THE QUALITY OF ENVIRONMENTAL IMPACT REPORTS FOR PROJECTS WITH THE POTENTIAL OF AFFECTING WETLANDS.

MAKOMA JOHANNAH MOLOTO Hons.Bsc, Msc (Med)Virology

Mini-dissertation submitted in partial fulfillment of the requirements for the degree Magister Environmental Management in Geography and Environmental Studies at the North-West University (Potchefstroom Campus).

Supervisor: Dr LA Sandham

Co-Supervisor: Prof H Bouwman

2005

THE QUALITY OF ENVIRONMENTAL IMPACT REPORTS FOR PROJECTS WITH THE POTENTIAL OF AFFECTING WETLANDS.

MAKOMA JOHANNAH MOLOTO

ACKNOWLEDGEMENTS

I would like to sincerely acknowledge and thank the persons mentioned below for their advice, guidance and motivation that assisted in the completion of this study.

I sincerely appreciate the academic guidance, leadership and patience from my supervisor Dr LA Sandham throughout the period of my research. My sincere gratitude for believing in me and his encouragement.

Many thanks to my co-supervisor Prof H. Bouwman for all the constructive comments that really assisted in the completion of this study.

I also sent my heartfelt gratitude to Mrs root from the University library for all the assistance in responding to all my information requests from the library.

Finally, I would like to thank God for giving me the mind, good health, strength and wisdom to complete this study.

CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS

DEAT: Department of Environmental Affairs and Tourism

DME: Department of Minerals and Energy

DWAF: Department of Water Affairs and Forestry

EIA: Environmental Impact Assessment

EIR: Environmental Impact Report

NGOs: Non-Governmental Organisations.

ABSTRACT

Listed development activities, which may have a substantial detrimental effect on the environment require an Environmental Impact Assessment (EIA). One of the important elements of the EIA process is the submission of a scoping report and/or an environmental impact report (EIR) to the relevant government department and to, specialist and interested and affected parties for review, in order to determine whether the report is adequate and/or whether a greater quantity of information is required before a decision for project approval can be made. Information available in the reports to decision-makers with regard to developments with the potential of affecting wetlands can play a significant role regarding the protection and/or destruction of wetlands. The acceptance of the assessments reports after the authority review process depends, inter alia, upon the quality of the report. However, the current DEAT guideline document on EIA regulations (DEAT, 1998a) does not provide specific guidance to EIA practitioners in considering wetlands within the current EIA, nor any guidance on what a good EIA should include for projects that have the potential of impacting on wetlands, as observed with the World Bank guideline document on EIA and wetlands. Hence, this study aimed at assessing the quality of the EIA assessment reports of four projects with the potential of impacting on wetlands. The objectives of the study included the review by independent reviewers of the quality of four-selected impact reports using a checklist, analysis of the review process results and provision of recommendations to improve the quality of environmental impact reports for projects with the potential of impacting on wetlands.

Based on the review results it is concluded that:

- The four reports were rated as satisfactory despite some omissions and/or inadequacies observed.

- The identification and evaluation of impacts, which forms the core area of the EIA, process was weakly performed.
- The review method is fairly robust and consistent/reliable.

The following were recommended:

- The availability for and use of a quality review checklist by EIA practitioners and authorities as an additional tool to the EIA regulations (DEAT 1997), and the Integrated Environmental Management series (DEAT, 2002) can further improve the quality of the reports for projects with the potential of affecting wetlands.
- The availability for and use by EIA practitioners of a wetland review checklist will assist in ensuring that all key aspects are addressed before submission to the relevant authority i.e. the report is scientifically and technically sound; the report is clearly and coherently organised and presented so that it can be understood and that it has addressed all the important issues to make a decision about the proposed development. This will further assist in fast-tracking the approval process usually delayed by the request of additional information from the applicant as a result of inadequate reports.
- Regular use of the review checklist by EIA practitioners and authorities for ascertaining the quality of the environmental impact reports will contribute to a baseline of EIR quality for evaluation of Wetlands EIA practice under the new regulations due in 2005.

OPSOMMING

Omgewingsinvloedbepalings (OIB) word vereis vir gelyste ontwikkelings aktiwiteite wat 'n nadelige invloed op die omgewing mag hê. Een van die belangrikste elemente van die OIB-proses is die indien van 'n Omvangbepalings- of Omgewingsinvloedverslag aan die betrokke owerheid en ook aan spesialiste en belanghebbende en geinteresseerde partye vir evaluering, om vas te stel of die verslag voldoende is en of meer inligting benodig word voordat 'n beslissing vir projekgoedkeuring gemaak kan word. Die inligting wat in die verslag aan besluitnemers beskikbaar is ten opsigte van ontwikkelings met die potensiaal om vleilande te affekteer, kan 'n beduidende rol speel in die beskerming of vernietiging van vleilande. Die aanvaarding van die verslag na afloop van die owerheid sevalueringsproses hang af, *inter alia*, van die kwaliteit van die verslag. Die huidige OIB-riglyndokument (DEAT, 1998a) verskaf egter nie spesifieke riglyne aan OIB-praktisyns aangaande vleilande nie, en verskaf ook nie enige riglyne oor wat 'n goeie OIB-verslag behoort te bevat waar die moontlikheid bestaan dat die projek negatief op vleilande mag impakteer nie, soos wel waargeneem in die Wereldbank se riglyndokument vir OIB en vleilande. Gevolglik het hierdie studie dit ten doel gestel om die kwaliteit van vier OIB-verslae van projekte wat die potensiaal het om vleilande negatief te impakteer, te evalueer. Die doelwitte van die studie sluit in 'n evaluering van die verslagkwaliteit deur onafhanklike evalueerders m.b.v. 'n stiplys, 'n analise van die evalueringsresultate en aanbevelings ter verbetering van verslagkwaliteit vir vleilandprojekte.

Op grond van die evaluerings is die slotsom gemaak dat:

- Die vier verslae is bevredigend geevalueer, ten spyte van enkele weglatings of tekortkominge.

- Die identifikasie en evaluasie van impakte, die kern van die OIB-proses, is relatief swak uitgevoer.
- Die evalueringsmetode is relatief robuust en betroubaar.

Die volgende aanbevelings word gemaak:

- Die beskikbaarheid en gebruik van 'n kwaliteitsevalueringsstiplys deur OIB-praktisyns en owerhede as 'n addisionele hulpmiddel tot die OIB regulasies (DEAT 1997) en die Geintegreerde Omgewimgsbestuurreek (DEAT, 2002) kan die kwaliteit van OIB-verslae vir vleilandprojekte verder verbeter.
- Die beskikbaarheid en gebruik van 'n kwaliteitsevalueringsstiplys deur OIB-praktisyns kan bydra maak om te verseker dat alle sleutelaspekte aangespreek is voordat die verslag aan die bekwame owerhede voorgelê word, nl. dat die verslag wetenskaplik en tegnies aanvaarbaar is, dat die verslag duidelik en samehanged georganiseer en aangebied is sodat dit verstaanbaar is en al die belangrike sake aangespreek ten einde 'n ingeligte beslissing te maak ten opsigte van die beoogde ontwikkeling. Dit sal verder help om die goedkeuringsproses te bespoedig, welke proses dikwels vertraag word deur die aanvra van addisionele inligting a.g.v. 'n tekort in die aanvanklike verslag.
- Gereelde gebruik van die evalueringsstiplys deur OIB-praktisyns en owerhede om die kwaliteit van die verslae te bepaal sal bydra tot 'n basislyn van OIB kwaliteit vir evaluasie van vleiland OIB-praktyk kragtens die nuwe OIB-regulasies wat teen die einde van 2005 of begin 2006 verwag word.

PREFACE

I. PROBLEM STATEMENT

There is an international and national concern for the conservation and sustainable use of wetlands, given their important ecological roles and in recognition of past and present stress on wetlands by human activities. Unfortunately, despite the benefits they offer (Bardecki 1984, Furter 2003, Odum 1983, Kotze 2000), wetlands count amongst the most threatened ecosystems in the world. The reasons for wetland losses and associated declines in biodiversity and ecosystem function include pollution, waste disposal, mining, ground water abstraction, urbanisation, deficiency in planning concept, policy deficiencies and institutional weakness (Barbier et al, 1997; Dugan, 1994). In South Africa it has been estimated that more than 50% of the wetlands ecosystems have been lost mainly through agricultural development and poor land management (DEAT, 1999; Walmsley, 1998). Those that remain constitute the country 's most threatened natural areas. South Africa has a reason to conserve its remaining wetlands, taking into consideration that is a semi-arid and a water scarce country.

In South Africa EIA is a legal requirement for a specified list of activities, which may have a detrimental effect on the environment (DEAT, 1997) or those projects that occur in the list of environments (DEAT, 1992). The existing guideline document (DEAT, 1998a) on the 1997 EIA regulations (currently under amendment) focuses mainly on the South African EIA process in general and less prescriptive on the report content in order to assist those involved in decision-making. The information available in the environmental impact report (EIR) to decision-makers with regard to developments with the potential of impacting on wetlands has a large influence on the extent of wetland protection and/or destruction

One of the mechanisms developed abroad (e.g. Canada and the World Bank) in an effort to protect these invaluable ecosystems is the use of a guidance document for environmental impact assessment (EIA) practitioners on the use of EIA for projects likely to affect biodiversity including wetlands (Canadian Environmental Assessment Agency, 1996, World Bank, 1997, World Bank 2002). Furthermore, the Ramsar Convention has developed a guideline document recommending that their member Parties include wetlands and biodiversity-related issues respectively into the EIA legislation and/or process (Ramsar Convention, 2002; Ramsar Convention, 2004). The guideline documents assist the EIA practitioners to highlight potential impacts likely to be generated and to indicate the type and scope of assessment and environmental planning and management. The DEAT guideline document on EIA regulations does not provide specific guidance to EIA practitioners on specific issues like wetlands, nor any guidance on what a good EIA should include for projects that have the potential of impacting on wetlands, as observed with the World Bank guideline document on EIA and wetlands. Hence the research reported here.

II. AIMS AND OBJECTIVES

Aim

The aim of this study is to assess the quality of the environmental impact reports for projects likely to affect wetlands, and to interpret the results in terms of EIA effectiveness for wetlands.

Objectives

The study has the following objectives:

i. To review by independent reviewers the quality of four selected environmental impact reports using a checklist;

ii. To analyse the results of the review process; and

iii. To provide recommendations to improve the quality of environmental impact reports for projects likely to affect wetlands.

III. STRUCTURE OF THE DISSERTATION

This dissertation is in article format. The format used is that required by the journal Water SA for the submission of a manuscript for publication, with one exception: i.e. tables and figures are inserted in the text rather than as appendices, for improved user friendliness. Following the abstract and the preface the structure of the dissertation will be as follows:

- **Chapter 1**

  Provides background information on wetlands.

- **Chapter 2**

  Provides background on EIA process in general and South African EIA process.

- **References.** Provides for references referred to in the abstract, preface and chapters 1 and 2.

- **Chapter 3 is the manuscript and consists of the following:**

  Article abstract: Provides brief information about the aim of the study, results and conclusions of the study.

  - **The introduction:** Provides an overview on wetlands, the EIA process in South Africa the problem statement leading to the study and the aim of the study.
  - **Materials and Methods:** Provides information on the case studies used, the concept of the Lee Colley review model, the development of a review checklist, the review methodology applied and the review process.
  - **Results and Discussion:** Presents the results of the

quality review of the EIRs, interpretation thereof, and the discussion of the results.

- **Conclusions and Recommendations**: Provides conclusions and recommendations reached from the results of the quality review.
- **References**: Provided according to the style stipulated by the journal Water SA.
- **Appendices I to VI**: Quality Review checklist and Review Results.

CHAPTER 1: INTRODUCTION TO WETLANDS

1.1. DEFINITION OF WETLANDS

Wetlands are complex ecosystems, which form an interface between terrestrial and aquatic habitats. The Ramsar Convention of which South Africa is a member party, defines in the text of the Convention , Article 1.1, wetlands as "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tides does not exceed six metres." (Ramsar Convention, 1994). The definition, broad as it is recognises the often, dynamic nature of wetlands and allows the consideration of the place that they have within the broader context of the landscape. This is crucial for wetland management, as it needs to take into account the hydrological linkages, temporal cycles and changes, and the terrestrial components of wetlands (Silvius et al, 2000).

1.2. WETLANDS BENEFITS

Wetlands have been referred as "kidneys of the landscape", because of the functions they perform in the hydrological and chemical cycles (e.g. groundwater replenishment, water purification, sediment and nutrient retention, flood control), and as "biological supermarkets" because of the extensive food webs and rich biodiversity they support (Babier et al, 1997). Features of a wetland system include components, functions and attributes, and it is a combination of all three that make a wetland important to society. Components are the biotic (fish, plants, wildlife) and non-biotic (water, soil and air) features. The interactions between the components express themselves as functions, which include nutrient recycling, erosion control, nutrient retention and sediment retention, the exchange of water between the surface and groundwater and the surface and the atmosphere and flood control. It is important to note that

not all wetlands perform the same functions or produce the same kind of benefits to humans (Barbier et al, 1997).

Society can benefit both indirectly and directly from wetlands (Bardecki, 1984; Mondi Wetlands Project, 2003). The indirect benefits offered to society by wetlands include the following:

- Flood reduction and stream flow regulation: Wetlands act as sponges, they provide for storage of water during periods of high flow, allowing the water to seep out gradually, augmenting low periods in stream flow thus playing an important role in flood control.
- Groundwater recharge and discharge: Wetland areas where groundwater is discharging are often referred to as seepage wetlands because they are places where the water seeps slowly out into the soil surface.
- Water purification: Wetlands are natural filters, helping to purify water by trapping pollutants (i.e. sediment, excess nutrients [most importantly nitrogen and phosphorus] heavy metals, disease-causing bacteria and viruses and synthetic organic pollutants such as pesticides). Thus, the water leaving a wetland is often purer than the water, which enters the wetland (Kotze, 2000).
- Erosion control by wetland vegetation: Shoreline wetlands provide protection from erosion. Wetland vegetation is generally good at controlling erosion by: (1) reducing wave and current energy; (2) binding and stabilizing the soil; and (3) recovering rapidly from flood damage.
- Biodiversity support: Wetlands particularly shallow open water and marshes, provide food, shelter and spawning sites for a wide variety of fish and invertebrate species. There are many different plants and animals that depend on wetlands, and without the habitat that wetlands provide, they would not be able to survive. Several of these species, such as the White-winged Flufftail and Wattled Crane are threatened in South

Africa.

- Chemical cycling: Wetlands, particularly peatlands serve as carbon sinks (stores). The decomposition of organic matter is slowed down by the anaerobic conditions present in wetlands. This results in wetlands trapping carbon as soil organic matter instead of releasing it into the atmosphere as carbon dioxide.

The direct benefits offered to society by wetlands include the following:

- Livestock grazing: Wetlands, especially temporarily and seasonally waterlogged areas, may provide very valuable grazing-lands for domestic and wild grazers.
- Fibre for construction and handcraft production: Wetland plants are used for providing valued material for products such as mats, baskets and paper (produced from papyrus, which is a sedge). There are several plant species, which are suitable and are used extensively for making handcrafts in South Africa, such as the rush (*Juncus krausii)*, and the sedges (*Cyperus latifolius* and *Cyperus.textiles)*. The common reed (*Phragmites australis*) is used for construction purposes. Some wetland plants are also collected for medicines.
- Valuable fisheries: Although the value of wetlands for fisheries varies greatly, floodplain wetlands and estuaries are typically valuable in the production of fish for human consumption, e.g. in the Pongola floodplain in Northern Kwazulu-Natal.
- A valuable source of water: Because water is stored in wetlands, they provide sites for the supply of water for domestic and livestock use, as well as for irrigation.
- Economically efficient wastewater treatment: Natural wetlands are sometimes purposefully used to treat polluted water and many artificial wetlands are being created for wastewater treatment.
- Aesthetics and nature appreciation: Although wetlands which fringe

estuaries, rivers and streams are next to open water, most natural inland wetland have fairly limited open water associated with them. Thus, they are generally not good sites for water sports. However, wetlands are good places for bird watching, which is a major eco-tourism activity. Large numbers of birds are often attracted to wetlands, with many of these birds found only in wetlands. Wetlands also add to the diversity and beauty of the landscape.

Wetlands are threatened, degraded or lost through human activities. Taking into consideration the myriad benefits they offer directly or indirectly to humans, their conservation and sustainable use is one of the fundamental keys to a sustainable planet.

1.3. WETLANDS LOSS

Despite their importance, wetlands everywhere are under threat. The many reasons leading to wetland losses and associated declines in biodiversity and ecosystem function include pollution, waste disposal, mining, ground water abstraction, agriculture, urbanisation, degradation through over-exploitation, artificial hydrological changes, deficiency in planning, policy deficiencies and institutional weakness (Barbier et al, 1997; Breen et al 1997; Dugan, 1994). In South Africa it has been estimated that more than 50% of the wetlands ecosystems have been lost, mainly through agricultural development and poor land management (DEAT, 1999; Walmsley, 1988). Other reasons for wetland loss from not conserving them in South Africa include lack of wetland awareness knowledge, lack of research and manpower, lack of wetland management training, lack of people working in the wetland conservation field outside nature reserves, and lack of co-operation between non-government organisations, government departments, landowners and the public. Threats to wetlands in South Africa appear to be greatest in:

Jl 5 kort

CHAPTER 2: ENVIRONMENTAL IMPACT ASSESSMENT

2.1. ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

Environmental Impact Assessment (EIA) is a management tool used internationally in order to prevent environmental degradation by giving planners and decision-makers better information about the consequences of development actions on the environment (Appiah-Opoku 2001, Glasson et al, 1995; Sadler, 1996; Tarr, 2003 and Wood, 2003) EIA is defined as a process of identifying, predicting, evaluating and mitigating the biophysical, social and other relevant effects of proposed projects and physical activities prior to major decisions and commitments are being made (Sadler, 1996; Lee and George, 2000). An environmental impact assessment includes the following generic stages:

- Screening to determine which projects or developments require a full or partial impact assessment study;
- Scoping to identify which potential impacts are relevant to assess, and to derive terms of reference for the impact assessment;
- Impact assessment to predict and identify the likely environmental (including the socio-economic) impacts of a proposed project or development taking into account inter-related consequences of the project proposal;
- Identifying mitigation measures (including not proceeding with the development, finding alternative designs or sites which avoid the impacts, incorporating safeguards in the design of the project, or providing compensation for adverse impacts);
- Authority review to decide whether to approve or not; and
- Monitoring and evaluating the development activities, predicted impacts and proposed mitigation measures to ensure that unpredicted impacts or failed mitigation measures are identified and addressed in a timely fashion.

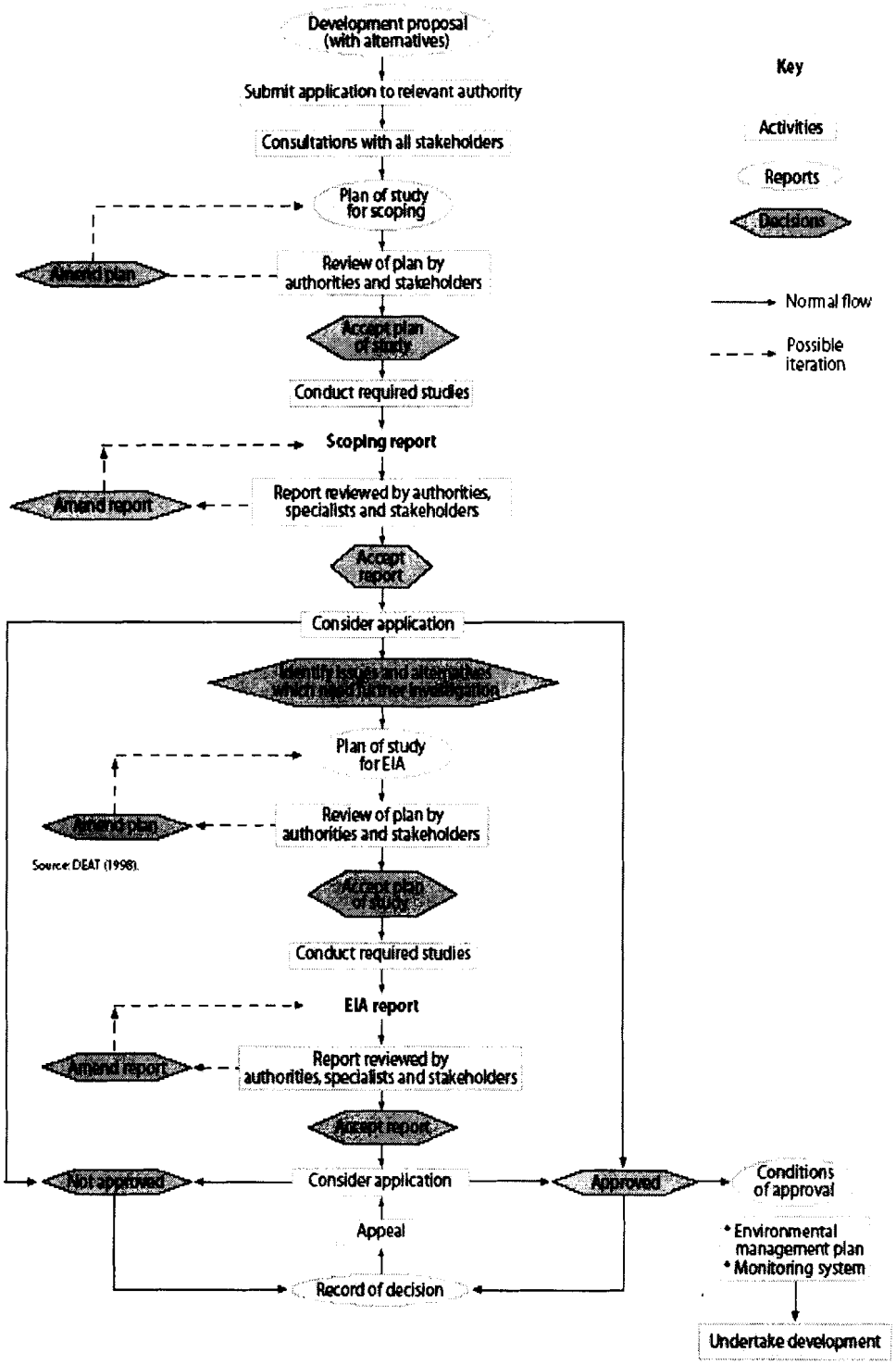
2.2. ENVIRONMENTAL IMPACT ASSESSMENT IN SOUTH AFRICA

In South Africa EIA is a legal requirement for a specified list of activities, which may have a detrimental effect on the environment (DEAT, 1997). EIA provisions are contained in both the Environment Conservation Act no 73 of 1989 (DEAT, 1989), the National Environment Management amendment Act 8 of 2004 (DEAT, 2004a) as well as some sectoral legislation such as the National Water Act 6 of 1998 (DWAF, 1998) and the Minerals Petroleum and Resource Development Act 28 of 2002 (repealing the Minerals Act 50 of 1991 on 1 May 2004) (DME, 2002). There are three sets of environmental impact assessment regulations (currently under amendment) that were phased in by April 1998 (DEAT, 1997). The first set of regulations (R1182) lists nine activities, which may have a substantial detrimental effect on the environment and require EIA. The second set of regulations (R1183) contains rules regarding the actual conduct and contents of environmental assessments. In the third set of regulations (R1184), the Minister of Environmental Affairs and Tourism designates the competent authority in each province as the authorized authority to issue written authorizations to undertake the listed activities provided for in regulation 1183. *Figure 1* illustrates the procedure to be followed to obtain authorization to commence with a listed activity. One of the requirements of the South African EIA process is the submission of a scoping report and/or an environmental impact report to the relevant department for authority review, before the project can be approved for implementation. The environmental impact report is designed to assist (DEAT, 1998a):

i. The proponent to plan, design and implement the proposal in a way that eliminates or minimizes the negative effect on the biophysical and socio-economic environments;

ii. The competent authority responsible to decide whether a proposal should be approved and the terms and conditions that should be applied; and

Figure 1: Application and EIA Process (Modified from DEAT, 1998a)



iii. The public to understand the proposal and its impacts on the community and environment and to provide opportunity for comments on the proposed action for consideration by decision-makers.

As indicated in Figure 1, some development projects can be approved at the scoping phase after the review of the scoping report. A full EIA, which requires the development of an environmental impact report, is conducted when issues identified during the scoping phase require further investigation. The guideline document on the 1997 EIA regulations (DEAT, 1998a) focuses mainly on the EIA process in general and has the following objectives:

- Providing the applicant, business and industry, NGOs, the public, labour organisations and national authorities on national and provincial or local government level with a uniform basis for implementing sections 21, 22 and 26 of the Environment Conservation Act, 1989;
- Providing background information regarding the legislation controlling environmentally harmful activities;
- Assisting applicants with the preparation, completion and submission of applications and required environmental reports(s); and
- Assisting authorities in determining their roles and responsibilities as decision makers.

The 1997 EIA regulations are in an amendment process (DEAT, 2004b; DEAT, 2005). The regulations are amended under section 24(5) of the National Environmental Management Act no. 107 of 1998 (DEAT, 1998b). According to the new EIA regulations activities that will require authorisation are divided as follows[1]:

- Category I activities would follow the screening process, and

[1] The regulations were not yet promulgated during at the time of the submission of this research

- Category II activities would be required to follow the environmental impact assessment process.

One of the intentions of the new EIA regulations is to specify the report contents in order to facilitate improved quality of the reports. However, the new EIA regulations are generic and less prescriptive on the report contents, and furthermore wetland issues are not addressed so that possible information is made available for decision-making process. Since the decision – making with regards to wetland protection or not after the review of the EIR depends inter alia on the quality of the report, the lack of a guideline document to assist the EIA practitioners on what information is required may cause inconsistencies in the review process of EIRs for projects with the potential of affecting wetlands thus having negative consequences for wetland protection.

This study aimed at assessing the quality of the environmental impact reports for projects likely to affect wetlands, and to interpret the results in terms of EIA effectiveness for wetlands. The research methodology, findings, conclusions and recommendations are discussed in the following chapter.

REFERENCES

APPIAH-OPOKU S (2001). Environmental impact assessment in developing countries: the case of Ghana, Environmental Impact Assessment Review, 21, 59 - 71.

BABIER EB, ACREMAN MC and KNOWLER D (1997) Economic valuation of wetlands: A guide for policy makers and planners: Ramsar Convention Bureau, Gland, Switzerland. 3pp.

BARDECKI 1984. Effective wetlands conservation efforts require careful reasoning and strong incentives to landowners. Journal of Soil and Water Conservation. Vol. 39: 166-169pp.

BREEN CM, QUINN NW, MANDER JJ (1997). Wetlands conservation in southern Africa: Challenges and opportunities. Summary of the SADC. Wetlands conservation survey reports. 27-48pp.

DEPARTMENT OF AGRICULTURE: Conservation of Agricultural Resources Act (CARA) 43 of 1983.

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM (1989). National Environment Conservation Act no. 73 of 1989.

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM (1992). The Integrated Environmental Management Procedure. Documents 1-6. Pretoria DEAT.

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM (1997). EIA Regulations (No 1182, 1183, 1184). Government Gazette18261: 387, 5 September.

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM (1998a). Guideline document: EIA regulations, implementation of sections 21, 22 and 26 of the Environment Conservation Act.

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM (1998b). National Environment Management Act no 107 of 1998.

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM (1999). State of the environment in South Africa-an overview. 17pp.

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM (2004a). National Environment Management amendment Act no.8 of 2004.

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM (2004b). National Environmental Management Act: EIA Regulations. Government Gazette, 26503: June 25. (Regulation Gazette No. 764)

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM (2005). National Environmental Management Act: Draft EIA Regulations. Government Gazette, 27163: 14 January (Regulation Gazette No. 12.)

DEPARTMENT OF MINERALS AND ENERGY (2004). Minerals, Petroleum and Resource Development Act no 28 of 2002.

DEPARTMENT OF WATER AFFAIRS AND FORESTRY (1998). National Water Act no.6 of 1998.

DUGAN P (1994). Wetland Conservation – A Review of current issues and Required Action: IUCN, Gland Switzerland.96pp.

FURTER L (2003). Floods, storm water management and wetlands. IEMSA 28 (3) 17-18.

GLASSON J; THERIVEL R; CHADWICK A (1995). Introduction to Environmental Impact Assessment. Principles and procedures, process, practise and prospects. UCL Press: L.ondon. pp141-165.

KOTZE DC, BREEN CM, QUIN N (1995). Wetland losses in South Africa. In G.I. Cowan(ed). Wetlands of South Africa. Department of Environmental Affairs and Tourism.

KOTZE DC (2000). Wetlands and water quality (Paper compiled for the Mondi Wetlands Project). [Web] http://www.wetland.org.za/wetpeople.htm [Date of access: 17 November 2004]

LEE N & GEORGE C (2000). Environmental Assessment in Developing and Transitional Countries, New York: Wiley & Sons.

MONDI WETLANDS PROJECT (2003). Wetlands and People [Web] http://www.wetland.org.za/wetpeople.htm [Date of access: 17 November 2004]

ODUM P (1983). Wetlands and Values. Journal of soil and Water Conservation (38) 380pp.

RAMSAR CONVENTION (1994). The Convention on Wetlands text, as amended in 1982 and 1987: 2pp.

RAMSAR CONVENTION (*2002). Guidelines for incorporating biodiversity-related issues into environmental impact assessment legislation and/or process and in strategic environmental assessment. Resolution VIII.9 adopted by the Convention on Biological Diversity, and their relevance to the Ramsar Convention. 8th Meeting of the Conference of Parties to the Convention on Wetlands (Ramsar, Iran, 1971) Valencia, Spain, 18-26 November 2002.

RAMSAR CONVENTION (2004). Ramsar Handbooks for the wise use of wetlands 2nd Edition. Impact Assessment. Guidelines for incorporating biodiversity-related issues into environmental impact assessment legislation and/or process and in strategic environmental assessment.

SADLER B (1996). Environmental Assessment in a changing world: Evaluating practice to improve performance, Final report of the international study of the effectiveness of environmental assessment. . 3pp.

http://www.ea.gov.au/assessments/eianet/eastudy/final/chapter2.html (Accessed 30 June 2003)

SILVIUS MJ, ONEKA M and VERHAGEN A (2000). Wetlands: Lifeline for people on the edge. Phys. Chem. Earth, vol. 25, no 7- 8.645-652pp.

TARR P (2003). EIA in southern Africa: Summary and future focus. In Southern African Institute for Environmental Assessment, 2003: Environmental Impact Assessment in Southern Africa. Windhoek, Southern African Institute for Environmental Assessment, pp. 329-337.

WALMSEY RD (1988). A description of the Wetlands Research Programme. South African National Scientific Programmes Report 145: p1- 26.

WOOD C (1998). EIA in the plan making. In Wathern P, 1988. Environmental Impact Assessment: Theory and Practice. London: Unwin Hyman. 161-196pp.

WOOD C. (2003). Environmental Impact Assessment: A Comparative Review Second Edition, Harlow, England: Pearson.

CHAPTER 3

This chapter is presented in an article format as according to the format required for submission of manuscripts for the Journal Water SA.

The Quality of Environmental Impact Reports for Projects with the Potential of Affecting Wetlands.

Makoma J Moloto

School of Environmental Sciences and Development, North-West University, Potchefstroom

Abstract

In South Africa listed development activities, which may have a substantial detrimental effect on the environment require an Environmental Impact Assessment (EIA), including projects with the potential of affecting wetlands. A key element of the EIA process is the submission of a scoping and/or an environmental impact report (EIR) for review in order to determine whether the report is adequate and/or whether a greater quantity of information is required before the project can be authorised. The information available to decision-makers in the EIR is a major determinant in the outcome of wetland protection and/or destruction. This study aimed at assessing the quality of the environmental impact reports for projects likely to affect wetlands, and to interpret the results in terms of EIA effectiveness for wetlands. The objectives of the study entailed: a) to review by independent reviewers the quality of four selected environmental impact reports using a checklist; b) to analyse the results of the review process; and c) To provide recommendations for improving the quality of environmental impact reports for projects likely to affect wetlands.

The quality of four environmental impact reports of projects with the potential of impacting on wetlands was assessed using a review checklist. It is concluded that the quality of the four reports was generally satisfactory but certain areas were found poorly performed i.e. identification and evaluation of impacts to the potential detriment of the wetlands for which the EIAs were performed and that the review method is fairly robust and consistent.

To improve the quality of the reports for projects with the potential of affecting wetlands the following were recommended:

- The availability for and use of a quality review checklist by EIA practitioners and authorities as an additional tool to the EIA regulations and the Integrated Environmental Management series.
- The availability for and use by EIA practitioners of a wetland review checklist will assist in ensuring that all key aspects are addressed before submission to the relevant authority.
- Regular use of the review checklist by EIA practitioners and authorities for ascertaining the quality of the environmental impact reports will contribute to a baseline of EIR quality for evaluation of Wetlands EIA practice under the new regulations due in 2005.

Keywords: Environmental Impact Report, Environmental Impact Assessment, Quality Review, Wetlands

3.1. INTRODUCTION

There are different definitions of wetlands depending on the user or interest groups. The Ramsar Convention of which South Africa is a member Party, defines wetlands in article 1.1 of the Convention Text as "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tides does not exceed six metres." (Ramsar Convention, 1994). This definition of wetlands recognises the often-dynamic nature of wetlands, and allows the consideration of the place that they have within the broader context of the landscape. Wetlands have been referred to as "kidneys of the landscape", because of the functions they perform in the hydrological and chemical cycles (e.g. groundwater replenishment, water purification, sediment and nutrient retention, flood control), and as "biological supermarkets" because of the extensive food webs and rich biodiversity they support (Babier et al, 1997a; Bardecki, 1984; Furter, 2003; Kotze 2000; Odum, 1983; Silvius et al, 2000). However, despite the benefits they offer, wetlands are amongst the most threatened ecosystems in the world. These threats, resulting in wetland losses and associated declines in biodiversity and ecosystem function, include pollution, waste disposal, mining, ground water abstraction, agriculture, urbanisation, deficiency in planning, policy deficiencies and institutional weakness (Barbier et al, 1997b; Dugan, 1994). In South Africa it has been estimated that more than 50% of the wetlands ecosystems have been lost mainly through agricultural development and poor land management (DEAT, 1999; Walmsley, 1988).

In an effort to protect these priceless ecosystems, Canada and the World Bank have developed and use a guideline document to provide guidance to environmental impact assessment practitioners in the use of EIA for projects likely to affect biodiversity including wetlands (Canadian Environmental Assessment Agency, 1996; World Bank, 1997; World Bank, 2002).

Furthermore, the Ramsar Convention has developed a guideline document recommending that their member Parties include wetlands and biodiversity-related issues respectively into the EIA legislation and/or process (Ramsar Convention, 2002; Ramsar Convention 2004). The guideline documents assist the EIA practitioners to highlight potential impacts likely to be generated and to indicate the type and scope of assessment and environmental planning and management.

EIA is a tool employed to identify and evaluate the potential environmental consequences of a proposed development action in order to facilitate decision-making and sound environmental management (Glasson et al, 1995; Sadler, 1996; Wood, 1998; Wood, 2003). In South Africa EIA is a legal requirement for specified list of activities, which may have a detrimental effect on the environment (DEAT, 1997; Sowman et al, 1995). The current EIA regulations that were published in terms of the Environment Conservation Act, no 73 of 1989 are under amendment (DEAT, 2004; DEAT 2005). The activities in the draft EIA regulations are divided into two categories. Category I activities would be required to undergo a screening process in order to determine whether there are potential significant impacts that would require further investigation or whether a decision can be made based on the information provided. Category II activities would be subjected to a full environmental impact assessment process.

According to the current South African EIA process, an independent consultant is appointed by the developer for the preparation and submission of a scoping report and/or an environmental impact report (EIR) to the relevant department for review by the relevant authorities, specialist and interested and affected parties in order to determine whether the report is adequate and/or whether additional information is required before a record of decision can be issued (DEAT, 1998). Some development projects can be approved (and/or rejected) at the scoping phase

after the review of the scoping report when issues identified during the scoping phase need not to be further investigated. The acceptance of the EIR and/or scoping report depends, inter alia, upon the quality of the reports. In the case of wetlands projects, the information available in the reports to decision-makers has a large influence on the extent of wetland protection and/or destruction. According to the current EIA regulations, the quality of the reports is determined by the comments received from the reviewers (i.e. relevant responsible authority, public and/or specialists) since there is no guideline document to assist the EIA practitioners on what information is required. This may result in inconsistencies in the review process of EIRs for projects with the potential of affecting wetlands with negative consequences for wetland sustainability. The dependence of the EIA practitioners on inputs from reviewers to determine whether the quality of EIR is adequate or not is a gap still not addressed in the draft new EIA regulations.

Internationally a number of studies have been published relating to environmental impact reports review and quality (Hickie, 1998; Simpson, 2001; Lee, 2000; Weston et al, 2000; Leu et al, 1996; Lee and Brown, 1992; Lee and Colley, 1991; Elkin and Smith, 1988; Geraghty, 1996; Ross, 1987). The research conducted in South Africa on the quality of environmental impact reports involved the development of a quality review package for environmental impact reports based on the Lee-Colley quality review package (Lee and Colley, 1991; Sandham et al, 2004). However, no international or local published studies could be found on the quality review of environmental impact reports specifically for projects with the potential of impacting on wetlands

In order to address this gap, this study aimed at assessing the quality of the environmental impact reports for projects likely to affect wetlands. The objectives of the research included the

following:

i. To review the quality of four selected environmental impact reports using a quality review checklist adapted for use in South Africa and modified for wetlands;

ii. Analyse the results of the review process; and

iii. To provide recommendations for improving the quality of environmental impact reports for projects likely to affect wetlands.

3.2. METHODOLOGY

3.2.1. Development and Concept of the Quality Review Checklist

The Lee Colley review package has been compiled primarily with particular reference to applications in the UK for reviewing the quality of environmental impact reports, and it has also been successfully applied elsewhere (Barker and Wood, 1999; Lee, 2000; Lee and Brown, 1992; Lee and Colley, 1991; Lee and Dancey, 1993). The review criteria are arranged in a hierarchical structure consisting of an overall report grade, four review areas, categories and sub-categories, which are then used to assess the quality of the environmental impact reports (*Figure 1*).

The quality review involves evaluating how well a number of assessment tasks (sub-categories, categories and areas) have been performed. The reviewer commences the review at the lowest level (sub-categories), which contains simple criteria relating to specific tasks and procedures. Then drawing upon these assessments, he/she moves upwards progressively from one level to another, applying more complex criteria to broader tasks and procedures in the process until the overall assessment of the environmental impact report has been completed. The assessment from applying each criterion is recorded by the reviewer on a Collation Sheet, using a standard list of assessment symbols (*Table 1*). Letters are used, as symbols rather than numbers to discourage reviewers from crude arithmetic aggregation to obtain

assessments at the higher levels in the pyramid. The symbols A-C represent generally satisfactory performance (A: very satisfactory, B: satisfactory and C: just satisfactory) and D-F generally unsatisfactory performance at each of the levels in the review hierarchy.

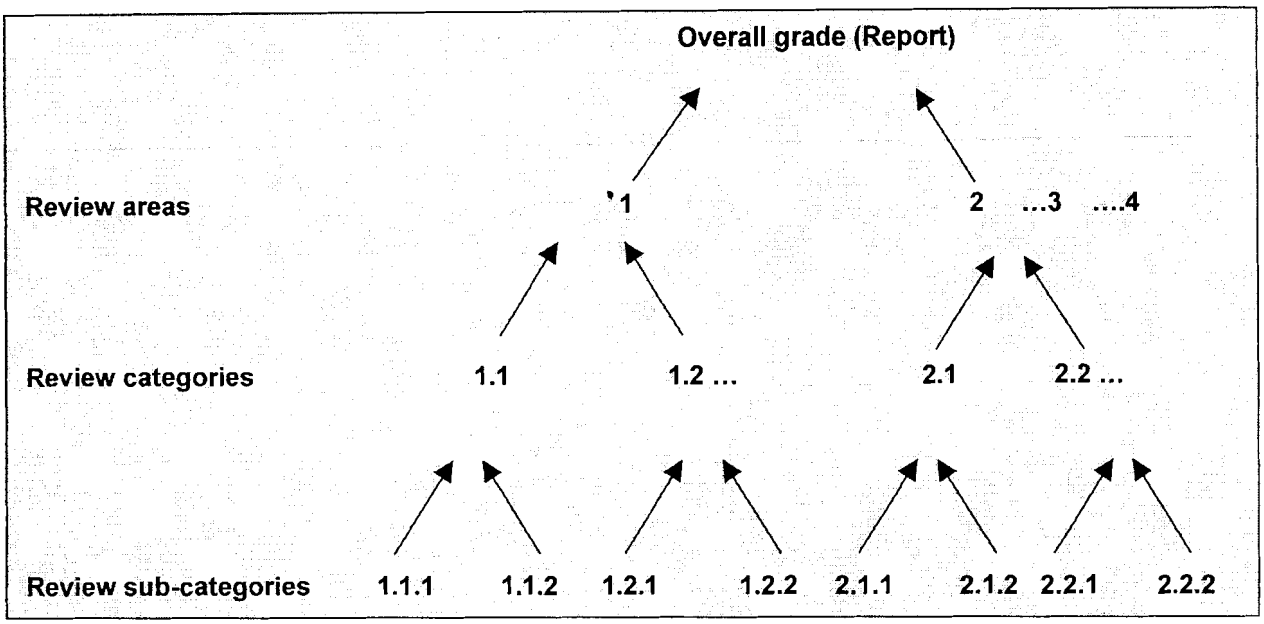


Figure 1: The Assessment Pyramid (Adapted from Lee and Brown, 1992)

Symbol	Explanation
A	Generally well performed, no important tasks left incomplete
B	Generally satisfactory and complete, only minor omissions and inadequacies
C	Can be considered just satisfactory despite omissions and/or inadequacies
D	Parts are well attempted but must, as a whole, be considered just unsatisfactory because of omissions or inadequacies
E	Not satisfactory, significant omissions or inadequacies
F	Not satisfactory, important task(s) poorly done or not attempted
N/A	Not applicable. The review topic is not applicable or irrelevant in the context of this EIA report

Table 1: List of Assessment symbol (Adapted from Lee and Colley, 1991)

The findings of the review can be used in the following ways (Lee and Colley, 1991):

- A developer having carried out a review of his own draft environmental impact report and having identified a number of deficiencies in it can alert those responsible for the preparation to correct any deficiencies before it is finalised.
- Where a statutory environmental authority or a non-governmental organisation, as part of the formal consultation process following the publication of an environmental impact report, has undertaken the review, its findings may form part of the consultant 's submission to the competent authority.
- The competent authority may use the review findings in a number of ways for example as a basis for identifying any additional information required from the developer, which is not satisfactorily provided in the environmental impact report.
- Review findings may be employed as a basis for identifying those environmental aspects described in the environmental impact report, which the competent authority needs to review in greater depth.
- Review findings may be used as an aid in evaluating likely environmental impacts of the project prior to reaching a decision in authorisation.

The review checklist used in this study (see Moloto; 2005) has been developed from an environmental impact report quality review checklist adapted for South Africa based on the Lee-Colley quality review model (Sandham et al, 2004). For the purpose of this study amendments were made at the sub-category level to add specific wetlands issues, based on the wetland aspects from the Canadian Environmental Assessment Agency (1996) and the World Bank (1997; 2002) and the Ramsar Convention (2002). The review topics are grouped hierarchically from 81 sub-categories through 15 review categories and 4 review areas to a single overall score / grade. This checklist will be referred to as the (South African) wetlands

review checklist.

3.2.2. Case Studies

The reports of the following projects approved for implementation by the National Department of Environmental Affairs and Tourism were reviewed using the wetlands review checklist:

i. The Braamhoek Pump Storage Scheme (BPSS). The proposed development involved the construction of a hydro-electric pump storage scheme constituting of two reservoirs (upper and lower reservoirs). The wetlands on the proposed upper reservoir site will be inundated and therefore permanently lost. Furthermore, the wetlands downstream the reservoir will also be impacted.

ii. Mooi Mgeni River Transfer Scheme-Receiving Streams (MM-RS). The proposed development involved the re-construction of the Mearns Weir (on the Mooi river) that forms part of the emergency transfer scheme that augments water supply to Durban and Pietermaritzburg. The proposed development would impact the riparian vegetation and wetlands along the receiving streams.

iii. Mooi Mgeni Transfer Scheme-Raising of the Midmar Dam Wall (MM-RDW). The proposed development involved the raising of the Midmar dam wall by 3.5m in order to improve the available water supply from the Midmar Dam. Raising the Midmar Dam wall would impact on wetlands on the southern side of the Midmar dam by inundation.

iv. The Development of Infrastructure in the Seekoeivlei Nature Reserve (DISNR). The proposed development involved the construction of cottages, a caravan park, information and conference centre within the Seekoeivlei Nature Reserve, which is a Ramsar designated area.

These case studies were chosen because there are wetlands situated within the proposed

projects area. The assessments of reports for projects submitted at the National Department of Environmental Affairs and Tourism were chosen because they were readily available for access by the researcher and because they were large projects requiring the full EIA process prior to authorisation. Furthermore, the four projects chosen were the only available assessment reports for large projects with the potential of impacting on wetlands (at National level) at the time that the research was conducted.

3.2.3. Quality Review Process

Two independent reviewers conducted the review of the environmental impact reports for BPSS, MM-RS and MM-RDW and three reviewers for DISNR. The reviewers were postgraduate students in the environmental management field who had previous experience in using the South African environmental impact report quality review checklist (Sandham et al, 2004). The reviewers met after the completion of their separate reviews to compare their results. Any differences in assessment between the reviewers were identified, re-examined, discussed and thereafter a consensus was reached. It was found that at the higher level in the assessment pyramid i.e. assessment of the review area assessment of the overall report in particular, there is a substantial level of agreement in the assessment made by different reviewers of the same EIR before a consensus is reached. However, the investigation of the difference in the assessment scores made by different reviewers of the same EIR and the source of the differences does not form part of this study, hence only consensus scores are presented.

3.3. RESULTS AND DISCUSSION

The review results presented below include the sub-category level, the category level, the review area level and the overall report. The detailed sub-category review results are included in Moloto (2005). The result level of detail at the higher levels (category, review area, overall report) enables the achievement of the study objectives hence; and since the subcategory review results are too cumbersome to deal with here, only a summary of the sub-category review results is included.

3.3.1. Review Results at the sub-category level

It was found in the analysis at the sub-category level that the assessment of cumulative and secondary impacts on the wetland(s) was poorly performed (i.e. D or lower) in all four case studies. Other tasks at the sub-category level that were poorly performed included:

- Assessment method used for determining wetland functions and values.
- Inclusion in the report of a list of issues identified as being of concern to interested and affected parties.
- Division of the project into phases (pre-construction, construction, operational and decommissioning) and duration of each phase.
- Level of agreement between the environmental consultant and the specialist report.
- The description of waste generated as a result of the project
- The proposed ways to handle and /or to treat wastes generated.
- The nature of raw materials needed for the project during construction and operational phases. The sub-category tasks assessed as not applicable (N/A) during the review process included the national wetland policy, and consultation of the national wetland site inventory because of the two not yet been developed in South Africa.

3.3.2. The review results at the category level

An 86% satisfactory performance in the four case studies was found at the category area level and only 6% well performed (Table 2). It was found that the description of the environment was well performed in the four case studies (Table 3). However, the following were not well performed (Table 3):

- Layout (information) (BPSS).
- Wastes (MM-RS).
- Site description (MM-RDW).
- Identification of impacts (MM-RS, MM-RDW, DISNR).

Symbol	Explanation	Number Symbols
A	Generally well performed, no important tasks left incomplete	3 (6%)
B	Generally satisfactory and complete, only minor omissions and inadequacies	21 (42%)
C	Can be considered just satisfactory despite omissions and/or inadequacies	19 (38%)
D	Parts are well attempted but must, as a whole, be considered just unsatisfactory because of omissions or inadequacies	3 (6%)
E	Not satisfactory, significant omissions or inadequacies	1 (2%)
F	Not satisfactory, important task(s) poorly done or not attempted	2 (4%)
N/A	Not applicable. The review topic is not applicable or irrelevant in the context of this EIA report	1 (2%)
Total		50 (100%)

Table 2: Total Performance in Percentages of the Review Category in the four case studies

Review Category	Review Results			
	BPSS	MM-RS	MM-DW	DISNR
1.1. Description of the development	C	B	B	B
1.2. Site description	C	E	C	B
1.3. Wastes	B	F	C	B
1.4. Environment description	B	A	A	B
1.5. Baseline conditions	C	B	B	B
2.1. Definition of Potential Impacts	C	B	B	C
2.2. Identification of impacts	C	F	D	D
2.3. Scoping	B	C	B	C
2.4. Prediction of impact magnitude	B	C	B	C
2.5. Assessment of impact significance	B	C	C	C
3.1. Alternatives	C	N/A	C	B
3.2. Scope and effectiveness of mitigation measures	B	C	B	B
4.1. Layout (information)	D	A	B	B
4.2. Presentation (information)	B	B	B	B
4.3. Emphasis (impacts)	C	B	B	B

Table 3: Review results at the Category level

3.3.3. The review results of the review areas

It was found in the assessment of the review areas that all the four review areas were performed satisfactory (Table 4). With regards to performance in the four case studies, there was a high quality of performance for Review Area 4: Communication of Results (3Bs, 1A) whereas review area 2: Identification and Evaluation of Key Impacts was the Weakest (2Bs, 2Cs).

3.3.4. The review results of the overall report

The four reports were rated satisfactory despite omissions and/or inadequacies with a B rating (satisfactory) for BPSS, MM-RS and DISNR and a C rating (just satisfactory) for MM-DW (Table 4).

REVIEW AREA	Review Results			
	BPSS	MM-RS	MM-RDW	DISNR
1. Description of the development, local environment and baseline studies.	B	B	B	B
2. Identification and evaluation of impacts.	B	C	B	C
3. Alternatives and mitigation of impacts	B	B	B	B
4. Communication of results	B	A	C	B
OVERALL REPORT SCORE	B	B	C	B

Table 4: Review results of the review areas

3.4. CONCLUSIONS AND RECOMMENDATIONS

3.4.1. Conclusions

It is concluded that:

- The four reports were rated as satisfactory despite some omissions and/or inadequacies observed.
- The identification and evaluation of impacts, which forms the core area of the EIA, process was weakly performed.
- The review method is fairly robust and consistent/reliable and therefore can be regarded as a reliable indication of EIR quality.

3.4.2. Recommendations

The successful implementation of the EIA-process depends in part on the production of high quality reports. Hence, it is recommended that:

- The availability for and use of a quality review checklist by EIA practitioners and authorities as an additional tool to the EIA regulations (DEAT 1997) and the Integrated Environmental Management series (DEAT, 2002) can further improve the quality of the reports for projects with the potential of affecting wetlands.
- The availability for and use by EIA practitioners of a wetland review checklist will assist in ensuring that all key aspects are addressed before submission to the relevant authority i.e. the report is scientifically and technically sound; the report is clearly and coherently organised and presented so that it can be understood and that it has addressed all the important issues to make a decision about the proposed development. This will further assist in fast-tracking the approval process usually delayed by the request of additional information from the applicant as a result of inadequate reports.

- Regular use of the review checklist by EIA practitioners and authorities for ascertaining the quality of the environmental impact reports will contribute to a baseline of EIR quality for evaluation of Wetlands EIA practice under the new regulations due in 2005.

3.5. REFERENCES

BABIER EB, ACREMAN MC and KNOWLER D (1997a) Economic valuation of wetlands: A guide for policy makers and planners: Ramsar Convention Bureau, Gland, Switzerland. 3pp.

BABIER EB, ACREMAN MC and KNOWLER D (1997b) Economic valuation of wetlands: A guide for policy makers and planners: Ramsar Convention Bureau, Gland, Switzerland. 4pp.

BARDECKI 1984. Effective wetlands conservation efforts require careful reasoning and strong incentives to landowners. Journal of Soil and Water Conservation (39): 166-169pp.

BARKER A AND WOOD C (1999). An evaluation of EIA system performance in eight EU countries, *Environmental Impact Assessment Review*, 19, 387 - 404.

CANADIAN ENVIRONMENTAL ASSESSMENT AGENCY (1996). A Guide on Biodiversity and Environmental Assessment.

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM (1989). National Environment Conservation Act, No 73 of 1989.

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM (1997). EIA Regulations (No 1182, 1183, 1184). Government Gazette18261:387, 5 September.

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM (1998). Guideline Document: EIA Regulations, Implementation of sections 21, 22 and 26 of the Environment Conservation Act.

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM (1999). State of the Environment in South Africa-an overview. 17pp.

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM (2002). Integrated Environmental Management Series, Information Series1-6. DEAT, Pretoria.

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM (2004). National Environmental Management Act: EIA Regulations. Government Gazette, 26503: June 25. (Regulation Gazette No. 764).

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM (2005). National Environmental Management Act: Draft EIA Regulations. Government Gazette, 27163: 14 January (Regulation Gazette No. 12.).

DUGAN P (1994). Wetland Conservation – A Review of current issues and Required Action: IUCN, Gland Switzerland. 96pp.

Elkin TJ and SMITH PGR (1988). What is a Good Environmental Impact Statement? Reviewing Screening Reports from Canada 's National Parks. Journal of Environmental Management, 26:71-89pp.

FURTER L (2003). Floods, storm water management and wetlands. IEMSA 28 (3): 17-18pp.

GERAGTHY PJ (1996). Environmental impact Assessment Practice in Ireland following the Adoption of the European Directive. Environmental impact Assessment Review, 16:189-211pp.

GLASSON J; THERIVEL R and CHADWICK A (1995). Introduction to Environmental Impact Assessment. Principles and procedures, process, practise and prospects. UCL Press: L.ondon. 141-165pp.

HICKIE D (1998). Development of Guidelines for Improving the Effectiveness of Environmental Assessment. Environmental Impact assessment review, 1998: 267-287pp.

KOTZE DC (2000). Wetlands and Water Quality (Paper compiled for the Mondi Wetlands Project). [Web] http://www.wetland.org.za/wetpeople.htm [Date of access: 17 November 2004].

LEE N AND BROWN D (1992). Quality Control in environmental Assessment. Project Appraisal. Vol 7, number 1: 41-45pp.

LEE N and COLLEY R (1991). Reviewing the Quality of Environmental Statements. Review methods and Findings. TPR 62 (2).

LEE N and DANCEY R (1993). The quality of environmental Impact Statements in Ireland and the United Kingdom: a comparative analysis. Project appraisal (8): 31-36pp. Beech Tree publishing, England.

LEE N (2000). Reviewing the Quality of Environmental Assessments. Environmental Assessment in Developing and Transitional Counties. Chapter 8: 137-147pp. Edited by N. Lee and C. George. John Wiley & Sons, Ltd.

LEU WS, WILLIAMS WP, AND BARK AW (1996). Development of an Environmental Impact assessment Evaluation Model and its Application. Environmental impact assessment Review, 16:115-133pp.

MOLOTO MJ (2005). The Quality of Environmental Impact Reports for Projects with the potential of Affecting on wetlands. Research mini-dissertation submitted for a Masters degree. North-west University, Potchefstroom.

ODUM P (1983). Wetlands and Values. Journal of soil and Water Conservation (38) 380pp.

RAMSAR CONVENTION (1994). The Convention on Wetlands text, as amended in 1982 and 1987, 2pp.

RAMSAR CONVENTION (2002). Guidelines for incorporating biodiversity-related issues into environmental impact assessment legislation and/or process and in strategic environmental assessment. Resolution VIII.9 adopted by the Convention on Biological Diversity, and their relevance to the Ramsar Convention. 8th Meeting of the Conference of Parties to the Convention on Wetlands (Ramsar, Iran, 1971) Valencia, Spain, 18-26 November 2002.

RAMSAR CONVENTION (2004). Ramsar Handbooks for the wise use of wetlands 2nd Edition. Impact Assessment. Guidelines for incorporating biodiversity-related issues into environmental impact assessment legislation and/or process and in strategic environmental assessment.

ROSS WA (1987). Evaluating Environmental Impact Statements. Journal of environmental Management, 25: 137-147pp.

SADLER B (1996). Environmental Assessment in a changing world: Evaluating practice to improve performance, Final report of the international study of the effectiveness of environmental assessment. 3pp.

http://www.ea.gov.au/assessments/eianet/eastudy/final/chapter2.html (Accessed 30 June 2003).

SANDHAM LA, PRETORIUS HE and VAN DER WALT AJ (2004). A Review Package for Assessing the Quality of Environmental Impact Reports in South Africa. 24th Annual Conference of the International Association of Impact Assessment, Vancouver, British Columbia, April 2004.

SILVIUS MJ, ONEKA M and VERHAGEN A (2000). Wetlands: Lifeline for people on the edge. Phys. Chem. Earth, (25) 7- 8: 645-652pp.

SIMPSON J (2001). Developing a Review Package to assess the quality of EA Reports of Local Authority Structure and Local Plans in the UK. Environmental Impact Assessment Review, 21: 83-95pp.

SOWMAN L, FUGGLE R AND PRESTON G (1995). A Review of the Evolution of Environmental Evaluation Procedures in South Africa. Environmental impact Assessment Review, 15: 45-67pp.

THE WORLD BANK (1997). Biodiversity and Environmental Assessment. Environmental Assessment Source Book Update no. 20.

THE WORLD BANK (2002). Wetlands and Environmental Assessment. Environmental Assessment Source Book Update no. 28.

WALMSLEY RD (1988). A description of the Wetlands Research Programme. South African National Scientific Programmes Report (145): 1- 26pp.

WESTON J (2000). Reviewing Environmental Statements: New Demands for the UK's EIA Procedures. Planning, Practice and Research, vol 15: Issue1/2.

WOOD C (1998). EIA in the plan making. In Wathern P, 1988. Environmental Impact Assessment: Theory and Practice. London: Unwin Hyman. 161-196pp.

WOOD C. (2003). Environmental Impact Assessment: A Comparative Review Second Edition, Harlow, England: Pearson.

APPENDICES

APPENDIX I: Review Checklist (Modified from Sandham et al, 2004)

AREAS	REVIEW CATEGORIES	REVIEW SUB-CATEGORIES
1. Description of the development, local environment and baseline studies.	**1.1. Description of the development**	1.1.1. The name of applicant and address must be included.
		1.1.2. The purpose(s) and objectives of the development should be explained.
		1.1.3. A description and nature of the activity or development must be included.
		1.1.4. A description of the site, design, size, scale and all relevant phases of the proposed development should be described. Diagrams, plans or maps will usually be necessary for this purpose.
		1.1.5. There should be information regarding the proposed location on a map at an appropriate scale, showing boundaries of the proposed site, major existing infrastructure, adjacent land uses, and any important environmental features (e.g. rivers).
		1.1.6. Where appropriate, the nature of the production processes and technology, intended to be employed, in the completed development should be described with the means of and a schematic drawing.
		1.1.7. The expected rate of production should be included.
		1.1.8. The nature and quantities of raw materials needed during both the construction and operational phases should be described;
		1.1.9. In regard to the raw materials an indication of its sources and availability especially of water should also be included.
	1.2. Site description	1.2.1. A site plan of the project illustrating location of existing buildings and facilities, proposed components of the project, and any infrastructure required to service the project (roads, rails, etc.) must be clearly shown on a map.
		1.2.2. The uses to which this land will be put should be described and the different land use areas demarcated.

AREAS	REVIEW CATEGORIES	REVIEW SUB-CATEGORIES
		1.2.3. The estimated duration (start and completion date) of the construction phase, operational phase and, where appropriate, decommissioning phase should be given.
		1.2.4 The number of workers and/or visitors entering the development site during both construction and operation should be estimated.
		1.2.5. Their access to the site and likely means of transport should be given.
		1.2.6 The infrastructure required servicing the project and means of transporting (e.g. roads, rails, etc) raw materials and products to and from the site and the approximate quantities involved should be described.
	1.3. Wastes	1.3.1. The solid, liquid or gaseous wastes produced as a result of the project should be described.
		1.3.2. The ways in which it is proposed to handle and/or treat these wastes and residuals should be indicated.
	1.4. Environment description	1.4.1. The environment, expected to be affected, by the development should be indicated with the aid of a suitable map of the area.
		A description of the following is required:
		1.4.2. Biophysical description of the site, including the physical (relevant physical features and characteristics, such as landscape features, dynamics and patterns).
		1.4.3. Biological characteristics (such as ecological processes and functions, species presence and seasonality, species interrelationships, and habitat).
		1.4.4. Social characteristics (such as patterns of land use, resources use, present land uses and patterns of other human disturbance). Note: Only the environmental elements within the study area that is relevant to the project need to be identified and evaluated.
		1.4.5. Cumulative impacts should be included in the report. These may be caused by, for example, the dispersion of pollutants, infrastructural requirements of the project, traffic, effects on human health, socio-economic conditions, physical and cultural resources etc.

AREAS	REVIEW CATEGORIES	REVIEW SUB-CATEGORIES
		1.4.6. The location of the project's area in relation to the hydro-geographical basin.
		1.4.7. Water and wetland issues in the project area.
		1.4.8. In the case of a Ramsar listed wetland, functions, values and attributes on which a wetland is listed should be included in decision making.
	1.5.Baseline conditions	1.5.1. The important components of the effected environments should be identified and described.
		1.5.2. Using the basic information on the project and the existing environment, potential links between them should be identified, the question how, where and when could the project's activities interact and effect the environment should be answered.
		1.5.3. A qualified wetland specialist should be involved in the EIA process to determine the range and type of baseline data needed to make defensible and robust impact predictions.
		1.5.4. The socio-economic benefits of the wetland as it is used at present should be determined in consultation with the relevant stakeholders (e.g. local community, NGOs).
		1.5.5. The replacement costs of the free goods and services now being produced by the wetland if it were destroyed should be determined.
		1.5.6. Data on seasonal (and inter-annual) variations that occur in a wetland should be determined.
		1.5.7. Data on current and potential wetland functions, values and uses and other tangible benefits to biodiversity provided by wetlands in consultation with stakeholders should be determined.
		1.5.8. The benefits to society provided by wetlands functions and values in consultation with stakeholders should be determined.
		1.5.9. Ecosystem boundaries or catchments areas should be used for deciding the boundaries of an EIA whenever possible.
		1.5.10. Wetlands in the project area should be described.

AREAS	REVIEW CATEGORIES	REVIEW SUB-CATEGORIES
		1.5.11. A National wetland sites inventory should be consulted.
		1.5.12. The Ramsar site status of the wetland to be impacted should be verified.
		1.5.13. Issues identified in the National wetland Policy (NWP) should be addressed.
		1.5.14. Sources of information, for primary data that have been collected should be mentioned.
		1.5.15. Assessment methods used for determining the wetland functions, values and uses should be outlined.
2. Identification and evaluation of impacts.	**2.1. Definition of Potential Impacts**	2.1.1. Assessment of significant potential impacts of project on wetlands functions, uses and values identified in the baseline studies.
		2.1.2. Consideration should not be limited to events, which will occur under design operating conditions. Where appropriate, impacts, which might arise from non-standard operating conditions, due to accidents, should also be described.
		2.1.3. The impacts should be determined as the deviation from baseline conditions, i.e. the difference between the conditions, which would obtain if the development were not to proceed and those predicted to prevail as a consequence of it.
		2.1.4. Assessment of any potential beneficial environmental effects of the proposal.
		2.1.5. An assessment should be done of indirect effects, including influences on adjacent or upstream/downstream areas and/or the catchments.
		2.1.6. Assessment should be done of cumulative impacts (adding together over different areas, times, processes etc) and secondary impacts (e.g. likely associated developments, connecting infrastructure). on the wetland.
		2.1.7. Consultation with stakeholders (local communities, interested NGOs and general public) should be conducted.

AREAS	REVIEW CATEGORIES	REVIEW SUB-CATEGORIES
		2.1.8. There should be a level of agreement between the environmental consultant and the specialist report(s) regarding the assessment of the potential impacts and conclusions reached.
	2.2. Identification of impacts	2.2.1. The project must be divided into four phases (Pre-construction-, Construction-, Operational- and Decommissioning phase) from which impacting activities can be identified.
		2.2.2. All the possible impacts from each phase must be identified.
	2.3. Scoping	2.3.1. There should be a genuine attempt to contact the general public and special interest groups, this must be done through a notice/ advertisement in the local or national paper, an example of the notice must be included in the report.
		2.3.2 In the report there must also be a description of the onsite notice that was placed on the proposed development site.
		2.3.3. The parties that will be affected by the proposed activity or development must be identified.
		2.3.4. The parties that have an interest in the proposal(s) or the environment(s) under consideration must be identified.
		2.3.5. The establishment and record of the procedure by which the identified and non-identified interested and affected parties were afforded the opportunity to participate at all appropriate stages of the preparation of the environmental impact report must be described.
		2.3.6. The provision for interested and affected parties to express their views (within a stated time period so that the decision-making process is not delayed) about the scope of the environmental impact report, including alternatives and issues that were investigated must be described.
		2.3.7. A list of issues that were identified as being of concern to interested and affected parties must be included.
		2.3.8. Notification criteria, which entails the reason for their participation in the various stages of the process, where the report can be obtained, where it can be examined (libraries), where and to whom the comments on such reports should be send to, the specified period for receiving comments must be included.

AREAS	REVIEW CATEGORIES	REVIEW SUB-CATEGORIES
		2.3.9. A record of all the views of and correspondence with interested and affected parties is to form an addendum to the report. Were the interested parties requested comments within a stated time period?
		2.3.10. Key impacts should be identified and selected for more intense investigation.
	2.4. Prediction of Impact magnitude	2.4.1. The standard method – provided in the guideline document concerning the nature of the impact, extent, duration, intensity and probability – or other criteria used to predict impact magnitude should be described.
		2.4.2. Where possible, predictions of impacts should be expressed in measurable quantities with ranges and/or confidence limits as appropriate (with the help of the criteria provided in the guideline document e.g. Nature of the impact, Extent, Duration, Intensity and Probability).
	2.5. Assessment of impact significance	2.5.1. The significance of the impacts to the effected community and the society in general should be described; these descriptions may include the effects on public health or risk of life and the size of the affected community.
		2.5.2. The significance of an impact should be assessed; account should be taken of the nature, duration, intensity, extent and probability of the impact in conjunction with national and local societal values.
		2.5.3 A description of the proposed method of assessing the significance of the impacts should be given thus the rating and ranking of impacts to attach values to impacts.
		2.5.4. It should be indicated where there are uncertainties, or where data could not be obtained.
3. Alternatives and mitigation of impacts	**3.1. Alternatives**	3.1.1. The method used to identify the alternatives must be clearly described for example informal discussions with authorities, overlay maps that indicate different environmental and socio-economic factors, brainstorming or the Delphi technique.
		3.1.2. An analysis of the range of alternatives (processes, demand, activity, scheduling, input and no-go) should be undertaken to decide which ones should be carried out for further investigation and which ones should be discarded. This analysis must be described.
		3.1.3. A minimum of two alternatives should be investigated in further detail.

AREAS	REVIEW CATEGORIES	REVIEW SUB-CATEGORIES
		3.1.4. The main environmental advantages and disadvantages, the extent and significance, the possibility for mitigation of these alternatives should be discussed and the reasons for the final choice given.
	3.2. Scope and effectiveness of mitigation measures	3.2.1. Where there are unavoidable potentially damaging effects, possible means of avoiding or mitigating those impacts should be considered and the extent to which it will influence the significance and status of each impact must be described.
		3.2.2. Mitigation measures considered should include selection of alternative sites to avoid impact on wetland, design features to prevent disturbance of the flow patterns and hydrologic regimes critical to conservation of the wetland, enhancement and/or protection of wetlands of other wetlands in substandard conditions to offset losses at project site, artificial construction of wetlands to replace areas lost (where experience has shown that the wetland type in question can, in fact be constructed), strengthening institutions to manage and protect wetlands, including local NGOs in the institutional arrangements for wetlands conservation, environmental education programs to disseminate knowledge on the importance of wetlands.
		3.2.3. It should be clear when and how mitigating measures should be done.
		3.2.4. An indication of the effectiveness of these measures must be included.
4. Communication of results	**4.1. Layout**	4.1.1. There should be an introduction briefly describing the project, the aims of the environmental assessment and how those aims will be achieved.
		4.1.2. Information should be logically arranged in sections or chapters and the whereabouts of important data should be signalled clearly.
		4.1.3 When data, conclusions or quality standards from external sources are introduced, the original source should be acknowledged at that point in the text and in a reference
	4.2. Presentation	4.2.1. Information should be presented so as to be comprehensible to the non-specialist. Tables, graphs and other devices used should be used as appropriate. Unnecessarily technical or obscure language should be avoided.
		4.2.2. The statement should be presented as an integrated whole. Summaries of data presented in separately bound appendices should be introduced in the main body.

AREAS	REVIEW CATEGORIES	REVIEW SUB-CATEGORIES
	4.3. Emphasis	4.3.1. Prominence and emphasis should be given to potentially severe adverse as well as to potentially substantial favourable environmental impacts.
		4.3.2. The statement should be unbiased; it should not lobby for any particular point of view. Adverse impacts should not be disguised by euphemisms or platitudes.

APPENDIX II: Sub-category Review Results-Braamhoek Pump Storage Scheme

Review Area	Review Category	Sub-categories	Reviewer 1	Reviewer 2	Consensus Result
1.	1.1.	1.1.1.	B	A	A
		1.1.2.	B	A	A
		1.1.3	B	A	A
		1.1.4.	A	B	B
		1.1.5.	B	C	C
		1.1.6.	C	C	C
		1.1.7.	A	A	A
		1.1.8.	F	B	E
		1.1.9.	E	B	D
	1.2.	1.2.1.	B	C	B
		1.2.2.	F	C	D
		1.2.3.	E	B	E
		1.2.4.	B	A/B	B
		1.2.5.	E	C	C
		1.2.6.	E	D	D
	1.3.	1.3.1.	A	A	A
		1.3.2.	D	B	C
	1.4.	1.4.1.	A	B	A
		1.4.2.	A	A	A
		1.4.3.	A	A	A
		1.4.4.	A	A	A
		1.4.5.	F	C/D	E
		1.4.6.	A	A	A
		1.4.7.	A	A	A
		1.4.8.	N/A	N/A	N/A
	1.5.	1.5.1.	A	A/B	A

Review Area	Review Category	Sub-categories	Reviewer 1	Reviewer 2	Consensus Result
	1.5.	1.5.2.	A	B	A
		1.5.3.	A	A	A
		1.5.4.	C	C	C
		1.5.5.	F	F	F
		1.5.6.	A	A/B	A
		1.5.7.	C	C	C
		1.5.8.	C	C	C
		1.5.9.	B	A	B
		1.5.10.	A	A	A
		1.5.11.	F	A	B
		1.5.12.	A	A	A
		1.5.13.	F	N/A	N/A
		1.5.14.	B	B	B
		1.5.15.	A	B/C	B
2.	2.1.	2.1.1.	A	A/B	A
		2.1.2.	F	D	F
		2.1.3.	B	B	B
		2.1.4.	C	C	C
		2.1.5.	D	C	D
		2.1.6.	F	D	E
		2.1.7.	A	A	A
		2.1.8.	F	B/C	C
	2.2.	2.2.1.	C	D	C
		2.2.2.	C	C	C
	2.3.	2.3.1.	B	B	C
		2.3.2.	F	N/A	N/A
		2.3.3.	A	A	A
		2.3.4.	A	C/D	C

Review Area	Review Category	Sub-categories	Reviewer 1	Reviewer 2	Consensus Result
		2.3.5.	B	A	A
		2.3.6.	A	B	B
		2.3.7.	A	A	A
		2.3.8.	B	A/B	B
		2.3.9.	B	B	B
		2.3.10.	A	A/B	A
	2.4.	2.4.1.	A	A/B	A
		2.4.2.	C	B/C	C
	2.5.	2.5.1.	A	B	B
		2.5.2.	A	B	B
		2.5.3.	A	A	A
		2.5.4.	F	C	D
3.	3.1.	3.1.1.	B	B	B
		3.1.2.	C	A/B	C
		3.1.3.	F	F/N/A	F
		3.1.4.	F	C	C
	3.2.	3.2.1.	F	B	B
		3.2.2.	F	C	C
		3.2.3.	A	B	B
		3.2.4.	A	C	B
4.	4.1.	4.1.1.	A	B	B
		4.1.2.	A	D	D
		4.1.3.	C	C	C
	4.2.	4.2.1.	A	B	B
		4.2.2.	C	B/C	C
	4.3.	4.3.1.	B	C	C
		4.3.2.	B	B	B

APPENDIX III: Sub-categories Review Results-Mooi Mgeni Receiving Streams

Review Area	Review Category	Sub-categories	Reviewer 1	Reviewer 2	Consensus Result
1.		1.1.1.	C	B	B
		1.1.2.	A	A	A
		1.1.3	A	A	A
		1.1.4.	C	D	C
		1.1.5.	A	A	A
		1.1.6.	N/A	N/A	N/A
		1.1.7.	B	A	A
		1.1.8.	F	N/A	N/A
		1.1.9.	C	B	B
	1.2.	1.2.1.	F	N/A	N/A
		1.2.2.	F	N/A	N/A
		1.2.3.	E	N/A	F
		1.2.4.	E	F	F
		1.2.5.	E	F	F
		1.2.6.	E	F	F
	1.3.	1.3.1.	E	F	F
		1.3.2.	E	F	F
	1.4.	1.4.1.	A	A	A
		1.4.2.	A	A	A
		1.4.3.	A	A	A
		1.4.4.	A	B	A
		1.4.5.	E	D	E
		1.4.6.	B	A	A
		1.4.7.	A	A	A
		1.4.8.	N/A	N/A	N/A
	1.5.	1.51.	A	A	A
		1.5.2.	C	A	B
		1.5.3.	B	A	A
		1.5.4.	E	C	D
		1.5.5.	E	N/A	N/A
		1.5.6.	C	A	C
		1.5.7.	C	A	C
		1.5.8.	C	A	C
		1.5.9.	C	A/B	B
		1.5.10.	B	A	B
		1.5.11.	N/A	F/ N/A	N/A
		1.5.12.	N/A/	N/A	N/A
		1.5.13.	N/A	F/ N/A	N/A
		1.5.14.	A	A	A
		1.5.15.	E	F	F
2.	2.1.	2.1.1.	A	B	B
		2.1.2.	B	A	B
		2.1.3.	E	A	B
		2.1.4.	A	A	A
		2.1.5.	B	B	B
		2.1.6.	E	C	D
		2.17.	C	B	C
		2.1.8.	B	A	B
	2.2.	2.2.1.	E	F/N/A	F
		2.2.2.	F	F/N/A	F
	2.3.	2.3.1.	C	A	B
		2.3.2.	E	F	E
		2.3.3.	C	B	B
		2.3.4.	B	B	B
		2.3.5.	C	B	B
		2.3.6.	B	B	B
		2.3.7.	B	A	B
		2.3.8.	D	D	D
		2.3.9.	D	D	D
		2.3.10.	B	A	A
	2.4.	2.4.1.	C	D	C
		2.4.2.	C	D	C
	2.5.	2.5.1.	B	C	B
		2.5.2.	E	D	E
		2.5.3.	E	F	E
		2.5.4.	B	B	B
3.	3.1.	3.1.1.	N/A	F/N/A	N/A
		3.1.2.	N/A	F/N/A	N/A
		3.1.3.	N/A	F/N/A	N/A
		3.1.4.	N/A	F/N/A	N/A
	3.2.	3.2.1.	B	A	A
		3.2.2.	B	A	A
		3.2.3.	B	A	A
		3.2.4.	C	A	A
4.	4.1.	4.1.1.	A	A	A
		4.1.2.	A	A	A
		4.1.3.	A	A	A
	4.2.	4.2.1.	C	B	B
		4.2.2.	B	B	B
	4.3.	4.3.1.	B	A	B
		4.3.2.	B	A	B

APPENDIX IV: Sub-categories_Review Results-Mooi Mgeni Raising of the dam wall

Review Area	Review Category	Sub-categories	Reviewer 1	Reviewer 2	Consensus Result
1.	1.1.	1.1.1.	A	A	A
		1.1.2.	A	A	A
		1.1.3	A	A	A
		1.1.4.	B	B	B
		1.1.5.	B	B	B
		1.1.6.	C	B/C	C
		1.1.7.	F	N/A	N/A
		1.1.8.	F	F	F
		1.1.9.	F	F	F
	1.2.	1.2.1.	A	B/C	B
		1.2.2.	B	B	B
		1.2.3.	F	E/F	F
		1.2.4.	F	F	F
		1.2.5.	F	D	F
		1.2.6.	F	E/F	F
	1.3.	1.3.1.	C	C	C
		1.3.2.	E	C	D
	1.4.	1.4.1.	B	A	B
		1.4.2.	A	A	A
		1.4.3.	A	A/B	A
		1.4.4.	A	B	B
		1.4.5.	B	E	C
		1.4.6.	B	A	B
		1.4.7.	A	A	A
		1.4.8.	N/A	N/A	N/A
	1.5.	1.5.1.	A	B	B
		1.5.2.	B	C	C
		1.5.3.	C	A	B
	1.5.	1.5.4.	C	B	C
		1.5.5.	D	B/C	C
		1.5.6.	E	B/C	D
		1.5.7.	C	B	C
		1.5.8.	C	B	C
		1.5.9.	B	B	B
		1.5.10.	A	A	A
		1.5.11.	N/A	F/N/A	N/A
		1.5.12.	N/A	N/A	N/A
		1.5.13.	N/A	N/A	N/A
		1.5.14.	A	B	B
		1.5.15.	F	D	D
2.	2.1.	2.1.1.	B	B	B
		2.1.2.	C	A/B	B
		2.1.3.	B	B	B
		2.1.4.	B	A	B
		2.1.5.	B	C	B
		2.1.6.	E	A	D
		2.1.7.	B	C	B
		2.1.8.	C	C	C
	2.2.	2.2.1.	E	D	E
		2.2.2.	B	D	D
	2.3.	2.3.1.	F	D	E
		2.3.2.	F	F	F
		2.3.3.	F	A	C
		2.3.4.	A	A	A
		2.3.5.	A	A	A
		2.3.6.	A	A	A
		2.3.7.	A	A	A
		2.3.8.	F	B	E
		2.3.9.	C	F	E
		2.3.10.	A	A	A
	2.4.	2.4.1.	E	G	C
		2.4.2.	B	B/C	C
	2.5.	2.5.1.	A	B	B
		2.5.2.	D	B/C	C
		2.5.3.	F	A/B	B
		2.5.4.	C	C	C
3.	3.1.	3.1.1.	C	C	C
		3.1.2.	C	B/D	C
		3.1.3.	C	C	C
		3.1.4.	C	C	C
	3.2.	3.2.1.	B	A	B
		3.2.2.	C	B	B
		3.2.3.	C	C	C
		3.2.4.	D	B	C
4.	4.1.	4.1.1.	A	B	B
		4.1.2.	A	B	B
		4.1.3.	A	B	B
	4.2.	4.2.1.	B	B	B
		4.2.2.	B	B	B
	4.3.	4.3.1.	C	A	B
		4.3.2.	B	A	B

APPENDIX V: Sub-categories Review Results-Development of Infrastructure in the Seekoeivlei Nature Reserve

Review Area	Review Category	Sub-categories	Reviewer 1	Reviewer 2	Reviewer 3	Consensus Result
1.	1.1.	1.1.1.	A	B	C	B
		1.1.2.	A	B	C	B
		1.1.3	A	B	C	B
		1.1.4.	B	B	C	B
		1.1.5.	A	B	C	B
		1.1.6.	N/A	N/A	C	N/A
		1.1.7.	N/A	N/A	C	N/A
		1.1.8.	D	D	C	D
		1.1.9.	C	B	C	C
	1.2.	1.2.1.	B	B	C	B
		1.2.2.	A	B	C	B
		1.2.3.	B	B	C	B
		1.2.4.	F	F	F	F
		1.2.5.	A	B	C	B
		1.2.6.	B	C	C	B
	1.3.	1.3.1.	B	B	C	B
		1.3.2.	A	B	C	B
	1.4.	1.4.1.	A	B	A	B
		1.4.2.	A	B	C	B
		1.4.3.	A	B	C	A
		1.4.4.	A	B	C	A
		1.4.5.	F	B	C	F
		1.4.6.	A	B	C	B
		1.4.7.	A	B	C	B
		1.4.8.	A	B	C	B
	1.5.	1.5.1.	A	B	C	B
		1.5.2.	A	B	C	B
		1.5.3.	A	A	C	B

Review Area	Review Category	Sub-categories	Reviewer 1	Reviewer 2	Reviewer 3	Consensus Result
	1.5.	1.5.4.	C	B	C	D
		1.5.5.	F	F	F	F
		1.5.6.	A	B	C	B
		1.5.7.	B	F	C	C
		1.5.8.	B	B	C	B
		1.5.9.	F	F	C	F
		1.5.10.	A	B	C	B
		1.5.11.	F	F	C	N/A
		1.5.12.	A	B	C	B
		1.5.13.	F	F	C	N/A
		1.5.14.	A	C	C	B
		1.5.15.	F	F	F	F
2.	2.1.	2.1.1.	A	B	B	B
		2.1.2	B	F	C	C
		2.1.3.	E	F	E	E
		2.1.4.	F	B	C	C
		2.1.5.	B	B	B	B
		2.1.6.	F	F	F	F
		2.1.7.	F	F	F	F
		2.1.8.	C	C	C	F
	2.2.	2.2.1.	D	D	C	D
		2.2.2.	D	D	C	D
	2.3.	2.3.1.	A	B	C	B
		2.3.2.	C	B	C	C
		2.3.3.	D	F	C	C
		2.3.4.	D	B	C	C
		2.3.5.	B	B	C	C
		2.3.6.	F	B	C	C
		2.3.7.	A	B	C	B

Review Area	Review Category	Sub-categories	Reviewer 1	Reviewer 2	Reviewer 3	Consensus Result
		2.3.8.	F	F	F	F
		2.3.9.	B	B	B	B
		2.3.10.	A	B	C	B
	2.4.	2.4.1.	A	B	B	B
		2.4.2.	F	F	F	F
	2.5.	2.5.1.	B	B	B	B
		2.5.2.	B	B	B	B
		2.5.3.	F	F	F	F
		2.5.4.	E	E	E	E
3.	3.1.	3.1.1.	F	F	E	E
		3.1.2.	A	B	C	B
		3.1.3.	A	B	B	B
		3.1.4.	A	B	B	B
	3.2.	3.2.1.	A	B	A	B
		3.2.2.	B	B	A	B
		3.2.3.	B	B	C	B
		3.2.4.	B	B	C	B
4.	4.1.	4.1.1.	A	B	A	A
		4.1.2.	A	B	B	B
		4.1.3.	C	D	C	C
	4.2.	4.2.1.	A	B	B	B
		4.2.2.	C	B	B	
	4.3.	4.3.1.	A	B	B	B
		4.3.2.	A	B	B	B

APPENDIX VI: Review Area tasks (sub-category) not well Performed

SUB-CATEGORY	BPSS	MM-RS	MM-RDW	DISNR
1.1.8. The nature and quantities of raw materials needed during both the construction and operational phases should be described;	x		x	x
1.1.9. In regard to the raw materials an indication of its sources and availability especially of water should also be included.	x		x	
1.2.2 The uses to which this land will be put should be described and the different land use areas demarcated.	x			
1.2.3. The estimated duration (start and completion date) of the construction phase, operational phase and, where appropriate, decommissioning phase should be given.	x	x	x	
1.2.4 The number of workers and/or visitors entering the development site during both construction and operation should be estimated.		x	x	x
1.2.5. Their access to the site and likely means of transport should be given.		x	x	
1.2.6 The infrastructure required servicing the project and means of transporting (e.g. roads, rails, etc) raw materials and products to and from the site and the approximate quantities involved should be described.	x	x	x	
1.3.1. The solid, liquid or gaseous wastes produced as a result of the project should be described.		x		
1.3.2. The ways in which it is proposed to handle and/or treat these wastes and residuals should be indicated.		x	x	
1.4.5. Cumulative impacts should be included in the report. These may be caused by, for example, the dispersion of pollutants, infrastructural requirements of the project, traffic, effects on human health, socio-economic conditions, physical and cultural resources etc.	x	x	x	x
1.5.4. The socio-economic benefits of the wetland as it is used at present should be determined in consultation with the relevant stakeholders (e.g. local community, NGOs).		x		
1.5.5. The replacement costs of the free goods and services now being produced by the wetland if it were destroyed should be determined.	x			x
1.5.6. Data on seasonal (and inter-annual) variations that occur in a wetland should be determined				x
1.5.9. Ecosystem boundaries or catchments areas should be used for deciding the boundaries of an EIA whenever possible.				x
1.5.15. Assessment methods used for determining the wetland functions, values and uses should be outlined.		x	x	x
2.1.2. Consideration should not be limited to events, which will occur under design operating conditions. Where appropriate, impacts, which might arise from non-standard operating conditions, due to accidents, should also be described.	x			
2.1.3. The impacts should be determined as the deviation from baseline conditions, i.e. the difference between the conditions, which would obtain if the development were not to proceed and those predicted to prevail as a consequence of it.				x
2.1.5. An assessment should be done of indirect effects, including influences on adjacent or upstream/downstream areas and/or the catchments.	x			
2.1.6. Assessment should be done of cumulative impacts (adding together over different areas, times, processes etc) and secondary impacts (e.g. likely associated developments, connecting infrastructure).on the wetland.	x	x		x
2.1.7. Consultation with stakeholders (local communities, interested NGOs and general public) should be conducted.				x

SUB-CATEGORY	BPSS	MM-RS	MM-RDW	DISNR
2.1.8. There should be a level of agreement between the environmental consultant and the specialist report(s) regarding the assessment of the potential impacts and conclusions reached.				x
2.2.1. The project must be divided into four phases (Pre-construction-, Construction-, Operational- and Decommissioning phase) from which impacting activities can be identified.		x	x	x
2.2.2. All the possible impacts from each phase must be identified.		x		x
2.3.1. There should be a genuine attempt to contact the general public and special interest groups, this must be done through a notice/ advertisement in the local or national paper, an example of the notice must be included in the report.			x	
2.3.2 In the report there must also be a description of the onsite notice that was placed on the proposed development site.		x	x	
2.3.8 A list of issues that were identified as being of concern to interested and affected parties must be included.	x	x		x
2.3.9. Notification criteria, which entails the reason for their participation in the various stages of the process, where the report can be obtained, where it can be examined (libraries), where and to whom the comments on such reports should be send to, the specified period for receiving comments must be included.		x		x
2.4.2. Where possible, predictions of impacts should be expressed in measurable quantities with ranges and/or confidence limits as appropriate (with the help of the criteria provided in the guideline document e.g. Nature of the impact, Extent, Duration, Intensity and Probability				x
2.5.2. The significance of an impact should be assessed; account should be taken of the nature, duration, intensity, extent and probability of the impact in conjunction with national and local societal values.		x		
2.5.3 A description of the proposed method of assessing the significance of the impacts should be given thus the rating and ranking of impacts to attach values to impacts.		x		x
2.5.4. It should be indicated where there are uncertainties, or where data could not be obtained.				x
3.1.1. The method used to identify the alternatives must be clearly described for example informal discussions with authorities, overlay maps that indicate different environmental and socio-economic factors, brainstorming or the Delphi technique.				x
3.1.3. A minimum of two alternatives should be investigated in further detail.	x			x
4.1.2. Information should be logically arranged in sections or chapters and the whereabouts of important data should be signalled clearly.	x			