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**An Evaluation of the Implementation of the Normative
Objectives set for Environmental Management Frameworks
in Selected Case Studies
in Gauteng and the Northwest Province, South Africa**

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Thesis Presented in partial fulfilment of the Degree of
MASTER OF PHILOSOPHY
in the Department of Environmental and Geographical Science
Faculty of Science
UNIVERSITY OF CAPE TOWN

December 2011

Declaration

I declare that this research is entirely my own, unaided work, except where otherwise stated. All sources referred to are adequately acknowledged in the text and listed. I accept the rules of assessment of the University of Cape Town and the consequences of transgressing them.

This dissertation is submitted in partial fulfilment of the requirements for the degree Masters Philosophy in Environmental Management in the Faculty of Geographical Science University of Cape Town.

It has not been submitted before for any degree or examination at any other university.

Signed by candidate
signature removed
Signature of Student

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Acknowledgements

I would first like to thank God for giving me this opportunity and helping me through the difficult times I encountered. Without Him this would not have been possible.

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Lastly I would like to thank my parents and family for their support and guidance, not just with this research but for their support and understanding.

Thank you.

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Abstract

An Evaluation of the Normative Objectives set for Environmental Management Frameworks in Selected Case Studies in Gauteng and the Northwest Province, South Africa

by

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The aim of this research is to investigate and evaluate if the normative objectives set for Environmental Management Frameworks (EMFs) in the development planning process of selected EMFs were achieved. Three case studies were used in order to do this evaluation. These case studies were the City of Tshwane Metropolitan Municipality's Zone of Choice Environmental Management Framework (EMF), Ekurhuleni Metropolitan Municipality's EMF, and the Tlokwe Municipality's EMF.

The research conducted through the analysis of case studies found that in all three cases the Environmental Management Frameworks achieved the normative objectives within the development planning process. Normative objectives of EMFs include the provision of a mechanism and decision support tool for the study area (identification of geographical areas) for competent authorities as well as provide proactive input into development proposals. EMFs functioning as a repository were found to facilitate effective and efficient decision making that is achieved through integrating all relevant and viable spatial information into a single workable platform that will provide input into local Spatial Development Frameworks (SDFs) and IDPs.

The research also found that authorities are improving on certain aspects of the Environmental Management Frameworks through the formulation of GIS databases and higher detailed environmental reports that would improve decision making on small scale land use management decisions. These strategies form part of the EMF environmental databases that have been developed through the EMF process. These smaller property specific strategies are called the Ekurhuleni Biodiversity and Open Space Strategy and Tshwane Open Space Framework. Within Tlokwe plans for developing such a smaller scale strategy is in place. However, the most important component of these strategies is the GIS database that

gives property specific spatial and non-spatial data that is constantly revised in order to provide the latest information.

List of Abbreviations

CoTMM	City of Tshwane Metropolitan Municipality
C-Plan	Gauteng Conservation Plan
DEA	Department of Environmental Affairs
DEADP	Department of Environmental Affairs and Development Planning
DEAT	Department of Environmental Affairs and Tourism
DECAS	Department of Environmental and Cultural Affairs and Sport
DWAF	Department of Water Affairs and Forestry
EA	Environmental Assessment
EBOSS	Ekurhuleni Biodiversity and Open Space Strategy
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMM	Ekurhuleni Metropolitan Municipality
EMP	Environmental Management Plan
GDACE	Gauteng Department of Agriculture, Conservation and Environment
GDARD	Gauteng Department of Agriculture and Rural Development
GIS	Geographic Information System
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
NEMA	National Environmental Management Act (Act 107 of 1998)
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
ZOC	Zone of Choice

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1. Chapter 1: Background and Rationale

1.1 Introduction

The advent of democracy in South Africa in 1994 introduced a radical reform process that saw the introduction of new policies, laws and systems of government. These new systems of governance brought about dramatic change in land use planning and development decision making processes (Sowman & Brown, 2006). For example, the South African Development Facilitation Act (DFA) No. 67 of 1995 emphasises principles of sustainability, integration, participatory planning, social and environmental justice (DFA, 1995). The local sphere of government is seen as a key role player in addressing socio-economic needs of local communities. This sphere is also tasked to perform sustainable service delivery. In order to achieve these goals the Integrated Development Plan (IDP) is seen as the principle tool (Sowman & Brown, 2006).

Integrated development planning can be defined as (Republic of South Africa: Department of Provincial and Local Government (DPLG), 2000: p.4):

“A process through which municipalities prepare a strategic development plan, for a five year period. The Integrated Development Plan (IDP) is a product of the integrated development planning process. The IDP is a principal strategic planning instrument which guides and informs all planning, budgeting, management and decision-making in a municipality”.

In order to cope with development needs the IDP is seen as a function of municipal management. The IDP forms part of an integrated system of planning and service delivery. During the IDP process issues such as the municipal budget, land management, promotion of local economic development and institutional transformation are discussed in a consultative, systematic and strategic manner. This process aims to promote the integration of socio-economic and environmental pillars of sustainability into the local government development planning process (Van Niekerk, 2005). The IDP is not only intended to inform municipal management, but also to guide the activities of different government spheres, corporate service

providers, Non Government Organisations (NGOs) and the private sector towards the objectives of the local municipality.

There are two major legislative reforms regarding the transformation and adoption of the IDP process within municipalities. The first is the White Paper on Local Government that provided a clear motivating policy framework for the methodology of the IDP process. The second legislative reform is the passing of the Municipal Structures Act 117 of 1998 and the Municipal Systems Act 32 of 2000 requires that all municipalities have to undertake an integrated development planning process in order to develop an IDP. IDPs are a legislative requirement and have legal status; therefore, IDPs supersede all other plans that guide development at local government level (Republic of South Africa: Development and Planning Commission (DPC), 1999). Before the adoption of an integrated development approach, service delivery departments, planning and conservation all functioned separately and this was particularly disquieting since issues that relate to the environment, historically and culturally important sites, and other socio-economic issues would not be considered for approval within the development planning process (DPC, 1999). In order to maintain environmental and socio-economic issues as part of the integrated development approach the IDP has to be regularly reviewed and revised in order to address constant changes in the local context within which it functions (Pierce *et al.*, 2004; Van Niekerk, 2005; DPLG, 2000; Retief & Sandham 2001).

Environmental sustainability considerations should form part of the IDP (Sowman & Brown, 2006). It is also argued that existing environmental legislation at national and provincial levels should inform and be upheld within the local government sphere IDP drafting and revision process (Pierce *et al.*, 2004; Van Niekerk, 2005; DPLG, 2000; Retief & Sandham 2001).

1.1.1 Biophysical Importance

The rationale for integrating environmental sustainability considerations within the IDP process is due to the realisation that peoples' livelihoods and their wellbeing have always been dependent on the natural environment (Millennium Assessment (MA), 2003; Millennium Assessment (MA), 2007). Natural resources have

increasingly depleted since the industrial revolution, with ever growing pressure due to human uses and demands (Millennium Assessment (MA), 2005). With the man made changes to the natural environment to meet demands for food, water and energy, unprecedented change has taken place within the world's ecosystems. Pressures placed on current ecosystems can result in a tipping point when human wellbeing is threatened due to sudden change in ecosystems affecting regional climates (MA, 2003). This could in turn lead to the collapse of sectors such as agriculture, manufacturing and the development sector that will adversely affect everyone (MA, 2003; MA, 2007; van Jaarsveld *et al.* 2005; DEA&DP, 2005).

Demand for water has been on the increase due to population growth worldwide. Communities will have to face water stressed environments as a result of higher water demands. Van Jaarsveld *et al.* (2005) argues that the use of water for agricultural and urban industrial expansion in South Africa is taking place at a significant cost to the quality and quantity of available fresh water resources that are normally used in ecosystems and for domestic use.

Ecosystems and biodiversity are at risk if they are not taken into consideration when planning approval is sought (Van Jaarsveld *et al.* 2005). Overexploitation can result in a loss of key ecosystem species resulting in habitat loss for many species both locally and internationally. Van Jaarsveld *et al.*, (2005: p.434) state that:

“The greatest impact on biodiversity in southern Africa has occurred in the grassland biome, followed closely by the fynbos biome. In both cases, the major cause is conversion to cultivated land, followed by urban sprawl and plantation forestry, while the degradation of rangelands predominates in the more arid regions of southern Africa”

Roughly 10-20% of current grassland is anticipated to change to other land use due to the expansion of the agriculture sector alone to meet increasing demands of the population within South Africa (MA, 2005; Republic of South Africa: Department of Environmental Affairs and Development Planning (DEA and DP), 2005). The success story of urban and rural development and its increase in socio-economic growth is overshadowed by the ever-growing high cost in terms of trade-offs with

natural ecosystem services (MA, 2005). This is as a result of direct impact from land cover change, the release of nutrients into rivers and water withdrawals for irrigation, mining, infrastructure and other development purposes (MA, 2005).

Within Southern Africa there are three of the world's Biodiversity Hotspots; namely the Succulent Karoo of South Africa and Namibia, Maputaland-Pondoland-Albany (which stretches along the east coast of southern Africa below the Great Escarpment) and the Cape Floristic Region. These areas are in critical danger due to the demands placed on land. The South African National Biodiversity Institute's summary table of listed threatened terrestrial ecosystems (2009) already lists 53 ecosystems as critically endangered and another 172 as endangered (South African National Biodiversity Institute (SANBI), 2009). In order to address these threats to biodiversity it is important to start taking nature's full value into account rather than viewing nature's services as free and limitless (MA, 2007).

Within a world of increased pressure on ecosystems and the realisation that humanity must start taking responsibility for the environment, the need for better sustainable development approaches have been realised. EA is seen as a key to contribute to the goals of sustainable development. Several EA tools have been developed since the introduction of EA as a means to contribute to the goals of sustainability. These include tools such as EIAs, SEAs, EMFs, Disaster Risk Indicators, Risk Mapping, Agro-Environmental Indicators and various others that have been developed and implemented. Each one of these tools was developed in a specific field of expertise to avoid, mitigate and remedy the affects of human activity on the environment.

With the acceptance of environmentally sustainable indicators within development planning, EA tools are seen as ideal decision support tools for decision makers and have resulted in EA influencing and improving decision making by focusing on sustainability (Dalal-Clayton & Sadler, 2005; Roberts & Colwell, 2001). EMFs are decision support tools that provide the decision makers with information of the biophysical, institutional and socio-economic issues as well as an indication of the interrelationships of these issues within its geographical context. EMFs are proactive tools that integrate IEM and sustainability principles into national, municipal

and provincial decision making in order to integrate and align Plans Policies and Projects (PPPs) on a sustainable development path. The following section examines the influence the concept of sustainable development has made on EA and development planning within South Africa.

1.2 South Africa and Sustainable Development

The most often-quoted definition of sustainable development comes from the Brundtland Commission (1997): “development that guarantees that future generations should have the same opportunities as current generations to meet all of their needs” (Ahmed & Sánchez-Triana, 2008: p.2). Sustainable development can also be interpreted as “economic growth that is socially equitable and environmentally responsible”(Ahmed & Sánchez-Triana, 2008: p.2). Modern cultures have realised there is a need for a new approach towards sustainable development within current civilisations (Hill, 2004; Hill & Bowen, 1997).

Since the 1970s sustainable development has been growing as a key objective for many countries. The National Environmental Policy Act of 1969 (NEPA) of the United States of America is a key document that influenced South African legislation such as the Environmental Conservation Act, 73 of 1989 (ECA) and the National Environmental Management Act, 107 of 1998 (NEMA). The importance of EA as a key tool to inform and take adequate decisions related to sustainable development was further recognised at the Earth Summit of 1992 resulting in documents such as the Rio Declaration on Environment and Development, Agenda 21, Convention on Biological Diversity, Framework Convention on Climate Change and the Forest Principles.

The South African approach to integrate EA within development planning and policies is known as Integrated Environmental Management (IEM) (Republic of South Africa: Department of Environmental Affairs and Tourism (DEAT), 2004a).

“IEM is a philosophy which prescribes a code of practice for ensuring that environmental considerations are fully integrated into all stages of the development and decision-making process. The IEM philosophy (and principles) is interpreted as applying to the planning, assessment, implementation and

management of any proposal (project, plan, programme or policy) or activity - at the local, national and international level - that has a potentially significant effect on the environment. Implementation... relies on the selection and application of appropriate tools to a particular proposal or activity. These may include environmental assessment tools (such as Strategic Environmental Assessment and Risk Assessment); environmental management tools (such as monitoring, auditing and reporting) and decision-making tools (such as multi-criteria decision-support systems or advisory councils).” (DEAT, 2004a: p.15)

This philosophy, which has been adopted by government, relies on the selection and application of suitable tools to a specific application or activity. These EA tools as previously mentioned are tools such as SEA, EIA and Risk Assessment. The newest of these tools is the establishment of EMFs for municipalities under the EIA regulations of 21 April 2006.

The practical implementation of small scale, case specific EIA, as a decision support tool for sustainable development has proven to be difficult due to its nature as a reactive approach (Sowman & Wynberg, 2007). The EMF is seen as an approach that will pro-actively identify potential critical areas of conflict between development proposals and critical sensitive environments. The EMF will therefore enable EIAs to be focused on important issues and pro-actively identify areas of high environmental sensitivity. EMFs will also identify issues for EA practitioners to focus on and minimise the time constraints placed on developments due to case specific EIA (DEAT, 1998a; DEAT, 2004a; DEAT, 2004b).

1.3 Rationale for the Research

EMFs were introduced as a new concept within IEM by the Department of Environmental Affairs and Tourism (DEAT) as means to address development activities in order to be environmentally sustainable (DEAT, 1998c). An EMF is a spatial representation of environmental information (maps) that is connected to parameters that provide a framework or guidelines within which development should proceed in order for such a development to be sustainable (DEAT, 1998c). Therefore, an EMF is not a land use plan that assigns specific development, but

rather a guiding framework within which development activities can take place (DEAT, 1998c).

Normative objectives of EMFs include (DEA, Unknown Date):

- Provision of a mechanism and decision support tool for the study area (identification of geographical areas) for competent authorities.
- Facilitate effective and efficient decision making that is achieved through EMFs' functioning as a repository, integrating all relevant and viable spatial information into a single workable platform that will in turn,
- Provide input into local Spatial Development Frameworks (SDFs) and IDPs.
- Provide proactive environmental information into development proposals within the identified development constraint zone.

These normative objectives need to be investigated, as they are what an EMF aims to achieve. The EMF normative objectives are used as performance indicators that the case specific EMFs can be measured against.

It has been argued that EMFs should be aligned with South Africa's National Biodiversity Strategy and Action Plan (NBSAP) and with the National Spatial Biodiversity Assessment (NSBA) (DEAT, 2005; Brownlie *et al.*, 2005).

The two distinct information categories that EMFs rely on are environmental data input and socio-economic planning priorities. The environmental data input takes into consideration factors such as soils, geology, vegetation, land cover, hydrology, etc., to identify environmental sensitivity zones that are also referred to as sensitive geographic areas. The Socio-economic Planning Priorities focus on structure plans, conservation plans/strategies in identifying Strategic Management Zones. These two zones are then merged to form what is known as an EMF that functions as a decision support tool with focus on the interrelationship, sensitivity, extent and

significance of biophysical, economic and institutional issues within a geographical area (DEAT, 1998).

EMFs are still a new and developing tool within the decision making process and its involvement within IDPs and SDFs is an ongoing learning process within South Africa. The most recent legal developments for EMFs are the new NEMA regulations published in the Government Gazette of 18 June 2010. This research aims to contribute to the strengthen of EMF 's role as a proactive information and decision tool for development planning processes and environmental authorisation through an analysis of current EMF normative objectives within three cases. This research also aims to open new areas of research within strategic EA tools and the importance of environmental tools within development planning processes.

1.4 Hypothesis of the Research

In this study, the EMFs are assumed to be used and integrated within the development and planning context of development planning processes. EMFs are also assumed to form part of new and revised IDPs and SDFs. It is assumed that EMFs will contribute to the IEM principles of integration within development plans and policies such as the IDP and SDF.

A hypothesis is an "expectation about the nature of things derived from theory" (Babbie, 2005. p: 484). Within this research the hypothesis that is being tested is as follows:

The EMF tool as used in the selected case studies is achieving its normative objectives, which are to:

- Provide a mechanism and decision support tool for the study area (identification of geographical areas) for competent authorities.
- Facilitate effective and efficient decision making that is achieved through EMFs functioning as a repository through integrating all relevant and viable spatial information into a single workable platform that will in turn
- Provide input into local Spatial Development Frameworks (SDFs) and IDPs.

- Provide proactive environmental information into development proposals within the identified development constraint zone

This hypothesis will be tested through three case studies of the respective municipality's EMFs. Case studies can investigate the complex inter-relationships between the 'lived in reality' and theory. Multiple case studies can also identify and investigate issues that often seem out of context within a specific case (Hodkins and Hodkins, 2001).

In order to test this hypothesis a case study methodology will be used in order to gather data that will be analysed and discussed that will either prove or disprove the hypothesis of this research for the three case studies through the answering of the research question and sub-questions.

1.5 Research question and sub-questions

This research will critically evaluate the extent to which the normative objectives of EMFs have been achieved in implementation the context of the development planning process within the three case studies. This process is geared to achieve co-operative governance, that is, an integrated and interdependent approach promoting the involvement and communication between all sectors and spheres of government. In order to achieve co-operative governance EMFs have to contribute to the environmental information used for developing and revising IDPs and SDFs and this is the context in which the research will investigate the normative objectives of EMFs.

A research question is one that yields hard facts to help solve a problem, produce new research and add to theory (Yin, 2009). The research question for this research is: How, and to what extent, have local EMFs contributed to development plans and policies such as IDPs, SDFs and contributed environmental information for decision making?

In order to answer this research question the sub questions are aimed at identifying the characteristics of each EMF in the cases through the structured

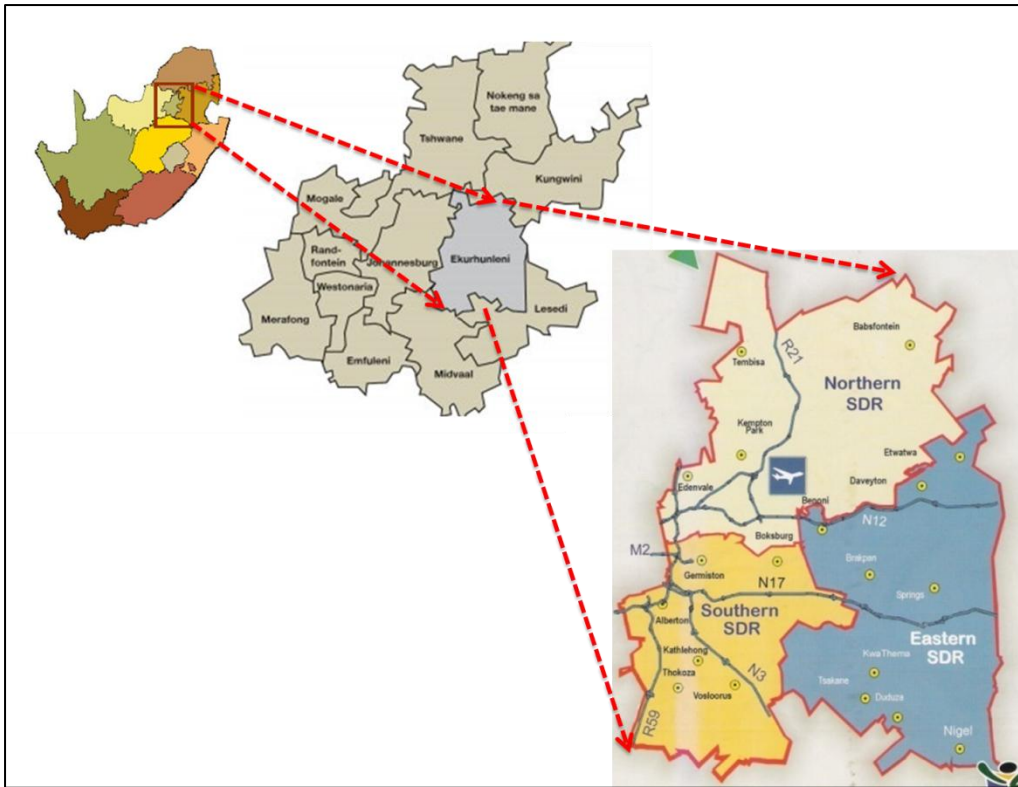
interviewing of competent authorities and thereby having an in-depth discussion and review of the case specific EMFs. These sub questions are:

- How, and to what extent, does the EMF enable competent authorities to make proactive decisions regarding the development of land? This question strives to answer if the EMF is a proactive decision support tool on types of future development that can be accommodated within the area in order to reach the desired future state of environment.
- How, and to what extent, does the EMF contribute environmental information to development proposal evaluation? This question will investigate if the EMFs are providing proactive input into development proposals, thereby identifying environmental issues that need to be addressed within development proposals.
- To what extent, and how, has the EMF improved the SDF of the competent authorities through the identification of development constraint zones and the development of guidelines for these zone's management? This question is to examine the EMFs ability of improving the SDFs of the municipalities.

1.6 Limitations of research

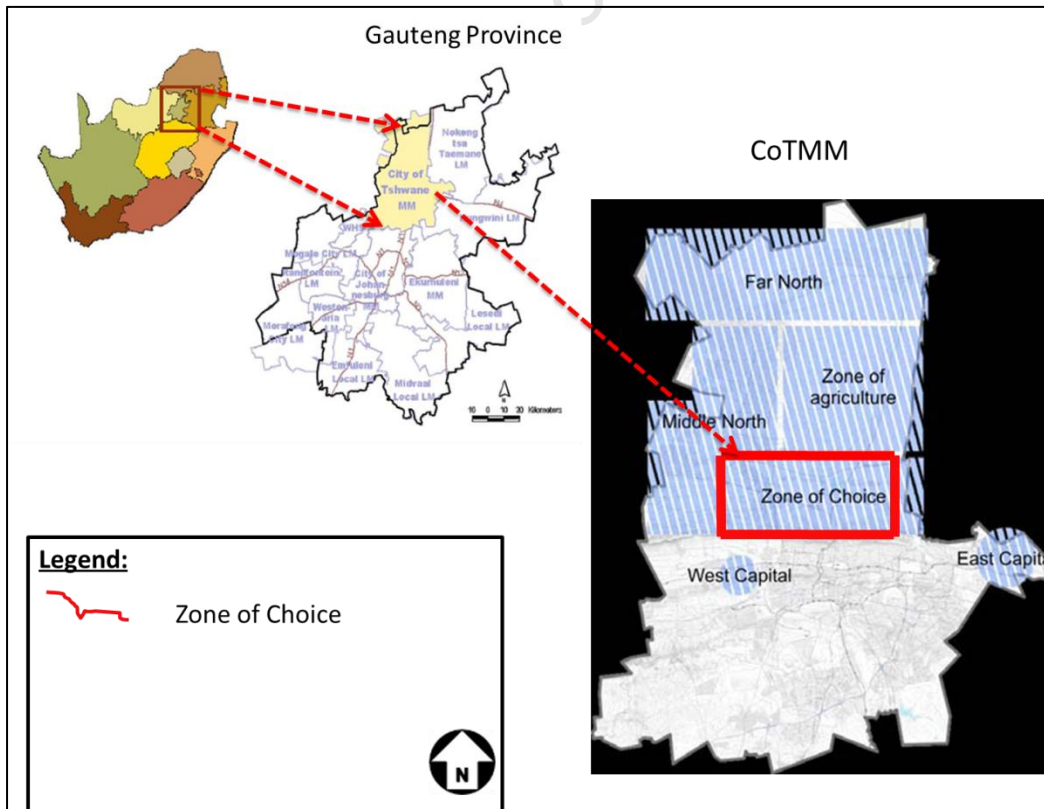
The research is aimed at analyzing the normative objectives of EMFs within the development and planning context of three municipal areas within South Africa. It is however difficult to analyse all EMFs across South Africa due to the sheer volume of documents and limited time constraints of the study. It is important to note that the analysis is focused on the following identified EMFs within their respective metropolitan/municipal areas:

- Ekurhuleni Metropolitan Municipality (Map: 1).



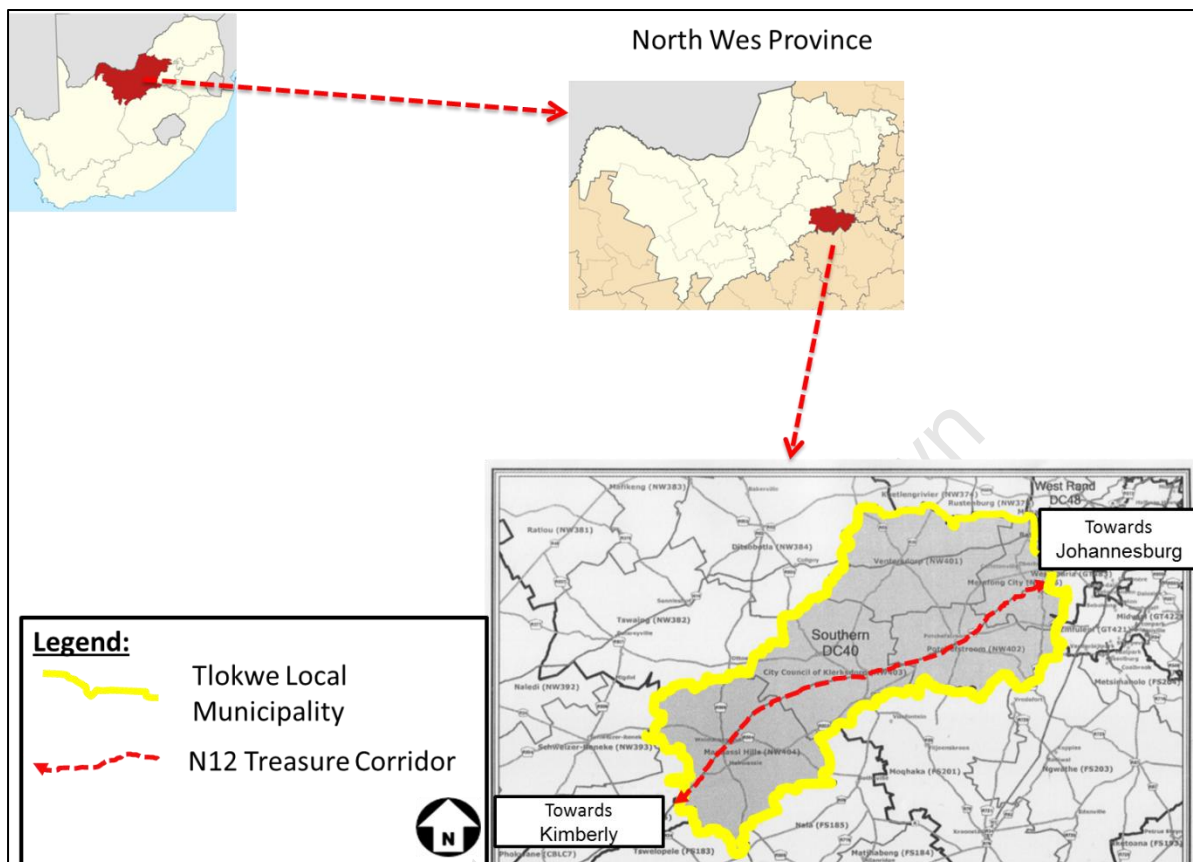
Map 1: Ekurhuleni Metropolitan Municipality

- The City of Tshwane’s “Zone of Choice” (ZOC) (Map: 2)



Map 2: The City of Tshwane Zone of Choice (ZOC)

- Tlokwe Local Municipality (North West Province) (Map: 3), and



Map 3: Tlokwe Local Municipality

To minimise the limitation of access to information and resources, an information oriented approach is used which identified these cases to yield a wide range of geographic contexts wherein EMFs need to function. By using the case study method direct observations and data collection of the applicable EMF can be made. These cases form what is known as a multiple case study approach (Yin, 2009).

The researcher chose these municipal areas for the following key reasons in order to make the research viable. These EMFs are across a range of geographic and demographic areas.

The City of Tshwane Metropolitan Municipality (CoTMM) Integrated Development Plan (IDP) (2009) states that the CoTMM has a lower population growth than the national average, but contributes to the largest percentage of its population being

economical active. This economically active population contribute to CoTMM's high skills percentage that is higher than the national average. This contributes to CoTMM's vision of being the knowledge centre of South Africa due to the amount of research institutions within the area

The ZOC is a development area identified by the CoTMM in their City Development Strategy as a key corridor for development and investment within the northern part of the city. The ZOC runs parallel to the N4 highway and with the proposed upgrades to the existing Wonderboom Airport, further development of the Rosslyn Automotive Manufacturing Cluster and proposed densification of the Kolonnade Shopping Centre, Pretoria North/Rainbow Junction and Akasia are a few of the strategic focus areas within the ZOC.

The Tlokwe Local Municipality (TLM) has a distinctive rural and mining history. Potchefstroom is the main urban area within the TLM and is one of the fastest growing areas within North West Province of South Africa. The area has also been allocated as the investment area within the North West Province (NW DACERD, 2009). The largest percentage of sectoral employment within the TLM is the government sector, trade and mining. From 1996 to 2001 there has been a decline within the agricultural and manufacturing sectors within the TLM and an increase within the informal economic sector (Integrated Development Plan, 2006).

The Ekurhuleni Metropolitan Municipality's (EMM) economic sector has grown 2.7% per annum between 1996 and 2001 and contributes an estimated 19% to the economic output of the Gauteng province. This is due to the EMM being the manufacturing hub within South Africa.

EMM has a history of mining, wetland areas and agricultural areas. Future development focuses on corridor development along the R21 to Pretoria and marketing the EMM as an aerotropolis due to the O.R Thambo International Airport. The EMM's EMF was also the first approved EMF in South Africa and has gone through a revision process that other EMFs are currently busy with or have yet to go through.

There are certain limitations that are present in a case study approach. There can be too much data gathered to analyse. This means that data that has been gathered can be so overwhelming that the researcher can miss critical issues. This is why the research question and sub questions are important as these help the researcher to distinguish relevant and irrelevant data. Case studies can be very expensive to conduct, especially at a large scale (Hodkins and Hodkins, 2001). This is why this research is limited to three case studies that are in relative close proximity to one another. Due to the case studies being qualitative and dealing with issues of environment and development that are not seen as a hard science, complex issues can be uncovered that can be difficult to represent simply (Hodkins and Hodkins, 2001). Finally, case studies can be easily dismissed by those who do not like the findings of the research (Hodkins and Hodkins, 2001). However, when case study is done correctly dismissal of the findings is very difficult due to case studies' ability to transpose beyond the borders of the cases' boundaries; thereby opening the field to more research and identifying good practice models that can be used. Case study can also facilitate new rich conceptual and theoretical development on theory within complex realities. The richness in data can also create new ways of thinking and new ideas (Hodkins and Hodkins, 2001).

1.7 Methodology of the Research

Behind the methodology used within a study is the research design for the study. The research design is also used to indicate how the research will be conducted. Research design is important as it outlines the steps to be taken in the gathering and analysis of data in the study (Malematsa, 2005).

In order to conduct the research a qualitative case study research design is used. This research focuses on literature reviews, desktop analysis, comparative analysis and structured interviews (primary data). The literature study will draw on published literature, government publications, international best practices, research reports on documents, international forums on the importance of biodiversity, laws and legislation affecting or contributing to land development.

The data that is to be collected is predominantly desktop data extracted from the selected case study EMFs and structured interview data (Appendix A) with the

competent authorities dealing with the EMFs in the development planning process. Qualitative data will be analysed to determine any trends, themes and categories. The findings will be communicated in words, narratives, and individual quotes. The findings will be discussed and inductive reasoning will be used to reach a conclusion.

This research aims to contribute to the strengthening of EMFs as a proactive information and decision tool for development planning processes and environmental authorisation through analysing current EMF normative objectives within three cases. This aim will be reached by focusing on whether or not the normative objectives are being met.

The approach taken in the gathering of data in this regard would be formal meetings where a semi-structured interviewing approach is used. Qualitative interviewing with the relevant officials, such as town and regional planners, head of planning development and environmental management officials, will familiarise the researcher with the cases and understand the context of the research in more detail. Qualitative interviewing has a general plan for inquiry that is not a specific set of questions, but has a format of asking questions in order to receive the information required. The researcher in this regard only helps to guide the interview/meeting in a general direction, but the responder does most of the talking (Babbie, 2005).

After the data has been collected, the data will be analysed in order to facilitate the following comparisons and conclusions:

- A comparative assessment will be done between the literature study and structured interviews;
- Comparisons between competent authorities answers to structured interviews to identify trends and commonalities;
- Conclusions will lastly be drawn to see if EMFs are achieving their objectives; and
- A conclusion will be drawn writing the receptiveness of development planning and environmental practitioners utilising more strategic EA information within the development planning process.

1.8 Data Collection, Analysis and Presentation

As previously mentioned, qualitative data will consist of primary data collected through structured interviews. The structured interviews will be analysed through desktop analysis and comparative analysis. The analysis of this primary data will be compared to trends and shortcomings of other EIA tools identified in the literature review.

Structured interviews will be held with the competent authorities, EA practitioners and private sector dealing with the compilation, integration and implementation of EMFs within the local authority's development planning process. To adhere to the request of interviewees for anonymity the following labels will be applied to interviewees. The abbreviations for two of the case studies, CoTMM, EMM and the name Tlokwe will designate where the interview will be held. With this abbreviation and name a Com-P for competent authority in Development Planning, Com-E for competent authority in Environmental Affairs, EAP for EA practitioner and PS for private sector will appear, for example, an interview with a competent authority in the CoTMM will be labeled CoTMM-Com. Each individual interview will be given a number i.e. 1,2,3 etc. Therefore a reference such as EMM-PS4 will mean an interview was held within the EMM, in the private sector interview number 4. Where no interviewee is referenced the data represented will be a result of the desktop study process.

The interviews will be structured in such a way that the participants provide information on their own experiences and understanding of EMF application within the development and planning context. The participants will be asked to give their receptiveness towards more strategic approaches towards EA as a strategic tool for better development plans and policies. Qualitative data analysis is rather lengthy due to it taking considerable amount of discursive writing to explain the analysis of the data (Babbie, 2005).

Documentation (EMFs, IDPs, SDFs and other relevant documents) form a critical data source in this research. Yin (2009), however, warns that it is important to acknowledge that documentation was written in a specific time, place, for a specific reason and audience. Documentation can be re-analysed throughout the qualitative

research approach and enables the researcher to notice certain data characteristics, think about those data characteristics before reporting those characteristics with other findings (Yin, 2009).

Through this approach of gathering data from documentation, structured interviews and then subjecting it to analysis the research can answer the research questions and prove or disprove the hypothesis, Yin (2009) explains that when doing case studies a researcher may need to do data collection and data analysis together when a case study approach is taken. A simple example is that while doing a structured interview data can surface that are in conflict with a previous interview (Yin, 2009). The data from the interviews is data collection but the conflict that has been identified is data analysis (Yin, 2009). This is important to do when case studies are done as the researcher will have to quickly adapt in the interview in order to accommodate the information that has come to light (Yin, 2009).

1.9 Structure of Research.

This introductory chapter provides the rationale for, and background to, this research the need for the research. Limitations and assumptions of the research will be discussed as well as the identification of the research question, sub-questions, hypothesis and methodology that will guide the research and researcher.

The second chapter of this dissertation discusses the evolution that EA has undergone in the South African context. This chapter also discusses the relationship between EA and the development planning process. This chapter lays the foundation in order to understand the role of EA and how it aims to influence development in a sustainable manner. This chapter also discusses the importance of the local government sphere as part of democratic governance, that is interrelated and interdependent, and a new legislative system that aims to empower the local sphere through devolution of power.

Chapter three discusses the tools used that form part of EA within the development planning process. This chapter deals with tools such as Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA), as well

as the expectations and shortcomings of these tools. This chapter also introduces the new tool of Environmental Management Frameworks (EMF) and how an EMF would form part of the development planning process. This research will be the first attempt to analyse the normative objectives of EMF within its implementation at local sphere since its adoption in Chapter 8 of the National Environmental Management Act Regulations 385, 2006.

Chapter four will give background of Ekurhuleni Metropolitan Municipality, Tshwane Zone of Choice and Tlokwe Municipality. This chapter will familiarize the researcher to the context and locality of the specific cases.

The fifth chapter is the data analysis that will analyse each specific EMF case according to the research questions developed in order to answer the research question.

Discussion of findings in chapter six will discuss the normative objective with reference to the case studies. The combination of the data analysis and the discussion of findings will thereby either prove or disprove the hypothesis of the research.

Finally, the conclusion of the research in chapter seven will recap the research approach and give the researcher's own opinion derived from the previous chapters findings.

1.10 Summary

The analysis of primary data will be time consuming within the research. Though this lengthy process might seem as a negative aspect, it will familiarise the researcher with the cases and the research topic as the EMF tool is quite new as a legislative strategic EA approach. EMF is seen as an important tool within the EA toolkit in South Africa to address issues regarding sustainable development.

EMFs are seen to form part of the EA approaches that are focused on sustainability. This research seeks to identify how the application of this broader

more strategic EA tool has and can influence the sustainability approach taken by development planning in South Africa. This research aims to contribute to the strengthening of EMF as a proactive information and decision tool for development planning processes and environmental authorisation through analysing of current EMF normative objectives within three cases. This aim can help identify ways to improve the concept and practice of EMFs thereby ensuring that this new strategic approach towards EA does not become the emperor's new clothes - devoid of substance - which according to Retief *et al.* (2007a) is the case with SEA practice in South Africa.

2. Chapter 2: Environmental Assessment, Evolution and Planning

This chapter's focal point is on the debate surrounding EA tools internationally, the history of EA in South Africa and how it has evolved into what we know and apply in today's practice. This will provide background information on why EMFs were developed and how the normative objectives of EMFs are aimed to be achieved. EIA is a small scale approach within EA and there was a need for a more strategic approach. Therefore SEA was introduced and EMF is currently a variant of SEA. The second part of this chapter will discuss the integration of environmental sustainability principles into the development planning process of South Africa and how IEM tools ought to be used in the development planning process will be discussed.

2.1 Environmental Assessment

2.1.1 Defining Environmental Assessment/ Debates of EA

EA entails far more than simply project level EIA. International debates surrounding the definition of EA has resulted in three cross cutting and interrelated themes being examined. The following questions may be applied to bring these themes to light (Kidd and Retief, 2009):

- What is EA?
This theme deals with the identity of EA. The underlying debate discusses the need for EA, what it aims to achieve and defining EA as a relatively new field of research.
- How can EA be applied?
This theme dominates current EA debate. The theme deals with macro-level issues such as system requirements and micro-level issues dealing with process requirements and methodologies.
- How well is EA being done and what is EA achieving?

Kidd and Retief (2009) state that by examining the third and final theme of debate surrounding EA, both the first and second themes can be clarified and further refined. The latter deal with the effectiveness, quality, system and importance of EA follow-up.

Theoretical debates concerned with what EA is and how it should or does work are at the heart of defining EA (Kidd and Retief, 2009; Sadler, 1999). EA definition includes, amongst others, both project level EIA and strategic level SEA (Hill, 2004. Sadler, 1995).

The growing inclusion of sustainability into decision making has resulted in EA that is used as an information tool that provides environmental information on the consequences for decision makers (Hill, 2004. Kidd and Retief, 2009. Sowman 2002). Thereby decision makers will be enabled to make adequate decisions that are based on the understanding of environmental consequences.

“This understanding acknowledges the complexity of decision making which is influenced by many variables outside the assessment process” (Kidd and Retief, 2009: p.981). Internationally, EA is also understood to have a set of techniques and procedures which must be followed before a specific human action is taken, to predict and evaluate the consequences thereof (Hill, 2004. Kidd and Retief, 2009).

With the ongoing debates surrounding EA internationally, EA processes and EA definitions in South Africa have evolved since its introduction (Kidd and Retief, 2009). EA has not only changed through the influence of international debates but also in its adaptation as a tool for decision making (Kidd and Retief, 2009). The following part of this chapter will look at the history of EA in South Africa and how it has evolved.

2.1.2 History of EA in South Africa

The following section on the history of EA in South Africa is taken largely from the work of Kidd and Retief (2009). These authors discuss the evolution EA has gone through in South Africa and describe four stages that can be distinguished, namely, inception, formation, formalisation and refinement. Each stage represents a change in the understanding and approach to EA. These changes in understanding and approach were influenced by international debate, local experience and the requirements placed on EA within the South African context.

2.1.2.1 The Beginning of EA in South Africa

The beginning of EA in South Africa can be referred to as the inception phase of EA. This phase was during the early 1970s to the early 1990s. The United States Environmental Protection Act (NEPA) of 1969 laid the foundations for the South Africa EA approach. The concept of sustainability, a term widely used today, was introduced as a notion of balancing human development with environmental conservation (Hill, 2004). The term environment during this phase of EA focused solely on that of the biophysical environment that excluded man-made environments (Sowman *et al.*, 1995; Sowman and Wynberg, 2007). Man-made environments started to gain some importance in the 1980 White Paper on a National Policy Regarding Environmental Conservation (Sowman *et al.*, 1995). The main issue that was dealt with during this stage was how to address conflict between conservation and development decisions (Fuggle, 1989. Fuggle and Rabie, 1999). It became apparent through the adaptation of EA into the South African context that merely importing and applying EA, as implemented by other developed countries, would not be successful and a appropriate home grown approach was needed (Fuggle, 1989. Fuggle and Rabie, 1999). EA within this period was related to project level EIA as reflected in various reports, journals, policy documents and workshop proceedings.

In 1984, the Council for the Environment decided to establish a committee that would recommend a national strategy for the integration of environmental management and sustainability principles, but which were not called sustainability principles at this time. After a period of research, consultation and debate, a practical process of guiding and documenting development decisions was recommended (Retief and Sandham, 2001). IEM was developed to serve as an overarching and holistic environmental philosophy that proposed a generic procedure and principles (Hill, 2004. Retief and Sandham, 2001).

During the late 1980s a mind shift took place in the approach to EA that realised project level EIA is too limited in scope, reactive, anti-development and functioned separately from other government processes like planning (Kidd and Retief, 2009). South Africa realised that it needed a broader philosophy that needed to be flexible, generally applicable, widely accepted and predict the environmental consequences of specific types of projects, policies and plans (Kidd and Retief, 2009). The

Department of Environmental Affairs and Tourism (DEAT) (1998) stated that IEM should be implemented in such a way that it contributes to and supplements existing EA requirements, rather than duplication or replacing them, and increases the quality of information in the planning process.

2.1.2.2 Forming an EA Approach

The early and middle 1990s can be described as the formation phase of EA. The promulgation of the Environment Conservation Act 73 of 1989 (ECA) and the Council for the Environment report on IEM in 1989 were seen as landmark events in South Africa (DEAT, 1998a). These documents are seen as the foundations for the formation of the EA approach seen in South Africa today. The ECA was an environmental policy where sections (21, 22 and 26) dealt with the implementation of EA and the IEM report provided a philosophy on environmental evaluation for South Africa. The procedures for the assessment of policies programmes and definitions formed part of the Council's IEM report (DEAT, 1998a.).

The IEM report made no clear distinction between the principles and procedures of project level assessment and strategic assessment because the Council for the Environment made it clear that the IEM report was concerned with assessment, implementation and monitoring of EA. This meant that IEM was focused on EA forming part of, rather than contributing to the planning cycle. The Department of Environmental Affairs introduced six IEM guideline documents in 1992 containing minor amendments and more detailed guidance to the 1989 proposals (DEA, 1992.).

Though the majority of EA cases were focused on project level EIA, there were some cases of SEA principles being included (Hansen *et al*, 1997. Mafune *et al*, 1997). The most renowned case that included SEA principles is the EIA of the Eastern Shores of Lake St Lucia (Weaver *et al.*, 1996). This case was one of the first examples that provided the application of IEM principles to different levels of decision making. The case dealt with strategic land use of sensitive geographic areas and project level consequences of mining heavy minerals from coastal dunes. The EA procedure used in the St Lucia case study was based on the planning process cycle from proposal to implementation and the IEM philosophy of policies

and planning proposals that need to be considered during an application. The case also applied IEM principles that other policies, which deal with the use of natural resources, should be considered for the EIA. The case study emphasised the importance of considering cumulative affects at a strategic level.

IEM philosophy was integrated within the broader planning context of South Africa and IEM started to define environment to include both the biophysical and the socio-economic components (DEA, 1992). During this period of EA evolution in South Africa the principles and procedures for applying EA was both of project and strategic level. EA during this stage mentioned sustainability, but without a clear definition or being mentioned as the ultimate goal of IEM (Hill, 2004). The IEM procedure was (Kidd and Retief, 2009: p. 978):

“Designed to ensure environmental consequences of development proposals are understood and adequately considered in the planning process. The purpose of IEM is to mitigate negative impacts and to enhance the positive aspects of development proposals”.

What is commonly referred to as sustainable development started in the middle of the 20th century when the earth's ability to sustain human well-being was questioned. Many concepts of sustainability were introduced into legislation, such as NEPA, and documentation such as Our Common Future (WCED, 1987). During the Rio Earth Summit in 1992 a global action plan for sustainable development was adopted by leaders of 179 countries. This action plan is known as Agenda 21. Many local municipalities developed their own Local Agenda 21 which functions as a framework for development plans and policies. Due to the concept of sustainable development forming part of EA debate and the adoption of Agenda 21 within government the debate on how to align these two fields in order to achieve sustainable development was the next evolutionary step of EA in South Africa.

2.1.2.3 Conception of EA in South Africa

The period from the mid 1990s to the mid 2000s can be referred to as the conception of EA in South Africa. This stage in EA evolution included the formalisation of EA.

The democratic elections of 1994 saw a change in the approach to planning and many other sectors and applicable laws. As a result environmental concerns became an increasingly debated matter in formulating broad development frameworks, sectoral policies and laws (Hauck and Sowman, 2003. Sowman and Brown, 2006).

“Principles of equity, social and environmental justice, participation, ecological limits, stewardship, good governance and capacity building in environmental management have been espoused” by the new government in their approach to EA (Sowman and Brown, 2006: p 701).

A key piece of legislation was passed in 1995. The Development Facilitation Act (Act No. 67 of 1995) (DFA) called for the sustained protection of the environment and optimum use of natural resources and the accommodation of social issues (Sowman and Brown, 2006). Other key documents that called for the integration of environmental issues into the planning process was the new Constitution of South Africa in 1996 that gave government the responsibility to ensure the environment is protected for the benefit of future generations, that promoted conservation, sought to secure ecologically sustainable development and promoted justifiable economic and social development, to name a few of its objectives (RSA, 1996. Sowman and Brown, 2006).

Concepts of environmental management and sustainability have been debated significantly in development planning and policies in South Africa (Sowman, 2002. Sowman and Brown, 2006. O’Riordan *et al*, 2000). These debates were influenced by global debates, trends and, due to highly politicised voters, became an ever more pressing matter on political agendas in South Africa (Hauck and Sowman, 2003). The new Constitution stipulated that co-operative governance was needed to strengthen procedural and participatory rights (Constitution, 1996, Hauck and Sowman, 2003). This would create accountability for decision-making (Constitution, 1996). The new constitutional model therefore had an effect on all development planning aspects such as plans, policies and programmes.

In 1996 another key milestone, the SEA primer, initiated discussions on SEA application as a tool for decision makers (Weaver *et al.*, 2003). The rationale was that SEA had a better potential to integrate IEM principles in development plans and policies than EIA that functioned separately from the development process (Hill, 2004). SEA was a response to the limitations of EIA, discussed in more depth later on in this chapter, through its ability to assess cumulative effects and promote sustainable development. SEA moved away from an EIA approach that analysed the effects of a development towards a sustainability centred approach.

During this period the approach to analysing policies and plans from an EA perspective was given the name of SEA and the 1997 EIA regulations distinguished EIA and SEA from each other (Sadler, 1995). During this period the Council for Scientific and Industrial Research (CSIR), National Department of Environmental Affairs and Tourism as well as the National Department of Water Affairs and Forestry (DWAF) played an important role in the development of SEA. Although many different authors worked on one concept, namely SEA, they had done so seemingly in isolation with no effective integration of thinking. In 1997 the White Paper on an Environmental Management Policy for South Africa proposed that IEM form a central role in impact assessment. In addition to this central role, IEM would form an essential role in development planning, economic policy formulation and sustainable development plans (DEAT, 1998b). The integration of IEM tools within the development planning process will be discussed later on in this chapter. The Draft Green Paper on Development and Planning (1999) drafted by the National Development Planning Commission (NDPC) further emphasised that there is a real threat that sustainability will not be reached if environmental considerations are not considered at all tiers of government.

Sowman and Brown (2006) argue that for IEM to succeed, the principles need to be applied to all organs of state, including local government, planning and decision making processes. The National Environmental Management Act No. 107 (NEMA) was promulgated in 1998 and this act provided an overall framework for sustainable development and environmental management in South Africa (Sowman and Brown, 2006). NEMA facilitated a context for the inclusion of EA into the development planning context (Sowman and Brown, 2006). NEMA provided a set of legally

binding principles for sustainable development (Sowman and Brown, 2006). The key principle underpinning NEMA was that, although development is people-centred, it still functions in an ecological framework. NEMA also had a sustainability principle that stated decisions taken should account for the interests of all, including the needs of current and the future generations (Sowman and Brown, 2006). Chapter 5 of NEMA, dealing with IEM, was used as a “framework legislation that provided enabling provisions for the formalisation of SEA” (Kidd and Retief, 2009: p. 980). This was done even though no universal understanding of SEA had existed. The Act also provided for the inclusion of public interests through public participation in environmental matters. NEMA also gives power to the public to hold government accountable for the inclusion of these principles during the course of executing its functions (Sowman and Brown, 2006).

The White Paper on Local Government (1998) embraced these principles and ideas of IEM. This resulted in local governments with an enabling responsibility of adopting sustainability principles and “committed itself to the creation of sustainable human settlements in a participatory and holistic way” (Sowman, 2002: p. 4). The White Paper on Local Government emphasised IDPs as they key to realise this commitment.

The period from 1998 to 2000 saw the development of national SEA guidelines for South Africa by the CSIR. These guidelines set out a SEA definition, approach, principles and process elements. These guidelines focused on SEA and how to assess plans and programmes but still excluded policies.

The year 2000 saw the promulgation of the Municipal Systems Act (MSA) No 32 of 2000, that recognised the important linkages between people’s livelihoods, development, poverty and the environment (Sowman and Brown, 2006). The MSA emphasised the significance of local government in the provision of municipal services that are both financially and environmentally sustainable and provide equitable accessible to all communities, residents and ratepayers (Sowman and Brown, 2006).

Following the MSA and the emphasis on the importance on local government the White Paper on Spatial Planning and Land Use Management, produced by the Ministry of Agriculture and Land Affairs in 2001, stated that integrated planning for sustainable management of land resources is of critical importance for sustainable development and that development planning should be holistic and comprehensive to ensure that all factors including social, environmental and economic in relation to land resources and environmental conservation are addressed and included. During this time EA debate around EIA limitations saw the DWAF publish SEA guidelines to guide SEA.

In 2004 the NEMA Amendment Act 8 of 2004 included provisions for SEA as an EA tool. Internationally, the European Union Directive on SEA and the United Nations Economic Commission for Europe (UNECE) Protocol on SEA gave SEA a platform as a tool for decision makers (DEAT 1998). This posed a new paradigm for decision makers within South Africa in the present day.

2.1.2.4 EA in the Present Day

The period from 2006 to the present day can be seen as the refinement phase of EA in South Africa. Updated regulations to NEMA were promulgated on 21 April 2006 that refined EA processes in South Africa. The regulations focused on the importance of screening criteria for the EIA process and included timeframes and public participation requirements during the EA process. The SEA approach in South Africa however was still riddled with confusion regarding the concept of SEA and its application in practice since it moved past “the realm of assessment into the realm of planning” (Kidd and Retief, 2009: p.981).

Since the 1970's to the present day EA has evolved throughout the decades from a voluntary ad hoc tool to the formalised EA system used today. This system forms part of the current development planning process approach within South Africa (Kidd and Retief, 2009).

2.1.3 Summary

The inclusion of sustainability thinking into decision making has resulted in EA being used as an information tool for decision makers (Hill, 2004. Kidd and Retief, 2009. Sowman, 2002). EA through its adaptation into the decision making process has evolved since it was introduced (Kidd and Retief, 2009).

This evolution of EA can be categorised into four different phases, which span over certain time frames, within South Africa. The first phase is the inception phase when EA was introduced into South Africa during the early 1970s and early 1990s. The second phase was the formation phase of EA during the middle 1990s. Thirdly, the conception phase of EA took place during the mid 1990s to the mid 2000s. The final phase is seen as the refinement phase of EA in South Africa and this is taking place in the present day.

The following chapter discusses the EIA and SEA application and limitations in South Africa and the need for the development of a new tool that can be used within the EA process.

3. Chapter 3: EIA, SEA Application and Limitations in South Africa and emergence of a New Tool

In this chapter the main focus is on two tools of IEM namely EIA and its failure to meet the need for a more strategic approach to influence policies, programmes and plans and SEA and its importance, application and shortcomings. The final part of this chapter will discuss the new tool namely EMF for IEM and EMFs' process and application within the IDP process.

3.1 EIA

"The most important aim of EIA is to introduce effectively a systematic consideration of environmental issues into all important decision-making stages on specific proposed development activities" (Bisset, 1996: p. 18).

EIA was defined by DEAT (1998: p. 8) as a

"...detailed study of the environmental consequences of a proposed course of action. An environmental assessment or evaluation is a study of the environmental effects of a decision, project, undertaking or activity. It is most often used within an Integrated Environmental Management (IEM) planning process, as a decision support tool to compare different options..."

EIA is a process where the potential impacts, negative or positive, of a proposed project on the environment are analysed. This EIA process is done to give decision makers adequate information to decide whether or not to proceed with a project (DEAT, 1998). Sowman *et al* (1995) state that EIA is the evaluation of the likely affects from projects that significantly affect both the biophysical and human-made or built environment.

3.1.1 Process

The EA process is made up of 6 stages, namely, screening, scoping, assessment, evaluation, review, and decision. In the broader sense of environmental management, the implementation and monitoring form part of the EMS stage (Hill, 2004). This process is most often used within the IEM process as a decision support

tool (DEAT 1998). Decision-making takes place throughout the EA process and stages and these decisions are incremental from the screening stage to discussions during the data collection and analysis and impact prediction stages (UNEP, 2006). The final decision is made to refuse or authorise a proposed project (UNEP, 2006).

These decisions are based on arguments for and against the project with information supporting each argument. Lawrence (2000) argues that the arguments made should be consistent. It is important to acknowledge that these arguments can be influenced by values and ethics and not just by objective facts as in rationalism (Benson, 2003. Hill, 2004. Lawrence, 2000). Decisions that are taken will never please everyone as there are always certain trade-offs involved. When decisions are taken critical rationality ought to be applied within the EIA process, in that authorities should use rational argument to justify the decision taken on a project (Hill, 2004).

Within South Africa, continued emphasis is placed on the environment and the relationship between it and development activities. As EA has evolved throughout the history of South Africa, so has the approach to EIA from an ad-hoc system to one that is integrated within the development planning process.

3.1.2 Limitations of EIA

Despite attempts to ensure the integration of environmental considerations into the developmental planning process and all the legislation and guidance given, environmental degradation continues to be a major concern for developing countries (Alshuwaikhat, 2004). The lack of capacity, a re-active approach to development proposals and a lack of political will have caused EIA to be ineffective. Another issue that faced government departments in South Africa has been the sheer volume of EIAs received. From September 1997 to June 2006 43600 applications were received, mainly due to the formation or change in land use (Welman and Retief, Unknown date). This was far higher than international trends. EIA is therefore not the answer to all environmental issues as it has its limitations. These limitations include amongst others (Alshuwaikhat, 2004. Hill, 2004. Sowman and Wynberg, 2007. Sowman, 2002. Sowman and Brown, 2006):

- Cumulative effects are not taken into consideration when an EIA is undertaken.
- The impacts of some small activities might appear to be harmless, but they can be significant.
- EIAs can be rushed if an unethical approach is taken to streamline the decision making process.
- Secondary or induced impacts of activities from one main large development are sometimes not addressed in EIAs.
- There is not enough detail and attention given to the development of alternatives though good EIA practice ought to give detailed attention to alternatives.
- In certain practices EIA have little to no input into the planning and design phase of projects.
- Time delays due to lack of capacity do to evaluate EIAs.
- Lack of capacity in practice by some to do quality EIAs resulting in bad practice.

Due to these limitations, the degradation of the environment continued and EIA was seen as an impediment against development projects rather than to aid in the decision making processes. A structural weakness of EIA is that it may be applied late in the decision making process (Dalal-Clayton and Sadler, 2005). The decision makers are also faced with a limited scope of alternatives and mitigation measures for proposed projects that result in a limited influence of EIA. The time frames of EIAs also limit the amount of public participation within the EIA process that resulted in EIA not including interested and affected parties (especially those in the local community) that could give vital information to the seasonal changes that occur within the environment. It is argued that because of EIA being such reactive to development that EIA does not have the opportunity to influence the design of projects (Alshuwaikhat, 2004). It should be noted that EIA as a tool itself is not at fault, but rather the way in which it has been applied has been less than conscientious.

EIA had a strong focus on technical-rational with an emphasis on scientific, or specialist's data when it was first implemented in South Africa. This approach has been internationally criticised and arguments have been made that real life decision making is based on a value driven methodology. This methodology has also been criticised and some argue that a balanced approach is needed within EIA to insure that the best possible decisions are taken (Bina, 2007. Retief *et al.*, 2007b). The lack of EA as a tool to advance sustainable development into South African PPPs became an ever pressing issue (Sowman and Wynberg, Unknown date). The failure of EA to incorporate sustainable development issues into PPPs led to the wide promotion of SEA.

3.1.3 Argument for a SEA approach

The argument towards SEA was that SEA would address the limitations and methodological dilemma that EIA faced of being reactive rather than proactive when a proposed project was to take place (Bina, 2007). The initial SEA approach was very similar to the EIA ad-hoc approach to development planning and was considered as being complex to implement effectively. The limitations surrounding the involvement of EA at a strategic level should not hinder the adaptation of a SEA approach within PPPs (Alshuwaikhat, 2004). The debate surrounding SEA was that it was another time consuming approach that would not resolve EIA limitations but cause further conflict between environmental management and development (Partidario 2000). The causes of these limitations apply equally well in the context of SEA.

One key issue that SEA addresses is that of cumulative affects of development. Cumulative affects are affects that do not take place in a short time frame but rather represent the effects of a multitude of activities over an extended period of time. Each individual project can yield environmentally acceptable consequences, but when these individual affects are combined, they can be significant and unacceptable. SEA can contribute to the assessment of cumulative effects of PPPs and how development should take place to reduce these effects (Alshuwaikhat, 2004. DEAT, 2003).

The debate surrounding EIA vs. SEA led to a realisation that SEA should not be seen as the answer to EIA limitations and the fulfilment of all the shortcomings left by EIA (Partidario, 2000). SEA however should be used to compliment EIA to incorporate environmental considerations into the design of PPPs. The use of SEA in a systematic manner for the guidance in PPPs as an overall course for development means that project-level EIAs can be streamlined in their assessment and therefore reduce time and effort in their preparation (Dalal-Clayton and Sadler, Unknown date).

3.2 SEA development in South Africa

Developing countries have sometimes developed SEA provisions but not necessary implemented them (Alshuwaikhat 2004. Cherp, 2001). South Africa, Brazil and Chile are a few of the developing countries that have SEA processes, or elements thereof, in place within its development of PPPs (Alshuwaikhat 2004). SEA is becoming ever more accepted as a tool at a provincial and regional level where PPPs go across borders. This is important as transboundary effects which were neglected in the past are also considered within the development process.

Due to the limitations of EIA and the realisation that EIA principles need to be applied at a more strategic level, SEA became a tool to address the limitation of EIA and promote sustainable development and IEM principles into development planning process (Rossouw *et al.*, 2000). Although SEA has been used in EA for at least a decade, no common international definition has been developed (DEAT and CSIR, 2000. Kidd and Retief, 2009). In South Africa the first attempt at giving SEA a definition was the White Paper on Environmental Management Policy for South Africa (1998) that defined SEA as “a process to assess the environmental implications of a proposed strategic decision, policy, plan, programme, piece of legislation or major plan” (DEAT and CSIR, 2000. p. 9). The problem with this definition is that SEA was seen as separate and apart from the development PPPs and encompassed only the impact of the environment on the development. While this is an important aspect, it is argued that SEA should also include in its conceptualisation an evaluation of the opportunities that the environment offers for development to take place (DEAT and CSIR, 2000). According to best practice

models, SEA ought to be a proactive process to strengthen environmental issues in decision making that aims to integrate environmental (biophysical, social and economic) considerations into the earliest stages of the development of PPPs (Sadler, 1995. Tonk and Verheem, 1998). Therefore, SEA will be a process of analysing PPPs at an early stage of development in order to give decision makers the best possible options to decide between (Alshuwaikhat 2004). SEA has the capability of strengthening project level EIA, addressing cumulative and large scale effects and incorporating sustainability considerations into the decision making process (Rossouw *et al.*, 2000. Sadler, 1996).

SEA has the potential to prevent PPPs that have unanticipated consequences for the environment through screening before a decision is made. SEA is not seen as a replacement for project level EIA, but more as a means to ensure that long term decisions are made in a sustainable manner at a strategic level (Alshuwaikhat 2004). This will promote the equitable management of the environment and will yield sustainable development. It is argued that SEA can reduce the number of project level EIAs through its identification of environmental sensitive areas for the conservation of biodiversity and ecosystems (Rossouw *et al.*, 2000. Sadler, 1996, Sowman and Wynberg, 2007).

The incorporation of SEA into the strategic level of PPP to promote sustainability principles will only be effective if it is adopted by policy makers, planners and officers who would use it to its optimal capacity (Alshuwaikhat 2004). There are of course those who would prefer to ignore SEA as it would influence the decision making process that they have become accustomed to (Alshuwaikhat 2004). It is argued that the application of SEA should increase the quality of decisions.

Within government and relevant stakeholders, SEA has been recognised as the tool to push sustainable development into the agendas of PPPs (Alshuwaikhat 2004). The role of SEA can assist decision makers to improve the design of, and create alternatives to, PPPs. This would enable a decision maker to choose the best design of the PPPs in order to achieve sustainable development objectives.

The ability of SEA to contribute to sustainability will grow as it is involved within PPPs on a regular basis. SEA could contribute to the evolution of sustainable development through its use of sustainable development indicators. SEA enables sustainability principles to be put into operation within the development planning context.

3.2.1 History of SEA in South Africa

The first step to develop SEA theory and as a tool for the development planning at a strategic level was in 1996 when the CSIR developed the *Strategic Environmental Assessment (SEA): A Primer*. The SEA Primer highlighted the debate surrounding SEA and the benefits of SEA application at a strategic environmental planning level. There was little information given in the SEA Primer on the methodology of SEA since there was little experience in practice (Rossouw *et al.*, 2000). After the development of the SEA Primer the CSIR released *A Protocol for Strategic Environmental Assessment in South Africa: Draft Discussion Document* in 1997, *Principles for Strategic Environmental Assessment: Working Draft for Discussion and Towards Strategic Environmental Assessment Guidelines for South Africa: Draft Discussion Document* in 1998. These documents deal with developing foundations for key principles and approaches for the development of SEA (Rossouw *et al.*, 2000).

The goals of these documents were to start a debate to develop a set of agreed upon principles for SEA in South Africa. As a result the development of a CSIR document, the *Guideline Document: Strategic Environmental Assessment in South Africa* in 2000, was to establish a common understanding of SEA and develop guidelines for its application in the South African context (Rossouw *et al.*, 2000).

3.2.2 Approach of SEA in South Africa

There are commonly three approaches internationally to SEA (Retief, 2006):

- Stand alone model
- Central model
- Integrated model

The approach of integrating SEA into the existing process of developing PPPs is a widely supported approach (Rossouw *et al.*, 2000. Boothroyd, 1995). This integrated approach, used in South Africa, focuses on the opportunities and constraints that the environment places on PPPs rather than how the PPPs will impact on the environment (Rossouw *et al.*, 2000).

This approach in South Africa enables SEA to take place at a strategic level of PPP formulation before specific project proposals are developed in order to promote sustainable development into decision making (Rossouw *et al.*, 2000). SEA enables decision makers to have the information ready at the right time for adequate decision making. SEA in South Africa in principle should create a context for lower levels of planning and reduce time spent in implementing EIA.

In South Africa, SEA is an integrative approach that needs to be flexible in order to respond to South Africa's diverse range of social, economic, biophysical, legislative and administrative context. This means that one specific methodology of SEA cannot be applied to all local contexts within South Africa (Rossouw *et al.*, 2000). However, certain key aspects of SEA methodology should be used in order to guide a context specific approach.

3.2.3 Process of SEA

Internationally, there is no one right approach to SEA methodology. Since SEA was developed to complement and address limitations of project level EIA, SEA has a two distinctive approach to the assessment of PPPs. The first approach (Figure 1) is very similar to that of EIA, whereas the second approach is less report driven, less specialist and deliberative approach by stakeholders involved in the policy formulation process.

The second SEA process, enables the formulation of a sustainability framework to guide future decision-making. This framework is developed through scoping, analysis of the existing situation and the development of sustainability parameters. These parameters can be in the form of principles and/or guidelines aimed at guiding the development planning process towards achieving sustainability. Parameters

should include recommendations on how the constraints identified could be addressed and the opportunities enhanced.

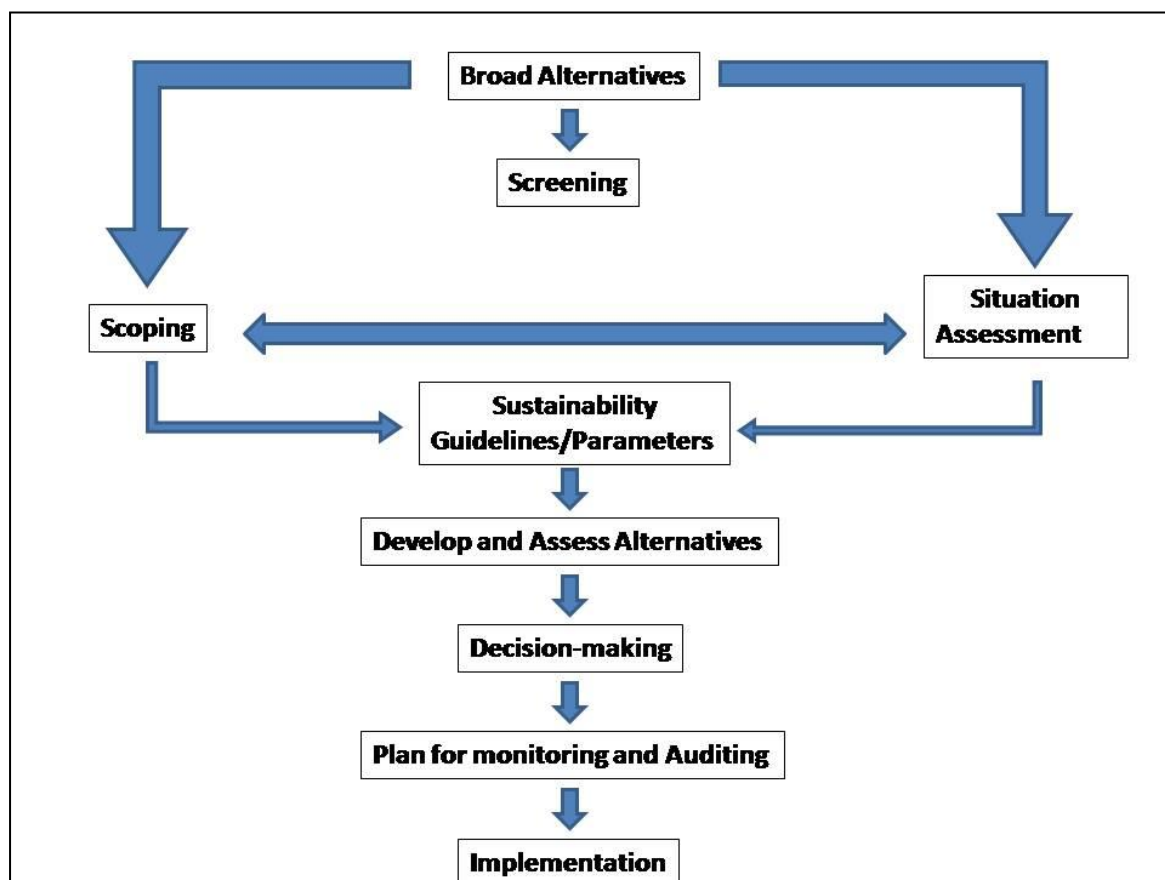


Figure 1: Conceptual illustration of the SEA process to the EIA process (DEAT, 2004. DEAT and CSIR, 2000. Rossouw et al., 2000)

It is argued that the approach of SEA in South Africa includes the proactive evaluation of the environment to sustain various types of development (DEAT and CSIR, 2000. Rossouw *et al.*, 2000). However, in practice, this has not been the case (Retief *et al.*, 2007. Retief, 2006). Not all of SEA's efforts have been effective and successful.

3.2.4 Shortcomings of SEA in SA

In many Developing Countries, SEA has not met its desired objectives and has proved to be less than effective. This is largely due to a lack of capacity within the development of PPPs. It has been argued that SEA does not have enough debate surrounding alternatives and an absence of effective public participation (Alshuwaikhat 2004).

Hill (2004) argues that the limitations to SEA are a product of institutional and political resistance, ignorance and inadequate procedures or methodologies. He notes that training of technical staff, changes to institutional procedures, decision making frameworks and the development of appropriate methodologies are all aspects that can improve the practice of SEA (Hill, 2004).

In South Africa, the approach to decision making in development planning has been a hierarchical approach, where a deductive and linear approach has been applied to decision making (Hill, 2004). This meant that when SEA was initially introduced it was not the inductive, iterative and incremental way of past development of PPPs.

Another issue facing SEA is that SEA is seen as the solution to all EIA limitations and problems (Hill, 2004). Hill argues that SEA should not be seen as an independent activity that makes project level EIA obsolete. Project level EIA is a critical tool in the IEM process and the promotion of sustainable principles through its in-depth analysis of a specific area is necessary in order to identify any specific environmental issues (Hill, 2004).

Retief *et al.* (2007a) undertook an in depth study of six SEA cases and found a number of macro and micro level features that they were highly critical of. The study included a broad analysis of 50 SEAs undertaken from 1996 to 2003 against 18 Key Performance Areas (KPA) and 57 Key Performance Indicators (KPIs). The macro level issues that were identified were that, firstly, SEAs is an expanding voluntary practice. This is because SEA does not have formal legislative backing and its application within the development of PPPs remains voluntary (Retief *et al.*, 2007a). Secondly, the diversity in practice is associated with an ever growing confusion internationally and some argue that it has become a lost concept (Partidario, 2000. Fisher and Seaton, 2002). Even though South Africa has attempted to define and create a home grown approach to SEA through the development of guide packs and numerous other SEA documents, the application of SEA in different sectors created diversity in its application (Retief *et al.*, 2007b). There were some cases where similar approaches were taken to SEA; these were mainly within the planning and conservation sectors (Retief, 2006. Retief, 2007b). Thirdly, SEA performance and

effectiveness in South Africa has not been subject to much research. The effectiveness of SEA in relation to its overall purpose, its ability to influence decisions and contents of plans and policies for the promotion of sustainability and IEM principles (Retief *et al.*, 2007a). Retief *et al.* (2007b) state that the limitation of SEA to influence the contents of PPPs and decision making is a major concern since the purpose of SEA is seen as influencing PPPs in order to make the best informed decision towards sustainable development.

The micro level features that Retief *et al.* (2007b) identified with regard to the application of SEA in South Africa were, firstly, the lack of focus in SEA. This meant that scoping in SEA is necessary to focus the study on significant strategic issues. Even though SEA in South Africa contains a scoping phase within its methodology the research showed a distinct lack of focus. He argued that the scope of SEAs were “far too extensive, with a large unmanageable number of issues, objectives and indicators” (Retief *et al.*, 2007b: p. 509) with those conducting the SEAs indicating that they did not know where to stop an assessment or what to leave out since SEA deals with such a wide area of issues. Secondly, SEA has been limited in its integration within the decision making process of South Africa. Proponents have debated for some time whether SEA ought to follow a more structured approach against that of allowing an adaptable, integrated and more flexible approach. In South Africa the approach taken is one that lends itself to both ways.

Retief *et al.* (2006, 2007) argue that in 36% of the cases analysed the integration of SEA into strategic decision making has not taken place. This is due to limited knowledge of the decision making process and the divide between data gathering and the availability of meaningful information for decision makers (Retief *et al.*, 2007a). Thirdly, SEA has been lacking in the assessment of PPPs outcomes and proposals. The lack of assessment that is limiting the effectiveness of SEA is argued to be caused by the approach to SEAs in South Africa and the technocratic-rational application in practice (Retief *et al.*, 2007a).

3.3 A New Approach to Address SEA Limitations, Assist EIA and Promote IEM

It has been shown that both SEA and EIA have limitations that are recognised at an international and national level. These limitations range from defining the concept, to questions about methodology, implementation and legislation. Although the 2006 EIA regulations have reduced the number of EIAs done in South Africa there is significant room for improvement when screening environmental issues to focus on the key issues (Welman and Retief, Unknown Date). SEA is seen as the most appropriate tool to influence PPPs at a strategic level that would identify the limitations the environment places on the PPPs (DEA and DP, 2009. DEAT, 1998c).

SEA faces a distinctive challenge of providing applicable information to decision makers at the proper scale and level of detail (Retief *et al.*, 2007a). This gives rise to the use of spatial representation data (like GIS) as a tool within the assessment process (Retief *et al.*, 2007b). However, as Retief *et al.* (2007a) found in their research, SEA has become 'The Emperors' New Clothes' in its application in South Africa. The authors argue that there are three distinct factors that influence the effectiveness of SEA in South Africa. Firstly, a requirement of an explicit legal framework that would provide backing for the implementation of SEA. Secondly, SEA is principally consultant driven and this leads to a separation from decision makers that are responsible for the implementation of SEA outcomes. Thirdly, the effectiveness of SEA is influenced by the public sector's capacity to take ownership of SEA outcomes to ensure their implementation.

The first discussions about EMFs being developed at a provincial level were held in 1998 in order for EMF to serve as a key component in the implementation of IEM (Retief and Sandham, 2001). With an ever growing awareness of the need to consider the strategic context of decisions, the incorporation of cumulative effects, societal needs and the public interest, the NEMA EIA Regulations of 2006 provided for the compilation of EMFs. This was the first set of regulations that called for the formulation of EMFs. According to the regulations that were promulgated in 2006 that made EMFs a legal obligation by authorities, a draft EMF must (Government Notice R. 547, 2010: p. 193):

- “Identify the geographical area to which it applies through the means of a map.
- Identify the attributes of the environment in the geographical 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 activities that would have a significant impact on those attributes and those that would not.
- Indicate the kind of development or land use that would be undesirable in the area or 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.
- Include any other matters that may be specified”.

EMFs are defined as frameworks of spatially represented information, connected to parameters that are biophysical, institutional as well as socio-economic. The main purpose of an EMFs (DEAT, 1998: p.2):

“to pro-actively identify areas of potential conflict between development proposals and critical/sensitive environments”.

EMFs are tools that will support IEM in South Africa through identifying environmental issues in the scoping phase. This will, theoretically, enable EIAs to focus on issues that are proactively ‘red-flagged’ as highly environmentally sensitive issues.

EMFs are decision support tools that provide the decision makers with information of the biophysical, institutional and socio-economic issues including the interrelationships between these issues within a geographical context. An EMF is a proactive tool that integrates IEM and sustainability principles into national, municipal

and provincial decision making in order to integrate and align PPPs on a sustainable development path.

EMFs consist of two distinctive but parallel information categories. These two categories are:

- Environmental Data Input that consists of all the relevant and available spatial environmental information.
- Socio-economic Planning Priorities that are derived from the public participation process.

The data used within the environmental data input category is assessed in terms of potential or latent environmental sensitivity for development. In order to analyse this data parameters are assigned to each of these sensitivity assessments. These parameters include standards that are quantifiable, values and norms referring to limits that are generally acceptable by society and criteria that are related to specific objectives. The outcome of the environmental data input category is an environmental sensitivity zone map and the socio economic planning priorities criteria are represented in a strategic management zone map. Both these spatial development representations are combined in order to develop an EMF that is used to evaluate planning and development proposals.

3.3.1 Process of EMF in South Africa

The process that EMFs use in order to gather these two input fields of environmental data and socio-economic planning priorities are similar to that of SEA. This process was also discussed in chapter 1. The main steps in the process of developing an EMF are; sensitivity evaluation, the determining of constraint zones or management zones (the determining of the geographical area in which certain constraints can be found) and finally the development of an implementation strategy for the EMF. This strategy is known as a Strategic Environmental Management Plans (SEMP) (DEA, Unknown Date).

The EMF process of identifying sensitive geographical areas is very similar to the process undertaken in a SEA, namely (DEA, Unknown Date):

- **Status Quo Assessment:** This involves the collection and review of existing, available and up-to-date information and data that are gathered and developed through specialists studies pertaining to the study area in order to establish a better understanding of its current 'state of environment'.
- **Sensitivity Evaluation:** This is an evaluation and weighting of environmental features that is an integration of spatially represented baseline information to determine areas unsuitable for development. The sensitivity evaluation takes current land uses and existing and proposed developments' influence on environmental sensitivity into consideration to identify critical environmental aspects and issues within the geographical area.
- **Determine Constraint Zones (Management Zones):** In order to identify the constraint zones of the area critical environmental aspects are delineated such as sensitive environments and integrative conservation linkages, sensitive vegetation, protected areas into National Environmental Management Protection Act, historical and cultural / scenic landscapes, sense of place, slope, aspect and sensitive topographical features such as coastal dunes, steep slopes and ridgelines.
- **Determine Geographical Areas for EMFs:** These areas are a combination of Status Quo Assessment, Sensitivity Evaluation and Constraint Zones (Management Zones). These geographical areas can overlap municipal boundaries.
- **Strategic Environmental Management Plans (SEMP):** The purpose of the SEMP is to link management requirements to each of the environmental constraint zones. The SEMP is a plan that indicates minimum environmental requirements that have to be met in order to allow for the approval of development applications. The SEMP also indicates what level of detail is expected from project level EIA in the specified zones. The criteria that can be stipulated by the SEMP for specialists report within the project level EIA involve a combination of economic, environmental and socio-economic considerations. A SEMP also enables environmental considerations to be integrated into the IDP process. The SEMP "fulfils the requirements of the

environmental management mandates of the relevant environmental authority, while it do not impose land uses on the planning mandate of provincial and local planning authorities” (van Viegen, Unknown Date: p. 27).

This process is done in order to map an area from its status quo to the desired environment through identification of environment management zones and preparation of environmental management plans and to affect environmental policy and develop guidelines for future development.

The two categories of data that are used within the formulation process of an EMF are environmental data and social-economic planning priorities. This data enable EMF to achieve the normative objectives, namely (DEA, Unknown Date):

- The provision of a mechanism and decision support tool for the study area (identification of geographical areas) for competent authorities (National and Provincial).
- To facilitate effective and efficient decision making that is achieved through EMFs functioning as a repository, integrating all relevant and viable spatial information into a single workable platform.
- Provide input into local SDF and IDPs.
- Provide Proactive environmental information into development proposals within the identified development constraint zones.

3.4 Summary

In this chapter, the EA tools that have been developed in order to implement IEM and sustainability principles in development planning were discussed. These tools were EIA, SEA and EMFs. EIA is the tool most commonly used for project level assessment and when it was introduced into the South Africa context was initially seen as an important tool to identify and assess environmental issues for development planning and decision makers (Sowman, 2002). However, the limitations of project level EIA became an ever pressing issue within development planning and environmental management. These limitations within EIA gave rise to debates in favour of a new tool called SEA.

SEA was initially heralded as a tool to solve all of EIA's limitations. However, it has been recognised more recently that the development of SEA focused on the technical shortcomings of EIA (symptoms) rather than the causes of the problems (Bina, 2007). The causes of EIA failure have been argued to be a lack of capacity at local level, lack of political will to commit to the adoption of EA within PPPs and inadequate skills in the private and public sector (Bina, 2007. Hamann, 2003). This means that SEA has, and will, suffer from many of the same limitations of EIA since the causes of these problems have not been addressed (Bina, 2007).

In South Africa and internationally, SEA should not be seen as replacing project level EIA (Bina, 2007. Partidario, 2000.Sowman, 2002).SEA can complement EIA by incorporating sustainability issues into PPPs (Clayton and Sadler, 2005). SEA can also limit project level EIA through its influence of identifying unwanted development in certain geographical areas (Clayton and Sadler, Unknown date).

SEA in the South African context does, however, have its limitations (Retief *et al.*, 2007b). These limitations include lack of integration, capacity and of broader policy and legislation. The absence of best practice models and no clear methodology still hinder SEA despite the attempts to develop guidelines (Retief *et al.*, 2007b. Sowman, 2002). A key issue is how to apply IEM principles in local development planning PPPs such as the IDP where the tools of EIA and SEA have failed to achieve their initial objectives.

It is argued that in order to guarantee that IEM and sustainability principles are implemented at the sphere of local government EMFs should be recognized in local municipalities and applied by local authorities within their IDP process (Alshuwaikhat, 2004. Retief and Sandham 2001). Of course the development of an EMF cannot be seen as separate from a tiered approach to government nor from other spatial representation tools such as the SDF. The spatial recommendations made by local EMF will be reflected in the SDF of the local authority and the Provincial SDF (PSDF). Since EMFs became legislated in 2006 it has taken some time to implement. The EMF is the first strategic assessment approach that is legislated within South Africa, unlike SEA that has yet to be legislated. In Regulation 547 of 18 June 2010 that came into affect on the 2 August 2010, EMFs are aimed at promoting

sustainability, securing environmental protection and promoting co-operative environmental governance. In order to achieve these aims EMFs need to achieve its normative objectives previously mentioned. These normative objectives within the three municipal areas of the City Of Tshwane's ZOC, Tlokwe Local Municipality and EMM municipality are the focal point of this research.

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4. Chapter 4: Background to Case Specific EMF

The preceding chapters laid the foundation for the research as well as discussing the need for the development of EMFs as an EA tool that forms part of the development planning process. This chapter focuses on the history and context of the three case studies as well as the formulation of environmental information. This is important as environmental information has been available since the late 1990s before the specific EMFs were developed. The environmental data that was available before the EMF was undertaken has contributed to the EMFs of the Ekurhuleni Metropolitan Municipality (EMM) and the City of Tshwane Metropolitan Municipality (CoTMM).

The following environmental information was gathered within the Gauteng Province before the development of EMFs of the EMM and the CoTMM. It is important to know that this information was developed before the specific EMFs were formulated as this environmental information formed the basis for the formulation of the EMFs. The Gauteng Province Department of Agriculture, Conservation, Environment and Land Affairs (DACEL) produced a number of documents including the State of the Environment in Gauteng: A Preliminary Report (in 1998), Draft Development Policy for Ridges (2001) and the Draft Red Data Plant Policy for Environmental Impact Evaluations (2001). These policy documents provided the start of an environmental database that all of the municipalities within its borders can use. In 2004 the Gauteng Department of Agriculture, Conservation and Environment (GDACE) produced the Gauteng State of Environment Report (2004) through an EA process of the Gauteng Province.

The Gauteng Department of Agriculture Conservation and Environment (GDACE) produced a map in 2006 that indicated the extent of urban development, conservation areas, sensitive areas, areas of high agricultural potential and 'NEUTRAL' areas. This map is known as the Gauteng Conservation Plan or C-Plan. The neutral areas identified through this plan were of critical importance as they are the areas that would be most likely to be developed in future. However, at the provincial scale of this plan the 'NEUTRAL' areas have very diminutive environmental constraints. The C-Plan provided a key stepping stone for the use of environmental data within the formulation process of EMFs within the Gauteng Province.

The EMFs within the three case studies generally consist of the following:

- Status Quo Assessment
- Desired Future State of Environment
- Development Parameters
- Identification of Geographical Areas in terms of NEMA
- A Strategic Environmental Management Plan

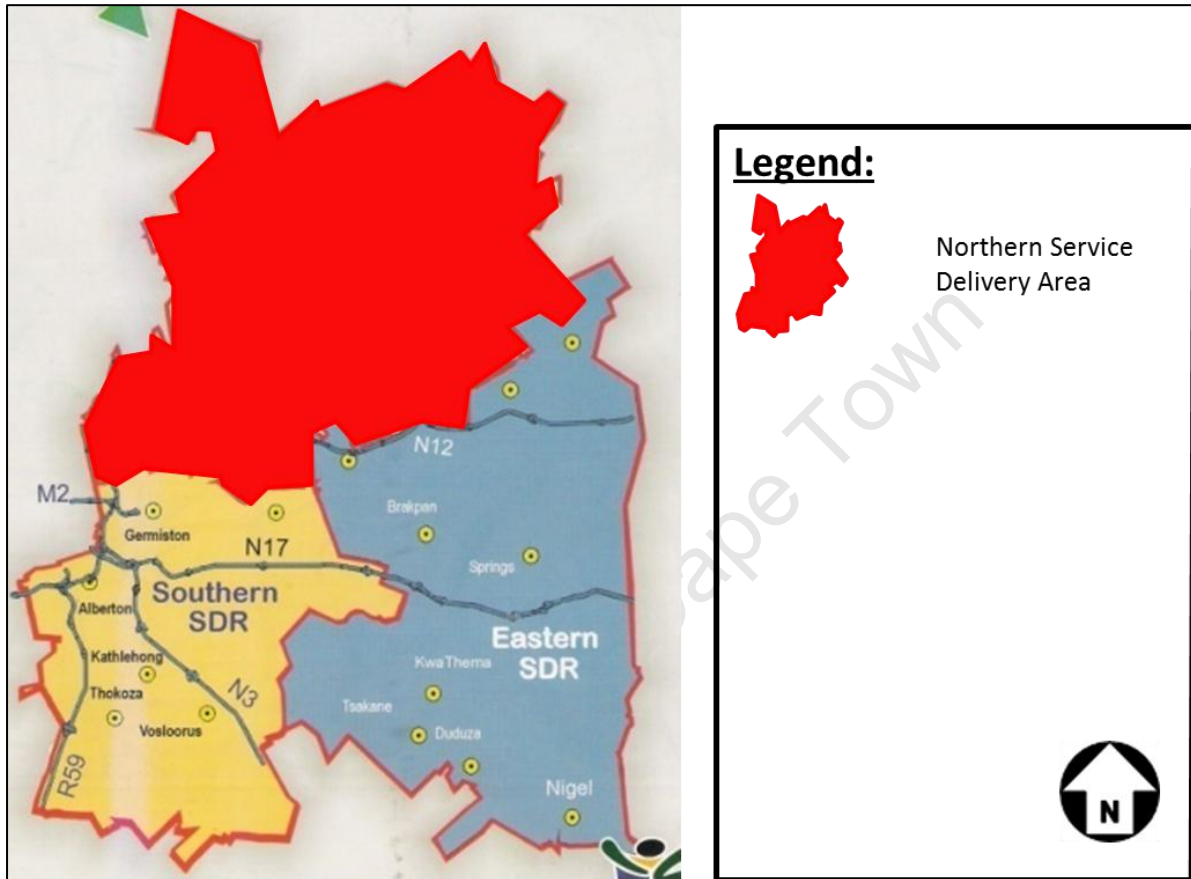
The Status Quo Assessment is an assessment of the Bio-Physical, Socio Economic and Demographic parameters of the area and the Land Use Management and Planning policies and strategies. This information is represented in a series of maps as well as forming part of a Geographic Information System (GIS) for the area. The Status Quo Assessment thereby identifies areas of concern and starts developing the GIS database. The Desired Future State of Environment is the ideal environment that the municipality would prefer. This Future State of Environment is based on environmental information such as biodiversity information derived from the Status Quo Assessment. However, to obtain the ideal future environment is not always possible and thereby this vision is compared to that of the status quo assessment. From there the development parameters are formulated and geographic areas are identified in terms of NEMA. Finally, the SEMP is developed in order to implement the EMF within the municipalities' development plans and policies.

4.1.1 Ekurhuleni Metropolitan Municipality

Due to the geographic location of the EMM within the Gauteng Province, it is expected to expand in future. This however poses a problem as areas within the EMM without environmental constraints have already been developed. The EMM therefore faces a challenge to increase the density of the urban fabric, redevelop already built up areas and to use other land optimally to combat issues such as urban sprawl.

In order to address these development challenges the EMM developed a Northern Service Delivery EMF that was adopted by council in 2005. The

development of the EMF for the Northern Service Delivery area (Map: 4) was due to the R21 route that formed an important geographic spatial context in terms of transportation and economic development between the EMM to the CoTMM. This corridor provided a context for the development of an EMF for the Northern Service Delivery area of EMM.

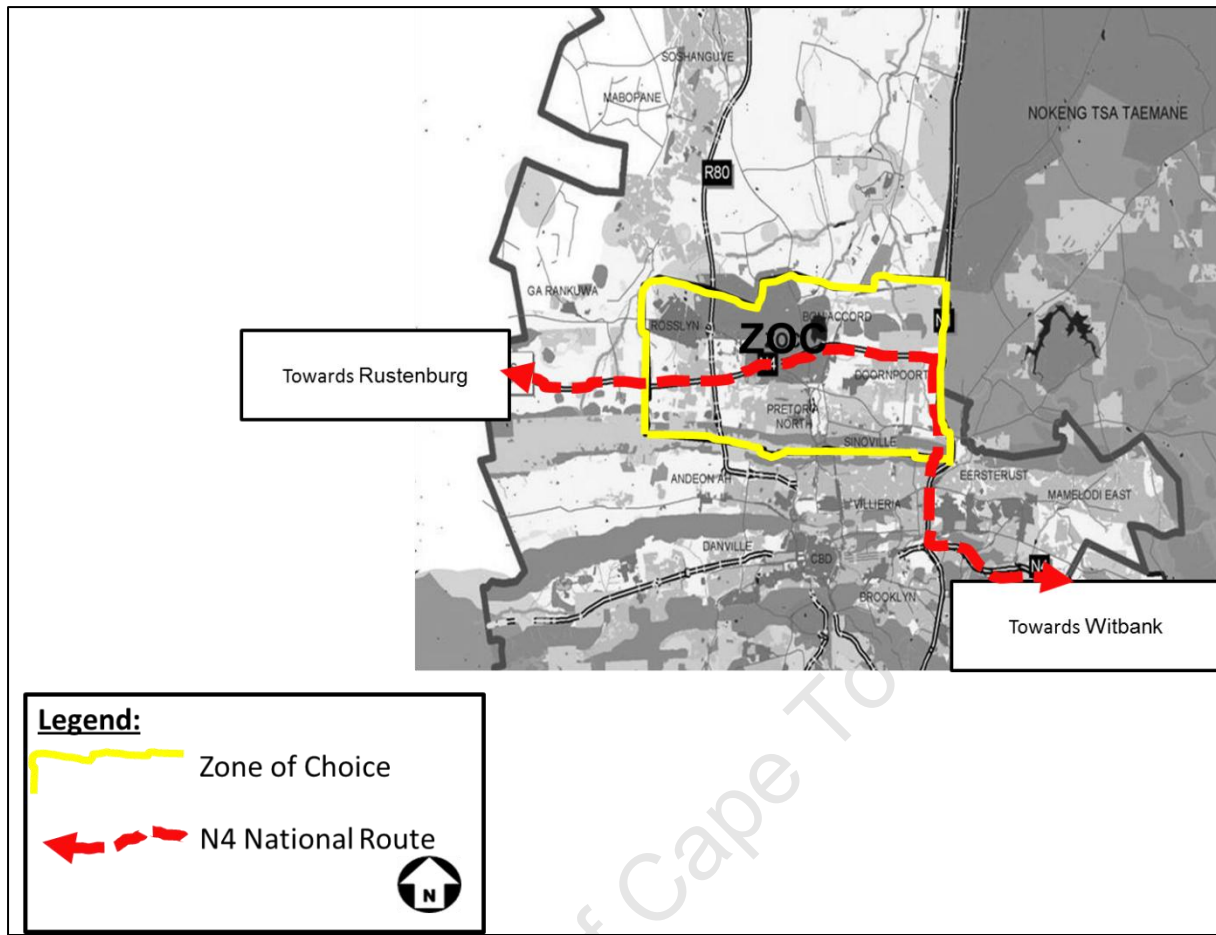


Map 4: Northern Service Delivery Area

4.1.2 Tshwane Zone of Choice

The Zone of Choice (ZOC) (Map: 5) forms part of the CoTMM strategy to develop the Northern area of its municipality as highlighted in the Tshwane City Development Strategy. This area forms a key strategic investment focus area that includes the upgrading or relocation of the Wonderboom Airport to an international/regional airport, the enhancement of the Rosslyn Automotive Manufacturing Cluster, the enhancement of the Platinum Corridor the integration of agriculture within the urban land use fabric.

The N4 Platinum Corridor initiative (Map: 5) is a spatial development strategy that will create a coast-to-coast Corridor from Walvis Bay in Namibia to Maputo in



Map 5: Zone of Choice context within CoTMM

Mozambique through the ZOC. This route will spur economic activity, allowing investment into every sector: mining, manufacturing, tourism, agriculture, electricity, water, gas, transport and financial sectors. The Pretoria-Rustenburg section of this SDI is already well-developed and will be extended.

The ZOC EMF was adopted in 2008 in order to facilitate development that is unique for the area. The ZOC EMF, however, was not the first environmental strategy that was produced by the CoTMM. The first environmental strategy that was approved in November of 2005 for the CoTMM was called the Tshwane Open Space Framework (TOSF). This framework aim was to:

“Establish a thorough understanding on the intrinsic value of Open Space and to then develop a visionary roadmap towards the creation of an exceptional Open Space network for the city and its people” (TOSF, 2005: p.2).

The TOSF facilitated effective environmental management of open space for the benefit of the city as a whole. The TOSF further provided a holistic framework within which the sustainable spatial development of the city can be guided and directed.

Though the TOSF became a very important strategy for the Tshwane Municipality, it has not obtained the legal stature EMFs have within national law. However the TOSF still forms an important part within the Tshwane Municipality development process and the incorporation thereof is an important aspect for the CoTMM EMFs.

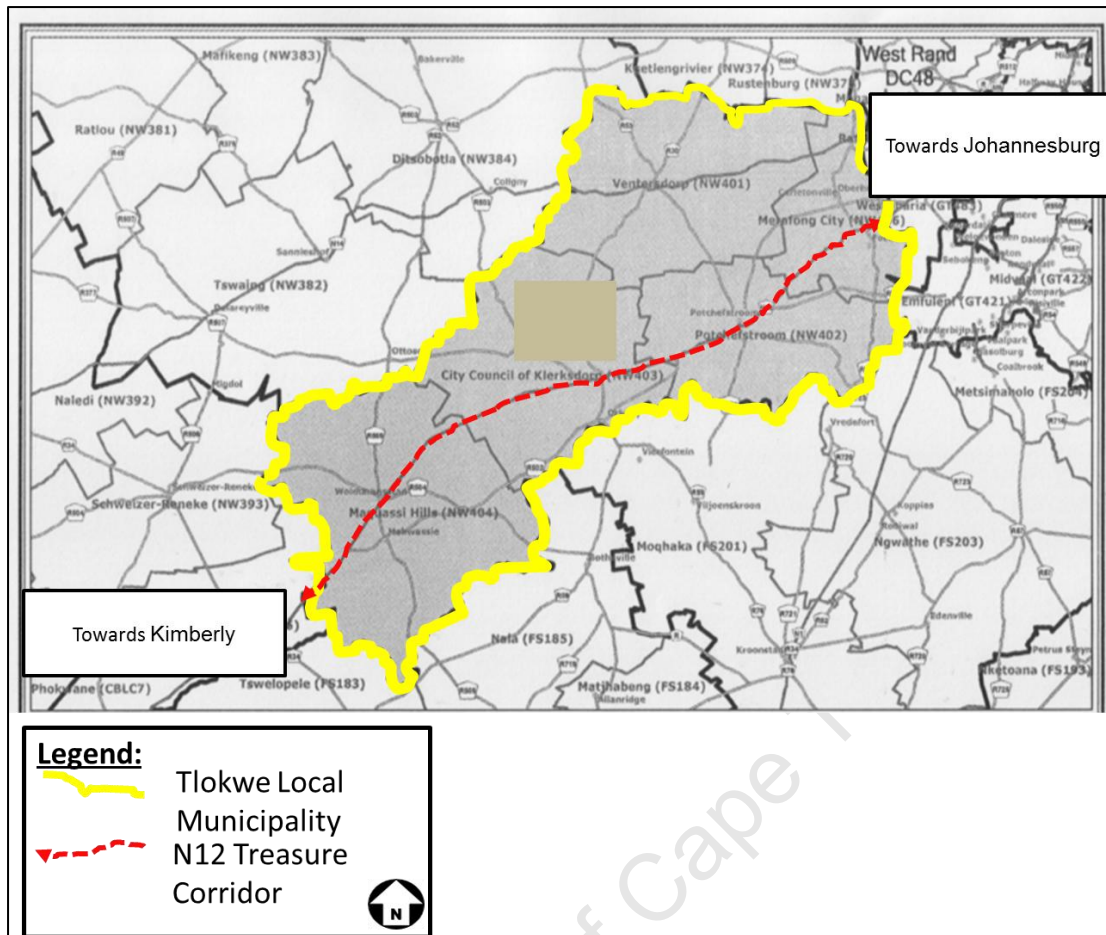
The EMF broadly contains the following aspects – Status quo assessment of the municipality focusing on bio-physical, socio economic and land use management and planning. This status quo data is used in order to map the desired future state of environment, identify geographical areas in accordance to NEMA and formulation of environmental parameters.

4.1.3 Tlokwe

The North West Province identified Tlokwe Municipality as the priority area for investment within the province due to the municipality's location onto the N12 Treasure Corridor.

The Treasure Corridor (Map: 6) is a spatial development initiative in order to strengthen development from Johannesburg to Potchefstroom, Klerksdorp and further south along the N12 national road. This corridor enters the North West Province near Fochville in the southern region of the province. The route travels through the goldfields near the towns of Potchefstroom, Stilfontein and Klerksdorp

The Tlokwe Municipality has experienced significant development and urbanisation over the last decade that poses significant development and environmental challenges.



Map 6: Treasure Corridor through Tlokwe Municipality

Environmental challenges include the excessive use of environmental resources, changes in land use, emissions and effluent of chemicals, waste and other pollutants.

Following the Earth Summit held in Johannesburg in 2002 the North West Province wanted to develop an environmental strategy to address sustainable development. The desire to develop an environmental strategy to inform development planning PPPs resulted in the identification of Tlokwe municipality as the area where such a strategy (namely EMF) was most desirable.

The development of such a strategy however was a lengthy process and the Tlokwe Municipality adopted the EMF in 2009. Unlike the cases of CoTMM EMF and EMM EMF the EMF of Tlokwe had little environmental data from provincial reports similar to that available in Gauteng Province. Detailed land-use information was obtained through the municipal SDF. However, the latest biodiversity information still

needed to be required. This information was obtained through the consultants of the EMF working closely with the biodiversity planning personnel from the North West Department of Agriculture, Conservation, Environment and Rural Development (NW DACERD) to formulate a draft provincial biodiversity conservation assessment

The following part of the research is an in depth analysis of each municipalities EMFs. These EMFs will be analysed according to the normative objectives that are outlined in the proceeding chapters.

4.1.4 Summary

All three of the respected case studies have development goals that are confronted with different environmental constraints. EMM is geared to develop the R21 corridor but faces environmental constraints such as wetland areas and dolomite areas. CoTMM development strategy is to develop the northern area that the ZOC forms a key development aspect, however, the area has numerous open spaces that have been identified in the TOSF. Finally Tlokwe Municipality is urbanising at a rapid rate while the municipality is developing the N12 corridor that is affected by environmental issues such as excessive use of environmental resources, changes in land use and pollution.

Though these three cases have different environmental constraints the respective EMFs consist of similar format namely:

- Status Quo Assessment
- Desired Future State of Environment
- Development Parameters
- Identification of Geographical Areas in terms of NEMA
- A Strategic Environmental Management Plan

The following chapter is the data analysis where the three case studies EMFs are analysed through desktop study and interviews.

5. Chapter 5: Data Analysis

The data analysis of this research is based on the identification of trends within the structured interviews in order to answer the research question and sub-questions. Answering the research sub-questions will enable the researcher to answer the research question and test the hypothesis of the research. At the end of the data analysis it can be concluded if EMFs are achieving the normative objectives set out earlier in the research.

The structured interviews were guided by the following research sub-questions:

- To what extent, and how, does the EMF enable competent authorities to make proactive decisions regarding the development of land?
- To what extent, and how, does the EMF contribute environmental information to development proposal evaluation?
- To what extent, and how, has the EMF improved the SDF of the competent authorities through the identification of development constraint zones and the development of guidelines for development constraint zone management?

These research sub-questions will be discussed and analysed for each of the case studies within the following part of this chapter.

5.1 Ekurhuleni Metropolitan Municipality

5.1.1 Research Question 1

To what extent, and how, does the EMF enable competent authorities to make proactive decisions regarding the development of land?

Environmental information has traditionally been the responsibility of different departments in the municipality and environmental information was separated into different fields such as biodiversity, geotechnical and conservation (EMM-Com-P-1, EMM-Com-P-2, EMM-Com-E1, EMM-EAP-1, EMM-PS-1). Examples of this separate information on the environment include the use of information from the Council for Geographic Science that was responsible for the identification of dolomite within the EMM. Dolomite, due to its characteristic of creating sinkholes, poses one of the biggest threats to development in South Africa, but it is not the only issue for development planning to take into account (EMM-Com1). Another example is

information from the Department of Water Affairs (DWA) emphasised the importance of wetlands and other water bodies that need protection and proper management. This emphasis by the DWA influenced the subsection of Water Affairs within the municipality to place emphasis on this need for protection and proper management (EMM-Com-P-1, EMM-Com-E-1, EMM-EAP-1).

The EMF enables development planning to use information that has been consolidated within the document on biodiversity, ecosystem functions, heritage areas and agricultural, geotechnical data, hydrology data and socio-economic data to influence the spatial development planning in order to minimise conflict between the natural environment and development (EMM-Com-P-1, EMM-Com-P-2, EMM-Com-E-1, EMM-EAP1, EMM-PS1). The consolidation of environmental management plans such as the C-Plan, GDACE and GDARD that contain different environmental information enables development planning to take proactive decisions regarding the development of land as well as providing a frame of reference (EMM-Com-E-1).

This consolidation of information within the EMF is depicted as various status quo maps. These maps form the basis for the development of the Strategic Environmental Management Plan of the EMF that illustrate and discuss the development parameters and geographical zones within the EMM (EMM-Com-P-1, EMM-Com-E-1, EMM-EAP-1). This information is also available within a Geographical Information System that has been developed is used in order to map the various environmental issues. The EMF has been used within the formulation and revision of three different spatial planning scales namely the:

- Metropolitan Spatial Development Framework;
- Regional Spatial Development Framework; and
- Local/Zonal/Precinct Spatial Development Framework (EMM-Com-E-1).

These frameworks are not blueprints or master plans aimed at rigid control of all development (EMM-Com-P-1, EMM-Com-E-1). The aim is to provide strategic guidance for the location and nature of future development (EMM-Com-P-1, EMM-Com-E-1).

The EMM EMF provides an enabling environment for the development of the Ekurhuleni Biodiversity and Open Space Strategy (EBOSS) that is a small scale, high detail document (EMM-Com-P-2, EMM-Com-E-1, EMM-EAP-1, EMM-PS-1).

EBOSS is diverse in scale that range from metropolitan municipality to 1:100000 in the document itself. Further property specific data is available through the GIS database for environmental practitioners, developers and development planning officials for the formulation and revision of plans and policies (EMM-Com-P-1, EMM-Com-E-1). The objectives of the EBOSS are to (EBOSS, 2009. P.1):

- “Meet the open space needs of the population of EMM in order to make adequate provision for access to a variety of types of open spaces in order to fulfil the physical and psychological needs of the community;
- meet the national biodiversity targets for vegetation types in the area in an appropriate manner that focuses on attainable priorities;
- consider and integrate the conservation plan needs of the province in a practical way;
- consider and take land needed for development into account in an objective and equitable manner;
- contribute as an integrated element in the proper functioning of Ekurhuleni as a city;
- set implementation targets in a manner that is realistic, affordable and achievable;
- provide objective implementation performance measures that will accurately indicate performance and ensure accountability of officials”.

EBOSS will be used to inform future SDFs and development planning in respect to areas and sites that should be conserved or be utilised for other open space functions (EMM-Com-P-1, EMM-Com-E-1). EBOSS therefore strengthens the EMM EMF through the environmental information it provides for development planning.

The EMF of the EMM has enabled decision makers to proactively identify what types of development are desirable in different development constraint zones (EMM-Com-P-1). This desired development is a result of the analysis of the status qua

information that has been compiled from different environmental information sources into one platform; namely the EMF (EMM-Com-P-1).

Even though the EMF has been successful within this objective, authorities still feel that the available environmental information can be improved through the inclusion of property specific environmental information (EMM-Com-E-1). This approach is emphasised through the development of the EBOSS that will enable property specific development parameters for development planning officials.

5.1.2 Research Question 2

To what extent, and how, does the EMF contribute environmental information to development proposal evaluation?

The EMF of EMM enables the proactive flagging of environmental issues within a geographical area. This enables environmental practitioners to identify key issues that need to be investigated in-depth within an EA (EMM-Com-P-1, EMM-EAP-1, EMM-PS-1). Development proposals include alternatives and recommendations for the proactively flagged issues within the geographic constraint zones. An example is within normal planning process when the proposed establishment of a residential township falls within a Air and Water pollution risk zone (identified geographical area) a basic assessment must be done that asses the risk of Air and Water pollution of the development. Through the pro-active flagging of key issues the amount of repetitive information within development proposals has been minimised within the development planning process (EMM-Com-P-1, EMM-Com-P-2).

The EMF of EMM assists the environmental practitioner of a project specific development and decision makers of the development proposal to ask the right, specific, questions that need to be asked within the drafting and evaluation of a development proposal (EMM-EAP-1, EMM-PS-1). This enables the decision makers to have knowledge on the relevant issues within an area that need to be taken into consideration on a specific development proposal to have specific knowledge on what are the relevant issues within an area and have a discussion with the environmental specialists of the proposal.

Even with all the available information the involvement of private developers and other stakeholders within the formulation process of the IDP has been difficult due to misconception of EMF (EMM-Com-P-1). Though the interaction between these parties would create an environment where knowledge is shared the misconception that the EMF is a pure conservation plan apposed to development has limited the sharing of knowledge. In fact many private developers as well as private town and regional planners still do not know that the environmental data used within the EMF is available to them in order to improve their investigation phase of a development proposal. The investigation phase during private development is the investigation of a specific property's applicable zoning, land use, development plans, policies and environmental issues and establishes if there are any blatant restrictions that will not allow the proposed development (EMM-EA-1, EMM-PS-1).

5.1.3 Research Question 3

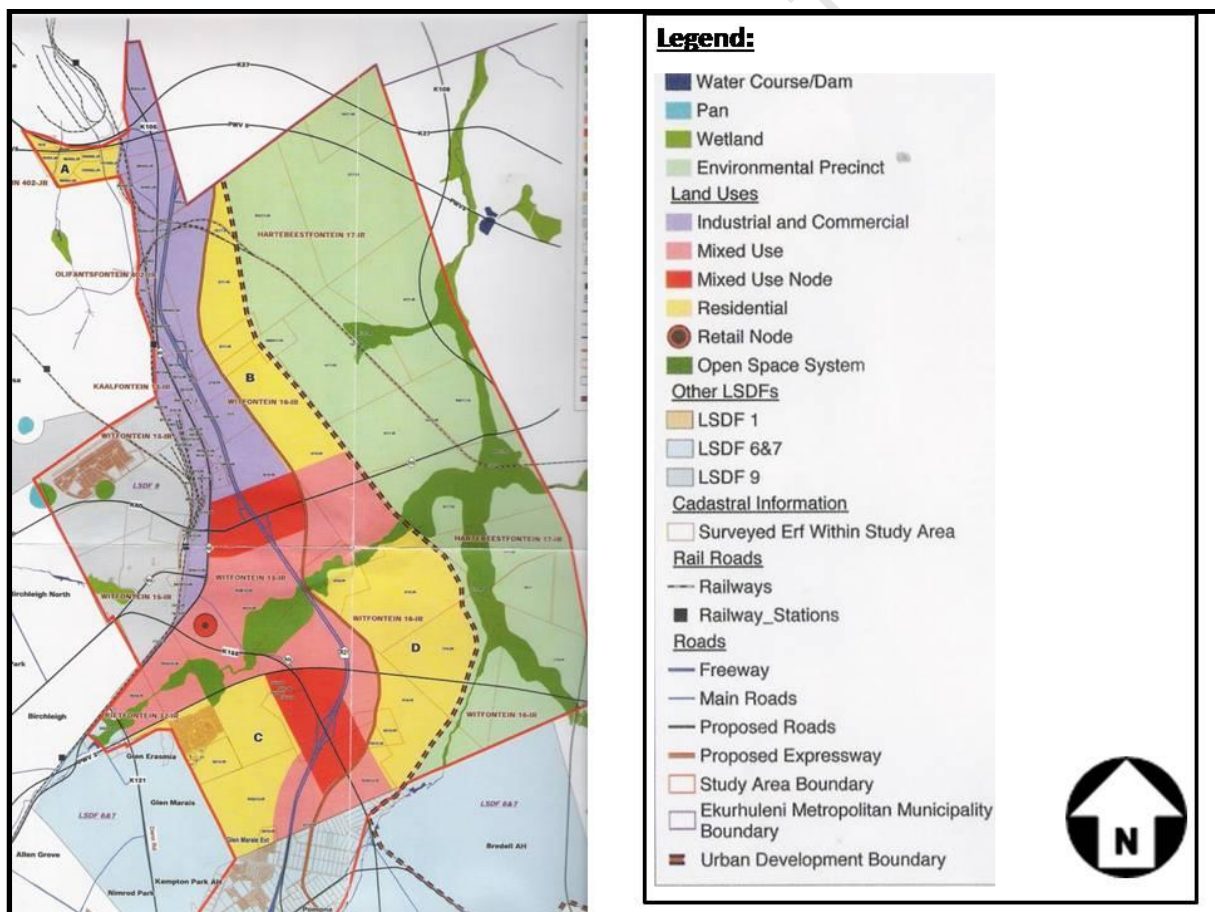
To what extent, and how, has the EMF improved the SDF of the competent authority through the identification of development constraint zones and the development of guidelines for development constraint zone management?

The EMF enabled the SDF to proactively guide development within and around the constraint zones (EMM-Com-P-1, EMM-Com-E-1). The SDF of EMM is therefore enabled to adequately manage potential threats to the environment and threats that the environment poses for development. One such case is Bapsfontein that had initial high potential for agricultural and industrial development. With the environmental information that the EMF provided for development planning the SDF changed this approach to potential agriculture due to the limitations that the environment places on development.

The limitation that environment poses for industrial development is the threat of sinkholes due to karst systems in the dolomite geology. The karst geological system can create vast caves that can cause sinkholes either through normal erosion, subtracting water in these caves through bore holes for irrigation, or in the case of industrial development overloading of the roof of these caves.

On the 27th of December 2010, the EMM announced that the first of 3000 families will have to be relocated due to dolomite (NW DDACERD and TLM, 2009). This threat of human loss resulted in the decision that the area is best suited for agriculture thereby limiting the amount of people and property in direct threat posed by the dolomite geology.

The identification of the geographical zones within the EMF enable development planning to limit the potential damage that development can impose on sensitive areas as these zones are used within the SDF of EMM to guide development. This became evident with the expansion of the urban edge along the R21 corridor to the East in order to create a 'step ladder of residential development' (Map 5). Previously the urban edge ran parallel with the R21 and industrial development would take place to the West of the R21.



Map 7: R21 Corridor

Map: 7 illustrates the potential threat for illegal development to take place Eastward of the R21 corridor without development approval would pose a significant danger to the environment as this area has large open space systems and wetlands.

The expansion of the urban edge enabled the EMM to have a 'step ladder of development' from industry and commercial to residential to an 800m buffer zone before the open space system was reached (described as the Environmental Precinct that is a development constraint zone). This enables the promotion of densification along the R21 corridor and limits the threats of sprawl that could have taken place along the R21 corridor.

The SDF of the EMM has benefitted greatly from the inclusion of the EMF and has changed to pro-actively guide development in a sustainable manner due to the environmental information available. EMM development planning will begin to place more emphasis on the EBOSS report in the revision of the SDF as it yields vast more detailed information on the natural environment than the EMF.

5.2 Tshwane ZOC

5.2.1 Research Question 1

To what extent, and how, does the EMF enable competent authorities to make proactive decisions regarding the development of land?

The ZOC EMF is a consolidation of all relevant environmental information for the CoTMM (CoTMM-Com-E-1). This includes environmental information such as the C-Plan, Gauteng State of Environment Report at a provincial level and at a regional level the Integrated Waste management strategy, Green Infrastructure and Facilities Guidelines, Biodiversity Strategy, Strategy for Sustainable Use of flora for traditional medicinal purposes, Environmentally Sustainable Framework for Urban Agriculture, Tshwane Open Space Framework (TOSF). All of these strategies are used as baseline information within the ZOC EMF. The ZOC EMF therefore incorporates all relevant environmental information for development planning into one document. The different environmental data is also available in a GIS database in order for higher detailed maps that can be layered over one another (CoTMM-E-1, CoTMM-EAP-1). This is to enable development planning to see all relevant environmental and non-spatial data for the formulation or revision process of development plans and policies.

One of the objectives of the TOSF, which later formed part of the baseline information for the development of the ZOC EMF, was to create a detailed data and information base on all the available open spaces within the CoTMM area. These open spaces include conservation areas, strategically important open space resources as noted within the C-Plan. This identification of open space also established the physical and economic resources of these open spaces for the CoTMM. The identification of these open spaces enabled development planning to manage the development along these open spaces (CoTMM-E-1, CoTMM-EAP-1). Within the formulation of the ZOC EMF as a provincial competency final decision was taken by the MEC to use the C-Plan information layers as they presented the 'bigger picture' that the EMF has to be in line with (CoTMM-Com-P-1, CoTMM-Com-E-1, CoTMM-EAP-1). The TOSF layers were used for reference due to the accurate local delineation of the area.

The TOSF developed principles and policy statements as a basis for consistent and integrated decision making within development planning on issues that affected the open space resources (CoTMM-Com-P-1, CoTMM-EAP-1). "Development applications must be based on a thorough understanding of the receiving open space and natural environment" (TOSF Volume 2, p119). This means that any development that is within or adjacent to an Open Space network must be compatible to the function and the aesthetics in terms of land-use, scale, massing, spatial interaction, appearances and landscaping. The development must further contribute to the protection and enhancement of the open space network without harming the open space in any way.

These principles and policy statements would also be used for informing land use and infrastructure development. Effective and collaborative development planning is one of the key objectives for the management framework of the TOSF.

5.2.2 Research Question 2

To what extent, and how, does the EMF contribute environmental information to development proposal evaluation?

The identification of environmental constraint zones within the ZOC are defined according to their environmental attributes that are linked to environmental parameters (CoTMM-EAP-1, CoTMM-PS-1). This means that within a development proposal the activities that have been identified within the constraint areas specify what activities require further investigation from an environmental perspective within a Basic Assessment Report, Scoping Report or Environmental Impact Assessment.

Further environmental investigation of these activities enables the development proposal such as township development, rezoning, industrial or commercial to have a focused approach on what are important environmental issues within these areas (CoTMM-EAP-1, CoTMM-PS-1, CoTMM-PS-2). This enables the limitation of repetitive environmental information within the environmental assessment of the proposed development.

5.2.3 Research Question 3

To what extent, and how, has the EMF improved the SDF of the competent authority through the identification of development constraint zones and the development of guidelines for development constraint zone management?

The EMF of the ZOC plays an important role within development planning as a decision support tool and consolidation of environmental information (CoTMM-Com-P-1, CoTMM-E-1, CoTMM-Com-P-2). However, the SDFs of the area have incorporated the TOSF of 2005 that introduced environmental considerations into the preparation process of the regional SDFs for the area before the development of the EMF.

The combination of using the C-Plan and the TOSF as sensitivity analysis of the ZOC identified protected environments (similar to constraint zones in EMF) (CoTMM-E-1, CoTMM-EAP-1, CoTMM-PS-1). These protected environments were introduced as a regulator and a buffer zone between development and the special nature reserve, world heritage site, nature reserve and areas that are sensitive for development due to biological diversity, natural characteristics, scientific and other

environmental goods and services (CoTMM-Com-P-1, CoTMM-E-1, CoTMM-EAP-1). The TOSF also identified areas that need to be protected for ecosystem functions outside of the nature reserves that have an ecological importance (CoTMM-EAP-1, CoTMM-PS-1). Controlled change in land use within these areas are of great importance as the development within these areas can, if not managed correctly, cause harm to these sensitive environments.

The incorporation of the C-Plan and TOSF amongst other environmental data within the EMF determined constraint zones with development parameters. These indicate the environmental sustainability of land for various types of land uses or activities within the CoTMM.

These parameters are not a rigid blue print plans but rather indicates the specific environmental requirements that must be met within the development applications for proposed development within the area (GDACE and CoTMM, 2008).

Environmental constraints within the ZOC are categorised within five categories namely (GDACE and CoTMM, 2008):

- Areas with high natural feature constraints
- Areas with medium natural feature constraints
- Primarily residential areas
- Low to no constraints
- General management parameters for the ZOC area

The constraint zone classified as areas with medium natural feature constraints can be described as areas that consist mostly of degraded natural areas and natural floodplains. These areas can serve the function as future viable sized open space areas. In certain situations, using these zones for development is a viable option. In the example of areas with medium natural feature constraints development parameters are used to guide development. These development parameters are divided into 3 categories namely:

- Land uses and activities that are compatible and may be allowed without further assessment. For example; conservation and related facilities and

infrastructure, urban open space with recreation activities that are appropriate to the areas with high natural constraints

- Land uses and activities that may be compatible (depending on the specific nature of land use or activity) that may be considered after an appropriate level of impact assessment (as required by law). For example; urban development, excluding industrial use, that utilise the area to create transitional areas between and essential bulk sewer and storm water infrastructure.
- Land uses and activities that are not appropriate for these areas. For example; any type of industrial use and any type of high density or high intensity use that ignores the transitional nature of these areas.

The identification of these areas contributes to the SDF of the region in proactively guiding desired development within these areas. The identification of ridges in accordance with GDACE and the Environmental Management Section of the CoTMM and the C-Plan identification of irreplaceable sites within the SDF enable development planning to promote lower density within the SDFs along these areas in order to create a buffer zone between the built and the natural environment. The EMF brings all these strategies together and represents it in a spatial format that can be used by the competent authority into making adequate decisions on how the SDF of the area will be revised.

Due to the ZOC EMF being a detailed plan compared to other EMFs in this research, the ZOC EMF has a high detailed representation of the constraint zones and the interaction with development. Due to the high level of detail, implementation of the EMF would require additional strategies. These strategies include:

- General protection of high quality natural vegetation and hydrological areas and features;
- Development and densification according to the relative sensitivity of land;
- Protection of sensitive environmental features on large properties; and
- Protection of sensitive environmental features on and surrounded by small properties.

The ZOC EMF will not be used in future SDF revision. This is due to the TOSF giving erf specific environmental information that can guide develop planning plans and policies such as the SDF on a much finer scale (CoTMM-Com-P-1).

5.3 Tlokwe EMF

5.3.1 Research Question 1

To what extent, and how, does the EMF enable competent authorities to make proactive decisions regarding the development of land?

The environmental information has been sourced from various organisations and institutions that include NW DACERD, Tlokwe Local Municipality, various national and provincial departments, research organisations and consultancies (Tlokwe-Com-P-1, Tlokwe-EAP-1, Tlokwe-PS-1). In addition, non-spatial information was recorded and organised in a GIS database which includes the following:

- Development and land-use information such as, building information and utilities services information, and
- Social and economic information

The EMF enables development planning to take cumulative effects of development into consideration when formulating development parameters and development plans and policies such as the IDP and SDF are drafted and reviewed (Tlokwe-Com-P-1, Tlokwe-Com-E-1). One such case was along the Vaal River where a large scale township development proposal was handed in. The development proposal was for approximately 3000 cluster homes along the Vaal River. Since the proposed development would take place within a constraint zone town planning officials and environmental officials were concerned about the affects on the Vaal River. Officials decided to do a scoping report of the cumulative affects of the proposed development (Tlokwe-Com-P-1, Tlokwe-Com-E-1, Tlokwe-EAP-1). The cumulative effect scoping report of the proposed development was found to have severe impacts on the river and the development had to adopt development parameters before it would be approved. For EMF this process of adopting EA information on proposed and approved developments as part of the environmental information used within the EMF enable the EMF to have a small scale (property

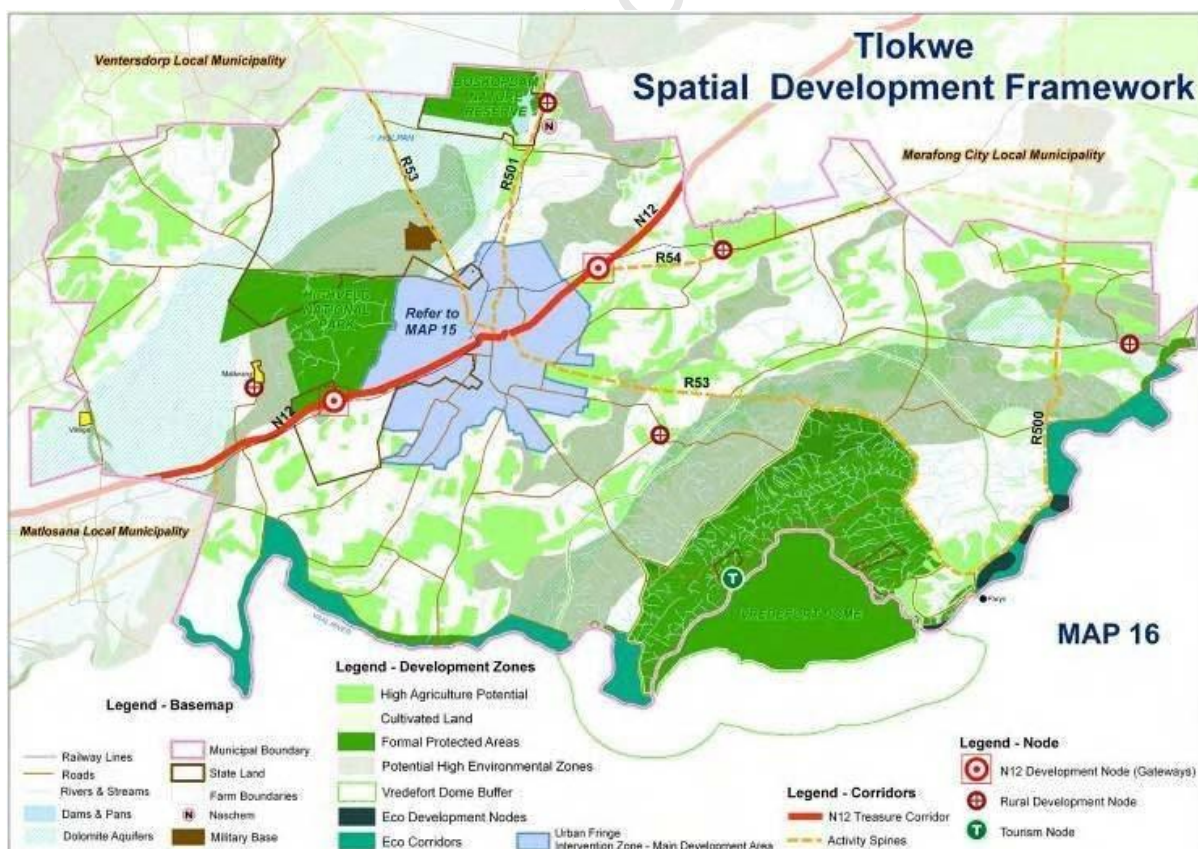
specific) database as well as focusing on the broader picture (Tlokwe-Com-E-1, Tlokwe-EAP-1, Tlokwe-PS-1).

The EMF enables a consistency between spatial planning and environmental management in order to minimise conflict and enables easier and consistent decision making (Tlokwe-Com-P-1).

5.3.2 Research Question 2

To what extent, and how, does the EMF contribute environmental information to development proposal evaluation?

The EMF of Tlokwe has formed an environmental guideline for the IDP spatial component that enables an illustrative presentation (Map 5) for the viability and desirability of future development (Tlokwe-Com-P-1, Tlokwe-EAP-1). The EMF informs development proposals proactively in what development may or may not be supported within specific areas (Tlokwe-PS-1).



Map 8: Potential spatial conflicts (TLM EMF, 2008)

Development strategies, such as development nodes, corridors and the urban edge (Map: 8) of the TLM are further enforced through environmental information identifying potential agricultural areas and other development parameters such as ecological corridors. The strengthening of such development planning strategies would also require the management of public and private open space within the Tlokwe Municipality.

5.3.3 Research Question 3

To what extent, and how, has the EMF improved the SDF of the competent authority through the identification of development constraint zones and the development of guidelines for development constraint zone management?

Tlokwe's EMF is described as a living report (Tlokwe-Com-P-1, Tlokwe-Com-E-1). This means that the EMF incorporates new environmental information into the framework as it becomes available. One such example is the expansion of the dolomite areas as new information becomes available compared to initial studies by provincial department. Dolomite within the area forms part of the karst system that extends as far as Limpopo and Mpumalanga provinces. The identification of this karst system and other dolomite in rural areas drastically affected the SDF of Tlokwe and their housing policy. If housing development would have been developed it could pose a serious concern for peoples' wellbeing.

The EMF of Tlokwe emphasises the management of prominent environmental features and resources against negative impacts from human related activities in order to ensure sustainability through the SDF. These environmental features include the existing protected areas, conservancies, dolomite aquifers and dolomite eyes, karst systems, ridges, wetland areas, areas of high biodiversity and agricultural land. These environmental features have a direct impact on the North West SDF, Zoning Plan and Housing Policies. The inclusion of these issues within the SDF enables the management of urban development on hills, ridges (Ikageng, Mohadin areas) and minimises impacts on rivers and streams (Mooi River and Wasgoedspruit).

The objectives of the EMF for the Tlokwe municipal area are implemented through applicable, practicable and implementable parameters. These parameters typically inform as to how a resource must be managed, and what should be avoided. These parameters contribute to the development of risk management for risk areas to form part of EMF in future and therefore will have great affect in setting development parameters.

University of Cape Town

6. Chapter 6: Discussion of Findings

The following chapter will be a discussion on the previous chapter's findings. This discussion will be structured according to the normative objectives for EMFs.

6.1 Provide a mechanism and decision support tool for the study area (identification of geographical areas) for competent authorities.

Within the three EMFs of the respective municipal areas the EMFs have provided a mechanism and decision support tool for the competent authorities. However, in the cases of CoTMM and EMM, the use of environmental information by competent authorities has been promoted by GDACE Gauteng State of Environment Report and TOSF for some time. These strategies, predating introduction of EMFs have been of great importance as the contribution of these strategies have helped to refine environmental information and strategies within the Gauteng Province. The development of EMFs of for the CoTMM and the EMM have added value to the environmental information available through consolidation of these different strategies within the EMF documents, maps and GIS data.

In the three cases, the EMF has been able to achieve this normative objective through its assessment of the environments status quo and baseline information such as the C-Plan. The identification of sensitive geographical areas in terms of the NEMA 2006 has provided lists of activities that should either be included or excluded within a Basic Assessment Report, Scoping or EIS.

Coupled with the identification of geographical areas, development parameters were developed within the three case EMFs. These areas indicate the environmental suitability of the bio-physical environment of land parcels for various types of land uses and activities. The EMF is not a strict master plan that limits development but rather indicates the minimum environmental requirements that must be met before the proposed development application can be considered.

The EMF of the different cases have refined development policies such as the urban edge policies and development initiatives such as the R21, N4 and N14

corridors. Tlokwe's EMF has contributed to the refinement of the housing policy within the area due to the identification of development parameters such as dolomite within areas that have been allocated for housing projects.

Competent authorities have however stated that the term development constraint zones (sensitive geographical areas) have had a negative connotation when promoting the EMF to developers and other stakeholders. In practice they have promoted the term Development Parameters in geographical areas. These development parameters include and exclude certain development in geographical areas, but are not always illustrated in the EMF, rather, the promotion of GIS on small scale has taken place for case specific development parameters. This small scale approach is found in the TOSF and EBOSS reports. Tlokwe municipality has started with this smaller scale approach and will continue to incorporate new information as it becomes available.

One common limitation that accorded within the cases of EMM and the ZOC EMFs is the lack of understanding of the EMF by planning officials. Many development planning officials do not know about the influence of the EMF on development plans and policies and regard the EMF as only applicable to the environmental side of development planning. This limitation can hinder the EMF's ability to fully achieve this normative objective. It must be noted that within the case of TLM that has a much smaller amount of planning officials and decision makers the understanding of the influence of the EMF on development plans and policies is higher.

The three case EMFs have achieved this normative objective, but the use of EMFs face a challenge of expanding the understanding and knowledge about this tool within the local authorities and the community.

6.2 Facilitates effective and efficient decision making through an EMF functioning as a repository for integrating all relevant and viable spatial information into a single workable platform.

In all three cases, officials, consultants and environmental practitioners emphasised the ability of EMFs to integrate the spatial environmental information of different policies of different schools of thought into a single platform. This has limited the time spent by officials, consultants and environmental practitioners analysing different policies on environment, development, conservation and developing an implementation strategy with sustainability objectives.

According to all three consultants that worked on all three EMFs, the amount of environmental information available was not a problem when the EMFs were in the early stages of the status quo assessment. The biggest concern was to filter out the environmental information that was not ideally suited for the objectives and aims of the EMFs.

The development of EMFs led to the development of GIS databases that will be updated as part of the implementation plan. This GIS database can be used as a platform within land use management planning. EMF formulation of guidelines, for development planning and environmental practitioners, are vital within environmental sensitive areas in order to promote sustainability. This promotion of sustainability is done through the inclusion or exclusion of certain developments and the proactive flagging of environmental attributes that has to be investigated further by the environmental practitioner involved in the development application.

The use of the GIS database by private and public sector players, however, has been limited according to officials working with the EMF in all three cases. This is due to a lack of knowledge on the tool. Ideally each person investigating the likelihood of changing land-use or proposing a new development would consult the GIS database in order to see the development parameters before a development proposal is considered.

However, though the available information can be found in GIS databases and the data is proficient, the data can still face certain limitations itself. These limitations

can be due to poor technical skills in capturing data resulting in poor documentation. This limitation of GIS can be overcome through the constant updating of the databases and making updates available to the public as soon as possible.

6.3 Provide environmental information for the development and revision of local SDFs and IDPs.

Within the two cases of CoTMM and EMM, EMFs have played an important role in influencing the SDFs and IDPs of the specific areas in the initial adoption within the development planning process. In the case of Tlokwe's EMF the EMF has influenced the housing policy of the area. However, the EMF has not been in use for a sufficient period in order to influence the SDF and IDP of the area. The Head of Town Planning at Tlokwe Municipality has stated that the EMF will be used within the revision process.

However, the EMFs in the case of CoTMM and EMM will not be used as in depth in the revision process of SDFs and IDPs as previously according to development planning officials. The reason for the exclusion of EMFs within the revision process is that the EMFs have enabled a platform for the development of much more detailed specific strategies. The EBOSS Report and the TOSF will therefore play an important role in the revision of SDF and IDPs as these strategies give officials in-depth property specific environmental information within geographical areas.

EMFs therefore provide information to guide initial development planning plans and policies. This can be seen in all three cases. However though an EMF gives environmental information in one single platform the environmental information remains at a municipal level. When SDFs are revised the ToSF and EBOSS will be used for local SDFs.

Through the inclusion of these highly detailed strategies, SDFs and IDPs will be able to address specific areas within the municipality where development will pose the biggest threat to environmentally sensitive areas. These strategies would ideally refine development parameters for geographical areas.

6.4 Provide proactive environmental information into development proposals within the identified development constraint zones.

Environmental practitioners within the three case studies have been using the EMF as a guide on what environmental issues the EIA of a development proposal within a geographical area needs to focus on. This is done to ensure that the issues identified within the EMF are addressed to guarantee these issues are taken into account within the development proposal.

Environmental practitioners, however, have stated that they are not using the EMF in such detail because it is a more strategic orientated initiative. Due to the EMF creating a GIS database with relevant environmental information that is property specific, the ability to do initial investigation on what potential environmental issues there can be with regards to a development. The GIS database also enables development officials to see multiple layers of information in order to make an informed decision.

In the case of Tlokwe Municipality, the EMF is currently used in the decision process of development planning. However, the EMF has not had the intended impact on development proposals, compared to the other cases, as of yet, since it is still a new tool being implemented.

According to above the head of development planning within all three cases the biggest issue to achieve objective is that the public does not know this strategy is available to them. Even though environmental practitioners are using the EMF to investigate and guide proposed development through the development parameters and GIS database, the biggest hurdle is that of developers not taking the importance of this strategy to heart. As a result the EMF has not fully obtained this objective.

In order to achieve this objective, public awareness needs to be increased dramatically on the availability of the EMF and GIS database to the public.

7. Chapter 7: Conclusion

This research aimed at evaluating the extent to which the normative objectives set for EMFs in the development planning process has been achieved in three selected case studies. These normative objectives of EMFs and the ability to achieve them are summarised in Table 1.

In order to investigate if the normative objectives set out for EMF were achieved in practice the research aimed to answer the research question: To what extent, and how, have local EMFs contributed to development plans and policies such as IDPs, SDFs and contributed environmental Information for decision making? The research did achieve its aim and also identified a new initiative taken to increase the effectiveness of EMFs, namely, developing new small scale property specific strategies, such as the EBOSS report, based on the GIS database for the case specific municipality. The full capability and influence of the EBOSS, the ToSF and the available GIS database is a limitation of the research. These property specific strategies can be subject to further research.

Investigating the hypothesis revealed that EMFs have given an enabling environment for more small scale strategies such as the TOSF and EBOSS to be developed that will refine the available environmental information within municipalities. This finer scale, more detailed, environmental information is aimed to guide SDFs and IDPs through the inclusion of these strategies within the EMF. The inclusion of these fine scale strategies would enable the SDF to proactively guide development from affecting small scale environmental sensitive areas. Since these strategies would form part of the EMF and therefore obtain legal stature within the development planning process.

In the researched cases the EMFs have given a legal enabling environment for the inclusion of substantial environmental information into the development planning plans and policies. In the case of the CoTMM and EMM, the EMFs have enabled the use of environmental information that was previously available and combined this information with more detailed studies. In the Case of Tlokwe Municipality EMF new

environmental information has enabled the refinement of planning policies such as the housing policy.

Table 1: Summary of EMFs achievement of Normative Objectives

Normative Objectives:	Ekurhuleni Metropolitan Municipality EMF	City of Tshwane Zone of Choice EMF	Tlokwe Local Municipality EMF
Provide a mechanism and decision support tool for the study area (identification of geographical areas) for competent authorities	Has achieved the normative objective. However faces the problem of lack of knowledge on the tool itself within the public and private sector.	Has achieved the normative objective. However faces the problem of lack of knowledge on the tool itself within the public and private sector.	Has achieved its objective. The TLM is however smaller than other cases and this can contribute to the public and private sector being more aware of the EMF
Facilitate effective and efficient decision making that is achieved through EMFs functioning as a repository, integrating all relevant and viable spatial information into a single workable platform	Achieved this objective and developed specific environmental strategies and a GIS database for the use in formulation of development plans and policies revision	Achieved this objective and developed specific environmental strategies and GIS databases for the use of information in development plans and policies formulation and revision	Achieved this objective and developed specific environmental strategies and GIS databases for the use of information in development plans and policies formulation and revision
Provide input into local SDFs and IDPs	Achieved	Achieved	Achieved
Provide proactive input into development proposals	Achieved	Achieved	Achieved

EMFs have developed as an EA tool out of SEA limitations, however, EMFs have not replaced SEA as SEA of development plans and policies is still a necessity. SEA would still be applicable after the SDFs and IDPs have incorporated the environmental information available through the EMF and finer scale strategies through assessing the SDFs and IDPs. These development planning plans and policies are still subject to assessment and this is where SEA still has a fundamental role to play in order to assess the environmental implications of these strategies. SEA will thus assess the sustainability of the development plans and policies, after they have incorporated the different environmental information, and the approach that development planning has taken to achieve this.

The integration of IEM and sustainability principles has been one of the key issues faced by EA and the development planning process. The research found that through the incorporation of effective EMFs into development plans and policies such as the SDFs and IDPs the integration of IEM and sustainability principles has been encouraged.

It is the researcher's view from the research conducted that EMFs can achieve the normative objectives set out effectively and create an enabling environment for smaller scale environmental strategies. However, the lack of understanding of how an environmental strategy such as the EMF does contribute to development planning process within private and public sector is of concern. Some Officials do not know what an EMF contributes to development planning process is and some private sector individuals do not care if EMF has identified certain constraints. They want to develop at all costs even if there is an attempt from competent officials to engage and give the environmental information to the individuals in order to minimise conflict between development and the natural environment.

In the future, when effective EMFs for municipal areas are formulated, the EMFs will enable the development and inclusion of fine scale site specific plans within the development planning process. These plans can contribute to fine scale development planning and form an important role in PPPs for environmental sensitive areas. These plans can proactively address biodiversity issues rather than reactively.

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10. Appendix 1

Background to familiarise researcher with EMF

- The need for EMF in the Zone of Choice (ZoC)?
 - Why was the ZoC identified for the EMF (the importance behind the ZoC)?
- Who compiled the ZoC for the government authority (public/private partnership, private)?
- When was the EMF used within development planning for the first time?
- During the development of the EMF was development planning involved from the beginning?

Normative objectives of EMFs include:

- Provision of a mechanism and decision support tool for the study area (identification of geographical areas) for competent authorities (National and Provincial).
- To facilitate effective and efficient decision making through the EMF functioning as a repository, integrating all relevant and viable spatial environmental information into a single workable platform.
- Provide input into local Spatial Development Frameworks (SDF) and programmes.
- Provide proactive input into development proposals.
- Provide a secondary platform to systematic conservation planning process with the identification of environmental sensitivity to assist in establishing priorities for conservation planning and resource management (DEA, Unknown Date).

Questions related to normative objectives:

- Proactive decision support tool
 - To what extent, and how, does the EMF enable competent authorities to make proactive decisions regarding the development of land?

- Proactive input into development proposals
 - To what extent, and how, does the EMF contribute regarding development proposals/projects within the IDP?
- Improve SDF by identifying constraint zones and developing guidelines for constraint zone management
 - Has the EMF informed the development of SDF of the competent authorities?
 - If so how was the EMF used to inform the SDF?
- Contribution to conservation planning and resource management
 - How has the EMF's inclusion within the SDF contributed to identifying or add to conservation areas and resource management being identified or extended?

Additional Questions for Structured Interview

- What does future development planning use in their revision process of SDF and IDP?
- What is the structure used to develop a SDF (Municipal Systems Act have called for SDF to be developed but little to no guidance was given to methodology involving other departments).
- What does the future hold for EMF in the development planning process? (Less large scale and more refinement, just revision of the EMF within the planning process).