste Management Plan (Table 4.2.7)	The IWMP was developed to satisfy the need for a coherent plan to address the waste management shortfalls and encourage the improvement of the waste management system, where appropriate, to establish the minimum acceptable service levels for waste management. The following types of waste is generated in the Province: • Mining waste in the form as waste rock dumps and tailings storage facilities; • Agricultural waste, mainly from crop farming, livestock farming and abattoirs;	Although the NWIWMP reflects on the status of waste management in the whole province, it includes the BPDM. Waste management concerns and goals raised in the NWIWMP should be reflected upon critically in the development of the BPDM EMF, in order to reflect the local realities.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	• Commercial and industrial waste from industries and commercial institutions that may include, ferrous and non-ferrous metals, and aluminium, as well as waste classified as municipal waste, organic waste and electronic waste; • Health care risk waste from hospitals, surgeries, clinics, waste treatment facilities and veterinary activities; • Electronic waste (E-waste) from all economic sectors that includes items such as computers, televisions, fluorescent tubes and used cellular phones; • Municipal waste. Nearly 1 million tonnes of waste was disposed of in the province in 2015, of which 32% was general waste and 68% was hazardous waste. The general waste component consisted mainly of municipal waste and commercial and industrial waste, while 95% of the hazardous waste component, emanated from ferrous metal slag. Limited formal recycling initiatives are being implemented within the Province. The IWMP identifies 8 goals for waste management in the province.	
North West Provincial Spatial Development Framework (Table 4.2.8)	The 2018 North West Provincial Spatial Development Framework (NWPSDF) provides a spatial assessment of the *status quo* of the province and identifies important features in the area. It also provides strategic objectives	Although the NWPSDF is primarily meant to inform policy and planning at a provincial level, it indicates the relationship between different development nodes (towns and settlements) and the envisioned development priorities in the BPDM, i.e. the spatial

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	and development priorities that are meant to guide development initiatives and strategies in the province. It identifies the following five strategic objectives that needs to be achieved if sustainable development goals is to be achieved in the province: 1. Focus development on regional spatial development initiatives, development corridors, development zones and nodes. 2. Protect biodiversity, water and agricultural resources. 3. Infrastructure Investment. 4. Economic development and job creation supporting and guiding the spatial development pattern of North West. 5. Balancing urbanisation and the development of rural areas within North West. For each of these objectives the DNWSDF proposes a strategy and highlights key issues that needs to be considered. Some of the key issues that are applicable to the BPDM and the EMF are: • Water savings in the BPDM area through the improvement of irrigation efficiency in the Crocodile West and the Hartbeespoort irrigation schemes. • Investment in Agri-Parks at Makapanstad to ensure growth in commercial agricultural activities. • Implementation of the Heritage Park proposal. • Investment in mining related industries in the BPDM, specifically resource beneficiation.	development vision of the province. This information provides insight into expected development 'pressures' in the area that should be considered in the context of an SDF. The DNWPSDF further reflects on sensitive environmental features at the provincial scale. The DNWPSDF will not only inform the development of future district and local municipal SDFs, but will also be used to inform the development of the BPDM EMF.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	• Stimulating mixed land use development along the N4 corridor.	
North West / BPDM Climate change vulnerability assessment (Table 4.2.9)	The Long Term Climate Change Adaptation Scenarios (LTAS) suggests that the region within which North West province is located, is likely to face potential increases in temperatures by as much as 2.5°C by 2035, and 1-3°C between 2040 and 2060 (or even 2-5°C in the high-end scenarios), and by 3-6.5°C between 2080 and 2100 (or as much as 5-8°C in the high-end scenarios). Assessing climate change sensitivity and exposure of each key sector allows for a picture of climate risk (potential impacts) to develop. When this is combined with the sector's adaptive capacity in the province, it allows for a richer understanding of sectoral climate change vulnerability to emerge. The current assessment reveals that the sectors in North West province displaying greater relative climate change vulnerability, in comparison with other sectors, are agriculture, terrestrial and aquatic ecosystems, rural livelihoods and mining. The high climate vulnerability of these sectors is a matter of great concern for North West Province. The province produces 18% of South Africa's total maize, a crop whose yields have been shown to be highly sensitive to rainfall changes. In particular, small-scale farmers in North West are likely to experience revenue losses if rainfall decreases markedly. Given the	While all the sectors examined as a part of this assessment display varying degrees of vulnerability to climate change, the potential impacts on some – either as a function of sensitivity or as a result of low adaptive capacity – are higher than others in relative terms. The priority sectors described here (agriculture, rural livelihoods and settlements, ecosystems, and extractives) will become the focus of the next stage of the project – the development of adaptation strategies based on best practices and consultation with stakeholders in North West province. Climate change vulnerability identified in the NW Climate change vulnerability assessment should be considered in the development of the BPDM EMF.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	province's major role in maize production and cattle ranching, impacts of climate change in the agriculture sector in North West have national implications. The relatively high vulnerability of rural livelihoods – predominantly based on agriculture and livestock – is also a matter of significance for North West province, where a large percentage of people reside in rural areas and rely mostly on natural resources for subsistence. According to the 2011 census, over 20% of people in North West were illiterate, and the province had the third lowest annual average household income of all provinces in the country – both factors that contribute to low adaptive capacity in the face of climate change. North West's ecosystems – both aquatic and terrestrial – are also highly vulnerable to climate change. The province already has one critically endangered ecosystem (the western sandy Highveld grassland), one endangered ecosystem (the Vaal-Vet sandy grassland), and eight vulnerable ecosystems. Grasslands in particular are at risk from climate change, with an increased likelihood that warmer temperatures and higher carbon dioxide levels in the atmosphere will support the growth of wooded plants and trees, edging out grasses. The savanna biome is less vulnerable to climate change, but nevertheless likely to see changes in range and in the level of ecosystem services being provided. The mining sector contributes nearly a fourth of North West's total economy, with platinum and gold being the	

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	main products. The sector accounts for 15% of the province's total employment and is a critical pillar of the province's economy. While mining is not directly impacted by changes in temperature and rainfall in the way that ecosystems and agriculture are, the sector's water dependency and the effect of heat on working conditions makes this sector susceptible to climate change as well.	
Bojanala Platinum District Municipality Air Quality Management Plan (Table 4.2.10)	The 2007 National Framework for Air Quality Management in the RSA identified Rustenburg as an area with poor air quality within the district, while the Minister of Environmental Affairs declared the Waterberg–Bojanala Priority Area (WBPA) as the third National Priority Area in South Africa in 2012. The WBPA crosses the North West and Limpopo provincial borders and includes a part of the BPDM, particularly, the MaLM, MKLM and RLM. The BPDM QAMP included an emissions inventory for air pollution sources in the District, in line with provincial inventory, with specific focus on quantifiable sources such as industries, vehicles and domestic fuel burning. This assisted with the identification of potential air pollution sources in the BPDM, their emissions, and the areas mostly impacted. The main sources of air pollution in the BPDM are industrial operations, agricultural and mining activities, veld fires, domestic fuel burning, vehicle emissions, waste treatment and disposal emissions, as well as	The AQMP were approved by the BPDM municipal council and then implemented. The BPDM AQMP is currently under review. Local municipalities are required to develop their own AQMPs as part of their IDPs. RLM has developed their own AQMP, while MKLM has recently developed an Air Quality Management System Implementation Plan. Air quality concerns raised in the BPDM AQMP should be reflected upon critically in the development of the BPDM EMF.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	transboundary movement from adjacent areas, primarily from the highly urbanised and industrialised Gauteng Province. The present ambient levels of atmospheric pollutants in the BPDM are mostly lower than the national ambient air quality standards. The AQMP concluded that the main area of pollution impact extends from the Rustenburg area eastwards towards Brits and up the eastern boundary of BPDM, corresponding with the main industrial and domestic fuel burning areas. The rest of the district municipality has relatively low pollution loads. Dispersion modelling results, based on the available sources included in the model, indicate that the contribution the metallurgical processing industries, as defined in this document, far exceeds all other sources on a continuous long-term basis. Other emission sources contribute primarily to short-term, seasonal, sporadic exceedances.	
BPDM Rural Development Plan (Table 4.2.11)	The rural areas of the BPDM remain characterised by a lack of development, reflected in a lack of basic services such as electricity, water, roads infrastructure and housing. The culmination of these absences is abject poverty, unemployment, frustration and a relatively poor quality of life. There are economic, socio- spatial and environmental endowments in the Bojanala DM that can be harnessed to transform rural economies The potential of the	District Rural Development Plans (DRDPs) could be used to complement existing strategic spatial plans located in all three spheres of government and render the needed 'rural development component' to the country's existing intergovernmental and cross-sectoral strategic spatial planning system. These plans will assist in identifying and unlocking opportunities of the rural areas to ensure that they achieve their development potential. As such, they

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	agricultural sector in revitalising rural economies is widely acknowledged. To this end, strategic sites for setting up Agri-Parks has been identified. These Agri-Parks will be critical hubs where investment in physical infrastructure and human capital will be harnessed to promote Agri-business. While agriculture, mining and manufacturing are traditional sectors holding rural economies, there is a need to identify sunrise i.e. new economic sectors that can diversify rural economies. Tourism as well as the service sector promise to provide new vistas for rural economic transformation. In addition, programmes such as the Black Industrialisation Programme, aimed at promoting the participation of black industrialists as manufacturers for those sectors driving economic growth and development, will also contribute to rural development, as agro-processing becomes more emphasized. The Information and Communication Technology (ICT) sector also has the potential to drive integrated rural development. In achieving this, the rural development approach for BPDM is hinged upon the identification and fostering of urban/rural linkages. The functionality of urban/rural spaces is dependent on the flow of capital, goods, people and ideas between and within these two spaces in an integrated fashion. The revitalisation of functional rural regions, therefore, will depend on the creation of sector-specific economic	could infuse well-targeted developmental thrusts to the existing family of spatial planning instruments, including the National Development Plan (NDP), the envisioned National Spatial Framework (NSF), Provincial Growth and Development Strategies (PGDSs), Provincial Spatial Development Frameworks (PSDFs), Integrated Development Plans (IDPs), and Local Economic Development Plans (LEDPs) across all three spheres of government. Rural development opportunities identified in the BPDM DRDP should be considered in the development of the BPDM EMF.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	hubs, such as Agri-Parks, Techno-parks and all-purpose community centres.	
Municipal Integrated Development Plans (Table 4.2.12)	The BPDM IDP identifies development priorities for the BPDM, which includes the local municipalities of Kgetlengrivier, Madibeng, Moretele, Moses Kotane and Rustenburg. The mission statement of the BPDM is to coordinate, facilitate and support these local municipalities through the provision of shared services and the equitable sharing of resources ensuring maximum community benefit of natural resources in a safe and healthy environment. The IDP refers to the following key strategic environmental issues that needs to be prioritised for the whole of the district municipality: • Protection of natural vegetation, ecosystems and ecologically sensitive zones. • Protection and development of cultural heritage sites. • Protection of unique geological features such as Pilanesberg and the Magaliesberg Mountain Range. • Protection of Red Data fauna and flora species that occur in the district. • The need for improved air and water quality in the district. In the IDP, the BPDM commits itself (in terms of the District Environmental Management Policy) to continually improve its environmental performance and highlights a number of objectives to honour this commitment.	The BPDM IDP provides background on important strategic environmental issues that should be considered if the mission statement of the BPDM is to be achieved. These issues and their associated objectives should be reflected on during the development of the EMF, as the EMF could facilitate their achievement. Although not all the LM IDPs gave equal attention to environmental considerations the following issues were reflected in most IDPs: • The management of water resources and water pollution sources. • The development of waste management strategies and plans and their implementation. • The monitoring of air quality and the drafting and implementation of air quality management plans. • The management of sensitive and high value natural areas (especially areas with protection status). These issues should be adequately considered and reflected in the EMF to ensure that the EMF can complement the IDPs and assist them in achieving their objectives of managing development in a sustainable manner.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	The Kgetlengrivier Local Municipality (KLM) IDP identifies development priorities for the KLM, which includes the towns of Swartruggens, Koster and Derby. Although the IDP does acknowledge the importance of viewing the environment as an important aspect, which if not protected, will be harmful to the health and wellbeing of its citizen and natural resources, it provides very little information on environmental issues and how they should be considered and managed. Some environmental issues such as soil erosion, loss of indigenous vegetation, air pollution, agriculture and agriculture are discussed, but not in detail. The IDP lacks detail on the manner in which environmental issues should be considered in the management of the municipality. The Madibeng Local Municipality (MaLM) IDP identifies development priorities for the MaLM, which includes the towns of Brits, Marikana and Hartbeespoort. The mission statement of the MaLM is to remain accountable in rendering affordable qualitative and sustainable services to [the] community. Although the IDP does not explicitly mention environmental strategic objectives, environmental considerations are referred to as sub-objectives of some objectives. The IDP further refers to MaLM EMF (which was in the process of being developed at the time of the drafting of the IDP) for detail on environmental issues in the municipality. It further states that the IDP and SDF processes where aligned with the EMF development process.	

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	The Moretele Local Municipality (MoLM) IDP identifies development priorities for the MoLM, which constitutes 65 villages. The mission of the MoLM is to provide and enhance equitable, cost effective, efficient and quality service delivery and exploit resources for sustainable development, growth and prosperity for all. In terms of environmental concerns, waste management, air quality and climate change are regarded as priority issues. However, only the issue of waste management is addressed through a strategic development objective. The IDP does not provide any further information on environmental issues and the manner in which they should be managed in terms of the IDP. The Moses Kotane Local Municipality (MKLM) IDP identifies development priorities for the MKLM which is mostly rural in nature, comprising of 107 villages, two formal towns – Mogwase and Madikwe – as well as Sun City. The mission statement of the KMLM is to provide responsive, transparent and accountable leadership, create and environment for business growth and job creation, and provide sustainable services. In terms of environmental management the IDP identifies waste management, sanitation systems, Illegal hunting of wild animals in rural areas and the possible expansion of the Pilanesberg National Park as key issues. The IDP calls for the development of an Environmental Management Policy and proposes projects that could assist in the management of existing open spaces. These projects will focus on the improvement of these spaces and their transformation into communal recreation areas.	

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	The Rustenburg Local Municipality (RLM) IDP identifies development priorities for the RLM which includes, the town of Rustenburg as well as the Royal Bafokeng Nation and their lands. The mission statement of the RLM is to continuously improve the quality of life, economic growth and eradicate poverty through the best practice, sustainability and inclusive governance. To fulfil this mission the RLM has set out seven key areas of performance, including to maintain a clean, green, safe and healthy municipal environment for all. To achieve this, the IDP deals with a number of aspects that have to be managed. It indicates that most of the available land in the municipality has been utilized for agriculture and emphasises the value of ecologically sensitive land. It proposes various interventions that, if implemented, would assist in waste as well as air quality management. It further recognises the Rustenburg and Magaliesberg Protected Environment EMFs as key strategic environmental management tools that must be utilised when considering development applications.	
Municipal Spatial Development Frameworks (Table 4.2.13)	The BPDM Spatial Development Framework (SDF) provides a spatial assessment of the *status quo* of the area, which informs a total of 13 objectives/principles, linked to implementation strategies and programmes, which essentially forms the basis of the SDF. These principles include development directives pertaining to the natural environment, social and economic infrastructure, engineering services, transportation, tourism development, industrial and business development, agriculture and residential development.	To ensure that the strategic visions for development and environmental management are well aligned, the BPDM EMF should reflect on the key features in the environment identified in the BPDM SDF that should be considered when development proposals are made, as well as on areas that has been earmarked for development potential.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	The Madibeng Local Municipality (MaLM) SDF provides a spatial assessment of the *status quo* of the area and identifies spatial opportunities and challenges, which was used to formulate spatial development proposals which must guide and manage development in the area. The SDF mentions only one spatial challenge that is of special relevance to the development of the EMF – that of natural features. It acknowledges the importance of formally protected areas, as well as areas of high agricultural potential, and calls for their protection. It also identifies balancing the conflict between development pressure and natural features that is of conservation value as the biggest challenge for the SDF. Through development and management directives, the SDF provides guidance on the management of 'natural open spaces' in and around settlements and 'high potential agricultural land'.	Through an analysis of the sensitivity of natural areas to different types of developments, the EMF could assist the MaLM to balance the conflict between development pressure and natural features that is of conservation value. This will ensure that much needed development can continue, but in a well-managed and though trough manner. This will also support the SDF development objective of "protecting the environmental assets of the municipal area". During the development of the EMF guidelines, the MaLM SDF development and management directives need to be reflected on to ensure that they are aligned and complementing each other.
	The Moretele Local Municipality (MoLM) SDF provides a spatial assessment of the *status quo* of the area and identifies and maps important features in the area. This information is used to formulate spatial development strategies and proposals that must guide and manage development in the area. The SDF identifies three development strategies: accelerating growth and development; sharing growth and development, as well as sustainable growth and development. It also proposes five principles that should be applied in order to ensure the management of sensitive features in a sustainable manner.	The EMF could assist the MoLM SDF in the application of the principles to ensure the sustainable management of sensitive features, by mapping sensitive features and linking them to management guidelines. The areas identified in the SDF as suitable for development should further be considered in the EMF to ensure that development potential is adequately considered and reflected and that possible conflicts, such as those between development and agriculture/conservation, is dealt with pro-actively. The EMF guidelines should also be aligned to the SDF's management guidelines for environmentally sensitive features.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	The Moses Kotane Local Municipality (MKLM) SDF provides a spatial assessment of the status quo of the area and identifies important features in the area. It identifies its 'unsustainable settlement structure', which is comprised 107 small villages, two small towns, but no large towns or cities as one of the greatest challenges in the municipality. The baseline information was used to formulate 16 spatial development objectives, which, if applied, could assist the municipality in addressing the aforementioned issue.	The EMF could support the MKLM in achieving the 16 spatial development objectives through complimentary management guidelines and the alignment of spatial priorities. Information such as the location of development corridors, identified urban growth areas, the mining corridor and tourism priority areas should be reflected in the EMF to ensure that they are considered against information on agricultural potential and environmental sensitivity. The proposed initiative to link the Pilanesberg National Park and the Madikwe Nature Reserve that is highlighted by the SDF should be reflected in the EMF to ensure its future viability. The management guidelines contained in the SDF should also be considered in the EMF process to ensure that the two tools are aligned and not contradicting.
	The Rustenburg Local Municipality (RLM) SDF provides a spatial assessment of the *status quo* of the area and identifies important features in the area. This baseline information was used to formulate six development priorities and objectives, meant to assist the municipality in achieving its development goals, as well as guiding principles that are meant to guide and manage development in the area.	By reflecting on the RLM municipal open space system when developing the EMF, the EMF could assist the RLM in the management of ecological sensitive areas & the municipal open space system. The EMF should also reflect the mining priorities in the SDF so that they are considered in managing conflicts between mining, other land uses & sensitive environmental features. The existing Rustenburg EMF and the SDF guidelines for the management of land uses should be considered to ensure that the BPDM EMF reflects the identified priorities and ensure alignment between the EMF and SDF.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	The KLM SDF was drafted in 2012. It provides a spatial assessment of the *status quo* of the area, identifies opportunities and constraints in the area and formulate development objectives for the area. The SDF list the following opportunities related to the environment: • The majority of the KLM area is classified as ecologically sensitive and in a good condition, and is situated amongst nature reserves, which provide good accessibility and creates the opportunity for tourism & other eco-related activities. • There are a number of heritage sites that need to be protected and promoted. In terms of environmental constraints, it states that: • Environmental concerns are not effectively managed, resulting in poor farming practices, informal settlements, uncontrolled mining activity soil erosion and loss of indigenous vegetation. • Phosphate levels in and downstream of the Koster Dam are unacceptably high. The SDF further states that strategic land use planning should be informed by information on environmental sensitivities.	To ensure that the strategic visions for development and environmental management are well aligned, the BPDM EMF should reflect the environmental opportunities and constraints identified in the KLM SDF. The EMF could contribute to the management of the 'environmental sensitive areas' by promoting low impact activities within these areas. The EMF could also ensure that the heritage sites and nature reserves are properly considered during development processes while it could also assist in addressing the two constraints by contributing to more effective environmental management. Trough identifying and mapping sensitive environmental features the EMF could facilitate better strategic land use planning. The development guidelines contained in the SDF could inform the development of similar guidelines for the EMF in an effort to ensure that they are aligned and working towards the same objectives.
Magaliesberg Biosphere Management Plan (Table 4.2.14)	The MBMP defines the vision and mission of the MB, as well as core values and objectives. The main objectives of the MB and its management are to:	The following elements of the MBMP should be considered in the development of the BPDM EMF, in order to ensure alignment: • vision, mission and objectives;

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	• Obtain recognition as a unique and important conservation area in an international, national, provincial and bioregional context so that it could be designated as a biosphere by UNESCO; • Create appreciation for the attributes of the MB and generate an interest and participation in the conservation of the Magaliesberg amongst land owners and other stakeholders; • Conserve the natural landscape, biodiversity and cultural history of the Magaliesberg Mountain range; • Promote the sustainable utilisation of the natural and cultural resources and other forms of sustainable development within the area; • Manage the impacts from sustainable development on the MB; • Improve the quality of life of the people within the MB through the stimulation of job opportunities and through education and training programmes; and • Enhance the tourism potential and tourism information network in the Magaliesberg area. The MBMP consist of the following elements: • A management framework • Resource protection strategies and instruments; • Sustainable and equitable development promotion strategies; • Appropriate education, training and research; and • An implementation and monitoring plan.	• the three complementary functions (conservation, development and logistical support) of biospheres; • the three types of zones (core, buffer and transition) to facilitate these functions and manage the spatial relationship between them. It is important that these zones are implemented with local needs and conditions in mind, allowing flexibility and creativity to accommodate such local needs and demands. To achieve this, the development and land use guidelines has been drafted for each of the MB zones. It is proposed that any development and land use application will be assessed against these guidelines by the relevant land use authority and the Management Board of the MB, before such rights are granted.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	The resource protection strategies elaborates on the three types of zones that have been identified in the MB. The core areas are securely protected sites for conserving biological diversity, monitoring minimally disturbed ecosystems, and undertaking non-destructive research and other low-impact uses (such as education), while the buffer zone, which usually surrounds or adjoins the core areas, is used for cooperative activities compatible with sound ecological practices, including environmental education, recreation, ecotourism, and applied and basic research. The flexible transition area, or area of co-operation, may contain a variety of agricultural activities, settlements and other uses and in which local communities, management agencies, scientists, non-governmental organisations, cultural groups, economic interests and other stakeholders work together to manage and sustainably develop the area's resources. Development and land use guidelines, aimed at protecting the special attributes of the MB and its landscape, are the most important resource protection instruments identified to be used at provincial, as well as district and local municipal levels.	
Moses Kotane Local Municipality Integrated Environmental Management Plan (MKLM IEMP) (Table 4.2.15)	The MKLM IEMP determines the environmental *status quo* in terms of the physical environment, natural environment and man-made environment. It also establishes the desired state of environment to determine the probable future land use for the MKLM. To do this, it identifies key environmental issues,	To ensure alignment between the MKLM IEMP and the BPDM EMF, the development of the EMF should consider the following elements of the IEMP: • key environmental issues, opportunities & constraints;

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	opportunities, constraints and the desired state. The MKLM IEMP also develops an environmental vision of the MKLM, and formulate and define eight environmental management objectives. Lastly, the MKLM IEMP recommend specific actions required to meet the environmental goals and objectives.	• the desired state of the environment; • environmental vision; • environmental management objectives; as well as • specific actions required to meet the environmental goals and objectives.
Biophysical issues		
Topography, geology, soil and climate		
Topography (Table 5.1.1)	The topography of the BPDM is generally uniform, with gently undulating plains on the Highveld plateau located in the southern parts of the BPDM, as well as in the lower lying areas to the north of the Magaliesberg. The Magaliesberg Mountain Range and the Pilanesberg are the two most prominent topographical feature of the BPDM.	Varying topography is recognized as one of the most powerful influences contributing to the high biodiversity of an area, due to the high spatial heterogeneity and unique features associated with it. In addition, areas with broken terrain are often also the most intact features in a transformed landscape, due to their inaccessibility. It is important that hills, ridges and valleys should be considered when determining environmental sensitivity for the BPDM.
Climate (Table 5.1.2)	The BPDM falls within the South African Highveld Climatic Zone, where temperatures are generally mild. The upper higher lying areas of the BPDM area experience cold winters with frost and reasonably hot summers (10°C and 30°C). North of the Magaliesberg Mountain Range winters are more moderate with little frost, while summers are hot, with midday temperatures reaching maxima of 35°C to 40°C in the shade. Light,	The climate information does not have any direct relevance to environmental sensitivity and merely useful for the determination of habitat types in the study area. However, the low rainfall and a high evaporation rate limits the type of agricultural activities than can be practiced. The high evaporation rate also has serious implications for water losses from dams and topsoil and places excessive demands on irrigation water.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	south-westerly winds prevail during winter and north-westerly winds during summer. Mean Annual Precipitation (MAP) is generally higher in the southern parts of the BPDM, while the northern and western lower lying areas have a lower MAP, except for the Pilanesberg area, which has a rainfall similar to that of the southern parts of the BPDM. Summer rainfall patterns predominate, with heavy afternoon downpours, while frontal climatic systems occasionally bring soft soaking rains in winter. During some years large-scale flooding occurs in the BPDM area on the broad floodplains associated with the middle and lower Crocodile River System, north of Magaliesberg, wreaking havoc with the irrigation farming operations. The generalised Mean Annual Evaporation (MAE - Gross Symon's Pan) varies from about 1600mm in the south to around 2000mm at the Crocodile River's confluence with the Limpopo River in the north.	
Geology (Table 5.1.3)	The geology in the district is very diverse, with band waves and patches from the east to the west. The major geological feature in the BPDM is the large area of volcanic intrusive rock, referred to as the Bushveld Igneous Complex. Rock formations in this complex are extremely rich in minerals, which has led to large-scale mining activities in this area. Chert rich dolomitic rock with high water storage capacity a is found in a band running east-west in the extreme southern part of the BPDM, as well as a band to the north of the Dwarsberg,	The geology of the BPDM plays a major role in the economic development and distribution of the population, providing minerals (chrome and platinum), topographical features supporting tourism e.g. Pilanesberg and the Magaliesberg, as well as high-yield potential dolomitic geological formations. Geological diversity is also often an indicator of the diversity of fauna and flora that can be expected in an area (De Frey & Kamffer, 2006). Geological units

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	with a few smaller compartments scattered in the north-eastern part of the BPDM. The balance of area consists of sedimentary rock, with the quartsitic Magaliesberg Mountain Range being the prominent feature, surrounded by large areas covered by shale, mudstone and other sedimentary rock formations.	can therefore be used to determine possible habitat types within an area.
Soil (Table 5.1.4)	Soil types of the BPDM are broadly classified as : • Moderate to deep sandy soils with less than 15% clay and susceptible to erosion, in the central northern part and a small area in the southern part of the BPDM; • Moderate to deep apedal fertile red sandy loams with 15-35% clay in the southern and north-eastern, as well as some of the western parts of the BPDM; • Moderate to deep structured clayey loams (vertic/melanic/red soils) with more than 35% clay, found in the central and western parts of the BPDM area; • Rocky areas with miscellaneous soils in the remaining parts of the BPDM municipality, found on the mountains, as well as shallow, rocky Glenrosa/Mispah soils, to the north and south of the Magaliesberg.	Based on the functions of soils in any land-based ecosystem, it is generally accepted that soil quality describes its capacity to sustain biological productivity, maintain environmental quality, and promote plant, animal and human health. Proper knowledge of soils and their distribution is therefore important for the sustainable use of this important natural resource. The scale of the general soils dataset and the fact that the dataset was derived from the land type dataset renders it unsuitable for further use in this study.
Hydrology		
Surface water resources (Table 5.2.1)	The Bojanala Platinum District Municipality (BPDM) falls within three main river systems, namely the Crocodile West and Groot Marico catchments that drain the	The National Water Act (NWA), Act No. 36 of 1998 requires that all water uses must be authorised. In order to determine if a water resource within a

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	northern parts of the BPDM, while a small portion of the southern part of the BPDM falls within the Vaal River catchment. There are a large number of dams in the BPDM. It includes the important Hartbeespoort (Crocodile River) and Molatedi dams (Groot-Marico River), but also a number of smaller dams. These include the Bospoort Dam (Hex River), Olifantsnek Dam (Hex River), Buffelspoort Dam (Sterkstroom River), Lindleyspoort Dam (Elands River), Mankwe Dam (Elands River), Swartruggens Dam (Elands River), Vaalkop Dam (Elands River), Koster Dam (Koster River), Klipvoor Dam (Moretele River), Rooikoppies Dam (Crocodile River). Five of these dams occur in the Rustenburg Local Municipality, three dams in each of the Kgetlengrivier, Moses Kotane and Madibeng Local Municipalities, with only 1 dam in the Moretele Local Municipality. Because the water resources that naturally occur in the Crocodile catchment have been fully developed and utilised, supplies to parts of Gauteng are transferred from the Vaal River to the Crocodile River via the Rand and Magalies Water distribution networks. This represents over 45% of the total water use in the Crocodile catchment, and results in large volumes of return flow being discharged into the Crocodile River and its tributaries. This constitutes an important source of water.	specific area is managed in a sustainable manner or not, it is necessary to identify indicators that reflect on elements of sustainability. In the context of water conservation and demand management, available water resources could be regarded as such an indicator. Significant surface water resources in the BPDM, as well as their tributaries should be regarded as sensitive to activities that might further deteriorate their quality. The importance and significance of surface water resources will be considered when the management zones are delineated for the EMF and compatible uses/activities are discussed.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
Groundwater resources (Table 5.2.2)	Groundwater resources are available throughout the entire BPDM, but in varying quantities, depending upon the hydrogeological characteristics of the underlying aquifer. The rocks underlying the Western Bankenveld & Marico Bushveld Hydrogeological Region, which covers the western-central parts of the BPDM, are predominantly sedimentary of nature and mostly belong to the Pretoria Group. Although the intergranular and fractured aquifer types have a low to medium development potential, it can supply basic water to small rural settlements, with at least some capacity for community gardens. Many rural settlements in this region are, in all probability dependent on groundwater, while some formal towns, such as Swartruggens and Derby, are also be dependent on groundwater. In the Western Bushveld Complex Hydrogeological Region, the fractured and intergranular and fractured aquifers have a low to medium development potential. Extensive mining in a parallel strip of land on the northern side of the Magaliesberg Mountain Range is associated with significant dewatering of the area around the mining operations, with concerns about the negative impact thereof on groundwater resources, impacting on the natural vegetation and farming practices between the mountains and this mining corridor. Many rural settlements in this region are not only dependent on groundwater for their domestic supplies, but also for their sustainable livelihoods.	Groundwater is a precious and often scarce resource in South Africa which is poorly understood. The extraction of groundwater should therefore be done in a sustainable manner that considers water levels, water balances, an appropriate abstraction schedule that takes into account local hydro-geological conditions, and the implementation of water conservation and demand management measures (adapted from DWA, 2004a). The use of groundwater resources in rural regions such as the BPDM is important to sustain local communities and agricultural practices (DWA, 2010) and should therefore be considered when new (urban and agricultural) developments are being planned, especially in areas where the groundwater yield is considered to be low.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	Crops are cultivated under irrigation from surface water sources, while some groundwater is also utilised for this purpose. Along the lower Crocodile River, sandy aquifers are found from which large quantities of water are abstracted for irrigation purposes. The Karst Belt Hydrogeological Region, which covers the southernmost parts of the BPDM contains karst aquifers many springs and a medium to high development potential. These karst aquifers are also highly vulnerable to pollution.	

Surface water quality (Table 5.2.3)	The quality of surface water resources in the Crocodile and Groot Marico River catchments are good. According to water quality monitoring results (2009-2013) in the major secondary catchments in the BPDM indicate that most of the parameters (electrical conductivity, ammonia, nitrate, phosphate and sulphate concentrations, as well as pH and E.coli count) are within the Target Water Quality Ranges (TWQRs) for domestic or aquatic use, with the greatest concentrations in the Crocodile River and Mooi River catchments. Parameters that are well below the TWQR, with fluctuating trends over time include electrical conductivity, nitrate, phosphate and sulphate concentrations, as well as acidity or pH. Surface water quality problems in the BPDM are confined to challenges with ammonia concentrations and the levels of *E.coli*. Ammonia concentrations has exceeded the TWQR of 1 mg/ℓ in the Crocodile River catchment in 2013, but the levels of *E.coli* has constantly exceeded the TWQR, by orders of magnitude. Both of these problems are most probably due to the challenges experienced by those responsible for waste water treatment, primarily the local municipalities. The Hartbeespoort Dam, which has for decades received large loads of wastewater effluent from the Gauteng metropolitan areas and will continue to do so into the future, experiences such levels of water pollution that the dam regularly experiences dense blooms of cyanobacterial algae, with associated levels of algal toxins that pose a significant threat to human	Surface water quality seems to be a major constraint to increased urban, mining and agricultural development in the BPDM area. With all the surface water resources within the BPDM area well developed, with a high degree of utilisation, water requirements outstripping the local yield and water being transferred into the catchment to meet requirements, it is essential to adequately protect the quality of the available surface water resources. Any additional water pollution sources in the BPDM area will further reduce the quality of the water resources, with subsequent negative impacts on urban development and the agricultural productivity in downstream irrigation areas. This needs to be considered in the EMF development.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	and animal health, while negatively affecting recreation and tourism, as well as real estate prices.	
Ground water quality (Table 5.2.4)	The groundwater quality in the BPDM is relatively good in the Crocodile, Groot Marico and Vaal River catchments, satisfying the DWS water quality guidelines for domestic and agricultural supply. Parameters that are well below the TWQR, with fluctuating trends over time include electrical conductivity, as well as ammonia, nitrate, phosphorus, and sulphate concentrations. The following Groundwater quality problems in isolated areas include elevated salt content in some of the areas in the eastern parts of the BPDM (in Karoo strata, especially close to the granite contact) and elevated fluoride values in the groundwater around the Pilanesberg Complex.	Just because water is underground does not mean that it cannot be polluted. Groundwater can be contaminated in many ways. Movement of water within the aquifer is then likely to spread these pollutants over a wide area, making the groundwater unusable and spreading disease. Pollution of groundwater can be a serious problem, because the impacts of activities on the land surface are poorly understood and contamination of the underground source can go undetected for a long time. This needs to be considered in the EMF development.
Water pollution sources (Table 5.2.5)	Possible water pollution sources in the BPDM primarily relate to land use activities such as agriculture, mining and industrial uses. In addition, it also relates to facilities where wastes are treated and disposed of, such as landfill sites and waste water treatment works. Various forms of crop production, whether dry land or under irrigation, can result in increased silt loads, due to soil erosion. Agricultural runoff enriched with fertilizers also contribute to eutrophication, while it can also lead to pollution with toxic substances such as herbicides and pesticides. Other major contributors to eutrophication include runoff that originates from domestic sources, as well as the	When combined with data on water quality, possible water pollution sources of critical concern could be identified for the BPDM. Understanding the characteristics and distribution of such pollution sources in the BPDM is important, especially in the light of proposed activities that may further contribute to water pollution. These activities should be considered in the development of the EMF and managed in a way that will ensure that their contribution to water pollution in the area is prevented or minimised.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	discharge of untreated or improperly treated wastewater into the rivers. On top of the discharge of nitrates and phosphates, domestic waste water also contains substances such as endocrine disrupting compounds and faecal pollution. Mining contributes pollutants such as salts and heavy metals that are released when rocks are crushed and minerals extracted, silt from tailing storage facilities, as well as chemicals used in the mining process.	
River Health (Table 5.2.6)	The BPDM falls within the Crocodile West and Marico water management area. The main rivers, i.e. the Crocodile, Apies/Pienaars and Elands rivers are all heavily regulated, to cater for the high associated socio-economic needs for water. Consequently, it is only the rivers in the northern parts of the BPDM (north of the Pilanesberg nature reserve) that are still largely natural and in a good ecological condition (i.e. Category B), as well as two rivers in the Madibeng and Moretele local municipalities. All of these occur in rural areas of the BPDM. The majority of the BPDM river systems are in a moderately modified state (Category C), maintaining basic ecosystem functioning. Quite a large proportion of the river systems in the BPDM are considered largely modified (Category D), with basic ecosystem functioning compromised and significant natural habitat and biota losses taking place. This includes the lower Elands River system, part of the Groot Marico River system, as well as the Lower Crocodile River.	River health is an integrated measure of the conditions that are necessary for proper river functioning. A river that functions well has the ability to supply good quality water as well as other services which include food for humans and animals, medicinal plants, building materials, self-purification, flood as well as erosion control, cultural value and tourism and recreation. Healthy rivers also support a diverse variety of animal and plant life. When river health deteriorates, some or all of these functions and services are compromised or even lost. When, for example, water quality declines, it may become unfit for human consumption. In more advanced stages of deterioration, it may become unfit for irrigation and industrial processes. This results in escalating water purification costs. Insufficient good quality water constrains socio-economic development.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	According to the NFEPA assessment, the headwater areas of rivers in BPDM are generally in better ecological condition (moderately modified) than the lower reaches, which are mostly largely modified ecologically.	Typical 'workhorse' rivers have fair river health scores. When river health deteriorates, becoming poor, river functions and services are lost. This impacts on the sustainability of the river ecosystem and long-term environmental, economic and social security. Most of the rivers in the BPDM area can be considered to be 'workhorse rivers' that are already in a fair to poor state. These should be considered as environmentally sensitive and protected against future activities that could result in the loss of river functions and services.
Buffer zones to protect surface water resources (wetlands and other surface water resources) (Table 5.2.7)	Various rivers and streams occur throughout the BPDM area, while wetlands also occur throughout, associated with dams and pans. Due to various land use and land degradation challenges, the majority of water resources have been impacted on and are vulnerable to further degradation. In this regard, buffer areas are of critical importance. Despite the BPDM area being fairly arid, it seems as if the buffer zones around water resources (water ways, water bodies and wetlands) cover between 25% and 33% of the area. In some local areas, this seems to be as high 50%. To protect these water bodies, buffer zones around these features should be treated with great care.	Wetlands are the most threatened of all ecosystems in South Africa. Therefore, areas within the buffer zones around wetlands and water courses should be considered sensitive to development activities and considered in the development of the EMF. A number of activities within 32 meters of a watercourse (measured from the edge of the watercourse) will require environmental authorization under the NEMA in terms of listing notice 1 (South Africa, 2014a), while a number of activities within 100 meters of a watercourse (measured from the edge of the watercourse) will also require environmental authorization under the NEMA in terms of listing notice 3 (South Africa, 2014a).

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
		As General Authorisations (GA) do not apply to the taking and storing, as well as impeding or diverting water within a distance of 500m upstream or downstream of a wetland in terms of GN 509 (DWS, 2016), a water use licence will be also required in terms of the NWA for activities within this zone.
Air quality		
Possible atmospheric pollution sources (*Table* 5.3.2)	The BPDM Air Quality Management Plan (BPDMAQMP) lists a range of atmospheric pollution sources within the boundaries of the BPDM including; industrial operations, agricultural activities, mining activities, biomass burning, domestic fuel burning, vehicle tailpipe emissions, waste treatment and disposal (emissions from waste incineration) and transboundary transport of air pollution. Large industry has been identified as the major contributor of air pollution in the BPDM. BPDM is the main industrial hub of the province and most of the industries in the district are located in Rustenburg and Madibeng. Consequently, these two municipalities account for over 90% of all reported industrial emissions in the BPDM. Emissions from industries other than mining comprise only 3.4% of the total air pollution. Platinum, gold, chrome and vanadium are the main minerals processed. Due to the nature of the Platinum Group Metal (PGM) bearing ore, the processing thereof is one of the main contributors to air pollution (and specifically SO2 and particulate pollution). Platinum	Although current levels of air pollution are not excessive, air pollution problems were experienced in the past and could again become a major problem in future. Therefore, the major sources of air pollution should be considered during the sensitivity analysis.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	smelters from Anglo Platinum, Impala Platinum and Lonmin Platinum, all in the Rustenburg area, are responsible for 96.2% of total emissions. Chrome smelters from Samancor Chrome, Xstrata, Xstrata Merafe Ferrochrome, Xstrata Wonderkop in Rustenburg area and Hernic Ferrochrome and Vametco in Madibeng also contribute significantly to air pollution. The BPDMAQMP has identified Rustenburg and the industrialized area of Brits as the areas with poor air quality within the district. The main area of air pollution impact extends from the Rustenburg area eastwards towards Brits and up the eastern boundary of BPDM, corresponding with the main industrial and domestic fuel burning areas. The rest of the municipality has relatively low pollution loads.	
Greenhouse gas emissions (*Table 5.3.1*)	From the maps it is clear that the BPDM is experiencing significant levels of pollution from major polluters such as industrial activities and mining activities (platinum, chrome and vanadium). All of the modelled pollutants (CH4, CO, CO2, N2O and SO2) show a significant level of pollution. From an evaluation of the study are it would seem that the major sources of air pollution might be mining activities (including smelters), burning of materials such as wood, paraffin and coal for heating and cooking purposes. The latter sources are directly linked to service provision and could be partially eradicated through the expansion of the currently electricity network.	Although at a coarse scale, the data provides an indication of the emissions of atmospheric pollutants in the context of South Africa. This data will not be usable for determining sensitivity and is only useful to provide an overview of the situation in South Africa.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
Historical Air Quality data from the draft BPDM AQMP 2013: Sulphur Dioxide, Particulate Matter (PM10) and dust fall concentrations (Table 5.3.3)	Although it is not possible to verify the current status of the air quality in the BPDM, due to a lack of data, the air quality monitoring data from 2006 – 2009 can be used to provide some insight into potential ambient air quality challenges. Daily SO2 concentrations for various monitoring stations are provided in figures 1-3. The following conclusions can be drawn: • Daily average SO2 concentrations at all monitoring stations generally fell below the national 24 hour average limit value for SO2. Exceedances of the national standard were recorded at some monitoring stations, although these were well within the allowable frequency of exceedance. • A distinct seasonal shift was not evident in SO2 concentrations, although elevated concentrations were recorded at some monitoring stations during autumn and winter. Diurnal (hourly) SO2 concentrations for various monitoring stations are provided in figures 4 and 5. The following conclusions can be drawn: • A diurnal SO2 signature was recorded at all the monitoring stations, with elevated concentrations in the morning periods. This diurnal trend is associated with emissions from tall stacks, where plumes from elevated sources emitting above or within the surface inversion are unable to reach ground level during the night-time. Increased convection during the day-time erodes the surface inversion,	Although not spatial, the information is relevant for the BPDM EMF as it provides an indication of potential air quality challenges within the BPDM.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	promoting the down-mixing and entrainment of elevated plumes, which result in the peak concentrations observed during the morning. • A smaller less significant peak of SO2 early in the morning is likely to be caused by local domestic fuel burning emissions or road traffic emissions. • Daily average PM10 concentrations for various monitoring stations are provided in figures 6-8. The following conclusions can be drawn: • Daily average PM10 concentrations were elevated and frequently exceeded the national 24 hour limit value. • A distinct seasonal signature was evident, with elevated concentrations during the autumn, winter and early spring months, due to changing meteorological conditions. Diurnal (hourly) PM10 concentrations for various monitoring stations are provided in figures 9 and 10. The following conclusions can be drawn: • Diurnal PM10 concentrations at most monitoring stations did not show a distinct diurnal signature, with concentrations remaining relatively stable during the day. • Where diurnal fluctuations were observed, these were attributed to either surrounding sources such as fugitive dust sources or domestic fuel burning sources used for cooking and heating purposes, especially where concentrations were elevated in the morning and evening periods.	

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	Average annual dust fall recorded at various monitoring stations from Wesizwe is provided in figure 11. • Preliminary results indicate that dust fallout levels at most monitoring stations fell in the slight dust fallout category. Moderate dust fallout was experienced at one monitoring station, while heavy dust fallout was also recorded at one monitoring station.	
Biodiversity and conservation		
National vegetation types (Table 5.4.1)	The natural vegetation in the BPDM is dominated by bushveld vegetation, which includes dense, short bushveld, and open tree savanna. Of the 22 vegetation types found in the area, 14 are bushveld vegetation types. The Central Sandy Bushveld covers the largest area, approximately 245380 ha in the North-West Province. Other prominent vegetation types include Marikana Thornveld, Dwaalboom Thornveld, Springbokvlakte Thornveld and Zeerust Thornveld. Some vegetation types in the district are associated with broken terrain, either hills and ridges or depressions, pans and drainage lines. Vegetation types associated with wetlands and pans cover small areas of the BPDM and includes the Eastern Temperate Freshwater and Subtropical Freshwater Wetland, as well as Highveld and Subtropical Salt Pans vegetation types. Vegetation types associated with hills and ridges include grasslands such as Carletonville Dolomite Grassland, bushveld such as Gold Reef Mountain Bushveld, Gauteng Shale Mountain Bushveld, Norite Koppies	Although the map provides an overview of the broad floristically based vegetation units (Mucina et al., 2006) in the BPDM area, it will not directly be used for mapping sensitivity. It will however be considered during the identification of fine scale habitat types for the BPDM.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	Bushveld, Pilanesberg Mountain Bushveld, Dwarsberg-Swartruggens Mountain Bushveld, as well as Andesite Mountain Bushveld.	
National Biodiversity Assessment (Terrestrial component) (Table 5.4.2)	Large parts of the Bojanala Platinum District Municipality are characterized by high levels of biodiversity. These include the areas along the Magaliesberg stretching from the southern parts of Madibeng Local Municipality in the east to Rustenburg and further north westwards up to the north western parts of the Rustenburg Local Municipality. It also includes areas in the central parts of the Kgetlengrivier Local Municipality, as well as large parts of the Moses Kotane Local Municipality west of the Pilanesberg National Park. Based on the proportion of the ecosystem type that remains in good ecological condition relative to a series of thresholds, the NBA classifies three vegetation ecosystems (Marikana Thornveld, Rand Highveld Grassland and Springbokvlakte Thornveld) within the BPDM as endangered. These endangered ecosystems are located in the Kgetlengrivier, Rustenburg, Madibeng and Moretele local municipalities. In addition, the Central Sandy Bushveld and Moot Plains Bushveld vegetation ecosystems that are located across all the five local municipalities in the district are classified as vulnerable ecosystems. No critically endangered or endangered ecosystems are found within the boundaries of the BPDM, while the rest of the ecosystems are classified as least threatened.	The NBA dataset is crucial from a national perspective and is meant to inform all strategic plans at lower spheres of government. The information contained in the NBA should be considered during the sensitivity analysis for the EMF, although refinements will be needed to ensure accuracy.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	Five formally protected ecosystems are found within the BPDM, the Pilanesberg National Park (Moses Kotane LM), Kgaswane Nature Reserve (Rustenburg LM), Magaliesberg Protected Natural Environment (Madibeng & Rustenburg LMs), Borakalalo National Park (Moretele LM) and Vaalkop Dam Nature Reserve (Rustenburg LM). There are also numerous private nature reserves/game farms in the district. Based on the proportion of an ecosystem type that occurs within a protected area recognized in terms of the National Environmental Management: Protected Areas Act (57 of 2003), the NBA also assessed the protection status of every ecosystem type. In terms of this assessment, one ecosystem type (Pilanesberg Mountain Bushveld) is well protected, while two others (Madikwe Dolomite Bushveld and Gold Reef Mountain Bushveld) are moderately protected. All of the other ecosystems, except the Norite Koppies Bushveld, which is not protected at all, are classified as either poorly protected or hardly protected. These include least threatened, vulnerable and endangered ecosystems. There are also two Biospheres in the BPDM. Large parts of the core and buffer areas of the declared Magaliesberg Biosphere Reserve occurs in the southern parts of the Kgetlengrivier, Rustenburg and Madibeng local municipalities, while parts of the phase 2 targeted expansion areas of the core and buffer of the proposed Marico Biosphere Reserve occurs in the southwestern corner of the Kgetlengrivier Local	

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	Municipality. Biosphere Reserves are geographical areas representing priority ecosystems that are nominated by national governments and internationally recognised by declaration through UNESCO to promote the conservation and sustainable utilisation of biodiversity. In response to the importance of biodiversity in the Bojanala Platinum District Municipality, the North West Parks and Tourism Board is considering the extension of a number of existing nature reserves and conservation areas. The most notable of these include the proposed Heritage Park development, which is envisaged to link the Madikwe Game Reserve (outside the BPDM) with the Pilanesberg National Park in the BPDM into one mega park. Other initiatives include the possible expansion of the Vaalkopdam Nature Reserve to link up with the Pilanesberg National Park, as well as the expansion of the Borakalalo Nature Reserve to link up with Vaalkopdam Nature Reserve to create a conservation corridor stretching from Borakalalo in the east through Vaalkopdam- and Pilanesberg to the Madikwe Game Reserve in the west. Other potential areas of conservation include the Magaliesberg area, as well as some of the Norite hills that have not been damaged by mining and quarrying activities.	
National Protected Areas Expansion Strategy (Table 5.4.3)	In terms of the NPAES, declared priority areas are large, intact and unfragmented areas suitable for the creation or expansion of large protected areas.	The focus areas identified in the NPAES are of strategic importance from a national perspective and should be considered as sensitive in the context of the EMF. Development in these areas will trigger

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	Several declared NW/Gauteng Bushveld priority areas within the boundaries of the BPDM have been identified according to the NPAES 2010. Approximately 18 of these bushveld priority areas identified are scattered across the district and include the expansion of endangered Marikana Thornveld vegetation type. In addition, the Vaal Grasslands located between the boundaries of the North-West Province and Gauteng Province is also declared a NPAES priority area.	basic assessments for a number of activities listed in Listing Notice 3 (South Africa, 2014b) of the EIA regulations.
Threatened terrestrial ecosystems (Table 5.4.4)	The Witwatersberg Skeerpoort Mountain Bushveld vegetation type is the only listed endangered terrestrial ecosystem located within the boundaries of the BPDM. It is located south of Hartbeespoort and cuts across North-West and Gauteng Provinces. Three other terrestrial ecosystems (Rand Highveld Grassland, Marikana Thornveld and Springbokvlakte Thornveld) are classified as vulnerable, while no listed critically endangered ecosystems occurs within the boundaries of the BPDM.	The listing an ecosystem has four main implications: • Planning related implications, linked to the requirement in the NEMBA that listed ecosystems must be taken into account in municipal IDPs and SDFs; • Environmental authorisation implications, in terms of NEMA and EIA regulations; • Proactive management implications, in terms of the NEMBA; and • Monitoring and reporting implications, in terms of the NEMBA. Listed terrestrial ecosystems are very important features from a national perspective and should be considered during the development of the biodiversity perspective for the BPDM. Developments in listed ecosystems will also automatically trigger basic environmental impact assessments for certain activities listed Listing Notice 3 of the 2014 EIA regulations.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
Areas of critical biodiversity (Table 5.4.5)	Large areas in all five of the local municipalities in the BPDM has been identified as critical for retaining terrestrial biodiversity and supporting continued terrestrial ecosystem functioning and services. These areas cover more than 50% of the Kgetlengrivier, Rustenburg and Moretele local municipalities, and approximately 50% of the Moses Kotane and Madibeng local municipalities. Some of these areas are still in a natural state (CBA1), while others are in a near natural state (CBA2). There are only a few areas (ESA1 & ESA2) scattered throughout the BPDM that play an important role in supporting the ecological functioning of terrestrial CBAs and/or in delivering terrestrial ecosystem services, but are not essential for meeting biodiversity targets. With regards to areas critical for retaining aquatic biodiversity and supporting continued terrestrial ecosystem functioning and services, fairly large parts of the BPDM has also been identified in all five local municipalities, although not as extensive as for terrestrial biodiversity. These areas also overlap in many places with the terrestrial CBAs and ESAs.	Both CBAs and ESA are important for the achievement of provincial conservation goals and should be considered in the sensitivity analysis of the EMF. CBAs will also trigger basic assessments in terms of Listing Notice 1 of the EIA regulations.
National Freshwater Ecosystem Priority Areas (*Table* 5.4.6)	The National Freshwater Ecosystem Priority Areas (NFEPA) project (Nel et al., 2011) identified 35 river ecosystem types in the province of which, 28 are threatened. Priority river reaches and their associated catchments are classified as Freshwater Ecosystem Priority Areas (FEPAs), i.e. rivers that are currently in a natural condition (A or B ecological category) and	FEPAs are important for the management of freshwater resources such as rivers, wetlands and estuaries in South Africa that need to stay in a good condition in order to conserve freshwater ecosystems and protect water resources for human use. These areas should be regarded as sensitive to activities that might degrade them and affect our

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	should remain in a good condition in order to contribute to national biodiversity goals and support sustainable use of water resources, Fish Support Areas (FSA), i.e. rivers lower than an A or B ecological condition, which are important for migration of threatened fish species and where river condition should be improved and alien invasive fish removed, Upstream Management Areas, i.e. catchments in which human activities need to be managed to prevent degradation of downstream river FEPAs and Fish Support Areas, as well as Phase 2 FEPAs, i.e. moderately modified (C) rivers that should not be degraded further, as they may in future be considered for rehabilitation, once good condition FEPAs (in an A or B ecological category) are considered fully rehabilitated. Of the 12 FEPA rivers in the BPDM, four occur in the Moses Kotane LM, with three each in the Kgetlengrivier and Rustenburg, as well as one each in the Madibeng and Moretele local municipalities. Four Phase 2 FEPA also occur in the BPDM, two in the Moses Kotane Local Municipality, and one each in the Rustenburg and Madibeng local municipalities. In addition, eight Fish Support areas are also found in the Kgetlengrivier (3), Rustenburg (4), and Madibeng (3) local municipalities. Furthermore, eight Upstream management areas also occur in the Moses Kotane (4), Kgetlengrivier (2), Madibeng (3) and Rustenburg (1) local municipalities. Several areas within the boundaries of the BPDM municipal area have been identified as NFEPA fish	freshwater supply. This does not mean that FEPAs need to be fenced off from human use, but rather that they should be supported by good planning, decision-making and management to ensure that human use does not significantly impact on the condition of the ecosystem (Nel et al., 2011). It is important to note that although FEPA status applies to the actual river reach within such a sub-quaternary catchment, the surrounding land and smaller stream network need to be managed in a way that maintains the good condition (A or B ecological category) of the river reach. It is furthermore important to note that river FEPAs currently in an A or B ecological category may still require some rehabilitation effort, e.g. clearing of invasive alien plants and/or rehabilitation of river banks. From a biodiversity point of view, rehabilitation programmes should therefore focus on securing the ecological structure and functioning of FEPAs. Managing FEPAs in a good condition is not just about conserving freshwater plants and animals – it should also be regarded as a comprehensive approach to sustainable and equitable development of water resources. Keeping strategically-chosen freshwater ecosystems in a good condition serves a dual purpose of meeting government objectives for both sustainable water resource development

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	sanctuaries. Fish sanctuaries are rivers that are essential for protecting threatened and near-threatened indigenous freshwater fish species, in this case the protection of one vulnerable or near-threatened indigenous fish species. These include two fish FEPAS in the Rustenburg LM, as well as nine Fish Support Areas, occurring in the Rustenburg (5), Kgetlengrivier (4) and Madibeng (2) local municipalities. In order to further freshwater species from becoming threatened and to prevent those fish species that are already threatened from going extinct, there should be no further deterioration in river condition in fish sanctuaries and no new permits should be issued for stocking invasive alien fish in farm dams in the associated sub-quaternary catchment.	(National Water Act) and freshwater biodiversity conservation (Biodiversity Act). FEPAs are an environmental attribute that should inform the determination of environmental sensitivity in an EMF, with restrictions on any deterioration of ecological condition within FEPAs, and appropriate restrictions on land-use in sub-quaternary catchments associated with FEPAs.
Wetlands (Table 5.4.7)	Various types of wetlands occur within the boundaries of the BPDM, including channelled and un-channelled valley-bottoms, floodplain, depression, flat, seep and valley-head seep wetlands. These occur in a variety of biomes, contributing to an amazingly rich diversity of wetlands in terms of setting, type, biodiversity and extent. Several of the well-formed natural un-channelled valley-bottom wetlands occur along the Magalies River in the Hartbeespoort area, while valley-head seep wetlands also occur in scattered areas. In the Magaliesberg, the topography largely determines where wetlands can potentially form. Wetlands are	Wetlands play a very important role in the regulation of water and often possess unique habitat features that attract specialised species. According to the NBA of 2011, wetlands are the most threatened of all South Africa's ecosystems (Driver et al., 2012) and are in dire need of protection. Consequently, most development activities in close proximity to wetlands will automatically trigger a basic assessment (South Africa, 2010b&c). In the light of the above, wetlands should be considered as sensitive in the context of the EMF.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	mainly found on the plateau or crest and where faults cut across northern drainage lines. Where these features are absent, wetlands occur mostly adjacent streams along the mid-slope or foothills of the mountain. Very few wetlands occur along the far eastern sections of the mountain, due to the absence of a plateau area, as well as the steep southern slopes, with a fast runoff. Some of the important wetlands are: • the extensive Moretele floodplain wetlands near Khomo-Khomo that rivals that of the Nyl River near the Waterberg, but urgently requires restoration; • the pristine Waterval valley bottom mire, a unique peat wetland system to the Magaliesberg within the Kgaswane Mountain Reserve, which is identified as a priority wetland for rehabilitation; • the eyes, mires and peatlands associated with the karst landscape, which occurs in the extreme southern parts of the BPDM; • the endorheic pans that are as diverse in character as they are in setting, varying from small permanently inundated pans to temporary playa-like pans from the wetter east to the more arid western parts of the BPDM. Most of the wetlands and pans in BPDM are heavily modified and under threat from mining, agriculture and urban expansion, resulting in the loss of wetland ecosystem functioning and form.	

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
Important bird areas (Table 5.4.8)	Only two Important Bird Area (IBAs) are found in the BPDM, namely the Magaliesberg IBA and Pilanesberg National Park. The two IBAs host some important species, such as the globally threatened Cape Vulture (Gyps coprotheres) (BirdLife South Africa, 2014). The Magaliesberg Natural Protected Environment is the largest IBA in the district, cutting across the local municipalities Rustenburg, Moretele, Madibeng and Kgetlengrivier. This IBA extends in an arc from just north-west of Rustenburg in the west to the N1 in the east near Pretoria. To the south, the Witwatersberg range runs parallel to the Magaliesberg, extending from the town of Magaliesburg in the west to Hartbeespoort Dam in the east. Land ownership in the Magaliesberg Protected Natural Environment includes some private landowners, as well as the State (undeclared State land). The Pilanesberg National Park IBA is a protected area located within the Moses Kotane local municipality and covers approximately 49 580 ha (BirdLife South Africa, 2014). It is managed by North West Parks and Tourism Board.	A remarkable 847 bird species occur in South Africa, about 8% of the world's bird species. Unfortunately, over 15% of our bird species are threatened with extinction, mainly due to loss of suitable habitat. Managing a network of 112 South African IBAs is our best hope of conserving our threatened, endemic, biome restricted and congregatory birds. In this regard, both of the IBAs should be considered as sensitive environmental features in the development of the EMF.
Agricultural potential		
Land capability (Table 5.5.1)	Most of the land in the BPDM has a moderate potential for crop production. This includes most of the land in the central and eastern parts of the BPDM, i.e. most of the land in the Moretele, Madibeng and Rustenburg local municipalities, as well as some land in the	Land capability data indicates areas with crop production capabilities, allowing further focus on those areas to minimise activities related to non-agricultural land use and optimize agricultural production. Non-agricultural development activities

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	Kgetlengrivier and eastern part of the Moses Kotane local municipalities. The potential of the land in a large part of the Moses Kotane Local Municipality, as well as small pockets of land in all the other municipalities have a marginal potential for crop production. In a fairly large part of the Kgetlengrivier Local Municipality and smaller parts of the Moses Kotane, Rustenburg and Madibeng local municipalities, the land has no potential for crop production and is only suitable for livestock grazing. The land in the mountainous areas are not suitable for agricultural production and classified as wilderness.	should be limited on areas with a better land capability, in order to optimize agricultural production. The coarse scale of the dataset will limit its use.
Crop field boundaries (Table 5.5.2)	Crop fields exist in all five local municipalities in the BPDM. The majority of these are cultivated annually and used for dryland crop production or planted pastures, while many of those in the proximity of the Crocodile river and some in the southern parts of the Kgetlengrivier Local Municipality are irrigated. Some of these are used for horticulture or viticulture production. In the Kgetlengrivier, Rustenburg and Madibeng local municipalities, the majority of the cultivated fields are commercially farmed, while the majority of cultivated fields in the Moses Kotane and Moretele local municipalities are cultivated by subsistence farmers. Some cultivated fields also occur on small holdings in the Rustenburg and Madibeng local municipalities, while some old fields also occur in the Kgetlengrivier, Rustenburg and Madibeng local municipalities.	The Department of Agriculture relies to a large extent on the database of crop field boundaries for the protection of high potential agricultural land. In the absence of more reliable information, all land that is or has been cultivated in the past, is considered to be high potential agricultural land. Alternative, non-agricultural land uses should be limited or not allowed on high potential agricultural land, in order to ensure the conservation and protection of such land for agricultural production.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
Grazing capacity (Table 5.5.3)	The potential of the land for livestock grazing or grazing capacity is expressed in the number of hectares of natural vegetation needed to sustain an animal unit. In the BPDM area, the grazing capacity large variations in grazing capacity is apparent, ranging from as high as 5-7 ha/animal unit to as low as 31-40ha/animal unit. Despite the patchiness of the grazing capacity throughout the BPDM, with patches of higher grazing capacity interspersed with patches of lower grazing capacity, the grazing capacity is generally higher in the eastern parts of the BPDM (Moretele, Madibeng, Rustenburg and eastern part of the Moses Kotane local municipalities) and lower in the western and southwestern parts (Kgetlengrivier and western part of the Moses Kotane local municipalities. The transformed rangelands, where the natural vegetation has been removed/ largely modified does not have any capacity to sustain livestock grazing.	Grazing capacity is considered a key norm for the protection of rangeland (veld) as the main forage resource for livestock in South Africa. Therefore, non-agricultural land uses should be limited on land with good grazing capacity, in order to ensure the conservation and protection of such land for livestock production. Due to the scale of the data, it may be of limited value in indicating environmental sensitivity. However, attempts should be made to refine the mapping of areas of high grazing capacity by combining the dataset with higher resolution land cover data.
Desertification, land degradation and soil loss (Table 5.5.4)	Land degradation is an important concern in the North West Province, where 71% of the province experiences erosion problems. From the maps it is clear that the land in the BPDM has a low susceptibility for wind erosion. A small parcel of land in the north-eastern corner of the BPDM is highly susceptible to wind erosion, while large parts of the Rustenburg, Madibeng, Moretele and Moses Kotane municipal areas are susceptible to wind erosion. Similarly, large parts of the BPDM is also not susceptible to water erosion, especially those areas	Soil formation is a relatively slow process and, therefore, soil is essentially a non-renewable and a limited resource. Prolonged erosion causes irreversible soil loss over time, reducing the ecological (e.g. biomass production) and hydrological functions (e.g. filtering capacity) of soil. Soil erosion not only involves the loss of fertile topsoil and reduction of soil productivity, but is also coupled with serious off-site impacts related to increased mobilization of sediment and delivery to rivers. Eroded soil material leads to

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	where the soils have a high clay content. Areas with a moderate to high susceptibility to water erosion occur primarily in the Kgetlengrivier, Moses Kotane and Madibeng Local Municipalities. An aspect of specific concern within the BPDM is that as much as 10% of the land area is classified as degraded. This figure is particularly high in the Moretele Local Municipality with an estimated 41% of the total land area classified as degraded. The comparative figures in the Moses Kotane and Madibeng local municipalities are 12% and 11% respectively. A recent land cover comparison (1990-2014) for all local municipalities in the province indicated that erosion or bare soil areas increased in the Kgetlengrivier (42.5%), Madibeng (51.7%), , Moses Kotane (79.4%) and Rustenburg (108.3%) local municipalities, while erosion or bare soil areas decreased by 27.2% in the Moretele Local Municipality. A specific land degradation challenge exists in the lower Elands River catchment, south of the Pilanesberg, where soil erosion and high sediment loads are prevalent due to overgrazing, which will reduce the yield of the Vaalkop Dam in the long-term (NWPG 2015).	sedimentation/siltation of reservoirs, as well as an increase in pollution due to suspended sediment concentrations in streams which affects water use and ecosystem health. Erosion also aggravates water management problems, especially in semi-arid regions such as South Africa where water scarcity is frequent. Due to the scale of the data, it may, however, be of limited value in indicating environmental sensitivity.
Invasive alien plant species (*SQ report, table* 5.5.5)	Alien invasive plants does not seem to be a big problem in the BPDM, with an average density of less than 5% in virtually the whole area. These plants primarily cause localised problems in the southern parts of the Madibeng, Kgetlengrivier and Rustenburg local municipalities, where alien invasive plants occur in	Alien plant invasions have a major impact on biodiversity, ecosystem services, agriculture, forestry, the economy and human welfare. AIPs cost South Africans tens of billions of rand annually in lost agricultural productivity and resources spent on management. Both the DAFF and DEA consider

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	densities higher than 5% and up to more than 20%. These invasions are probably associated with the grasslands and broken terrain in the valleys, and ridges, as well as river systems.	AIP distribution/invasions as an important indicator for the protection of the agricultural production potential of crop and grazing land and biodiversity. Due to the limitations of the IAP dataset with regard to scale and coverage the layer will not be usable for determining sensitivity. However, development activities that cause soil disturbance should be limited or only allowed after adequate environmental impact assessments, in order to ensure that the potential for IAP invasion is considered and mitigated.
Solar potential		
Solar energy potential (Table 5.6.1)	The North West Province shows considerable potential for contributing to the national renewable energy targets, especially in the form of solar energy, considering that it receives an estimated average daily solar radiation of more than 2 200 kWh/m2. Although the average annual solar radiation levels in the BPDM seems to be fairly high from a national perspective, in the range of 2 222-2 361 kWh/m2, when analysed on a finer scale, it is slightly lower, at 2098 kWh/m2 maximum. Areas with the highest potential occur in the southern, western and eastern parts of the BPDM, while the solar potential in the central and south-eastern parts of the BPDM are lower, to a minimum of 1982 kWh/m2, probably due to a higher cloud cover associated with the mountainous areas.	The solar development potential of the BPDM area could assist with economic development and small scale employment opportunities in the area. The solar potential could be harnessed through local economic development initiatives, while the community benefit requirements of the Department of Energy (DoE) Renewable Energy Independent Power Producers Programme (REIPPP) could also contribute towards community development and infrastructure provision and maintenance.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	At present, one application for the construction and operation of a solar PV facility has been approved in the Moses Kotane Local Municipality and another one in the Madibeng Local Municipality.	
Socio-economic issues		
Socio-economic profile		
Population density (Table 6.1.1)	The biggest total population (549 575) in the BPDM occur in the Rustenburg Local Municipality, while the smallest total population (51 049) occur in the Kgetlengrivier Local Municipality. The local municipalities with the highest and lowest population densities corresponds largely with those with the biggest and smallest total populations. The density in the Rustenburg Local Municipality is 161 persons/km^2, while in the Kgetlengrivier Local Municipality it is 13 persons/km^2. The biggest percentage of the population that are of a working age (i.e. 15-64 years) occur in the Rustenburg Local Municipality (72.5%), while the smallest percentage of the population that are of a working age occur in the Moretele Local Municipality (60.9%). The biggest percentage of the population that are elderly (i.e. 65+ years) occur in the Moretele Local Municipality (8.2%), while the smallest percentage of the population that are elderly occur in the Rustenburg Local municipality (3.4%).	Population size and density is an indicator of current and future development trends in an area as the majority of future urban development will most likely concentrate around already developed and highly populated areas. The potential impact of these areas on the natural environment due to solid waste generation and disposal, water use and pollution and in many cases, dependency on the surrounding environment for fuel sources, such as wood. These potential impacts and issues should be considered in the development of the EMF.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
Levels of education (Table 6.1.2)	In virtually the whole of the BPDM, between 10-30% of the population has a grade 12 certificate. In a few isolated geographical areas in the Moses Kotane, Rustenburg and Moretele local municipalities, less than 10% of the population has a grade 12 certificate, while in the urban area of Rustenburg, the percentage is higher at 30-50%. The highest % of adults (20 + years) with matric (grade 12) occurs in the Rustenburg Local Municipality (31.0%), while the lowest percentage of adults (20 + years) with grade 12 occurs in the Kgetlengrivier Local Municipality (15.8 %). The highest % of adults (20 + years) with no schooling occur in the Kgetlengrivier Local Municipality (22.7%), while the lowest percentage of adults (20 + years) with no schooling occur in the Rustenburg Local Municipality (5.4 %). The majority of people in each of the local municipalities has completed primary education, but the majority of these did not complete their secondary education. Except for the urban areas of Rustenburg and Brits, as well as the Pilanesberg National Park, where between 10-30% of the population holds a tertiary qualification, in the rest of the BPDM this figure is less than 10% of the population. The highest % of adults (20 + years) with higher education occur in the Rustenburg Local Municipality (8.9%), while the lowest percentage of adults (20 + years) with higher education occur in the Moretele Local Municipality (4.6 %).	The dataset is unlikely to have any direct implication for sensitivity but provides crucial information on the skills and knowledge present in the area, which could be important when considering possibilities for local economic development with a focus on local procurement.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
Employment levels (Table 6.1.3)	Employment levels in the BPDM varies from areas where less than 10% of the economically active (employed or unemployed but looking for work) population is employed, i.e. areas around the platinum mines in the vicinity of Rustenburg and Mooinooi, to areas where between 70-90% of the economically active population is employed, i.e. rural areas in the Moses Kotane and Moretele local municipalities. In large parts of the BPDM, employment levels vary from 30% to 70%, or putting it differently, unemployment levels vary from 30% to 70%. In the individual local municipalities the situation is as follows: In the Moretele Local Municipality (LM), 45.95% of the economically active 54 528 people are unemployed. The Madibeng LM is characterised by high levels of unemployment, with an unemployment rate of 30.4%. However, the unemployment rate for those aged 15 to 24 is 38.2%, which is almost 10% more than the overall unemployment rate. Of the 266 471 economically active people in the Rustenburg LM, 26.4% are unemployed, while, 34.7% of the 142 219 economically active youth (15 – 34 years) are unemployed. 20.5% of the 18 859 economically active people in the Kgetlengrivier Local Municipality are, unemployed, but 26.7% of the 9 142 economically active youth is unemployed.	The dataset is unlikely to have any direct implication for sensitivity but provides information crucial to understanding the employment context of the area, which in turn provides invaluable information with regard to the economic climate and possible development trends/potential in the area.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	In the Moses Kotane Local Municipality There are 74 744 people who are economically active, and of these 37.9% are unemployed, while almost half (47.4%) of the economically active youth is unemployed.	
Gross geographic value (Table 6.1.4)	The GVA levels in the BPDM displays a large variation, from an area (covering more than 50% 0f the BPDM) where GVA is less than R 50 million, to smaller areas where the GVA exceeds R 1000 million, to a part of the Rustenburg LM where it exceeds R 6000 million per annum. Areas where the GVA exceeds R 500 million per annum covers less than 20% of the BPDM and are clustered around the Pilanesberg National Park, as well as the mining belt stretching from south of the Pilanesberg National Park, past Rustenburg to Brits.	Gross Geographic Value is an indicator of the economic activity in the BPDM area and related to employee compensation in the area i.e. the available spending power. Disposable income has a direct effect on economic development, especially with regard to economic activities dependent on the local population for success. Although there is again not a direct link to environmental sensitivity of the area, this information provides valuable insights into the socio-economic context of the study area, which could translate into adverse environmental impacts.
Household income (Table 6.1.5)	Less than 25% of the households in virtually the whole BPDM has no income. There are only 2 small geographical areas, one in the Moses Kotane LM and another in the Madibeng LM, where larger proportions of the households does not have any income. In all of the local municipalities, the percentage of households with no income ranged from approximately 15-20%, with little variation between the municipalities in this regard. Where households had an income, it mostly exceeded R3 200 per month, as the geographical distribution of the percentage of households in the BPDM with an income of less than R3 200 per month is to a large	Household income is an indicator of disposable income which has a direct effect on economic development especially where economic activities dependent on the local population for success is concerned. It is also an indicator of poverty which might have a very real effect on the physical environment.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	extent similar to that of the households with no income. Less than 25% of the households in virtually the whole BPDM has a monthly household income of less than R3 200. It is, however, notable that between 25% and 50% of households in the north-eastern part of the Rustenburg LM has a monthly household income of less than R3200. The average household income of the majority of households in the Kgetlengrivier, Moses Kotane and Moretele local municipalities is between R9 600 and R19 600 per month, while the average income of the majority of households were higher in the Madibeng (R19 600 – R38 200) and Rustenburg (R38 200 – R76 400) local municipalities. Only 20.6% of the households in the Moretele LM earns more than R38 200 per month, while less than 30% of the households in the Kgetlengrivier and Moses Kotane local municipalities earn this amount. In the Madibeng LM, 37% of households earn more than R38 200 per month, while nearly 50% of households in the Rustenburg LM earn more than this amount.	
Infrastructure development		
Settlement typology (Table 6.2.1)	Settlements in more than 50% of the BPDM are classified as sparse rural settlements, including the major parts of the Kgetlengrivier and Moses Kotane local municipalities, as well as more than 50% of the Rustenburg, Madibeng and Moretele local municipalities.	The settlement typology gives insight into the nature of settlements in the area. The settlements where the most economic activity could be expected can be argued from the typology dataset (along with other socio-economic datasets). These insights will improve the general understanding of development

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	Three of the urban areas located in the central part of the BPDM are classified as 'cities'. These include Rustenburg and Phokeng (and their surrounds) in the Rustenburg and Kgetlengrivier local municipalities, as well as Mooinooi and its surrounds in the Madibeng LM. Other notable urban areas classified as 'city regions' include Brits, as well as areas to the north (Jericho) and south (Hartbeespoort) thereof in the Madibeng LM, as well as the southern and central parts of the Moretele LM, including Mathibestad, Maubane and Motsheko (and their surrounding areas). The remainder of the settlements are classified as 'local or niche towns', as well as 'dense rural' and 'high density rural', while Ledig next to Sun City is classified as a service town.	pressures in the area, which again has significance for sensitivity analysis.
Housing conditions (Table 6.2.2)	In nearly two thirds of the BPDM, between 70% and 90% of the population reside in formal housing, with a few small localities in the Rustenburg, Moses Kotane and Moretele local municipalities where it exceeds 90%. In the majority of the remaining third of the BPDM, between 50% and 70% of the population reside in formal housing. There are only a few areas in the Kgetlengrivier, Rustenburg and Madibeng local municipalities where less than 50% of the population do not have formal housing. In 2005 the BPDM already had a massive housing backlog of approximately 101 114 units. The bulk of which were located in the Rustenburg and Madibeng	Housing conditions reflects the socio-economic status and associated needs of an area to some extent. For instance, high numbers of informal dwellings would result in the need for the formalisation of those dwellings, which in turn will result in residential development. These types of development trends, influenced by the *status quo* of housing in an area should be considered as a potential development pressure, especially with regard to their possible effects on the biophysical environment.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	Local Municipality. In 2017 this number has been reduced to approximately 64 000 units. The situation with regard to settlement type and land tenure status is as follows: **Moses Kotane Local Municipality** Approximately 92% of households in the municipality reside in tribal and traditional lands, with only 7.5% staying in urban areas. Nearly 59% of households in the municipality own their houses, which are fully paid and approximately 21% of occupants occupy rent free. **Kgetlengrivier Local Municipality** Approximately 67% of the households in the municipality lives in urban areas and the remainder on private farms. Nearly 31% of households own their fully paid houses, while nearly 36% of households occupy their houses rent free. **Madibeng Local Municipality** More than 70% of the population is located in rural villages and farms and the remainder in urban areas. 50% of households own fully paid houses, while nearly 29% of occupants rent accommodation.	

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	Rustenburg Local Municipality Approximately 68% of households in the municipality resides in urban areas and 30% in tribal and traditional land. Approximately 22% of households own fully paid houses, while approximately 45% of households rent accommodation and 20% occupy rent free stands. **Moretele Local Municipality** More than 88% of the population is located in traditional areas, with the remainder residing in urban areas. More than 80% of households live in formal dwellings and about 15% occupy informal dwellings. Approximately 72% of houses owned is fully paid and nearly 24% of occupants occupy houses rent free.	
Dwelling unit density (Table 6.2.3)	Dwelling units in the BPDM area are mostly clustered around the medium to large settlements located in the central and eastern parts of the BPDM. Very low dwelling densities occur to the north-western part of the BPDM, in the Moses Kotane LM. Dwelling unit densities are the highest in settlements such as Rustenburg, Brits and Mooinooi, with densities in some areas exceeding 450 units/km2. Dwelling density decreases as one move further away from these settlements.	Dwelling unit density is an indicator of possible development pressures and cumulative effects in the area. It further provides insight on possible development trends that could be expected. One of the key objectives for housing delivery in the BPDM is to promote more compact urban structures through urban infill and densification where feasible, in clearly defined settlement clusters.
Basic services (Table 6.2.4)	There are only a few areas in the BPDM in the Rustenburg and Madibeng local municipalities where more than 90% of households have access to municipal water. In the Kgetlengrivier LM, more than 50% of	The status and condition of basic services have important implications for environmental sensitivity. The status and condition of basic services should be considered in terms of its possible effect on the

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	households in all areas have access to municipal water, while a similar situation exists in the Rustenburg LM, although only 30-50% of households in the rural areas northeast of Rustenburg have access to municipal water. Access to municipal water to more than 50% of households is primarily restricted to the southern parts of the Madibeng LM, while access in the northern parts vary from 10-30% and 30-50% of households. In the Moses Kotane LM, access to municipal water for more than 50% of households are primarily restricted to the south-eastern, as well as three other smaller parts of the municipality. In addition, access to municipal water in other central parts vary from 10-30% and 30-50% of households, while less than 10% of households in the western part of the municipality has such access. Although there are small areas in the Moretele LM where 50-70% and 70-90% of households have access to municipal water, in most areas this access is restricted to 10-30% or 30-50% of households. In most areas of the BPDM, more than 50% of households have access to electricity, with many areas where such access is available to more than 70% and even more than 90% of households. In the Kgetlengrivier LM, more than 50% of households have access to electricity, while there are still some areas in the Rustenburg and Moses Kotane local municipalities where 10-30% of households have access to electricity. In approximately 30% and 50% of the Moretele and	environment and its subsequent relevance to sensitivity.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	Madibeng local municipalities, respectively, 30-50% of households do not have access to electricity. Access to flush toilets is not common in and largely restricted to the southern parts of the BPDM. There are a few small areas where this service is available to 50-70% of the households, and even to more than 90% of households, primarily in the Rustenburg and Madibeng local municipalities. In the Kgetlengrivier local municipality, more than 30% of all households in all areas have access to flush toilets. However, less than 10% of households in virtually the whole of the Moses Kotane and Moretele local municipalities, as well as large areas in the Rustenburg and Madibeng local municipalities do not have access to flush toilets. In fairly large areas of the latter two municipalities, only 10-30% of households have access to such services. The provision of municipal waste removal seems to be the biggest municipal service challenge in the BPDM, with very few areas where more than 30% of households have access to this service. In a few isolated patches, higher levels of service delivery (30-50% and 50-70%) is available, while the service is delivered to more than 90% of households in 6 isolated areas in the Rustenburg (3) and Madibeng (3) local municipalities. In large parts of the Moretele and Madibeng, as well as small parts of the Rustenburg and Moses Kotane local municipalities, less than 10% of households are serviced by municipal waste removal services.	

Waste disposal sites and Waste water treatment works (Table 6.2.5)	Currently, the Bojanala District Municipality has 16 operational (public and private) landfill sites. These are situated as follows: • Rustenburg Local Municipality There are 6 sites in the RLM: one municipal landfill site (Waterval) and five communal sites (Marikana, Lethabong, Monnakato, Phatsima and Bethanie). One municipal landfill site (Townlands) has been decommissioned recently. • Moses Kotane Local Municipality In the MKLM, there are two municipal landfill sites (Mogwase and Madikwe), as well as two privately owned landfill sites (Sun City and Swartklip Platinum Mine). • Madibeng Local Municipality There are one municipal landfill site (Hartbeespoort Regional) and three privately operated landfill sites (Eastern Platinum, Western Platinum and Mooinooi) in the MaLM. • Kgetlengrivier Local Municipality In the KLM, there are two unlicensed municipal landfill sites (Koster and Swartruggens). • Moretele Local Municipality There is no municipal licensed waste disposal site in the MoLM, but solid waste is disposed of at an unlicensed, private waste disposal site (Bosplaas). There are currently 12 Waste Water Treatment Works (WWTWs) that are primarily owned and operated by the	Waste disposal sites and waste water treatment works are facilities that have the potential to have cause environmental pollution, as a result of both the types of waste in handles, as well as the long term nature thereof. If not well managed, both types of facilities can have significant negative effects on the receiving natural environment, with the potential of causing water, air and soil pollution. In addition, both can also affect human health and well-being. Over the last 2 decades, the levels of management of these facilities have not been good and numerous cases of serious pollution have been recorded in the BPDM.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	local municipalities and treat waste water. These are as follows: • RLM has four WWTWs (Rustenburg, Boitekong, Monnakato and Lethabong); • KLM has two WWTWs (Koster and Swartruggens); • MaLM has four WWTW (Brits, Mothotlung, Letlhabile and Rietfontein); • There is only one WWTW in the MKLM, situated at Mogwase; • The MoLM has one WWTW (Swartdam) that is owned and maintained by the BPDM. BPDM has identified the following challenges regarding WWTWs: • Insufficient capacity of WWTWs in the district to handle the current rate of population growth; • Inadequate human capacity and maintenance levels of WWTWs in the district; • non-compliance of WWTWs and potential impact on surface and groundwater resources.	
Eskom electricity network (Table 6.2.6)	Although Eskom power lines cover some parts of the BPDM, there are still other parts where such infrastructure is absent, especially in the Moretele local municipality and the rural areas of the Madibeng, Moses Kotane and Kgetlengrivier local municipalities. It is important to note that the existing and new 400 KV lines primarily transfers electricity over large distances, but also supplies electricity to major substations.	The distribution of available infrastructure serves as an indicator of where possible development might transpire. Many residential, commercial and industrial developments depend on the ESKOM network for electricity. Therefore, the electricity distribution network dataset provides an indication of where future development pressures might be expected.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
Roads and railways (Table 6.2.7)	The road and railway coverage in the BPDM are fairly well established. It is traversed by one national route (N4 highway), which forms the foundation for future infrastructure and spatial development. In addition, a well-developed secondary road network occurs throughout the municipality, connecting urban areas and settlements. The BPDM has a total provincial road network of 4 193 km. Of this, approximately 40% (1 703 km) are tarred, while 2 490 km are gravel roads. In the Rustenburg and Madibeng local municipalities, more than 50% of the provincial roads are tarred, while in the Moretele and Moses Kotane local municipalities, less than 25% of the provincial roads are tarred. The majority of the paved roads are in a fair to good condition, while gravel roads range from fair to poor condition. A total of 151 km (3.6%) of the road network in the BPDM is in a poor or very poor condition. The bulk of these occur in the Madibeng (48%) and Rustenburg (34%) local municipalities. Two interprovincial rail lines cross the BPDM. The first line runs from Pretoria, via Brits, to Rustenburg, from where it diverts to the north past Sun City and Mogwase to Thabazimbi. The second line from Johannesburg via Swartruggens (Borolelo) and Koster to Zeerust runs east-west through the southern part of Rustenburg Local Municipality and is also linked to Pretoria via Magaliesburg.	Roads and railways can also assist in identifying areas that might be likely to develop in the near future. Accessibility in terms of main roads might for example determine where future industrial development will transpire or where a PV solar plant will be developed.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	Although there are numerous public and private landing strips in the BPDM, most of the air transport services are provided at the Pilanesberg Aerodrome, serving mainly tourists to Sun City and the Pilanesberg Game Reserve.	
Land use		
Land cover and land cover changes (Table 6.3.1)	The primary economic sectors of mining, agriculture and tourism spatially cover large areas in the BPDM and have the potential to affect the environment, as well as the planning and operation of human settlements. Land use patterns in the BPDM, indicate that by 2014, approximately 32% of the district's total surface area of 1,831,241 ha had been converted from natural vegetation to other land uses. Within the BPDM, 77.3% of the land in the Moses Kotane local municipality was still in a natural condition in 2014, while in the other local municipalities this area varied from 60.9% (Rustenburg) to 66.2 (Kgetlengrivier). Agriculture is by far the most extensive land use in the BPDM. Through the conversion of natural veld to cultivation, it is also the most extensive land use activity that impacts on natural ecosystems in the BPDM. In 2014, 22.2 % of the land in the BPDM was cultivated, of which nearly 30% occurred in the Kgetlengrivier local municipality. Less than 8% of the cultivated land occurred in the Moretele local municipality, while the other local municipalities shared fairly equally with between 20-22% of cultivated land each.	Land cover indicates where natural habitat is still intact and will be crucial in the determination of the sensitivity of these areas for different activities. This information can be used to identify areas where conflicts between agriculture, mining, urban development and nature conservation might be expected in the future.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	Agriculture takes on many forms, including commercial dryland and irrigated cultivation, livestock farming, game farming, as well as subsistence farming. It affects land resources either through degradation of soils or water, or through impacts on ecosystem functioning. It is therefore crucial to find a balance between agricultural transformation and retention of open spaces and water. Although mining dominates the economy in the BPDM, as it generates the bulk of the economic activity and employs the bulk of the workforce in areas around the mines, it accounts for less than 10% of the total change in natural habitat. Demands for human resources, however, inevitably results in settlements clustering around the main mining areas in the BPDM, leading to rapidly growing urban populations. Urban development covers nearly 25% of the BPDM and places pressure on the land as demand for living space and basic services increases, as does the effective footprint of the urban centres in terms of the sourcing of various resources such as water, energy, food and materials. The rate of conversion of natural habitat to other land uses is a major areas of concern in the BPDM. Between 1990 and 2014, 247 691 ha (13.5%) of the BPDM was converted to non-natural land uses. This equates to a conversion rate of 0.56% per year, which is higher than the rate of loss of natural habitat in all other districts in the North-West Province. Within the BPDM, the highest	

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	rate of loss of natural habitat (16.4%) occurred in the Rustenburg local municipality, while this rate varied from 11.6% (Moses Kotane) to 14.8% (Madibeng) in the other local municipalities. As indicated before, the primary contributors to the loss of natural habitat in the BPDM since 1990 is agriculture, urban development and mining. Between 1990 and 2014, the average conversion rate from natural habitat to cultivated land in the BPDM was 64% or 2.7% per annum, with the highest conversion rate of 126% or more than 5% per annum in the Moses Kotane local municipality. Land covered by mining activities in the BPDM has grown by 122% or more than 5% per annum since 1990. Exceptional high rates of change from natural habitat to mining use occurred in the Moses Kotane (272% or more than 11% per annum), Rustenburg (210% or nearly 9% per annum) and Madibeng (153%) local municipalities, with virtually no change (6%) occurring in the Moretele local municipality. Urban development grew by 94% or more than 5% per annum since 1990. Although urban settlements only contributed 20% to the loss of natural habitat since 1990 in the Kgetlengrivier local municipality, it occurred at an extremely high growth rate of more than 44% per annum, compared to the next highest annual growth rate of 5% in the Rustenburg local municipality. In the Moretele local municipality, urban settlements only grew by less than 1.3% per annum.	

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
Heritage		
Palaeontological sensitivity (Table 6.4.1)	The online map indicates that the paleontological sensitivity of large areas in the central parts of the BPDM is insignificant/zero or low and developments will not require any studies to determine potential impacts to palaeontological heritage resources. This area covers the northern half of the Rustenburg local municipality, eastern part of the Moses Kotane local municipality, as well as central and north-eastern parts of the Madibeng local municipality. The southwestern part of the Moses Kotane local municipality, as well as small areas in Kgetlengrivier, Rustenburg and Madibeng local municipalities are considered to be moderately sensitive to paleontological impacts and proposed developments that could potentially impact palaeontological heritage resources will require desktop studies. There are currently two national heritage sites of national and international significance at Gondolin and Haasgat in the Madibeng Local Municipality where the series of fossil sites is one of the most important in the world for the study of human evolution in the context of changing ecological and biological processes. Gondolin Cave has yielded hominin remains of Paranthropus robustus and a suite of extinct fauna, while the fossiliferous deposits from Haasgat contain extinct terminal Pliocene / early Pleistocene primates and other fauna, but no hominins have yet been recovered. Both of these sites have	Fossil sensitivity is an important element of the proactive management of palaeontological and geological heritage resources and guides and assists developers, heritage officers and practitioners in screening palaeontologically sensitive areas. Because fossils are very seldom visible to most people, it is important that the sensitivity should be considered in the identification of environmental sensitivity zones and be considered in the development of the SDF and Land Use Scheme. However, the coarse scale of the dataset renders it unsuitable for further use in the development of the EMF.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	National Heritage status and the area has been declared a World Heritage Site under UNESCO. Large parts of the Kgetlengrivier local municipality, the southern half of the Rustenburg local municipality, the southern part of the Madibeng local municipality and virtually the complete Moretele local municipality are regarded as areas where the sensitivity to potential impacts to paleontological heritage resources are high to very high and proposed developments that could potentially impact palaeontological heritage resources will require desktop studies and field assessment.	
Heritage sites (Table 6.4.2)	The heritage resources of the BPDM include both tangible resources (e.g. heritage objects, natural features and landscapes) and intangible resources such as oral histories, traditional knowledge systems, cultural practises and folklore. The rapid development of mining and other activities in the BPDM has contributed towards an increased heritage resource knowledge base in the area. Humankind has been an inhabitant of the Magaliesberg and surrounding areas for millions of years and archaeological sites in the vicinity reveal ample evidence of Stone Age and Iron Age cultures. The Cradle of Humankind spanning the border between the North West and Gauteng provinces contains fossils and skeletal remains, amongst other archaeological finds, that are amongst the oldest records of human remains. Gondolin and Haasgat fall within the band of	Heritage sites are sensitive to any activity that might threaten to damage, destroy, deface, alter, excavate, alter, subdivide or remove it from its original position. Significance plays a central role in assessing heritage and is usually one of the most contentious issues when registering a new site. The degree of vulnerability of a site (resource) determines the policies and management practices for the site (resource) to ensure that the significance will be retained.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	important paleo-anthropological sites that comprise the Sterkfontein Valley landscape, within the Cradle of Humankind. Interdisciplinary research is currently being undertaken at both localities. Due to the fact that the Cradle of Humankind World Heritage Site is already protected in terms of the Gauteng Provincial EMF, it is excluded from the BPDM EMF. Kruger Cave close to the Olifantsnek Dam is the most important Late Stone Age locality in the province. Excavations found that hunter-gatherers occupied the site over many years, leaving behind a rich suite of cultural materials, apart from an extensive lithic assemblage. The remains of iron smelting furnaces and ceramics in Kruger Cave are evidence of the subsequent utilisation of this locality by African farmers. The ubiquitous presence of hunter-gatherers and pastoralists on the landscape is further demonstrated by the number of significant rock art localities in the North West province. It is universally accepted that the landscape featured importantly in the selection of suitable surfaces to make rock markings. Several localities in the Magaliesberg, contain rock engravings on boulders and rock outcrops. Most of the Magaliesberg sites engravings occur near numerous stone-walled settlements. The engravings show authorship of both hunter-gatherers and African farmers, e.g. at the large stone-walled settlement of Olifantspoort at Maanhaarrant in the BPDM.	

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	Later Iron Age sites occur across the entire North West province, including the BPDM. Important documented sites associated with this time are: • Broederstroom, a Provincial Heritage Site near the Hartbeespoort Dam; • Molokwane, a potential national heritage site west of Rustenburg that was the pre-difaqane 19th-century capital of the Modimosana Mmatau Kwena; • the stone-walled Tlokwa settlement of Marothodi near Pilanesberg that was the capital of the Rustenburg Tlokwa prior to their dispersal during the difaqane; • the Olifantspoort complex near Koster that contain extensive stonewalled settlements; • the mid-19th century settlement of Mabele-a-Podi in the Pilanesberg National Park that was the capital of Pilane's Kgafela Kgatla; • settlements along the Kgetleng (Elands) River that yielded insight into the smelting and working of copper and iron by indigenous metal workers; • a number of other aggregated stone-walled settlements across the BPDM landscape that had been identified during aerial surveys. Apart from the above, there are also numerous other historical heritage resources in the BPDM. These include buildings (Preller House, rondavel house and cemetery, Pelindaba, as well as other historical houses in Karee Road, and Fourie House No. 1, De Kroon, all	

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	located in the Madibeng Municipality; Schoch House, Boschdal, Boekenhoutfontein, Dutch Reformed Church and Old Anglican, as well as the Old Lutheran School (Library) and Old Lutheran Church in Kroondal, as well as a sawn-off stump of an ancient syringa tree in Rustenburg under which the Reformed Church was found. Lastly, there are also a number of battlefields from the Anglo Boer war (Nooitgedacht, Kommandonek, Silkaatsnek, Buffelspoort, Dwarsvlei, Tweefontein, Kalkheuwel, etc.)	
Mining		
Mineral points (Table 6.5.1)	The mineral deposits in the BPDM is primarily determined by Bushveld Igneous Complex, which is located north of the Magaliesberg. Formations in this complex are extremely rich in minerals and include exploitable quantities of platinum, gold, uranium, vanadium, iron, chrome, and manganese. Other minerals that have been identified in the BPDM include limestone, lead, copper, magnesium, fluorspar, phosphate, thorium and anorthite. Most of the mining activities are concentrated in a band (the Merensky Reef) which stretches from west of the Pilanesberg, southwards through the Bafokeng area and parallel to the Magaliesberg towards Marikana and Brits in the east. A few platinum and chrome mines are also found north of the Pilanesberg National Park in the Moses Kotane Local Municipality, as well as north of the Magaliesberg in the Madibeng local municipality. Over	Mining is regarded as the human activity with the most detrimental effect on the environment. The mining industry is a very important driver in the South African economy and a large portion of the population is dependent on it. Therefore, areas with mining potential will always have the potential of being developed and should be considered as a possible conflict area in the context of the EMF, especially as some of the mineral resources occur in cultural and environmental sensitive areas.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	the past 10-15 years, granite mining has also impacted on the majority of the Norite hills northwest of Brits. Diamonds are mined near Koster in the Kgetlengrivier Local Municipality. Platinum, gold, diamonds, chrome and vanadium are the main minerals found. Other minerals mined include lead, marble, granite and slate. Large-scale mining activities occur in the vicinity of the towns of Rustenburg and Brits, while various small open-cast stone, gravel and sand quarries also occur in the area. Three of the world's biggest platinum mines, Anglo Platinum, Impala Platinum and Lonmin Platinum, are located near Rustenburg, while new platinum mines are being developed on a large scale, primarily in the RLM.	
Mining authorisations (Table 6.5.1)	Existing mining rights reflect current mining operations to the north of the Magaliesberg, stretching in a curved line from Brits in the Madibeng local municipality in the east, to just south of Pilanesberg National Park in the central northern part of the BPDM indicates the importance of mining in the BPDM. A few isolated mining activities are also found to the north of the Pilanesberg National Park. Mining rights that were in process or had lapsed are indicated in shades of pink and are largely closely associated with the granted mining rights. The extent of prospecting right applications is also of critical importance. Affected areas cover close to 50% of the BPDM, occurring in all five local municipalities.	Since mining in South Africa is the backbone of the country's economy, opportunities for growth in this sector will continuously be explored. Therefore, areas with mining potential will have the potential of being developed and should be considered conflict areas in the context of the BPDM EMF.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	Although a fairly large percentage of these have lapsed, especially in the western parts of the BPDM, and quite a few have been rejected/refused or withdrawn, approximately 50% of the prospecting right applications have been granted. If a number of these lead to mining activities, the socio-economic benefits and environmental impacts of mining could extend beyond the boundaries of the Rustenburg and Madibeng into the other three local municipalities in the district.	
SANBI mining & biodiversity guidelines (Table 6.5.2)	In the BPDM area, there are five conservation areas that are legally protected and where mining is prohibited (Category A). Areas of highest biodiversity importance with highest risk for mining (Category B) occurs spread throughout the BPDM area, primarily related to river systems. Areas of high biodiversity importance with a high risk for mining (Category C) occur as buffers around the formally protected conservation areas, but also in nearly 50% of the BPDM. Small pockets of the remainder of the BPDM area are also of moderate biodiversity importance with a moderate risk for mining (Category D), The risk ratings of the last 3 categories are linked to their status as Critical Biodiversity Areas in the BPDM.	South Africa's mineral endowment implies that mining and the environment will continue to interact and need to walk this path together to achieve prosperity and sustainability. Without the integrity of the natural systems, there will be no sustained long-term economic growth or life. In the EMF information on biodiversity sensitivity and risk of mining must be utilised to ensure that mineral resource development takes place in a way that supports an optimal growth path for BPDM.
Tourism		
Tourism opportunities (Table 6.6.1)	Most of the tourism activities in the BPDM is focussed on the 'bushveld experience', including game viewing and hunting, but natural and cultural history itself also represents a significant drawcard. The main tourism	Existing tourism trends (and ecosystem opportunities) will need to be considered in the EMF, since it may have a direct influence on the economic growth and development in the area.

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	attractions the region has to offer, are closely linked to the comparative advantages the area has to offer with regard to its natural assets, the occurrence of many heritage sites relating to iron / stone age, Anglo-Boer history and indigenous tribes such as the Tswana and Ndebele, and the variety of minerals and mining activities found in the area. By far the best known attractions in the BPDM area are the nature reserves located in the district. Pilanesberg Game Reserve is one of the most accessible South African game reserves. It is the fourth largest game reserve in South Africa and is set high in the Pilanesberg range, traversing the floor of an ancient, long-extinct volcano. Pilanesberg conserves all the major mammal species including lion, leopard, elephant, rhino and buffalo. The Kgaswane Game Reserve, a 4 257 ha reserve situated above the town of Rustenburg offers a great range of viewing experiences to wildlife enthusiasts, is, across a varied habitat of quartzite mountain peaks. Sun City and Lost City, located on the southern boundary of the Pilanesberg Game Reserve, are luxury resorts with modern entertainments. The complex is set on the slopes of a picturesque valley in the Pilanesberg Mountains and captures the essence of an ancient African kingdom. Casinos, the Valley of the Waves and two world-renowned championship golf courses are just some of the many attractions.	

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	There are numerous historic buildings and structures in the BPDM. These include the Anglican Church and the Dutch Reformed Church, the historic statue of the Voortrekker girl and the Rustenburg Museum in Rustenburg. There are also a multitude of sites with cultural and historical significance in the BPDM area. This is no surprise, given the many different communities in the area, such as the indigenous Bafokeng, Bakgatla and Botswana tribes, whose totemic tribal traditions are of much interest. There is also the German community of Kroondal, North West Kroondal that traces its origins back to 1857. Many Anglo-Boer and ethnic war battles also took place in the area, with the districts of Koster, Swartruggens and Rustenburg featuring prominent battlefields, memorial graves and ruined forts. Caves are also important heritage and archaeological sites, and some, like the Weltevreden Caves (Koster area) are well-known tourist attractions. Other tourism attractions in the BPDM include the following: • Heritage Park (including development at Molatedi Dam); • Further development of tourism facilities around Sun City node; • Development of tourism facilities at Borakalalo Reserve (Klipvoordam);	

Environmental component (Table references refers to SQ report)	*Status quo*	Implications for sensitivity
	• Upgrading of Papatso cultural village and establishment of incubator for arts, crafts and cultural industries; • Improved road access to Hartbeespoortdam tourism node; • Soccer World Cup precinct development; • Traditional Art Gallery and cultural information centre at Rustenburg; and • Bospoortdam Tourism/Waterfront development. Lastly, there are also numerous other resorts in the BPDM, such as the ATKV Buffelspoort, Rustenburg Kloof and Dikhololo resorts.	

5.3 Considerations for development and management

From the analysis in Table 1 it is clear that the key sensitivities in the BPDM relate to land with high agricultural potential and ecological (biodiversity) significance, land use, surface and groundwater sources, heritage resources, socio-economic development, and physical infrastructure and built structures, while the primary development opportunities relate to mining and tourism.

5.3.1 Land use

The primary economic sectors of mining, agriculture and tourism spatially cover large areas in the BPDM and have the potential to affect the environment, as well as the planning and operation of human settlements. By 2014, approximately 32% of the district's total surface area of 1 831 241 ha had been converted from natural vegetation to other land uses. This varied between the five local municipalities within the BPDM, where, 77% of the land in the MKLM was still in a natural condition, while in the other local municipalities this area varied from 61% (RLM) to 66% (KLM).

Agriculture is by far the most extensive land use in the BPDM, as well as the one with the biggest impact on natural ecosystems. It takes on many forms, including commercial dryland and irrigated cultivation, livestock farming, game farming, as well as subsistence farming. In 2014, approximately 22 % of the land in the BPDM was cultivated, of which nearly 30% occurred in the KLM. Less than 8% of the cultivated land occurred in the MoLM, while the other local municipalities shared fairly equally with between 20-22% of cultivated land each. It affects land resources either through degradation of soils or water, or through impacts on ecosystem functioning. It is therefore crucial to find a balance between agricultural transformation and retention of open spaces and water.

Although mining dominates the economy in the BPDM, generating the bulk of the economic activity and employing the bulk of the workforce, it accounts for less than 10% of the total change in natural habitat. Indirectly, however, demands for human resources inevitably results in settlements clustering around the main mining areas in the BPDM, leading to rapidly growing urban populations.

Urban development covers nearly 25% of the BPDM and places pressure on the land, as demand for living space and basic services increases. The effective footprint of the urban centres in terms of the sourcing of various resources such as water, energy, food and materials, further places pressure on the land.

The rate of conversion of natural habitat to other land uses is a major areas of concern in the BPDM. Between 1990 and 2014, 247 691 ha (13.5%) of the BPDM was converted to non-natural land uses. This equates to a conversion rate of 0.56% per year, which is higher than the rate of loss of natural habitat in all other districts in the North-West Province. Within the BPDM, the highest rate of loss of natural habitat (16.4%) occurred in the RLM, while this rate varied from 11.6% to 14.8% in the other local municipalities. As indicated, the primary contributors to the loss of natural habitat in the BPDM is agriculture, urban development and mining.

Many areas in the BPDM area that are currently used for urban development purposes or zoned for such future use are located in environmentally sensitive areas, such as on sensitive hills and ridges with high biodiversity, within the 100 year flood line, in close proximity to wetlands and in close proximity to possible red data species habitat.

To address land concerns in the BPDM, it is important that development activities should be managed in such a way that land owners and users are allowed to continue with their existing rights relating to the sustainable and efficient lawful use of land, while redressing the imbalances of the past and ensuring that there is equity in the application of spatial development planning and land use management systems.

5.3.2 Biodiversity (ecological) resources

Large parts of the Bojanala Platinum District Municipality are characterized by high levels of biodiversity. These include the areas along the Magaliesberg, stretching from the southern parts of MaLM in the east to Rustenburg and further north westwards up to the north western parts of the RLM. It also includes areas in the central parts of the KLM, as well as large parts of the MKLM, west of the Pilanesberg National Park.

Based on the proportion of the ecosystem type that remains in good ecological condition relative to a series of thresholds, three vegetation ecosystems (Marikana Thornveld, Rand Highveld Grassland and Springbokvlakte Thornveld) in the KLM, RLM, MaLM and MoLM within the BPDM are classified as endangered. In addition, two vegetation ecosystems (Central Sandy Bushveld and Moot Plains Bushveld) that are located across all five local municipalities are classified as vulnerable ecosystems.

Five formally protected areas, the Pilanesberg National Park (MKLM), Kgaswane Nature Reserve (RLM), Magaliesberg Protected Natural Environment (MaLM & RLM), Borakalalo National Park (MoLM) and Vaalkop Dam Nature Reserve (RLM), are found within the BPDM. There are also numerous private nature reserves/game farms in the district. Only one ecosystem type (Pilanesberg Mountain Bushveld) in the BPDM is well protected, while two others (Madikwe Dolomite Bushveld and Gold Reef Mountain Bushveld) are moderately protected. All of the other ecosystems, except the Norite Koppies Bushveld, which is not protected at all, are classified as either poorly protected or hardly protected. These include least threatened, vulnerable and endangered ecosystems. In response to the importance of biodiversity in the BPDM, the North West Parks and Tourism Board is considering the extension of a number of existing nature reserves and conservation areas.

There are two Biospheres, internationally recognised areas for the promoting the conservation and sustainable utilisation of biodiversity, in the BPDM. Large parts of the core and buffer areas of the declared Magaliesberg Biosphere Reserve occurs in the southern parts of the Kgetlengrivier, Rustenburg and Madibeng local municipalities, while parts of the phase 2 targeted expansion areas of the core and buffer of the proposed Marico Biosphere Reserve occurs in the southwestern corner of the KLM.

Alien invasive plants does not seem to be a big problem in the BPDM, with an average density of less than 5% in virtually the whole area. These plants primarily cause localised problems in the southern parts of the Madibeng, Kgetlengrivier and Rustenburg local municipalities, where alien invasive plants occur in densities higher than 5% and up to more than 20%. These invasions are probably associated with the grasslands and broken terrain in the valleys, and ridges, as well as river systems. Alien plant invasions have a major impact on biodiversity, ecosystem services, agriculture, forestry, the economy and human welfare. They also cost the South African economy tens of billions of rand annually in lost agricultural productivity and resources spent on management. Both the DAFF and DEA consider AIP distribution/invasions as an important indicator for the protection of the agricultural production potential of crop and grazing land and biodiversity.

5.3.3 Agricultural resources

As indicated, agriculture is by far the most extensive land use in the BPDM, as well as the one with the biggest impact on natural ecosystems. It includes commercial dryland and irrigated crop production, livestock and game farming, as well as subsistence crop and livestock farming.

Most of the land in the BPDM has a moderate potential for crop production, including most of the land in the central and eastern parts of the BPDM (MoLM, MaLM, RLM and MKLM), as well as some land in the southern part (KLM). In the remainder of the BPDM, the crop production potential is marginal or the land has no potential for crop production and is only suitable for livestock grazing. The land in the mountainous areas are not suitable for agricultural production and classified as wilderness.

Crop fields exist in all five local municipalities in the BPDM. The majority of these are cultivated annually and used for dryland crop production or planted pastures, while many of those in the proximity of the Crocodile River and some in the southern parts of KLM are irrigated. While the majority of cultivated lands are used for grain crop production, some are also used for horticulture or viticulture production. In the Kgetlengrivier, Rustenburg and Madibeng local municipalities, the majority of the cultivated fields are commercially farmed, while the majority of cultivated fields in the Moses Kotane and Moretele local municipalities are cultivated by subsistence farmers.

In the BPDM area, large variations in grazing capacity is apparent, ranging from as high as 5-7 ha/animal unit to as low as 31-40ha/animal unit. Despite the patchiness of the grazing capacity throughout the BPDM, with patches of higher grazing capacity interspersed with patches of lower grazing capacity, the grazing capacity is generally higher in the eastern parts of the BPDM and lower in the western and southwestern parts.

Land degradation is an important concern in the North West Province, where 71% of the province experiences erosion problems, as well as the BPDM, where as much as 10% of the land area is classified as degraded. Although these are areas with high susceptibility to water and wind erosion, large areas of the BPDM has a low susceptibility to both of these types of erosion, especially those areas where the soils have a high clay content.

In the MoLM, an estimated 41% of the total land area classified as degraded, with comparative figures of 12% and 11% in the MKLM and MaLM, respectively. From 1990 to 2014, erosion or bare soil areas increased tremendously in the RLM (108.3%), MKLM (79.4%), MaLM (51.7%) and KLM (42.5%), while it decreased in the MoLM. A specific land degradation challenge exists in the lower Elands River catchment, south of the Pilanesberg, where soil erosion and high sediment loads are prevalent due to overgrazing, which will reduce the yield of the Vaalkop Dam in the long-term.

Management of development activities should on the one hand focus on the protection of high value agricultural land for agricultural purposes, and on the other to facilitate initiatives to identify areas that is degraded and implement rehabilitation programmes, linked to improved land management.

5.3.4 Protection of water resources

Water is a key environmental component in the arid environment of the BPDM. The area is endowed with various water resources. Large numbers of people rely on groundwater

as their only source of water, while irrigation water is an important contributor to unlocking the agricultural potential of the high value cropland.

Surface water resources occur throughout the BPDM area and include three river catchments that flows periodically after good rainfall events in the area, with two large dams, i.e. the Hartbeespoort and Molatedi dams, as well as a number of smaller dams, i.e. Vaalkop, Buffelspoort, Olifantsnek, Bospoort, Lindleyspoort, Mankwe, Koster, Swartruggens, Klipvoor and Rooikoppies dams. There are also numerous pans in the BPDM area that contribute to surface water accumulation after good rainfall events in the area. The numerous pans and associated wetlands in the area are also important from a biodiversity conservation perspective. The overall present ecological status of many water resources in the BPDM is largely to seriously modified, due to industrial (including current mining activities), domestic and commercial effluents, sewage, dysfunctional Waste Water Treatment Works' (WWTWs), agricultural run-off and litter, over-abstraction of groundwater and eutrophication problems.

Although groundwater occurs throughout the BPDM, high potential groundwater resources are primarily limited to a few dolomitic aquifers and associated fountains. Groundwater has always been an important source of rural water supply within the BPDMM area, especially in the drier parts, where groundwater constitutes the main, and in many cases the only source of water for rural domestic supplies and stock watering, as well as for towns.

Protecting the valuable water resources is, therefore, imperative to sustainable development in the BPDM and should be a key focus area for management of development activities.

5.3.5 Social development

Despite recent improvements, between 70-90% of the population in the BPDM only has a qualification lower than grade 12, between 30-70% of the economically active population is employed, while less than 25% of the households earn less than R3200 per month. The average household income in the Kgetlengrivier, Moses Kotane and Moretele local municipalities is R9 600 to R19 600 per month, while the average income of the majority of households were higher in the Madibeng and Rustenburg local municipalities. Development activities should be managed to facilitate sustainable socio-economic growth in the BPDM, in order to improve the lives of all citizens and progressively meet their basic social and economic needs and build just, sustainable communities.

5.3.6 Heritage resources

The heritage resources of the BPDM include both tangible resources (e.g. heritage objects, natural features and landscapes) and intangible resources such as oral histories, traditional knowledge systems, cultural practises and folklore. The rapid development of mining and other activities in the BPDM has contributed towards an increased heritage resource knowledge base in the area.

Humankind has been an inhabitant of the Magaliesberg and surrounding areas for millions of years and archaeological sites in the vicinity reveal ample evidence of Stone Age and Iron Age cultures. The Cradle of Humankind, spanning the border between the North West and Gauteng provinces, contains fossils and skeletal remains, amongst other archaeological finds, that are amongst the oldest records of human remains. Due to the

fact that the Cradle of Humankind World Heritage Site is already protected in terms of the Gauteng Provincial EMF, it is excluded from the BPDM EMF.

Kruger Cave close to the Olifantsnek Dam is the most important Late Stone Age locality in the province, while Later Iron Age sites occur across the entire BPDM, with a number of important documented sites (Broederstroom, Molokwane, the stone-walled Tlokwa settlement near Pilanesberg, the Olifantspoort complex near Koster, the settlement of Mabele-a-Podi in the Pilanesberg National Park, settlements along the Elands River and a number of other aggregated stone-walled settlements across the BPDM landscape). The ubiquitous presence of hunter-gatherers and pastoralists on the landscape is further demonstrated by the number of significant rock art localities, with several localities in the Magaliesberg, containing rock engravings on boulders and rock outcrops, most of which occur near stone-walled settlements.

Apart from the above, there are also numerous other historical heritage resources, including buildings in the MaLM (Preller House, rondavel house and cemetery, Pelindaba, historical houses in Karee Road, and Fourie House No. 1, De Kroon) and the RLM (Schoch House, Boschdal, Boekenhoutfontein, Dutch Reformed Church and Old Anglican churches, Old Lutheran School (Library) and Old Lutheran Church in Kroondal, as well as a sawn-off stump of an ancient syringa tree in Rustenburg under which the Reformed Church was found). Lastly, there are also a number of battlefields from the Anglo Boer war (Nooitgedacht, Kommandonek, Silkaatsnek, Buffelspoort, Dwarsvlei, Tweefontein, Kalkheuwel, etc.)

5.3.7 Physical infrastructure and built structures

In most areas of the BPDM, the majority of households have access to electricity, while the majority of households have access to municipal water in approximately 50% of the BPDM. Access to flush toilets to the majority of household is restricted to a few small areas in the BPDM, while in more than 50% of the BPDM, less than 30% of the households have such access. The situation with waste removal services is even worse, with only very few areas where more than 50% of households have access and less than 30% of households with in almost 50% of the BPDM. In addition, the bulk of the waste and waste water treatment facilities are not operated optimally, contributing to environmental pollution. The status and condition of basic services have important implications for environmental sensitivity and should therefore be considered in all decisions on development applications.

5.3.8 Topography and geology

The topography of the BPDM is generally uniform, with gently undulating plains on the Highveld plateau located in the southern parts of the BPDM, as well as in the lower lying areas to the north of the Magaliesberg. The Magaliesberg Mountain Range and the Pilanesberg are the two most prominent topographical feature of the BPDM, while norite hills are scattered to the north of the Magaliesberg. Normally, these topographical features hosts higher biodiversity than the surrounding plains. Due the view from them, there is also huge pressure to develop on these, especially around urban areas.

The geology in the district is very diverse, with band waves and patches from the east to the west. The major geological feature in the BPDM is the large area of volcanic intrusive rock, referred to as the Bushveld Igneous Complex. Rock formations in this complex are extremely rich in minerals, which has led to large-scale mining activities in this area. Chert

rich dolomitic rock with high water storage capacity a is found in a band running east-west in the extreme southern part of the BPDM, as well as a band to the north of the Dwarsberg, with a few smaller compartments scattered in the north-eastern part of the BPDM.

Development activities that could negatively impact these unique topographical features and geological resources should be managed in such a way that these features are protected as far as possible.

5.3.9 Tourism, mining and solar potential

Tourism opportunities in the MMM are primarily linked to cultural and natural heritage sites, such as the Magaliesberg and Pilanesberg, the Cradle of Humankind and the numerous historical buildings and sites, including stone age and iron age sites, Anglo-Boer War sites like Kommandonek, dams such as the Hartbeespoort, Olifantsnek and Vaalkop dams, as well as the numerous holiday resorts in the BPDM. Development projects that could stimulate the potential of these natural, cultural and heritage sites should be promoted.

Rock formations in the strip of land to the north of the Magaliesberg, covered by the Bushveld Igneous Complex, that stretches from Brits in the east, past Rustenburg and north to areas beyond the Pilanesberg are extremely rich in minerals, especially the platinum group metals and has led to large-scale mining activities in this area. These activities has prompted tremendous economic growth and are likely to do so well into the future. Responsible mining developments that subscribed to the principles, during the planning, operational and decommissioning and closure phases of mining should be promoted.

The areas to in the western and northern parts of the BPDM have great potential to generate electricity from solar energy. Although, compared to other areas in the Northern Cape and elsewhere, it may not be as lucrative for commercial exploitation, it is good enough for the large scale roll-out of solar geysers and other smaller household applications.

5.3.10 Conflicts and pressures

Some conflicts and pressures that may arise are those pertaining to development clustered around existing infrastructure and natural features. If not effectively managed this type of clustering may contribute to the existing cumulative impacts and cause a number of environmental problems, ranging from water pollution to land degradation. Further conflicting land uses include any land use that will deprive landowners and communities of their existing rights relating to the lawful use of the land or negatively affect the safe, undisturbed and quiet enjoyment of their properties. Conflicts and pressures can, however, be managed if recognised and planned for in a pro-active manner, as this framework and other parallel tools set out to do.

6 DESIRED STATE OF THE BOJANALA PLATINUM DISTRICT MUNICIPALITY ENVIRONMENT (PHASE 4)

The analysis and evaluation of the base line information, issues raised through the public participation process, and authority requirements and policies identify and provide the basis for establishing environmental priorities, related to critical environmental issues, in the EMF development process. These environmental priorities must be used to develop a vision and strategic objectives for the Desired State of the Environment, as well as management guidelines for the EMF (South Africa, 2012b).

The process of identifying the desired state of the BPDMM comprised several steps (Figure 5), which could be considered sub-phases of phase 4 of the project. These steps systematically build on the *status quo* analysis and include a review of policy drivers and a stakeholder engagement process. The results of the *status quo* reporting phase, as captured in the *status quo* report was used to facilitate a public participation process, where interested and affected parties were provided the opportunity to contribute in defining the Desired State of the Environment in terms of a vision, mission and guiding principles, as well as five primary and four secondary strategic objectives for the management of the BPDM environment.

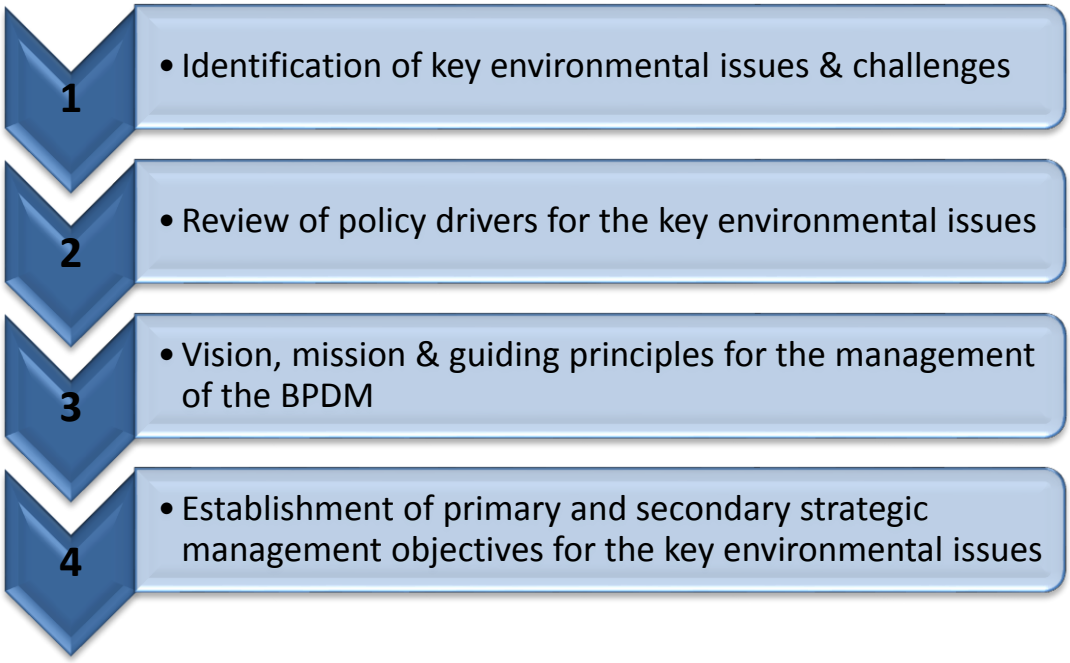


Figure 5. Process of determining the Desired State of the Environment

6.1 Purpose of the Desired State of the Environment phase

The purpose of this phase is to identify the strategic significant issues, identify environmental opportunities and constraints, and to clearly describe the desired future state of the environment. It details the identified conflicts between land-use planning, the key potentially conflicting land uses, i.e. urban development, mining and agriculture and biodiversity conservation, and identifies the strategies needed for dealing with them.

The deliverables from this phase is twofold in nature and include

- a detailed development vision for the area, as well as
- a comprehensive set of development objectives related to the desired future state relating to the priority environmental issues within the area.

6.2 Key Issues, opportunities and threats

This section summarises the key environmental issues, as well as opportunities and threats in the BPDM, as identified from the findings of the *status quo* analysis and the inputs received from stakeholders during the public participation workshops. The discussion does not present these issues in any order of importance, but merely serves to highlight some critical issues, opportunities and threats.

The key issues, opportunities and threats are classified under three main headings i.e. Legal and Institutional Framework, Natural Environment and Socio-economic Environment.

6.2.1 Issues and challenges relating to the legal and institutional framework

The legal and institutional context for the BPDM is complex and can be divided into the legal and institutional frameworks for the BPDM; related strategic planning frameworks and the various mandates for project level authorizations. The main conclusions on each of these components are summarised in Table 1.

It is evident that the effective management of the BPDM will require a clear understanding of its legal status and mandate, combined with effective alignment thereof with the strategic planning frameworks for the area, as well as effective co-operative governance between different stakeholders, including institutions at all three spheres of government, with regard to strategic planning, land use management and project level authorizations.

6.2.2 Issues and challenges relating to aspects of the natural environment

The status quo analysis describes the natural environment in relation to geology and topography, biodiversity, water resources (hydrology), air quality, agricultural potential and solar potential. The main conclusions on each of these environmental components are summarised in Table 2.

Threats to biodiversity include human-induced or mediated activities that result in the loss (transformation) or reduction (degradation) of biodiversity pattern and/or processes, either directly or indirectly. These may manifest as changes in biodiversity structure (e.g. landscape fragmentation, bush encroachment), composition (e.g. species loss), or as changes in ecosystem functioning (e.g. altered hydrology, reduced net primary productivity) (Desmet et. al. 2009).

Direct causes of biodiversity loss relate predominantly to various forms of land use that either compete directly with biodiversity (urban development, agriculture and mining), or utilise natural resource at unsustainable levels (overgrazing, water abstraction) and include agriculture, mining and urbanisation. Indirect causes are usually systemic in nature and usually have a socio-economic or political origin and include institutional and enabling environment issues relating to conservation management and land-use and land-use change management. The direct impacts on biodiversity due to competing land-uses result in loss of habitat and landscape fragmentation, as well as degradation of the natural environment, but their impacts could be significantly mitigated if the institutions responsible for environmental and land-use planning and management operated and applied the law effectively (Desmet et. al. 2009).

Other potential threats to the natural environment include the following:

- Destruction/degradation of areas with high agricultural potential, i.e. cropland by mining and urban development;

- Destruction/degradation of areas with moderate agricultural potential, i. e. grazing land, especially by poor grazing practices and veld fires;
- Destruction/degradation of areas of special ecological significance;
- The degraded state of the Crocodile, Apies, Elands and Marico rivers that diminishes the natural value of the area; and
- Over-exploitation of the limited groundwater resources.

6.2.3 Issues and challenges relating to aspects of the socio-economic environment

The status quo analysis described the socio-economic environment in relation to socio-economic profile, land use, heritage resources, mining, tourism and physical (services) infrastructure. The main conclusions on each of these socio-economic components are summarised in Table 3.

Potential threats to the socio-economic environment include the following:

- Illegal developments, especially on high potential agricultural land;
- Poor condition of roads and other municipal services infrastructure;
- Lack of municipal services.

The most important socio-economic opportunities relate to the multi-functional use of the land in the BPDM – where various complementary land-uses, such as farming and tourism, which will not threaten the sustainability of local communities, could facilitate socio-economic development. Such land uses could also facilitate the development of the necessary infrastructure required and may also serve to protect the natural environment.

Table 2: Issues and challenges relating to the legal and institutional framework

Findings of the *Status Quo* Analysis	Inputs from Stakeholders/Interested and Affected Parties
Legal and Institutional aspects	
In terms of the legal status of the BPDM EMF, a range of international and national legislation is applicable, including the National Environmental Management Act 107 of 1998: 2010 EMF Regulations; National Environmental Management Act 107 of 1998, National Water Act 36 of 1998, National Environmental Management: Waste Act 59 of 2008; National Environmental Management: Biodiversity Act of 10 2004; National Environmental Management Protected Areas Act 57 of 2003; Conservation of Agricultural Resources Act 43 of 1983; Subdivision of Agricultural Land Act 70 of 1970 and the Mineral and Petroleum Resources Development Act 28 of 2002. The strategic natural resource management and development planning perspectives are set out in various strategic documents, including the National Water Resource Strategy 2, July 2012; Internal Strategic Perspective: Crocodile West Marico Water Management Area, February 2004, National Groundwater Strategy, Draft 4 (April 2016); North West Groundwater Master plan, 2010; Crocodile West River Reconciliation Strategy, 2012; State-of-Rivers Report: Monitoring and Managing the Ecological State of Rivers in the Crocodile (West) Marico Water Management Area, 2005; National Wetlands Inventory, 2006; National Freshwater Priority Areas, 2011; National Spatial Biodiversity Assessment, 2006; National Biodiversity Assessment, 2011; North West Biodiversity Sector Plan, 2015; National list of Threatened and Terrestrial Ecosystems, 2011; National Protected Areas Expansion Strategy, 2010, North West Provincial Air Quality Management Plan, 2015 etc. Strategic environmental decision-support documents include existing EMFs adopted in the past that cover two out of the five local municipalities, namely the Rustenburg Local Municipality EMF and the Madibeng Local Municipality EMF. In addition, the adopted EMF for the Magaliesberg Protected Environment (MPE) covers parts of both the Rustenburg and	Special consideration should be provided to the Cradle of Humankind World Heritage Site, which is protected in terms of the World Heritage Convention and the World Heritage Convention Act 49 of 1999. Special consideration should also be provided to the proclaimed Magaliesberg Biosphere and the proposed Marico Biosphere, both of which will be protected in terms of the UNESCO Man and the Biosphere Programme, a programme designed to promote the conservation of genetic resources, species, and ecosystems; scientific research and monitoring; and sustainable development in communities of the surrounding region.

Madibeng local municipal areas. Lastly, it must be noted that a portion of the Cradle of Humankind World Heritage Site (COHWHS) falls within the Madibeng Local Municipality boundary. This area is covered by the Gauteng Provincial EMF and excluded from the ambit of the BPDM EMF. Strategic land use management documents include Spatial Development Frameworks for the North West Province, as well as the Bojanala Platinum District Municipality, as well as the Kgetlengrivier, Madibeng, Moretele, Moses Kotane and Rustenburg local municipalities. Finally the range of project level authorisation processes that are applicable to developments in the BPDM include environmental authorisations in terms of the National Environmental Management Act 107 of 1998; water use authorisations in terms of the National Water Act 36 of 1998; waste management licenses in terms of the National Environmental Management: Waste Act 59 of 2008; atmospheric emission licenses in terms of the National Environmental Management: Air Quality Act 59 of 2008; approval/permission for the subdivision of agricultural land in terms of the Subdivision of Agricultural Lands Act70 of 1970 and the Division of Land Ordinance 20 of 1986; heritage resource authorisation in terms of the National Heritage Resources Act 25 of 1999 and mining related licenses/permits issued in terms of the Mineral and Petroleum Resources Development Act 28 of 2002. It also includes land use management related authorisations such as recommendations on land use and development applications from Municipal Planning Tribunals in terms of the Spatial Planning and Land Use Management Act 16 of 2013; permissions/approvals in terms of the Advertising on Roads and Ribbon Development Act 21 of 1940; certificates of cancellation for township establishment on agricultural smallholdings in terms of the Agricultural Holdings Act 22 of 1919, as well as recommendation from the Townships Board in terms of the Town Planning and Township Ordinance 15 of 1986; approvals for removal of restrictive conditions from a Deed of Transfer in terms of the Removal of Restriction Act 84 of 1967; approvals for township establishment in terms of the Less Formal Township Establishment Act 112 of 1991 and the Regulation relating to Township Establishment and Land Use of 1986; municipal approvals for township establishment in terms of the Town Planning and Township Ordinance 15 of 1986; as well as municipal rezoning or subdivision	

Findings of the *Status Quo* Analysis	Inputs from Stakeholders/Interested and Affected Parties
of land application approvals issued in terms of applicable land use schemes, regulations and by-laws.	

Table 3: Issues and challenges relating to aspects of the natural environment

Findings of the Status Quo Analysis	Inputs from Stakeholders/Interested and Affected Parties
Hydrology and water resources	
Water is a key environmental component in the arid environment of the BPDM. The area is endowed with various water resources, including valuable underground aquifers and associated fountains. Large numbers of people, including numerous smaller towns rely on groundwater as their only source of water. Surface water resources includes the Crocodile River, Elands River and Apies River, with numerous dams in each of these river systems. The dams provide water to the towns and villages, as well as irrigation water to farmers. Periodic river flows occur after good rainfall events in the area, while surface water also accumulates in numerous pans during such events. The numerous pans and associated wetlands in the area are also important from a biodiversity conservation perspective. The surface water resources within the BPDM area are well developed, with a high degree of utilisation. Water requirements outstrip the local yield and water is transferred into the catchment to meet requirements. Irrigation water is an important contributor to the unlocking of the agricultural potential of the high value cropland. Major concerns relate to the future availability of water, eutrophication of water bodies, especially the Hartbeespoort dam, and poor ecological condition of most watercourses.	The community feels that water shortage and water safety, especially where mining activities are found, should be addressed. The FSE recommends that the EMF proposes the no-go option for mining within water source areas and water focus areas, as well as river and wetland freshwater ecosystem priority areas (Ramsar sites) and a 1 km buffer around these areas and legally protected areas. The overall present ecological status of many water resources in the BPDM is largely to seriously modified, due to industrial (including current mining activities), domestic and commercial effluents, sewage, dysfunctional Waste Water Treatment Works' (WWTWs), agricultural run-off and litter, over-abstraction of groundwater and eutrophication problems.

Findings of the Status Quo Analysis	Inputs from Stakeholders/Interested and Affected Parties
Land use and transformation	
Transformation of land threatens sensitive & valuable environmental resources.	
Agricultural potential	
Prime agricultural land is lost to other land-uses, such as urbanisation and mining.	Some game farmers stop cultivating their croplands. This is a sustainable economic factor. Where suitable, cropland should be used for crop production purposes. Uncontrolled veld fire is an important risk to agricultural production. There has to be an assessment of fire hazards, fire risk as well as proper fire burning regimes if the environment is to be properly managed regarding fires. It is also important that the effective and proper functioning of FPA's in the BPDM in terms of the National Veld and Forest Fire Act is emphasised.
Biodiversity and ecosystem health	
The number of threatened species & ecosystems is increasing, and critical ecological resources is not formally protected.	The FSE recommends that the EMF proposes the no-go option for mining within areas of high biodiversity (critically endangered and endangered ecosystems, critical biodiversity areas, river and wetland freshwater ecosystem priority areas and Ramsar sites) and a 1 km buffer around these areas, and legally protected areas.

Findings of the Status Quo Analysis	Inputs from Stakeholders/Interested and Affected Parties
	The MBMB recommends that the Magaliesberg Biosphere is included in the BPDM EMF so as to strengthen its protection. Fire is an important aspect in the spread of invasive species and in the protection of the various vulnerable ecosystems. There has to be an assessment of fire hazards, fire risk as well as proper fire burning regimes if the environment is to be properly managed regarding fires. It is also important that the effective and proper functioning of FPA's in the BPDM in terms of the National Veld and Forest Fire Act is emphasised.
Air quality	
Current ambient air quality is good, but may be affected negatively by regional developments. Poor air quality in settlements impacts negatively on health and well-being.	

Table 4: Issues and challenges relating to aspects of the socio-economic environment

Findings of the Status Quo Analysis	Inputs from Stakeholders/Interested and Affected Parties
Sustainable human settlements	
Poverty & lack of basic services in informal & rural settlements render people reliant on slowly degrading natural environments	
Socio-economic development	

Findings of the Status Quo Analysis	Inputs from Stakeholders/Interested and Affected Parties
Despite recent improvements, approximately 70% of the population in the BPDM does not have a grade 12 qualification and less than 10% hold a tertiary qualification. In addition, unemployment levels of the economically active population varies from approximately 30% in some parts of the BPDM, to approximately 70% in others, while in a few restricted areas, unemployment may be as high as 90%. Lastly less than 25% of households in most areas has no income, while up to 50% of households earn less than R3200 per month in some of the central areas around the mines.	
Waste (disposal) and waste water (treatment) services	
Poor quality of service infrastructure and levels of service contributes to environmental pollution and degradation	Illegal waste sites in the Moretele Municipality appear to be the norm, especially in Bosplaas, where large scale illegal dumping of industrial waste occurs extensively. Very little waste removal services is offered in rural areas.
Mining	
Mining largely drives economic growth in the BPDM, but fails to respond to socio-economic issues and puts water, soil, air and energy resources, as well as natural and cultural heritage resources under pressure.	The FSE recommends that the EMF requires that the decision makers in mining applications must take into consideration whether a proposed development will constitute the best use of the resources (i.e. the best practicable environmental option).
Heritage resources	
The BPDM area hosts a wide range of heritage resources, including historical political and conflict sites, numerous historical buildings, numerous monuments, some archaeological and	

Findings of the Status Quo Analysis	Inputs from Stakeholders/Interested and Affected Parties
palaeontological sites, as well as cemeteries with historical graves. Although few of these are of national importance, they should be protected for future generations and where possible, also celebrated as tourism destinations. Currently, the status of heritage resources is deteriorating due to development conflicts, poor management & conservation	
Tourism	
Tourism opportunities in the BPDM are primarily linked to cultural and natural heritage sites, such as the numerous historical buildings and sites in the BPDM; the Cradle of Humankind World Heritage Site, Pilanesberg National Park, Borakalalo National Park, the Kgaswane Nature Reserve and Vaalkop Dam Nature Reserve, Gondolin and Haasgat paleontological sites, Kruger Cave late stone age archaeological site, large stone-walled settlement of Olifantspoort and other similar iron age archaeological sites, Anglo-Boer War sites like Nooitgedacht, Kommandonek, Silkaatsnek etc., as well as the Hartbeespoort, Vaalkop, Olifantsnek and other dams and holiday resorts. Development projects that could stimulate the potential of these natural, cultural and heritage sites should be promoted.	

6.3 Desired State of the Bojanala Platinum District Municipality environment

In line with the key environmental concerns identified in the Status Quo report and relevant national and provincial policies, the desired state for the Bojanala Platinum District Municipality environment, is:

"An environment, where the following are realised:

- *Sufficient water of adequate quality is available to provide for basic human needs, while water resources are ecologically sustainable;*
- *Land is used sustainably, to the benefit of all land users;*
- *Agricultural land is adequately protected and sustainably used for agricultural production;*
- *Terrestrial and aquatic biodiversity are adequately conserved and well-managed;*
- *Sustainable socio-economic growth is facilitated to improve the lives of all citizens;*
- *Basic municipal services are delivered effectively and efficiently;*
- *A healthy ambient air quality environment is maintained that does not negatively affect human health and well-being;*
- *Mineral resources are developed effectively, while mining activities are managed and closed sustainably;*
- *Unique cultural and heritage resources are adequately protected and well-managed;*
- *The tourism potential of the area is optimally developed and utilised.*

All of the this is done to promote ecologically sustainable development, while also promoting justifiable social and economic development that ensure sustainable and equitable benefits to present and future generations."

6.3.1 Vision and guiding principles for the BPDM EMF

6.3.1.1 Vision

The BPDM IDP 2012-2017 vision is to be *"A model of cooperative governance for effective and efficient service delivery, in partnership with local municipalities and all stakeholders."* (BPDM, 2012).

This vision is supported by the BPDM mission in the same document that "BPDM, through shared services, will coordinate, facilitate and support local municipalities by equitable sharing of resources and maximising community benefit of natural resources, in a safe and healthy environment (BPDM, 2012).

From an environmental perspective, the vision and mission is further also supported by the two key performance areas of local economic development and basic service delivery and infrastructure investment that both aim to ensure a clean, safe and healthy municipality, as well as universal access to quality, affordable and reliable municipal services (e.g. water, sanitation, electricity, refuse removal and transportation).

When the BPDM vision and mission is read together with the key performance areas, it addresses the following key environmental elements:

- a safe and healthy environment;
- maximum community benefit of natural resources;
- effective and efficient service delivery.

In conclusion, it seems as if there is therefore no need to modify the existing BPDM municipal vision and mission in terms of the Desired State of the Environment.

This is especially true if the above is read in the context of the 2013 Provincial Environmental Outlook, which:

- acknowledge our dependence on natural resources;
- recognise that we must take care of the natural environment that we depend on, in order to achieve a strong, growing, sustainable economy; and
- recognise the importance of effective and efficient service delivery, not only to serve the people, but also to protect the environment (that includes health & well-being).

6.3.1.2 Guiding Principles for the EMF

The EMF is guided by the principles for sustainable development, as captured in the NEMA, as well as indirectly by the general development principles, as captured in the SPLUMA, including the principles of spatial justice, spatial sustainability, spatial resilience, efficiency and good administration.

6.3.2 Strategic objectives for the Desired State of the Environment

Strategic objectives for the BPDM were established for all the key natural and socio-economic environmental issues (Table 5). This was done through the consideration of the requirements of the NDP 2030 Vision for Environmental Sustainability and Resilience, as documented in the MTSF, NW PDP, as well as objectives of relevant legislation, policies and strategies of national and provincial spheres of government, as well as stakeholder input.

Table 5: Strategic objectives for key natural and socio-economic environmental issues

Significant environmental issue	Strategic Objective
Primary strategic objectives	
Water resource management (Hydrology)	To manage the water (surface and groundwater) resources in the BPDM for the benefit of all recognised water users and beneficial water uses, through good planning, decision-making and management.
Land use	To enable communities in the BPDMM to develop and sustainably utilise the natural resources in their areas to the benefit of local communities, while allowing communities and private land owners in the BPDM the continuation of their existing rights relating to the existing lawful use of the land, redressing the imbalances of the past and ensuring that there is equity in the application of spatial development planning and land use management systems, and responding to climate change through appropriate adaptation and mitigation arrangements.
Agricultural development	To promote the long term sustainable use and conservation of natural agricultural resources, including grazing land, and the protection of high potential cropland and its productive use in the BPDM, to ensure profitable agricultural economic output and national and household food safety and security.

Significant environmental issue	Strategic Objective
Biodiversity and conservation	To conserve and manage terrestrial and aquatic biodiversity in the BPDM, including vulnerable and unique ecological communities, as well as rare indigenous plant and animal species, through good planning, decision-making and management, as well as wise and efficient use of natural resources, to ensure sustainable and equitable benefits to the people of the BPDM.
Sustainable human settlements	• To facilitate sustainable socio-economic growth in the BPDM, through active community participation, enhanced governance systems and capacity, as well as improved co-operation between all spheres of government, in order to improve the lives of all citizens and progressively meet their basic social and economic needs and build just, sustainable communities. • To facilitate effective & efficient service delivery, in partnership with local municipalities, to protect health, well-being and the environment by providing for - ➢ the right of access to basic water supply and basic sanitation; ➢ the accountability of water services providers; and ➢ the promotion of effective water resource management and conservation. ➢ the implementation of reasonable measures ○ to promote and ensure the effective delivery of waste services; ○ to promote awareness of the impact of waste on health, well-being and the environment; ○ to reduce, re-use, recycle and recover waste; ○ to treat and safely dispose of waste; and ○ to remediate contaminated land that presents a significant environmental risk.
Secondary strategic objectives	
Air quality	• To enhance the quality of ambient air for the sake of securing an environment that is not harmful to the health and well-being of BPDM communities; and • To provide reasonable measures for the protection and enhancement of the air quality in the BPDM and the prevention of air pollution & ecological degradation.

Significant environmental issue	Strategic Objective
Mining	To ensure the following: • the sustainable development of South Africa's mineral resources and that prospecting or mining operation are conducted in accordance with generally accepted principles of sustainable development, • the management of all environmental impacts in accordance with the approved EMPr; as an integral part of the prospecting or mining operations; • the rehabilitation of the affected environment to a land use which conforms to the generally accepted principle of sustainable development; and • responsibility for the sustainable closure of the mining operations and any future environmental damage, pollution or ecological degradation as a result of the mining operations
Heritage Resources	To conserve and manage a full range of the cultural heritage resources of the BPDM, through good planning, decision-making and management
Tourism	To promote the optimal development and utilisation of the tourism potential of the BPDM.

7 ENVIRONMENTAL SENSITIVITY MAPPING AND DELINEATING OF ENVIRONMENTAL MANAGEMENT ZONES (PHASE 5)

An EMF should, amongst others, indicate specific environmental attributes and environmental management priorities in the area that may be sensitive to certain types of activities (South Africa, 2010). This requirement is realized through the mapping of environmental sensitivities, the spatial desired state of the environment and the delineation of environmental management zones.

The process followed to develop the EMF, consisting of an environmental constraints dataset (informed by sensitivity maps), an environmental management zone dataset, a decision support matrix with accompanying guidelines, an implementation plan (Strategic Environmental Management Plan) and a spatial screening tool is summarised in Figure 6.

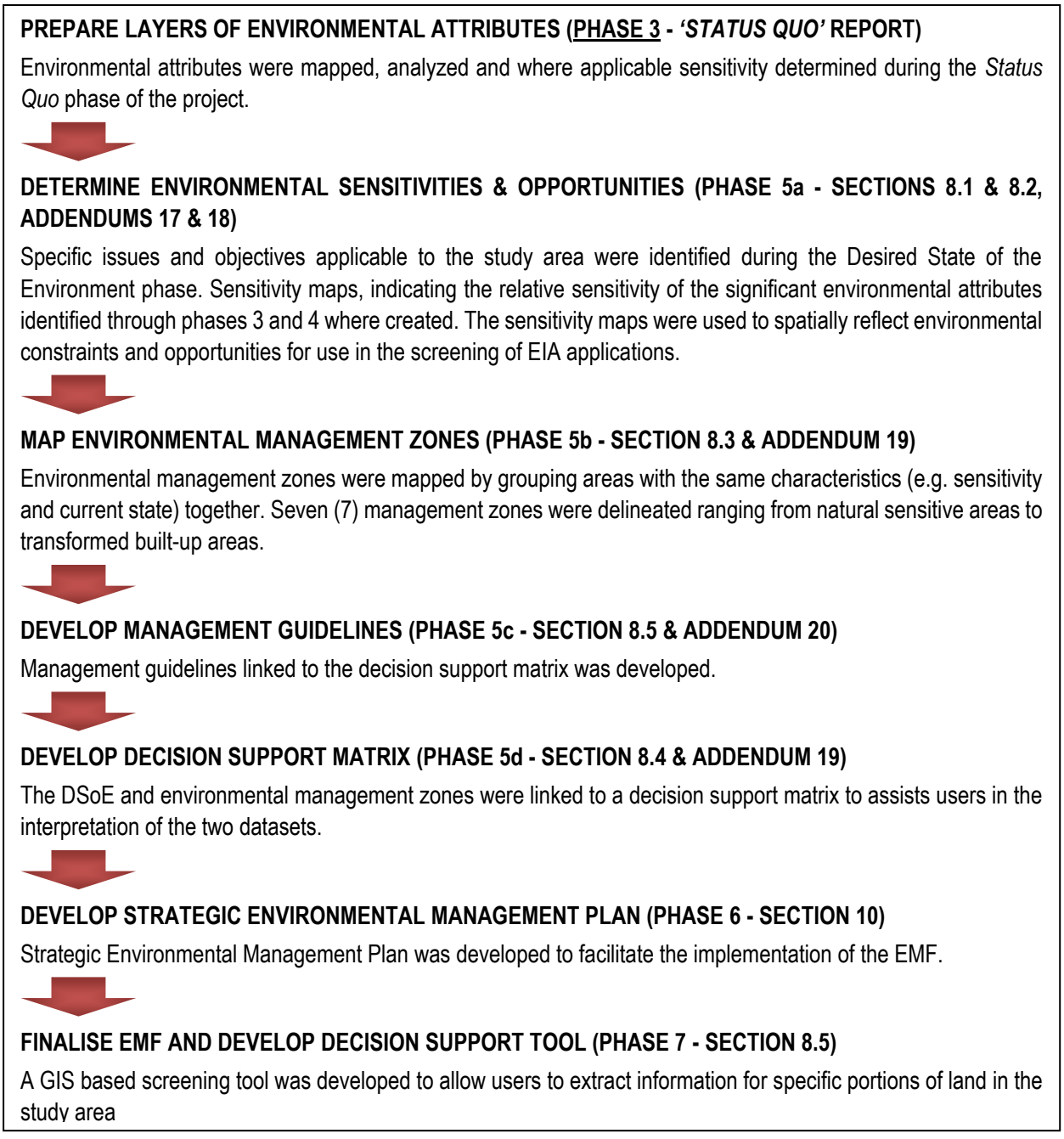


Figure 6. EMF development process

To determine environmental management zones, a sensitivity and opportunity analysis was conducted and sensitivities and opportunities mapped in line with the requirements set out in EMF Regulations and the EMF Guidelines. These datasets are aimed at facilitating future decision making on environmental requirements and acceptability of development applications by indicating the environmental sensitivities present in the study area and the extent to which envisaged activities will be compatible in specific areas or zones.

Maps were produced at a maximum scale of 1:50,000 and should therefore not be interpreted beyond this scale. If zoomed beyond 1:50,000 into individual properties or finer areas, the detail displayed will not be accurate or verifiable. It is important to note that the EMF serves as a strategic management tool aimed at assisting decision making and should not be confused with the EIA process, which deals with the actual project level decision making process relying on much finer detailed information captured via specialist studies at site specific scales.

7.1 Environmental sensitivity and opportunity analysis (Phase 5a)

A key consideration in the development of an EMF relates to environmental sensitivity. In the context of the EMF, environmental sensitivity is defined as the manner in which a feature in the environment may or may not be affected by specific types of activities or land uses.

Specific environmental components, as identified in the DSoE phase (Phase 4), were mapped in terms of their relative sensitivity to impacts that might negatively affect them (Addendum 1) and are linked to the key strategic objectives that were formulated for the study area. Environmental sensitivity was evaluated for the following possible development constraints in the environment:

- Hydrological features;
- High potential agricultural land;
- Biodiversity; and
- Topographical sensitivity.

By combining the sensitivity maps for the different environmental components discussed in Section 7.1 with the strategic objectives (Table 5) obtained through the DSoE process and the analysis of possible impacts of listed activities, the sensitivity of features in the environment that might be impacted by certain activities or land uses and should be managed to achieve the objectives of the DSoE, could be considered (Figure 7).

For example, the DSoE lists the conservation of areas of high biodiversity in the BPDM as a strategic objective, while one of the sensitivity datasets spatially indicates sensitive biodiversity features at a scale of roughly 1:50 000. These areas of sensitive biodiversity will be considered ‘sensitive’ if present on a parcel where an activity that might negatively impact biodiversity is considered. A more detailed investigation will then have to be conducted during the EIA process to determine the extent and manner in which biodiversity may or may not be affected. The environmental sensitivity maps (Addendum 1) therefore indicates sensitivities in the area, mapped at a scale of 1:50 000, which might have to be further investigated – depending on the envisaged activity – before decisions on environmental authorisations can be taken.

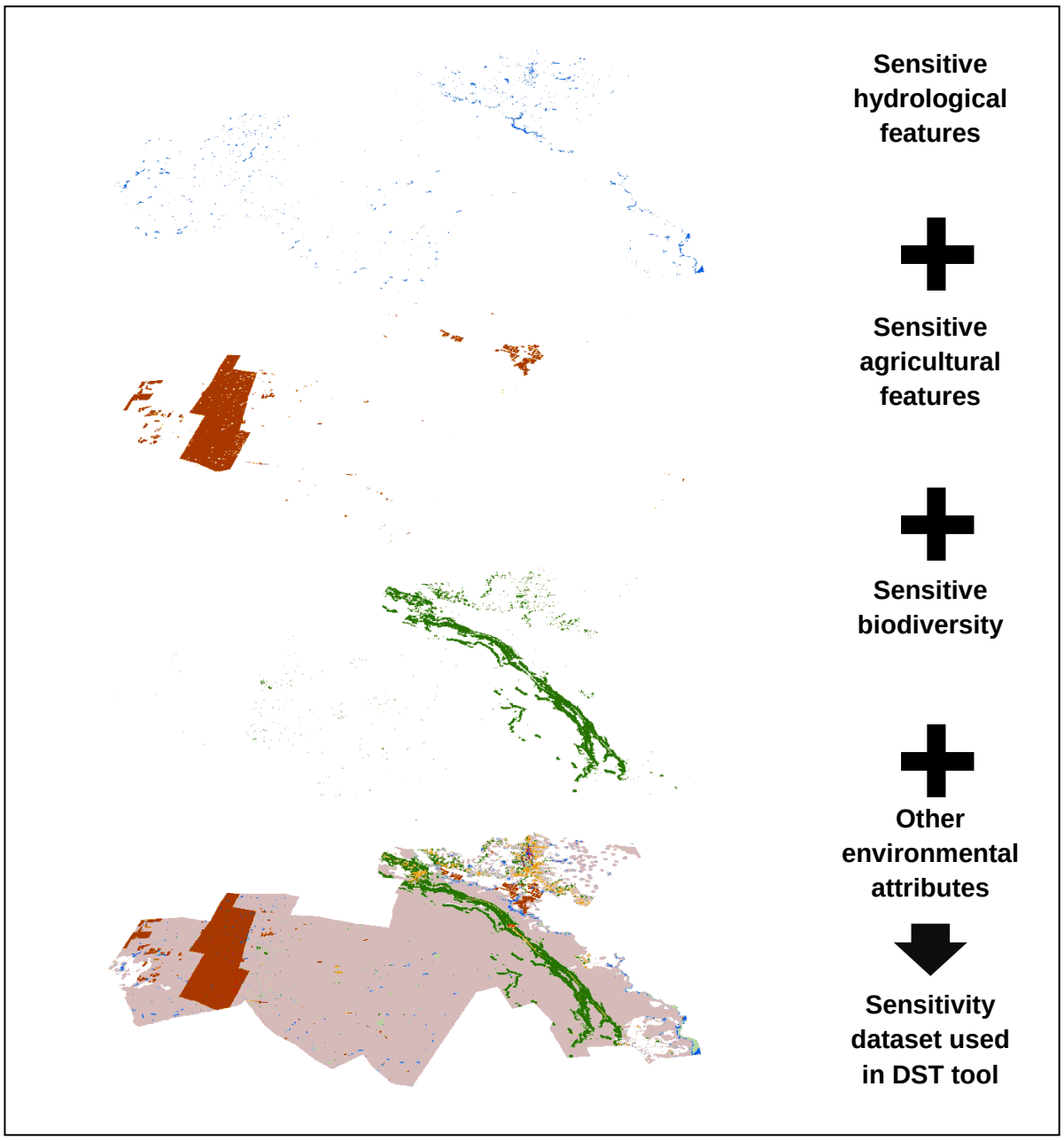


Figure 7. Process for compiling of environmental sensitivity dataset

To better understand 'sensitivity' and the way in which it relates to these the strategic objectives, an analysis was conducted in which the activities were evaluated, grouped into activity themes and activity sub-themes and their possible impacts on the environment considered.

From this analysis, two types of potential impacts or issues were identified: generic issues and site specific issues. Generic issues or impacts refer to the types of impacts an activity might have, regardless of where the activity is being proposed. Site specific issues on the other hand, refer to the types of impacts an activity might have on specific locational environmental features, i.e. the sensitive environmental attributes present at a specific location.

Except for the constraints, environmental opportunities in the area that should be prioritised to stimulate sustainable development were also considered. Environmental

opportunities (Addendum 2) were mapped from the relevant municipal SDFs. These opportunities are:

- General urban development potential;
- Industrial development potential; and
- Mining potential.

7.2 Methodology used to delineate environmental management zones (Phase 5b)

To aid strategic environmental management in the area, environmental management zones were delineated by grouping areas which share the same characteristics together. Areas were grouped based on their current or envisaged use (e.g. Agriculture, Mining, Biodiversity, etc.) and their sensitivity to different types of activities. Using this approach the study area was divided into seven (7) environmental management zones (see Addendum 4 for the map). For a more detail on the approach used to derive the sensitivity layers and delineate the environmental management zones refer to Addendum 3. The seven zones are indicated in Table 6.

Table 6: Description of the identified environmental management zones

Zone A – Development zone I (Res. & Bus.)
'Development Zone I' is a refinement of areas identified for future urban development in local municipal SDFs. These development uses include, amongst others, residential land uses, commercial land uses and land uses related to government functions, but specifically excludes industrial land uses and mining related land uses.
Zone B – Development zone II (Industrial)
'Development Zone II (Industrial)' is a refinement of areas identified for future industrial development in local municipal SDFs.
Zone C – Development zone III (Mining)
'Development Zone III (Mining)' is a refinement of areas identified in local municipal SDFs as areas with potential for mining development. If developed in a sustainable manner, these areas have the potential to stimulate economic growth in the area.
Zone D – Agriculture Zone I
The 'Agriculture Zone' represents existing high potential agricultural land in the area (i.e. cultivated fields) that should be preserved for crop production and other agricultural purposes.
Zone E – Agriculture Zone II
The 'Agriculture Zone' represents areas deemed suitable for further agricultural development for both grazing and cultivation purposes. The land may also be utilised for other types of development.
Zone F – Biodiversity Zone
The 'Biodiversity Zone' represents areas of high and significant biodiversity in the Bojanala District Municipality. Areas of high biodiversity was identified from the North West Province Biodiversity Sector Plan and includes, amongst others, critical biodiversity areas (CBAs) and Ecological Support areas (ESAs).

Zone G – Sensitive Topography Zone
The ‘Sensitive Topography Zone’ represents the sensitive topographical features, such as hills and ridges, which are deemed sensitive to development.
Zone H – MPE Zone with sub-zones
The ‘MPE Zone’ represent the Magaliesberg Protected Environment, which is a formal protected area in terms of the National Environmental Management: Protected Areas Act. It consists of three sub-zones: sensitive, highly sensitive and exceptional conservation value.

These environmental management zones will guide strategic level thinking on the management of the area from an environmental perspective and are interpreted through the decision support matrix and accompanying environmental management guidelines in which general management guidelines for these zones as well as possible environmental authorisation exemptions are discussed.

7.3 Environmental management guidelines (Phase 5c)

Environmental management guidelines were developed for each of the environmental management zones. General guidelines were developed, which is meant to guide the overall management of the zones. In addition to the general environmental management guidelines, specific environmental management guidelines were developed for specific activities in each zone. Where mentioned, specified NEMA listed activities may be considered to be excluded from the requirement to obtain an environmental authorisation from the competent authority within a specific management zone. These exclusions will be subject to the specific environmental management guidelines pertaining to such specific activities in such environmental management zones. The general, as well as the specific environmental management guidelines for the various zones are provided in Addendum 6.

7.4 Decision support matrix (Phase 5d)

To facilitate the use of the EMF and interpret the sensitivity of the management zone in relation to specific activities a decision support matrix was developed (See Addendum 5). The decision support matrix can be viewed as the link between the spatial datasets, the activities and/or land uses considered and the strategic objectives for the area. The use of the decision support matrix is discussed in more detail in Section 9.

7.5 Finalization of EMF and development of a decision support tool (Phase 5e)

Once the EMF was finalised, a spatial screening tool, assisting in the extraction of spatial data and the interpretation thereof, was developed. The tool allows users to select a specific portion of land and generate a report, specifying the environmental constraints present on that portion of land. This information is used along with the decision support matrix and management guidelines to inform decision makers and the general public on the issues or non-issues related to envisaged activities.

8 HOW TO USE THE EMF

The management guidelines, decision support matrix and spatial screening tool are the key components of the EMF. The EMF will assist relevant authorities in the management of the area and give effect to the three main objectives (Figure 8) of the EMF which are to:

- Serve as a spatial screening mechanism for EIA;
- Provide strategic context for EIA applications in the area; and
- Inform strategic spatial planning.

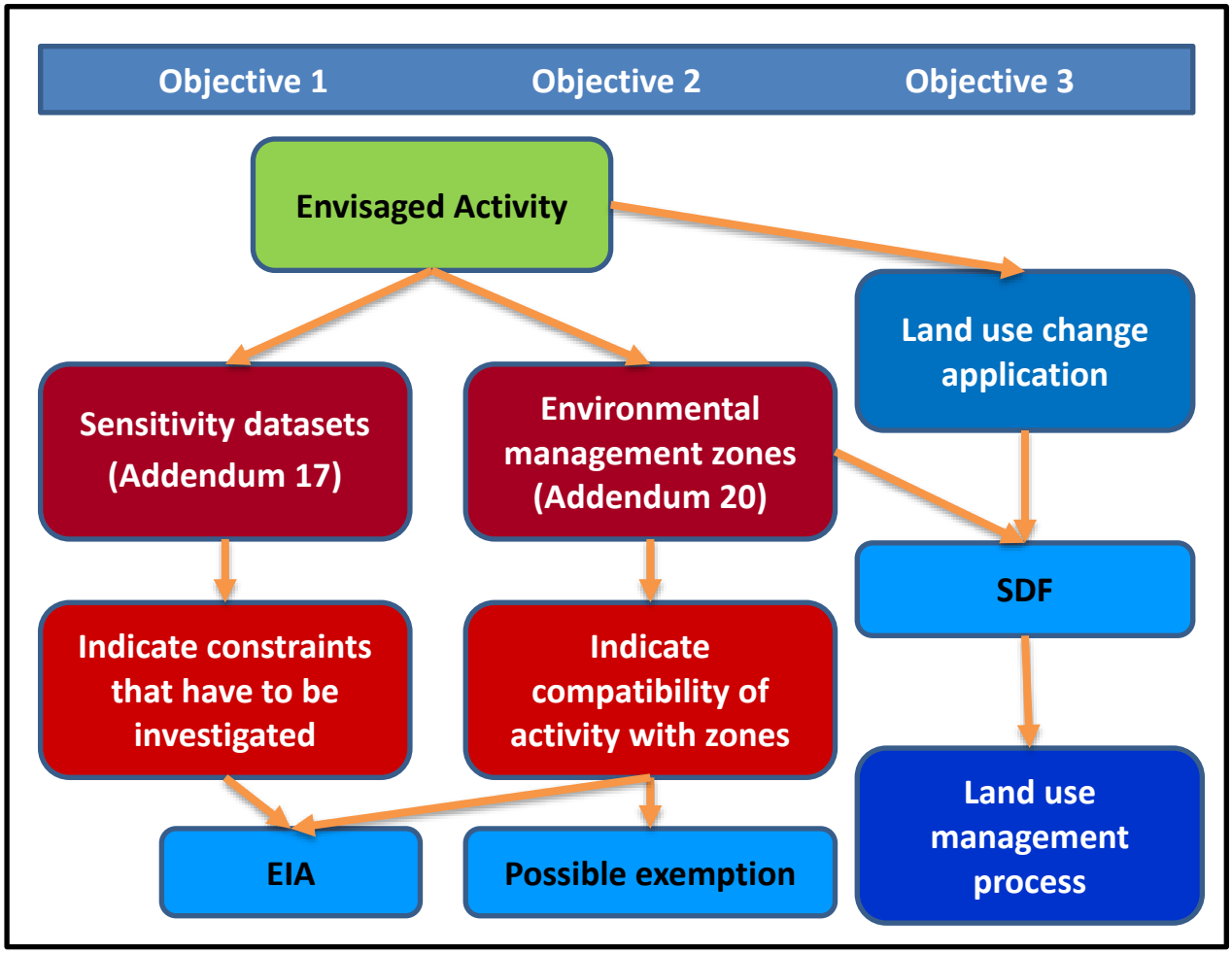


Figure 8. Schematic representation of EMF objectives

Objective one is achieved through the environmental sensitivity dataset (Addendum 15), which indicates the issues that should be investigated in more detail during the EIA process, while objectives two and three are achieved through the environmental management zones dataset (Addendum 18).

For objective two, the environmental management zones dataset will indicate, through the decision support matrix and accompanying management guidelines, whether an envisaged activity is compatible in a specific area/zone or not, viewed from a strategic perspective.

For objective three, the environmental management zones dataset should be used to inform the review of the MMM Spatial Development Framework (SDF), which is responsible for strategic spatial planning and guiding of land use management in the area.

To achieve objectives one and two, the EMF is applied by following four steps (Figure 9) that guide the user through the use of the decision support matrix, environmental constraints dataset and environmental management zones dataset. The four steps are subsequently discussed.

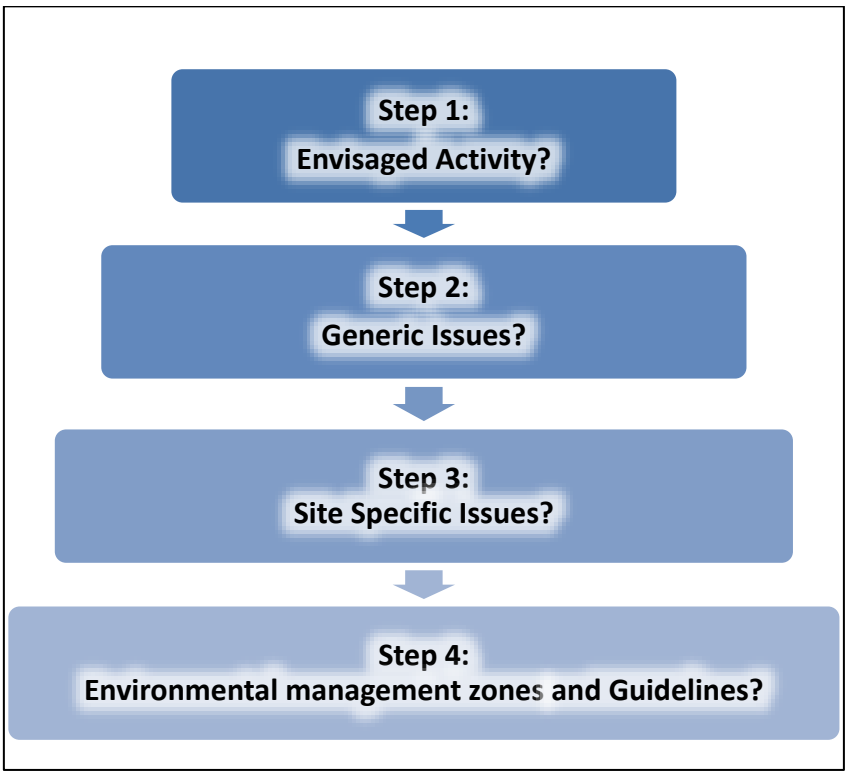
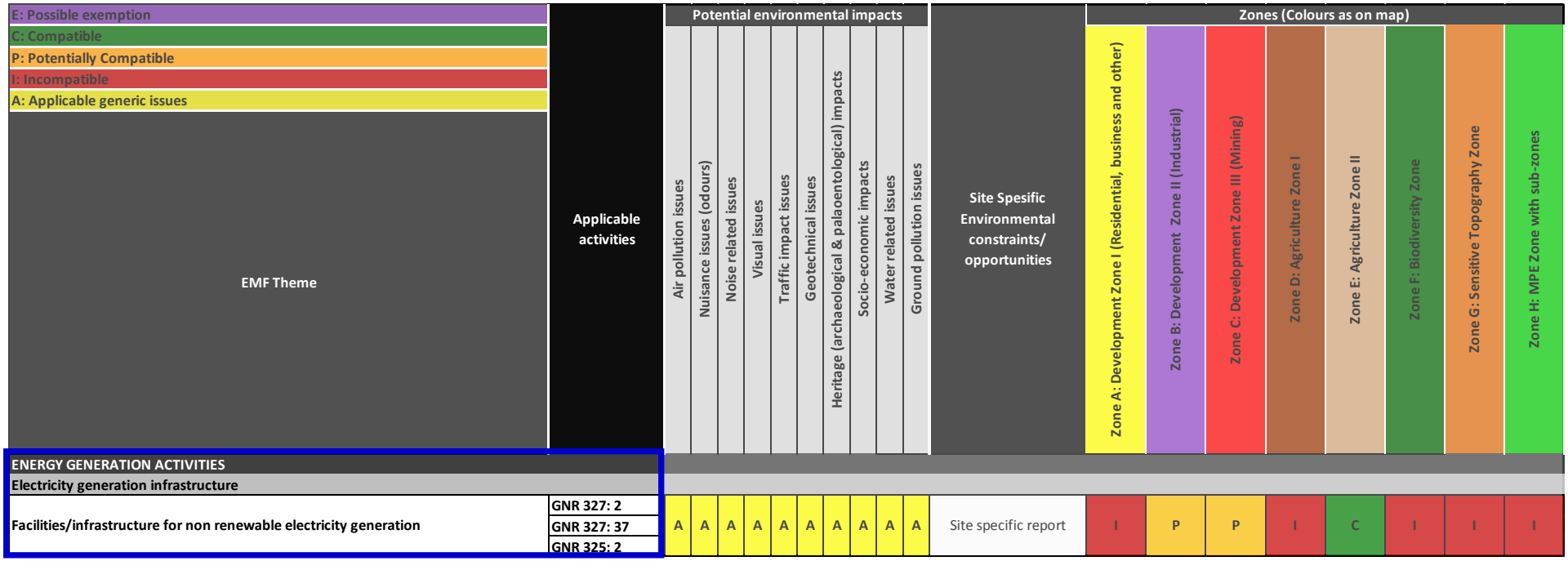


Figure 9. Application of the EMF

The use of the EMF tool also discussed and explained in the EMF training tutorial video which is available with the EMF.

8.1 Step 1: Identify the proposed activity.

During the sensitivity analysis all listed activities were investigated and grouped into activity themes and sub-themes. These themes guide the user with regard to the possible impact an activity might have. In Step 1 the user will select the applicable activity or activities from the 'Applicable Activities' column (Figure 10) in the decision support matrix.

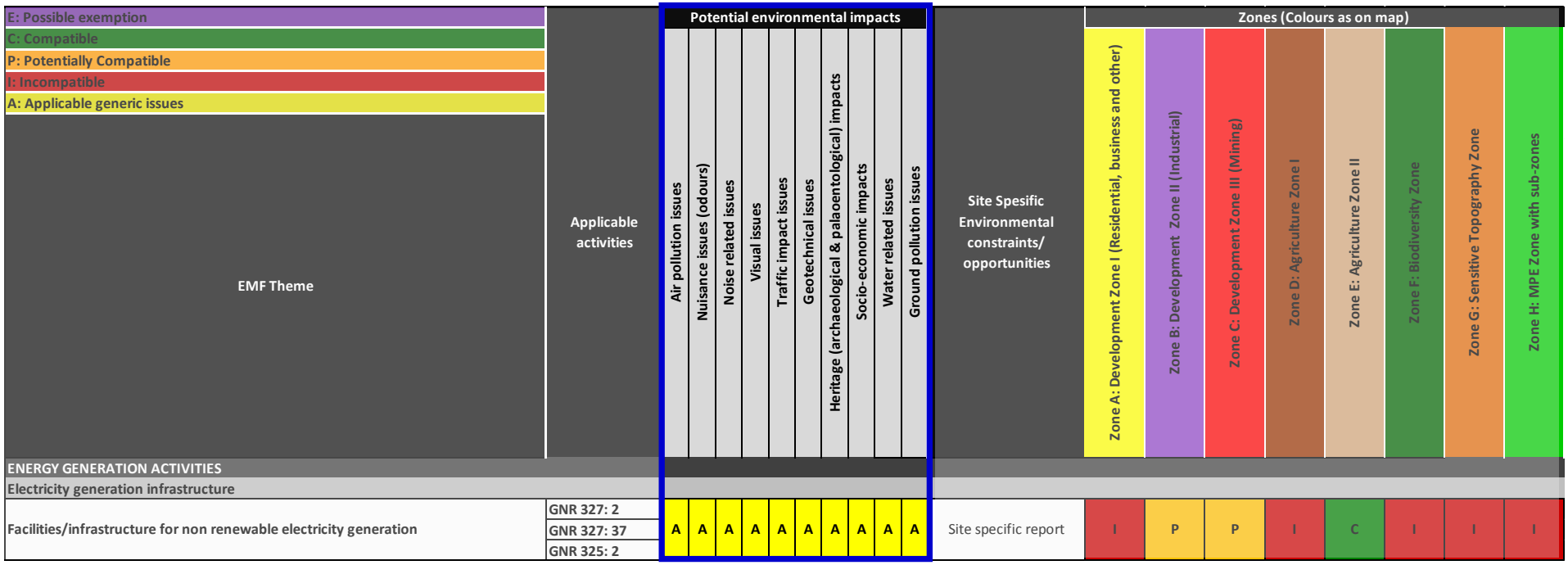


E: Possible exemption C: Compatible P: Potentially Compatible I: Incompatible A: Applicable generic issues EMF Theme	Applicable activities	Potential environmental impacts: Air pollution issues	Nuisance issues (odours)	Noise related issues	Visual issues	Traffic impact issues	Geotechnical issues	Heritage (archaeological & palaeontological) impacts	Socio-economic impacts	Water related issues	Ground pollution issues	Site Spesific Environmental constraints/ opportunities	Zones (Colours as on map): Zone A: Development Zone I (Residential, business and other)	Zone B: Development Zone II (Industrial)	Zone C: Development Zone III (Mining)	Zone D: Agriculture Zone I	Zone E: Agriculture Zone II	Zone F: Biodiversity Zone	Zone G: Sensitive Topography Zone	Zone H: MPE Zone with sub-zones
ENERGY GENERATION ACTIVITIES																				
Electricity generation infrastructure																				
Facilities/infrastructure for non renewable electricity generation	GNR 327: 2 GNR 327: 37 GNR 325: 2	A	A	A	A	A	A	A	A	A	A	Site specific report	I	P	P	I	C	I	I	I

Figure 10. Identify envisaged activity (Step 1)

8.2 Step 2: Identify generic environmental issues related to the undertaking of the proposed activity.

Once the envisaged activity has been established the generic issues associated with that activity should be considered. As discussed, generic issues refers to the types of impacts an activity might have regardless of where the activity is being envisioned and were determined during the sensitivity analysis. The generic activities are listed under the ‘Generic Issues’ column (Figure 11) in the decision support matrix and were determined for each of the sub-themes and indicates which issues should be considered during the EIA process to provide the necessary information to inform sound decision making.



E: Possible exemption C: Compatible P: Potentially Compatible I: Incompatible A: Applicable generic issues	Applicable activities	Potential environmental impacts										Site Spesific Environmental constraints/ opportunities	Zones (Colours as on map)							
EMF Theme		Air pollution issues	Nuisance issues (odours)	Noise related issues	Visual issues	Traffic impact issues	Geotechnical issues	Heritage (archaeological & palaeontological) impacts	Socio-economic impacts	Water related issues	Ground pollution issues		Zone A: Development Zone I (Residential, business and other)	Zone B: Development Zone II (Industrial)	Zone C: Development Zone III (Mining)	Zone D: Agriculture Zone I	Zone E: Agriculture Zone II	Zone F: Biodiversity Zone	Zone G: Sensitive Topography Zone	Zone H: MPE Zone with sub-zones
ENERGY GENERATION ACTIVITIES																				
Electricity generation infrastructure																				
Facilities/infrastructure for non renewable electricity generation	GNR 327: 2 GNR 327: 37 GNR 325: 2	A	A	A	A	A	A	A	A	A	A	Site specific report	I	P	P	I	C	I	I	I

Figure 11. Identify generic issues (Step 2)

8.3 Step 3: Identify site specific environmental issues.

As explained, site specific issues refer to impacts relevant to a specific portion of land. The 'Site Specific Environmental Constraints (Environmental constraints Dataset)' column (Figure 12) instructs the user to consult a '*site specific report*'. This report refers to a report that is generated through the decision support tool in a GIS environment (*see* section 8.6). Once the user has selected the applicable portion of land (location/site) for the envisaged activity, the tool will generate a report listing the constraints that might be impacted by the applicable activity theme. These constraints should then at the discretion of the competent authority be further investigated through specialist studies and considered in decision making.

E: Possible exemption C: Compatible P: Potentially Compatible I: Incompatible A: Applicable generic issues EMF Theme	Applicable activities	Potential environmental impacts: Air pollution issues	Nuisance issues (odours)	Noise related issues	Visual issues	Traffic impact issues	Geotechnical issues	Heritage (archaeological & palaeontological) impacts	Socio-economic impacts	Water related issues	Ground pollution issues	Site Spesific Environmental constraints/ opportunities	Zones (Colours as on map): Zone A: Development Zone I (Residential, business and other)	Zone B: Development Zone II (Industrial)	Zone C: Development Zone III (Mining)	Zone D: Agriculture Zone I	Zone E: Agriculture Zone II	Zone F: Biodiversity Zone	Zone G: Sensitive Topography Zone	Zone H: MPE Zone with sub-zones
ENERGY GENERATION ACTIVITIES																				
Electricity generation infrastructure																				
Facilities/infrastructure for non renewable electricity generation	GNR 327: 2 GNR 327: 37 GNR 325: 2	A	A	A	A	A	A	A	A	A	A	Site specific report	I	P	P	I	C	I	I	I

Figure 12. Site specific issues (Step 3)

8.4 Step 4: Reflect on compatibility of the proposed activity in the relevant Environmental Management Zone

The next step involves the environmental management zones dataset which provides strategic context for the EIA decision making process. The seven environmental management zones are listed in the 'Environmental Management Zones' column (Figure 13) in the decision support matrix. The matrix indicates the compatibility of each activity sub-theme within each of the different environmental management zones. Compatibility is rated as either 'Compatible', 'Potentially Compatible', 'Incompatible', 'Possible Exclusion' or 'Not Applicable' (Table 9).

E: Possible exemption C: Compatible P: Potentially Compatible I: Incompatible A: Applicable generic issues EMF Theme	Applicable activities	Potential environmental impacts: Air pollution issues	Nuisance issues (odours)	Noise related issues	Visual issues	Traffic impact issues	Geotechnical issues	Heritage (archaeological & palaoentological) impacts	Socio-economic impacts	Water related issues	Ground pollution issues	Site Spesific Environmental constraints/ opportunities	Zones (Colours as on map): Zone A: Development Zone I (Residential, business and other)	Zone B: Development Zone II (Industrial)	Zone C: Development Zone III (Mining)	Zone D: Agriculture Zone I	Zone E: Agriculture Zone II	Zone F: Biodiversity Zone	Zone G: Sensitive Topography Zone	Zone H: MPE Zone with sub-zones
ENERGY GENERATION ACTIVITIES																				
Electricity generation infrastructure																				
Facilities/infrastructure for non renewable electricity generation	GNR 327: 2 GNR 327: 37 GNR 325: 2	A	A	A	A	A	A	A	A	A	A	Site specific report	I	P	P	I	C	I	I	I

Figure 13. Environmental management zones (Step 4)

Table 7: Compatibility categories for activity sub-themes

Compatible
‘Compatible’ means that an activity will be acceptable in a specific management zone. The activity will still require an environmental authorisation, but from a strategic level it is deemed suitable and complimentary to the applicable management zone and a positive authorisation should be highly possible.
Potentially Compatible
‘Potentially compatible’ means that an activity is only moderately suitable to a specific management zone. The activity will require an environmental authorisation, but from a strategic level it is deemed relatively suitable to the applicable management zone but more information will be needed to make an informed decision.
Incompatible
‘Incompatible’ means that an activity is not suitable to a specific management zone and should be avoided. An application can still be lodged for an environmental authorisation but from a strategic level it will not be supported. Incompatible activities should be avoided as far as possible.
Possible exclusion
‘Possible exclusion’ refers to activities that may be excluded from the requirement to obtain an environmental authorisation in this management zone. The specific environmental management guidelines referenced in the ‘decision support matrix’ should be consulted on the criteria and requirements for a possible exclusion.

The environmental management zones will inform the user on the compatibility of envisaged activities in specific geographical areas or on specific portions of land. If, for example, a portion of land is divided into Zone A (development zone I), Zone D (agriculture zone) and Zone E (biodiversity zone) the decision support matrix will suggest that an activity that might be ‘incompatible’ with Zones D and E but only has ‘potential exemption’ in Zone A, rather be considered in Zone A in an effort to minimize the impact of that applicable activity. The possible exclusion will then be explained through the specific management guidelines (Addendum 20) that is linked to that specific activity in Zone A.

9 STRATEGIC ENVIRONMENTAL MANAGEMENT PLAN

The purpose of this phase is to develop a Strategic Environmental Management Plan (SEMP) for the MMM area that addresses roles and responsibilities for implementing the EMF and include the following strategies:

- for maintaining productive agricultural activity on land where agriculture has been identified as a feasible and desired land use;
- for maintaining biodiversity conservation on land where biodiversity conservation has been identified as a feasible and desired land use;
- for maintaining land as open spaces where identified as appropriate;
- to recommend where feasible development activities may be allowed to proceed without an EIA authorisation;
- that deals with environmental land use management conflicts; and
- for incorporating environmental management zones into SDFs and LUMS.

9.1 Overview and purpose of the SEMP

All environmental management programmes/plans aim to provide arrangements/guidelines to enhance the positive aspects of a project and prevent undue adverse impacts on the environment.

In 2000, SEA was identified as an appropriate instrument to incorporate environmental aspects into strategic planning processes. It was not intended that SEA should replace EIA, but streamline project-specific assessment by providing an effective instrument for environmental assessment at the plan and programme level. SEA may form the context for lower levels of planning and provide input into higher, more strategic levels (DEAT and CSIR, 2000).

In this context, “an EMP (Strategic Environmental Management Plan (SEMP)) that has been developed where a SEA framework exists, should help to establish a sound planning and management framework”. “The SEMP provides the framework for addressing cumulative impacts of ongoing developments through a spatial approach to mitigation, monitoring and management... SEAs highlight key issues of concern in the sector or region, whilst SEMPs may prescribe standard approaches to project design and mitigation through environmental guidelines and monitoring requirements. This reduces the scope of work for individual EIAs and detailed EMPs for projects. SEMPs have increasingly been used in South Africa to provide management frameworks to guide development. The SEMP provides the means to incorporate environmental objectives into development decision-making processes” (DEAT, 2004).

It is now common knowledge that Environmental Management Frameworks were developed and promulgated, instead of SEA, to incorporate environmental aspects into strategic planning processes, highlight key issues of concern in the sector or region, form the context for lower levels of planning and provide input into higher, more strategic levels.

In this context, a Strategic Environmental Management Plan (SEMP) should help to establish a sound planning and management framework to guide development planning and decision-making, as opposed to specific activities, where an EMF exists, in order to reach certain environmental targets. SEMPs provides the means to incorporate environmental objectives into development decision-making processes and may

prescribe standard approaches to project design and mitigation through environmental guidelines and monitoring requirements, reducing the scope of work for individual EIAs and detailed EMPs for projects.

The process for developing and implementing the SEMP is illustrated in Figure 14.

Figure 14. Schematic illustration of the SEMP process

9.2 BPDM EMF SEMP

The BPDM EMF SEMP (Table 10) is the actual implementation component of the EMF. It focusses on the identified desired state themes and consists of the strategic objectives that originate from the *Status Quo* and Desired State of the Environment analysis, and intervention strategies or action plans that are required to achieve a consistent and effective implementation of the environmental management zones, as well as the responsible organisations (institutional framework) for achieving the targets. Furthermore, it contains management guidelines for the implementation of the EMF, linked to a system of KPIs to evaluate, monitor and report on progress made towards meeting the DSoE strategic objectives.

Key role players to whom the approaches in the SEMP will be of importance include BPDM and the Kgetlengrivier, Madibeng, Moretele, Moses Kotane and Rustenburg local municipalities, national and provincial government institutions, as well as land owners. The key organisations involved in the BPDM and their responsibilities are summarised in Figure 15.

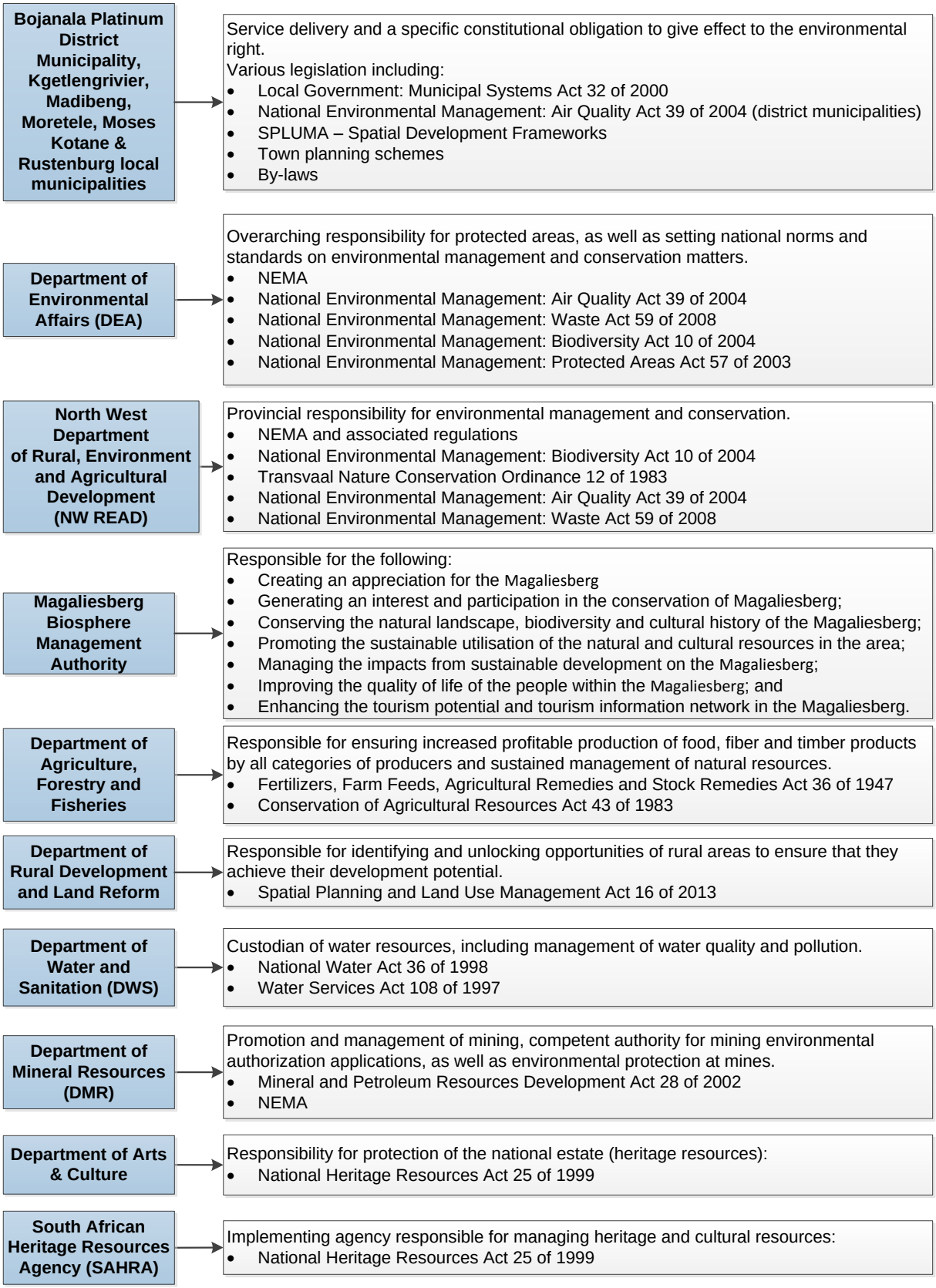


Figure 15. Key organisations involved in the BPDM

Table 8: Strategic Environmental Management Plan to steer the development in the BPDM towards the identified desired state

Actions (Targets)	Key Performance Indicator (KPI)	Organisations
Primary Strategies		
Strategic objective	**Issues addressed**	
To manage the water (surface and groundwater) resources in the BPDM for the benefit of all recognised water users and beneficial water uses, through good planning, decision-making and management.	Integrated water resource management	
Support the protection of the surface water resources such as wetlands, vleis and streams by promoting buffer areas around these through good planning, informed decision-making and effective management, so that the contribution of harmful activities to water pollution in the area is prevented or minimised.	• Improved surface water quality. • Compliance with the determined integrated Resource Water Quality Objectives (RWQOs). • Acceptable levels of salinity, eutrophication and microbiological contamination in the Hartbeespoortdam, Crocodile River system and major tributaries.	DEA DWS NW READ MBMA BPDM & 5 LMs (KLM, MaLM, MoLM, MKLM, RLM)
Limiting activities (crop production, waste water treatment and waste disposal) that may further deteriorate the water quality in these through good planning, informed decision-making and effective management, so that the contribution of such activities to water pollution in the area is prevented or minimised.		
Promote improved management of the water resources of the BPDM through improved control and management of point and diffuse water pollution sources, as well as the planning and implementation of measures that will prevent and/or minimise pollution from those pollution sources that may significantly impact on the water resources.		
Maintain and protect existing groundwater resources through the sustainable abstraction of groundwater, promoted by good planning, informed decision-making and effective management that considers local hydro-geological conditions, water levels,	Effective groundwater management programmes, tailored to local quantity and quality requirements.	DWS NW READ MBMA BPDM & 5 LMs

Actions (Targets)	Key Performance Indicator (KPI)	Organisations
water balances, appropriate abstraction schedules and the implementation of water conservation and demand management measures.		Organised agriculture
Conduct regular monitoring and assessment of surface and ground water resources and report on water quality parameters.	Regular reports on the status and management of surface and groundwater resources.	DWS BPDM Environmental health
Strategic objective	**Issues addressed**	
To promote the long term sustainable use and conservation of natural agricultural resources, including grazing land, and the protection of high potential cropland and its productive use in the BPDM, to ensure profitable agricultural economic output and national and household food safety and security.	Land Capability Land degradation Problem Animal Control Veld Fire Management	
Promote land use practices that limit and control land degradation (soil erosion and bush encroachment)	Land use practices that limit and control soil erosion and bush encroachment	DAFF NW READ MBMA
Protect and preserve agricultural land and its productive use, in order to ensure that agricultural land remains available and viable for agricultural development.	• Limited alternative, non-agricultural land uses (development activities) on areas with a better (crop production) land capability and land with good grazing capacity • Controlled subdivision of agricultural land that may compromise the viability of farming	DRDLR DAFF NW READ
Regularly monitor sensitive areas that are susceptible to soil erosion and bush encroachment, to ensure that sustainable land use practises are maintained.	Regular reports on the status of sensitive areas that are susceptible to soil erosion and bush encroachment	DAFF NW READ

Actions (Targets)	Key Performance Indicator (KPI)	Organisations
Initiate soil conservation and bush control projects and measures – through labour intensive Expanded Public Works Programme (EPWP) or Landcare projects.	Labour intensive EPWP soil protection & bush control or Landcare projects	DEA DAFF NW READ MBMA
Map all areas where EPWP/Landcare projects had been carried out, and monitor these sites.	• Map of all areas where EPWP/Landcare projects had been carried out • Effective monitoring of areas where EPWP/Landcare projects had been carried out	DAFF NW READ
Implement the objectives of the National Veld and Forest Fire Act (NVFFA) related to agriculture and ensure the effective and proper functioning of Fire Protection Associations (FPAs) in the BPDM	• Undertake an assessment of fire hazards, fire risk as well as proper fire burning regimes in the BPDM. • Facilitate the implementation and maintenance of fire breaks as required by the NVFFA. • Ensure well-trained fire-fighting teams with appropriate equipment to prevent fire damage and limit the extent of areas burnt • Develop and implement protocols to facilitate the assistance of the Working for Fire initiative. • Establish and maintain effective communication and rapid emergency response procedures to control veld fires. • Ensure co-ordination and assistance between various role-players, including the local municipalities in the BPDM, with regard to fire fighting.	BPDM & 5 LMs MBMA Organised agriculture

Actions (Targets)	Key Performance Indicator (KPI)	Organisations
Actively discourage problem animals and limit problem animal occurrences and incidents in the BPDM area.	Limited number of problem animal occurrences and incidents	NW READ Organised agriculture
Ensure sustainable development of the agricultural sector, in order to maintain and increase rural employment, facilitate a reduction in poverty levels and a sustained improvement in quality of life.	A viable agricultural sector employing optimal numbers of farm workers	NW READ MBMA Organised agriculture
Strategic objective	**Issues addressed**	
To enable communities in the BPDMM to develop and sustainably utilise the natural resources in their areas to the benefit of local communities, while allowing communities and private land owners in the BPDM the continuation of their existing rights relating to the existing lawful use of the land, redressing the imbalances of the past and ensuring that there is equity in the application of spatial development planning and land use management systems, and responding to climate change through appropriate adaptation and mitigation arrangements.	Land Use Management	
Ensure that the exercise of existing rights relating to the existing lawful use of the land does not threaten any sensitive environmental components.	Minimal impacts of existing land uses on sensitive environmental components	DEA DWS NW RAED BPDM & 5 LMs MBMA Tribal authorities
Strategic objective	**Issues addressed**	
• To facilitate sustainable socio-economic growth in the BPDM, through active community participation, enhanced governance systems and capacity, as well as improved co-operation between all spheres of government, in order to improve the lives of all citizens and progressively meet their basic social and economic needs and build just, sustainable communities.	Socio-Economic Development	

Actions (Targets)	Key Performance Indicator (KPI)	Organisations
Identify and promote new socio-economic development opportunities that are sustainable and viable to promote and develop the area.	Improved *status quo*, from mainly agricultural driven economy, to viable alternative land uses that unlock alternative economic opportunities	DRDLR NW READ BPDM & 5 LMs
Develop the capacity of local SMMEs and entrepreneurs in the BPDM area.	Well-developed SMME and entrepreneurial sector that are provided opportunities to participate in the economy	DRDLR MPDM & 5 LMs
Strategic objective	**Issues addressed**	
• To facilitate the equitable provision of effective, efficient and affordable service delivery, in partnership with local municipalities, to protect health, well-being and the environment by providing for - ➢ the development and maintenance of adequate roads, storm water, water and sanitation, electricity and solid waste management infrastructure in the BPDM; ➢ Increased awareness of the impact of waste on health, well-being and the environment; opportunities to reduce, re-use, recycle and recover; as well as to treat and safely dispose of waste; ➢ the accountability of services providers; ➢ the promotion of effective water conservation and demand management.	Buildings & Built Structures Waste management Water provision & sanitation networks Road, electricity & communication networks	
Promote acceptable and desired infrastructure development in the BPDM area that enhances the quality of life of all citizens, where affordable.	Adequate infrastructure that meets the needs of local communities and landowners: • Well-planned and maintained road network; • Well-planned and maintained water provision and sanitation infrastructure; • Well-planned and maintained electricity network; • Well-planned and maintained waste management infrastructure.	DWS DRDLR SANRAL BPDM & 5 LMs

Actions (Targets)	Key Performance Indicator (KPI)	Organisations
Manage all solid and liquid wastes in the BPDMM area in a sustainable manner, in line with national legislation, through *inter alia* the principles of reduce, reuse and recycle.	• Waste disposal facilities that comply with legislative requirements • No negative impacts on sensitive cultural and environmental features due to poor waste and waste water management practices	DWS BPDM & 5 LMs NW READ Tribal authorities
Secondary Strategies		
Strategic objective	**Issues addressed**	
To conserve and manage terrestrial and aquatic biodiversity in the BPDM, including vulnerable and unique ecological communities, as well as rare indigenous plant and animal species, through good planning, decision-making and management, as well as wise and efficient use of natural resources, to ensure sustainable and equitable benefits to the people of the BPDM.	Threatened ecosystems Critical biodiversity & conservation areas Areas of high biodiversity & potential red data species habitat Wetland ecosystems & riparian areas Alien Invasive Plants	
Support the protection and conservation of vulnerable and endangered ecosystems, unique ecological communities, as well as localised or rare indigenous plant and animal species by good planning, informed decision-making and effective management	• No activities allowed that impacts negatively on the protection and conservation of vulnerable and endangered ecosystems, unique ecological communities, as well as localised or rare indigenous plant and animal species in the BPDM • Incorporate the following areas into planning and decision-making processes: o National Protected Areas Expansion Strategy focus areas; o National Freshwater Ecosystem Priority Areas; o Critical Biodiversity Areas; o Threatened ecosystems, etc.	DEA NW READ BPDM & 5 LMs MBMA Tribal Authorities

Actions (Targets)	Key Performance Indicator (KPI)	Organisations
Encourage conservation efforts in biodiversity priority areas that are currently not well protected, through good planning, decision-making and management, to ensure that a representative sample of biodiversity and key ecological processes are conserved.	Biodiversity is effectively managed in biodiversity priority areas, such as: • key ecological corridors (ridges and valleys) • high priority fragments of natural habitats (wetland ecosystems and likely riparian areas, areas of potential red data species habitat, as well as • unique ecological communities/ assemblages.	DEA NW READ BPDM & 5 LMs MBMA Tribal Authorities
Manage and control alien invader plant infestations and limit distribution of exotic plant species to undeveloped areas.	• Limit development activities that cause soil disturbance or only allow these after adequate environmental impact assessments, in order to minimise the potential for IAP invasion. • Develop and implement an invasive species monitoring, control and eradication plans for the BPDM, as part of the IDP.	DEA DAFF NW READ BPDM & 5 LMs MBMA
Initiate IAP control projects through the labour intensive Working for Water programme or Landcare projects.	Labour intensive IAP control and eradication programme or Landcare projects	DEA DAFF NW READ
Implement the objectives of the National Veld and Forest Fire Act (NVFFA) related to biodiversity management and ensure the effective and proper functioning of Fire Protection Associations (FPAs) in the BPDM to control the spread of invasive species and protect vulnerable ecosystems.	• Undertake an assessment of fire hazards, fire risk as well as proper fire burning regimes in the BPDM. • Facilitate the implementation and maintenance of fire breaks as required by the NVFFA. • Ensure well-trained fire-fighting teams with appropriate equipment to prevent fire damage and limit the extent of areas burnt • Develop and implement protocols to facilitate the assistance of the Working for Fire initiative.	BPDM & 5 LMs MBMA Organised agriculture

Actions (Targets)	Key Performance Indicator (KPI)	Organisations
	• Establish and maintain effective communication and rapid emergency response procedures to control veld fires. • Ensure co-ordination and assistance between various role-players, including the local municipalities in the BPDM, with regard to fire fighting.	
Strategic objective	**Issues addressed**	
To conserve and manage a full range of the cultural heritage resources of the BPDM, through good planning, decision-making and management	Heritage resource management	
Address co-operative governance needs to ensure alignment between the NW READ, BPDM and Tribal Authority planning processes and requirements.	• Good, co-ordinated planning & development decisions that protects the BPDM heritage resources • Effective management of the heritage resources in the BPDM area	NW READ BPDM & 5 LMs Tribal authorities MBMA
Respect and acknowledge the importance of cultural heritage, whilst fostering an appreciation of and pride in the nation's heritage.	Compliance with the provisions of the National Heritage Resources Act.	NW READ SAHRA BPDM & 5 LMs Traditional authorities Scientific community
Strategic objective	**Issues addressed**	
• To enhance the quality of ambient air for the sake of securing an environment that is not harmful to the health and well-being of BPDM communities; and • To provide reasonable measures for the protection and enhancement of the air quality in the BPDM and the prevention of air pollution & ecological degradation.	Air quality management	

Actions (Targets)	Key Performance Indicator (KPI)	Organisations
Reduce the negative impact of poor air quality as a result of emissions from fossil fuel use in residential applications, industrial sources and transport on human health and the environment	Strict control over emissions from fossil fuel use in residential applications, industrial sources and transport	BPDM & 5 LM AQM functions
Monitor strategic important air quality parameters in the BPDM area	Monitoring of strategically important air quality parameters	BPDM & 5 LM AQM functions
Strategic objective	**Issues addressed**	
To promote the optimal development and utilisation of the tourism potential of the BPDM.	Tourism and recreation development	
Promote tourism and economic development opportunities in the region.	A variety of tourism destinations that cater for different markets	NW READ NW Department of Tourism BPDM & 5 LMs
Promote the redevelopment and beautification of the towns and villages in the BPDM area.	Successful redevelopment and beautification projects	DRDLR NW READ BPDM
Optimally develop and utilise the tourism potential of the BPDM area	• Graded and accredited tourism facilities. • Well-developed SMME tourism facilities. • Well-trained personnel, e.g. guest house and lodge managers, housekeeping staff, tour operators etc.	NW READ NW Tourism BPDM & 5 LMs MBMA
Promote more effective marketing through the development of new markets and the expansion of existing activities.	More effective initiatives to develop new markets and promote tourism	NW READ NW Tourism BPDM & 5 LMs

Actions (Targets)	Key Performance Indicator (KPI)	Organisations
Strategic objective	**Issues addressed**	
To ensure the following: • the sustainable development of South Africa's mineral resources and that prospecting or mining operations are conducted in accordance with generally accepted principles of sustainable development, • the management of all environmental impacts in accordance with the approved EMPr; as an integral part of the prospecting or mining operations; • the rehabilitation of the affected environment to a land use which conforms to the generally accepted principle of sustainable development; and • responsibility for the sustainable closure of the mining operations and any future environmental damage, pollution or ecological degradation as a result of the mining operations	Mineral development potential	
Promote the sustainable development of mineral resources and ensure that prospecting or mining operations are conducted in accordance with the principles of sustainable development	An increasing number of mines that are operating sustainably	DMR DWS BPDM Tribal authorities
Ensure that all mines manage their environmental impacts in accordance with the approved EMPr; as an integral part of the prospecting or mining operations and rehabilitate the affected environment to a land use which conforms to the generally accepted principle of sustainable development	An increasing number of mines that are managing their environmental impacts in accordance with the approved EMPr; as an integral part of the prospecting or mining operations and rehabilitate the affected environment to a land use which conforms to the principle of sustainable development	DMR DWS BPDM Tribal authorities
Ensure that all mines remain responsible for the sustainable closure of the mining operations and any future environmental damage, pollution or ecological degradation as a result of the mining operations until closure	An increasing number of mines that remain responsible for the sustainable closure of the mining operations and any future environmental damage, pollution or ecological degradation as a result of the mining operations until closure	DMR DWS BPDM Tribal authorities

9.3 Strategic Environmental Management Plan implementation

Strategic environmental management planning is an on-going process that is initiated with the identification of a strategic objective. Once this strategic objective has been identified, different strategies or targets are planned so as to give effect to the identified objective. The implementation of the different strategies so as to achieve the targets is accompanied by monitoring and corrective measures to ensure continuous improvement. The identified and implemented strategies should be routinely revisited so as to ensure that the identified strategic objectives will be met.

10 EMF ADOPTION AND IMPLEMENTATION PLAN

The success of any EMF lies in its implementation and application. The institutional structure to ensure that the EMF can, and will be applied in practice depends largely on the buy-in and support of all spheres of government, especially the competent authorities mandated with managing the various components of the environment.

It is imperative that the EMF be developed in a spirit of co-operative governance between all spheres of government. Similarly, it is important to ensure that all the respective government role-players and decision-makers who will be directly affected by the implementation of the EMF are part of the development process and has supported this initiative from the inception.

In order to implement the EMF, the following steps as set out below are recommended. The SEMP and its implementation will also play an important role in the effective implementation and roll out of the EMF towards meeting the desired objectives as identified.

Table 9: EMF Implementation Plan

Action	Responsibility
Adoption of the EMF by BPDM council	
The EMF as submitted by the consultant must be internally circulated, considered and commented on. If Council is satisfied, the EMF must be adopted through a council resolution.	BPDM & 5 LMs
Receive and consider the final EMF as submitted by the consultant.	**RRA**
Once Council has adopted the EMF as submitted by the consultant, it must be circulated to other key stakeholders for consideration and comment.	NW READ BPDM & 5 LMs
Collation of Internal Comments	
Once the EMF has been internally circulated for comment, all such comments must be collated and forwarded to the consultant for consideration and finalisation of the EMF. It is at this point that the NW READ must decide whether or not to circulate the finalised EMF to the I&APs identified and consulted throughout the EMF process.	NW READ BPDM & 5 LMs
Internal Acceptance & Alignment of Internal Functions for Gazetting of EMF	
The Minister of Environmental Affairs or the MEC responsible for environmental affairs, in concurrence with the Minister, may adopt an environmental management framework (South Africa, 2010). For any EMF that has been triggered by issues of a provincial and local nature, such as the BPDM EMF, the MEC, with the concurrence of the Minister, may initiate the adoption process (South Africa, 2012). If the EMF process is supported by NW READ, as the relevant provincial authority, the department can legally initiate the adoption process. The MEC will also be the custodian of the EMF once it has been adopted.	NW READ
Notice must also be given to the national minister tasked with environmental affairs, who has to ultimately concur with the findings and recommendations.	NW READ DEA

Action	Responsibility
Upon receipt of concurrence, official publication of the EMF by NW READ via a notice in the Government Gazette.	
The EMF document, once finalised should be prepared for gazetting. All internal functions and process must be completed and aligned in preparation for the EMF to be gazetted.	NW READ
Initial Gazetting	
The intention to adopt the EMF must be gazetted.	NW RAED DEA
Collation and Consideration of Public Comments	
All public comments received in the commenting period allowed for by the gazetting of the EMF must be collated and considered. If required, inputs from the consultant team may be sought.	NW READ DEA Consultant
Final Gazetting	
The final EMF must be gazetted. All internal alignments and process must be completed.	NW READ DEA
Once adopted, the MEC must publish a notice in the Government Gazette indicating that the EMF has been adopted (South Africa, 2010).	NW READ
EMF Roll out and Implementation	
In this phase several actions have to be completed: • The EMF must be loaded onto appropriate GIS systems for use. • Training must be conducted on the use of the EMF tool within DEA, FS DEDTEA, as well as BPDM. • Alignment of the EMF, as well as other strategic tools and processes must be pursued and ensured, as well as the implementation of the SEMP.	BPDM & 5 LMs NW READ DEA Consultant All relevant authorities
The EMF, once adopted, will have to be considered by the competent authority in decisions on applications for environmental authorisations, during the evaluation of development proposals through the environmental impact assessment process. It has to be considered during the evaluation of activities that may have a negative impact on the BPDM geographical area (South Africa, 2010).	NW READ DEA
The information and guidelines contained in the EMF may, however, be used to inform decision-making and spatial planning in the BPDM area, with or without the final concurrence of the Minister. The SDF has not yet been aligned with the EMF, therefore both the IDP and SDF review process should be informed by the EMF information to refine and add detail to the current strategic planning proposals.	NW READ BPDM & 5 LMs
Monitoring the effectiveness of the EMF	
The adopted BPDM EMF will have to be monitored on a regular basis to ensure that it achieves its purpose and goal. The effectiveness of the EMF in decision-making and development proposals must be monitored against the	BPDM & 5 LMs NW READ DEA

Action	Responsibility
achievement of the strategic environmental objectives and the desired state of the environment (South Africa, 2010).	
Review and revision of the EMF	
The EMF may from time to time, or as specified in the revision schedule of the EMF, be revised on the initiative of the Minister, or the MEC in concurrence with the Minister. Areas of improvement must be identified and any necessary changes should be effected (South Africa, 2010).	NW READ DEA
Once the BPDM EMF has been revised, notice must be given in the Government Gazette or the official provincial Gazette of the revision (South Africa, 2010).	NW READ

11 REFERENCES

SOUTH AFRICA. 2010. Environmental Management Framework Regulations. Pretoria: Department of Environmental Affairs.

SOUTH AFRICA. 2012. Environmental Management Framework Regulations 2010. Integrated Environmental Management Guideline Series 6. Pretoria: Department of Environmental Affairs.

SOUTH AFRICA. 2015a. The outcomes approach. Available at: http://www.gov.za/issues/outcomes-approach. Date of use: 07/10/2015.

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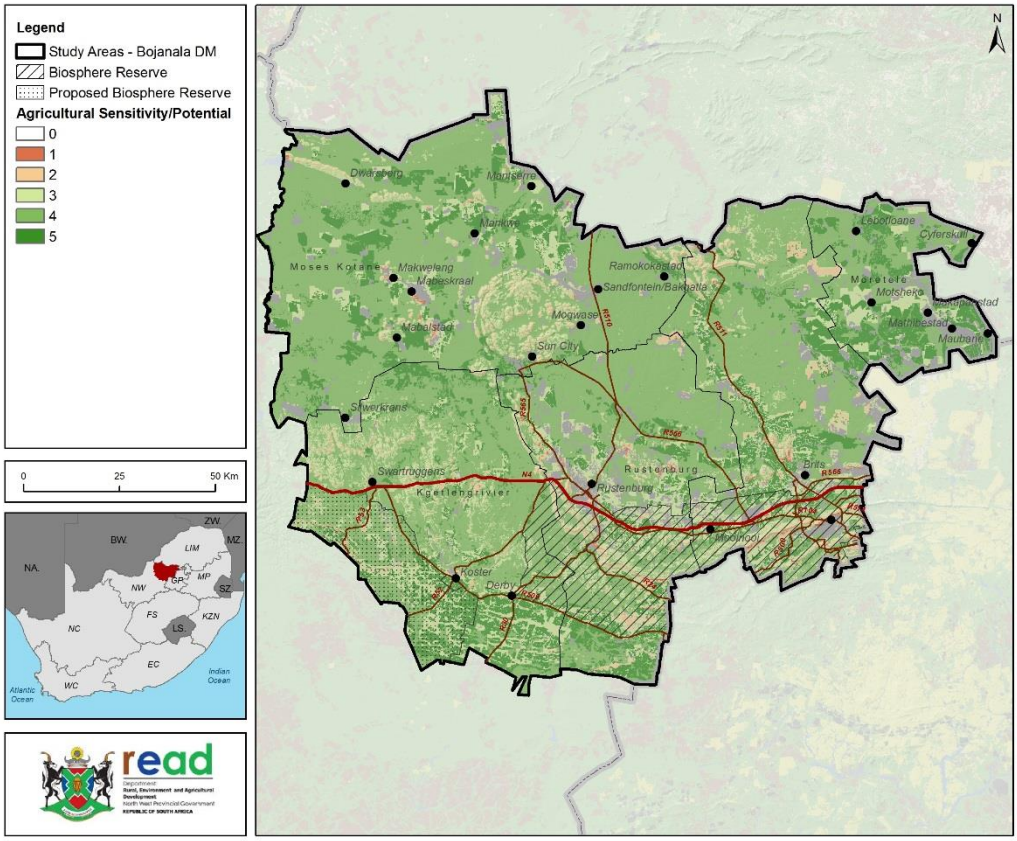
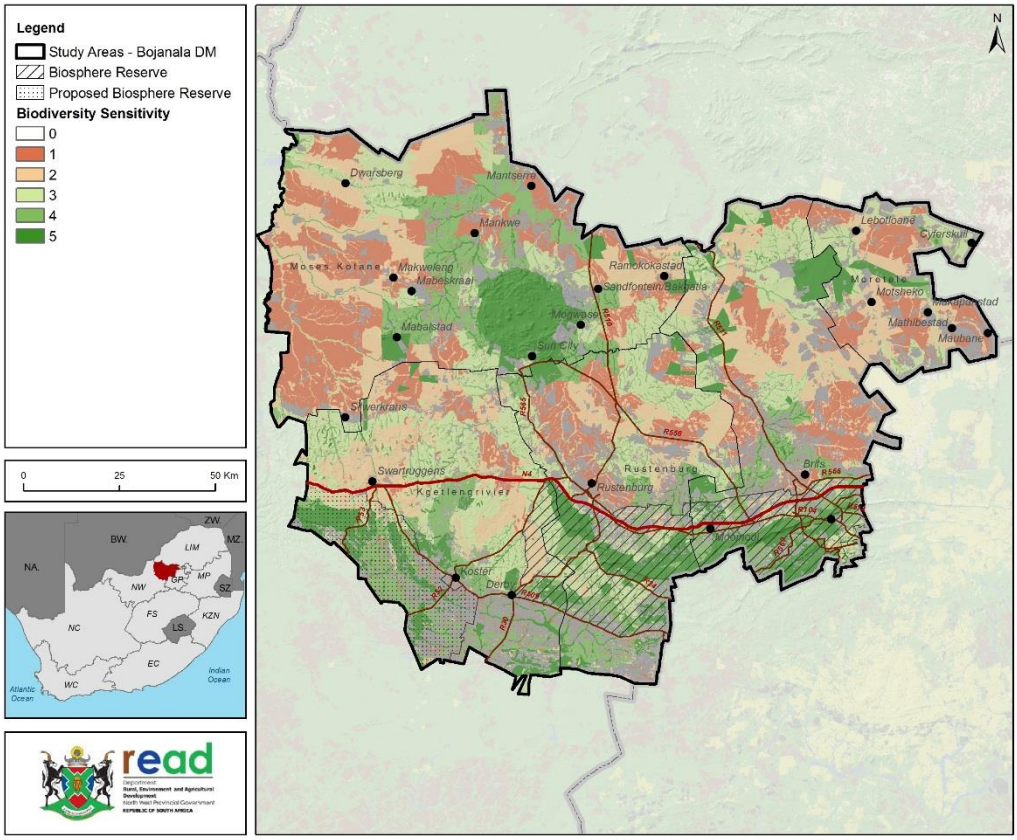
SOUTH AFRICA. nd a. National Development Plan 2030: Our Future-make it work. Available at: http://www.poa.gov.za/news/Documents/NPC%20National%20Development%20Plan%20Vision%202030%20-lo-res.pdf. Date of use: 07/10/2015.

12 ADDENDUMS

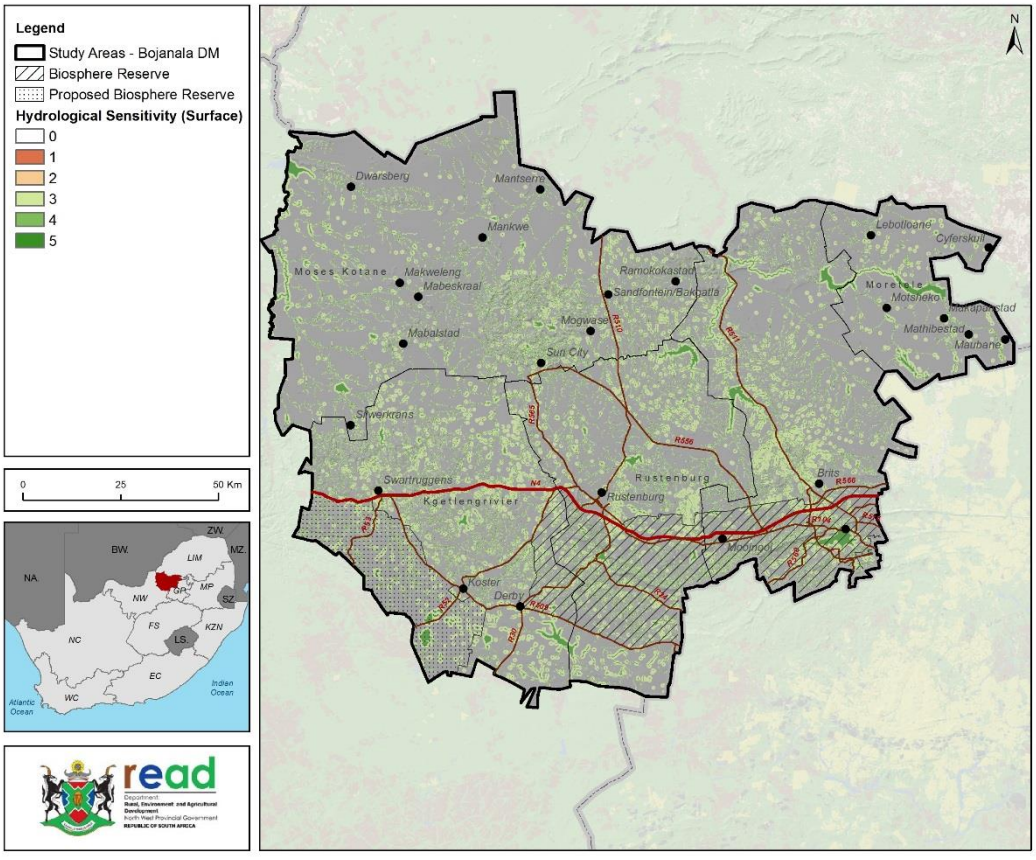
Addendum 1: BPDM Environmental sensitivity maps



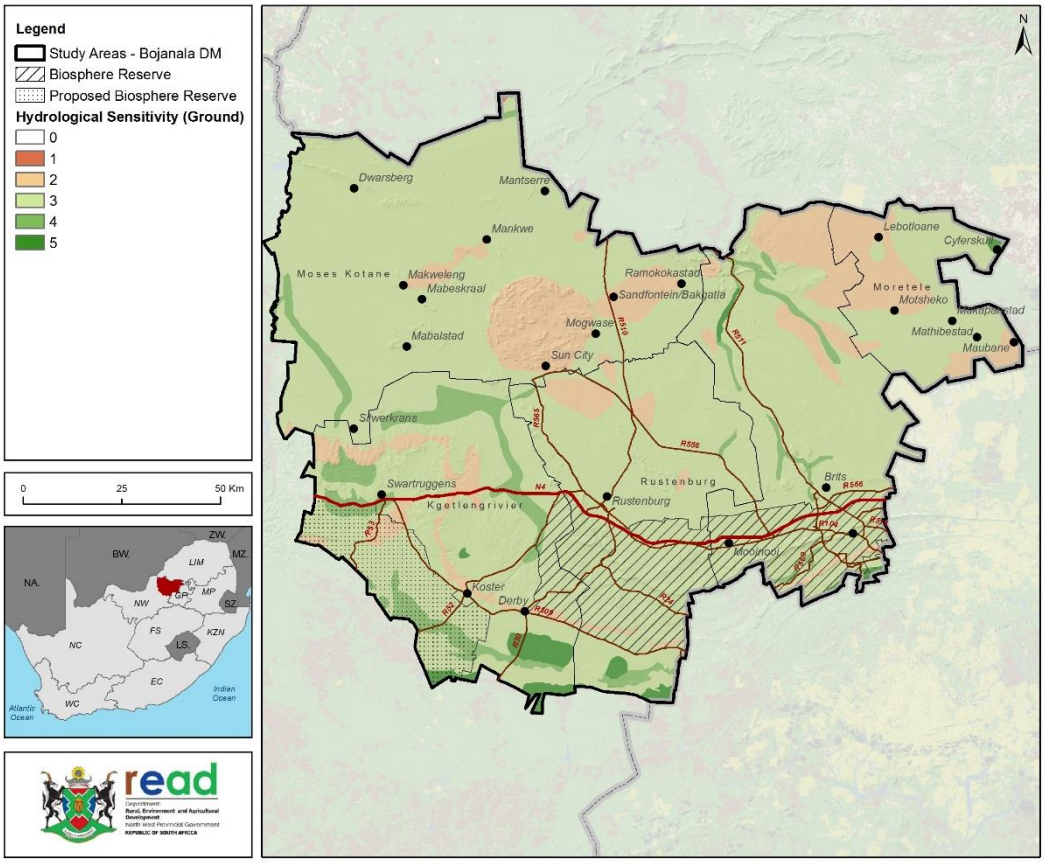
Spatial representation of agricultural sensitivity in the BPDM



Spatial representation of biodiversity sensitivity in the BPDM

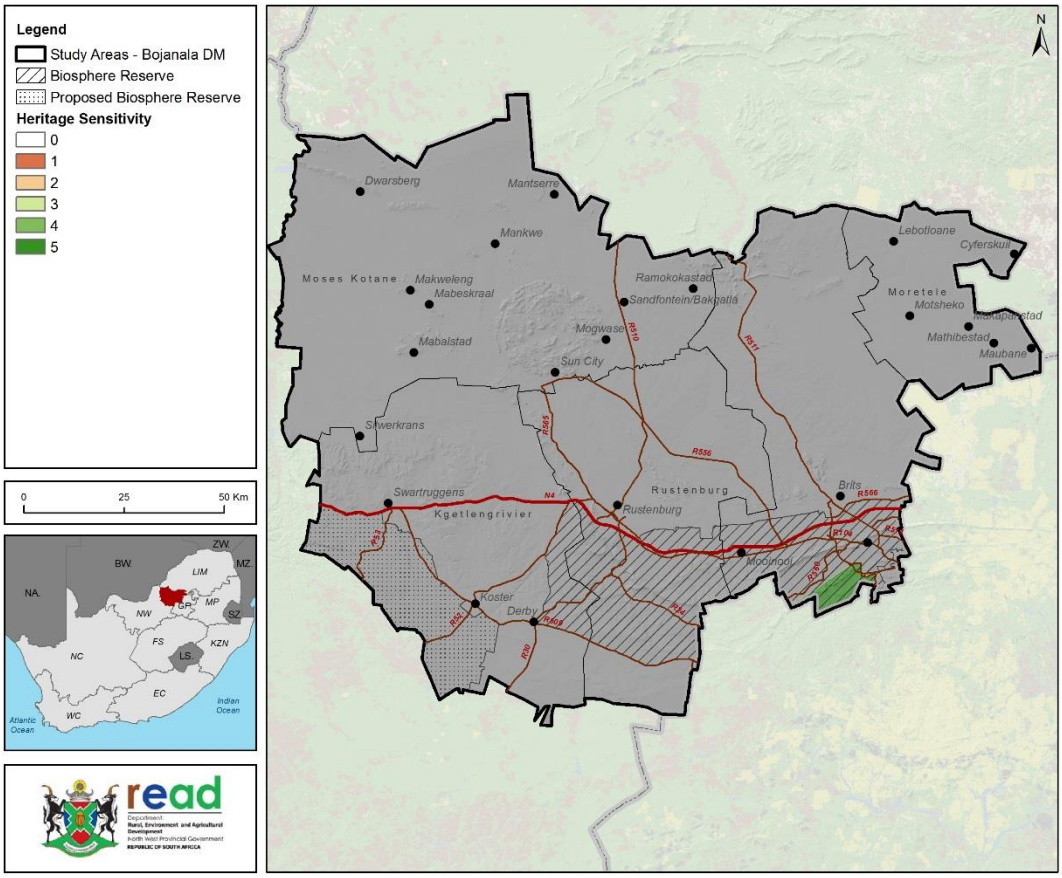


Spatial representation of surface water sensitivity in the BPDM



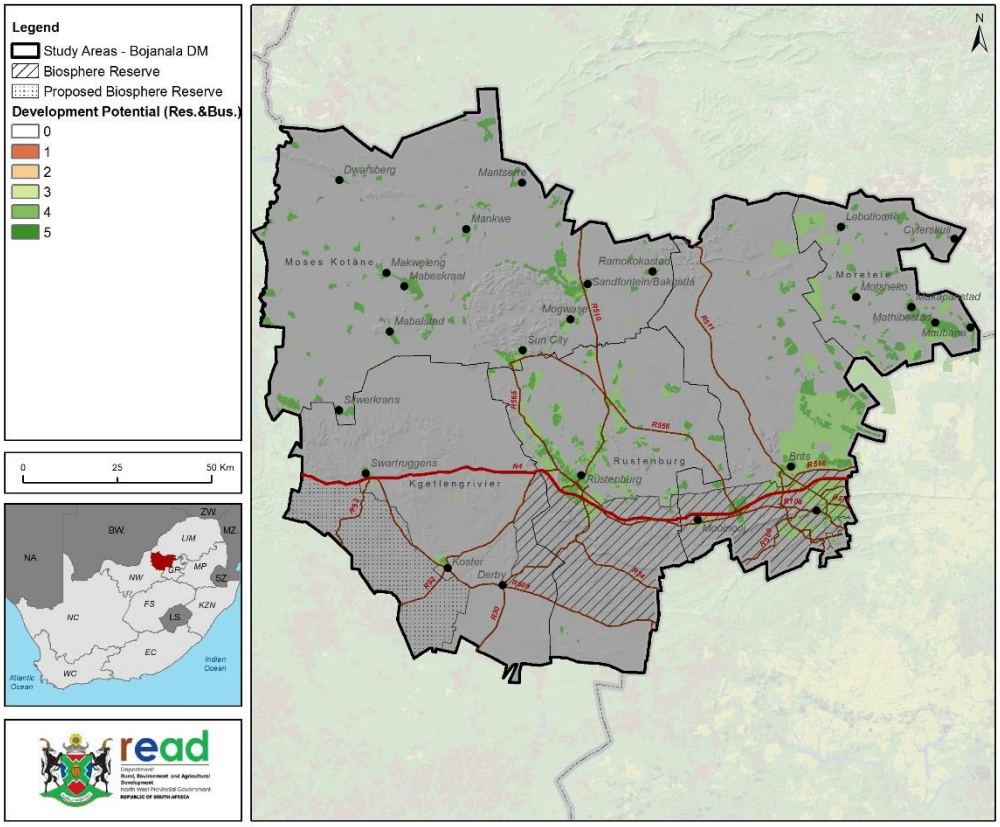
Spatial representation of groundwater sensitivity in the BPDM

Spatial representation of topography sensitivity in the BPDM

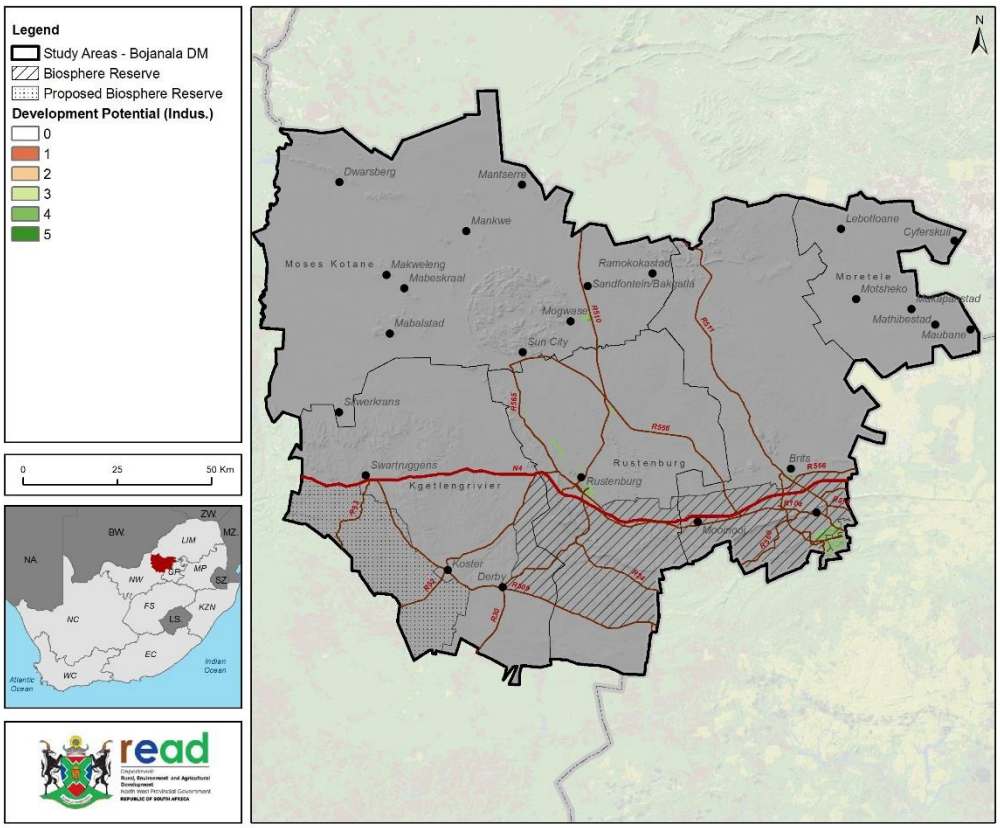


Spatial representation of heritage sensitivity in the BPDM

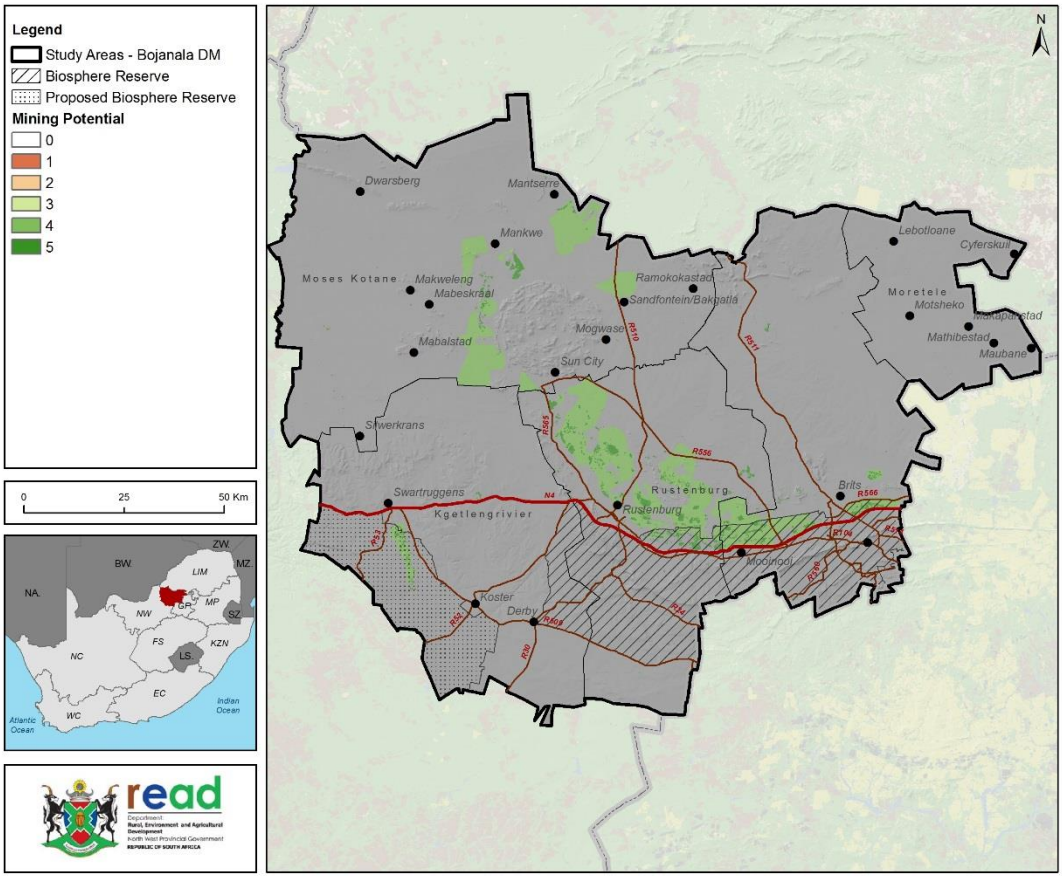
Addendum 2: BPDM Environmental opportunities maps



Spatial representation of urban (housing, commercial and other) development potential in the BPDM



Spatial representation of urban (industrial) development potential in the BPDM



Spatial representation of mining development potential in the BPDM

Addendum 3: Methodology used to derive the environmental sensitivity layers and delineate the environmental management zones

1. Sensitivity Maps

1.1. Agriculture
1.2. Biodiversity
1.3. Topography
1.4. Hydrology
1.4.1. Surface
1.4.2. Groundwater

2. Pressures & Opportunities

2.1. Agriculture
2.2. Urban
2.3. Industrial
2.4. Mining

All analysis done in raster format at a resolution of 30m x 30m
Ratings expressed ranging from 0 to 5 (zero being insignificant and 5 highly significant OR 0 = bad and 5 = very good)
A weighted overlay procedure is used

Sensitivity Maps

1.1 Agriculture

- ***Input 1 – Existing Cultivated Areas (Field crop boundaries)***
  - Annual crop cultivation / planted pastures = **5**
  - Horticulture / Viticulture = **5**
  - Pivot irrigation = **5**
  - Shade net = **5**
  - Remainder = **0**
- ***Input 2 – Grazing capacity (ha per animal unit)***
  - < 10 = **5**
  - 11 - 21 =**4**
  - 22 – 40 = **3**
  - 41 – 100 = **2**
  - > 100 = **1**
  - Transformed rangeland = **0**
- ***Input 3 – Land capability***
  - 13 - 15 = **5**
  - 10 - 12 = **4**
  - 7 – 9 = **3**
  - 4 – 6 = **2**
  - 1 – 3 = **1**
  - No Data = **0**
- ***Input 4 - Slope (%)***
  - 0 - 4 = **5**
  - 4 – 8 = **4**
  - 8 – 12 = **3**
  - 12 – 16 = **2**
  - > 16 = **1**
- **Solution**
  - 0.33 (2) + 0.34 (3) + 0.33 (4)
  - Result + Input 1 {1 supersedes all others}

1.2 Biodiversity

- ***Input 1 – Biodiversity Sector Plan***
  - Rank 2 – 5 = **5**
  - Rank 6 – 9 = **4**
  - Rank 10 – 13 = **3**
  - Rank 14 – 17 = **2**
  - Rank 18 – 21 = **1**
- ***Input 2 – Important bird areas and protected areas***
  - Protected areas & IBAs = **5**
  - Marico Biosphere = **3**
  - Remainder = **0**
- **Solution**
  - Input 1 + Input 2 (Input 2 supersedes all others)

NPAES, listed threatened terrestrial ecosystems will be superimposed separately (scale limitations)

1.3 Topography

- ***Input - Slope***
  - < 5° = **0**
  - ≥ 5° = **5**

1.4. Hydrology

1.4.1. Surface

- ***Input 1 – Wetlands***
  - Wetland buffer (5m) = **5**
  - Wetland buffer (32m) = **4**
  - Wetland buffer (500m) = **3**
  - Wetland buffer (>500m**) = 0**
- ***Input 2 – Waterways***
  - River buffer (5m) = **5**
  - River buffer (32m) = **4**
  - River buffer (100m) = **3**
  - River buffer (>100m) = **0**
- **Solution**
  - (1) AND (2) {highest value receives score}

1.4.2. Groundwater

- ***Input 1***
  - 0 – 0.1 l/s = **1**
  - 0. 1 – 0.5 l/s = **2**
  - 0. 5 – 2.0 l/s = **3**
  - 2.0 – 5 l/s = **4**
  - > 5 l/s = **5**
- **Solution**
  - Input used as sensitivity

Pressures/Opportunities

2.1. Agriculture

- ***Use Agriculture sensitivity dataset***

2.2. Urban (General)

- ***Input 1 – Urban development potential***
  - Existing urban areas = **5**
  - Planned urban areas = **4**
  - Remainder = **0**
- **Solution**
  - Input used as sensitivity

2.3. Industrial

- ***Input 1 – Industrial development potential***
  - Existing industrial areas = **5**
  - Planned industrial areas = **4**
  - Remainder = **0**
- **Solution**
  - Input used as sensitivity

2.4. Mining

- ***Input 1 – Mining***
  - Existing mining areas = **5**
  - Planned mining areas = **4**
  - Remainder = **0**
- **Solution**
  - Input used as sensitivity

Management Zones

High Biodiversity (5) / Protected areas (5) trumps agriculture and ridges {Rxxxx**B**A}
Existing Urban (5) trumps all {xxx**U**xxx}
Existing Industrial (5) trumps all {xx**I**xxxx}
Existing Mining (5) trumps all {**M**xxxxx}
Urban expansion (4) trumps Agric potential (4) {xxx**U**xxA}
Industrial expansion (4) trumps Agric potential (4) {xx**I**xxxA}
Mining expansion (4) trumps Agric potential (4) {x**M**xxxxA}
Biodiversity potential (4) trumps agriculture potential (4) {xxxxx**B**A}
Biodiversity potential (4) trumps urban expansion (4) {xxxUx**B**x}
Biodiversity potential (4) trumps mining potential (4) {xMxxx**B**x}
Biodiversity potential (4) trumps Industrial potential (4) {xxIxx**B**x}
Urban expansion {SDF} (4) trumps mining potential (4) {xMx**U**xxx}

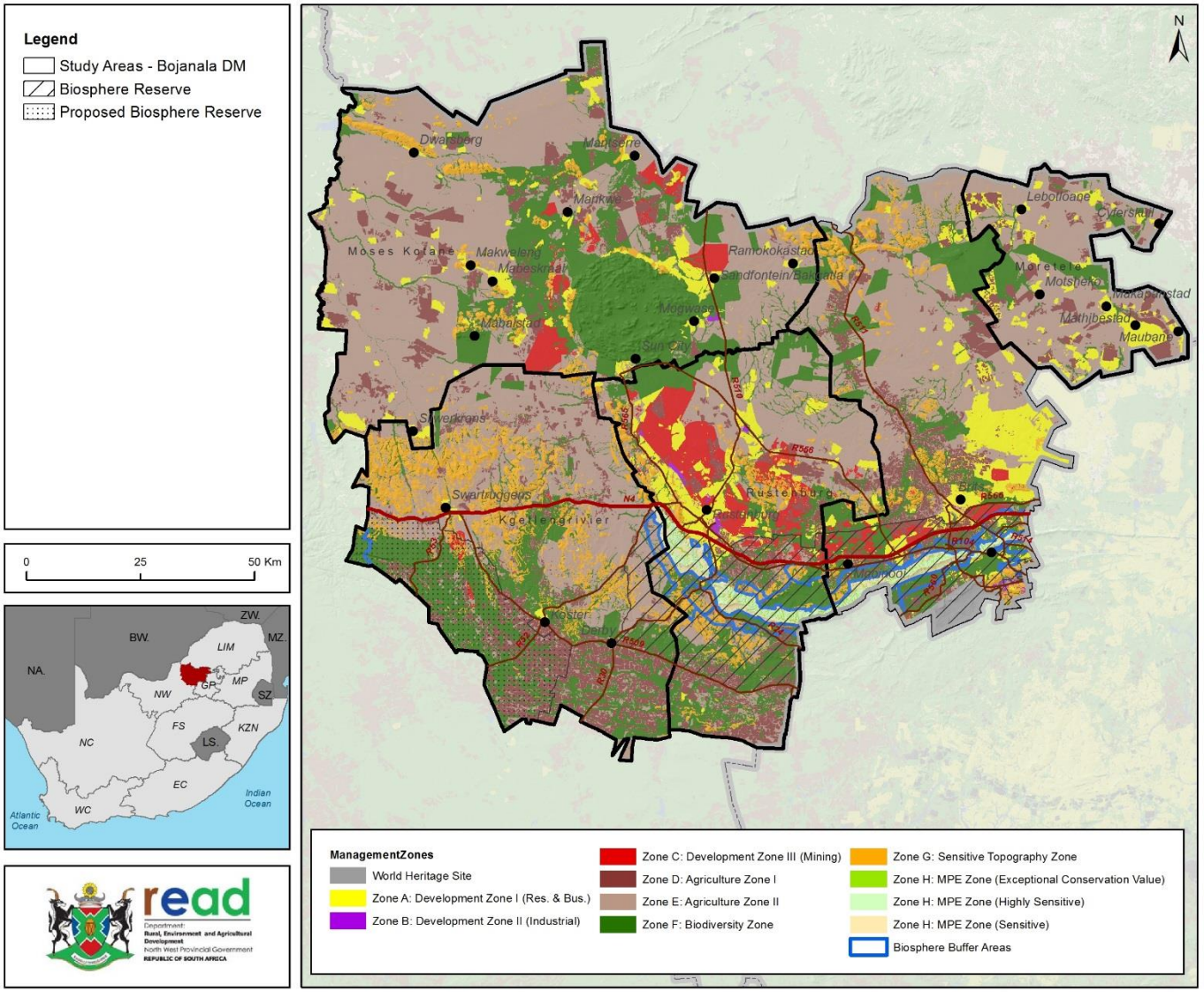
- Reclassified sensitivity layers:
  - **L1**: Areas of high agricultural potential (**0,1,2,3,4,5**)
  - **L2**: Areas of high biodiversity (**0,10,20,30,40,50**)
  - **L4**: General urban development potential areas (**0,1000,2000,3000,4000,5000**)
  - **L5**: Industrial development areas (**0,10000,20000,30000,40000,50000**)
  - **L6**: Mining priority areas (**0, 100000,200000,300000,400000,500000**)
  - **L7**: Sensitive topography (**0, 5000000**)
- Combined the four layers in raster calculator: **L1** + **L2** + **L3** + **L4** + **L5** + **L6** + **L7**
- Reclassified result:
  - High Biodiversity (5) / Protected areas (5) trumps agriculture and ridges {RxxxxBA}
  - Existing Urban (5) trumps all {xxxUxxx}
  - Existing Industrial (5) trumps all {xxIxxxx}
  - Existing Mining (5) trumps all {Mxxxxx}
  - Urban expansion (4) trumps Agric potential (4) {xxxUxxA}
  - Industrial expansion (4) trumps Agric potential (4) {xxIxxxA}
  - Mining expansion (4) trumps Agric potential (4) {xMxxxxA}
  - Biodiversity potential (4) trumps agriculture potential (4) {xxxxxBA}
  - Biodiversity potential (4) trumps urban expansion (4) {xxxUxBx}
  - Biodiversity potential (4) trumps mining potential (4) {xMxxxBx}
  - Biodiversity potential (4) trumps Industrial potential (4) {xxIxxBx}
  - Urban expansion {SDF} (4) trumps mining potential (4) {xMxUxxx}

- Generalize management zones:
  - Apply a majority filter to the result (four neighbours – threshold set to half – 10x iterations)
  - Generated a hexagonal grid (300m in diameter)
  - Transfer raster values to grid and dissolve features
- Final reclassification:
  - Add formal protected areas and MOSS as these areas trump all other classes.
- Add Hydrological features (rivers, wetlands, water bodies and groundwater yield), Protected Area Expansion Strategy Focus Areas and Threatened Terrestrial Ecosystems to map.

Decision support matrix

- Dataset 1: Management zones.
- Dataset 2: Constraints maps based on sensitivity layers:
  - Biodiversity sensitivity layer
    - Also flags – CBAs, Protected Area Expansion Focus Areas & Threatened Terrestrial Ecosystems
  - Agricultural sensitivity layers
  - Topography sensitivity layer
  - Hydrological features
  - Groundwater

Addendum 4: BPDM Environmental management zones



Addendum 5: BPDM EMF Decision support matrix

E: Possible exemption
C: Compatible
P: Potentially Compatible
I: Incompatible
A: Applicable generic issues

EMF Theme	Applicable activities	Potential environmental impacts										Site Spesific Environmental constraints/ opportunities	Zones (Colours as on map)							
		Air pollution issues	Nuisance issues (odours)	Noise related issues	Visual issues	Traffic impact issues	Geotechnical issues	Heritage (archaeological & palaoentological) impacts	Socio-economic impacts	Water related issues	Ground pollution issues		Zone A: Development Zone I (Residential, business and other)	Zone B: Development Zone II (Industrial)	Zone C: Development Zone III (Mining)	Zone D: Agriculture Zone I	Zone E: Agriculture Zone II	Zone F: Biodiversity Zone	Zone G: Sensitive Topography Zone	Zone H: MPE Zone with sub-zones
ENERGY GENERATION ACTIVITIES																				
Electricity generation infrastructure																				
Facilities/infrastructure for non renewable electricity generation	GNR 327: 2 GNR 327: 37 GNR 325: 2	A	A	A	A	A	A	A	A	A	A	Site specific report	I	P	P	I	C	I	I	I
Facilities/infrastructure for renewable electricity generation	GNR 327: 1 GNR 327: 36 GNR 325: 1				A		A	A	A	A	A	Site specific report	E (see A-1)	C	C	I	C	I	I	I
Facilities involving nuclear reactions																				
Facilities involving nuclear reactions	GNR 325: 3 GNR 325: 29			A	A	A	A	A	A	A	A	Site specific report	I	P	P	I	P	I	P	I
STORAGE FACILITIES/INFRASTRUCTURE																				
Water storage dams and reservoirs (off-stream)																				
Reservoirs for bulk water supply	GNR 324: 2 GNR 324: 16				A		A	A		A	A	Site specific report	E (see A-1)	E (see B-1)	C	I	C	P	P	I
Infrastructure for the off-stream storage of water	GNR 327: 13 GNR 327: 50						A	A		A	A	Site specific report	P	P	C	I	C	P	P	I
Facilities/infrastucture for storage & handling of DGs																				
Storage and handling of dangerous goods	GNR 324: 10 GNR 324: 22 GNR 327: 14 GNR 327: 51 GNR 325: 4	A					A	A	A	A	A	Site specific report	P	E (See B - 2)	C	I	P	I	P	I

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I: Incompatible
A: Applicable generic issues

EMF Theme	Applicable activities	Potential environmental impacts: Air pollution issues	Nuisance issues (odours)	Noise related issues	Visual issues	Traffic impact issues	Geotechnical issues	Heritage (archaeological & palaeontological) impacts	Socio-economic impacts	Water related issues	Ground pollution issues	Site Spesific Environmental constraints/ opportunities	Zones (Colours as on map): Zone A: Development Zone I (Residential, business and other)	Zone B: Development Zone II (Industrial)	Zone C: Development Zone III (Mining)	Zone D: Agriculture Zone I	Zone E: Agriculture Zone II	Zone F: Biodiversity Zone	Zone G: Sensitive Topography Zone	Zone H: MPE Zone with sub-zones
POWER LINES & PIPELINES																				
Electricity distribution infrastructure																				
Electricity distribution infrastructure	GNR 327: 11 GNR 327: 47 GNR 325: 9				A			A				Site specific report	E (See A - 2)	E (See B -3)	C	P	C	P	P	P
Pipelines and associated infrastucture																				
Pipelines for bulk transportation of DGs	GNR 325: 7 GNR 327: 60				A		A	A	A	A	A	Site specific report	P	C	C	P	C	I	I	I
Pipelines for bulk transportation of water or storm water	GNR 327: 9 GNR 327: 45				A		A	A		A		Site specific report	E (See A - 3)	E (See B - 4)	C	P	C	P	P	P
Pipelines for bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes	GNR 327: 10 GNR 327: 46				A		A	A	A	A	A	Site specific report	E (See A - 4)	E (SeeB - 5)	C	P	P	I	I	I
Facilities/infrastructure for the transfer of large volumes of water	GNR 325: 11 GNR 327: 63				A		A	A		A		Site specific report	C	C	C	P	C	P	P	P
TRANSPORT INFRASTRUCTURE																				
Road construction	GNR 327: 24 GNR 324: 4 GNR 324: 18 GNR 327: 56 GNR 325: 27	A		A		A	A	A	A	A	A	Site specific report	E (See A - 5)	E (See B - 6)	C	I	C	P	P	I
Outdoor tracks of routes for motor powered vehicles	GNR 324: 11 GNR 324: 21	A		A				A		A	A	Site specific report	E (See A - 6)	E (See B - 7)	C	I	C	P	P	P

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EMF Theme	Applicable activities	Potential environmental impacts										Site Spesific Environmental constraints/ opportunities	Zones (Colours as on map)							
		Air pollution issues	Nuisance issues (odours)	Noise related issues	Visual issues	Traffic impact issues	Geotechnical issues	Heritage (archaeological & palaeontological) impacts	Socio-economic impacts	Water related issues	Ground pollution issues		Zone A: Development Zone I (Residential, business and other)	Zone B: Development Zone II (Industrial)	Zone C: Development Zone III (Mining)	Zone D: Agriculture Zone I	Zone E: Agriculture Zone II	Zone F: Biodiversity Zone	Zone G: Sensitive Topography Zone	Zone H: MPE Zone with sub-zones
POWER LINES & PIPELINES																				
Electricity distribution infrastructure																				
Electricity distribution infrastructure	GNR 327: 11 GNR 327: 47 GNR 325: 9				A			A				Site specific report	E (See A - 2)	E (See B -3)	C	P	C	P	P	P
Railway lines	GNR 325: 12 GNR 327: 64			A			A	A	A	A		Site specific report	C	C	C	I	C	P	P	I
Cable ways & zip lines or foefieslides	GNR 324: 8 GNR 324: 20 GNR 324: 9 GNR 324: 25				A			A				Site specific report	E (see A - 7)	E (see B - 8)	C	P	C	P	P	P
Airports/airfields	GNR 324: 7 GNR 324: 19 GNR 325: 8 GNR 327: 61			A		A		A	A	A	A	Site specific report	P	C	C	I	P	P	I	I
INDUSTRIAL ACTIVITIES																				
Refining, extraction or processing of gas, oil or petroleum products	GNR 325: 5 GNR 327: 59	A	A	A	A	A	A	A	A	A	A	Site specific report	I	C	C	I	C	I	I	I
Activities requiring permits of licenses in terms of legislation governing the release of emissions or pollution	GNR 327: 34 GNR 325: 6	A	A				A	A	A	A	A	Site specific report	p	C	C	I	C	I	P	I
Agri-industrial activities	GNR 327: 8 GNR 327: 43		A	A		A	A	A	A	A	A	Site specific report	I	C	C	P	E (see E - 1)	I	P	I
Abbatoirs	GNR 327: 3 GNR 327: 38		A			A		A	A	A	A	Site specific report	I	C	P	I	P	I	P	I

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I: Incompatible
A: Applicable generic issues

EMF Theme	Applicable activities	Potential environmental impacts										Site Spesific Environmental constraints/ opportunities	Zones (Colours as on map)							
		Air pollution issues	Nuisance issues (odours)	Noise related issues	Visual issues	Traffic impact issues	Geotechnical issues	Heritage (archaeological & palaeontological) impacts	Socio-economic impacts	Water related issues	Ground pollution issues		Zone A: Development Zone I (Residential, business and other)	Zone B: Development Zone II (Industrial)	Zone C: Development Zone III (Mining)	Zone D: Agriculture Zone I	Zone E: Agriculture Zone II	Zone F: Biodiversity Zone	Zone G: Sensitive Topography Zone	Zone H: MPE Zone with sub-zones
ACTIVITES WITHIN A WATERCOURSE OR WITHIN 32M OF A WATERCOURSE																				
Dams	GNR 327: 66						A	A		A	A	Site specific report	P	P	C	I	C	P	C	I
	GNR 325: 16																			
Construction of infrastructure within a watercourse or within 32m of a water course	GNR 327: 12				A		A	A		A	A	Site specific report	C	C	C	I	C	P	P	I
	GNR 327: 48																			
	GNR 324: 14																			
	GNR 324: 23																			
Dredging, excavation, removal or depositing of material in a water course	GNR 327: 19						A	A		A	A	Site specific report	P	P	C	I	C	P	P	I
	GNR 325: 24																			
AGRICULTURE RELATED ACTIVITIES																				
Concentration of animals for commercial production	GNR 327: 4		A		A	A		A	A	A	A	Site specific report	I	C	C	I	C	I	I	I
	GNR 327: 39																			
	GNR 327: 5																			
	GNR 327: 40																			
AQUACULTURE RELATED ACTIVITIES																				
Fresh water aquaculture	GNR 324: 13						A	A		A		Site specific report	P	P	C	I	C	I	P	I
	GNR 324: 24																			
	GNR 327: 6																			
	GNR 327: 41																			
BIODIVERSITY RELATED ACTIVITIES/PROCESSES																				
Release of GMOs	GNR 327: 29											Site specific report	P	P	C	C	C	I		I
Threatening activities/processes in listed ecosystems	GNR 327: 30											Site specific report	P	P	P	P	P	I		I
CEMETERIES																				
Cemeteries	GNR 327: 23					A	A	A	A	A		Site specific report	C	C	C	I	P	I	I	I
	GNR 327: 44																			

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EMF Theme	Applicable activities	Potential environmental impacts										Site Spesific Environmental constraints/ opportunities	Zones (Colours as on map)							
		Air pollution issues	Nuisance issues (odours)	Noise related issues	Visual issues	Traffic impact issues	Geotechnical issues	Heritage (archaeological & palaeontological) impacts	Socio-economic impacts	Water related issues	Ground pollution issues		Zone A: Development Zone I (Residential, business and other)	Zone B: Development Zone II (Industrial)	Zone C: Development Zone III (Mining)	Zone D: Agriculture Zone I	Zone E: Agriculture Zone II	Zone F: Biodiversity Zone	Zone G: Sensitive Topography Zone	Zone H: MPE Zone with sub-zones
TOURISM RELATED ACTIVITIES																				
Small hotels	GNR 324: 5			A		A	A	A	A	A	A	Site specific report	E (See A - 8)	P	P	I	C	P	P	I
Large hotels, lodges and resorts	GNR 324: 6 GNR 324: 17			A		A	A	A	A	A	A	Site specific report	E (See A - 8)	P	P	I	I	I	P	I
HABITAT DESTRUCTION																				
The transformation of zoned land	GNR 324: 15							A		A		Site specific report	C	C	C	I	P	I	P	I
Physical alteration of virgin soil	GNR 325: 13							A		A		Site specific report	I	C	C	I	C	I	I	I
Clearance of vegetation	GNR 324: 12 GNR 327: 27 GNR 325: 15	A						A		A		Site specific report	C	C	C	I	C	I	I	I
DEVELOPMENT OF PREVIOUSLY DISTURBED LAND																				
Residential, mixed, retail, commercial, industrial or institutional developments, where land was previously used for agriculture/afforestation, mining or heavy industrial purposes	GNR 327: 28 GNR 327: 26 GNR 327: 35					A	A	A	A	A	A	Site specific report	E (See A-9)	C	C	I	C	I	I	I
MINING & PETROLEUM DEVELOPMENT ACTIVITIES																				
Mining activities	GNR 327: 20 GNR 327: 21 GNR 325: 17 GNR 325: 19	A		A	A	A	A	A	A	A	A	Site specific report	I	P	C	I	C	I	P	I
Mineral processing	GNR 327: 33 GNR 327: 58	A	A	A				A	A	A	A	Site specific report	I	I	C	I	C	I	I	I
Petroleum winning activities	GNR 325: 18 GNR 325: 20	A	A	A	A	A	A	A	A	A	A	Site specific report	I	P	C	I	C	I	P	I
Decommisioning & mine closure	GNR 327: 22	A	A	A	A	A	A	A	A	A	A	Site specific report	P	P	C	I	C	C	C	C

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EMF Theme	Applicable activities	Potential environmental impacts										Site Spesific Environmental constraints/ opportunities	Zones (Colours as on map)							
		Air pollution issues	Nuisance issues (odours)	Noise related issues	Visual issues	Traffic impact issues	Geotechnical issues	Heritage (archaeological & palaeontological) impacts	Socio-economic impacts	Water related issues	Ground pollution issues		Zone A: Development Zone I (Residential, business and other)	Zone B: Development Zone II (Industrial)	Zone C: Development Zone III (Mining)	Zone D: Agriculture Zone I	Zone E: Agriculture Zone II	Zone F: Biodiversity Zone	Zone G: Sensitive Topography Zone	Zone H: MPE Zone with sub-zones
DECOMMISSIONING ACTIVITIES																				
Decommisioning activities	GNR 327: 31	A	A	A	A	A	A	A	A	A	A	Site specific report	P	C	C	I	C	C	C	C
ACTIVITIES WITH VISUAL INTRUSION																				
Activities with visual intrusion	GNR 324: 1				A	A						Site specific report	E (See A - 10)	E (See B-9)	C	P	C	I	I	I
	GNR 324: 3																			
WASTE AND WASTE WATER MANAGEMENT ACTIVITIES																				
Treatment of effluent/waste water/sewerage	GNR 327: 25	A	A	A	A		A	A	A	A	A	Site specific report	P	C	C	I	C	P	P	I
	GNR 325: 25																			
	GNR 327: 57																			
Desalination of water	GNR 327: 16	A		A			A	A	A	A	A	Site specific report	C	C	C	I	C	p	P	I
	GNR 327: 53																			
Storage of waste	GNR 921: A1		A				A		A	A	A	Site specific report	P	P	P	I	I	I	P	I
	GNR 921: B1																			
Re-use, recycling or recovery of waste	GNR 921: A3	A	A			A			A	A	A	Site specific report	C	P	P	I	I	I	P	I
	GNR 921: A4																			
	GNR 921: A5																			
	GNR 921: B2																			
	GNR 921: B3																			
Treatment of waste	GNR 921: A6	A	A		A	A				A	A	Site specific report	C	P	P	I	I	I	I	I
	GNR 921: A7																			
	GNR 921: B4																			
	GNR 921: B5																			
	GNR 921: B6																			

E: Possible exemption
C: Compatible
P: Potentially Compatible
I: Incompatible
A: Applicable generic issues

EMF Theme	Applicable activities	Potential environmental impacts										Site Spesific Environmental constraints/ opportunities	Zones (Colours as on map)							
		Air pollution issues	Nuisance issues (odours)	Noise related issues	Visual issues	Traffic impact issues	Geotechnical issues	Heritage (archaeological & palaeontological) impacts	Socio-economic impacts	Water related issues	Ground pollution issues		Zone A: Development Zone I (Residential, business and other)	Zone B: Development Zone II (Industrial)	Zone C: Development Zone III (Mining)	Zone D: Agriculture Zone I	Zone E: Agriculture Zone II	Zone F: Biodiversity Zone	Zone G: Sensitive Topography Zone	Zone H: MPE Zone with sub-zones
DECOMMISSIONING ACTIVITIES																				
Decommisioning activities	GNR 327: 31	A	A	A	A	A	A	A	A	A	A	Site specific report	P	C	C	I	C	C	C	C
ACTIVITIES WITH VISUAL INTRUSION																				
Disposal of small volumes of inert, general and domestic waste	GNR 921: A9		A				A	A		A	A	Site specific report	C	P	P	I	P	I	I	I
	GNR 921: A10																			
	GNR 921: A11																			
Disposal of hazardous waste and large volumes of inert and general waste	GNR 921: B7		A		A	A	A		A	A	A	Site specific report	P	P	P	I	P	I	I	I
	GNR 921: B8																			
	GNR 921: B9																			
Construction of facilities for Category A and B waste management activities, as well as expansion or decommissioning of all waste management facilities	GNR 921: A12	A		A		A	A	A	A	A	A	Site specific report	C	P	P	I	P	I	I	I
	GNR 921: A13																			
	GNR 921: A14																			
	GNR 921: B10																			
Residue stockpiles or residue deposits	GNR 921: A15	A		A	A	A	A	A	A	A	A	Site specific report	C	C	P	I	P	P	P	I
	GNR 921: B11																			
OTHER ACTIVITIES																				
Phased activities	GNR 324: 26	A	A	A	A	A	A	A	A	A	A	Site specific report	P	P	P	P	P	P	P	I
	GNR 325: 67																			
Continuation of activities where the Environmental Authorisation has lapsed	GNR 327: 32	A	A	A	A	A	A	A	A	A	A	Site specific report	P	P	P	P	P	P	P	I

Addendum 6: General environmental management guidelines for the various environmental management zones, as well as specific environmental management guidelines for specified activities within these zones.

Zone A: Development Zone I (Residential, business and other)
Description
'Development Zone I' is a refinement of areas identified for future urban development in local municipal SDFs. These development uses include, amongst others, residential land uses, commercial land uses and land uses related to government functions, but specifically excludes industrial land uses and mining related land uses.
General environmental management guidelines
The following general management guidelines are applicable to Zone A: • *Development should be confined to urban areas (areas situated within the urban node/edge/fringe, or where no such node/edge/fringe has been defined or adopted, areas situated within the edge of built-up areas) to minimise the effects of urban sprawl in the area.* • *The zone should be used for the expansion of urban areas and the integration of existing settlements.* • *Green open spaces should be established and protected within the zone.* • *The following should be encouraged in this zone:* o *Urban infill development;* o *Residential development;* o *Commercial developments;* o *Government functions;* o *Other appropriate land uses as reflected in the applicable SDF/s;* o *Upgrading of service infrastructure; and* o *Urban greening.* • *If the zone falls within a Biosphere Buffer Zone, the following guidelines are also applicable:* o *The development guidelines in the relevant management plan should be consulted whenever an activity falls within the buffer area.* o *Developments that might put stress on the protected environments should be avoided within the buffer area.* o *The applicable biosphere development guidelines and principles should be considered.* o *Conservation and tourism orientated developments should be promoted within the buffer area.* o *High density developments, industrial developments, mining activities and other high-impact developments should be avoided in the buffer area.*

Possible listed activities that <u>may</u> be excluded from the requirement to obtain an environmental authorisation in this zone.		
Code	**Applicable activity**	**Specific environmental management guideline**
A - 1	GNR 324: 2 GNR 324: 16	The activity may be excluded from the requirement to obtain an environmental authorisation within **Zone A,** provided that the following development conditions are met: • **A 1.1** – The development footprint will not exceed the boundaries of **Zone A**. • **A 1.2** – The development footprint **does not intersect** one of the following areas identified in Listing Notice 3 of the Environmental Impact Assessment Regulations 2017: o **A 1.2.1** – An area zoned for use as public open space; or

Possible listed activities that <u>may</u> be excluded from the requirement to obtain an environmental authorisation in this zone.		
		○ **A 1.2.2** – An area designated for conservation use in any adopted plan or framework.
A - 2	GNR 327: 11 GNR 327: 47	The activity **may** be excluded from the requirement to obtain an environmental authorisation within **Zone A,** provided that the following development conditions are met: • **A 2.1** – The development footprint will not exceed the boundaries of **Zone A**. • **A 2.2** – Upon consideration of the '**site specific report**' generated by the EMF decision support tool, the competent authority will decide whether specific specialist studies must be conducted to inform the site lay-out (development footprint) or the environmental management programme. In addition, the following management requirements must be **implemented** by the developer and **accepted in writing and verified** by the applicable competent authority(ies): • **A 2.3** – A detailed site development plan (layout and footprint of the development) will be submitted to the competent authority for approval. • **A 2.4** – An environmental management programme will be submitted to the competent authority for approval and implemented. • **A 2.4** – Any sensitive features identified on the site will be reported to the competent authority. • **A 2.5** – Officials from the competent authority will be granted access to the site (on prior arrangement with the developer) during and after the development phase of the project. • **A 2.6** – Any other requirements identified by the relevant competent authority(ies) will be adhered to.
	GNR 325: 9	**Not applicable to this zone**
A - 3	GNR 327: 9 GNR 327: 45	The activity may be excluded from the requirement to obtain an environmental authorisation (basic assessment) within **Zone A,** provided that the following development conditions are met: • **A 3.1** – The development footprint will not exceed the boundaries of **Zone A**.
A - 4	GNR 327: 10 GNR 327: 46	The activity may be excluded from the requirement to obtain an environmental authorisation (basic assessment) within **Zone A,** provided that the following development conditions are met: • **A 4.1** – The development footprint will not exceed the boundaries of **Zone A**.

Possible listed activities that <u>may</u> be excluded from the requirement to obtain an environmental authorisation in this zone.		
A - 5	GNR 327: 24 GNR 327: 56	The activity may be excluded from the requirement to obtain an environmental authorisation (basic assessment) within **Zone A,** provided that the following development conditions are met: • **A(a) 5.1** – The development footprint will not exceed the boundaries of **Zone A**.
	GNR 324: 4 GNR 324: 18	The activity may be excluded from the requirement to obtain an environmental authorisation (basic assessment) within **Zone A,** provided that the following development conditions are met: • **A(b) 5.1** – The development footprint will not exceed the boundaries of **Zone A**. • **A(b) 5.2** – The development footprint **does not intersect** one of the following areas identified in Listing Notice 3 of the Environmental Impact Assessment Regulations 2017: o **A(b) 5.2.1** – An area zoned for use as public open space; or o **A(b) 5.2.2** – An area designated for conservation use in any adopted plan or framework. o **A(b) 5.2.3** – An area zoned as a natural heritage site
	GNR 325: 27	May not be excluded from the requirement to obtain an environmental authorisation, but **COMPATIBLE** in **Zone A**
A - 6	GNR 324: 11 GNR 324: 21	The activity may be excluded from the requirement to obtain an environmental authorisation within **Zone A,** provided that the following development conditions are met: • **A 6.1** – The development footprint will not exceed the boundaries of **Zone A**. • **A 6.2** – The development footprint **does not intersect** one of the following areas as defined in Listing Notice 3 of the Environmental Impact Assessment Regulations 2017: o **A 6.2.1** – An area zoned for use as public open space; or o **A 6.2.2** – An area designated for conservation use in any adopted plan or framework. o **A 6.2.3** – An area zoned as a natural heritage site.
A - 7	GNR 324: 8 GNR 324: 20 GNR 324: 9 GNR 324: 25	The activity may be excluded from the requirement to obtain an environmental authorisation (basic assessment) within **Zone A,** provided that the following development conditions are met: • **A 7.1** – The development footprint will not exceed the boundaries of **Zone A**. • **A 7.2** – The development footprint **does not intersect** one of the following areas identified in Listing Notice 3 of the Environmental Impact Assessment Regulations 2017: o **A 7.2.1** – An area zoned for use as public open space; or o **A 7.2.2** – An area designated for conservation use in any adopted plan or framework. o **A 7.2.3** – An area zoned as a natural heritage site o **A 7.2.4** – Critical biodiversity areas (Type 1 or 2) as identified in the Free State Province Critical Biodiversity Assessment.

Possible listed activities that <u>may</u> be excluded from the requirement to obtain an environmental authorisation in this zone.		
A - 8	GNR 324: 5 GNR 324: 6 GNR 324: 17	The activity may be excluded from the requirement to obtain an environmental authorisation (basic assessment) within **Zone A,** provided that the following development conditions are met: • **A 8.1** – The development footprint will not exceed the boundaries of **Zone A**. • **A 8.2** – The development footprint **does not intersect** one of the following areas identified in Listing Notice 3 of the Environmental Impact Assessment Regulations 2017: o **A 8.2.1** – An area zoned for use as public open space; or o **A 8.2.2** – An area designated for conservation use in any adopted plan or framework.
A-9	GNR 327: 28	The activity **may** be excluded from the requirement to obtain an environmental authorisation within **Zone A,** provided that the following development conditions are met: • **A 9.1** – The development footprint will not exceed the boundaries of **Zone A**. • **A 9.2** – The development footprint will not exceed **7 hectares**. • **A 9.3** – Upon consideration of the '**site specific report**' generated by the EMF decision support tool, the competent authority will decide whether specific specialist studies must be conducted to inform the site lay-out (development footprint) or the environmental management programme. In addition, the following management requirements must be **implemented** by the developer and **accepted in writing and verified** by the applicable competent authority(ies): • **A 9.4** – A detailed site development plan (layout and footprint of the development) will be submitted to the competent authority for approval. • **A 9.5** – An environmental management programme will be submitted to the competent authority for approval and implemented. • **A 9.6** – Any sensitive features identified on the site must be reported to the competent authority. • **A 9.7** – Officials from the competent authority should be granted access to the site (on prior arrangement with the developer) during and after the development phase of the project. • **A 9.8** – Any other requirements identified by the relevant competent authority(ies) should be adhered to.
	GNR 327: 26	May not be excluded from the requirement to obtain an environmental authorisation, but **COMPATIBLE** in **Zone A**
	GNR 327: 35	May not be excluded from the requirement to obtain an environmental authorisation, but **COMPATIBLE** in **Zone A**
A - 10	GNR 324: 1	The activity **may** be excluded from the requirement to obtain an environmental authorisation (basic assessment) within **Zone A,** provided that the following development conditions are met:

Possible listed activities that <u>may</u> be excluded from the requirement to obtain an environmental authorisation in this zone.		
		• **A(a) 10.1** – The development footprint will not exceed the boundaries of **Zone A**.
	GNR 324: 3	The activity **may** be excluded from the requirement to obtain an environmental authorisation (basic assessment) within **Zone A,** provided that the following development conditions are met: • **A(b) 10.1** – The development footprint will not exceed the boundaries of **Zone A**. • **A(b) 10.2** – The development footprint **does not intersect** one of the following areas identified in Listing Notice 3 of the Environmental Impact Assessment Regulations 2017: ○ **A(b) 10.2.1** – An area zoned for use as public open space; or ○ **A(b) 10.2.2** – An area designated for conservation use in any adopted plan or framework.

Zone B: Development Zone II (Industrial)
Description
'Development Zone II (Industrial)' is a refinement of areas identified for future industrial development in local municipal SDFs.
General environmental management guidelines
The following general management guidelines are applicable to Zone B: • *Development should be confined to urban areas (areas situated within the urban node, or where no urban node has been defined or adopted, areas situated within the edge of built-up areas) to minimise the effects of urban sprawl in the area.* • *Green open spaces should be established and protected.* • *The following should be encouraged in this zone:* ○ *Industrial development; and* ○ *Upgrading of service infrastructure.* • *If the zone falls within a Biosphere Buffer Zone, the following guidelines are also applicable:* ○ *The development guidelines in the relevant management plan should be consulted whenever an activity falls within the buffer area.* ○ *Developments that might put stress on the protected environments should be avoided within the buffer area.* ○ *The applicable biosphere development guidelines and principles should be considered.* ○ *Conservation and tourism orientated developments should be promoted within the buffer area.* ○ *High density developments, industrial developments, mining activities and other high-impact developments should be avoided in the buffer area*

Possible listed activities that may be excluded from the requirement to obtain an environmental authorisation in this zone.		
Code	**Applicable activity**	**Specific environmental management guideline**
B - 1	GNR 324: 2 GNR 324: 16	The activity may be excluded from the requirement to obtain an environmental authorisation within **Zone B,** provided that the following development conditions are met:

Possible listed activities that may be excluded from the requirement to obtain an environmental authorisation in this zone.		
Code	**Applicable activity**	**Specific environmental management guideline**

		• **B 1.1** – The development footprint will not exceed the boundaries of **Zone B**.
		• **B 1.2** – The development footprint **does not intersect** one of the following areas identified in Listing Notice 3 of the Environmental Impact Assessment Regulations 2017:
		  ○ **B 1.2.1** – An area zoned for use as public open space; or
		  ○ **B 1.2.2** – An area designated for conservation use in any adopted plan or framework.

B - 2	GNR 324: 10 GNR 324: 22	The activity may be excluded from the requirement to obtain an environmental authorisation within **Zone B,** provided that the following development conditions are met: • **B 2.1** – The development footprint will not exceed the boundaries of **Zone B**.
	GNR 327: 14	May not be excluded from the requirement to obtain an environmental authorisation, but **COMPATIBLE** in **Zone B**
	GNR 327: 51	May not be excluded from the requirement to obtain an environmental authorisation, but **COMPATIBLE** in **Zone B**
	GNR 325: 4	May not be excluded from the requirement to obtain an environmental authorisation, but **COMPATIBLE** in **Zone B**
B - 3	GNR 327: 11 GNR 327: 47	The activity **may** be excluded from the requirement to obtain an environmental authorisation within **Zone B,** provided that the following development conditions are met: • **B 3.1** – The development footprint will not exceed the boundaries of **Zone A**. • **B 3.2** – Upon consideration of the '**site specific report**' generated by the EMF decision support tool, the competent authority will decide whether specific specialist studies must be conducted to inform the site lay-out (development footprint) or the environmental management programme. In addition, the following management requirements must be **implemented** by the developer and **accepted in writing and verified** by the applicable competent authority(ies): • **B 3.3** – A detailed site development plan (layout and footprint of the development) will be submitted to the competent authority for approval. • **B 3.4** – An environmental management programme will be submitted to the competent authority for approval and implemented. • **B 3.4** – Any sensitive features identified on the site will be reported to the competent authority. • **B 3.5** – Officials from the competent authority will be granted access to the site (on prior arrangement with the developer) during and after the development phase of the project.

Possible listed activities that may be excluded from the requirement to obtain an environmental authorisation in this zone.		
Code	**Applicable activity**	**Specific environmental management guideline**
		• **B 3.6** – Any other requirements identified by the relevant competent authority(ies) will be adhered to.
	GNR 325: 9	**Not applicable to this zone**
B - 4	GNR 327: 9 GNR 327: 45	The activity may be excluded from the requirement to obtain an environmental authorisation (basic assessment) within **Zone B,** provided that the following development conditions are met: • **B 4.1** – The development footprint will not exceed the boundaries of **Zone B**.
A - 5	GNR 327: 10 GNR 327: 46	The activity may be excluded from the requirement to obtain an environmental authorisation (basic assessment) within **Zone B,** provided that the following development conditions are met: • **B 5.1** – The development footprint will not exceed the boundaries of **Zone B**.
B - 6	GNR 327: 24 GNR 327: 56	The activity may be excluded from the requirement to obtain an environmental authorisation (basic assessment) within **Zone B,** provided that the following development conditions are met: • **B(a) 6.1** – The development footprint will not exceed the boundaries of **Zone B**.
	GNR 324: 4 GNR 324: 18	The activity may be excluded from the requirement to obtain an environmental authorisation (basic assessment) within **Zone B,** provided that the following development conditions are met: • **B(b) 6.1** – The development footprint will not exceed the boundaries of **Zone B**. • **B(b) 6.2** – The development footprint **does not intersect** one of the following areas identified in Listing Notice 3 of the Environmental Impact Assessment Regulations 2017: ○ **B(b) 6.2.1** – An area zoned for use as public open space; or ○ **A(b) 6.2.2** – An area designated for conservation use in any adopted plan or framework. ○ **B(b) 6.2.3** – An area zoned as a natural heritage site
	GNR 325: 27	May not be excluded from the requirement to obtain an environmental authorisation, but **COMPATIBLE** in **Zone B**
B - 7	GNR 324: 11 GNR 324: 21	The activity may be excluded from the requirement to obtain an environmental authorisation within **Zone B,** provided that the following development conditions are met: • **B 7.1** – The development footprint will not exceed the boundaries of **Zone B**. • **B 7.2** – The development footprint **does not intersect** one of the following areas as defined in Listing Notice 3 of the Environmental Impact Assessment Regulations 2017: ○ **B 7.2.1** – An area zoned for use as public open space; or ○ **B 7.2.2** – An area designated for conservation use in any adopted plan or framework.

Possible listed activities that may be excluded from the requirement to obtain an environmental authorisation in this zone.		
Code	**Applicable activity**	**Specific environmental management guideline**
		○ **B 7.2.3** – An area zoned as a natural heritage site.
B - 8	GNR 324: 8 GNR 324: 20 GNR 324: 9 GNR 324: 25	The activity may be excluded from the requirement to obtain an environmental authorisation (basic assessment) within **Zone B,** provided that the following development conditions are met: • **B 8.1** – The development footprint will not exceed the boundaries of **Zone B**. • **B 8.2** – The development footprint **does not intersect** one of the following areas identified in Listing Notice 3 of the Environmental Impact Assessment Regulations 2017: ○ **B 8.2.1** – An area zoned for use as public open space; or ○ **B 8.2.2** – An area designated for conservation use in any adopted plan or framework. ○ **B 8.2.3** – An area zoned as a natural heritage site ○ **B 8.2.4** – Critical biodiversity areas (Type 1 or 2) as identified in the Free State Province Critical Biodiversity Assessment.
B - 9	GNR 324: 1	The activity **may** be excluded from the requirement to obtain an environmental authorisation (basic assessment) within **Zone B,** provided that the following development conditions are met: • **B(a) 9.1** – The development footprint will not exceed the boundaries of **Zone B**.
	GNR 324: 3	The activity **may** be excluded from the requirement to obtain an environmental authorisation (basic assessment) within **Zone B,** provided that the following development conditions are met: • **B(b) 9.1** – The development footprint will not exceed the boundaries of **Zone B**. • **B(b) 9.2** – The development footprint **does not intersect** one of the following areas identified in Listing Notice 3 of the Environmental Impact Assessment Regulations 2017: ○ **B(b) 9.2.1** – An area zoned for use as public open space; or ○ **B(b) 9.2.2** – An area designated for conservation use in any adopted plan or framework.

Zone C: Development Zone III (Mining)
Description
'Development Zone III (Mining)' is a refinement of areas identified in local municipal SDFs as areas with potential for mining development. If developed in a sustainable manner, these areas have the potential to stimulate economic growth in the area.
General environmental management guidelines
The following general management guidelines are applicable to **Zone C**: • *Mining activities should, as far as possible, be confined to **Zone C**.* • *Mining activities should be conducted in a sustainable manner.*

- *Wetlands, areas in proximity to aquatic features, areas of high or sensitive biodiversity, and areas of sensitive topography should be avoided at all costs.*

- *If the zone falls within a Biosphere Buffer Zone, the following guidelines are also applicable:*
  - *The development guidelines in the relevant management plan should be consulted whenever an activity falls within the buffer area.*
  - *Developments that might put stress on the protected environments should be avoided within the buffer area.*
  - *The applicable biosphere development guidelines and principles should be considered.*
  - *Conservation and tourism orientated developments should be promoted within the buffer area.*
  - *High density developments, industrial developments, mining activities and other high-impact developments should be avoided in the buffer area*

Possible listed activities that may be excluded from the requirement to obtain an environmental authorisation in this zone

Code	Applicable activity	Specific environmental management guideline
C - 1	GNR 327: 8 GNR 327: 43	The activity **may** be excluded from the requirement to obtain an environmental authorisation within **Zone C,** provided that the development conditions are met: • **C 1.1** – The development footprint will not exceed the boundaries of **Zone C**. • **C 1.2** – The development footprint will not exceed 3000 square metres. • **C 1.3** – Upon consideration of the '**site specific report**' generated by the EMF decision support tool, the competent authority should decide whether specific specialist studies must be conducted to inform the development footprint or the environmental management plan. In addition, the following management requirements must be **implemented** by the developer and **accepted and verified in writing** by the applicable competent authority(ies): • **C 1.4** – A detailed site development plan (layout and footprint of the development) will be submitted to the competent authority for approval. • **C 1.5** – An environmental management programme will be submitted to the competent authority for approval and implemented. • **C 1.6** – Any sensitive features identified on the site will be reported to the competent authority. • **C 1.7** – Officials from the competent authority will be granted access to the site (on prior arrangement with the developer) during and after the development phase of the project. • **C 1.8** – Any other requirements identified by the relevant competent authority(ies) will be adhered to.

Zone D: Agriculture Zone I

Description

The 'Agriculture Zone' represents existing high potential agricultural land in the area (i.e. cultivated fields) that should be preserved for crop production and other agricultural purposes.

General environmental management guidelines

The following general management guidelines are applicable to Zone D:

- *High potential agricultural land that is actively being cultivated should not be used for other types of development.*
- *Agriculture is the main priority within this zone and should be prioritised above all other types of activities and developments.*
- *Crop farming should be encouraged.*
- *Irrigation potential should be optimised.*
- *Intensive agriculture should be encouraged and developed.*
- *Sustainable farming practices should be encouraged.*

- *If the zone falls within a Biosphere Buffer Zone, the following guidelines are also applicable:*
  - *The development guidelines in the relevant management plan should be consulted whenever an activity falls within the buffer area.*
  - *Developments that might put stress on the protected environments should be avoided within the buffer area.*
  - *The applicable biosphere development guidelines and principles should be considered.*
  - *Conservation and tourism orientated developments should be promoted within the buffer area.*
  - *High density developments, industrial developments, mining activities and other high-impact developments should be avoided in the buffer area*

Zone E: Agriculture Zone II

Description

The 'Agriculture Zone' represents areas deemed suitable for further agricultural development for both grazing and cultivation purposes. The land may also be utilised for other types of development.

General environmental management guidelines

The following general management guidelines are applicable to Zone E:

- *High potential agricultural land that is actively being cultivated should not be used for other types of development.*
- *Agriculture is the main priority within this zone and should be prioritised above all other types of activities and developments.*
- *Crop farming should be encouraged.*
- *Irrigation potential should be optimised.*
- *Intensive agriculture should be encouraged and developed.*
- *Sustainable farming practices should be encouraged.*

- *If the zone falls within a Biosphere Buffer Zone, the following guidelines are also applicable:*
  - *The development guidelines in the relevant management plan should be consulted whenever an activity falls within the buffer area.*
  - *Developments that might put stress on the protected environments should be avoided within the buffer area.*
  - *The applicable biosphere development guidelines and principles should be considered.*
  - *Conservation and tourism orientated developments should be promoted within the buffer area.*
  - *High density developments, industrial developments, mining activities and other high-impact developments should be avoided in the buffer area*

Zone E: Agriculture Zone II		
Possible listed activities that may be excluded from the requirement to obtain an environmental authorisation in this zone		
Code	**Applicable activity**	**Specific environmental management guideline**
E - 1	GNR 327: 8 GNR 327: 43	The activity **may** be excluded from the requirement to obtain an environmental authorisation within **Zone E,** provided that the development conditions are met: • **E 1.1** – The development footprint will not exceed the boundaries of **Zone D**. • **E 1.2** – The development footprint will not exceed 3000 square metres. • **E 1.3** – Upon consideration of the '**site specific report**' generated by the EMF decision support tool, the competent authority should decide whether specific specialist studies must be conducted to inform the development footprint or the environmental management plan. In addition, the following management requirements must be **implemented** by the developer and **accepted and verified in writing** by the applicable competent authority(ies): • **E 1.4** – A detailed site development plan (layout and footprint of the development) will be submitted to the competent authority for approval. • **E 1.5** – An environmental management programme will be submitted to the competent authority for approval and implemented. • **E 1.6** – Any sensitive features identified on the site will be reported to the competent authority. • **E 1.7** – Officials from the competent authority will be granted access to the site (on prior arrangement with the developer) during and after the development phase of the project. • **E 1.8** – Any other requirements identified by the relevant competent authority(ies) will be adhered to.

Zone F: Biodiversity Zone
Description
The 'Biodiversity Zone' represents areas of high and significant biodiversity in the Bojanala District Municipality. Areas of high biodiversity was identified from the North West Province Biodiversity Sector Plan and includes, amongst others, critical biodiversity areas (CBAs) and Ecological Support areas (ESAs).
General environmental management guidelines
The following general management guidelines are applicable to **Zone F**: • *Biodiversity and sensitive topographical features should be protected within these areas at all costs.* • *Before any non-conservation related activity is to be considered a detailed specialist study has to be conducted by an accredited scientist to determine the impacts of the envisaged activity on not only the site but also on the larger area (strategic context).* • *Activities should be limited to conservation related and low-impact tourism related activities.*

- *The guidelines contained in North West Province Biodiversity Sector Plan are applicable and should be applied within this zone.*

- *If the zone falls within a Biosphere Buffer Zone, the following guidelines are also applicable:*
  - *The development guidelines in the relevant management plan should be consulted whenever an activity falls within the buffer area.*
  - *Developments that might put stress on the protected environments should be avoided within the buffer area.*
  - *The applicable biosphere development guidelines and principles should be considered.*
  - *Conservation and tourism orientated developments should be promoted within the buffer area.*
  - *High density developments, industrial developments, mining activities and other high-impact developments should be avoided in the buffer area*

Zone G: Sensitive Topography Zone
Description
The 'Sensitive Topography Zone' represents the sensitive topographical features, such as hills and ridges, which are deemed sensitive to development.
General environmental management guidelines

The following general management guidelines are applicable to **Zone G**:
• *Sensitive topographical features should be protected and any development that might negatively affect them should be discouraged.*
• *A detailed specialist study might have to be conducted by an accredited scientist to determine the impacts of an envisaged activity on the corridor function provided by a topographical feature.*
• *The visual impacts of proposed developments in this zone should be considered and developments/activities with high visual impact avoided.*
 	
• *If the zone falls within a Biosphere Buffer Zone, the following guidelines are also applicable:*
  ○ *The development guidelines in the relevant management plan should be consulted whenever an activity falls within the buffer area.*
  ○ *Developments that might put stress on the protected environments should be avoided within the buffer area.*
  ○ *The applicable biosphere development guidelines and principles should be considered.*
  ○ *Conservation and tourism orientated developments should be promoted within the buffer area.*
  ○ *High density developments, industrial developments, mining activities and other high-impact developments should be avoided in the buffer area*

Zone H: MPE Zone and sub-zones
Description
The 'MPE Zone' represent the Magaliesberg Protected Environment, which is a formal protected area in terms of the National Environmental Management: Protected Areas Act.
General environmental management guidelines
The following general management guidelines are applicable to **Zone H**: • *The relevant Management Plan should be consulted whenever an activity is envisaged in this zone.*

- *Non-conservation related activities should be avoided in this zone.*
- *The Biosphere development guidelines should be considered.*
- *Before any non-conservation related activity is to be considered a detailed specialist study has to be conducted by an accredited scientist to determine the impacts of the envisaged activity on not only the site but also on the larger area (strategic context).*

Activities that are incompatible, potentially compatible and incompatible with the sensitivity zones and their overall development objectives (MPE EMF Guidelines)

Exceptional conservation value zone

The following activities (as defined in the MPE EMF report) are compatible with this sensitivity zone and the overall development objectives identified in the report:

- Establishment of bioregions, conservancies, cultural heritage sites and nature reserves
- Protected areas
- Conservation, Heritage conservation
- Minor structural alterations to existing buildings
- Hiking trails
- Home enterprises

The following activities (as defined in the MPE EMF report) are potentially compatible with this sensitivity zone and the overall development objectives identified in the report:

- Farm settlements
- Livestock and game farming
- Fencing, firebreaks
- Recreation
-

The following activities (as defined in the MPE EMF report) are incompatible with this sensitivity zone and the overall development objectives identified in the report:

- Country and golf estates, group housing, retirement village
- Informal structures, Informal and semi-formal rural settlements
- Accommodation enterprises, guest house, guest lodge, conference facility,
- Hotel, restaurant, gymnasium, social hall
- Public & private resorts
- Public garage, public worship
- Camping, caravan park
- Mining, peat extraction
- Construction or enlargement of buildings or structures
- Excavations, construction of bulk infrastructure, electrical purposes, installation of bulk pipelines
- Wholesale trade, shop
- Place of refreshment, tavern, teagarden, liquor activities
- Private & public open space
- Transport uses, roads, railway purposes, quad bike trails/facilities
- Wildlife rehabilitation centre
- Abattoirs, agri-industries,
- Factories, industry, light industry
- Mobile graveyard, scrapyard, panel beating
- Livestock yard, kennels
- Aerodrome
- Aquaculture
- Bakery
- Cemetery, Crematorium

Activities that are incompatible, potentially compatible and incompatible with the sensitivity zones and their overall development objectives (MPE EMF Guidelines)

- Cultivation of virgin soils
- Drive-in and drive-through restaurants
- Feedlots
- Signage
- Filling stations
- Government purposes, place of instruction
- Nursery
- Sub-division of land
- Waste disposal
- Taxi rank, holding and parking areas
- Telecommunication

Highly sensitive zone

The following activities (as defined in the MPE EMF report) are compatible with this sensitivity zone and the overall development objectives identified in the report:

- Establishment of bioregions, conservancies, cultural heritage sites and nature reserves
- Protected areas
- Conservation, heritage conservation
- Minor structural alterations to existing buildings
- Construction or enlargement of buildings or structures
- Hiking trails
- Home enterprises
-

The following activities (as defined in the MPE EMF report) are potentially compatible with this sensitivity zone and the overall development objectives identified in the report:

- Farm settlements
- Livestock & game farming
- Fencing, firebreaks
- Recreation, camping
- Private & public open space
- Camping, guesthouse
-

The following activities (as defined in the MPE EMF report) are incompatible with this sensitivity zone and the overall development objectives identified in the report:

- Country and golf estates, group housing, retirement village
- Informal structures, Informal and semi-formal rural settlements
- Accommodation enterprises, guest house, guest lodge,
- Hotel, restaurant, conference facilities, social hall
- Public & private resorts
- Public garage, public worship
- Place of amusement, gymnasium
- Recreation, camping
- Mining, peat extraction
- Excavations, construction of bulk infrastructure, electrical purposes, installation of bulk pipelines
- Wholesale trade, shop
- Place of refreshment, tavern, teagarden
- Drive-in and drive-through restaurants

Activities that are incompatible, potentially compatible and incompatible with the sensitivity zones and their overall development objectives (MPE EMF Guidelines)

- Transport uses, roads, railway purposes, quad bike trails/facilities
- Wildlife rehabilitation centre
- Abattoirs, agri-industries,
- Factories, industry, light industry
- Mobile graveyard, scrapyard, panel beating
- Livestock yard, kennels
- Aerodrome
- Aquaculture
- Bakery
- Cemetery, crematorium
- Cultivation of virgin soils
- Drive-in and drive-through restaurants
- Feedlots
- Signage
- Filling stations
- Government purposes, place of instruction
- Nursery
- Sub-division of land
- Waste disposal
- Taxi rank, holding and parking areas
- Telecommunication

Sensitive zone

The following activities (as defined in the MPE EMF report) are compatible with this sensitivity zone and the overall development objectives identified in the report:

- Establishment of bioregions, conservancies, cultural heritage sites and nature reserves
- Protected areas
- Conservation, Heritage conservation
- Farm settlements
- Livestock & game farming
- Heritage conservation
- Minor structural alterations to existing buildings
- Accommodation enterprises, guest house, guest lodge
- Construction or enlargement of buildings or structures
- Hiking trails
- Home enterprises
- Place of refreshment, teagarden
- Private & public open space
- Recreation
- Mining, peat extraction
- Roads
- Wildlife rehabilitation centre
- Nursery

The following activities (as defined in the MPE EMF report) are potentially compatible with this sensitivity zone and the overall development objectives identified in the report:

- Camping
- Fencing, firebreaks

Activities that are incompatible, potentially compatible and incompatible with the sensitivity zones and their overall development objectives (MPE EMF Guidelines)

The following activities (as defined in the MPE EMF report) are incompatible with this sensitivity zone and the overall development objectives identified in the report:

- Country and golf estates, group housing, retirement village
- Informal structures, Informal and semi-formal rural settlements
- Hotel, restaurant, tavern, conference facilities
- Public & private resorts
- Public garage, public worship
- Place of amusement, gymnasium, social hall
- Drive-in and drive-through restaurants
- Wholesale trade, shop
- Mining, peat extraction
- Excavations, construction of bulk infrastructure, electrical purposes, installation of bulk pipelines
- Abattoirs, agri-industries,
- Factories, industry, light industry
- Mobile graveyard, scrapyard, panel beating
- Livestock yard, kennels
- Aerodrome
- Transport uses, railway purposes
- Quad bike trails/facilities
- Aquaculture
- Bakery
- Caravan park
- Cemetery, crematorium
- Cultivation of virgin soils
- Feedlots
- Filling stations
- Signage
- Government purposes, place of instruction
- Sub-division of land
- Waste disposal
- Taxi rank, holding and parking areas
- Telecommunication