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Environmental Impact Assessment follow-up in South Africa: Critical analysis of predictions and compliance for the Mooi River Mall case study

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This is dedicated to the people I love, who truly believed I could pull through even though life is filled with adversities and tribulations.

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ACRONYMS/ABBREVIATIONS

"CBD": Central Business District

"CEA": Cumulative Effects Assessment

"CEM": Centre for Environmental Management

"EA": Environmental Authorisation

"EAP": Environmental Assessment Practitioner

"ECA": Environmental Conservation Act, 73 of 1989

"ECO": Environmental Control Officer

"ELO": Environmental Liaison Officer

"EIA": Environmental impact assessment

"EIS": Environmental Impact Statement

"ELC": Environmental Liaison Committee

"EMF": Environmental Management Framework

"EMP": Environmental Management Plan

"EMIs": Environmental Management Inspectorates

"EMS": Environmental Management System

"EO": Environmental Officer

"DEAT": Department of Environmental Affairs and Tourism

"IEM": Integrated Environmental Management

"ISO 14001": International Standard Organisation

"IUCN": International Union for Conservation of Nature

"MRM": Mooi River Mall

"NEMA": National Environmental Management Act, 107 of 1998

"NCR": Non-compliance report

"RoD": Record of decision

"RSA": Republic of South Africa

"SEA": Strategic Environmental Assessment

"US NEPA": United States National Environmental Policy Act

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ABSTRACT

Environmental Impact Assessment (EIA) is recognised worldwide as a tool for identifying the potential adverse effects of a proposed development on the environment. Very little attention has been given to determining the actual environmental effects resulting from a development. The need for EIA follow-up (i.e. monitoring, auditing, evaluation, management and communication) was identified and would form the building blocks within the EIA process. Follow-up provides information about the consequences of an activity and presents opportunities to implement adequate mitigation measures. EIA follow-up is not developed to its full potential even though the need for it is acknowledged and supported in legislation, scientific journals and scientific books. EIA follow-up necessitates feedback in the EIA process to ensure lessons learnt and outcomes from past experiences can be applied in future actions. Follow-up is only a legal requirement if conditions are specified in the environmental authorisation (EA).

Of particular concern to follow-up is the accuracy of prediction and secondly, the level of compliance to conditions set out in the authorization and management plans. This study will focus primarily on critically analysing predictions and compliance from the construction phase of a high profile mega shopping mall project, namely the Mooi River Mall (MRM), with an analysis to gauge the actual effect and contribution of the EIA process to decision making and implementation practices. Multiple data sources were used to determine the accuracy of predictions and legal compliance level of the Mooi River Mall.

The Mooi River Mall's accuracy of predictions (66%) and legal compliance (83%) suggest that some of the impacts were unavoidable; that mitigation measures were either not implemented or identified or that EIA follow-up served its purpose in the form of implementing effective auditing programmes to monitor legal compliance.

Keywords: Accuracy of predictions; Environmental Impact Assessment (EIA); Environmental Authorisation (RoD); EIA Follow-up; Legal Compliance.

1. CHAPTER ONE: INTRODUCTION

1.1 SETTING THE SCENE

During the 1970s it became apparent that the environmental impacts and consequences of development activities need to be considered at all levels of decision making. This need was first addressed at the United Nations Conference on the Human Environment in Stockholm in 1972, whereby the casual relationship of poverty, the environment and development were highlighted (IUCN, 2006:1).

After the advent of democracy in South Africa in 1994, environmental matters and international trends were coming to the forefront. Radical law reform processes, new governance systems and significant planning and decision making processes followed after 1994 (Sowman & Brown, 2006: 695).

Environmental issues have found their way into legislation such as the Bill of Rights in the South African Constitution of the Republic of South Africa, Act 108 of 1996 and the National Environmental Management Act, 107 of 1998 (Glazewski, 2005: 76-81 & 137-141; RSA, 1998: 1-37; RSA, 1996:7-8). Section 24 of the Bill of Rights represents the so-called 'environmental clause' which makes provision for the environment to be protected through reasonable measures. Environmental impact assessments (EIA) have been introduced as such a measure to give effect to Section 24.

EIA has been present for a number of years in South Africa, dating back to the early 1970s during which time voluntary EIAs were conducted for large infrastructure projects (Mafune *et al,* 1997; Glazewski, 2005:235). The first EIA legislation emerged in 1997 (RSA, 1997), to assess environmental impacts at project level.

EIA is considered one of the most successful policy interventions of the last decade in South Africa (Kidd and Retief, 2009). The primary purpose of EIA is to provide decision-makers with an indication of the likely environmental consequences of their actions, ensuring developments proceeds in an acceptable manner (Wood, 2003). It is also used to put management measures in place to address potential environmental impacts and to reduce them. According to literature, environmental assessment is concerned with political choices, effective communication and the provision of information, as a basis for decision making processes (Kornov and Thissen, 2000:191-194). Ultimately, EIA is a policy implementation instrument designed to help improve the basis on which decisions are made (Bartlet, 1988:73; Bartlet, and Kurian, 1999:415).

Internationally, the importance of post decision follow-up after the completion of an EIA is not considered nor monitored (Lee and George, 2000:177).

1.2 PROBLEM STATEMENT AND SUBSTANTIATION

The emphasis of an EIA is on the stages leading up to environmental authorisation or the Record of Decision (RoD), as it is referred to under the Environment Conservation Act, 73 of 1989 (RSA, 1989:10), but there is little concern for successive monitoring and auditing to ensure that mitigation measures, conditions and/or recommendations of the EIA are put into practice. This lack of concern is not only evident in South Africa, the absence of EIA follow-up appears to be a worldwide occurrence as noted by Wood (1999:52-59), Arts (1998: 535), Baker & Dobos (2001). Follow-up (i.e. monitoring, auditing, evaluation, management and communication) should be made an integral part of an ongoing process of integrated environmental management to ensure a project can be successful (DEAT, 2008:111).

EIA follow-up in South Africa is not deemed mandatory in environmental legislation unless highlighted in the permit conditions of the authorisation issued by governmental departments (Hulett & Diab, 2002:298). The Integrated Environmental Management guidelines of South Africa focus mainly on compliance monitoring; environmental monitoring; and auditing. It is a vital requirement during the EIA implementation stage that the latter must be met, however none of these practices are legally required and EIA follow-ups are therefore undertaken on a voluntary basis (Hulett & Diab, 2002: 298).

The Environment Conservation Act (ECA), 73 of 1989, including the EIA regulations which were promulgated under this Act in 1997, neglected EIA follow-up. Moreover, it was only partially considered under the new National Environmental Management Act (NEMA), 107 of 1998 (section 24 (7)(f)) requiring the *"investigation and formulation of arrangements for the monitoring and management of environmental impacts*" (Hulett & Diab, 2002:298). Hill (2000:50-54) stipulates that the lack of regulations on EIA follow-up constitutes a retrograde step for environmental management in South Africa.

In 2004 the National Environmental Management Second Amendment Act, 8 of 2004 came into effect in 2005 and replaced section 24 of NEMA with a different set of EIA rules for South Africa (Glazewski, 2005: 217). Additional regulations were promulgated in 2006 which prescribed the new legislative process that needs to be followed when conducting an EIA (RSA, 2006a; RSA, 2006b; RSA, 2006c). The 2006 EIA regulations have made provision for EIA follow-up however, the implementation thereof has been inadequate. As described by Arts *et al*, (2001:

176) the follow-up mentioned above relates to the follow-up of individual plans and projects and does not directly narrate to the evaluation of the overall EIA process.

Even though pre-decision analysis associated with an EIA is a requirement, it is an insufficient condition for sound planning, decision making and management, evidently creating uncertainties and gaps in knowledge and/or understanding that could lead to considerable differences between project plans and their implementation (Arts *et al*, 2001:176*).* It is therefore not the predicted impacts but the real effects on the environment that make the difference to environmental quality and sustainability.

Follow-up provides information about the consequences of an activity taking place at that point in time and gives the responsible parties the opportunity to implement adequate mitigation measures. One could consider follow-up as the missing link between EIA and project implementation (Arts *et al*, 2001: 176). Lee & George (2000:177) place emphasis on the role of EIA follow-up by stating that *"If the road to hell is paved with good intentions, environmental assessments which end at the decision-making stage make costly and misleading paving stones. Their good intentions are likely to come to nothing if they are not monitored"*.

Of particular concern to follow-up is the accuracy of prediction and secondly, the level of compliance to conditions set out in the authorization and management plans. These two aspects lie at the heart of post-decision actions and subsequent effectiveness of EIAs and have not received the required attention in the South African environment (DEAT, 2008:117). Therefore, this research aims to conduct a critical analysis of predictions and compliance, with a view to gauge the actual effect and contribution EIAs are making to decision making processes and implementation of projects. Due to the difficult methodological challenges this type of research presents, the analysis will focus on the construction phase of a high profile mega shopping mall project, namely the Mooi River Mall (MRM) development situated in the North West Province in the town of Potchefstroom. It is worth mentioning here that the Mooi River Mall impact assessment was done in 2005/2006 and the 1997 EIA regulations promulgated under ECA 1989 was used and not the new EIA regulations.

1.3 RESEARCH AIM AND SUB-QUESTIONS

The following research aim and questions will be addressed by this study. .

1.3.1 RESEARCH AIM

To conduct a critical analysis of the accuracy of EIA prediction, and the level of compliance to environmental authorization requirements, for the construction phase of a mega project.

1.3.2 RESEARCH QUESTIONS

In order to address the overall research aim the following research questions have been identified:

1. What is the state of knowledge on EIA follow-up in South Africa?
2. Did the predicted impacts after mitigation described in the EIA report materialize during the construction phase of the Mooi River Mall (MRM) development?
3. Did any unforeseen impacts associated with the case study occur that was not predicted in the EIA?
4. What was the level of compliance to the environmental authorization during the construction phase?

1.4 STRUCTURE OF DISSERTATION

Table 1 (see page 15) provides a summary of the structure of the dissertation by linking the research aim and questions, with the chosen research methodology as well as the steps in the research process. To allow for easy reference the table also clearly links the research questions with specific chapters.

1.4.1 THE FRAMEWORK OF THE STUDY

Chapter 1 sets the scene and provides justification for the research.

Chapter 2 describes the manner in which the analysis was conducted and what sources were accessed to address the research aim and questions as established in this chapter. The research design is subsequently discussed followed by a description of the methods of data collection, the samples and the analytical strategies. The chapter is concluded by discussing the validity and reliability of the study, taking into consideration certain ethical aspects and limitations to the research.

Chapter 3 discusses relevant literature relating to EIA, environmental authorisation (RoD), decision making models and risk factors for the construction of a mega project.

Chapter 4 presents the research results obtained from the collected data, followed by a critical analysis of the data.

Chapter 5 discusses, reflects and considers the literature review and findings to address the research aim. Recommendations for future research are discussed in detail. In conclusion, the dissemination and final thoughts of the study are presented.

Table 1: Structure of the Dissertation

RESEARCH QUESTIONS	METHODS		RESEARCH PROCESS	CHAPTERS	
What is the state of knowledge on EIA follow-up in South Africa?	Literature review: • International and national sources; • Legislation pertaining to EIA; and • Review of single case studies.	Phase 1: Define and design	Step 1: Conduct literature review. ↓ Step 2: Establish database of relevant sources.	Chapter 3: Literature review	Chapter 1 and 2: Introduction and methodology
Did the predicted impacts described in the EIA report materialize during the construction phase of the Mooi river development?	Multiple sources of data was used (documentation such as inspection records; specialist reports, meeting minutes) to compile a database to analyse the data.	Phase 2: Prepare, collect and analyze	Step 3: Collect multiple sources of evidence such as: • documentation (minutes, EMP, EIA report, specialist reports, maps and photographs, and non-compliance certificates); • focused interview (think tank meeting); and • direct observation (site inspections and Environmental Committee meeting). ↓ Step 4: Establish database of predicted impacts and compliance activities. The data will be analysed and possibly presented in a table format.	Chapter 4: Data analysis and discussion	
Did any unforeseen impacts associated with the case study occur that was not predicted in the EIA?	A focused interview held to identify whether unforeseen impacts did occur.				
What was the level of compliance to the environmental authorisation (RoD) during the construction phase?	The Record of Decision and non-compliance reports used to determine the level of compliance.				
RESEARCH AIM To conduct a critical analysis of the accuracy of EIA prediction, and the level of compliance to environmental authorization requirements, for the construction phase of a mega project.		Phase 3: Conclude	Step 5: Reflect on literature review and research results.	Chapter 5: Conclusion	

2. CHAPTER TWO: METHODOLOGY

This chapter describes the research design and methodology aimed at addressing the following research aim:

> *"To conduct a critical analysis of the accuracy of EIA prediction, and the level of compliance to environmental authorization (RoD) requirements, for the construction phase of a mega project".*

The research design will be discussed followed by an outline of the selected methods of data collection and analysis. Issues of validity and reliability will subsequently be considered related to the study highlighted.

2.1 RESEARCH STRATEGY AND APPROACH

In order to address the research aim and questions described in Chapter 1, the research relied on a flexible single case study design making use of multiple sources of data. It is a qualitative research study that preserves chronological flow from which constructive explanations can be derived. In view of the data requirements the research followed a single case study approach. This approach has been commonly used in follow-up and effectiveness research, mainly due to the detailed and extensive context specific data typically required for research questions dealing with such themes (Miles and Huberman, 1994:1; Yin, 2003: 1-2).

2.1.1 CASE STUDY RESEARCH

The Mooi River Mall was selected as a **single case study** in line with 'replication logic'. Such logic typically expects results for one case to reasonably replicate for other similar cases within similar contexts (Robson, 2002:182; Yin, 2003). Case studies have until recently been considered a "soft option" compared to "meticulous experiments/surveys". However, Robson (2002:180) puts emphasis on case studies being a fundamental research strategy with its own designs rather than being a flawed experimental design. It is therefore not surprising that case study research has been a common strategy in many applied fields of research and basic disciplines for example: psychology, social studies, urban planning, etc (Yin, 2003:1).

2.1.2 DESIGN

The research design as mentioned above for the Mooi River Mall, followed a "***flexible design"*** path, which is mainly characterized by having a rigorous data collection procedure, accessing

different data sources and ensuring that the complexity of the research is truly reflected and communicated (Robson, 2002: 166).

2.1.3 MULTIPLE SOURCES

"Multiple sources" of data was collected from the mega project's construction phase, which formed part of the triangulation strategy. Triangulation means using different methods to collect data on the same subject, allowing findings to be compared and be verified accordingly. In using the triangulation strategy, possible threats to the validity of the study can be reduced by enhancing the research design (Robson, 2002: 175).

2.2 CASE STUDY DESCRIPTION

The case study selected for this research is a single storey, enclosed, retail mall consisting of offices which covers a total extent of approximately 40 000m^2 with associated basement parking. Approximately eighty percent of the mall was closed and air conditioned and 20 percent is open space facing the parking area. The mall is located in close proximity to the Central Business District (CBD) of Potchefstroom in the North West Province. It is near to and visible from the N12 with public transportation nodes (refer to Figure 1 and Figure 2: CEM, 2005:50). The Mooi River Mall has been constructed over the Mooirivier which is a perennial stream, fed by various springs. The water is used for industrial (mining) and domestic application with some water supplied to irrigation systems along the River (CEM, 2005:52). It is worth noting that the Mooirivier is heavily transformed and stressed in some locations due to water pollution but is however still functional (CEM, 2005: 53). Construction of the Mooi River Mall did present significant challenges in ensuring the river's ecology and functionality is not negatively affected to such an extent so as to render the water unusable in future.

The Mooi River Mall development was a listed activity in terms of section 21 of the Environment Conservation Act, 73 of 1989 (Old EIA regime and not current EIA regime), whereby it was highlighted as being an activity that could have significant detrimental effects on the environment which therefore required authorisation from the North West Department of Agriculture, Conservation, Environment and Tourism (NWDACET).

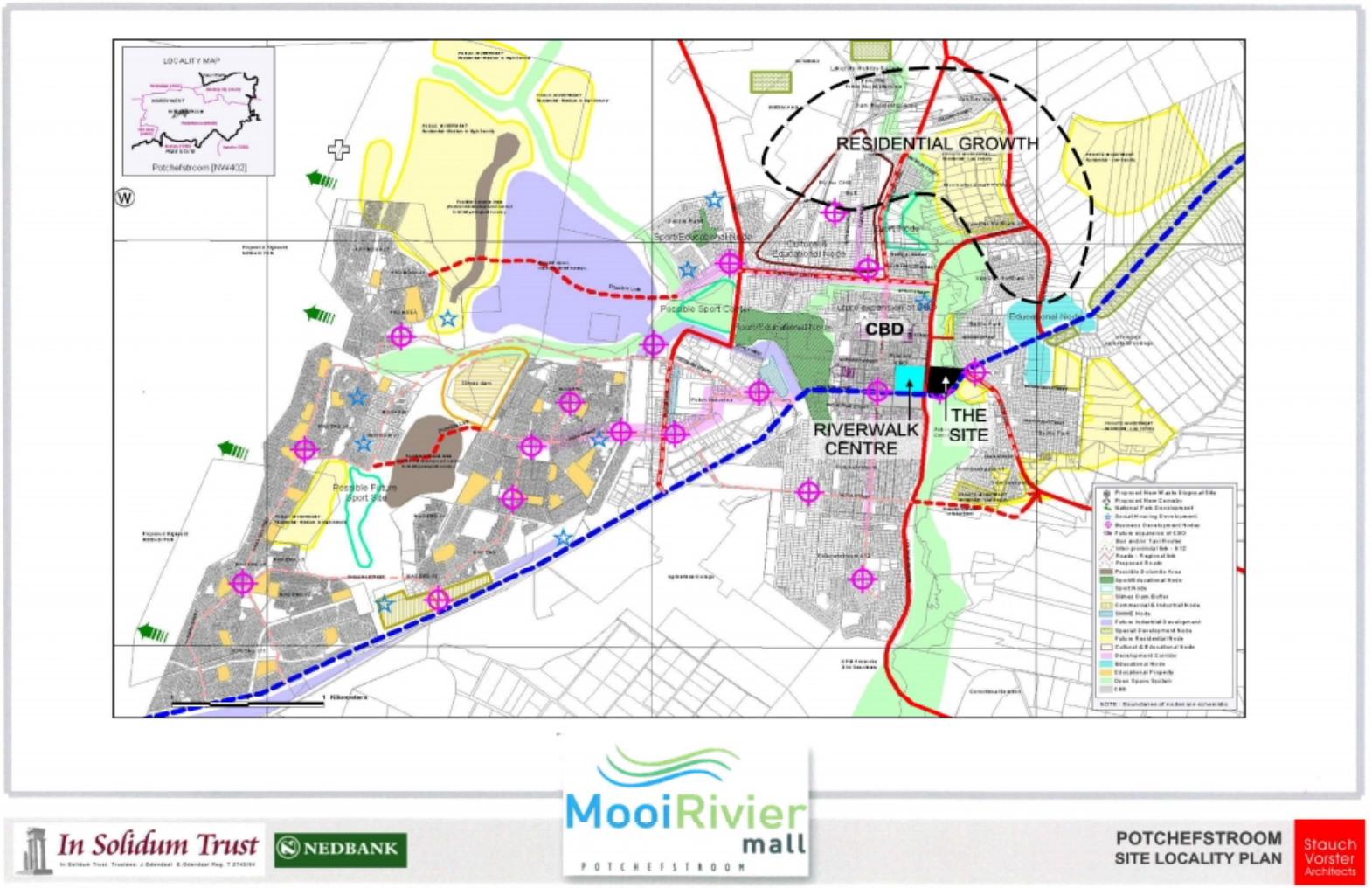

Figure 1: Site location map of the MRM development (CEM, 2005:126).

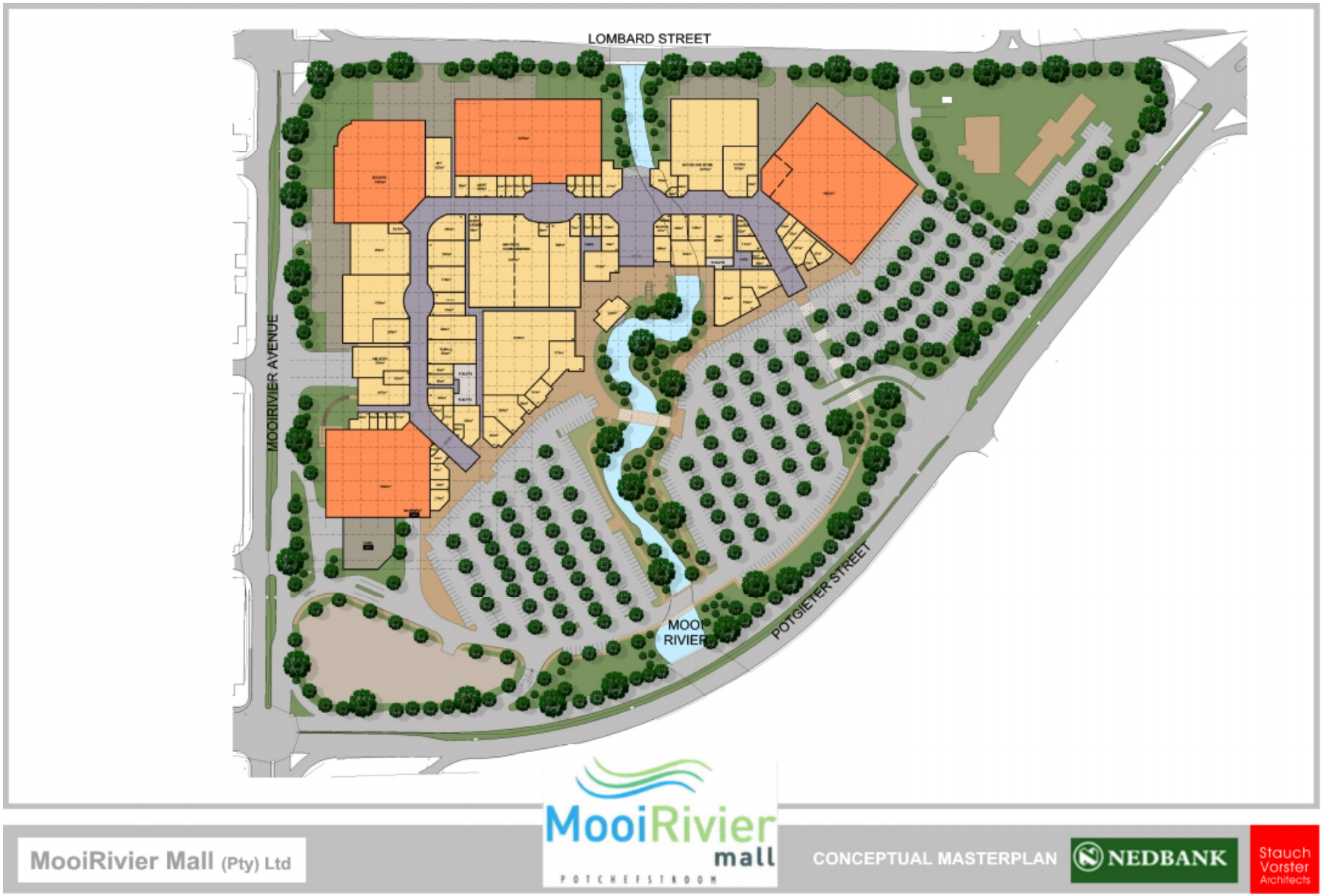

Figure 2: Modified mall design to ensure maximum functionality of the Mooirivier (with design mitigations; CEM, 2005: 134).

In summary the Mooi River Mall case study was selected for the following reasons:

- *Scale of the development:* The development represented a large infrastructure mega project (consisting out of three shopping centres) that ensures revenue is retained in Potchefstroom and to provide the people with a choice of different shopping centres instead of only two. Potchefstroom is a small city with a population consisting of 124 351 (Anon, 2007:15) and only two shopping centres namely the Riverwalk and West Acres centres provided retail facilities to the population of Potchefstroom. A one stop shopping destination was therefore lacking in the city to curb the outflow of disposable income to the other surrounding areas.
- *Extent of associated impacts:* The significant potential impacts associated with the development attracted many concerned stakeholders. By building this mega project, part of the "green belt" of Potchefstroom could potentially be lost. The proposed development would be within 1:50 and 1:100 flood lines that could potentially lead to water impacts, flood related incidents and safety hazards. During the course of this project, other significant environmental impacts such as surface and ground water pollution; air pollution; increase in traffic on the roads etc. could transpire.
- *EIA requirements related to the development:* The development required environmental authorisation in the form of a Record of Decision (RoD) as this development is defined as a listed activity (2c) in terms of section 21 of the Environment Conservation Act (ECA), 73 of 1989.
- *Record keeping:* As part of the permit conditions, the permit holder was required to ensure that records were kept on file and in good working order. These records were made available to interested and affected parties (I&AP) if and when requested. The availability of records played an important role from a methodological perspective.
- *Access to information:* Information such as the EIA, EMP, audit reports, checklists, etc. was readily accessible due the permission granted by the CEM whereby the EIA and ECO function was fulfilled.

2.3 METHODS AND DATA ANALYSIS

2.3.1 DATA SOURCES

To be able to address the research aim, research questions and to reach a conclusion, data sources were identified and information gathered for the construction phase of the Mooi River

Mall. The data sources are depicted as tiers in Figure 3 (see page 21) to illustrate the complexity of the study and to eliminate any confusion that might arise when the different sources are triangulated (Robson, 2002: 174). Additionally, tiers were selected to ensure the levels in management difficulty are clearly distinguishable, with Tier 1 being less difficult to manage and tier 4 the most difficult and challenging tier.

Figure 3: Data source Tiers

TIER 1: LITERATURE DATABASE/REVIEW

Literature review can be defined as: "*the selection of available documents (both published/unpublished) on the topic, which contain information, ideas, data, and evidence written from a particular standpoint to fulfil certain aims or express certain views on the nature of the topic and how it is to be investigated, and the effective evaluation of these documents in the relation to the research being proposed*" (Hart, 1998:13). This definition enables the investigator to make use of an array of sources to critically analyse a research topic. It was

therefore decided that a basic literature study/review be performed on EIA follow-up making use of international as well as national sources and legislation.

TIER 2: MULTIPLE SOURCES

Multiple sources of data were used. Triangulation of the data provided the validity required to determine the accuracy of prediction as well as legal compliance. Verification of data was only done by the using the sources mentioned below. No questionnaires as well as interviews were considered as part of the scope of the study and could be used in future planned projects. The data used included:

- Environmental Liaison Committee (ELC) Minutes,
- Environmental Management Plan (EMP),
- EIA report,
- Specialist reports (water and biodiversity),
- Maps, photographs,
- Weekly and/or monthly inspection records,
- Audit and non-compliance reports.
- Think tank meeting was held on 11 to 12 June (2009) with the Environmental Control/Liaison Officer (ECO/ELO) to discuss the predicted vs. actual impacts (comparing notes and information). The information derived from the meeting was highlighted in the compliance and impacts database as personal communication.
- Direct observations and/or documentary analysis which includes attending the Environmental Liaison Committee meetings (minutes of meetings reviewed), inspections done on site (completed by the ECO/ELO on a weekly basis) and external/internal audits done by qualified auditors.

TIER 3: PREDICTED IMPACTS VS. ACTUAL IMPACTS

During this study, the predicted impacts were taken from the EIA report (identification matrix with mitigation measures) and used to determine whether the predictions occurred during the construction phase of the Mooi River Mall project. If mitigation measures are implemented and effective, it could be concluded that fewer predicted impacts would occur or that the severity of the impact would be reduced, than if no mitigation measures were implemented for this mega project. The predicted impacts and mitigation measures highlighted in the EIA report was selected for the purpose of this study, and predicted impacts without mitigation measures were not referenced. The rationale behind this exclusion being, that if predictions were used without

mitigation measures, all of the predictions would assumedly occur as actual impacts (100 % actual impact rating). The decision was made to focus on the accuracy of predictions; the probability and significance of the impact; and whether or not unforeseen impacts had occurred that never formed part of the predicted impacts identification process. These focus points are described below in more detail.

Accuracy of predictions:

To ensure accurate predictions, variables were allocated a different number i.e. if an impact took place more than 5 times it was deemed as a full occurrence of the said impact; if the impact occurred less than 5 times but more than once it was referred to as partial occurrence. If the predicted impact did not occur it was given a zero. For each variable, the relevant reference and/or justification was captured (refer to Annexure A). From this database, another database was derived providing only the essential details i.e. which impacts were not predicted during the EIA process and which of the predicted impacts did occur or not (refer to Annexure B).

Probability and Significance:

The probability and significance of each predicted impact, as described in the EIA report, was compared to the actual impacts found during the research (refer to Annexure C). Chapter 4 entails the discussion of what was found in terms of probability and significance for predicted impacts. Probability was rated in terms of the likelihood of each impact actually occurring. The following rating scale was used (CEM, 2005: 27):

- Improbable (possibility of impact to materialize is very low either because of design or historic experience);
- Probable (distinct possibility that the impact will occur);
- Highly probable (most likely that the impact will occur); and
- Definitely (where impact will occur regardless of any prevention measures).

During the EIA process of the Mooi River Mall, the significance of each impact was determined and described in the EIA report. For the purpose of this study, it was decided that the following ratings be used to determine the significance of each predicted impact (CEM, 2005: 27):

- Low (where it will have no impact);
- Medium (where it should have an influence on the impact unless mitigated); and
- High (activity impacted regardless of any mitigation).

Unforeseen Impacts

Unforeseen impacts were identified at a “think tank meeting” held during the month of June 2009. The Environmental Control Officer for the Mooi River Mall was invited to discuss whether any unforeseen impacts had occurred during the construction phase of the project. These impacts were tabled and presented in Chapter 4. The majority of these unforeseen impacts were captured on incidence registers.

TIER 4: LEGAL COMPLIANCE

The environmental authorisation (RoD) was selected (refer to Annexure D for the compliance records) to measure the level of compliance of the Mooi River Mall during the construction phase of the project. Environmental authorisation (EA) as referred to in Chapter 1, Chapter 2 and Chapter 4 is interpreted as the RoD under the Environment Conservation Act, 73 of 1989 and does not refer to EA as part of the new National Environmental Management Act, 107 of 1998.

The RoD sets out 12 standard specifications, 29 specific conditions and 8 compliance (non-compliance) conditions. Two conditions were omitted as they were unmeasurable against the Mooi River Mall construction phase. The RoD was used to develop a database and to compare the compliance of the Mooi River Mall with the environmental authorisation. The compliance rating of the Mooi River Mall was presented as full compliance (green), partial compliance (blue) and non-compliance (orange).

2.3.2 LIMITATIONS TO THE RESEARCH

Several limitations were experienced during the initial analysis of the MRM files and it should be noted that compliance was measured from information available at the time of the research. These limitations include, but are not limited to:

- The data was collected during 2009 and therefore the governance and legislative regime considered during the research excludes the new 2010 EIA Regulations in term of NEMA as well as the new EIA regime which did not fall within the scope of study.
- Time constraints played a role as files could not be reviewed for extensive periods of time (management of data).
- Direct contact (involvement) during the construction phase was limited. By being directly involved with the project, pre and post experiences could have been learnt, thus providing a better overview of the Mooi River Mall and its associated impacts.
- The project life cycle was not analysed due to time-constraints and since the study only focused on the construction phase. This type of analysis would provide an overall view

of the accuracy of the predicted impacts as well as the level of compliance for all stages of the project life cycle.

- Limited access to information due to confidentiality clauses and access to information restrictions during the research time frame. Only information made available during the time of the research was used.
- Additional licenses not utilised during this study could be used to broaden the context of the single case study. This includes compliance to the Water Use License and local municipal bylaws. The main reason why these licensed were not used is due to time constraints and that the primary focus of the study was to determine the legal compliance rating in terms of the RoD.
- Questionnaires and possibly interviews would have been an effective tool to verify many of the findings but due to time constraints and not forming part of the scope of the study this was not considered.

3. CHAPTER THREE: LITERATURE REVIEW

This chapter draws on the literature, including policy materials to examine and explore:

"What is the state of knowledge on EIA follow-up in South Africa?"

In particular, this review will clarify the importance of environmental management and link environmental management to the EIA process as part of the introductory section of this chapter. Subsequently, EIAs are discussed in depth by comparing past and current legislation, EIA requirements, and the strengths and weaknesses of EIA. This chapter will be concluded by a discussion regarding the origin and possible future of EIA follow-up. The literature that forms the basis for this chapter comes from a range of sources including peer reviewed journals, books, national environmental legislation and the EIA report. The literature thus focuses on the interface between EIA and EIA follow-up.

3.1 VIRIDIS SOCIETAS ("GREEN SOCIETY")

After the publishing of "Silent Spring" by Rachel Carson in 1962, social awareness of environmental issues reached a pivotal point and has continued to grow ever since. To date, environmental considerations have become an integral part of developmental thinking and decision making in South Africa. Environmental Management is a field rapidly growing in importance as a discipline on its own. For many individuals and groups of communities, the environment is a vague concept consisting of fauna and flora or a scenic place of recreation and is considered someone else's responsibility if a problem arises. Natural services (clean water and air, sustainable energy and water purification) provided by the environment to humans are increasingly threatened, and as humanity inches ever closer to the ultimate carrying capacity of the earth, so environmental management will become increasingly necessary. This is clearly illustrated by Richard N. Goldman, founder of the Goldman Environmental Prize given to young and ordinary individuals working at the fundamental levels to enhance environmental protection globally (Anon, 2010: page unknown).

3.2 THE LINK BETWEEN INTEGRATED ENVIRONMENTAL MANAGEMENT AND EIA

During the late 1960's, public concern and political activism led to the formation of the National Environmental Policy Act of 1969 (NEPA) in the United States (US) (Jay, et al. 2007: 288, Morrison-Saunders and Fischer, 2006: 20). The intention of this policy was to fulfil the responsibilities of each generation as trustees of the environment for subsequent generations.

The enactment of NEPA led to wider international outcomes, ultimately leading to the United Nations Conference on the Environment in Stockholm in 1972 (Jay, et al. 2007: 289). Within society, the need arose to resolve or mitigate negative impacts and to enhance the positive aspects of the environment, which triggered the development and implementation of environmental evaluation procedures in both developed and developing countries (Sowman, et al. 1995: 45). A large part of the initial development took place in a few high-income countries, such as Canada, Australia, and New Zealand (1973-74). However, there were some developing countries that introduced EIA relatively early - Columbia (1974) and the Philippines (1978). South Africa has a history of EIA application dating back to the 1970s (DEAT, 2008: 97).

South Africa only started to develop procedures appropriate to its circumstances in 1989. South Africa faced various constraints to bridge development and implementation of environmental procedures, these included (Sowman, et al. 1995: 46):

- Absence of a general environmental policy;
- Lack of political will and awareness for the need to consider environmental issues;
- An authoritarian system of government;
- Lack of accountability by decision-makers;
- Inadequate public participation;
- Inefficient administrative structures;
- Legislative inadequacies; and
- Lack of environmental expertise and financial resources.

Due to the constraints faced by South Africa, the Environment Conservation Act 73 of 1989 was developed. This legislation only made provision for EIA however, it did slot in with the emerging Integrated Environmental Management (IEM) procedure developed by the Department of Environmental Affairs (DEAT, 2004a: 6). For the purpose of this study,

IEM is defined as:

"a holistic framework that can be embraced by all sectors of society for the assessment and management of environmental impacts and aspects associated with an activity for each stage of the activity life's cycle, taking into consideration a broad definition of environment and with the overall aim of promoting sustainable development" (DEAT, 2004a: 8).

It is a philosophy describing a code of practice for ensuring that the environmental considerations are fully integrated into all stages of the development process to achieve a

desirable balance between conservation and development. To meet the latter, a wide range of principles for environmental policy, environmental assessment and management principles worldwide (i.e. 1992 IEM Principles, NEMA environmental management principles, IAIA international principles, Agenda 21, United Kingdom, Australia just to name but a few) were used to underpin IEM (DEAT, 2004a: 9-10).

The IEM philosophy, with its supporting principles (DEAT, 2004a: 9), is a cradle-to-grave approach relevant to the planning, assessment, implementation and management of any local, national or international proposal (*i.e.* project, plan, programme or policy), with a potentially significant impact on the environment and sustainable development. With the development of IEM and the newly promulgated Constitution of the Republic of South Africa Act, Act 108 of 1996, it was found that new environmental legislation should be developed, with the aim to convert the constitutional environmental right and IEM procedure into practice. The IEM philosophy was dovetailed into Chapter 5 of the National Environmental Management Act, Act 107 of 1998 (as amended by the National Environmental Laws Amendment Act 14 0f 2009), and entitled Integrated Environmental Management (RSA, 1998: 18).

3.3 OVERVIEW OF EIA

Environmental impact assessment (EIA) has existed for over 30 years due to the enactment of the US NEPA which was regarded internationally as a tool to effectively manage the environment. As a result of the establishment of US NEPA, not only developed countries but developing countries also adopted EIA (Bartlett and Kurian, 1999:1).

Before the promulgation of the South African EIA regulations in September 1997 (R1182, R1183 and R1184 of the Environment Conservation Act, 73 of 1989), EIA was only carried out on a voluntary base (Duthie, 2001: 215). No procedures, methods, triggers or products were enforced by South Africa law. Formal administrative systems did not exist to process EIA's at any level of government despite enabling clauses in the Environmental Conservation Act, 73 of 1989. Furthermore, EIA's were only conducted in accordance with the IEM procedure published by the Council for the Environment in 1989 and a set of six IEM guideline documents developed by the Department of Affairs and Tourism (Duthie, 2001: 215).

After the advent of democracy in South Africa (1994), environmental matters and international trends came to the forefront i.e. radical law reform processes, new governance systems, and significant planning and decision making processes (Sowman and Brown, 2006: 695). Environmental issues have thus found their way into legislation such as the Bill of Rights in the

South African Constitution and the National Environmental Management Act, 107 of 1998 (NEMA; Glazewski, 2005: 76-81 & 137-141; van der Linde & Feris: 31-283) and various framework environmental legislation such as the:

- National Environmental Management: Protected Areas Act 57 of 2003;
- National Environmental Management: Biodiversity Act 10 of 2004;
- National Environmental Management Act: Air Quality Act 39 of 2004;
- National Environmental Management: Waste Act 59 of 2008;
- National Environmental Management: Integrated Coastal Management Act 24 of 2008;
- Environment Conservation Act 73 of 1989 (last amended by Environmental Amendment Act 14 of 2009). This Act has largely been repealed by the NEMA but certain provisions remain relating to EIA.

3.3.1 EIA AND LEGAL REQUIREMENTS: PAST AND PRESENT

Different aspects of environmental assessment are required by South African legislation. The Bill of Rights in the Constitution of the Republic of South Africa, Act 108 of 1996 states in section 24 that *"Everyone has the right - (a) to an environment that is not harmful to their health or well-being; and (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures …" (*RSA, 1996: 24).

This supreme law governs all other laws in South Africa, and clearly identifies the need to strive towards environmental excellence, by developing environmental management tools, such as EIAs to control certain human activities which may have a detrimental effect on the environment.

Various provisions thus needed to be included in South African Environmental Law which mandates the execution of environmental impact assessments (EIA). Each project may very well negatively influence the environment in which it is taking place in different ways and it is legislation's aim to fill this gap i.e. Environmental Conservation Act, 73 of 1989 and National Environmental Management Act, 107 of 1998 (refer to Table 2 for comparison of past versus present legislation).

Table 2: Comparison between past and present legislation

PAST: ENVIRONMENT CONSERVATION ACT	PRESENT: NATIONAL ENVIRONMENTAL MANAGEMENT ACT
The Environment Conservation Act (ECA), 73 of 1989 (RSA, 1989)	National Environmental Management Act (NEMA), 107 of 1998 (RSA, 1998) National Environmental Management Second Amendment Act, 8 of 2004 (RSA, 2004)
Regulation 1182 of 5 September 1997 (RSA, 1997a) Regulation 1183 of 5 September 1997 (RSA, 1997b) Regulation 1184 of 5 September 1997 (RSSA, 1997c)	Regulation 385 of 21 April 2006 (RSA, 2006a) Regulation 386 of 21 April 2006 (RSA, 2006b) Regulation 387 of 21 April 2006 (RSA, 2006c)
No thresholds for listed activities.	Thresholds for listed activities.
No differentiation between activities in terms of nature and scale.	Differentiation between activities in terms of nature and scale.
No time-frames resulting in high volumes of expensive EIA executions and increased capacity and time needs related to the decision-making authority.	Strict time-frames.
Lack of proper guidance in terms of public participation pertaining to the nature and extent.	Clear definition on Interested and Affected Parties and clear prescriptions in terms of public participation.
No provision for EIA follow-up.	Monitoring and auditing prescriptions.
No prescriptions in terms of consultant's competence and professionalism.	Independent consultants must be appointed. Prescriptions in terms of appointment requirements and disqualification for consultants provided.
Low clarity and different interpretations because of low prescriptive measures that pertain to impacts on the environment and that the impacts were not managed effectively– no reference made to compliance to the provisions of the Record of Decision (RoD). Neither monitoring nor compilation of Environmental Management Plans (EMPs) is addressed. The RoD is issued for listed activities.	Highly prescriptive in terms of identifying the impacts and the mitigation measures to be put in place. Monitoring to be done and EMPs to be developed before activity can commence. Environmental Authorisation (EA) is given for listed activities
Low enablement of strategic decision making.	Strategic decision making enabled through provisions for Environmental Management Frameworks (EMF and Environmental Management Plans.
Not streamlined process, but did however assist authorities to make informed decisions.	Streamlined in terms of provisions for combination of projects.
Unnecessary time and monetary costs.	Timeframes set and should be cost-effective.
Time and resources wasted due to no differentiation of nature, environmental footprint and –risk of those listed activities which required an EIA – all activities were subject to a similar EIA process.	Clear differentiation between listed activities and there is two processes for basic and scoping EIA.
Social Impact Assessment (SIA) not included in EIA as it lacks legal standards – social issues are often seen as unimportant and it is poorly funded compared to EIA (Kruger & Chapman, 2005).	SIA only addressed as part of specialist inputs if identified by the Environmental Assessment Practitioner (EAP).

Applicable to the MRM mega project, since the project was governed under the 1997 EIA regulations promulgated under ECA 1989.	Not applicable to scope of MRM since only came in force in 2006 promulgated under NEMA and the new EIA regime.

The EIA provisions of the Environment Conservation Act, 73 of 1989 promulgated in terms of Sections 21, 22 and 26 on 5 September 1997 (Sandham, et al. 2005:51) were repealed by the EIA provisions of the National Environmental Management Act, 107 of 1998 in terms of Chapter 5. The latter was promulgated on 21 April 2006 and came into effect on the 03rd of July 2006 which included:

- Government Notice No. R. 385: Regulations in terms of Chapter 5. Its purpose is to regulate procedures and criteria as contemplated in Chapter 5 of the Act for the submission, processing, consideration and decision of applications for environmental authorisation and activities, and for matters pertaining thereto;
- Government Notice No. R. 386: list of activities and competent authorities identified in terms of sections 24 and 24D (*i.e.* list for activities which are subject to Basic Assessment procedure); and
- Government Notice No. R. 387: list of activities and competent authorities identified in terms of sections 24 and 24D (*i.e.* list for activities which are subject to Scoping and EIA procedure).

3.3.2 WHAT IS ENVIRONMENTAL IMPACT ASSESSMENT (EIA)?

Environmental Impact Assessment (EIA) has numerous definitions outlined *belo*w:

"…refers to the evaluation of the effects likely to arise from a major project (or other action) significantly affecting the natural and man-made environment…" (Bartlet, 1988:73; Wood, 1999:52; Wood, 2003:1).

"the systemic identification and evaluation of the potential impacts (effects) of proposed projects, plans, programmes or legislative actions relative to physical-chemical, biological, cultural and socio-economic components of the total environment" (Glazewski, 2005:231).

"…a process of identifying, predicting, evaluating and mitigation the biophysical, social, and other relevant effects of proposed projects and physical activities prior to major decision and commitments being made" (Glazewski, 2005: 231).

The EIA process forms an integral part of environmental management (Morrison-Saunders and Fischer, 2006: 21) and is therefore an integrated environmental management tool (DEAT, 2004b: 10). Furthermore, it is able to support complementary policy and planning processes which is not intended to replace the processes but merely to provide inputs. This process is also used to aid decision making and contribute to sound environmental management (i.e. assessment, mitigation and public participation), thereby promoting sustainable development (Hulett and Diab, 2002: 297). The main purpose of EIA is to provide decision-makers with an indication of the likely environmental consequences of their actions, assisting them to ensure that developments proceed in an acceptable manner. Morrison-Saunders and Fischer, (2006: 21) identified four objectives relevant to EIA's:

- Improve the quality of decisions from an environmental point of view;
- Aid project management;
- Smooth consent procedures; and
- Raise environmental awareness.

3.3.3 THE EIA PROCESS IN SOUTH AFRICA

The EIA process is clearly stipulated in terms of Chapter 5 of the National Environmental Management Act, 107 of 1998. By including these stipulations in environmental legislation, authorities have ensured that the effects likely to arise from a project must be determined, making it an enforceable requirement for legal compliance. In doing so, specific regulations were developed to regulate procedures and criteria contemplated in Chapter 5 of the National Environmental Management Act, 107 of 1998 for the submission, processing, considerations and decisions of applications for environmental authorisation (RSA, 2006a: 11).

Regulation 385 defines a clear line between two different processes that need to be adhered to, to obtain environmental authorisation i.e. Basic Assessment and Full EIA. Where the criteria of an activity is listed under Government Notice No. R. 386, the activity is subject to a Basic Assessment application (RSA, 2006b: 130-164). It is believed that the aim of Basic Assessment is to provide a sufficient amount of information to the authorizing body to reach a decision without compromising the quality of the study (RSA, 2006a: 21).

A full EIA on the other hand, is aimed at thorough investigations of the activity, the environment it is proposed to be conducted in and the environmental consequences that will be suffered as a result. Where the criteria of an activity is listed under Government Notice No. R. 387, the activity is subject to a Full EIA (RSA, 2006c: 165-185).

A full EIA can be described as:

> "A*n application to which scoping must be applied, (and) means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application*" (RSA, 2006a: 9).

Morrison-Saunders and Arts (2004a: 2), describes the steps of the EIA process as follows:

Preliminary Assessment
Screening: to establish if an EIA is necessary
Scoping: to identify key issues and impacts
Detailed Assessment
Impact analysis: identify, predict and evaluated potential significance of risks, effects and consequences
Mitigation: specify measures to prevent, minimize and off-set environmental loss/damage
Reporting: document results
Application: ensure that report meets terms of reference and standards of good practice
Decision-making: to approve/reject proposal and to establish terms and conditions
Follow-up
Monitoring: check if actions are in compliance
Audit/Evaluation: compare monitoring results with standards, predictions and expectations to be able to document the results
Management activities: address unforeseen events or unanticipated impacts

Therefore, the aforementioned process i.e. the new EIA regulations promulgated under NEMA is currently applicable in South Africa and is referred to as the new EIA regime. The MRM however was not regulated under the 2006 EIA regulations but by the 1997 EIA regulations promulgated under ECA 1989. Therefore, the EIA process described in this Chapter is was not applicable at the time when the MRM was authorised and regulated.

3.3.4 STRENGTHS AND WEAKNESSES OF EIA PROCESS

Regardless of the existence of legislation and good EIA guidelines, sub-standard application still remains, resulting in environmental degradation (Ross, *et al.* 2006: 3). In many cases, EIA has not been effective due to (Alshuwaikhat, 2005: 308):

- Legislation;
- Organisational capacity;
- Training;
- The lack of base line environmental information;
- Participation from all stake holders involved;
- Lack of experience;

- Donor policy; and
- Political will.

Alshuwaikhat (2005: 311) states the following: *"the general perception is that EIAs are conducted only because they are required by the government legislation and donor agencies, not to ensure sustainability of projects or to develop better management plans. In many cases, EIA is seen by proponents as an impediment to the implementation of development projects. It is regarded as a tool to justify projects, than using it as means to derive the best decision"*. The fact still remains that "EIA is not rocket science, and most of the problems can be solved by a good dose of common sense to the process" as stated by Ross et al. (2006: 3).

EIA's have weaknesses and strengths that are documented in a broad range of literature (Alshuwaikhat, 2005: 308-309; Appiah-Opoku, 2001: 64-65; Anon, 2003: 6; Kruopiené *et al,* 2008: 29-30). These include:

Strengths of EIA:	*Weakness/Limitation of EIA:*
Improved public participation and co-operation.	Ignores politics and models of decision making.
Decision-making becomes more transparent.	Uncertainty is an intrinsic factor.
Universal applicability (many positive outcomes in developing countries).	Inadequate understanding of the behaviour of the environment.
Tool for innovations and cost-saving alterations.	To a great extent a commitment dependent tool.
Increases environmental awareness.	Susceptible to bias and personal interests (developer as well as pressure groups).
Tool for sustainability.	Quality of data (out of date or the level of detail may be insufficient).
Extends into Strategic Environmental Assessment (SEA) as an integrated part of decision making.	Subjectivity in forecasting environmental effects.
Introduces a cyclical learning process into a linear planning process.	Insufficient consideration of alternatives.
Takes into account trans-boundary impacts.	Competency of authorities.
EIA consultants and the competent authority will have the same qualifications.	Cumulative impacts are not adequately considered and there is inadequate evaluation of possible impacts.
Governments bid to improve EIA's: Quicker, Simpler and Better.	Lack of environmental awareness.
Significant changes to projects with marked environmental improvements.	Before the EIA is planned the project can, and often is finalised with irreversible decisions taken.
Some net financial benefits and job creation.	Ineffective EIA implementation and mitigation measures.
Greater understanding of Project by the Public.	Insufficient connection between EIA and other environmental legislation.
EMIs function to monitor compliance and enforcement.	

Timeframes (shorten) for competent authorities to make decisions. Taking into account various environmental media in EIA studies. Rational and clear decisions. Focus to be more on Post-decision follow-up. Create base case of information. Socio-economic and environment vs. environment scope only	Limited influence for decision-making. Insufficient public involvement. Technical shortcomings, specialist reports often do not provide the necessary information. Procedural limitations, including inconsistencies in process administration and guidance. Time delays and costs of applying EA remain a serious concern for project managers. Structural issues, stemming from the application of EIA as a separate process, unrelated to the project cycle or the larger context of decision-making. Not many tangible environmental benefits, is expensive and hampers /slows down development. EAPs are not well trained or qualified. Project changes after EIA proposal. Insufficient monitoring after decision-taking.

In summary, EIA is of utmost importance because it is tool that is used to put management measures in place to address potential environmental impacts and to reduce them.

3.4 EIA FOLLOW-UP

3.4.1 WHAT IS EIA FOLLOW-UP?

EIA follow-up is concerned with the events that occur after a consent decision has been granted (RoD/Environmental Authorisation), consequently distilling the ingredients required for success (Morrison-Saunders et al, 2003: 43). Simply put, EIA follow-up is an umbrella term for a range of EIA activities and is the dose of common sense to the EIA process by ensuring it is applied. EIA follow-up is (Morrison-Saunders and Arts, 2004a:4; Morrison-Saunders and Arts, 2004b: 1; Arts *et al,* 2001: 176):

"*the monitoring and evaluation of the impacts of a project or plan (that has been subject to EIA) for management of, and communication about, the environmental performance of that project or plan*"

Morrison-Saunders *et al* (2003: 44), as well as Arts *et al* (2001: 177) explain that EIA follow-up consists out of four primary elements:

- Monitoring (e.g. baseline studies, compliance monitoring, state of the environmental monitoring, impact monitoring);
- Evaluation/Auditing – appraisal of monitoring results against established benchmarks;
- Management – making decisions and implementing project and environmental management actions in response to monitoring and evaluation findings; and
- Communication – informing all stakeholders including the general public about the results of EIA follow-up.

3.4.2 THE NEED FOR EIA FOLLOW-UP

As stated above, EIA follow-up is regarded as a tool to justify projects, but should be used as a tool to ensure that projects are sustainable. Morrison-Saunders *et al.,* (2003: 46) stipulates that *"having regulations in place is clearly an important first step in initiating EIA follow-up: however, the presence of regulations does not necessarily guarantee that follow-up will actually occur in practice*". Regardless of the generic steps (refer to Section 3.3. Overview of EIA) of EIA indicating the established role for follow-up, it still remains the weakest step in most fields where EIA is practiced (Morrison-Saunders and Art, 2004a:1).

Great emphasis is placed on the stages leading to environmental authorisation (EA) or the Record of Decision (RoD), but there is little concern for post-decision follow-up to ensure the mitigation measures or conditions and recommendations of the EIA are implemented (Jay et al, 2007: 298). This is not only a problem in South Africa but has been identified worldwide (Hulett and Diab, 2002: 298). It should also be noted that although many EIA's have been conducted in South Africa using the EIA regulations, there has been little empirical investigation to assess compliance to the regulations or performance towards achieving the objectives of legislation (Kruger and Chapman, 2005: 52).

Case studies identified by Morrison-Saunders *et al. (2001:* 290-292*)* clearly highlight the reasons why EIA follow-up is of utmost importance. These include:

- The offshore natural gas well in the Gulf of Guayaquil, Ecuador, where the proponent was self motivated to undertake EIA follow-up due to the liability faced by the proponent if mitigation measures and follow-ups were not done. The outcome of this case study determined that even without a legislative mandate it would be economically and financially viable and/or wise to conduct EIA follow-up.
- The industrial Estate of Map Ta Phut situated in Thailand caused considerable public concern and led to a diverse action plan to be implemented by the government to

address the cumulative effects. This case study illustrates that effective monitoring programmes can lead to management action resulting in a reduction of cumulative impacts.

- In Hong-Kong, government was the main driving force to undertake EIA follow-up, especially in the extremely urbanised areas. Due to the increase in socio-economic and environmental protection pressures, the government decided to investigate more efficient control measures of developments by implementing EIAs (pre-decision stages) and necessitating environmental management and auditing (post-decision stages).

It is clear from the above that EIA follow-up can provide the opportunity to improve not only the management of individual projects but the future practise of EIA.

Without EIA follow-up the consequences of EIA activities will never be known (Dipper *et al.,* 1998: 733). By implementing EIA follow-up, concrete evidence of environmental outcomes can be provided and would enable the stakeholders and practitioners to shift from theoretical views on a proposal towards actual facts (i.e. understanding and knowing a real situation once the project have been implemented). It is not the predicted impacts, but rather the real effects that are relevant to protecting the environment (Morrison-Saunders and Arts, 2004b: 3). EIA follow-up therefore seeks to understand EIA outcomes (Morrison-Saunders and Arts, 2004a: 2) providing essential opportunities to learn from past experiences and apply in future actions (Dipper *et al.,* 1998:733). Figure 4 emphasises the need that further exists to apply and implement EIA follow-up (Morrison-Saunders and Arts, 2004a: 25):

Figure 4: The need for EIA follow-up (adapted from Morrison-Saunders and Arts, 2004a: 25)

3.4.3 LEGISLATIVE REQUIREMENTS FOR EIA FOLLOW-UP

The Environment Conservation Act 73 of 1989 was the first legislation to deal with effective protection and controlled utilisation of the environment (RSA, 1989: 1). It however, neglected to address follow-up and the regulations promulgated under this Act was incomplete. After the apartheid era, a range of institutional arrangements took place. These arrangements included

the development of the Integrated Environmental Management Procedure documents that identify compliance monitoring, environmental monitoring and environmental auditing as vital components of an EIA process (Hulett and Diab, 2002: 298). It provides an overview of the concepts of and approaches to, Integrated Environmental Management, which is a key instrument of our National Environmental Management Act, 107 of 1998. However, these guidelines are not legally binding and leave the issue for EIA follow-up to be undertaken on a voluntary basis. The National Environmental Management Act, 107 of 1998 which replaced the Environment Conservation Act, 73 of 1989 only provides for partial consideration of EIA follow-up.

Section 24 (4)(f) of the National Environmental Management Act, 107 of 1998 requires an investigation and formulation of arrangements for the monitoring and management of impacts, and the assessment of the effectiveness of such arrangements after their implementation (South Africa, 1998: 24). Even though follow-up is not extensively considered in Chapter 5 of the National Environmental Management Act, 107 of 1998, one needs to consider Chapter 7 (Compliance, Enforcement and Protection) of the said act. In section 28 (1) of Chapter 7 it is emphasized that every person who causes, has caused or may cause significant pollution or degradation of the environment must take all reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring (RSA, 1998: 31). This section implies that follow-up needs to be considered whether in the form of compliance, environmental monitoring or environmental auditing.

The new regulations promulgated under the National Environmental Management Act, 107 of 1998 during 2006 (Section 23, 32 and 34 of Regulation 385) identified the need to implement environmental management and mitigation measures, to develop Environmental Management Plans (EMP) and to propose mechanisms for monitoring compliance. It also provides us with what is expected of the content of the Environmental Authorisation (RoD) since Section 38 (d)(ii) stipulates that requirements for the management, monitoring and reporting of the impacts of the activity on the environment throughout the life of the project needs to be specified (RSA, 2006a: 24, 32, 34, 36).

EIA legislation has improved considerably since 1989, by improving/enhancing the Regulations and considering follow-up components in the EIA process. However, as previously mentioned, follow-up is not made binding or defined/specified in legislation, making it difficult and open to interpretation.

3.4.4 PRINCIPLES OF EIA FOLLOW-UP

Follow-up gives proponents and regulators the opportunity to implement measures and to mitigate or prevent negative effects on the environment. It also provides information about the consequences of an activity as it occurs (Marshall *et al.,* 2005: 178). The International Association for Impact Assessment have developed best practice principles for EIA which includes two tiers (Senécal *et al.,* 1999:1-4):

1. "*Basic Principles*" that needs to be applied to all stages of the EIA as well as the Strategic Environmental Assessment (SEA) of policies, plans and programs. These principles are (Adapted from Senécal *et al.,* 1999:1-4):

a) ***Purposive*** - the process should inform decision making and result in appropriate levels of environmental protection and community well-being.

b) ***Rigorous*** - the process should apply "best practicable" science, employing methodologies and techniques appropriate to address the problems being investigated.

c) ***Practical*** - the process should result in information and outputs which assist with problem solving and are acceptable to and able to be implemented by proponents.

d) ***Relevant*** - the process should provide sufficient, reliable and usable information for development planning and decision making.

e) ***Cost-effective*** - the process should achieve the objectives of EIA within the limits of available information, time, resources and methodology.

f) ***Efficient*** - the process should impose the minimum cost burdens in terms of time and finance on proponents and participants consistent with meeting accepted requirements and objectives of EIA.

g) ***Focused*** - the process should concentrate on significant environmental effects and key issues; i.e., the matters that need to be taken into account in making decisions.

h) ***Adaptive*** - the process should be adjusted to the realities, issues and circumstances of the proposals under review without compromising the integrity of the process, and be iterative, incorporating lessons learned throughout the proposal's life cycle.

i) ***Participative*** - the process should provide appropriate opportunities to inform and involve the interested and affected parties, and their inputs and concerns should be addressed explicitly in the documentation and decision making.

j) ***Interdisciplinary*** - the process should ensure that the appropriate techniques and experts in the relevant bio-physical and socio-economic disciplines are employed, including the use of traditional knowledge, which should be considered as relevant.

k) ***Credible*** - the process should be carried out with professionalism, rigor, fairness, objectivity, impartiality and balance, and be subject to independent checks and verification.

l) ***Integrated*** - the process should address the interrelationships of social, economic and biophysical aspects.

m) ***Transparent*** - the process should have clear, easily understood requirements for EIA content; ensure public access to information; identify the factors that are to be taken into account in decision making; and acknowledge limitations and difficulties.

n) ***Systematic*** - the process should result in full consideration of all relevant information on the affected environment, of proposed alternatives and their impacts, and of the measures necessary to monitor and investigate residual effects.

2. "*Operating Principles"* is where the aforementioned principles are applied in the EIA process. EIA process should specifically provide for (Adapted from Senécal *et al.,* 1999:1-4):

a) ***Screening*** - to determine whether or not a proposal should be subject to EIA and, if so, at what level of detail.

b) ***Scoping*** - to identify the issues and impacts that are likely to be important and to establish terms of reference for EIA.

c) ***Examination of alternatives*** - to establish the preferred or most environmentally sound and benign option for achieving proposal objectives.

d) ***Impact analysis*** - to identify and predict the likely environmental, social and other related effects of the proposal.

e) ***Mitigation and impact management*** - to establish the measures that are necessary to avoid, minimize or offset predicted adverse impacts and, where appropriate, to incorporate these into an environmental management plan or system.

f) ***Evaluation of significance*** - to determine the relative importance and acceptability of residual impacts (i.e., impacts that cannot be mitigated).

g) ***Preparation of environmental impact statement (EIS) or report*** - to document clearly and impartially, impacts of the proposal, the proposed measures for mitigation, the significance of effects, and the concerns of the interested public and the communities affected by the proposal.

h) ***Review of the EIS*** - to determine whether the report meets its terms of reference, provides a satisfactory assessment of the proposal(s) and contains the information required for decision making.

i) ***Decision making*** - to approve or reject the proposal and to establish the terms and conditions for its implementation.

j) ***Follow-up*** - to ensure that the terms and condition of approval are met; to monitor the impacts

of development and the effectiveness of mitigation measures; to strengthen future EIA applications and mitigation measures; and, where required, to undertake environmental audit and process evaluation to optimize environmental management

Internationally, principles for best practice EIA follow-up were developed to establish the stepping stones for effective implementation of EIA follow-up. The principles are divided into four groups and are described in more detail below (Marshall *et al.,* 2005: 178):

- The core values are described as principles 1-3 (why?);
- Roles and responsibilities of participants in EIA follow-up is indicated as principle 4-7 (who?);
- Nature of EIA follow-up is presented as principles 8-11 (what?); and
- Conducting EIA follow-up is specified as principles 12-17 (how?).

Table 3: Principles of EIA follow-up (adapted from Marshall *et al., 2005:178-180)*

The Core Values (The Why Principles)
1. Follow-up is essential to determine EIA outcomes EIA and follow-up have the same goal, which is to minimise the negative effects of developments and to promote the positive impacts. It is crucial that follow-up takes place to ensure the value of EIA increases and to ensure that the consequences of EIA planning and decision-making are known. Through this, follow-up can safeguard environmental protection.
2. Transparency and openness in EIA follow-up is important It is very important to provide stakeholders with feedback on the EIA process and to ensure that all the actions and decisions taken are fair, transparent and communicated to them. The active involvement of stakeholders in the follow-up process is also preferable.
3. EIA should include commitment to follow-up EIA follow-up should be included as a commitment with all parties accountable for their actions. Provision should be made to allow for follow-up programmes in the pre-decision EIA process and be carried out in the post-decision phase. Therefore, the follow-up commitments relate to programme preparation and implementation of monitoring, evaluations, management and communication.
Roles and Responsibilities of Participants (The Who Principles)
4. The proponent of change must accept accountability for implementing EIA follow-up This section refers to the duty of care principle described in the NEMA (1998) and due consideration must be taken by the proponent in terms of the consequences of their actions on the environment. The proponent must carefully consider the necessity for EIA follow-up. The

proponent should be made responsible to mitigate the adverse effects of the activity and to communicate this to stakeholders. EIA follow-up should be seen by the proponents as a project-management tool and to realize the potential cost savings.

5. Regulators should ensure that EIA is followed up

   The need for EIA follow-up should be identified by the regulators and must be enforced through regulatory requirements, securing a balance between the interest of the proponent and the community, confirm proponents compliance and to promote a learning experience.

6. The community should be involved in EIA follow-up

   The community should be informed of EIA outcomes; however, direct community participation in the follow-up programme is desirable. Certain benefits will flow out of community involvement such as local knowledge sharing, focused programme designs, building trust and partnerships.

7. All parties should seek to co-operate openly and without prejudice in EIA follow-up

   Through the interlinking of the proponents, regulators and community interests, their cumulative interest should initiate practicable and reasonable EIA follow-up programmes. The successfulness of EIA follow-up depends mainly on the shared sense of purpose by all, to avoid, reduce or to remedy the adverse environmental effects. Consensus on procedural and methodological approaches should be reached and all parties must be committed to carrying out their specified tasks and to respond constructively to the findings of EIA follow-up.

Nature of EIA follow-up (The What Principles)

8. Follow-up should be appropriate for the EIA culture and societal context

   There is no single recipe for undertaking EIA follow-up and should be custom-made to suit legislative, administrative, socio-economic and cultural circumstances. It should then be dovetailed with existing planning, decision-making and project management activities. It should also be noted that there is no need to invent completely new procedures for EIA follow-up as other mechanisms can suffice, such as EMS and state of the environment reporting.

9. EIA follow-up should consider cumulative effects and sustainability

   To apply EIA follow-up at the individual project level can be intrinsically limited in dealing with cumulative effects of multiple developments and sustainability issues. However, the strategic level or area oriented approach should be followed.

10. EIA follow-up should be timely, adaptive and action-orientated

    The benefits of EIA follow-up can be maximized through adaptability and being proactive to deal with environmental management issues. Actions must be efficacious to meet the defined goals of EIA follow-up programmes.

11. EIA follow-up to promote continuous learning from experience to improve future practice.

    EIA follow-up should not be static and must strive to maximize learning from experience through active feedback.

Conducting EIA Follow-up (The How Principle)

12. EIA follow-up to have a clear division of roles, tasks and responsibilities

    The roles in EIA follow-up should be clearly defined and identified in the pre-decision stages of EIA documentation and subsequent EIA approvals and management systems. This should clearly outline tasks and responsibilities within and among the different parties, and all practitioners involved must discharge their tasks competently.

13. EIA follow-up should be objective-led and goal-orientated

    EIA follow-up should seek to achieve defined objectives and/or goals and is an integral task of scoping in EIA follow-up.

14. EIA follow-up should be '*fit-for-purpose*'

    EIA follow-up programmes must be tailored to the proposed activity, its stages and dynamic context. A need exists to keep EIA follow-up practicable and feasible and to focus on the '*art of the possible*'.

15. EIA follow-up should include the setting of clear performance criteria

    Rigorous performance criteria reflecting best practice must be used in EIA follow-up and be enacted through well-defined methodologies or approaches to monitoring, evaluation, management and communication. These actions should be become useful information and outcomes that can be measured easily.

16. EIA follow-up should be sustained over the entire life of the project

    EIA follow-up actions and/or programmes must cover not only designs and construction of a development, but should also focus on the operation and decommissioning phases of the project life cycle. EIA follow-up should be responsive to long-term and short-term environmental changes.

17. Adequate resources should be provided

    EIA follow-up must be cost-effective, efficient and pragmatic. Resources such as time, staff and capacity need to be provided.

3.4.5 THE OBJECTIVES AND CONTEXTUAL SETTING OF EIA FOLLOW-UP

Before EIA follow-up can be conducted, the objectives and contextual setting of the must be clearly defined. The main objectives of EIA follow-up include (Morrison-Saunders and Arts, 2004a: 8-9):

1. Control of projects and their environmental impacts:

   This relates to EIA follow-up providing both verification and controlling functions for the implementation of projects.

2. Maintain decision-making flexibility and promote an adaptive management approach:

   Feedback from follow-up programmes allows the project manager and regulatory agencies to respond towards changes in the activity, the environment or in the socio-political context.

3. Improve scientific and technical knowledge: Some EIA follow-up activities evaluate the utility and effectiveness of specialist reporting.
4. Improve public awareness and acceptance: Public awareness can be improved by ongoing EIA follow-up which is concerned with the actual effects of the development on the environment, potentially leading to public acceptance of the proposal.
5. Integration with other information: Follow-up can link with other existing environmental information and contribute to the greater understanding of both area-wide effects and issues.

The success of EIA follow-up is dependent on the relationship between the contextual (setting) factors and stakeholders participating in the process. It is therefore pivotal that the interactions between stakeholder groups and the correct factors will determine the nature of EIA follow-up and whether it is successful or not (Morrison-Saunders and Art, 2004a: 10-14 and Figure 5).

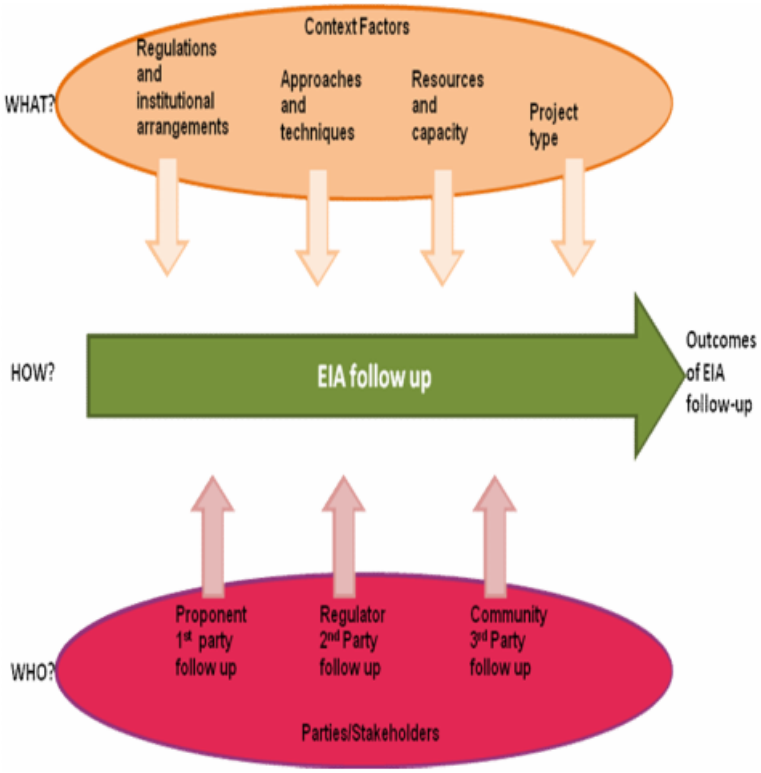

Figure 5: The contextual factors and stakeholder groups that contribute to the successfulness of EIA follow-up (adapted from Morrison-Saunders and Arts, 2004a: 14).

3.4.6 Outcomes and Challenges of EIA-Follow-up

As mentioned above, there are various stakeholders that play a crucial part in determining the success of EIA follow-up. Each of the stakeholder groups can benefit from EIA follow-up with its applicable outcomes which are described in Figure 6 (Morrison-Saunders and Arts, 2004a: 15).

The proponent can benefit from EIA follow-up by protecting himself/herself from liabilities; being accepted by the community; improving on International Standard Organisation certification status (enhancing the Environmental Management System ISO 14001); surpassing project management; and establishing a "green" outlook. For the EIA regulator, EIA follow-up provides the following (Morrison-Saunders and Arts, 2004a: 15):

- Linking the pre- and post decision stages;
- Mitigating positive and negative effects;
- Provides a notebook on EIA performance;
- Monitors regulatory/legal compliance; and
- Connecting with contractual, permitting, licensing and other management systems.

Figure 6: Outcomes of EIA follow-up (adapted from Morrison-Saunders and Arts, 2004a: 15).

EIA follow-up contributes to communities by knowledge enhancement relating to real impacts that are taking place within their surrounding; creating a sense of calm about the cumulative impacts and reducing the uncertainties; and providing a tool to lodge complaints and concerns related to health, safety, quality and environmental issues (Morrison-Saunders and Arts, 2004a: 15).

EIA follow-up does not only have positive outcomes to improve overall environmental performance, but subsequently have numerous challenges. These challenges are (Morrison-Saunders and Arts, 2004a: 16):

- Uncertainty and limited information: Uncertainty during the initial pre-decision stages of the EIA is a vital flag point for initiating EIA follow-up but these uncertainties are not necessarily resolved and may pose challenges during the follow-up investigations.
- Deficiencies in Environmental Authorizations (RoD) or Environmental Impact Statements: Many RoDs in the past had vague impact predictions, extrapolation from little or no baseline data or absence of details as to the description of the project.
- Lack of guidance: There is little to no guidance on how to conduct EIA follow-up studies but a wealth of information available on how to conduct EIA. This in turn clearly indicates that there is a need to address training and capacity building in this respective field of science especially in countries with little to no experience.
- Legislative deficiencies: The lack of formal legislative reform/requirements impedes on EIA follow-up as minimal guidance.
- Demand on financial and staff resources: A considerable amount of resources such as time, money and staffing must be provided by both stakeholders (proponents) and regulators to reap the benefits of EIA follow-up for a long term positive contribution. Due to the lack of progress in this area, follow-up could be severely hampered and growth encumbered.

Follow-up (i.e. monitoring, auditing, evaluation, management and communication) should be an integral part of an ongoing process of integrated environmental management, resulting in the ultimate success of a project by determining the outcomes of the proposals. But, EIA follow-up is not seen as a mandatory step in the EIA process although legislation incorporating follow-up has been passed in numerous countries such as New Zealand, Australia, Canada and South Africa (Hulett and Diab, 2002: 298). Follow-up processes are only legally required if specified in the RoD. It should therefore be emphasized that follow-up links the pre-decision and post-decision stages of EIA, thereby bridging the implementation gap that arises when a considerable difference between project plans and their implementation exists.

3.5 CONCLUDING REMARKS

In order to address the overall research aim it is important to know what the existing knowledge on EIA follow-up in South Africa is. There are well developed international guidelines on EIA

follow-up in first world countries but these do not yet exist in South Africa. The development of South African guidelines based on best practice EIA follow-up should be fast tracked.

EIA follow-up is not developed to its full potential even though the need for it is recognised and supported in legislation, journals and books. EIA follow-up necessitates feedback in the EIA process to ensure that lessons learnt and outcomes from past experiences can be applied in future actions.

The challenges faced with the implementation EIA follow-up must be overcome to ensure that the benefits of it are gained nationally and internationally. EIA follow-up should not be seen as a tool to justify projects, but should be used as a tool to ensure that projects are sustainable. Therefore, it is imperative that follow-up and feedback be incorporated into the EIA process to shift EIA's from being a static process to a dynamic process.

EIA follow-up forms the missing link between EIA and environmental management by incorporating the findings into the business-making processes. Without this link, it remains a regulatory-driven–information gathering-exercise without adding any value to the scientific and social networks/field of expertise. EIA follow-up should be used as paving blocks to ensure the "good intentions" of EIA are met.

4. CHAPTER FOUR: DATA ANALYSIS AND RESULTS

This chapter describes the research results obtained from the data analysis in relation to the following research questions:

"Did the predicted impacts after mitigation described in the EIA report materialize during the construction phase of the Mooi River Mall (MRM) development?

Did any unforeseen impacts associated with the case study occur that were not predicted in the EIA?

What was the level of compliance to the environmental authorization (RoD) during the construction phase?"

The chapter begins by comparing predicted impacts with the actual impacts during construction. The predicted significance and probability rating against the actual impacts have also been considered during analysis. The second part of the chapter analyses the occurrence of unforeseen impacts, and why these impacts were not identified during the EIA process. A discussion then follows regarding the level of compliance of the MRM construction phase to the stipulations in the RoD. The chapter is concluded with a summary of the main research results.

4.1. COMPARING PREDICTED IMPACTS WITH ACTUAL IMPACTS DURING THE CONSTRUCTION PHASE OF THE MRM

4.1.1. PREDICTED IMPACTS VERSUS ACTUAL IMPACTS

As described in Chapter 2, the EIA report (of which the impact prediction matrix with related mitigation measures played a major role), was used as a baseline for the research (CEM, 2005:149-152). The impact prediction matrix included in the EIA process, was adapted to make provision for references and the justification of the impact identification rating awarded by the researcher (i.e. the different sources analysed to determine the actual impact; refer to Annexure A). Each variable, as per the matrix, was allocated a different value related to the frequency of occurrence. If an impact occurred more than 5 times it was deemed a full occurrence of the said impact; if the impact occurred less than 5 times but more than once, it was referred to as partial occurrence. If the predicted impact did not occur, a zero was allocated. The results of the analysis i.e. the impact rating per environmental aspect and the corresponding environmental impact, is summarised in Annexure B.

The data indicated that 289 impacts (with related mitigation measures) were predicted for the construction phase of the MRM. Of the 289 predicted impacts (see Figure 7), only 88 impacts (30 %) occurred; 103 impacts (36 %) partially occurred and 98 impacts (34 %) did not occur or could not be determined.

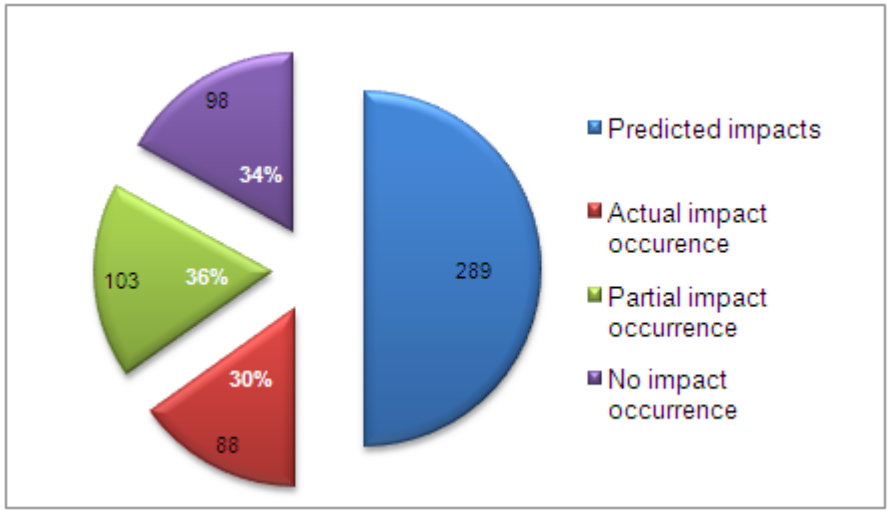

Figure 7: Predicted impacts vs. actual impacts (with mitigation measures) of the Mooi River Mall development during the construction phase.

Figure 7 illustrates that in total 66 % of the predicted impacts came to pass during the construction phase of the Mooi River Mall mega project. This implies an overestimation of 34% and an accuracy of 66%. Compared with other studies conducted in South Africa as well as internationally, an average prediction accuracy of 70% has been noted. However, research conducted in Australia shows accuracy as low as 40%. International research does not provide a clear benchmark for prediction accuracy, but the results for the MRM appear to be consistent with the limited work that has been done (Buckley, 1991:161; Dipper *et al*., 1998:731; Wood *et al*., 2000:23; Culhane, 1987: 217; Noble and Storey, 2005:166-168, Freemantle, 2008).

The effectiveness of mitigation measures is an important influencing factor that needs to be acknowledged, as these measures could determine / influence the accuracy of prediction results. The 98 impacts (34% of total predicted impacts) which did not occur need to be considered / investigated with the effectiveness of mitigation in mind. The occurrence or non-occurrence of impacts could potentially be due to the fact that: (1) impacts were not mitigated as planned; (2) impacts occurred even though they were mitigated; and (3) impacts were only partially mitigated. The next step in the analysis was to consider the results against the predicted probability and significance ratings in the EIA report.

4.1.2. PROBABILITY AND SIGNIFICANCE

As mentioned in Chapter 2 'Methodology', the probability and significance rating for each predicted impact (with mitigation measures) was compared to the actual impacts that were identified.

4.1.2.1. PROBABILITY OF OCCURRENCE

The next level of analysis aims to compare the predicted probability of occurrence with the actual impacts. The EIA report shows that of the 289 predicted impacts (see Figure 8), only 23 impacts (8 %) were rated improbable impacts; 141 impacts (49 %) were rated probable impacts; 96 impacts (33 %) were rated as highly probably impacts and 29 impacts (10 %) were in actual fact determined to be definite impacts during the construction phase. Possible examples of the aforementioned relations (only construction phase) are presented in Table 4.

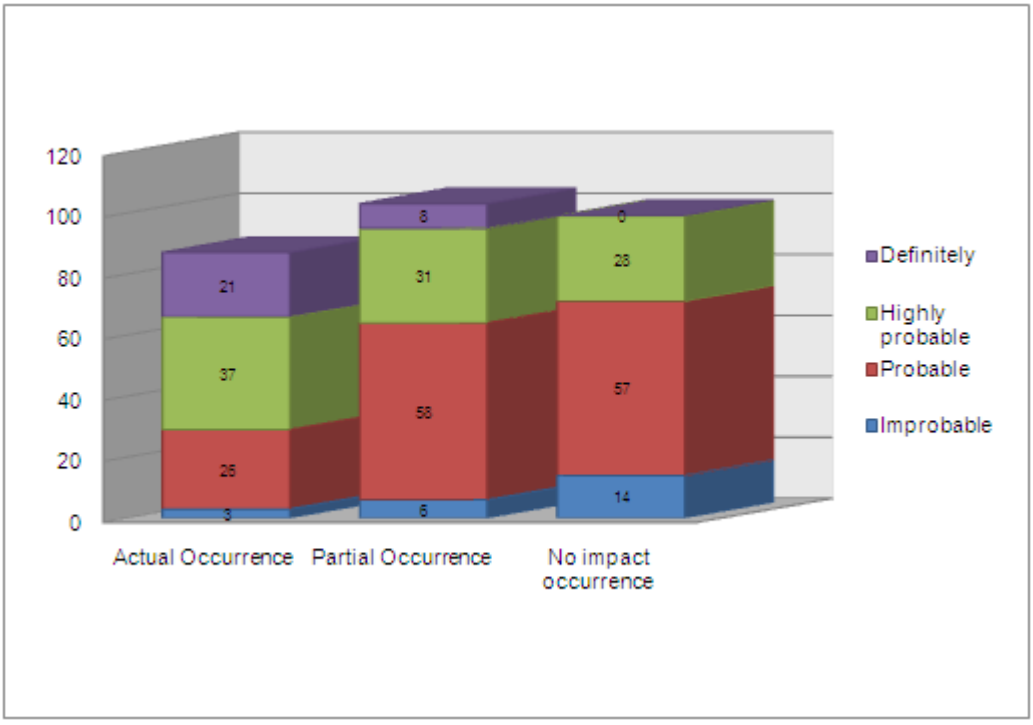

Figure 8: The actual occurrence of impacts in relation to probability prediction (with mitigation measures).

The main conclusions from Figure 8 (refer to Annexure C) are:

- A high number of impacts rated as highly probably (28) and probable (57) did not occur. This might suggest that resources may have been wasted or ineffectively allocated to deal with these impacts;

- A small number of impacts rated as definite, only partially occurred (8). It would be expected that all definite rated impacts would occur as predicted. This could be linked to the risk averse approach followed with the EIA process; and
- Only a small number of impacts did occur which were rated as improbable (3). The majority of actual occurrences were rated as definite (21) and highly probably (37). This could suggest a lack of prioritization of probability of occurrence of impacts. This means that more focus need to be placed on high risk impacts instead of addressing and focussing too much on low risk impacts this will have a minimal effect on the environment.

Table 4: Examples of the probability and occurrence of impact relation as part of the construction phase of the Mooi River Mall

Probability and predicted impact rating	**Environmental Aspect**	**Environmental Impact**
Highly probable / No occurrence	Earthworks	Social impacts
	Removal of underground water seepage from excavations	Soil pollution and erosion
	Removal of temporary construction structures and services	Social impacts
	Landscaping and establishing of parking area	Air pollution
	Construction of river diversion and bridge	Land use potential
	River feature and habitat transformation	Soil pollution and erosion
	Management of vehicles and machinery and equipment	Ecological and corridor functioning; economic impacts
	Handling and use of hazardous materials	Habitat transformation
	Litter generation	Ecological and corridor functioning
	Solid waste generation, storage and disposal	Ecological and corridor functioning; social impacts
	Liquid waste generation, storage and disposal	Ecological and corridor functioning; social impacts
Definite / Partial occurrence	Removal of underground water seepage from excavations	Ecological and corridor functioning
	Removal of existing silt depositions from underneath bridge	Hydrology; soil pollution and erosion; ecological and corridor functioning
Improbable / Occurrence	Removal of underground water seepage from excavations	Ground water pollution
	Provision and operation of on site staff facilities and activities	Economic impacts

4.1.2.2. SIGNIFICANCE OF OCCURRENCE

Of the 289 predicted impacts, 136 were rated to be of low significance (47 %), 115 as of medium significance (40 %) and only 38 impacts were determined to be highly significant (13 %). Possible examples of the significance of each predicted impacts (as indicated above) during the construction phase are presented in Table 5.

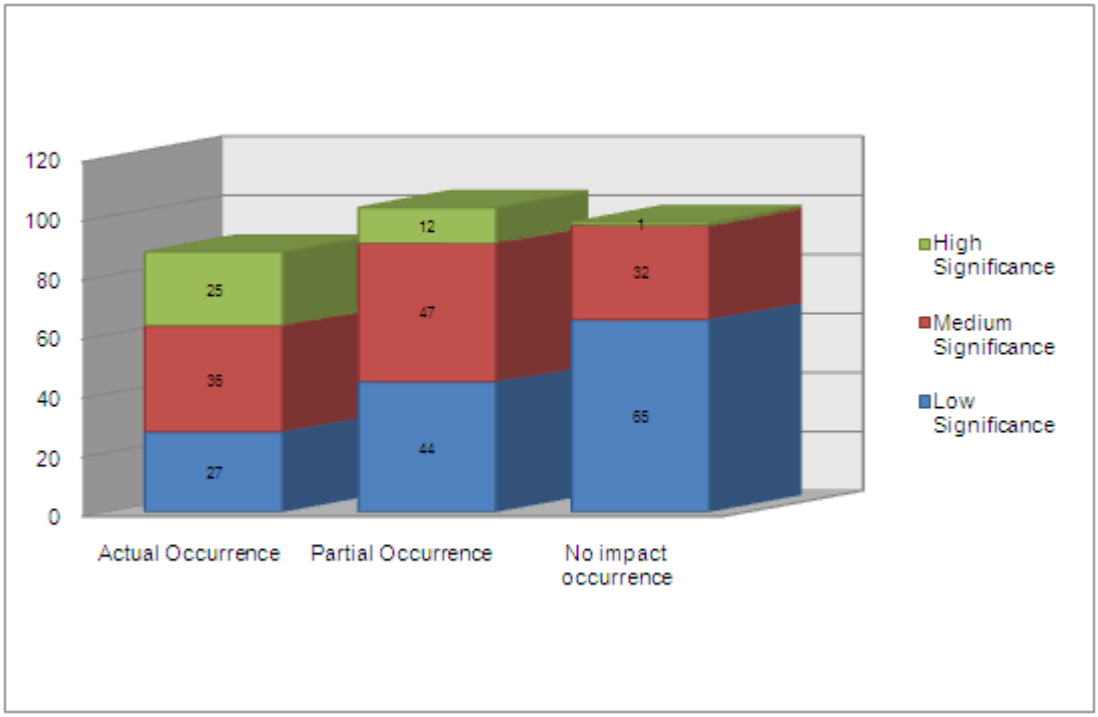

Figure 9: The significance of predicted impacts (with mitigation measures).

Figure 9 illustrates (refer to Annexure C) that:

- A number of predicted impacts that occurred had low significance ratings (27). A larger number of predicted impacts had a medium significance (38) and highly significant (25) rating. This suggests that the accuracy of prediction is higher for more significant impacts.
- A number of impacts that partially occurred had high significance ratings (12). Partial predicted impacts also indicated low significant ratings (44).

A large number of impacts predicted, but which did not occur had a medium significance rating (32). This might reflect a risk averse approach to the EIA which results in a high number of potential impacts identified combined with a slight overestimation of probability and significance.

Table 5: Examples of the significance and occurrence of impact relation as part of the construction phase of the Mooi River Mall:

Significance and predicted impact rating	**Environmental Aspect**	**Environmental Impact**
Occurrence / Low significance	Management of vehicles and machinery and equipment	Air pollution
	Provision and operation of on site staff facilities and activities	Land use potential and Traffic impacts
	Construction of road access points and upgrading of critical intersections	Soil pollution, aquatic habitat transformation (sediment loading)
	Establishment of storm water drainage and other service infrastructure.	Soil pollution and erosion
	Removal of underground water seepage from excavations	Ground water pollution
	Handling and use of hazardous materials	Economic impacts
	Litter generation	Surface water pollution and land use
	Solid waste generation, storage and disposal	Soil pollution and Ecological and corridor functioning
	Liquid waste generation, storage and disposal	Economic impacts
Partial occurrence / High significance	Handling, storage of soil and fill material	Surface water pollution and soil pollution.
	Removal of underground water seepage	Ecological and corridor functioning
	Construction of river diversion and bridge	Hydrology and aquatic habitat transformation (sediment loading)
	Landscaping and establishment of parking area	Land use potential
	River features and habitat reconstruction	Surface water pollution
	Removal of existing silt depositions from underneath bridge.	Ecological and corridor functioning
	Handling and use of hazardous materials	Ecological and corridor functioning and erosion
Partial occurrence / Low significance	Construction of road access points and upgrading of critical intersections	Air pollution and economic impacts
	Removal of temporary construction structures	Soil pollution; air pollution; aquatic habitat transformation (sediment loading); and economic impacts

	Transportation of bulk materials in the public domain	Air pollution
	Handling and storage of bulk and or fill materials	Social impacts
	Construction of barrier to prevent access to site	Hydrology
	Solid waste generation, storage and disposal	Surface water pollution; air pollution; ad land use potential Ground water pollution
	Management of vehicles and machinery and equipment	Surface water pollution; soil pollution; air pollution; aquatic habitat transformation (sediment loading); ecological and corridor functioning; and social impacts.
	Provision and operation of on site staff facilities and activities	
	Establishment of storm water drainage	Land use potential
	Construction of shopping mall	Air pollution
	Removal of existing silt depositions underneath bridge	Economic
	Soil preparations and establishment of gardens	Air pollution and aquatic habitat transformation (sediment loading)
No occurrence / Medium significance	Earthworks	Social impacts
	Landscaping and establishment of parking area	Surface water pollution and air pollution
	Soil preparations and establishment of gardens	Surface water pollution
	River feature and habitat transformation	Social impacts
	Management of vehicles and machinery and equipment	Aquatic habitat transformation (sediment loading); ecological and corridor functioning; and economic impacts.
	Handling and use of hazardous materials	Land use potential and habitat transformation
	Litter generation	Ecological and corridor functioning and social impacts
	Liquid waste generation, storage and disposal	Habitat transformation and Ecological and corridor functioning

4.2. UNFORESEEN IMPACTS

As mentioned in section 4.1, 289 impacts were predicted (after mitigation) during the construction phase of the Mooi River Mall. Even though many impacts were predicted during the EIA process, nine unforeseen impacts occurred during the construction phase of the Mooi River Mall development. These impacts were identified during a think tank meeting (personal communication) held on 11 to 12 June (2009) with the ECO/ELO in Potchefstroom to discuss the predicted vs. actual impacts (refer to Annexure D and Chapter 2 for the methodology).

The low number of unforeseen impacts is related to the risk averse approach followed with the EIA process, which identified a very large number of impacts, many of which never occurred. The number of unforeseen impacts also provides an opportunity to gauge how many identified impacts would have provided a perfect prediction score, namely 200 (191 actual impacts + the 9 unforeseen impacts). The high number of potential impacts identified in the EIA could be considered excessive and suggests a possible lack of prioritization of impact significance.

The unforeseen impacts are presented in Table 6 and include the type of impact, why it occurred, what was the mitigation and the proposed mitigation measures that were put in place. Table 6 refers to the reference and/or source identification of the unforeseen impact. Further reference is made with supporting photographic evidence relating to the unforeseen impacts (refer to Table 7).

Evidently, the EIA for the Mooi River Mall made provision for a range of impacts, but did not address the above mentioned impacts thoroughly during the construction phase. This is an example where impacts that were not predicted during the EIA process can still be managed and mitigated if swift action is taken and proper management systems are in place. Overall, nine unforeseen impacts is considered a very small number for such a mega project. The low number of unforeseen impacts is possibly the result of the risk averse approach followed during the EIA. Such an approach usually results in a lower risk for the client in terms of omitting impacts, but it is also more expensive, as a higher number of identified impacts need to be dealt with. The ideal scenario would entail focusing more on significant impacts and measures to ensure a quick response to possible impacts, rather than focusing on excessively detailed assessments that grapple with large numbers of low probability and insignificant impacts.

Table 6: Unforeseen impacts identified during the construction phase of the Mooi River Mall.

Number	Impact	Reason Why?	Mitigation	Proposed Mitigation	Reference/Source
1	Biodiversity (Flora)	Willow trees found on site and classified as Category 2 Invader species / plant (need to obtain permission from Department of Land Use and Soil Management (Potchefstroom) to keep the trees in tact).	Permission obtained - document on file, however trees need to be maintained due to it being natural heritage to Potchefstroom. No new Willows are to be planted, other indigenous species to be planted. EMP requirements and the Environmental Management Specifications made provision for identifying heritage features on site during all phases of the project.	Should have been addressed in the EIA (construction phase), however provision was made in the Pre-construction phase for the protection of heritage sources.	Personal Communication: ECO/ELO
2	Personnel and management of construction activities	Training provided, however a small number of workers did not undergo training - Training was under estimated.	Could not be mitigated even though it was an EMP requirement.	Proper planning to be done before commencement of activities to ensure all staff are trained. Include possibility of implementing a card system for environmental training. A training needs analysis and training plan could be developed.	Personal Communication: ECO/ELO
3	Communication of requirements from Principal Contractor to Subcontractors not always done	During various site establishment activities of subcontractors - EMP requirements were not adhered to i.e. site establishment and/or contractor camps established within 100 m of the water course. This was a direct contravention of the WULA requirements.	Site inspections conducted and formal discussions held with the Subcontractors to address the matter. Non-compliance reports were issued for corrective action.	List of subcontractors to be available during the pre-construction preparation to communicate the requirements of other licenses such as the WULA to prevent non-compliances from occurring.	Personal Communication: ECO/ELO
4	Rehabilitation under span	Proper planning initiated, however designs were only finalised during the construction phase and the EIA did not clearly stipulate the requirements relating to rehabilitation underneath the span i.e. lighting etc.	ELC meetings held to improve on designs and to communicate to PM what the requirements should be. However, no formal guidelines were set out to ensure that rehabilitation under span would be successful.	The ELO should be more directly involved during the designs phase. Proper lighting studies and advice / consultations from specialists should be considered prior to the commencement of the activities	Personal Communication: ECO/ELO
5	Increase of development's footprint	Developers and Architects increased the extent of the project resulting in an application to amend the RoD	Application was approved and interested and affected parties (I &AP's) informed accordingly. ELO advised the Project Manager to increase the footprint after amended RoD has been received. The PM needs to adhere to the 47500 m^2 requirements as set out in the RoD.	Formal decisions need to be made during the Full EIA process to ensure that the scope of works falls within the boundaries of work before the RoD is provided to prevent further delays	Personal Communication: ECO/ELO
6	Micro-design changes during construction	Small changes and/or amendments were made to various designs during the construction phase which impacted on the implementation and construction of other designs such as storm water culverts which in turn evidently led to significant erosion of the river banks	ELO pressured the design team (i.e. Architects) to ensure a speedy design change. Non-compliance reports were submitted to the PM team to ensure that the NC is addressed as soon as possible to prevent future damage to the riverbanks.	During the design phase of the project life cycle, one must ensure that designs have been finalised. It should be noted that designs can change during the works activity due to unforeseen circumstances or environmental matters that may not have been considered. It is evident that the role and function of the ELO should be emphasized when planning a project/development to revert back to designs and amending. One should always take into consideration the surrounding environment and where the proposed development is going to be constructed to ensure all necessary requirements are addressed before construction commences.	Personal Communication: ECO/ELO

7	Potential flooding hazard of the proposed development and liabilities to PM	Flood plan for the Development is currently not signed off due to various amendments that need to be made.	Requirements were set out as per WULA to develop a flood plan and to ensure that the 1:50 y and 1:100 y flood line are considered. The Contractor did however build containment areas to ensure that the development will be able to deal with potential floods.	Emergency response plans i.e. fires, spillages, flooding, explosions etc should have been completed and signed off by the ELO before construction commenced. The necessary training and evacuation drills should have been undertaken to ensure that when a person is exposed to such conditions/emergencies, a person would be able to know the roles and responsibilities of each worker/employee.	Personal Communication: ECO/ELO
8	Water pollution outside the site boundary	Not adhering to EMP requirements and the correct communication line was not followed i.e. instructing the employee correctly where to dump contaminated water (piling water) and not just outside the site boundaries.	EMP requirements to be emphasized during environmental awareness training and Contractors made to understand the consequences of transgressing these requirements whether inside or outside the site boundaries/works area. Even though spot fines were issued for numerous offences on site, Contractors did not always understand duty of care principle and the implications of transgressing it	Enforcement of the duty of care principle and linking fines to various transgressions i.e. allocating different amount of money to various non-compliances and increasing the amount when multiple offences take place. Training also to be strictly enforcement and to ensure that there is a Zero Tolerance No Harm to the People and the Environment Rule.	Personal Communication: ECO/ELO
9	Heritage	During construction bones were found on site and the works area was cordoned off and activities were stopped. SAHRA was notified to determine the way forward. The bones were taken off-site to an Archaeological Specialist to investigate whether it was of human origin. It was however stipulated that the bone was of animal origin and activities could continue.	As per the Environmental Management Specifications and EMP, the correct pathway was followed. It did however influence construction activities and caused delays in the works programme. The potential for locating heritage features / sources during the construction phase were not identified in the EIA. It was captured as a predicted impact of the pre-construction phase	Provision should be made in PM works programme for the possibility of coming across heritage (i.e. graves, head stones, artefacts, bones, coins etc). It should also have been identified in the EIA during construction phase since such a find can have numerous implications i.e. site stoppage, police investigations etc.	Personal Communication: ECO/ELO

Table 7: Photographic evidence and comments related to unforeseen impacts.

Photo: Personnel and management of construction activities (see point 2 of Table 6)  
Comment: Discussions regarding personnel and management of construction activities were held during training sessions with employees (environmental training), however, as identified by the Environmental Control Officer, the training attendance register did not reflect the number of employees that were not subject to the relevant training. Absence / lack of this training could have contributed to employees operating machinery within the 30 m no-go corridor and the storing of building rubble, empty paint containers and dump rock in the 30 m no-go corridor. This was communicated to the relevant parties as being non-compliances towards the RoD and EMP.
Photo: Formal communication: No photo available (see point 3 of Table 6)
Comment: There was no formal communication between the Principal Contractor and the subcontractors regarding the requirements set out in the RoD and EMP (i.e. not having a formal top-down approach). If proper communication lines existed, information ensuring compliance would have been efficiently communicated and incidents such as the litter and storage of empty paint containers would either not have occurred or been allowed. If inspections were done by the Contractor's environmental officer, this type of transgression could have been identified, addressed and prevented during the rest of the project life cycle.

Photo:

Rehabilitation (see point 4 of Table 6)

Comment:

As per the EMP, the necessary rehabilitation should be considered during the construction phase to prevent unnecessary hold-ups during the operation phase. One would be able to determine from the above mentioned photographs that rehabilitation designs were only finalized during the construction phase, which left the contractors with no choice to start with rehabilitation at a later stage. It should be mentioned that the EIA did not clearly stipulate the requirements relating to the rehabilitation underneath the span. The only enforcement tool that could be used is the Environmental Control Officer and the necessary Method Statements to ensure compliance. One can see that building rubble and general waste containers were found underneath the span.

Photo:

Footprint (see point 5 of Table 6)

Comment:

Increasing the footprint of the development and intruding into the 30 meter no-go corridor. Changes to micro-design could have played a role here due to no prior consultation with the Environmental Control Officer and no approved Method Statement.

Photo:

Micro-designs (see point 6 of Table 6)

Comment:

Micro design changes were made by Contractors to suit their needs, which did not align with the license requirements that were issued before construction started. For example: A non-compliance report was submitted to the Contractor relating to the storm water culvert designs and construction which does not make provision for the movement of terrestrial species up and down the river and which was not reflected as part of the approved method statement. The EMP section dealing with the management and protection of fauna states that a management objective is to *"maintain the movement of **terrestrial species** up and down the river".* Furthermore, this is a fundamental principle determined in the EMP. Section 6.2.2 of the RoD also states that "mitigation measures outlined in the EMP dated December 2005 are legally binding components of any contract and should be legally enforced". The contractor was informed of his non-compliance and provided with the necessary resolutions and measures to be put in place to ensure that the necessary movement of terrestrial species was not restricted.

Photo:

Fines and penalties (see point 8 of Table 6)

Drie skuldig ná plaasaanval

Enviromental scare or harmless act?

Tagtig maar eintlik twintig

Comment: Even though penalties/fines were issued to Contractors not complying with the RoD, some contractors were ignorant or had less knowledge of environmental related issues. From the newspaper it was stipulated that a Contractor evidently discharged waste water into the Mooi River without consulting the necessary responsible parties, this could have led to significant non-compliances and/or site stoppage. The RoD could have been revoked, however the relevant discharge was addressed and the necessary steps taken to ensure it does not happen again.
Photo: Archeological finding (see point 9 of Table 6) 
Comment: Bones found on the Mooi River Mall site which evidently was mistaken for a human bone. The bones were removed from site and assessed by an Archeology Specialist. The area where bones were found was demarcated and no work could occur in the area until instructed to do so. The bones were found to be of an animal origin and construction related activities could commence.

Unforeseen impacts are an inherent part of EIA and it can be expected that unforeseen impacts would surface during the operational phase. However, it is the effectiveness of the measures put in place to manage these impacts that would ultimately contribute to a sustainable outcome.

4.3. COMPLIANCE PERFORMANCE / RATING

The RoD was selected as the benchmark against which to measure compliance. Various conditions were stipulated that the Mooi River Mall development had to comply with. Table 8 was developed to reflect the same numbering as in the RoD. To be able to allocate a compliance rating to the conditions, the compliance records database (Annexure E) was critically analysed, including various other documents such as the MRM files; inspection reports; monitoring reports; minutes of meetings; other licenses; communication with the authorities

and/or project manager; training records; presentations; the EMP; non-compliance certificates; method statements; penalties and/or fines; developed plans for the project; complaints; issue and response plans and relevant audit results. Table 8 was derived from Annexure E allowing for a qualitative database to be developed and a full summary of the compliance rating for the Mooi River Mall in terms of the conditions as set out in the RoD could be determined (Annexure E). The compliance rating was presented as full compliance (green), partial compliance (blue) and non-compliance (orange).

Table 8: The compliance rating of the Mooi River Mall during the construction phase of the project.

Number	RoD conditions set by DEAT	Compliance Rating	Justification (RoD compliance for the MRM)	Reference
		Standard Conditions		
6.1.2	Compliance to other legislation	FC	Obtained WUL (document on file), rezoning permit, exemption in terms of Willows (Category 2 Invader Plant) i.t.o the Conservation of Agricultural Resources Act, Act 43 of 1983	WULA document, Rezoning permit on file,
6.1.3	Only Activity 2c is allowed	FC	Land-use changed to the construction of a retail shopping centre - Only allowable activity	EMP principles, RoD (environmental authorisation obtained); Amendment to RoD was made due to the increasing environmental footprint of the proposed development
6.1.4	Regular audits must be carried out to establish compliance (External audit to be done every six month and annually during operation)	PC	Audits were held pertaining to environmental compliance and legal compliance. The only evidence indicates that 3 audits took place. Contractual agreements were put in place and regular audits scheduled	Audit reports
6.1.4	Conditions to be brought under the attention of all employees associated with the activity. To take the necessary measures to bind such persons.	PC	Environmental Training - Extensive for management and awareness to employees - However, the people did not always understand the significance of these conditions and transgressed in some cases.	Training registers and attendance documents on file
6.1.5	One week's notice to Senior Environmental Mgmt Services of DEAT before commencement of the construction activities	FC	Notification completed and sent through to DEAT 31 July 2006	Notification
6.1.6	Changes in proposal resulting in significant environmental impacts are only permissible if approved in writing by Senior Manager: Environmental Mgmt Services	FC	Some of the erven descriptions for the MRM were incorrect and an amendment to the RoD was applied for	Amendment application
6.1.7	Notification of RoD to I&AP within 5 days informing them of the outcome and if requested provide copies of the RoD. A copy of the authorisation to be available on-site during construction and all staff to be made aware of the contents of this authorisation	FC	After receiving the RoD and the amendment, notifications was sent through to all I&AP	Records such as email, faxes etc were kept on file
6.1.7	A copy of authorisation available on-site and all staff to be made aware of the contents of this authorisation	FC	Copy available on-site (in EO's file),with the project manager and the ECO/ELO)	Viewed the site file
6.1.8	Changes and/or amendments by department	FC	Yes, as mentioned above some of the erven descriptions for the MRM were incorrect and an amendment to the RoD was applied for	Amendment application and amended RoD
6.1.9	Change of ownership and/or project developer	FC	No change of ownership and project developer	RoD
6.1.10	Change of address of the applicant	FC	No change of address	RoD
6.1.11	Complaints	FC	The MRM has a complaints register on site and all complaints are captured on a register (ECO/ELO) and responses provided to I&AP. During the construction phase 28 complaints were raised and addressed accordingly	Complaints register as of February 2009
		Specific Conditions		

6.2.1	Refuse and waste during construction must be compacted and stored on-site in appropriate container and regularly removed to the local licensed waste disposal site	FC	Waste was stored in bins with lids to prevent wind -blown litter from lying around on site. It must be noted that during some stages litter became a problem but was addressed immediately. The contractor dumped litter, solid/liquid waste at a licensed facility and provided safe disposal certificates as proof of safe disposal.	Weekly inspection records, EMP requirements, Waste manifests (safe disposal certificates)
6.2.2	Implementation of EMP which is legal document	FC	Specific environmental management document and EMP was implemented to ensure compliance with the RoD. The requirements were also communicated to site management and to employees via training.	Training presentation, pre-meeting with management to highlight the main environmental aspects and impacts, EMP requirements
6.2.3	Storm water management measures be put in place and erosion must be controlled as specified in Environmental Conservation Act, Act 73 of 1989.	NC	Design modifications led to culverts not constructed in designated timeframe - led to erosion. Berms were constructed to ensure that silt laden water is not released into any water bodies/sources.	Weekly inspection records, ELC minutes, progress meeting minutes, Method Statements and designs, EMP requirements
6.2.4	Hazardous chemical substances not allowed to find their way into sewers or the storm water system	FC	Mitigation measures: Impermeable concrete slabs and bund walls constructed	Weekly inspection records and Method Statements, EMP requirements
6.2.4	Discharge of any substances into the sewers or storm water management are not allowed, if and when discharges are to be allowed it must comply with the standards as stipulated by the water license or applicable bylaws	NC	Piling related activities was not done in accordance with the WUL and cement laden water was released. This was immediately remediated to ensure that it does not take place again. Water monitoring data however did not indicate that the piling related cement laden water had posed any risks to the health of the environment and water body.	Non-compliance certificates, weekly inspection records, EMP requirements, water monitoring records
6.2.5	Storm water leaving applicants premises must in no way be contaminated by any substances whether solid, liquid, vapour or gas or combination thereof	PC	The no-go zone berm (dump rock in baskets lined with biddum) was utilised to ensure that storm water with silt is settled out before reaching the river. This however was not immediately erected and only after numerous NCR's did construction of the berm take place.	Non-compliance certificates, weekly inspection records, EMP requirements, water monitoring records
6.2.6	Storm water outlets to be designed to prevent erosion of the area surrounding the outlet incorporating measures such as natural energy breakers and/or breathing canals	NC	Storm water culverts were only installed at later stages after designs were finalised. This had a tremendous impact on the environment causing erosion and bank instability	Non-compliance certificates, weekly inspection records, EMP requirements, Method Statements and designs
6.2.7	Appropriate action to ensure that the river crossings and the culverts are designed to be maintained in a sustainable manner and to ensure no excessive damage occurs by floods exceeding the magnitude of floods occurring on average once in every 20 years	NC	Designs were not finalised in the beginning of the project thereby impacting on the programme of the Contractor. Provisions were made for 1:100 floods and water quality reports compiled (as per specification). An emergency flood plan procedure was developed but not yet approved. Emergency exit door in the parking area were currently a concern and the placement thereof and the exiting route for people were being finalised. Non-compliance letter was drafted and distributed on the 12th of September 2008. Other outstanding issues include the collapsible walls (since completed) and the electrical and mechanical equipment in the basement.	ELC minutes, Emergency Flood plan procedure, Non-compliance certificates, designs

6.2.8	Minimization of the extent of any damage caused to the flood plain - No pollution of river system	NC	Water monitoring was done on a monthly basis and indicated that the current activities close to the riverine systems is not impacting on the river in terms of the quality of water. The EMP training that was done also ensured that the employees know why the river is important. Spot fines/penalties were also handed out to those employees not adhering to the requirements. Within standards but impossible to comply with	Weekly inspection records, ELC minutes, progress meeting minutes, Method Statements and designs, EMP requirements, water monitoring results
6.2.9	No physical damage to any aspect of the water course other than what is necessary to complete the works as specified and accordance with design specifications	PC	If and when Non-compliance reports were generated it was clearly stipulated that the application of the authorisation is liable for the said activity. The ECO/ELO enforced the requirement with the Contractor	Weekly inspection records, ELC minutes, progress meeting minutes, Method Statements, designs, EMP requirements, water monitoring results
6.2.10	Topsoil stockpiles not higher than 1.5 m	PC	There was however indications that stockpiles were exceeding the required height but was resolved immediately.	Weekly inspection records, EMP requirements
6.2.11	All materials off-loaded and stored in dedicated areas and well away from surface water resources	PC	Various weekly reports indicate that material was stored within 100 m of the river which is a contravention in terms of the WUL and the EMP requirements. This was however resolved with the responsible parties to ensure compliance.	Weekly inspection records, Non-compliance certificates, EMP requirements
6.2.12	No on-site burial or dumping of any waste materials, vegetation, litter or refuse	FC	This was emphasized with the Contractor to ensure compliance. There was however no evidence in terms of all the applicable documentation that waste materials, vegetation, litter and refuse were buried or dumped. Waste Manifests indicated that the litter were dumped at a licensed facility	Waste manifests (safe disposal certificates); weekly inspection records, EMP requirements
6.2.13	Integrated waste management Plan based on best practices must be used - solid waste to be disposed of at a licensed landfill site	FC	Solid waste was disposed at a licensed facility and the Contractor was able to provide proof of the permit and the safe disposal certificates	IWMP, weekly inspection records, waste manifest (safe disposal certificates), EMP requirements
6.2.14	Limitations of erosion and sedimentation	PC	Storm water culverts were only installed at later stages after designs were finalised. This had a tremendous impact on the environment causing erosion and bank instability. The no-go zone berm (dump rock in baskets lined with biddum) were utilised to ensure that storm water with silt is settled out before reaching the river. This however was not immediately erected and only after numerous NCR's was the berm constructed.	Non-compliance certificates, weekly inspection records, EMP requirements, water monitoring records, Method Statements and designs
6.2.15	Temporary crossings are to be stable and does not induce a flooding or safety hazard - temporary structures to be inspected for accumulation of debris, blockade, erosion of abutments and overflow areas	PC	Temporary structures were inspected to ensure that it is stable and does not induce a flooding or safety hazards. Barricades and hand-railings were constructed to ensure stability. There was however during some inspections debris seen under these structures and the Contractor was to remove this as a matter of urgency. Erosion was noted and was addressed	Weekly inspection records, Non-compliance certificates, EMP requirements

6.2.16	Increased run-off due to vegetation clearance and/or soil compaction must be managed and steps to be taken to ensure that storm water does not lead to bank instability and excessive levels of silt entering the stream	NC	Storm water culverts were only installed at later stages after designs were finalised. This had a tremendous impact on the environment causing erosion and bank instability. Culvert installation was not done in time which caused bank instability. This was rectified almost upon completion of the construction phase. Berms were constructed to ensure silt laden water does not enter the riverine environment and contaminating it.	Weekly inspection records, Non-compliance certificates, progress meeting minutes, photographic evidence, Method Statement and designs
6.2.17	The establishment of riparian vegetation to assist with the stabilization of the banks and soil to minimize the risk of erosion	PC	Landscaping formed part of the construction phase and the Contractor was advised to re-design the parking lots and gardens to ensure that indigenous plant species are planted and not invaders. The implementation of this activity took only place by the end of the construction phase. Plants were not selectively removed as per the requirements of the EMP and non-compliance reports generated.	Weekly inspection records, Non-compliance records, EMP requirements, Method Statement and designs, Issue and Response Plan
6.2.18	Development and Establishment of an early warning system for the safety and security of the development in the event of a flood exceeding 1:50 years	PC	A flooding alarm was installed which is an ultra sound sensor that will monitor the level of the river under the mall bridge. The flooding alarm was installed but during the time of reviewing the documentation the flooding alarm was not approved. Emergency Flood Plan was developed but also not approved	Issue and Response Plan, ELC minutes, progress meeting minutes, Emergency Flood Procedure
6.2.19	The applicant must appoint an external professional engineer to undertake bi-monthly inspections to protect the development and downstream water users. The inspections is to include upstream and downstream bridges and culverts for obstructions, structural integrity of the basement and buildings; structural integrity of the upstream Lombaard Street berm constructed for the purpose of preventing flooding during high rainfall events	NC	An external engineer was appointed (no evidence on file but was indicated by the Contractor) to undertake such monitoring. Monitoring was not done in accordance with specifications and was only done July 2007 and September 2007 (only records available)	Water quality reports
6.2.20	Weeds and Invader Plants that are declared in terms of the Conservation of Agricultural Resources Act (43 of 1989) must be controlled	PC	Cat 2 Invader: Willow - Exemption obtained later during the construction phase	Exemption letter on file
6.2.21	Protected plant species must not be removed unless authorised by the Directorate: Nature Conservation services of this department	PC	Some plant species were earmarked for relocation to the nursery, other plant species were left untouched within the 30 m no-go zone. Only upon approval from the ECO/ELO was removal of plant species allowed. There was however evidence that plant species were removed but was not done selectively in accordance with EMP specifications.	Weekly inspection records, ELC minutes, EMP requirements, Non-compliance certificates, Method Statement and designs
6.2.22	ECO/ELO to be appointed to ensure that conditions stipulated in the RoD, mitigation measures contained in the EMP are complied with. Name and contact details to be forwarded to department prior to construction phase	FC	ECO/ELO was appointed and a permanent EO for the Contractor to manage the various activities	Appointment letters on file

6.2.23	The contractor must leave the construction site free from erosion, silting, pollution and/or unwanted material. Affected areas to be rehabilitated	PC	During weekly inspection it was highlighted that various areas need urgent attention - removal of garden refuse, gabions to be covered with topsoil, equipment to be moved etc. The gabions need to be rehabilitated and the planting of covered gabions was in the process of being conducted. Other related matters include clearing and rehabilitation of various areas still needs to be done i.e. Shaping of riverbeds, planting of vegetation, activation of Growth lights, scaffolding to be removed	Issue and Response Plan, ELC minutes, progress meeting minutes, Weekly inspection reports, Non-compliance certificates
6.2.24	Archaeological artefacts be found during construction related activities - activities in the vicinity must be stopped - Site to be fenced off and marked. SAHRA to be contacted ASAP	FC	Bones found - SAHRA contacted to identify the artefacts and to provide the contractor with a way forward	Letters of bone confirmation
6.2.25	Mobile dry chemical toilets must be applied for the construction workers during the construction phase	FC	Toilets were provided and screened - Maintenance of these controlled to a certain extent.	Weekly inspection records, EMP requirements
6.2.26	Operation of machinery/equipment/vehicles must be kept to normal working hours to prevent unwanted high noise levels at night	NC	Contractor worked at night - even though requested not to do so - Permission was to be obtained from the Municipality which was granted (no letter on file) at a later stage.	Weekly inspection records, EMP requirements, ELC minutes
6.2.27	Employment opportunities to be given to the local skilled, semi-skilled and unskilled labour force during construction and during operation to stimulate the local and regional economy	FC	Employment was provided to local skilled, semi-skilled and unskilled labour during the construction phase. The induction records indicate where the employees came from and who was employed by a labour broker.	Training records and attendance register
6.2.28	Authorised activity, including site preparation may not commence before the statutory 30 days of an appeal period has expired	FC	The RoD was received by the Contractor on the 7th of June 2006 and only after 30 days was a notice of construction works submitted to the department (31st July 2006).	RoD and Notice of construction works to commence
			Non-compliance	
7.1	In the event of non-compliance by any contractor during the construction of the authorised activities, the holder/applicant of this authorisation will be liable	FC	If and when Non-compliance reports were generated it was clearly stipulated that the application of the authorisation is liable for the said activity. The ECO/ELO enforced the requirement with the Contractor	Non-compliance certificates, EMP requirements
7.2	If any condition stipulated in terms of this authorisation is not being complied with , the authorisation may be withdrawn after 30 (thirty) calendar days written notice to the application in terms of section 22(4)	FC	Authorisation was not withdrawn even though non-compliances did take place.	Site specific EMP and EMP principles were developed. EMP is quite extensive which included templates of various checklists. Checklists were completed by the ELO and Contractor (daily, weekly, bi-weekly and monthly). Meetings were held with Contractor and to undergo regular scheduled audits. Communication with client/Departments also played an important role

7.3	Failure to comply with any of these conditions shall be regarded as an offence and may be dealt with in terms of sections 29, 30 and 31 of the Environmental Conservation Act, 1989 (Act No. 73 of 1989) as well as any other appropriate legal mechanisms	FC	No other appropriate legal mechanism was enforced by the Department since the non-compliances by the project was never followed up	No documents from the authority
7.4	Holder must in the event of non-compliance with any condition of this authorisation inform the Senior Manager: Environmental Management Services of DEAT in writing within 48 hours	FC	The department were informed within 48 hours of any non-compliances	Non-compliance register and certificates
7.5	Records relating to compliance and non-compliance with the conditions of this authorisation must be kept in good order. Such records must be made available to this Department within seven days of receipt of a written request by the Department	FC	Non-compliance certificates were kept on file and copies kept with ECO/ELO	Non-compliance register and certificates
7.6	Provincial Government, Local Authority of committees appointed in terms of the conditions of the application or any other public authority or organization shall not be held responsible for any damages or losses suffered by the developer or his successor in title in any instance where construction or operations subsequent to construction are to be temporarily or permanently stopped for reasons of non-compliance by the developer with the conditions of approval as set out in this document or any other subsequent document emanating from these conditions of approval	N/A	This condition was overlooked as no proof in the form of documentation was available.	N/A
7.7	The applicant is responsible for compliance with the provisions of the Duty of Care and remediation of damage contained in Section 28 of NEMA, 1998 (Act No. 107 of 1998).	N/A	This condition was overlooked as no proof in the form of documentation was available.	N/A
7.8	The holder/applicant must be responsible for all costs necessary to comply with the above conditions unless otherwise specified.	FC	As part of the contractual agreements it was stipulated that the holder/applicant is fully responsible for all costs to comply with all the related conditions of the RoD.	Contractual agreement

From Table 8 it can be deduced that the Mooi River Mall fully complied with 26 RoD conditions, partially complied with 13 conditions and had 8 non-compliances. After establishing the ratings of compliance, the percentage of compliance was determined and is presented in Figure 10.

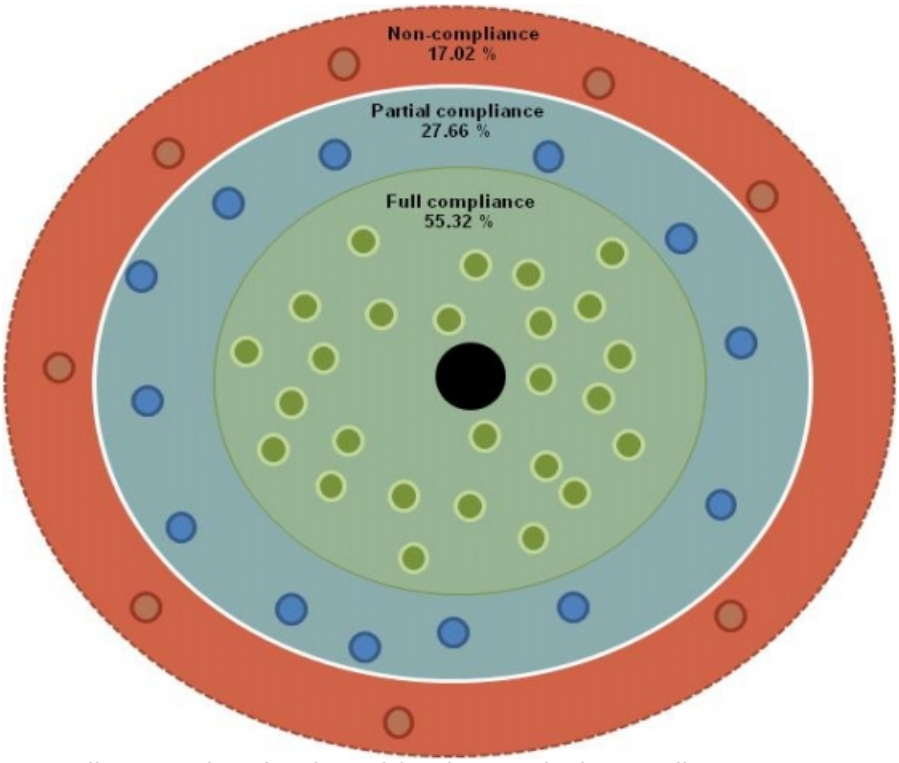

Figure 10: Compliance rating dart board for the Mooi River Mall.

Figure 10 depicts the percentage of compliance by the Mooi River Mall construction phase and it is clear from the dart board that the development had an overall good legal compliance with only 17.02 % non-compliances (refer to Table 8 for the non-compliances references). The non-compliances can be derived from poor storm water designs and implementation; poor planning of the works programme; subcontractor management; and outsourcing reports to water specialists which is time consuming and costly.

Partial compliance was estimated to be 27.66% of the construction phase of the Mooi River Mall, which could be attributed to a lack of knowledge and skills by the contractors; training requirements not fully met; the non-involvement by the authorities; poor planning and communication between the different lines of management; lack of penalties/fines against the contractor; enforcement of requirements not stringent enough; lack of commitment by contractors and lack of environmental coordination and/or cooperation.

The Mooi River Mall had a full compliance rating of 55.32 % for the construction phase even if there were some non-compliances and partial compliance ratings.

4.4. SUMMARY OF RESULTS

This chapter aimed to address the three research questions described in the introduction. It is concluded that the 66 % accuracy of predictions are generally in line with international trends. There is also a correlation between the occurred impacts and the probability and significance ratings of impacts. The higher the significance the more accurate the predictions seem to be. During the EIA process a small number of unforeseen impacts occurred which could be attributed to the risk averse approach of EIA. Finally the overall compliance levels of the Mooi River Mall development were 83% (actual level 82.98 %), which is considered good.

The following chapter will provide some reflection and critical discussion of the research results in relation to the existing knowledge on EIA follow-up in South Africa. Recommendations and areas of future research are also presented.

5. CHAPTER FIVE: DISCUSSION & CONCLUSION

This chapter addresses the overall research aim as described in Chapter 1.

"To conduct a critical analysis of the accuracy of EIA prediction, and the level of compliance to environmental authorization requirements, for the construction phase of a mega project".

The chapter begins with a critical reflection of the research results as presented in Chapter 4 and provide possible explanations for the findings. The chapter concludes with a discussion of lessons learnt and subsequent recommendations.

5.1 CRITICAL REFLECTION OF IMPACTS AND LEGAL COMPLIANCE

5.1.1 ACCURACY OF PREDICTIONS (RELATED TO PREDICTED IMPACTS, PROBABILITY OF IMPACTS, AND SIGNIFICANCE OF IMPACTS)

Impact prediction during the construction phase of the Mooi River Mall is considered accurate since 66 % of predicted impacts either occurred or partially occurred (the 9 unforeseen impacts were not calculated as part of this). The 66% accuracy of predictions from the construction phase of the MRM can be compared to several international sources. One of these include Canadian case studies presented by Noble and Storey (2005) where the conclusion was reached that the precision and unambiguousness of impact predictions present considerable challenges when attempting to evaluate and verify accuracy of predictions. Noble and Storey (2005:179-180) also state that determining accuracy becomes problematic and less valuable when the characteristics of the variables for which specific predictions are made are subject to change. However, it does not imply that predictive accuracy is not "nice to know". Compared to the data from these case studies the accuracy of the Mooi River Mall's predictions in relation to the predictions made was fairly accurate.

Secondly, by comparing the accuracy of predictions (66%) from the MRM with South Africa (focussing mainly on the Northern Cape and Free State; Freemantle, 2008) as well as first world countries such as the United Kingdom (Dipper *et al*., 1998; Wood *et al*., 2000), Australia (Buckley, 1991) and the United States (Culhane, 1987) it can be concluded that the MRM did extremely well in predicting the accuracy of environmental impacts (refer to Figure 11 for more details) but that limited work in this field has been done. The extent of international research does not provide a clear benchmark, but the results for the MRM seem consistent with the limited work that has been done. Figure 11 was developed to provide an illustration of the

accuracy of predictions world-wide and when predictions fall within a certain perimeter what the actual outcome would be i.e. are you a cheater or should you consider another career.

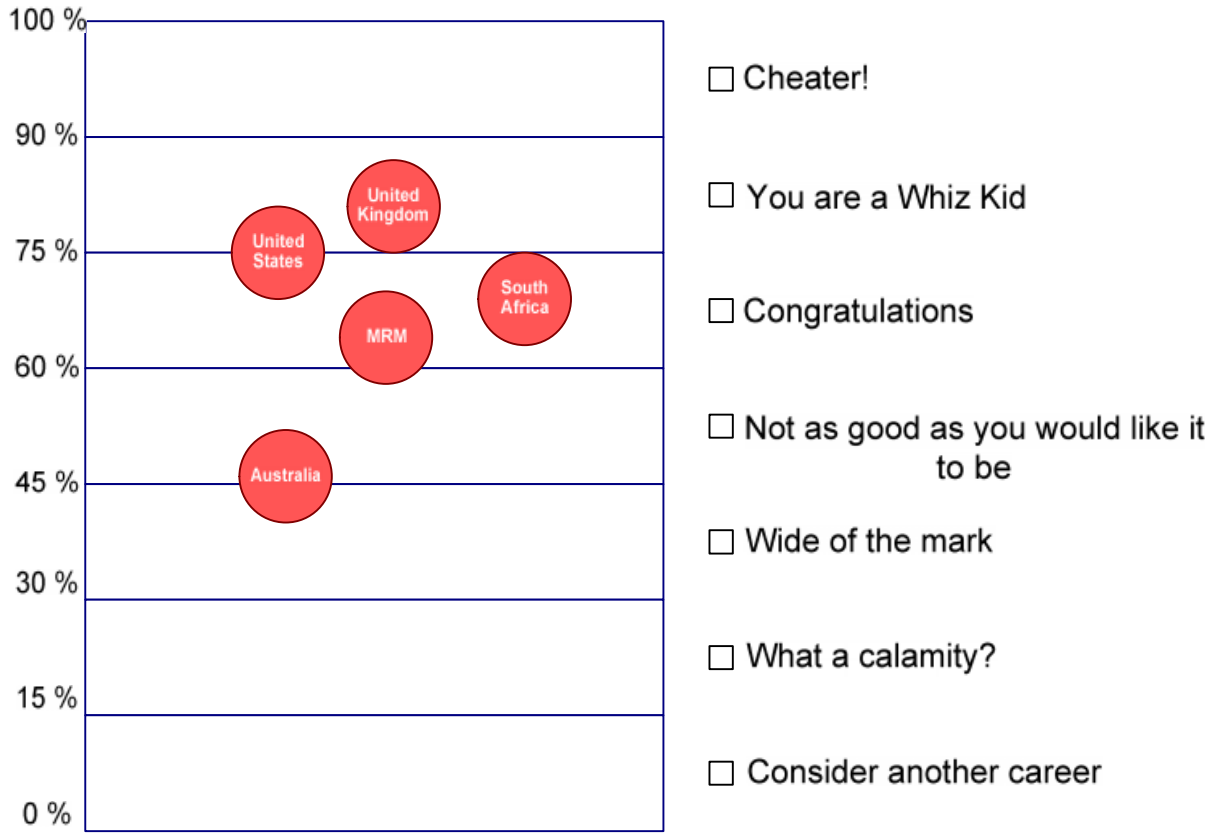

Figure 11: Accuracy of predictions based on international and national sources.

The accuracy of prediction as well as the low number of unforeseen impacts can amongst other be ascribed to the generic nature of construction related activities that means that many or all of the predicted impacts for construction relating projects do not differ often. Therefore, conducting EIA follow-up after the construction phase could provide useful information about the accuracy of the predictions which could in turn assist with the effectiveness of mitigation measures and overall success of environmental management and protection.

Furthermore, the accuracy of predictions could provide developers with enough useful information to be more committed to environmental protection and to increase the credibility of public confidence in the EIA process. By implementing EIA follow-up developers can identify and correct unanticipated impacts (unforeseen impacts) at an early stage which promotes more sustainable outcomes.

5.1.2 UNFORESEEN IMPACTS

Only nine unforeseen impacts were identified during the construction phase of development. The low number of unforeseen impacts is related to the risk averse approach followed with the EIA process, which identified a very large number of impacts, many of which never occurred. However, by mitigating these impacts through action plans the impacts did not cause significant damages. It is worth mentioning that the possibility always exists that unforeseen impacts could occur at any stage during the project life cycle, however, the way a development (licensee/developer) responds to these impacts (i.e. through corrective measures, responding effectively and timeously) can result in impacts being avoided, mitigated or managed. As a result of the aforementioned intervention measures the Mooi River Mall was able to manage these impacts.

5.1.3 LEGAL COMPLIANCE

The Mooi River Mall had an overall good legal compliance level of 83 % with only 17 % non-compliance. As mentioned in Chapter 4 some of the conditions could not be met due to the impracticality thereof and therefore the project was not able to comply with all the conditions. The good legal compliance could be the result of proper auditing requirements that were put in place as well as regular monitoring of the conditions set out in the environmental authorisation. For the non-compliance reports of the development, authorities could possibly have played a more prominent role to ensure enforcement of compliance by the contractors, even if non-compliance reports were compiled and generated. It is not helpful if conditions are stipulated in the environmental authorisation but not enforced by the local and/or national authorities, creating uncertainty and possible lack of commitment by the developer. The actual follow-up and/or compliance monitoring should be done by the local and/or national authorities even if an environmental officer or environmental control officer has been appointed. Detailed mitigation plans and standards/procedures (implementation of an EMS) could have been developed and/or established to incorporate the various requirements of the EMP and EIA follow-up methods to have a tool in place if all plans seem to fail. The reason being, that EMS provides a better understanding of how to manage, monitor and evaluate your company's effect/impact on the environment and it also provides the link between EIA follow-up and the EIA process.

5.2 RECOMMENDATIONS AND FUTURE STUDIES

The contribution of this study is to share information that could begin to address the "reinvention of the wheel problem" and to provide more insight into EIA follow-up. EIA follow-up could, in the

long run, convert EIA from being an endless paperwork exercise to a more accurate and instrumental tool to achieve rational, sound, resource management and sound sustainable environmental management (Dipper *et al*., 1998:734, Noble and Storey, 2005:165). Other recommendations emerging from the study that could be considered for future research include:

- Evaluating more projects and gathering more information;
- Considering the whole life cycle of projects instead of focusing on the construction phase;
- Assessing more licenses i.e. emission-to-air; water use licenses; etc;
- Measuring the extent, duration, status and intensity of impacts.
- Looking at cumulative, health and local community effects (social and cultural) that need to be considered on the national scale.
- Developing an audit database whereby results from projects can be incorporated and be made available when future projects of the same nature arise.
- An exceedance notification database can also be explored to enable future projects to review the exceedances and implement more stringent measures (Morrison-Saunders *et al.,* 2001:293).
- Developing formal procedures and guidelines relating to EIA follow-up to ensure and promote best practise (Marshall *et al.,* 2005: 180; Morrison-Saunders *et al,* 2001: 293).
- To educate and build capacity for generic EIA follow-up practice internationally (Marshall *et al.,* 2005: 180)
- Promoting continuous improvement through national and international networks.
- Cumulative effect assessment (CEA) should also be considered and be integrated into legislation and processes to enhance current practices that would support sustainable development (DEAT, 2004c: 16).
- EIAs also need to be reviewed more effectively to ensure adequate information is provided for decision-making and gaps/deficiencies are identified i.e. unforeseen impacts (DEAT, 2004d: 2).
- SEA could also contribute to the EIA process by strengthening it and streamlining the process by addressing the causes of environmental impacts instead of treating the symptoms (DEAT, 2004e: 5).
- Mandatory requirements and/or central guidelines must be further explored and additional follow-up be undertaken that needs to be published and circulated to all (Dipper *et al*., 1998: 744).

- Conducting interviews/developing questionnaires as verification tools could be used for future studies to ensure that report findings are verified with the people that were involved with the project.
- To go into more detail on the actual effect and contribution EIA's are making to decision making processes. This information could then be used to aid the National Department to streamline the EIA process.

5.3 FINAL THOUGHTS

Overall, the accuracy of the predictions made and the legal compliance level of the Mooi River Mall development were fairly good compared to international research. This could be related to unavoidable impacts; failure to implement/identify mitigation measures; or that EIA follow-up served its purpose in the form of implementing effective auditing programmes to monitor legal compliance.

The key to EIA follow-up and future direction should be one of enhancing everyone's learning experience at all levels of application and practise. EIA follow-up is essential for determining both cumulative effects and the contribution of individual projects to cumulative environmental change. The image of EIA follow-up needs to be improved to ensure that the benefits are highlighted in practice and that the negative perceptions are eradicated.

EIA follow-up need not be complex nor expensive because a healthy dose of common sense with due attention to detail will enhance EIA follow-up and the subsequent accuracy of predictions. The dictum should not read "built it and forget it" but rather focus on "paving the building blocks" to ensure sound environmental management. The instrument to ensure this happens is EIA follow-up (*the brick builder*).

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7.1 ANNEXURE A: ACTUAL IMPACT RATING

Not predicted	NP
Occurrence	>5
Partial occurrence	>0 & <4
No occurrence	0

Modified mall design with mitigations

		Water Impact			Soil	Air	Land use	Biodiversity			Social	Visual	Economy	Traffic	
Project Phase	Predicted Impacts	Surface water pollution	Ground water pollution	Hydrology	Soil pollution and erosion	Air pollution	Land use potential	Habitat transformation	Aquatic habitat transformation (sediment loading)	Ecological and corridor functioning	Social Impacts	Visual & aesthetic impacts	Economic impacts	Traffic impacts	Reference & Justification
Pre-construction	Construction of barrier to prevent access to site	>5	NP	NP	NP	0	NP	>5	>5	>5	0	NP	0	>5	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist
	No protection of natural features	NP	NP	0	0	NP	0	0	>5	>5	0	NP	2	NP	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist
	Removal of pre-identified biota prior to earthworks	>5	NP	1	NP	1	NP	>5	2	>5	0	NP	2	NP	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist
	Modifications to existing drainage and other infrastructure (pipes)	>5	0	>5	0	0	2	1	2	3	0	NP	>5	NP	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist
	Earthworks	1	0	NP	1	0	1	1	1	2	0	NP	0	NP	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist
	Handling and storage of soil and/or fill material	2	0	NP	2	1	2	1	1	2	3	NP	0	NP	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist
	Transportation of bulk materials in the public domain	0	NP	NP	NP	1	NP	NP	NP	1	3	NP	>5	>5	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist
	Provision and operation of on site staff facilities and activities	0	0	NP	2	1	3	3	0	1	0	NP	>5	NP	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist
	Management of vehicles, machinery & equipment	1	0	NP	NP	0	NP	1	0	0	0	NP	0	NP	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist
	Handling and use of hazardous materials	2	0	NP	>5	0	0	0	0	1	0	NP	>5	NP	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist
	Litter generation	1	NP	NP	NP	1	2	NP	0	0	0	NP	>5	1	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist

	Solid waste generation, storage & disposal	1	0	NP	0	0	2	0	0	0	0	NP	>5	NP	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist
	Liquid waste generation, storage & disposal	2	0	NP	>5	NP	0	0	0	0	0	NP	>5	NP	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist
Construction	Earthworks	>5	>5	NP	>5	2	>5	>5	>5	>5	0	NP	>5	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes
	Handling and storage of soil and/or fill material	>5	0	NP	3	3	>5	4	>5	>5	2	NP	0	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes
	Transportation of bulk materials in the public domain	1	NP	NP	NP	1	NP	NP	NP	0	1	NP	2	>5	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes
	Construction of shopping mall	>5	2	>5	>5	2	>5	>5	>5	>5	2	NP	>5	>5	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes
	Removal of ground water seepage from excavations	2	>5	NP	0	NP	0	0	>5	3	NP	NP	NP	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes
	Construction of river diversion and bridge														
	Construction of river diversion & bridge	>5	NP	2	2	0	0	>5	3	>5	0	NP	3	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes
	Establishment of storm water drainage and other services infrastructure	4	0	>5	>5	0	1	>5	>5	>5	2	>5	1	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes
	Construction of road access points & upgrading of critical intersections	0	NP	NP	>5	1	0	NP	>5	NP	NP	NP	3	>5	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes
	Removal of temporary construction structures & services	0	NP	NP	3	2	0	0	2	0	0	3	1	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes
	Landscaping and establishment of parking area	0	NP	2	2	0	1	3	1	>5	0	NP	>5	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes
	Soil preparation & establishment of gardens	0	NP	NP	3	1	NP	3	1	>5	0	NP	>5	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes
	Removal of existing silt depositions from underneath bridges	>5	NP	2	2	NP	>5	>5	>5	3	NP	NP	1	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes
	Dam Construction														

	River features and habitat reconstruction	3	NP	2	0	0	>5	>5	>5	>5	0	NP	>5	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes
	Provision and operation of on site staff facilities and activities	2	0	NP	4	2	>5	>5	4	1	2	NP	>5	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes
	Management of equipment, litter, hazardous chemicals and waste														
	Management of vehicles, machinery & equipment	>5	1	NP	>5	>5	NP	>5	0	0	0	NP	0	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes
	Handling and use of hazardous materials	2	2	NP	>5	0	0	0	>5	2	0	NP	>5	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes
	Litter generation	>5	NP	NP	NP	2	>5	NP	0	0	0	NP	>5	3	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes
	Solid waste generation, storage & disposal	2	0	NP	>5	1	1	0	0	>5	0	NP	>5	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes
	Liquid waste generation, storage & disposal	2	0	NP	>5	NP	1	0	0	3	0	NP	>5	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes

7.2 ANNEXURE B: PREDICTED VS. ACTUAL IMPACTS

Not predicted	NP
Occurrence	O
Partial occurrence	P
No occurrence	N

Modified mall design with mitigations

		Water Impact			Soil	Air	Land use	Biodiversity			Social	Visual	Economy	Traffic		
Project Phase	Predicted Impacts	Surface water pollution	Ground water pollution	Hydrology	Soil pollution and erosion	Air pollution	Land use potential	Habitat transformation	Aquatic habitat transformation (sediment loading)	Ecological and corridor functioning	Social Impacts	Visual & aesthetic impacts	Economic impacts	Traffic impacts	Reference & Justification	Rating
Pre-construction	Construction of barrier to prevent access to site	O	NP	P	NP	N	NP	O	O	O	N	NP	N	O	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist	5 x O; 1 x P; 3 x N; 4 x NP
	No protection of natural features	NP	NP	N	N	NP	N	N	O	O	N	NP	P	NP	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist	2 x O; 1 x P; 5 x N; 5 x NP
	Removal of pre-identified biota prior to earthworks	O	NP	NP	NP	P	NP	O	P	O	N	NP	P	NP	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist	3 xO; 3 x P; 1 x N; 6 x NP
	Modifications to existing drainage and other infrastructure (pipes)	O	N	O	N	N	P	P	P	P	N	NP	O	NP	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist	3 x O; 4 x P; 4 x N; 2 x NP
	Earthworks	P	N	NP	P	N	P	P	P	P	N	NP	N	NP	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction	0 x O; 6 x P; 4 x N; 3 x NP

															checklist	
	Handling and storage of soil and/or fill material	P	N	NP	P	P	P	P	P	P	P	NP	N	NP	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist	0 x O; 8 x P; 2 x N; 3 x NP
	Transportation of bulk materials in the public domain	N	NP	NP	NP	P	NP	NP	NP	P	P	NP	O	O	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist	2 x O; 3 x P; 1 x N; 7 x NP
	Provision and operation of on site staff facilities and activities	N	N	NP	P	P	P	P	N	P	P	NP	O	NP	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist	1 x O; 6 x P; 3 x N; 3 x NP
	Management of vehicles, machinery & equipment	P	N	NP	NP	N	NP	P	N	N	N	NP	N	NP	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist	0 x O; 2 x P; 6 x N; 5 x NP
	Handling and use of hazardous materials	P	N	NP	O	N	N	N	N	P	N	NP	O	NP	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist	2 x O; 2 x P; 6 x N; 3 x NP
	Litter generation	P	NP	NP	NP	P	P	NP	N	N	N	NP	O	P	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist	1 x O; 4 x P; 3 x N; 5 x NP
	Solid waste generation, storage & disposal	P	N	NP	N	N	P	N	N	N	N	NP	O	NP	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist	1 x O; 2 x P; 7 x N; 3 x NP

	Liquid waste generation, storage & disposal	P	N	NP	O	NP	N	N	N	N	N	NP	O	NP	Weekly inspection records, NCR's, ELC minutes, progress meeting minutes, pre-construction checklist	2 x O; 1 x P; 6 x N; 4 x NP
Construction	Earthworks	O	O	NP	O	P	O	O	O	O	N	NP	O	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes	8 x O; 1 x P; 1 x N; 3 x NP
	Handling and storage of soil and/or fill material	P	N	NP	P	P	O	P	O	O	P	NP	N	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes	3 x O; 5 x P; 2 x N; 3 x NP
	Transportation of bulk materials in the public domain	P	NP	NP	NP	P	NP	NP	NP	N	P	NP	P	O	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes	1 x O; 4 x P; 1 x N; 7 x NP
	Construction of shopping mall	O	P	O	O	P	O	O	O	O	P	NP	O	O	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes	9 x O; 3 x P; 0 x N; 1 x NP
	Removal of ground water seepage from excavations	O	O	NP	N	NP	N	N	O	P	NP	NP	NP	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes	3 x O; 1 x P; 3 x N; 6 x NP
	Construction of river diversion & bridge															
	Construction of river diversion & bridge	O	NP	P	P	N	N	O	P	O	N	NP	P	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes	3 x O; 4 x P; 3 x N; 3 x NP
	Establishment of storm water drainage and other services infrastructure	P	N	O	O	N	P	O	O	O	P	NP	P	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes	5 x O; 4 x P; 2 x N; 2 x NP

	Construction of road access points & upgrading of critical intersections	N	NP	NP	O	P	N	NP	O	NP	NP	NP	P	O	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes	3 x O; 2 x P; 2 x N; 6 x NP
	Removal of temporary construction structures & services	N	NP	NP	P	P	N	N	P	N	N	NP	P	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes	0 x O; 4 x P; 5 x N; 4 x NP
	Landscaping and establishment of parking area	N	NP	P	P	N	P	P	P	O	N	NP	O	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes	2 x O; 5 x P; 3 x N; 3 x NP
	Soil preparation & establishment of gardens	N	NP	NP	P	P	NP	P	P	O	N	NP	O	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes	2 x O; 4 x P; 2 x N; 5 x NP
	Removal of existing silt depositions from underneath bridges	O	NP	P	P	NP	O	O	O	P	NP	NP	P	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes	4 x O; 4 x P; 0 x N; 5 x NP
	Dam Construction															
	River features and habitat reconstruction	P	NP	P	N	N	O	O	O	O	N	NP	O	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes	5 x O; 2 x P; 3 x N; 3 x NP
	Provision and operation of on site staff facilities and activities	P	N	NP	P	P	O	O	P	P	P	NP	O	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes	3 x O; 6 x P; 1 x N; 3 x NP
	Management of equipment, litter, hazardous chemicals and waste															

	Management of vehicles, machinery & equipment	O	P	NP	O	O	NP	O	N	N	N	NP	N	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes	4 x O; 1 x P; 4 x N; 4 x NP
	Handling and use of hazardous materials	P	P	NP	O	N	N	N	O	P	N	NP	O	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes	3 x O; 3 x P; 4 x N; 3 x NP
	Litter generation	O	NP	NP	NP	P	O	NP	N	N	N	NP	O	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes	3 x O; 1 x P;3 x N; 6 x NP
	Solid waste generation, storage & disposal	P	N	NP	O	P	P	N	N	O	N	NP	O	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes	3 x O; 3 x P; 4 x N; 3 x NP
	Liquid waste generation, storage & disposal	P	N	NP	O	NP	P	N	N	P	N	NP	O	NP	Weekly inspection records, audit documentation, NCR's, ELC minutes, bi-weekly site meeting minutes	2 x O; 3 x P; 4 x N; 4 x NP

7.3 ANNEXURE C: PROBABILITY AND SIGNIFICANCE

Not predicted	NP
Occurrence	O
Partial occurrence	P
No occurrence	N

Improbable	IPr
Probable	Pr
Highly Probable	HPr
Definite	Df

Low Significance	LS
Medium Significance	MS
High significance	HS

Modified mall design with mitigations

		Water Impact			Soil	Air	Land use	Biodiversity			Social	Visual	Economy	Traffic	
Project Phase	Predicted Impacts	Surface water pollution	Ground water pollution	Hydrology	Soil pollution and erosion	Air pollution	Land use potential	Habitat transformation	Aquatic habitat transformation (sediment loading)	Ecological and corridor functioning	Social Impacts	Visual & aesthetic impacts	Economic impacts	Traffic impacts	Rating
Pre-construction	Construction of barrier to prevent access to site	O/Pr/LS	NP	P/Pr/LS	NP	N/Pr/LS	NP	O/IPr/LS	O/Pr/LS	O/HPr/LS	N/Pr/LS	NP	N/Pr/LS	O/Df/LS	1 IPr; 6 Pr;1 HPr; 1 Df; 9 LS
	No protection of natural features	NP	NP	N/Pr/LS	N/Pr/LS	NP	N/Pr/LS	N/IPr/LS	O/Df/MS	O/HPr/MS	N/Pr/MS	NP	P/IPr/LS	NP	2 IPr; 4 Pr; 1 HPr; 1 Df; 5 LS; 3 MS
	Removal of pre-identified biota prior to earthworks	O/Pr/LS	NP	NP	NP	P/IPr/LS	NP	O/HPr/MS	P/Pr/LS	O/Pr/LS	N/IPr/LS	NP	P/IPr/LS	NP	3 IPr; 3 Pr; 1 HPr; 6 LS; 1 MS
	Modifications to existing drainage and other infrastructure (pipes)	O/HPr/HS	N/IPr/LS	O/HPr/MS	N/Pr/LS	N/Pr/LS	P/Pr/LS	P/Df/MS	P/HPr/HS	P/Pr/MS	N/Pr/LS	NP	O/HPr/MS	NP	1 IPr; 5 Pr; 4 HPr; 1 Df; 5 LS; 4 MS; 2 HS
	Earthworks	P/HPr/MS	N/IPr/LS	NP	P/HPr/MS	N/HPr/MS	P/Pr/MS	P/Df/HS	P/HPr/MS	P/Df/HS	N/HPr/MS	NP	N/HPr/MS	NP	1 IPr; 1 Pr; 6 HPr; 2 Df; 1 LS;7 MS; 2 HS
	Handling and storage of soil and/or fill material	P/HPr/MS	N/IPr/LS	NP	P/HPr/MS	P/HPr/MS	P/HPr/MS	P/Pr/MS	P/HPr/MS	P/HPr/MS	P/Pr/LS	NP	N/Pr/LS	NP	1 IPr; 3 Pr; 6 HPr; 3 LS; 7 MS
	Transportation of bulk materials in the public domain	N/Pr/MS	NP	NP	NP	P/IPr/LS	NP	NP	NP	P/Pr/LS	P/Pr/MS	NP	O/Pr/MS	O/Df/HS	1 IPr; 4 Pr; 1 Df; 2 LS; 3 MS, 1

															HS
	Provision and operation of on site staff facilities and activities	N/Pr/MS	N/IPr/LS	NP	P/Pr/LS	P/Pr/LS	P/Pr/LS	P/Pr/MS	N/Pr/LS	P/Pr/LS	P/Pr/LS	NP	O/IPr/LS	NP	2 IPr;8 Pr; 8 LS; 2 MS
	Management of vehicles, machinery & equipment	P/Pr/LS	N/IPr/LS	NP	NP	N/Pr/LS	NP	P/HPr/MS	N/Pr/LS	N/HPr/MS	N/Pr/LS	NP	N/HPr/MS	NP	1 IPr; 4 Pr; 3 HPr; 5 LS; 3 MS
	Handling and use of hazardous materials	P/Pr/MS	N/Pr/LS	NP	O/HPr/MS	N/Pr/LS	N/Pr/MS	N/HPr/MS	N/Pr/MS	P/Pr/MS	N/Pr/LS	NP	O/Pr/LS	NP	8 Pr; 2 HPr; 4 LS; 6 MS
	Litter generation	P/Pr/LS	NP	NP	NP	P/IPr/LS	P/Pr/LS	NP	N/Pr/LS	N/HPr/MS	N/Pr/MS	NP	O/Pr/LS	P/Pr/LS	1 IPr; 6 Pr; 1 HPr; 6 LS; 2 MS
	Solid waste generation, storage & disposal	P/Pr/LS	N/IPr/LS	NP	N/Pr/LS	N/IPr/LS	P/Pr/MS	N/HPr/MS	N/Pr/LS	N/HPr/MS	N/HPr/LS	NP	O/HPr/LS	NP	2 IPr; 4 Pr; 4 HPr; 7 LS; 3 MS
	Liquid waste generation, storage & disposal	P/Pr/LS	N/Pr/LS	NP	O/Pr/LS	NP	N/Pr/LS	N/HPr/MS	N/Pr/LS	N/HPr/MS	N/HPr/LS	NP	O/HPr/LS	NP	5 Pr; 4 HPr; 7 LS; 2 MS
Construction	Earthworks	O/HPr/HS	O/Pr/MS	NP	O/HPr/HS	P/HPr/MS	O/Df/HS	O/Df/HS	O/HPr/HS	O/Df/HS	N/HPr/MS	NP	O/HPr/MS	NP	1 Pr; 6 HPr; 3 Df; 4 MS; 6 HS
	Handling and storage of soil and/or fill material	P/HPr/HS	N/IPr/LS	NP	P/HPr/HS	P/HPr/MS	O/Pr/HS	P/Pr/MS	O/HPr/HS	O/HPr/MS	P/Pr/LS	NP	N/Pr/LS	NP	1 IPr; 4 Pr; 5 HPr; 3 LS; 3 MS; 4 HS
	Transportation of bulk materials in the public domain	P/Pr/MS	NP	NP	NP	P/IPr/LS	NP	NP	NP	N/Pr/LS	P/Pr/MS	NP	P/Pr/MS	O/Df/MS	1 IPr; 4 Pr; 1 Df; 2 LS; 4 MS
	Construction of shopping mall	O/HPr/HS	P/Pr/MS	O/Pr/HS	O/HPr/MS	P/Pr/LS	O/Df/HS	O/Df/HS	O/HPr/HS	O/Df/HS	P/HPr/MS	NP	O/Df/HS	O/Df/MS	3 Pr; 4 HPr; 5 Df; 1 LS; 4 MS; 7 HS
	Removal of ground water seepage from excavations	O/Df/HS	O/IPr/LS	NP	N/HPr/LS	NP	N/Pr/LS	N/Pr/LS	O/HPr/HS	P/Df/HS	NP	NP	NP	NP	1 IPr; 2 Pr; 2 HPr; 2 Df; 4 LS; 3 HS
	Construction of river diversion & bridge														

	Construction of river diversion & bridge	O/HPr/HS	NP	P/Pr/HS	P/HPr/MS	N/Pr/LS	N/HPr/HS	O/HPr/MS	P/HPr/HS	O/Hpr/HS	N/Pr/MS	NP	P/Pr/MS	NP	4 Pr; 6 HPr; 1 LS; 4 MS; 5 HS
	Establishment of storm water drainage and other services infrastructure	P/HPr/MS	N/Pr/LS	O/HPr/MS	O/HPr/LS	N/Pr/LS	P/Pr/LS	O/HPr/MS	O/HPr/MS	O/HPr/MS	P/Pr/MS	NP	P/HPr/MS	NP	4 Pr; 7 HPr; 4 LS; 7 MS
	Construction of road access points & upgrading of critical intersections	N/Pr/LS	NP	NP	O/HPr/LS	P/Pr/LS	N/Pr/LS	NP	O/Pr/LS	NP	NP	NP	P/Pr/LS	O/Df/LS	5 Pr; 1 HPr; 1 Df; 7 LS
	Removal of temporary construction structures & services	N/Pr/LS	NP	NP	P/Pr/LS	P/Pr/LS	N/Pr/LS	N/Pr/LS	P/Pr/LS	N/Pr/LS	N/HPr/LS	NP	P/Pr/LS	NP	8 Pr; 1 HPr; 9 LS
	Landscaping and establishment of parking area	N/Pr/MS	NP	P/HPr/MS	P/HPr/MS	N/HPr/MS	P/HPr/HS	P/HPr/MS	P/Pr/MS	O/Df/MS	N/Pr/LS	NP	O/HPr/MS	NP	3 Pr; 6 HPr; 1 Df; 1 LS; 8 MS; 1 HS
	Soil preparation & establishment of gardens	N/Pr/MS	NP	NP	P/HPr/MS	P/HPr/LS	NP	P/HPr/MS	P/Pr/LS	O/HPr/MS	N/Pr/LS	NP	O/Pr/MS	NP	4 Pr; 4 HPr; 3 LS; 5 MS
	Removal of existing silt depositions from underneath bridges	O/Df/HS	NP	P/Df/MS	P/Df/MS	NP	O/Df/MS	O/HPr/MS	O/Df/HS	P/Df/HS	NP	NP	P/Pr/LS	NP	1 Pr; 1 HPr; 6 Df; 1 LS; 4 MS; 3 HS
	Dam Construction														
	River features and habitat reconstruction	P/Df/HS	NP	P/HPr/MS	N/HPr/LS	N/Pr/LS	O/HPr/MS	O/Df/MS	O/Df/HS	O/Df/HS	N/Pr/MS	NP	O/Pr/MS	NP	3 Pr; 3 HPr; 4 Df; 2 LS; 5 MS; 3 HS
	Provision and operation of on site staff facilities and activities	P/Pr/LS	N/IPr/LS	NP	P/Pr/LS	P/Pr/LS	O/Pr/LS	O/Pr/MS	P/Pr/LS	P/Pr/LS	P/Pr/LS	NP	O/IPr/LS	NP	2 IPr; 8 Pr; 9 LS; 1 MS
	Management of equipment, litter, hazardous chemicals and waste														
	Management of vehicles, machinery & equipment	O/Pr/MS	P/Pr/LS	NP	O/Pr/MS	O/Pr/LS	NP	O/HPr/MS	N/Pr/MS	N/HPr/MS	N/Pr/LS	NP	N/HPr/MS	NP	6 Pr; 3 HPr; 3 LS: 6 MS
	Handling and use of hazardous materials	P/HPr/MS	P/Pr/MS	NP	O/Pr/MS	N/IPr/LS	N/Pr/MS	N/HPr/MS	O/HPr/MS	P/Pr/HS	N/Pr/LS	NP	O/Pr/LS	NP	1 IPr; 6 Pr; 3 HPr; 3 LS; 6 MS; 1 HS

	Litter generation	O/Pr/LS	NP	NP	NP	P/Pr/LS	O/Pr/LS	NP	N/Pr/LS	N/HPr/MS	N/Pr/MS	NP	O/Pr/MS	NP	6 Pr; 1 HPr; 4 LS; 3 MS
	Solid waste generation, storage & disposal	P/Pr/LS	N/IPr/LS	NP	O/Pr/LS	P/Pr/LS	P/Pr/LS	N/HPr/LS	N/Pr/LS	O/HPr/LS	N/HPr/LS	NP	O/HPr/MS	NP	1 IPr; 5 Pr; 4 HPr; 9 LS; 1 MS
	Liquid waste generation, storage & disposal	P/HPr/MS	N/Pr/LS	NP	O/Pr/MS	NP	P/Pr/MS	N/HPr/MS	N/HPr/MS	P/HPr/MS	N/HPr/LS	NP	O/HPr/LS	NP	3 Pr; 6 HPr; 3 LS; 6 MS

7.4 ANNEXURE D: UNFORESEEN IMPACTS

Number	Impact	Reason Why?	Mitigation	Proposed Mitigation	Reference/Source
1	Biodiversity (Flora)	Willow trees found on site and classified as Category 2 Invader species / plant (need to obtain permission from Department of Land Use and Soil Management (Potchefstroom) to keep the trees in tact).	Permission obtained - document on file, however trees need to be maintained due to it being natural heritage to Potchefstroom. No new Willows are to be planted, other indigenous species to be planted. EMP requirements and the Environmental Management Specifications made provision for identifying heritage features on site during all phases of the project.	Should have been addressed in the EIA (construction phase), however provision was made in the Pre-construction phase for the protection of heritage sources.	Personal Communication: ECO/ELO
2	Personnel and management of construction activities	Training provided, however a small number of workers did not undergo training - Training was under estimated.	Could not be mitigated even though it was an EMP requirement.	Proper planning to be done before commencement of activities to ensure all staff are trained. Include possibility of implementing a card system for environmental training. A training needs analysis and training plan could be developed.	Personal Communication: ECO/ELO
3	Communication of requirements from Principal Contractor to Subcontractors not always done	During various site establishment activities of subcontractors - EMP requirements were not adhered to i.e. site establishment and/or contractor camps established within 100 m of the water course. This was a direct contravention of the WULA requirements.	Site inspections conducted and formal discussions held with the Subcontractors to address the matter. Non-compliance reports were issued for corrective action.	List of subcontractors to be available during the pre-construction preparation to communicate the requirements of other licenses such as the WULA to prevent non-compliances from occurring.	Personal Communication: ECO/ELO
4	Rehabilitation under span	Proper planning initiated, however designs were only finalised during the construction phase and the EIA did not clearly stipulate the requirements relating to rehabilitation underneath the span i.e. lighting etc.	ELC meetings held to improve on designs and to communicate to PM what the requirements should be. However, no formal guidelines were set out to ensure that rehabilitation under span would be successful.	The ELO should be more directly involved during the designs phase. Proper lighting studies and advice / consultations from specialists should be considered prior to the commencement of the activities	Personal Communication: ECO/ELO
5	Increase of development's footprint	Developers and Architects increased the extent of the project resulting in an application to amend the RoD	Application was approved and interested and affected parties (I &AP's) informed accordingly. ELO advised the Project Manager to increase the footprint after amended RoD has been received. The PM needs to adhere to the 47500 m^2 requirements as set out in the RoD.	Formal decisions need to be made during the Full EIA process to ensure that the scope of works falls within the boundaries of work before the RoD is provided to prevent further delays	Personal Communication: ECO/ELO
6	Micro-design changes during construction	Small changes and/or amendments were made to various designs during the construction phase which impacted on the implementation and construction of other designs such as storm water culverts which in turn evidently led to significant erosion of the river banks	ELO pressured the design team (i.e. Architects) to ensure a speedy design change. Non-compliance reports were submitted to the PM team to ensure that the NC is addressed as soon as possible to prevent future damage to the riverbanks.	During the design phase of the project life cycle, one must ensure that designs have been finalised. It should be noted that designs can change during the works activity due to unforeseen circumstances or environmental matters that may not have been considered. It is evident that the role and function of the ELO should be emphasized when planning a project/development to revert back to designs and amending. One should always take into consideration the surrounding environment and where the proposed development is going to be constructed to ensure all necessary requirements are addressed before construction commences.	Personal Communication: ECO/ELO

7	Potential flooding hazard of the proposed development and liabilities to PM	Flood plan for the Development is currently not signed off due to various amendments that need to be made.	Requirements were set out as per WULA to develop a flood plan and to ensure that the 1:50 y and 1:100 y flood line are considered. The Contractor did however build containment areas to ensure that the development will be able to deal with potential floods.	Emergency response plans i.e. fires, spillages, flooding, explosions etc should have been completed and signed off by the ELO before construction commenced. The necessary training and evacuation drills should have been undertaken to ensure that when a person is exposed to such conditions/emergencies, a person would be able to know the roles and responsibilities of each worker/employee.	Personal Communication: ECO/ELO
8	Water pollution outside the site boundary	Not adhering to EMP requirements and the correct communication line was not followed i.e. instructing the employee correctly where to dump contaminated water (piling water) and not just outside the site boundaries.	EMP requirements to be emphasized during environmental awareness training and Contractors made to understand the consequences of transgressing these requirements whether inside or outside the site boundaries/works area. Even though spot fines were issued for numerous offences on site, Contractors did not always understand duty of care principle and the implications of transgressing it	Enforcement of the duty of care principle and linking fines to various transgressions i.e. allocating different amount of money to various non-compliances and increasing the amount when multiple offences take place. Training also to be strictly enforcement and to ensure that there is a Zero Tolerance No Harm to the People and the Environment Rule.	Personal Communication: ECO/ELO
9	Heritage	During construction bones were found on site and the works area was cordoned off and activities were stopped. SAHRA was notified to determine the way forward. The bones were taken off-site to an Archaeological Specialist to investigate whether it was of human origin. It was however stipulated that the bone was of animal origin and activities could continue.	As per the Environmental Management Specifications and EMP, the correct pathway was followed. It did however influence construction activities and caused delays in the works programme. The potential for locating heritage features / sources during the construction phase were not identified in the EIA. It was captured as a predicted impact of the pre-construction phase	Provision should be made in PM works programme for the possibility of coming across heritage (i.e. graves, head stones, artefacts, bones, coins etc). It should also have been identified in the EIA during construction phase since such a find can have numerous implications i.e. site stoppage, police investigations etc.	Personal Communication: ECO/ELO

7.5 ANNEXURE E: MRM COMPLIANCE RECORD

Name of Document	Description of Document and Purpose	On MRM file	Source/Reference	Photographic Evidence
RoD/Environmental authorisation				
Record of Decision (07.06.2006)	Environmental authorisation (07.06.2006) to go ahead with construction related activities which all depend on certain standard and specific conditions which need to be adhered to. Permit to work	√	RoD	Yes (scanned version)
I&AP's	I&AP's informed of decision that was made via different sources/media that forms part of the RoD requirements	√	Faxes, post, emails	Yes
Request to Amend RoD Application	Request to amend the RoD application due to footprint of development increasing (To NWDACE on 27.07.2006)	√	Application Document	Yes (scanned version)
RoD amendment received	RoD amendment received back (13.02.2007) - Decision provided to increase the footprint from 40000 m2 to 47500 m2	√	RoD amendment Document	Yes (scanned version)
I&AP's	I&AP's informed of decision that was made via different sources/media that forms part of the RoD requirements	√	Faxes, post, emails	Yes (scanned version)
Environmental Management Plan				
Environmental Management Plan	Environmental management plan was provided to Contractors to ensure compliance - Discussions were held with management to enable Contractors to comply with the site rules. Within the EMP, the 6 EMP principles were highlighted	√	EMP	Forms part of the MRM file (i.e. working document)
Environmental Management Specifications				
Environmental Management Specifications	Extensive document to ensure compliance (2005.01.01). This document was attached to the EMP whereby various environmental matters were addressed and to ensure compliance	√	Addendum to EMP	Provided to Contractors during the start up of the project
Water Use License				
WULA request for information: Modifications of work	Part of WULA application	√	WUL application	N/A
Water Use License document	WUL received on 21.12.2006 with conditions for adherence. WUL includes conditions and the Determination of the Reserve (28.09.2006)	√	WUL	Yes, (scanned version)
South African Heritage Resources (NHRA)				
SAHRA documents to Mokgophe (25 July 2005) in terms of artifacts etc. No objections (replied back)	SAHRA Exemption	√	SAHRA exemption	N/A
Instruction for cessation of construction works	Works were stopped on 03.07.2007 due to bones being found in the works are. In terms of the requirements as set out by the SAHRA exemption report and the EMP requirements activities needed to cease until instructed on the way forward	√	SAHRA exemption and EMP requirements	N/A

Bone confirmation	First confirmation send through on 25.07.2007 - Animal bone; Animal bone. Photographic evidence available	√	As per SAHRA exemption requirements and EMP requirements	Yes
Bone confirmation	First confirmation sent through on 25.07.2007 - Animal bone; Second find 03.10.2007 - Animal bone. Photographic evidence available	√	As per SAHRA exemption requirements and EMP requirements	Yes
Rezoning				
Rezoning permit	Rezoning permit on file 17 Jan 2006 & 20 Jan 2006	√	Public domain - Gazette	N/A
Invaders				
Exemption of Cat 2 Invader	Exemption of Cat 2 Invader Salix *babylonica* on file - Application was done 1 July 2007 and feedback received on the 10 July 2007	√	Exemption cat 2 Invaders	N/A
Monitoring requirements as set out in RoD & WULA				
Water quality reports	Water quality reports (to be done monthly) - to ensure whether water quality deteriorate - Variables to monitor - TDS, TSS, pH, soap/oil/grease	√	WULA conditions - to be reported to DWAF on an annual basis and within 3 months after close of the period	N/A
Water quantity reports	Water quantity reports (early warning system to be developed (continuously)); sedimentation loading - water quality reports will indicate; stability and structural integrity (earth berm to be constructed) - Only done July 2007 and September 2007	√	WULA conditions	N/A
Bio-monitoring	Bio-monitoring to be done bi-annually (summer and winter) to determine the impact of the development on the linear functioning of the Mooirivier. Various components needs to be considered such as erosion of natural channel, riparian Vegetation Index, Fish Health Integrity Index, Latest SASS scoring system, To monitor the heronry conservation - check reed bed integrity. This was done for the first quarter of May 2007, second quarter Sep 2007; First quarter Jan 2008	√	WULA conditions	N/A
Templates Inspection records				
Start up, daily, weekly, monthly and temporary site closure checklist	Various templates were available on file which forms part of the EMP requirements.	√	Forms part of the EMP requirements	N/A
Monthly compliance certificates template	A template regarding the monthly compliance certificates was available on file (this was implemented only for four months after which is was scraped from the system - Reason being was not effective	√	Forms part of the EMP requirements	N/A
Contact details of Key role players				
Contact details of Key role players	The contact details of various key role players were developed to ensure that the necessary information is captured and to be able to contact the key role players. It is a excel spreadsheet which indicates the company, name of person, position, cell nr and email address.	√	As per RoD conditions (ECO to be able to ensure all is contacted)	N/A

Functions and expertise of each key role player	There is another document on file which provides more details as to what the functions or expertise of each person is	√	As per RoD conditions (ELO to be able to ensure all is contacted)	N/A
Environmental Liaison Officer (ELO)				
Appointment letter and Contract	Letter is on file, however during the inspection of the files it was found that the letter was not signed. The ECO advised that the letter were with CEM on file and will not be available on the MRM files. Have requested to see the signed letter	√	As per RoD conditions (7.4)	N/A
Non-compliance certificates				
Certificate 17.09.2006 (1)	A non-compliance report was compiled to maintain the 30 m no-go corridor (EMP requirement) whereas gabions have been erected closure than 15 meters from the middle of the river bed (Section 6.2.2 RoD - EMP legal binding document).	√	Section 6.2.2. & 7.1 - 7.4 & 7.7 RoD and & EMP	No
Certificate 17.09.2006 (2)	A non-compliance report was compiled for piling and related activities in the absence of Water Use License (No work to start in a water course before the WUL has been received in terms of section c & I of the NWA	√	Section 21 c & I of the NWA & ss per RoD conditions (7.1 - 7.4 & 7.7)	No
Certificate 17.09.2006 (3)	A non-compliance report was compiled relating to the RoD for the MRM. The report addressed the non-compliances to the requirements of the 30 m no go corridor along the length of the river which is captured in the EMP requirements and various communication to the developer. It also stipulates that the corridor is not included in the drawings leading to the fence being erected less than 15 m on one side of the river.	√	EMP requirements, RoD 6.2.2 & 7.1 - 7.4 & 7.7	No
Certificate 16.10.2006 (1)	Multiple NC's document was compiled for piling and related activities relating to no environmental awareness training (Section 6.1.4 RoD & 6.1.7, no approval for such activity (Method statement - EMP requirements), operating after 7 pm at night, daily checklist not completed (EMP requirement), major diesel spill (no response plan evident and corrective action only started a week later), effluent generated by the contractor being disposed of into the watercourse (section 6.2.8 of RoD & WULA Section 21f - water use and should be licensed), no evidence pertaining to stockpiled material which has been approved by the PE (EMP requirements - handling and storage).	√	Section 6.2.8 RoD, Section 6.1.4, 7.1 - 7.4 & 7.7 and 6.1.7, EMP requirements - handling and storage, Section 21f of the NWA	Yes (see NC's section)
Certificate 16.10.2006 (2)	Multiple NC's document was compiled for erosion control measures not implemented i.e. EMP requirements not met): construction of gabions as the preferred soil erosion measures. Some areas had gabions but not all areas were covered. Stockpiles were found to be at these open areas and need to be rectified	√	As per Section 6.2.3 & 6.2.14, 7.1 - 7.4 & 7.7 RoD conditions & EMP requirements	Yes (see NC's section)
Certificate 24.10.2006	A non-compliance report was generated to address the contraventions of the Contractor towards piling and related activities (I,e, discharging water containing waste) into the river course. The report reflects on the site visits that were done which found evidence pertaining to discharging of water containing waste from the piling process. Section 6.2.8 of the RoD stipulates that the river must not be polluted. Also section 21 f of the NWA refers to the aforementioned activity as a water use and need to be licensed. Section 2.4 of the DWAF "Preliminary Determination of the Reserve and the Resource class" for the development states that water use licenses will be obtainable from DWAF and that no abstraction or discharge of waste or water containing waste into the river may take place without approval from DWAF. The developer has only applied for section 21 c and i i.t.o of the NWA and is not allowed to discharge. Section 39 stipulates that measures must be taken to avoid disposal or spillage of any material which could destroy or degrade the in stream or riparian habitat	√	RoD (6.2.8 & 7.1 - 7.4 & 7.7), EMP requirements, 21 f NWA, Section 2.4 DWAF Document, Section 39 of the WULA	No

Certificate 13.11.2006 (1)	Application of herbicides in order to remove exotic/invader plants - not done in accordance with related Method Statement & Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (nr 36 of 1947) - ELO advised that Method (application of herbicide) was not suitable for use close to a river and Contractor was referred to a invader plant specialist for advice and to secure the services of a specialist to supervise the application of herbicides to minimize potential risks. A herbicide was applied without the prior approval from the ELO and that the said activity was controlled/supervised by no/very limited experienced people. The MSDS referred to a substance that is a highly active non-selective herbicide that works through root-uptake in plants (i.e. death in plants can occur. No Pest Control Operator (PCO) was used to apply the herbicide (FFFARSRA) section 2aii states that a registered PCO be used.	√	As per RoD conditions (7.1 - 7.4 & 7.7) & EMP/EMS	Yes (see NC's section)
Certificate 13.11.2006 (2)	Multiple NC's document was compiled for the 30 m no-go zone fencing and erosion control measures. It stipulates that in terms of the EMP the 30 meter corridor will be fenced for its entire length before earth works and construction starts. The EMP also refers to a berm that need to be constructed along the 30 m corridor before any stockpiling commences to prevent potential eroded soil from reaching the river - Berms/gabions on Eastern side were not constructed although earth works have started (soil erosion is highly likely due to current rain storms which will result in siltation of the river. Platform was elevated which could negatively impact on the berms constructed - to rectify this a cut-off trench was proposed but was not constructed. The current erosion measures at the opening of the storm water channel into the Mooi river close to Lombard Street bridge are not sufficient to prevent erosion of the river bank and siltation of the river (corrective actions were proposed but not implemented)	√	As per RoD conditions (7.1 - 7.4 & 7.7) & EMP/EMS	Yes (see NC's section)
Certificate 18.03.2007	Non-compliance relating to piling - discharge of water containing waste into the river course - A newspaper article was compiled regarding wastewater that were wrongfully discharged into the river course without the approval from the necessary relevant authorities. The incident was investigated and it was found that the Mooi river site's ECO confirmed that the actions was not in accordance with the agreed method of discharge piling groundwater effluent at an evaporation dam at the Tlokwe City Council's sewage works. Section 6.2.8 RoD - construction work to be minimized and to not pollute the river system as a result of his activities. The action is regulated by the section 21 of the NWA (36 of 1998) which clearly stipulates that s21f discharging of waste or water containing waste into a water course through a pipe, canal, sewer, sea outfall or other conduit constitutes a water use and requires a license. Section 39 of the NWA refers to measures must be provided to avoid disposal or spillage of any material which could destroy or degrade the in stream or riparian habitat.	√	As per the RoD conditions (7.1 - 7.4 & 7.7), NWA and EMP requirements, Section 39 WUL and 2.4 DWAF document	Yes (the article)
Certificate 20.03.2007	Non-compliance document compiled regarding non-compliances and fines with regards to waste water discharge into the river: piling and building contracts. A contravention took place whereby during multiple site visits evidence were found that waste water effluent containing unknown compounds were discharged into the river by the building contracts and piling water were discharged into the river by the piling contractor. The legal requirements were not met and include Section 6.2.8 RoD and the WUL requirements (s 21 f). Certain legal duties need to be adhered to, which includes RoD conditions: notifying NWDACE in the event of non-compliances and in terms of the NWA section 151: contravention of the act constitutes an offence and section 5.7 of the license stipulates that any incident that cause or may cause water pollution must be reported to the Regional Director. The incident was reported to DWAF which indicated that failure to stop and to correct these offences will result in legal action against the developer in the form of a directive. In this non-compliance report reference is made to the other reports that were submitted to the various contractors. It also summarizes that in the event of such re-occurrence fines can and will be issued (EMP Annexure 20, Section 1.6 Tolerances). A fine were issued to the piling Contractor for R8000	√	As per the 6.2.8 & 7.1 - 7.4 & 7.7 RoD conditions, s 21f, section 151 NWA, 5.7 WUL and EMP requirements Section 1.6, & 2.4 DWAF document	No
Certificate 30.03.2007	Non-compliance report was compiled with regards to working at night. It states that several incidents of the Contractor working at night have been recorded and that it has been acknowledged by the Developer and the Building contractor during a bi-weekly site meeting. Section 6.2.26 RoD stipulates that during the construction phase, the operation of machinery/equipment/vehicle must be kept to a normal working hours to prevent unwanted high noise levels at night. The working house as specified by the Potchefstroom by-laws is from 6 am to 6 pm. Any non-compliance/contravention must be reported to NWDACE (section 7.4 RoD)	√	RoD conditions (section 7.1 - 7.4 & 7.7 and 6.2.26).	No

Certificate 02.08.2007	Non-compliance report was compiled which relates to the storm water culvert of James Maroko Avenue causing bank instability. The report refers to previous communication with the license holder. Corrective actions and finalization of the designs were proposed and minuted at the ELC meeting, whereby the designs have been finished and signed by DWAF and the ELO. The construction of the culvert has not been initiated and is still to commence. Various commitments were made dating back as from November 2006. There was however constraints faced by the Contractor i.e. scaffolding not removed which prohibits the earthworks contractor to enter the area to perform their tasks. The delay in construction is causing additional bank instability to an area that is already severely eroded. The legal requirements relating to the illegal activity includes Section 6.2.3 of the RoD, Section 6.2.9, Section 6.2.14, Section 5.20 WUL no bank instability may be caused.	√	RoD conditions (6.2.3, 6.2.9, 6.2.14, 7.1 - 7.4 & 7.7) & Section 5.20 of the WUL	No
Certificate 18.10.2007	A multiple non-compliance report were compiled which relates to oil spillages, maintenance of contractor camps and related activities. Evidence that supported the report includes: oil spillages were found at and nearby the bunded area of the main contractor & subcontractor; general waste maintenance including cement bags not disposed off; soil pollution due to oil leakages from plant; maintenance of sub-contractor's camp & the mixing of general and hazardous waste which is not done in accordance with the EMP and the Method Statement. The legal requirements relating to the illegal activity includes: RoD (6.2.1, 6.2.2, 6.2.12, 6.2.13), WUL (5.28, 5.37, 5,38) & the Method statement and EMP requirements that were not met.	√	RoD (6.2.1, 6.2.2, 6.2.12, 6.2.13, 7.1 - 7.4 & 7.7), WUL (5.28, 5.37, 5.38) & the Method statement and EMP requirements that were not met.	Yes (see NC's section)
Certificate 29.10.2007	Non-compliance report compiled relating to landscaping within the 30 m corridor. The report was compiled due to evidence that were found on numerous occasions that indigenous endemic plant species' are being removed non-selectively within the 30 m corridor. The legal requirements/conditions pertaining to the aforementioned activity is the RoD and EMP requirements and Method Statement.	√	RoD (7.1 - 7.4 & 7.7) & EMP requirements	No
Certificate 21.01.2008	A non-compliance report was compiled relating to impeding the movement of terrestrial species on river banks. The reports pertain to the EMP requirements not followed (fundamental requirement that is management objectives is to "maintain the movement of terrestrial specie up and down the river"). Section 6.2.2 refers to mitigation measures outlined in the EMP dated December 2005 is a legal binding document and the components of any contract and should be legally enforced. The design for the storm water culvert on the western banks of the Mooi River at James Maroko (Lombard Street) do not comply to EMP objective and that the gradient of the storm water culvert do not allow for the movement of terrestrial species through the culvert (culvert design 1).	√	EMP requirements, RoD 6.2.2 & 7.1 - 7.4 & 7.7	Yes (see NC's section)
Certificate 07.02.2008	A non-compliance report was generated that relates to non-compliance in terms of the WUL. Three incidents were observed during an inspection which relates to1. the storm water pipe adjacent to Governor Mbeki road was found to be filled with soil ultimately draining into the Mooi river and adding to the total dissolved solids (TDS) load during heavy rains; 2. Cement spillage at the House of Coffee area that partially spilled into the water adjacent to the gabions; 3. dewatering activities (pumping of excessive water) of the water mill construction area were taking place onto the riverbank at the Spur area. The excess water draining freely into the river was found to be in contact with cement and is therefore classified as water containing waste. In terms of the legal requirements relating to the illegal activities reference is made to Section 6.2.8 RoD, Section 21 f NWA and Section 39 of the WUL. .	√	RoD (6.2.2. & 7.1 - 7.4 & 7.7), Section 21 f NWA and Section 39 of the WUL	No
Certificate 07.02.2008	A non-compliance report was compiled relating to 30 m no-go zone damage. The report was compiled due to the fact that t30 m no-go zone corridor along the length of the river on the site have not been maintained. The area of concern was the north of the link bridge to James Maroka bridge where the 30 m fence (on both sides) has been completely removed, thus allowing the area to be severely damaged by employees and construction vehicles entering the area. No effort was observed to rectify the situation at the time of inspection. The 30 m no-go fence was damaged at the heronry area which allowed employees to enter the area. The requirement for the no-go fencing forms part of the EMP.	√	RoD (7.1 - 7.4 & 7.7) & EMP requirements	No
Certificate 14.03.2008	A non-compliance report was generated relating to landscaping. Change in the landscaping plan for advertising and other purposes were presented to the ECO on the 12th of March. Large areas without trees at James Maroka and N12 constituted to the non-compliance. The shrub plan indicated significant reduction in shrub specimens along Governor Mbeki , N12 and James Maroka. The EMP stipulates that avian and lepidoptera movement corridors will be established as specified by specialist. The specialists consisted of a working team. The plans were presented and submitted which was in term accepted by the ELC members whereby the changes plan that was submitted to the ELO on the 12th of March does not reflect which was agreed upon plan for both tree and shrubs distribution and number of flora specimens. In terms of the legal requirements relating to the illegal activity is that the landscaping contractor is in contravention with the RoD, EMP and draft Method Statement.	√	RoD (7.1 - 7.4 & 7.7) & EMP requirements	No

Certificate 17.11.2008	A non-compliance report was compiled relating to waste management, construction and housekeeping. The report reflects on the contractor's contraventions pertaining to evidence that was found during a specific site inspection. This includes unsafe storage of waste near the river, cement spillages into the river and uncontrolled storage of builders' rubble. No preventative measures were used to prevent the spillages into the river and evidence of spillages into the river and builders' rubble has been observed. The non-compliance report also refers to fines that could be issued for various transgressions. The legal requirements no adhered to includes Section 6.2.1, 6.2.2 & 6.2.12 of the RoD; the EMP requirements (safe handling and storage), WUL Section 5.28 and Section 5.38; Waste Management Plan and Method Statements	√	RoD (6.2.1, 6.2.2, 6.2.12, 7.1 - 7.4 & 7.7), WUL (5.28 and 5.38), Waste Management Plan and Method Statements	No
Certificate 31.11.2008	A non-compliance report was generated which relates to the pedestrian crossing and bicycle parking. The report reflects on the traffic impact study that clearly indicates that pedestrian crossing points will be provided on site as part of the internal circulation and that designated space for bicycle parking be provided.	√	RoD (7.1 - 7.4 & 7.7) & Traffic Impact Study	No
Letters from developer to Contractors				
Letter regarding non-compliance (24.10.2006	A letter was compiled by the client for Contractors regarding multiple non-compliances and not adhering to environmental legislation, the RoD/EMP and EMS	√	As per RoD conditions & EMP/EMS	N/A
Construction Closure Report and Outstanding issues from ELO to Developer, NWDACE and DWAF				
Report from ELO to developer, DWAF and NWDACE	A report was generated by the ELO to DWAF, NWDACE and the developer addressing various outstanding issues. Numerous construction issues were addressed/closed out during the compilation of the report, but there were a couple of issues and milestones that have not been met on site both in finalizing the building specifications as well as closing all environmental issues and requirements as stated in the EMP. The mall opened in April 2008 and has been operating jointly with construction activities that posed significant challenges in terms of environmental responsibilities which have been met as far as possible. It was agreed on the 19th of February 2008 by the developer and the mall operations management that all construction issues will be formally handed over to operations to complete. In the report reference is made to an Annexure A which is a list of outstanding issues that have been handed over to the operational phase management and serves as a list for record purposes to the relevant authorities, developer and mall management. Annexure A is part of the MRM Issues and Response Plan that serves the function of an updated EMP which is continually monitored by the ELO, Mall Management, 3rd party auditors as well as the ELC member	√	EMP requirements	N/A
Monthly Compliance certificates (NC reports)				
Monthly compliance certificate to Subcontractors	Monthly compliance reports were submitted to all the relevant Contractors on site, but was deemed not necessary after 4 months of implementation since the necessary non-compliance reports were compiled by the ECO to ensure compliance	√	EMP requirements	N/A
Issues and Response Plan				
Plan	An issues and response plan (update to EMP) was compiled by the ELO to ensure compliance and to address outstanding construction issues. 11 Issues have been highlighted in the reports as being outstanding which includes: 1. Gabion and Armco-flex rehabilitation in the 30 m zone; 2. Pedestrian crossings and bicycle parking; 3. Approval of flood plan that was drafted by hydrological engineer; 4. Installation of flooding alarm; 5. Approval of installed flooding alarm; 6. Clearance of invader poplar trees and shaping of eastern banks north of Lombard Street); 7. The information boards along the river on the boardwalk need to be completed; 8. Rehabilitation of link bridge; 9. Rehabilitation of Trimpark area; 10. Builder's rubble storage on parking areas in 30 m zone and picnic area; & 11. building of collapsible wall	√	Monitoring document that captures the EMP and provides an update of outstanding issues	No
Instruction letters				
Instructions	Various instructions were compiled by the ECO to ensure that various highlighted issues are addressed e.g. Installation of macerators at the wet-waste generating area.	√	EMP requirements	No
Fines/Penalties				
Non-compliance fines	A fine was issued pertaining to the misuse of the water point at the entrance and usage of coffers to contain the water	√	RoD conditions	No

Spot fines	The Principal Contractor also issued spot fines to employees who were caught in act contravening the EMP and the RoD.	√	RoD conditions	
Reports Generated by Principal Contractor				
Daily inspection records	Daily inspection records were completed by the Principal Contractor to ensure that environmental matters are captured pertaining to the construction phase of the project	√	RoD conditions and EMP requirements	No
Meetings				
Construction phase meetings	Progress meetings and bi-weekly site meetings were held to ensure that environmental issues could be addressed as part of the agenda and minutes.	√	EMP requirements	No
Environmental Liaison Committee				
Constitution	Even though the establishment of an ELC is not enforced by the RoD, the ECO initiated such a committee to ensure that I&AP are involved in the whole of the construction phase. A constitution was developed to ensure that all who attend ensures that the constitution is adhered to.	√	ECO commitment to ensure the EMP and RoD conditions are met during the construction phase	No
Agenda & Minutes	Monthly meetings were held to address progress made with the MRM	√	ECO commitment to ensure the EMP and RoD conditions are met during the construction phase	No
Environmental Training (induction)				
Presentation	A presentation was developed in accordance with the EMP which includes the values, EMP principles, Roles and Responsibilities, key role players, approvals and conditions, waste management, storm water management, water management, RoD specific conditions, heritage, non-compliances, EMP in dept - regulations and the construction phase (what is expected of all).	√	RoD conditions and EMP requirements	No
Records	A copy of the training records is available on file - last training done in 2008	√	RoD conditions and EMP requirements	No
Register	A register was compiled by the Principal Contractor which was updated on a weekly basis to ensure that all employees have gone through environmental induction	√	RoD conditions and EMP requirements	No
Method Statements				
Purpose	In terms of the EMP it is a requirement that for all activities taking place on site, a method statement need to be developed to indicate the purpose and the activity list of the said activity. The MS needs to be approved by the ECO before construction works can start.	√	EMP requirements	No
Method Statements	A significant number of method statements were compiled by the Principal Contractor and his subcontractors. There is currently evidence on the file that almost all the MS has been signed off.	√	EMP requirements	No

Types	Site Establishment and Traffic Control; Waste management; Daily refueling of vehicles and daily pre-start checks and maintenance; Delivery and storage of construction material; bulk earth works - control of water pollution/erosion and flood management; Construction of bulk earth works; Construction of gabions in areas; Temporary site closure; Temporary piling platforms for road bridge; Removal of temporary gabions; Construction of temporary piling platforms; installation of Auger Cast in situ piles; Drilling/Driving casing in the installation of temporary cased auger cast in situ piles; Containment of spillages/leaks; placing of concrete; Emergency procedures for flood condition; Site camp establishment; Material storage and delivery; Dust control and pest control for termite extermination; Emergency response for fire and flooding; Waste management and handling; erection of pedestrian bridge across the Mooi river; Handling fuel and other HCS spills; To create cleaning schedule for roads surrounding the building site; Temporary site closure during December holidays; New concrete bridge over river; Landscape construction; Pouring of concrete on pedestrian bridge.	√	EMP requirements	No
Communication to the provincial and national governmental departments				
Non-compliance reports	This was submitted to the Department within the required time frame	√	RoD conditions	No
Notice of construction commencement of MRD Development.	Notice was submitted to the Department on 31 July 2006 Ref NR: EIA 160/2005NW	√	RoD conditions	No
Exemption of Cat 2 Invader	Document submitted to the NW DACE			
Communication with the sub contractors				
Principal Contractor	Various communication was done between the PC and his subcontractors.	√	EMP requirements	No
Complaints register				
Register	A complaints register was developed and kept on site and with the ECO to address accordingly. This was opened as from the start of the project up until 2008 (26 complaints received).	√	RoD conditions	No
Audits				
Environmental Compliance Audit	Two Audits were held with the Principal Contractor during December 2007 and April 2008.	√	RoD conditions	No
Legal Compliance Audit	A audit pertaining to legal compliance were held in February 2009 for the operational phase	√	RoD conditions	No
Emergency Flood plan				
Plan	There is no evidence on file that an emergency flood plan exist, however there is a method statement pertaining to emergency flood procedures and were deemed sufficient	√	RoD conditions	No