



Environmental Impact Assessments:
**Have EIA regulation amendments influenced report
quality?**

MSc (CW/RR) in the Field of Environmental Sciences

RESEARCH REPORT (GEOL 7007)

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degree of Master of Science**

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DECLARATION

I declare that this research report is my own, unaided work. It is being submitted for the Degree of Master of Science at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.



Ms Kariesha Tilakram

02nd day of November 2018 at Johannesburg

ABSTRACT

South Africa has implemented regular amendments to the Environmental Impact Assessment (EIA) regulations in an attempt to improve the effectiveness of the process. One way of evaluating effectiveness is to assess the quality of EIA reports submitted for decision-making. This study aimed to assess whether the amendments to the National Environmental Management Act (NEMA), (Act no 107, 1998) EIA regulations in 2014 have contributed to better EIA report quality in South Africa in comparison to the previous EIA system. As such, a sample of 26 EIA reports, 16 under the 2010 EIA regulations and 10 under the 2014 EIA regulations, were reviewed using an adapted version of the Lee and Colley review package. The findings of this research revealed that overall report quality improved under the 2014 EIA regulatory system compared to the 2010 system. Furthermore, an improvement in the 2014 EIA report quality indicates that the decision-making process is more well informed and holistic, which further indicates an improvement in effectiveness of the EIA process. Key amendments to the 2014 EIA regulations that have an influence on EIA report quality include appendix 2 which outlines the objective, scope and content of a scoping report, appendix 3 which outlines the objective, scope and content of an EIA report, appendix 4 which outlines the content of an EMP, and appendix 6 which outlines the content of a specialist report. It is thus concluded that amendments to the EIA regulations have in fact influenced report quality. These findings differed from those of other studies undertaken on EIA quality under the 2006 EIA system in comparison to the 1997 EIA system.

Key words: Environmental Impact Assessment, Effectiveness, Environmental Impact Assessment Report, EIA Report Quality, EIA Regulations, National Environmental Management Act.

DEDICATION

This research report is affectionately dedicated to my loving Family who taught me love, patience, kindness, dedication, hard work and unremitting devotion:

- My late Grandmother, Mrs Khemawatee Bechan;
- My Grandmother, Mrs Dunpathia Devrajh;
- My Dad, Mr Tamanlall (Manesh) Tilakram;
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TABLE OF CONTENTS

DECLARATION	i
ABSTRACT	ii
DEDICATION	iii
ACKNOWLEDGEMENTS	iv
CHAPTER 1: INTRODUCTION	1
1.1. Research Aim and Objectives	2
1.2. Layout of Research Report	3
CHAPTER 2: LITERATURE REVIEW	4
2.1. Management of adverse business impacts with the aim of promoting Sustainable Development	4
2.2. Environmental Impact Assessment	6
2.3. EIAs in South Africa	7
2.4. EIA effectiveness and decision-making	11
2.5. The quality of EIA reporting	13
2.6. Minimum EIA reporting requirements for 2010 and 2014 EIA regulations	20
CHAPTER 3: METHODOLOGY	29
3.1. Adaptation of the Lee and Colley Review Package to assess the quality of EIA reports under the 2010 and 2014 EIA regulations in South Africa.	31
3.2. Data Collection	33
3.3. Analysis of Data	35
CHAPTER 4: RESULTS AND DATA ANALYSIS	38
4.1. Quality of Review areas	41
4.1.1. <i>Review area 1: Description of the development and environment</i>	41
4.1.2. <i>Review area 2: Identification and evaluation of key impacts</i>	45
4.1.3. <i>Review area 3: Alternatives and Mitigation</i>	50
4.1.4. <i>Review area 4: Communication of results</i>	54
4.2. Summary of key findings	58
CHAPTER 5: DISCUSSION	59
REFERENCES	68

APPENDICES

Appendix 1: Comparison of 2014 EIA regulation reporting requirements to van Heerden's (2010) adapted version of Lee and Colley review package	75
Appendix 2: Adapted version of the Lee and Colley Review Package	80

Appendix 3: Raw data collected using adapted version of Lee and Colley Review Package.....	82
Appendix 4: Detailed results of 2010 and 2014 EIA quality review: overall score, review area and review category grades, and percentage of EIA reports in various grade groupings	85
Appendix 5: Detailed comparison of 2010 and 2014 EIA review results and percentage of EIA reports in various grade groupings	87

LIST OF FIGURES

Figure 1: The Lee and Colley review package 4-level hierarchy approach (Lee <i>et al.</i> , 1999:16).	29
Figure 2: A hierarchy representation of the review areas 1 and 2 with its categories and sub-categories (Lee <i>et al.</i> , 1999:27).	30
Figure 3: Summary of overall quality review results based on grading	40
Figure 4: Review area grades for 2010 and 2014	40
Figure 5: C or better (A-C) grades (satisfactory) achieved for review area 1	42
Figure 6: Well performed (A-B) grades for review area 1	43
Figure 7: Poorly performed (E-F) grades for review area 1	44
Figure 8: Critical category (%C-D) grades for review area 1	45
Figure 9: C or better (A-C) grades (satisfactory) achieved for review area 2	47
Figure 10: Well performed (A-B) grades for Review area 2	47
Figure 11: Poorly performed (E-F) grades for Review area 2.....	48
Figure 12: Critical categories (%C-D) of review area 2	49
Figure 13: C or better (A-C) grades (satisfactory) achieved for review area 3	51
Figure 14: Well performed (A-B) grades for review area 3	52
Figure 15: Poorly performed (E-F) grades for review area 3	52
Figure 16: Critical categories (%C-D) of review area 3	53
Figure 17: C or better (A-C) grades (satisfactory) achieved for review area 4	55
Figure 18: Well performed (A-B) grades for review area 3	56
Figure 19: Poorly performed (E-F) grades for review area 4	56
Figure 20: Critical categories (%C-D) of review area 4	57

LIST OF TABLES

Table 1: Findings of studies that assessed EIA report quality using the Lee and Colley review package	15
Table 2: Summary of strengths and weaknesses from research studies for each review area.....	19
Table 3: Comparison of the minimum reporting requirements for EIA reports under the 2010 and 2014 EIA regulations (South Africa, 2010; 2014).	20
Table 4: Assessment symbols used to complete the collation sheet for each category (Lee <i>et al.</i> , 1999:17).	30

Table 5: Adaptation of the Lee and Colley Review Package (Adapted from Lee <i>et al.</i> , 1999).	32
Table 6: List of EIA Reports obtained for projects within Gauteng Province that were compiled under the 2010 EIA regulations.	34
Table 7: List of EIA Reports obtained for projects within Gauteng Province that were compiled under the 2014 EIA regulations.	35
Table 8: Grouping, interpretation and calculation of results (van Heerden, 2010)	36
Table 9: Summary of overall report quality results: overall scores, review areas and review categories.	39
Table 10: Results of review area 1	42
Table 11: Results of Review area 2	46
Table 12: Results of review area 3	50
Table 13: Results of review area 4	54
Table 14: Comparison of the best and worst performing categories	58

CHAPTER 1: INTRODUCTION

Environmental management emanated from catastrophic and detrimental impacts to the environment caused by increasing anthropogenic and/or business activities. As a result, environmental management legislative frameworks and tools were established and instituted globally to address and manage potential environmental impacts with the aim of promoting sustainable development (CSIR, 2010; McLamb, 2011; Al-Sharafi, *et al.*, 2017).

South Africa introduced and enacted the National Environmental Management Act (Act 107 of 1998) (NEMA) framework to regulate human impacts on the environment by incorporating the principles of sustainable development (van Wyk, 2007). Chapter 5 of the NEMA refers to the integrated environmental management (IEM) of activities, which promotes the application of supporting IEM principles and a range of environmental assessment and management tools that are aimed at promoting sustainable development (DEAT, 2004c; van Wyk, 2007). One of these environmental management tools is Environmental Impact Assessment (EIA), which is project-specific and used to predict potential impacts associated with the project, identify mitigation and management measures to avoid or reduce negative impacts and enhance positive impacts, identify alternatives to meet the purpose of the project, and present the assessment to a competent authority for holistic decision-making (DEAT, 2004c; Polonen, Hokkanen and Jalaya, 2011; Cardenas and Halman, 2016; Madlome, 2016; Loomisa and Dziedzic, 2018).

Since the enactment of the NEMA framework in South Africa, the following four sets of EIA regulations were promulgated between 2004 and 2017:

- NEMA EIA regulations, 2006;
- NEMA EIA regulations, 2010;
- NEMA EIA regulations, 2014; and
- Amendments to the NEMA EIA regulations 2014, 2017.

The aim of introducing each new EIA regulation and repealing the previous EIA regulation in South Africa, was to improve the quality as well as the effectiveness of

the EIA process. Compiling good quality EIA reports is one aspect of effectively translating EIA policy into practice (Talime, 2011). Quality reporting translates into better decision-making and promotes an effective EIA process (Sadler, 1998). However, the challenge faced by many Environmental Assessment Practitioners (EAPs) is to ensure that the information used to compile the EIA is “correct, comprehensive and comprehensible” (DEAT, 2004b, page 4).

Many factors such as “personal opinion, inaccurate source data and scientific limitations” can sway the objective and quality of EIA reporting, which poses a grave challenge for effectiveness (DEAT, 2004b, page 4). Based on the challenges faced with EIA quality reporting, more research on evaluating the effectiveness of EIAs is required. As such, reviews of the quality of EIA reports has been the focus of many studies worldwide. A review ensures quality control and assurance during the EIA process (Sadler, 1998) and is an effective way of evaluating the satisfactoriness and quality of EIA reports (DEAT, 2004b). There are many quality review packages available that are used globally to assess EIA report quality (van Heerden, 2010; Mbhele, 2009). However, the most recognised and most widely used review package in many research studies to assess the quality of the EIA reports, is the Lee and Colley review package (Hoffmann, 2007; Sandham, *et al.*, 2008; Mbhele, 2009; van Heerden, 2010; Talime, 2011 and Sandham *et al.*, 2013; Zakari, 2015). One of the key reasons is that this review package is easily adaptable, yet still effective, as it has been widely adapted to review project level EIA reports globally (Mbhele, 2009; van Heerden, 2010; Talime, 2011; Madlome, 2016).

1.1. Research Aim and Objectives

By assessing EIA report quality for reports undertaken in terms of the EIA regulations 2010 and comparing it to the EIA report quality for reports undertaken in terms of the EIA regulation 2014, this research aimed to determine whether the amendments to EIA regulations have in fact influenced report quality. Since the 2017 regulations were recently passed, it was not possible to attain a sufficient number of EIA reports evaluated under the EIA regulation 2017. Therefore, EIA reports compiled under the

EIA regulation 2014 were used as a comparison to those compiled under the EIA regulation 2010, to assess EIA quality reporting.

Specifically I set out to (1) compare EIA report quality under the 2010 and 2014 regulations using an adapted version of the Lee and Colley review package and (2) to identify any relationship between the amendments to the EIA regulations and report quality.

1.2. Layout of Research Report

This research report comprises of five chapters. Chapter 1 provides an introduction, the problem statement and objectives of this research study. Chapter 2 provides a review of the existing literature relating to the EIA process, the NEMA EIA regulations and the quality of EIA reporting. Chapter 3 describes the methodology and approach used to conduct this research. Chapter 4 presents an analysis and interpretation of the results obtained from the study on the quality of EIA reports investigated. Chapter 5 provides an interpretation of the data analysed in comparison to the literature review undertaken and closes with an overview of the key findings and the conclusions of the study as well as limitations to the study and recommendations for further research. All references used for this research are listed after Chapter 5. Appendices that supplement this research can be found at the end of this research report. Figures and tables are numbered consecutively.

CHAPTER 2: LITERATURE REVIEW

The growing human population and economic growth have led to increased business activities worldwide. Since the industrial revolution, business activities have led to a series of progressively worsening effects on the environment (CSIR, 2010; McLamb, 2011). Many of these business activities aim to cater for the “human modern life style” (Al-Sharafi, *et al.*, 2017, pg. 418), hence the increasing demand for resources, housing, developments and infrastructure, owing to an increasing population and industrial and economic growth, have caused and still have the potential to cause detrimental impacts to the environment and its ecosystems. As a result, there is now excessive dependency on Earth’s natural resources, resulting in encroachment of land for new developments, mining of fossil fuels for energy production, water extraction for industrial use and deforestation for the generation of wood, amongst others, which have created and still are creating adverse impacts on the receiving environment. The biggest threats by business activities to the environment are pollution and habitat destruction which have led to long-term environmental degradation (CSIR, 2010; Al-Sharafi, *et al.*, 2017). This not only creates environmental challenges, but also social and economic challenges for current and future generations (Japan, 2012). Thus there is a need to protect the environment from potential detrimental impacts posed by anthropogenic activities and manage these impacts with the aim of promoting sustainable development.

2.1. Management of adverse business impacts with the aim of promoting Sustainable Development

During the 1970s, global conflicts around protecting environmental resources, enhancing business activities and economic development or meeting basic human needs through social development had occurred. In 1987, The World Commission on Environment and Development (WCED) released the Brundtland Report (Our Common Future, 1987) which aimed to resolve this conflict by introducing the concept of ‘sustainable development’. Sustainable development is “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987: 43) and integrates environmental and social

aspects into economic development from the onset (Newman, 2005). The thought behind the concept emanated in the 1960s, when Rachel Carson (1962) published *Silent Spring*, a book which brought about global awareness on detrimental environmental impacts caused by the extensive use of pesticides. The 1992 United Nations Conference on Environment and Development further established the concept by publishing the Earth Charter to be globally implemented in order to achieve a peaceful and just society (Newman, 2005).

In South Africa, Section 24 of the Constitution states that “everyone has the right to an environment that is not harmful to their health or wellbeing and to have the environment protected through reasonable legislative measures” (South Africa, 1996). In 1998, changes to environmental management legislation in South Africa resulted in the proclamation of the NEMA as a framework enacted for regulating human impacts on the environment by incorporating the principles of sustainable development (van Wyk, 2007). Furthermore, the NEMA Chapter 5 refers to the integrated environmental management (IEM) of activities, which promotes the application of supporting IEM principles as well as a range of tools for environmental assessment and management, that aim to promote sustainable development (DEAT, 2004c; van Wyk, 2007).

Some of the most commonly used environmental assessment and management tools include strategic environmental assessment (SEA), social impact assessment (SIA), life cycle assessment (LCA), environmental management systems, environmental auditing, cost-benefit analysis, risk assessment, sustainability analysis, environmental management plan (EMP) and EIA (DEAT, 2004c). An SIA is the process of engaging with various interested and affected stakeholders about a project and its activities to determine associated social impacts which informs decision-making. A LCA systematically analyses and evaluates environmental aspects of products or services throughout its life cycle. Environmental auditing is a systematic management tool which evaluates and documents environmental performance and compliance thereof against company policies, procedures, adopted standards, legislated requirements and key performance indicators (DEAT, 2004c). A risk assessment evaluates the probability and severity of adverse impacts that may occur due to associated stressors and are usually undertaken for risks posed to human health risk or the ecological environment. A SEA is a proactive tool and

framework used to determine environmental consequences of verdicts reached on strategic objectives of policies, plans and programmes (DEAT, 2004c). It aims to assess the opportunities and constraints placed by the environment onto developments. An Environmental Management Plan (EMP) details the management of activities to avoid or reduce potential environment impacts, enhance potential environmental benefits and ensure environmental compliance, throughout all phases of the project / activity (DEAT, 2004c). Finally, an EIA is a project-specific tool used to predict the impacts of a proposed project, identify mitigation measures to avoid or reduce negative impacts and enhance positive impacts, identify alternatives to meet the purpose of the project, and present the assessment to a competent authority for holistic decision-making (DEAT, 2004c; Polonen, Hokkanen and Jalaya, 2011; Cardenas and Halman, 2016; Madlome, 2016; Loomisa and Dziedzic, 2018).

Taking cognisance of the tools described, in order to predict, evaluate and mitigate adverse impacts to the environment that may result from proposed business activities, appropriate environmental management tools must be utilised during the early stages of the project (Mbhele, 2009). The only tool that is required and regulated by law to be undertaken during the planning stages of a project is the EIA.

2.2.Environmental Impact Assessment

EIA is a well-known and widely used environmental management tool in many countries worldwide (Wood, 2003; DEAT, 2004a; Polonen, Hokkanen and Jalaya, 2011; Madlome, 2016; Loomisa and Dziedzic, 2018). EIAs are generally conducted during the planning phase of a project to identify, predict, assess, evaluate and manage environment impacts of a proposed development or activity so as to avoid or reduce negative impacts and enhance positive impacts before any major decisions are taken and any commitments are made (Lee *et al.*, 1999; Sandham *et al.*, 2008; Wood 2003; Polonen, Hokkanen and Jalaya, 2011; Madlome, 2016; Loomisa and Dziedzic, 2018). An EIA requires, among other things, the publication of an EIA report detailing the likely significant impacts of a proposed development (Jay *et al.*, 2007), and consultation and public participation play a fundamental role in the EIA evaluation process. An EIA is thus considered to be an anticipatory and participatory environmental management tool (Jay *et al.*, 2007).

EIAs are usually undertaken by an independent body, the Environmental Assessment Practitioner (EAP). The EIA report specifies activities of the proposed development, details of the proponent, detailed descriptions of the surrounding biophysical and social areas, alternatives for the proposed development, comments from all stakeholders, the methodology for impact rating and the detailed impact assessment for all potential impacts per alternative derived from aspects/activities of the proposed development. The EIA report is concluded with an Environmental Impact Statement (EIS) from the EAP, summarising the outcomes of the assessment (Mbhele, 2009). The EIA is then subjected to a decision from the relevant competent authority that either grants or refuses authorisations to the applicant, with the aim to promote sustainable development” (Mbhele, 2009).

The origin of EIAs stems from the late 1960’s, when the United States of America initially introduced environmental assessments in respect of the United States National Environmental Policy Act (NEPA) (DEAT, 2004a; Jay *et al.*, 2007). Since then, most industrialised countries worldwide have enacted legislation that requires some form of environmental impact assessment (DEAT, 2004a). Over the years, EIAs have evolved and have been lawfully enforced by many countries, including South Africa, as an environmental assessment and management tool for planning projects (Mbhele, 2009).

2.3. EIAs in South Africa

EIA’s were first introduced in South Africa in 1989 through the proclamation of regulations in accordance with the Environment Conservation Act, Act No 73 of 1989 (ECA) (South Africa, 1989). In 1998, South Africa enacted the National Environmental Management Act (Act 107 of 1998) which repealed the ECA, as it incorporated principles of integrated environmental management and hence improved the objectives of the EIA process (Wood, 1999; Glazewski, 2005; Mbhele, 2009). Since then, several tools form part of the NEMA legal framework (DEAT, 2004c). EIAs in South Africa are well established and recognised as a useful tool towards achieving the principles of sustainability, thus conforming to Section 2 of the NEMA and contributing to sustainable development (DEAT, 2004c). As such, South

Africa is known for having one of the most advanced environmental legislation worldwide (Wood, 2002; DEAT, 2004c; Madlome, 2016).

Four sets of NEMA EIA regulations were enacted between 2004 and 2017. After the enactment of the NEMA in 1998, the 1997 ECA regulations were amended in 2004, and in 2006 new EIA regulations were introduced which replaced the 1997 ECA regulations (South Africa, 2006; Mbhele, 2009). The 2006 regulations introduced a rationalised approach to the EIA process and were gazetted as three separate regulations, GN R385 (EIA regulations of 2006), GN R386 (Listing Notice 1) and GN R387 (Listing Notice 2). The listing notices detailed activities that will be subjected to environmental authorisation before the commencement of projects that trigger either a Basic Assessment (BA; Listing Notice 1) or a Scoping and EIA process (S&EIA; Listing Notice 2). The NEMA regulations 2006 included more specifications in terms of the activities as well as activities that were previously omitted under the ECA regulations. The main difference was the differentiation between activities that required basic assessments and full environmental impact assessments to be undertaken. Role players were well defined, the decision-making process had prescribed timeframes, and the public participation process was defined with minimal prescribed requirements (South Africa, 2006). The amendment of the 2006 NEMA EIA regulations provided more details regarding the public participation process (South Africa, 2006).

Progressive aims to improve the EIA effectiveness in South Africa led to the promulgation of new NEMA EIA regulations in August 2010, which replaced the 2006 NEMA EIA regulations. The new 2010 EIA regulations included several changes in an attempt to further streamline the EIA process. These regulations also identified specific geographic areas that should be considered more carefully (eThekweni Municipality, 2011). One of the main changes included the layout of the regulations. The lists of activities requiring environmental authorisation were streamlined into four parts with three listing notices, GN R 543 (EIA regulations of 2010), GN R 544 (Listing Notice 1), GN R 545 (Listing Notice 2) and GN R 546 (Listing Notice 3), as opposed to the previous regulations which consisted of three parts and two Listing Notices. Listing Notices 1 and 2 of the 2010 regulations still described activities that triggered either a BA or S&EIA process respectively, however the introduction of Listing Notice 3 considered activities triggered within environmentally sensitive areas

and with specific environmental attributes outlined for each of the nine provinces. Activities from Listing Notice 3 were subjected to a BA process. Other key changes included reporting requirements which provided more clarity in terms of the public participation process, timeframes and environmental management programmes (EMPr's) (South Africa, 2010).

The approach to the NEMA EIA regulations 2010 was adopted to provide more careful consideration to impacts associated with geographically sensitive areas, to avoid applications for less significant activities, i.e. activities with a minimal footprint and known/easily predictable impacts, as well as to reduce costs and to make the process more efficient and feasible (DEA, 2010).

The NEMA EIA regulations 2014 were promulgated on 8 December 2014, and replaced the NEMA EIA regulations 2010. The NEMA EIA regulations of 2014 consist of four parts as with the NEMA EIA regulations 2010, with three listing notices. The lists of activities for each of the listing notices were revised and updated, and the regulations were published as GNR 982 (EIA regulations of 2014), GNR 983 (Listing Notice 1-BA), GNR 984 (Listing Notice 2-S&EIA) and GNR 985 (Listing Notice 3-BA). In comparison to the EIA regulations 2010, the EIA regulations 2014 are more streamlined and specific in their activities, process requirements and timeframes as the timeframes are clearly specified not only for authority decision-making, but also for the applicants reporting throughout the process. These regulations are unique as they form part of the "one environmental system", which aims to synchronise and streamline the entire permitting process for environmental authorisations in South Africa, by integrating administrative and legislative requirements in terms of the NEMA and the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA) (TMG, 2017). As such, the EIA regulations 2014 include mining-related activities and requirements and allow the Minister of Mineral Resources to also issue environmental authorisations and waste management licences, so as to avoid the duplication of processes and reduce the number of environmental permits required, as well as reduce the time for processing applications (TMG, 2017).

Key changes in the EIA regulations 2014 include the format of the regulations, the incorporation of MPRDA requirements for environmental authorisation permitting, the inclusion of a closure plan, where applicable, as part of the BA process requirements, withdrawal and auditing requirements for compliance with environmental

authorisation and environmental management programmes, more specified public participation requirements, inclusion of transitional provisions for EMPs and EMPs which have been approved in terms of the MPRDA to comply with the EIA regulations 2014 auditing and amendment requirements for environmental authorisations, EMP and closure plans and the introduction of appendices detailing reporting requirements for basic assessments, scoping, EIA, EMP, closure plans, specialists and environmental audit reports (South Africa, 2014).

The amendments to the EIA regulations 2014 promulgated by the Minister of Environmental Affairs on 7 April 2017 are the most recent changes to the EIA regulations in South Africa. The lists of activities for each of the listing notices were revised and updated, and the regulations were published as GNR 324 (EIA regulations of 2014), GNR 325 (Listing Notice 1-BA), GNR 326 (Listing Notice 2-S&EIA) and GNR 327 (Listing Notice 3-BA). Changes to the definitions in the EIA regulations 2014 were made as well as numerous amendments to activities in Listing Notices 1 to 3. Activity 49 (expansion of jetties, slipways, buildings, boardwalks or infrastructure) and Activity 62 (development of facilities for marine telecommunication) of Listing Notice 1, as well as Activities 10 (development of facilities for marine telecommunication), 21 (primary processing of a mineral resource), 22 (primary processing of a petroleum resource) and 28 (activities that require an atmospheric emission license) of Listing Notice 2 have been removed from the 2014 EIA regulations, as they have been recognised as maintenance activities, which would have been covered in past authorisations or covered in other parts of the regulations (South Africa, 2017).

The regulations further stipulate that the Competent Authority for the three Listing Notices is the provincial authority of where the activity occurs, except for mining-related activities and activities that are applied for in terms of section 24C (2) of the NEMA, where the Minister is the competent authority, or where the competent authority has been identified by the Minister or an MEC, for granting environmental for those activities (South Africa, 2017). The amended regulations include transitional provisions for Environmental Management Programmes and Plans approved in terms of the MPRDA to comply with the EIA regulations, 2014 (as amended). It also includes changes to the content of specialist reports, environmental authorisation

amendments, public participation and the submission of EIA reports (South Africa, 2017).

These amendments aim to enhance the roll out of the One Environmental System amongst the Department of Mineral Resources, Department of Environmental Affairs and the Department of Water Affairs and Sanitation and incorporate integrated environmental management system in the mining industry (TMG, 2017). Thus, the intent of the NEMA regulations 2014, as amended, is to provide for an integrated environmental management system and streamline the EIA reporting and permitting processes across these three government departments into one environmental system in an effort to make the process faster, more efficient and effective.

The aim of the NEMA EIA regulations amendments was thus made to improve the quality and effectiveness of the EIA system. It is therefore important to evaluate the effectiveness of EIA.

2.4.EIA effectiveness and decision-making

The extensive use of EIAs as an anticipatory environmental management tool, globally and in South Africa, has brought about great concerns and research discussions over EIA effectiveness (Cashmore *et al.*, 2004; Glazewski, 2005; Jay *et al.*, 2007; Mbhele, 2009; van Heerden, 2010; Sandham *et al.*, 2013; Madlome, 2016; Lyhne *et al.*, 2017). According to Sadler (2004), EIA effectiveness can be defined as whether the EIA process or its components has achieved its purposes (i.e. identify, predict, assess, evaluate and manage environment impacts of a proposed development or activity so as to minimise negative impacts and enhance positive impacts before any major decisions are taken and any commitments are made, with the overall aim of achieving sustainable development). Hence, by evaluating EIA effectiveness, the impact of EIA on decision-making and environmental protection can be determined (Sadler, 2004; Jay *et al.*, 2007; Heinma and Poder, 2010; van Heerden, 2009).

EIA effectiveness can be broadly measured in terms of its procedural effectiveness (compliance to EIA policy and procedural requirements in terms of all elements that constitute an EIA system), substantive effectiveness (impact on decision-making and

environmental protection), transactive effectiveness (financial and time-based costs of undertaking an EIA), and normative effectiveness (degree to which policy meets its purpose) (Loomisa and Dziedzic, 2018; Bond, Fischer and Fothergill, 2017; Chanchitpricha and Bond, 2013). Thus, evaluating EIA effectiveness depends on many components such as effectiveness of prediction and management of impacts, assessing EIA criteria to determine EIA compliance with procedural requirements, quality of reports and how it affects decision-making, monitoring and post-auditing operational efficiency, cost-effectiveness of the process, EIA follow-up and whether EIA achieved its purpose and objectives (Sadler, 2004; Retief, 2008; Hoffman 2007; Sandham and Pretorius, 2008; van Heerden, 2010; Talime, 2011; Sandham *et al.*, 2013; Zakari, 2015; Bond, *et al.*, 2018). From the above, one component of particular importance is the quality of EIA reports, i.e. the quality of information contained in the EIA report that has an influence on the decision-making process (Lee *et al.*, 1994; Hoffman 2007; Sandham and Pretorius, 2008; van Heerden, 2010; Talime, 2011; Sandham *et al.*, 2013; Zakari, 2015; Bond, *et al.*, 2018).

The purpose of an EIA as an environmental management tool is to provide sufficient information on the project, alternatives considered and potential environmental impacts associated with project activities for each alternative, allowing for a more informed decision to be taken during the decision-making process (DEAT, 2004b, Jay *et al.*, 2007). The information contained in the EIA must therefore be easily accessible and comprehensible for review by all identified stakeholders and decision-makers. However, the challenge faced by many EAPs is to make certain that the information captured in the EIA report is accurate, holistic and understandable (DEAT, 2004b). Many factors such as subjectivity, incorrect information and technical limitations, for example, can sway the objective and the quality of EIA reporting, which poses a grave challenge in its effectiveness (DEAT, 2004b). Hence, compiling good quality EIA reports is one key aspect of effectively translating EIA policy and procedural requirements into practice (Talime, 2011), which translates into better decision-making and promotes an effective EIA process (Sadler, 1998).

However, it is also generally assumed that EIA reports of good quality lead to good decision-making and EIA effectiveness (Retief, 2008). The decision-making phase should translate the EIA information provided into lawfully obligatory requirements that will ensure the prevention of significant impacts to the environment, and thus the

link between EIA and decision-making, i.e. the link between procedural and substantive effectiveness of the EIA process, is fundamental to decision-making, (Polonen, Hokkanen and Jalaya (2011). Therefore there is great emphasis to undertake more studies for the evaluation of EIA report quality in order to assess EIA effectiveness (Sandham and Pretorius, 2008; Sandham *et al.* 2013; van Heerden, 2010).

2.5. The quality of EIA reporting

The EIA report plays a crucial part in the EIA process and as such the quality of EIA reports has been the focus of many studies worldwide in order to determine EIA effectiveness. According to Sadler (1998), undertaking reviews of EIA reports translates into an effective quality control and assurance strategy during the EIA process.

Several review packages are used globally for assessing the quality of EIA reports (van Heerden, 2010). Some of these review packages include review checklists from the South African Institute for Environmental Assessment; the Lee and Colley review package as well as the review package from the Impact Assessment Unit's Environmental Impact Statement (Mbhele, 2009). The Lee and Colley review package (1999) is the most well-known quality review package and has been used in many studies to assess the quality of the EIA reports (see Hoffmann, 2007; Sandham, *et al.*, 2008; Mbhele, 2009; van Heerden, 2010; Zakari, 2015; Talime, 2011 and Sandham *et al.*, 2013). This package was primarily established for reviewing EIA reports in the United Kingdom (Lee *et al.*, 1999) and since then has been widely adapted for reviewing project level EIA reports globally. It is a four-level hierarchy approach with an overall report rating consisting of four review areas, 13 categories and 39 sub-categories, used solely to assess the quality of EIA reports. The four key review areas include (1) the description of the project, the local environment and the baseline conditions; (2) identification and evaluation of significant impacts; (3) alternatives and mitigation of impacts; and (4) communication of results (Lee *et al.*, 1999).

Many studies on evaluating EIA report quality using the Lee and Colley review package have been undertaken globally in developed and developing countries to determine the EIA effectiveness in relation to report quality (Sandham *et al.* 2013). According to van Heerden (2010), EIA systems internationally have been evaluated in terms of effectiveness by using evaluation review criteria in a number of developed countries, including assessments in eight European Union countries (Barker and Wood, 1999), and also in third world countries such as Mauritius (Ramjeawon and Beedassy, 2004); Middle East Africa and North Africa (El-Fadl and El-Fadl, 2004); Eritrea (Zeremariam and Quinn, 2007); Pakistan (Nadeem and Hameed, 2008); Egypt (Badr, 2009); Columbia (Toro *et al.*, 2010); Syria (Haydar and Padiaditi, 2010); and Ethiopia (Ruffeis *et al.*, 2010). van Heerden (2010) noted that challenges for both first world and third world countries comprised of EIA legal or procedural requirements, inadequacy of resources and political will, significance of EIA reporting in decisions and inadequate monitoring. In addition, other challenges highlighted by Sandham *et al.* (2013) included weaknesses such as inadequate capacity of the various authorities involved, public participation, methodologies used, prediction of impacts, follow-up in relation to monitoring measures, alternatives consideration as well as identification of cumulative impacts. Talime (2011) evaluated effectiveness by reviewing EIA report quality in Lesotho and found that EIAs had several inadequacies, particularly in terms of the project description, impact identification, evaluation and mitigation, consideration of alternatives and public participation consultation. Zakari (2015) evaluated the quality of EIA reports in Niger Republic and found that EIA report quality had increased from 1980 to 1999.

In South Africa, a few studies have been undertaken to evaluate whether changes to regulations or EIA systems improved EIA report quality. van Heerden (2010) also looked at the evaluation of the South Africa EIA system, of which studies were undertaken in the Free State Province and in the Limpopo Province (Wood, 1999; Kruger and Chapman, 2005; Sandham, Siphugu and Tshivhandekano, 2005). From these studies, Wood (1999) found that EIA practice was satisfactory in South Africa, and the areas of weakness in the EIA regulatory framework included the review of EIA reports, the importance of impact significance in decision-making, the post-monitoring of impacts, the public participation process, and the monitoring of the effectiveness of the EIA system, whilst Sandham, Siphugu and Tshivhandekano

(2005) found that EIA reports in Limpopo contained unsatisfactory data and major weaknesses in EIA effectiveness included lack of competent authority capacity and the inability to conduct thorough EIA reviews. Kruger and Chapman (2005) found that poor regulatory compliance due to system deficiencies such as the exclusion of socio-economic impacts, subjective impact assessment methods, poor specialist input, inadequate alternative consideration and public participation, poor consideration and integration of EIA findings in the decision-making process were the greatest problem that influenced EIA quality and decision-making in South Africa.

Sandham *et al.* (2013) reviewed the 2006 South African EIA system in which the 1997 regulations were modified in order to improve EIA effectiveness. EIA reports were reviewed using an adapted version of the Lee and Colley review package and it was found that, although some aspects had improved, the overall report quality had decreased slightly under 2006 system as compared to the 1997 EIA system (Sandham, *et al.* 2013). van Heerden (2010) had also undertaken a comparative study of the 1997 and the 2006 EIA system in South Africa, which concluded that EIA report quality hadn't improved with EIA regulations enacted in 2006. Studies undertaken by Mbhele (2009) which assessed EIA report quality in terms of the 2006 EIA regulations for housing developments in Mpumalanga Province, Hoffmann (2007) which assessed the EIA report quality in the mining industry in South Africa, and Sandham and Pretorius (2008) on evaluating the quality of EIA reports as a component of EIA effectiveness in the North West Province found that EIA report quality was generally satisfactory and had remained the same with enhanced legislation. Some of the key studies relating directly to evaluating EIA effectiveness in terms of report quality are summarised in Table 1 below.

Table 1: Findings of studies that assessed EIA report quality using the Lee and Colley review package

STUDY ON ASSESSING THE QUALITY OF EIA REPORTS	KEY FINDINGS FROM QUALITY REVIEW OF EIA REPORTS
Hoffmann (2007) evaluated the EIA report quality in the	<u>Report quality was satisfactory</u>

STUDY ON ASSESSING THE QUALITY OF EIA REPORTS	KEY FINDINGS FROM QUALITY REVIEW OF EIA REPORTS
South African mining industry.	Challenges with reporting included: review area 3 (alternatives and mitigation) which scored the lowest due to ambiguous legislation and varying interpretations by consultants, inadequate consideration/investigation of alternatives and effectiveness of mitigation measures; insufficient information regarding identification of impacts understaffed and unmotivated government officials review area 2 (impact identification and evaluation); review area 4 (communication of results) was generally well performed, having issues only with poor executive summaries and no guidelines for the structure/layout of the EIA report; and the description of the development and the environment (review area 1) was the best performing area with the only challenge relating to the lack of accredited and qualified consultants (Hoffmann, 2007).
Sandham and Pretorius (2008) evaluated EIA report quality in the North West Province of South Africa.	<u>Report quality was generally satisfactory.</u> Challenges with reporting included: lack of political will, capacity in relevant government departments, inadequate analytical aspects such as impact significance (Sandham and Pretorius, 2008)
Sandham <i>et al.</i> (2008) evaluated the quality of four environmental impact reports for projects with the potential of affecting wetlands in South Africa.	<u>Report quality was generally satisfactory.</u> Challenges with reporting included: omission of impact identification and evaluation (Review area 2) for each phase of the development and omission of impact assessment methodology which made this the worst performing area;

STUDY ON ASSESSING THE QUALITY OF EIA REPORTS	KEY FINDINGS FROM QUALITY REVIEW OF EIA REPORTS
	description of the development and the environment (review area 1) was poorly attempted and was the second worst performing area; alternatives and mitigation of impacts (review area 3) was generally well performing to satisfactory with having only unsatisfactory scores relating to alternatives selection and effectiveness of mitigation measures; and the communication of results (review area 4) were the best performing area with the only challenge relating to presentation of information without bias and no guidelines to the layout of the EIA report (Sandham <i>et al.</i>, 2008).
Mbhele (2009) evaluated EIA report quality in terms of the 2006 EIA regulations for housing developments in the Mpumalanga Province in South Africa.	<u>Report quality was satisfactory</u> Challenges with reporting included: unsatisfactory site description, baseline conditions and omissions related to several sub-categories in the description of the development and the environment (review area 1), although this was the best performing area overall; issues related to impact identification and evaluation (review area 2) were definition prediction and description of impacts; issues related to alternatives and mitigation were feasible alternatives considered and scope and effectiveness of mitigation measures; issues related to communication of results (review area 4) were non-technical summary, layout of the report and emphasis (Mbhele, 2009).

STUDY ON ASSESSING THE QUALITY OF EIA REPORTS	KEY FINDINGS FROM QUALITY REVIEW OF EIA REPORTS
van Heerden (2010) compared quality of EIA reports before and after implementation of the 2006 EIA system in South Africa to determine EIA effectiveness in terms of EIA report quality.	<u>Report quality decreased</u> Challenges with reporting included: identification of impacts, impact magnitude prediction, the evaluation of cumulative impacts and methodologies (review area 2); monitoring measures proposed, alternatives considered, authority resources and public participation; (review area 3) (van Heerden, 2010).
Sandham <i>et al.</i> (2013) evaluated whether enhanced regulation improves EIA report quality under the 2006 EIA regulations by referring to case studies in South Africa.	<u>Report quality had decreased</u> compared to the 1997 EIA regulations Challenges with reporting included: the identification and evaluation of impacts in review area 2 of the review package and alternatives and mitigation measures in review area 3 of the review package. Changes to the regulations was found to not improve the quality of EIA reporting.
Talime (2011) undertook a critical review of the quality of EIA reports in Lesotho.	<u>Report quality had decreased</u> Challenges with reporting included: noncompliance with minimum regulatory requirements; inadequate project information; inexperienced EAPs; time constraints; baseline data; poor public participation; alternatives considered and inadequate mitigation measures (Talime, 2011).
Zakari (2015) evaluated the quality of EIA reports in Niger Republic.	<u>Report quality improved slightly</u> The effectiveness of the EIA process is reliant on quality of EIA reporting. EIS was not satisfactory. Challenges with reporting included: the effective

STUDY ON ASSESSING THE QUALITY OF EIA REPORTS	KEY FINDINGS FROM QUALITY REVIEW OF EIA REPORTS
	application of EIA by environmental consultants and the degree to which EIA evaluations affects decision-making (Zakari, 2015).

In particular, for the research studies undertaken on the South African EIA regulatory system in terms of EIA report quality, the strengths and weaknesses for each review area from these studies are summarised in Table 2.

Table 2: Summary of strengths and weaknesses from research studies for each review area.

	Best Performing Categories - Strengths	Worst Performed Categories - Weaknesses
Review Area 1: Description of the Environment (5 categories)	Description of the development (1.1) Environmental description (1.4) Baseline Conditions (1.5)	Site description (1.2) Waste (1.3)
Review Area 2: Identification and evaluation of key impacts (5 Categories)	Scoping (2.3)	Definition of impacts (2.1) Identification of Impacts (2.2) Prediction of impacts (2.4) Assessment of impact significance (2.5)
Review Area 3: Alternatives and mitigation (3 Categories)	Scope an effectiveness of Mitigation measures (3.2)	Alternatives (3.1) Commitment to mitigation (3.3)
Review Area 4: Communication of results (4 categories)	Layout of report (4.1) Presentation (4.2) Emphasis (4.3) Non-technical summary (4.4)	

Commonalities in the findings from Table 2 suggest that impact identification and evaluation (review area 2) and alternatives and mitigation of impacts (review area 3) were the worst performed review areas, compared to description of the environment (review area 1) and communication of results (review area 4) which were the best performing areas. Overall, the findings from the research studies above using the Lee and Colley (1999) review package revealed that EIA report quality was generally satisfactory for most studies, but in particular had decreased under the implementation of 2006 EIA system.

The aim of promulgating new NEMA EIA regulations and repealing the previous EIA regulations over the years was to improve EIA report quality and thus the effectiveness of the South African EIA process (van Heerden, 2010; Sandham *et al.*, 2013). Reflecting on the findings of the case studies above, which demonstrated generally satisfactory to decreased EIA report quality due to reporting challenges faced, it is thus imperative to determine whether the most recent NEMA EIA regulation amendments in South Africa have in fact affected/influenced EIA reporting quality in order to determine whether it is improving the effectiveness of the EIA process or not.

2.6. Minimum EIA reporting requirements for 2010 and 2014 EIA regulations

Table 3 below shows a comparison of the minimum reporting requirements for EIA reports under the 2010 and 2014 EIA regulations. The detailed and more comprehensive specifications of the 2014 regulations were prominent. The unfilled spaces indicated that no explicit equivalent regulations were available under the 2010 regulations.

Table 3: Comparison of the minimum reporting requirements for EIA reports under the 2010 and 2014 EIA regulations (South Africa, 2010; 2014).

Reporting requirements under regulation 28 (1) of 2010 EIA regulations (South Africa, 2010)	Reporting requirements under Appendix 3, Section 3, of 2014 EIA regulations (South Africa, 2014)

(a) details of- (i) the EAP who prepared the report; and (ii) the expertise of the EAP to carry out an environmental impact assessment	(a) details of- (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae;
	(b) the location of the activity, including: (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;
(c) a description of the property on which the activity is to be undertaken and the location of the activity on the property, or if it is- (i) a linear activity, a description of the route of the activity; or (ii) an ocean-based activity, the coordinates where the activity is to be undertaken;	(c) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is- (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;
(b) a detailed description of the proposed activity;	(d) a description of the scope of the proposed activity, including- (i) all listed and specified activities triggered and being applied for; and

	(ii) a description of the associated structures and infrastructure related to the development;
	(e) a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;
(f) a description of the need and desirability of the proposed activity;	(f) a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location;
	(g) a motivation for the preferred development footprint within the approved site
(d) a description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity; (e) details of the public participation process conducted in terms of sub-regulation (1), including- (i) steps undertaken in accordance with the plan of study; (ii) a list of persons, organisations and organs of state that were	(h) a full description of the process followed to reach the proposed development footprint within the approved site, including: (i) details of the development footprint alternatives considered; (ii) details of the public participation process undertaken in terms of regulation 41 of the regulations, including copies of the supporting documents and inputs; (iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which

registered as interested and affected parties; (iii) a summary of comments received from, and a summary of issues raised by registered interested and affected parties, the date of receipt of these comments and the response of the EAP to those comments; and (iv) copies of any representations and comments received from registered interested and affected parties; (g) a description of identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity; (h) an indication of the methodology used in determining the significance of potential environmental impacts;	the issues were incorporated, or the reasons for not including them; (iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; (vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks; (vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (viii) the possible mitigation measures that could be applied and level of residual risk;
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	(ix) if no alternative development locations for the activity were investigated, the motivation for not considering such; and (x) a concluding statement indicating the preferred alternative development location within the approved site;
(d) a description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity; (i) a description and comparative assessment of all alternatives identified during the environmental impact assessment process; (j) a summary of the findings and recommendations of any specialist report or report on a specialised process; (k) a description of all environmental issues that were identified during the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures;	(l) a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity, including- (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;

(l) an assessment of each identified potentially significant impact, including- (i) cumulative impacts; (ii) the nature of the impact; (iii) the extent and duration of the impact; (iv) the probability of the impact occurring; (v) the degree to which the impact can be reversed; (vi) the degree to which the impact may cause irreplaceable loss of resources; and (vii) the degree to which the impact can be mitigated;	(j) an assessment of each identified potentially significant impact and risk, including- (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be mitigated;
	(k) where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these regulations and an indication as to how these findings and recommendations have been included in the final assessment report;
(o) an environmental impact statement which contains- (i) a summary of the key findings of the environmental impact assessment; and (ii) a comparative assessment of the positive and negative implications of	(l) an environmental impact statement which contains- (i) a summary of the key findings of the environmental impact assessment; (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental

the proposed activity and identified alternatives;	sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;
(p) a draft environmental management programme containing the aspects contemplated in regulation 33; (q) copies of any specialist reports and reports on specialised processes complying with regulation 32;	(m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;
	(n) the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;
	(o) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;
(m) a description of any assumptions, uncertainties and gaps in knowledge;	(p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;
(n) a reasoned opinion as to whether the activity should or should not be authorised, and if the opinion is that	(q) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that

it should be authorised, any conditions that should be made in respect of that authorisation;	it should be authorised, any conditions that should be made in respect of that authorisation;
	(r) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;
	(s) an undertaking under oath or affirmation by the EAP in relation to: (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;
	(t) where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;
	(u) an indication of any deviation from the approved scoping report, including the plan of study, including-

	(i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and (ii) a motivation for the deviation;
(r) any specific information that may be required by the competent authority	(v) any specific information that may be required by the competent authority; and
(s) any other matters required in terms of sections 24(4)(a) and (b) of the Act.	(w) any other matters required in terms of section 24(4)(a) and (b) of the Act.

The 2014 EIA reporting requirements are more comprehensive and consist of all information requirements included under the 2010 EIA regulations. Hence, the 2014 EIA reporting requirements can be used as a means of comparing EIA reporting requirements against the review criteria in van Heerden's (2010) adapted version of the Lee and Colley review package. When comparing the review areas, categories and sub-categories to the 2014 EIA regulations, no additional review criteria were needed as all requirements are covered under the sub-categories according to van Heerden's (2010) adapted version of the Lee and Colley review package.

CHAPTER 3: METHODOLOGY

The Lee and Colley review package was chosen based on its extensive use worldwide and was developed specifically for reviewing EIAs in the UK. It's consistent, systematic and objective approach allows for the ease of adaptability to any user to conduct quality review (Lee *et al.*, 1999; Sandham *et al.*, 2013). The Lee and Colley package also allows a user to compare their findings with international research findings from studies using this package.

The Lee and Colley review package consists of a four-level hierarchy approach which is used to assess the quality of EIA reports in conjunction with the overall report rating (**Figure 1**).

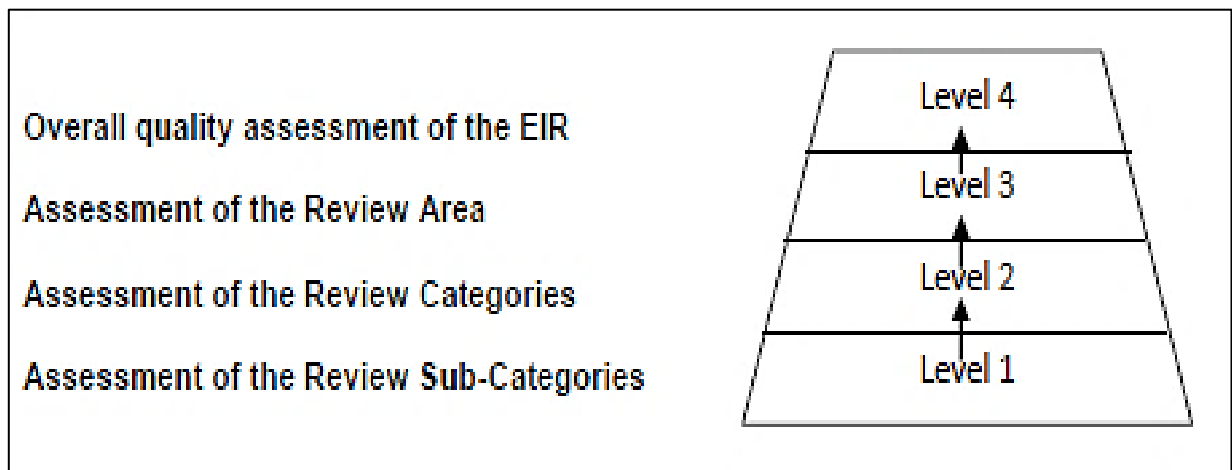


Figure 1: The Lee and Colley review package 4-level hierarchy approach (Lee *et al.*, 1999:16).

The overall assessment comprise of four review areas, 13 categories and 39 sub-categories. The four review areas include (1) the description of the project, the local environment and the baseline conditions; (2) identification and evaluation of significant impacts; (3) alternatives and mitigation of impacts; and (4) communication of results. The review sub-categories were used to assess the review categories and the review categories were used to assess the review areas. All categories were assessed in accordance with the requirements as specified in Part B2 of the Lee and Colley review package (refer to Figure 2) (Lee *et al.*, 1999).

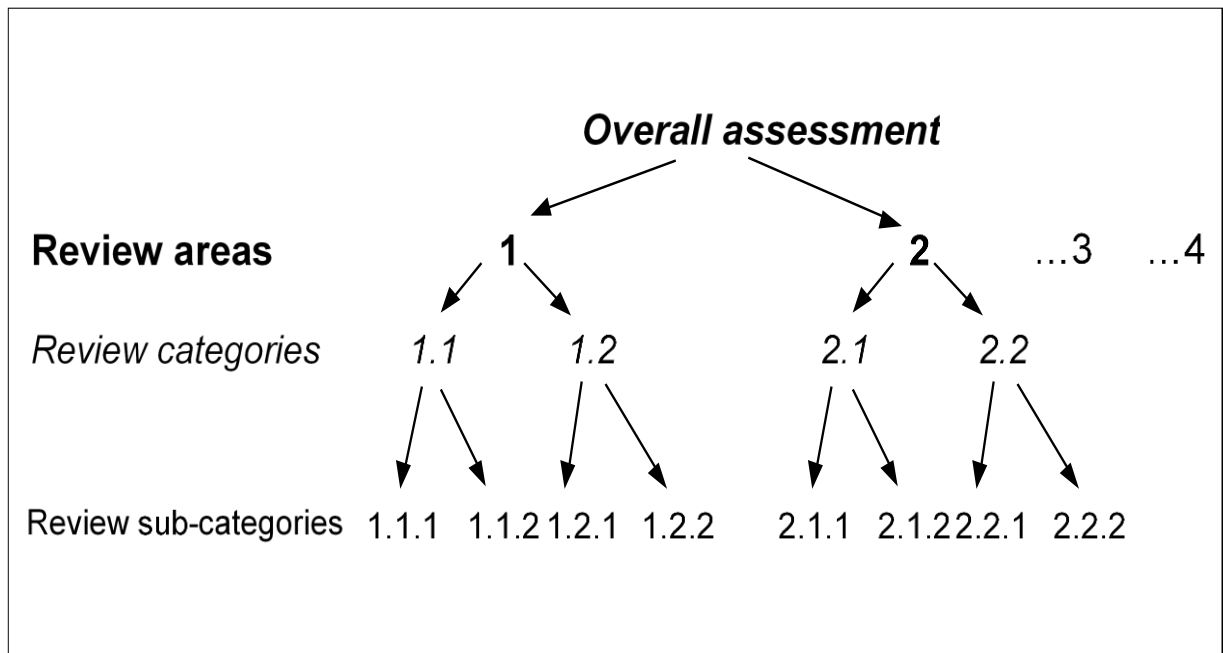


Figure 2: A hierarchy representation of the review areas 1 and 2 with its categories and sub-categories (Lee *et al.*, 1999:27).

Each review sub-category, review category and review area was assigned an assessment symbol as described in Table 4 below (Lee *et al.*, 1999).

Table 4: Assessment symbols used to complete the collation sheet for each category (Lee *et al.*, 1999:17).

Symbol	Explanation
A	Relevant tasks 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	Very unsatisfactory, important task(s) poorly done or not attempted.
N/A	Not applicable. The Review Topic is not applicable or it is irrelevant in the context of this Statement.

First, an assessment symbol was assigned to each review sub-category (for e.g. 1.1.1 to 1.1.7) which was determined from information provided in the EIA report. Second, an assessment symbol was assigned to each review category based on the overall assessment of that particular category (e.g. 1.1) considering all assessment symbols per sub-category (e.g. 1.1.1 to 1.1.7). Third, the review area (e.g. review area 1) assessment symbols were assigned based on the outcome of the assessment of the review categories (e.g. 1.1 to 1.5). The overall assessment of the EIA report was then determined based on the assessment of each of the review areas (i.e. review areas 1 to 4). The assessment of each category, review area and overall assessment was determined by taking the overall average of all symbols assigned.

3.1. Adaptation of the Lee and Colley Review Package to assess the quality of EIA reports under the 2010 and 2014 EIA regulations in South Africa.

An adapted version of the Lee and Colley review package was compiled by van Heerden (2010) to compare the quality of EIA reports under the 2010 EIA regulations and 2014 EIA regulations (Lee *et al.*, 1999; van Heerden, 2010). The adapted Lee and Colley review package took into consideration the reporting requirements of the 2010 and 2014 EIA regulations in South Africa and still consists of a four-level hierarchy approach which was used to assess the quality of EIA reports in conjunction with the overall report rating which included the original four review areas, 13 categories and 39 sub-categories. The review sub-categories were used to assess the review categories, and the review categories were used to assess the review areas. All categories were assessed in accordance to the requirements as specified in Part B2 of the Lee and Colley review package and Figure 2 (Lee *et al.*, 1999).

The 2010 and 2014 EIA reporting requirements were analysed to ensure that van Heerden's (2010) adapted version of the review criteria included all reporting requirements as stipulated under the 2010 and 2014 EIA regulations in South Africa. This allowed for the assessment of changes in EIA quality reporting between 2010 and 2014 (Table 3).

Since the 2014 EIA regulations were more comprehensive and consisted of information requirements included under the 2010 EIA regulations, the 2014 EIA regulations were used to compare EIA reporting requirements against the review criteria in van Heerden's (2010) adapted version of the Lee and Colley review package. When comparing the review areas, categories and sub-categories to the 2014 EIA regulations (Appendix 1), no additional review criteria were needed as all requirements are covered under the sub-categories according to van Heerden's (2010) adapted version of the Lee and Colley review package.

Table 5 describes the criteria used in van Heerden's (2010) adapted version of the Lee and Colley review package. Key changes involved the inclusion of applicant and EAP details, a comparative assessment of all alternatives identified and the inclusion of the EAP's opinion of whether the activity should be authorised or not. In addition, some criteria indicated as "Accepted with changes" (AWC) describe the criteria that were amended in order to comply with South African legislative requirements.

Table 5: Adaptation of the Lee and Colley Review Package (Adapted from Lee *et al.*, 1999).

Review Sub-Categories	Applicability of criteria	Review Sub-Categories	Applicability of criteria
1.1.1 Purpose and objectives	AWC	2.4.1 Data to estimate magnitude of main impacts	NC
1.1.2 Design and size	NC	2.4.2 Methods used to predict impact magnitude	NC
1.1.3 Presence and appearance of completed development	NC	2.4.3 Predictions of impact in measurable quantities	NC
1.1.4 Nature of production processes	NC	2.5.1 Significance of impacts on affected community	AWC
1.1.5 Nature and quantity of raw materials	NC	2.5.2 Significance of impacts in terms of national and international quality standards	NC
1.1.6 Identification of applicant	CA	2.5.3 Justification of proposed method of assessing significance	AWC
1.1.7 Details of EAP	CA	3.1.1 Description of alternative sites	NC
1.2.1 Area of development site	AWC	3.1.2 Description of alternative processes, designs and operation conditions	NC
1.2.2 Demarcation of land use area	NC	3.1.3 alternatives identified for severe adverse impacts rejected	NC
1.2.3 Duration of phases	NC	3.1.4 Comparative assessment of all alternatives identified	CA

1.2.4 Number of workers/visitors	NC	3.2.1 Consider mitigation of all significant adverse impacts	AWC
1.2.5 Means of transporting raw materials/products and quantities	NC	3.2.2 Mitigation measures	NC
1.3.1 Types and quantities of waste	NC	3.2.3 Extent of effectiveness of mitigation when implemented	AWC
1.3.2 Treatment, disposal and disposal routes	NC	3.3.1 Record of commitment to mitigation measures	AWC
1.3.3 Methods of obtaining quantity of wastes	NC	3.3.2 Monitoring arrangements	NC
1.4.1 Area to be affected by development	NC	4.1.1 Introduction	NC
1.4.2 Effects occurring away from immediate affected environment	NC	4.1.2 Information logically arranged	NC
1.5.1 Important components of the affected environment	NC	4.1.3 Chapter summaries for very long chapters	NC
1.5.2 Existing data sources	NC	4.1.4 External sources acknowledged	NC
1.5.3 Local land use plans, policies consulted and other data collected	NC	4.2.1 Presentation of information	NC
2.1.1 All possible effects on environment	NC	4.2.2 Technical terms, acronyms, initials defined	NC
2.1.2 Interaction of effects	NC	4.2.3 Statement presented as an integrated whole	NC
2.1.3 Impacts from non-standard operation conditions	NC	4.3.1 Emphasis to potentially severe impacts	NC
2.1.4 Impacts from deviation from baseline conditions	NC	4.3.2 Statement must be unbiased	NC
2.2.1 Impact identification methodology	NC	4.3.3 Opinion as to whether activity should/should not be authorised	CA
2.2.2 Impact identification method used	NC	4.4.1 Non-technical summary of main findings and conclusions	NC
2.3.1 Contact general public and special interest groups	AWC	4.4.2 Summary must cover all main issues	NC
2.3.2 Collect opinions and concerns of I&APs	AWC	KEY: NC – No changes in criteria CA – Criteria added AWC – Accepted with changes	
2.3.3 Key impacts	AWC		

The full adapted Lee and Colley review package (i.e. the list of all review areas, categories and subcategories) that was used for this research, can be found in Appendix 2.

3.2. Data Collection

A sample of 26 EIA reports, 16 compiled under the 2010 EIA regulations and 10 compiled under the 2014 EIA regulations, requested and obtained from various public sources such as the DEA, the Gauteng Department of Agriculture and Rural Development (GDARD) and various consulting firm websites, were investigated specifically for projects undertaken within Gauteng Province. The PAIA process was

followed in attaining EIA reports from the DEA. The GDARD requested to access the EIA reports on their premises.

The sample of EIA reports obtained for this research are listed in Table 6 (EIA reports compiled under the 2010 EIA regulations) and Table 7 (compiled under the 2014 EIA regulations) below. A random selection was undertaken to avoid bias where possible.

Table 6: List of EIA Reports obtained for projects within Gauteng Province that were compiled under the 2010 EIA regulations.

Nature of Project (EIA reports compiled under 2010 EIA regulations)	No. of projects (n=16)	Source of Information
Roads	3	Consulting Firm
Mixed-use developments	5	DEA and Consulting Firm
Solar energy	2	DEA
Waste reuse, recovery and treatment / Waste-to-energy	2	Consulting Firm and DEA
Upgrade and expansion of an industrial and automotive lubricants plant	1	Consulting Firm
Water Pipeline	1	DEA
Sludge disposal facility and pipelines associated with the treatment of Acid Mine Drainage	1	DEA
New rail manufacturing plant	1	DEA

Table 7: List of EIA Reports obtained for projects within Gauteng Province that were compiled under the 2014 EIA regulations.

Nature of Project (EIA reports compiled under 2014 EIA regulations)	No. of projects (n=10)	Source of Information
Waste water treatment works	2	Consulting Firm
Mixed use development	4	Consulting Firm and GDARD
Roads	2	Consulting Firm and GDARD
Solar energy	1	Consulting Firm
Atmospheric Emissions Licence	1	GDARD in-house

3.3. Analysis of Data

Data collected were analysed using Microsoft Excel 2016 and STATISTICA Version 13.3, 2017. The results of the Lee and Colley review included the grading of each category, review area and the overall assessment score. These results were evaluated to determine if the minimum requirements of the Lee and Colley review package have been met, including broad compliance and the overall quality in terms of the environmental impact statement (Lee *et al.*, 1999). The scores for each category, review area and the overall assessment were compared and analysed to identify strengths and weaknesses of both EIA systems.

Descriptive statistical analysis was used in Microsoft Excel to assess initial patterns and trends in the data collected from the Lee and Colley review. This methodology follows Mbhele's (2009), van Heerden's (2010), Sandham *et al.*'s (2013) and Laven's (2017) methodologies (which are the same) for data analysis and interpretation of results. This methodology included grouping assessment symbols A (well performed), B (satisfactory and complete) and C (just satisfactory) in order to interpret the scores. These symbols indicate that tasks were completed to a satisfactory standard, and provided sufficient information for decision-making. Assessment symbols assigned to tasks that are just satisfactory or just unsatisfactory

reflect the critical boundary, between C and D, which affect report quality and decision-making. For the identification of strengths and weaknesses, A-B grades and E-F grades were also calculated.

Percentages of reports in various grade groupings were calculated for ease of comparison and interpretation. First each grading / assessment symbol was replaced with numerical values (0-6) in order to calculate percentages of the results and provide a comparative assessment of the results. Numerical values were assigned as follows: A = 1, B = 2, C = 3, D = 4, E = 5, F = 6 and N/A = 0. Second, category grades were summed using COUNTIF function on excel. For example, the total number of 1's, 2's, 3's, 4's, 5's, 6's and 0's, were added/counted for each category under the 2010 EIA review results and the same calculation was repeated for the 2014 EIA review results. Third, percentages of results were calculated as per grouping of assessment symbols/grading and interpreted as shown in Table 8.

Table 8: Grouping, interpretation and calculation of results (van Heerden, 2010)

Grouping	Interpretation	% Calculation
% C or better (A-C):	Generally satisfactory EIA report quality	(Sum of A, B and C scores) * 100/ total number of EIA reports
% A-B:	Well performed – Strengths in the EIA process	(Sum of A and B scores) * 100/ total number of EIA reports
% C-D:	Just satisfactory or just unsatisfactory – Critical areas that influence decision-making in the EIA process	(Sum of C and D scores) * 100/ total number of EIA reports
% E-F:	Poor attempt or Did not attempt – Weaknesses in the EIA process	(Sum of E and F scores) * 100/ total number of EIA reports

The above methodology allowed for a comparative assessment of the EIA report quality for reports compiled under the 2010 EIA regulations and for reports compiled under the 2014 EIA regulations.

Further statistical analysis was done using STATISTICA Version 13.2 (Statsoft, 2017). A Shapiro Wilks test was used to test for normality of data. As data were

found not to be normally distributed, a Wilcoxon matched pairs test was used to compare two dependent variables, i.e. the assessment review results of the 2010 and 2014 EIA reports. Significance was set at $p < 0.05$.

CHAPTER 4: RESULTS AND DATA ANALYSIS

Data were collected from a sample of 26 EIA reports obtained from various public sources as indicated in Table 6 and Table 7 of the previous section. Raw data were collected using the adapted version of the Lee and Colley review package. The complete raw data sets for the reports reviewed under the 2010 and 2014 EIA systems are provided in Appendix 3. The detailed results of the 2010 and 2014 EIA quality review which includes the overall score, review area, review category grades, and percentage of EIA reports in various grade groupings are provided in Appendix 4 and a detailed comparison of the results is provided in Appendix 5.

Table 9 below provides a summary comparison of the overall scores, review area grading and category grading for the 2010 and 2014 EIA regulatory systems. Overall, the EIA report quality for 2010 was satisfactory, while the EIA report quality for 2014 was well performed. The assessment of the overall quality of the EIA reports indicates that 100% of the reports were graded as satisfactory (A-C) under both the 2010 and 2014 EIA regulations. However, under the 2010 EIA regulations, 31% of the reports achieved C grades which were just satisfactory, despite omissions and/or inadequacies, compared to 0% under the 2014 EIA regulations which mostly achieved A-B grades. While only 69% of the 2010 reports achieved A-B grades, all the assessed reports under the 2014 EIA system achieved A-B grades. Compared to the 2010 reports, the 2014 reports showed better performance with a decrease in C and D scores and a simultaneous increase in A scores (Figure 3 and Figure 4).

Table 9: Summary of overall report quality results: overall scores, review areas and review categories.

Review Area	Summary of all review categories	2010				2014			
		% C or better (A-C)	% A-B	% C-D	% E-F	% C or better (A-C)	% A-B	% C-D	% E-F
	OVERALL SCORE	100	69	31	0	100	100	0	0
RA 1	Description of development, local environment and baseline conditions	94	38	63	0	100	80	20	0
1.1	Description of the development	94	56	44	0	100	90	10	0
1.2	Site description	38	25	69	6	70	50	50	0
1.3	Wastes	50	13	56	31	50	50	40	10
1.4	Environment description	94	69	31	0	100	100	0	0
1.5	Baseline conditions	94	56	44	0	100	100	0	0
RA 2	Identification and evaluation of key impacts	94	44	56	0	100	90	10	0
2.1	Definition of impacts	88	56	44	0	100	90	10	0
2.2	Identification of impacts	94	38	63	0	100	100	0	0
2.3	Scoping	100	81	19	0	100	90	10	0
2.4.	Prediction of impact magnitude	94	38	63	0	100	90	10	0
2.5	Assessment of impact significance	94	31	63	6	100	70	30	0
RA 3	Alternatives and mitigation	94	56	44	0	100	80	20	0
3.1.	Alternatives	88	63	31	6	100	90	10	0
3.2.	Scope and effectiveness of mitigation measures	88	50	50	0	80	80	20	0
3.3	Commitment to mitigation	94	44	56	0	100	80	20	0
RA 4	Communication of results	88	69	31	0	100	100	0	0
4.1	Layout of the report	88	56	44	0	100	100	0	0
4.2	Presentation	88	63	38	0	100	90	10	0
4.3.	Emphasis	100	63	38	0	100	100	0	0
4.4.	Non-technical summary	88	75	19	6	100	100	0	0

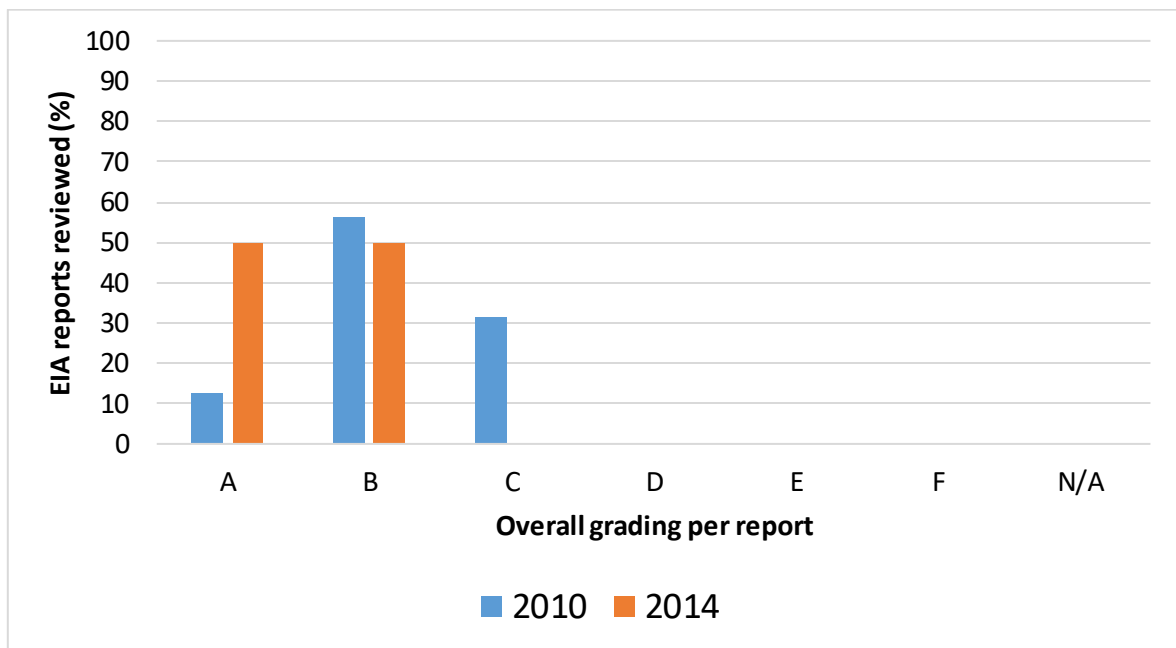


Figure 3: Summary of overall quality review results based on grading

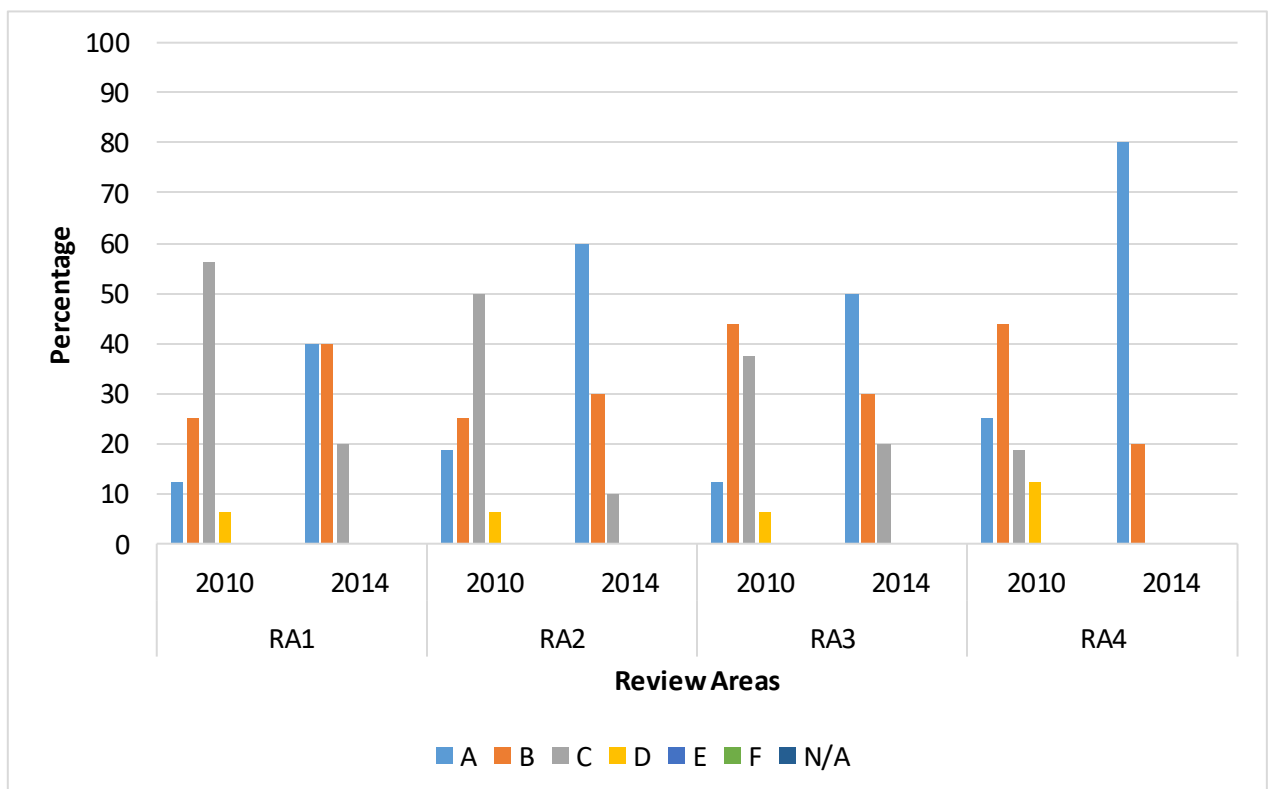


Figure 4: Review area grades for 2010 and 2014

A – well performed, B – generally satisfactory, C – just satisfactory, D – just unsatisfactory, E – not satisfactory, and F – very unsatisfactory.

The results of the Kruskal-Wallis H test determined statistically significant differences between the 2010 and 2014 review results for five specific categories with regards to environment description (1.4) ($H= 2,201$; $p= 0,028$), identification of impacts (2.2) ($H= 2,366$ and $p= 0,018$), prediction of impact magnitude (2.4) ($H= 2,521$; $p= 0,117$), alternative (3.1) ($H= 2,520$ and $p= 0,012$), layout of the report (4.1) ($H= 2,201$ and $p= 0,0277$), and one review area, i.e. review area 4 ($H= 2,366$ and $p= 0,017$). In all cases, the 2014 reports were of better quality than the 2010 reports.

4.1. Quality of Review areas

Review areas 1 (Description of development, local environment and baseline conditions), 2 (Identification and evaluation of key impacts) and 3 (Alternatives and mitigation) were addressed to a satisfactory level under the 2010 EIA regulations with 94% of reports scoring C or higher. Review area 4 (Communication of results) under the 2010 EIA regulations was also addressed to a satisfactory level, with 88% of reports scoring C or higher grades. In comparison, all review areas under the 2014 EIA regulations were addressed to a satisfactory level, with 100% of reports scoring C or higher. Under the 2010 EIA regulations, review areas 1 and 2 had the worst performing scores for more than 50% of reports, as compared to the 2014 EIA regulations, which had the worst performing scores for review areas 1 and 3 for 20% of reports. The best performing review area for both the 2010 and 2014 EIA regulations was review area 4 with 69% and 100% of reports scoring A-B respectively. A detailed description of each of the review area gradings is provided in the sections that follow and only refers to the category and sub-category scores where applicable.

4.1.1. Review area 1: Description of the development and environment

For review area 1, 94% of the 2010 sample scored C or higher, compared to 100% of the 2014 sample that scored C or higher. Under the 2014 system, 80% of reports were well performed to generally satisfactory (%A-B) compared to 38% under the 2010 system, and 20% of reports were just satisfactory or just unsatisfactory (%C-D), compared to that of 63% under the 2010 system. Overall, review area 1 was well performed with all reports being of good quality under the 2014 system compared to

the 2010 system. Table 10 provides a comparison of the results for review area 1 for the 2010 and 2014 EIA systems and

Figure 5 shows the percentage of reports reviewed that achieved satisfactory quality grading (i.e. C or better).

Table 10: Results of review area 1

	Summary of all review categories	2010				2014			
		% C or better (A-C)	%A-B	%C-D	%E-F	% C or better (A-C)	%A-B	%C-D	%E-F
RA 1	Description of development, local environment and baseline conditions	94	38	63	0	100	80	20	0
1.1	Description of the development	94	56	44	0	100	90	10	0
1.2	Site description	38	25	69	6	70	50	50	0
1.3	Wastes	50	13	56	31	50	50	40	10
1.4	Environment description	94	69	31	0	100	100	0	0
1.5	Baseline conditions	94	56	44	0	100	100	0	0

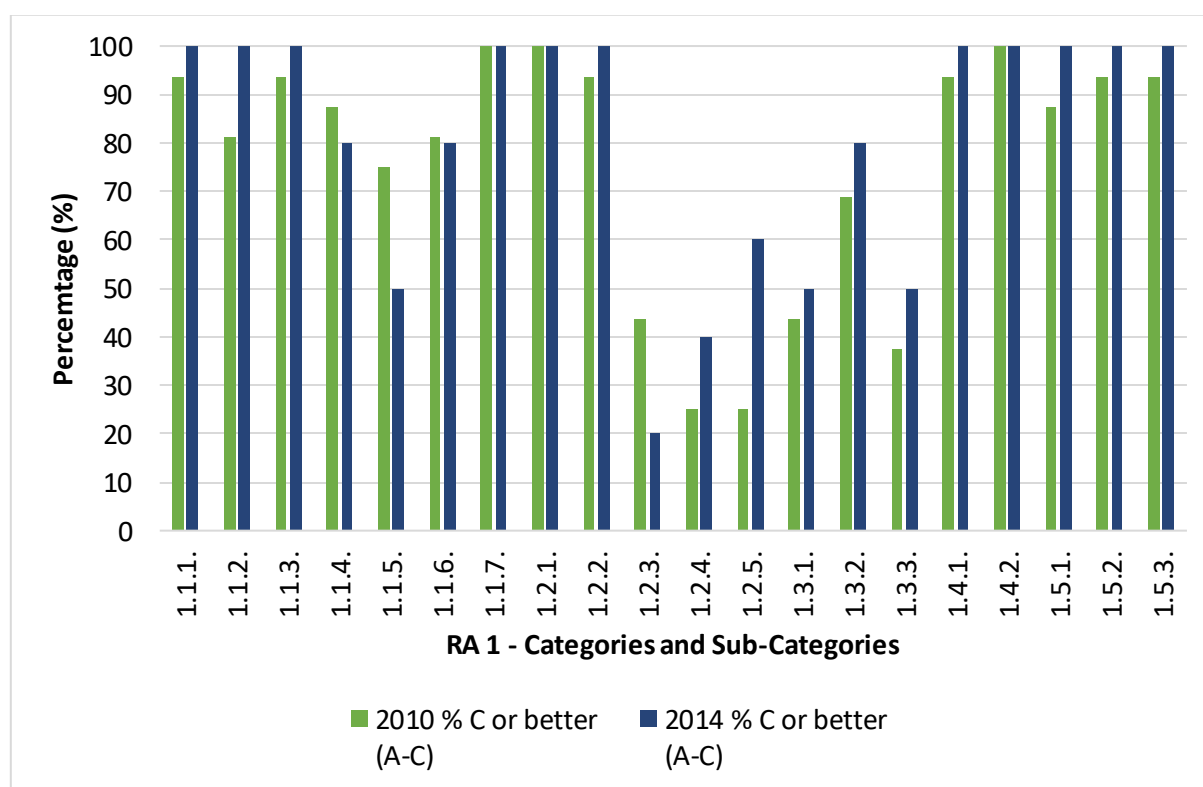


Figure 5: C or better (A-C) grades (satisfactory) achieved for review area 1

From the 5 categories (i.e. 1.1 to 1.5), the description of the development (1.1), environmental (1.4) and baseline conditions (1.5), had 100% of reports scored C or higher under the 2014 system compared to 94% under the 2010 system (refer to Figure 5). The results of the Kruskal-Wallis H test determined statistically significant differences between the 2010 and 2014 review results for only one category in review area 1, i.e. environment description (1.4) ($H= 2,201$; $p= 0,028$) where the 2014 descriptions of environmental conditions were of better quality than in the 2010 reports.

The best performing categories (%A-B) under the 2014 system were environmental description (1.4) and baseline conditions (1.5), whilst the worst performing category was wastes (1.3). In comparison, the best performing category (%A-B) under the 2010 system was environmental description (1.4) and the worst performing category (%E-F) was wastes (1.3) (refer to 6 and Figure 7).

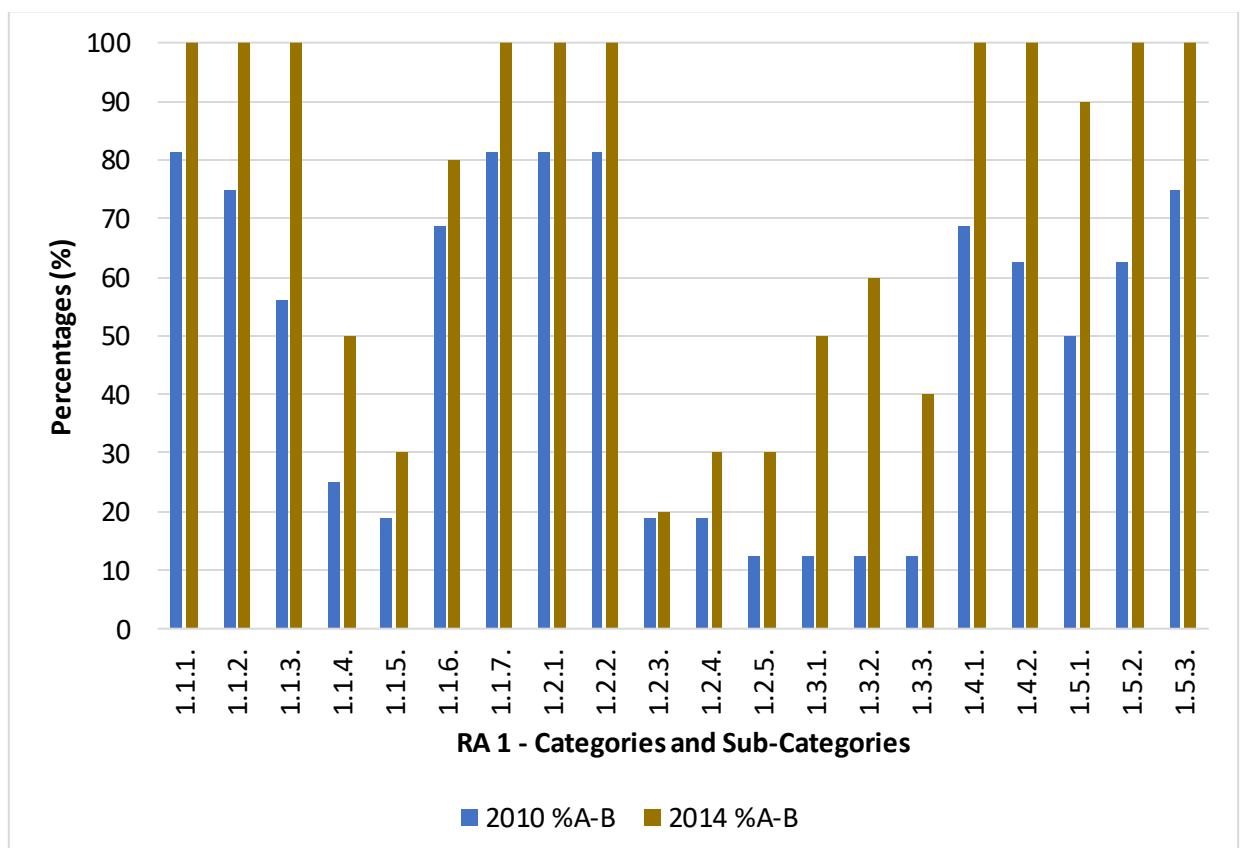


Figure 6: Well performed (A-B) grades for review area 1

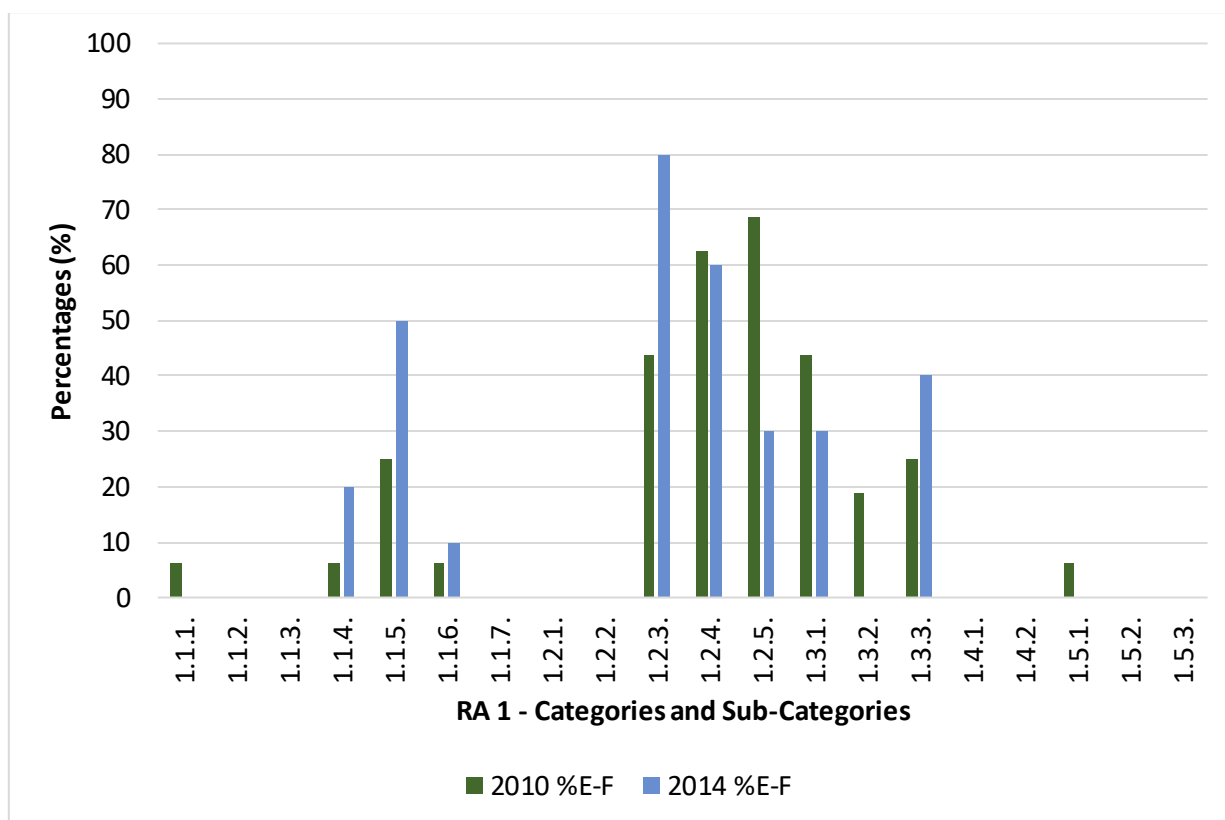


Figure 7: Poorly performed (E-F) grades for review area 1

Under the 2014 system, categories that inform decision-making (%C-D - just satisfactory or just unsatisfactory) identified for review area 1 were site description (1.2) where 50% of reports scored between C and D, with the lowest scoring sub-category being transporting raw materials/ products and quantities (1.2.5), and wastes (1.3) where 40% of reports scored between C and D, with the lowest scoring sub-category being treatment, disposal and disposal routes (1.3.2). In comparison, sub-categories that inform decision-making under the 2010 system (%C-D - just satisfactory or just unsatisfactory) for review area 1 related to the nature of the production processes (1.1.4); nature and quantities of raw materials (1.1.5); treatment, disposal and disposal routes (1.3.2) and methods of obtaining quantity of wastes (1.3.3) (Figure 8).

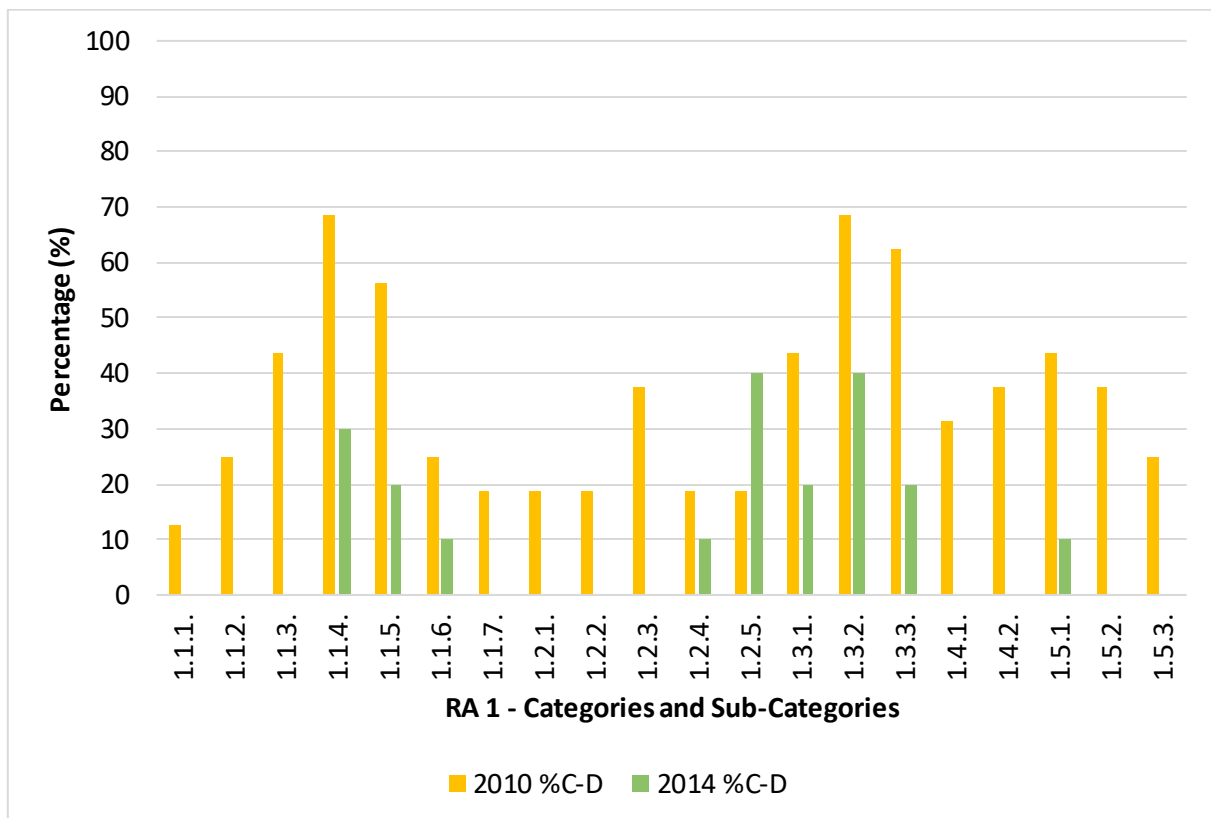


Figure 8: Critical category (%C-D) grades for review area 1

From the 2014 reports, the nature of the production processes (1.1.4), the nature and quantities of raw materials (1.1.5), the duration of different phases (1.2.3) and estimated number of workers and/or visitors (1.2.4), and methods of obtaining quantity of wastes (1.3.3) were poorly covered or not even attempted compared to the 2010 system, where for most of the reports, the duration of different phases (1.2.3), estimated number of workers and/or visitors (1.2.4), the means of transporting raw materials/ products and quantities (1.2.5) and types and quantities of wastes (1.3.1) were poorly attempted or not even attempted.

4.1.2. Review area 2: Identification and evaluation of key impacts

From Table 11, all the 2014 reports scored C or higher, which indicates that review area 2 was a well performed area with all reports being of good quality. 94% of the 2010 sample scored C or higher which indicates that review area 2 was of relatively good report quality. 90% of reports were well performed to generally satisfactory (%A-B) compared to 44% under the 2010 system, and 10% of reports were just

satisfactory or just unsatisfactory (%C-D) compared to that of 56% under the 2010 system.

Table 11: Results of Review area 2

	Summary of all review categories	2010				2014			
		% C or better (A-C)	%A-B	%C-D	%E-F	% C or better (A-C)	%A-B	%C-D	%E-F
RA 2	Identification and evaluation of key impacts	94	44	56	0	100	90	10	0
2.1	Definition of impacts	88	56	44	0	100	90	10	0
2.2	Identification of impacts	94	38	63	0	100	100	0	0
2.3	Scoping	100	81	19	0	100	90	10	0
2.4	Prediction of impact magnitude	94	38	63	0	100	90	10	0
2.5	Assessment of impact significance	94	31	63	6	100	70	30	0

All five categories for review area 2, i.e. definition of impacts (2.1), identification of impacts (2.2), scoping (2.3), prediction of impact magnitude (2.4) and assessment of impact significance (2.5), scored C or higher in 100% of the cases under the 2014 system compared to 88% of reports with a score C or higher under the 2010 system (Figure 9). The results of the Kruskal-Wallis H test determined statistically significant differences between the 2010 and 2014 review results for two categories in review area 2, i.e. identification of impacts (2.2) ($H= 2,366$ and $p= 0,018$) and prediction of impact magnitude (2.4) ($H= 2,521$; $p= 0,117$). For these categories, the 2014 reports were of better quality than the 2010 reports.

The best performing category (%A-B) was identification of impacts (2.2) and there was no worst performing category (%E-F) for the 2014 system. In comparison, the best performing category (%A-B) was scoping (2.3) and the worst performing category (%E-F) was assessment of impact significance (2.5) for the 2010 system (Figure 10 and Figure 11).

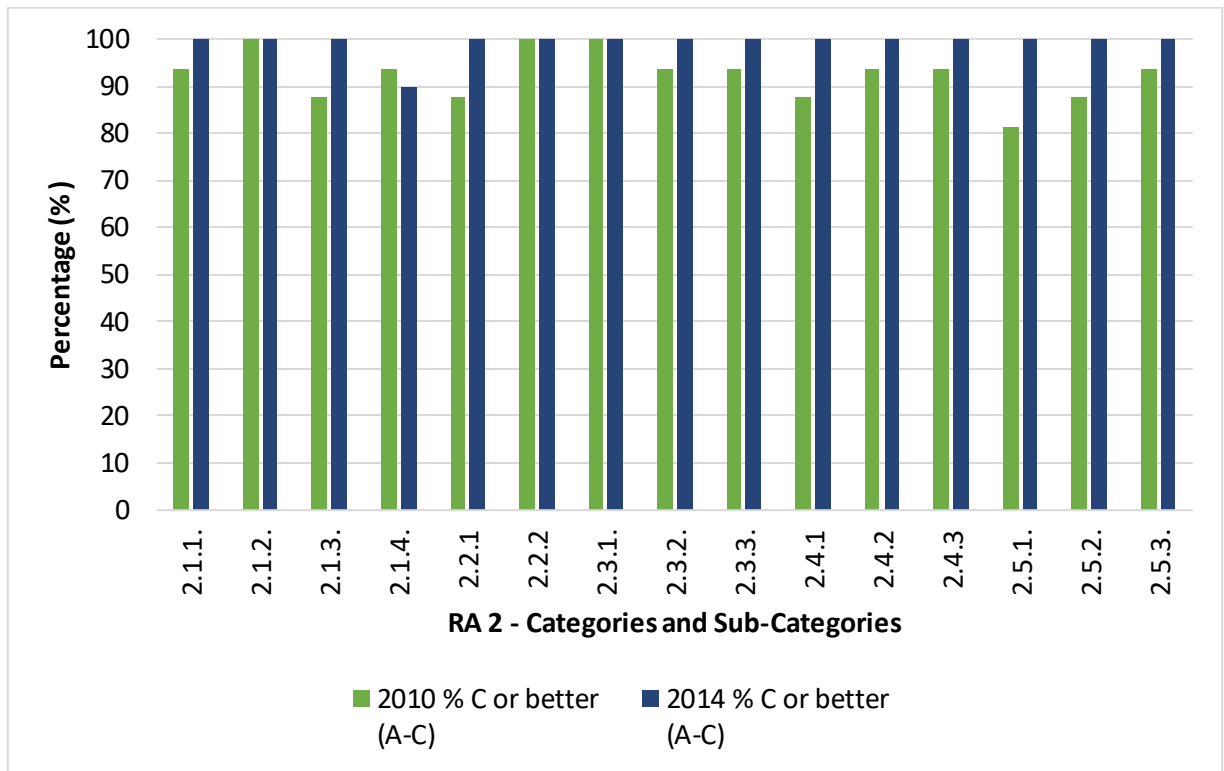


Figure 9: C or better (A-C) grades (satisfactory) achieved for review area 2

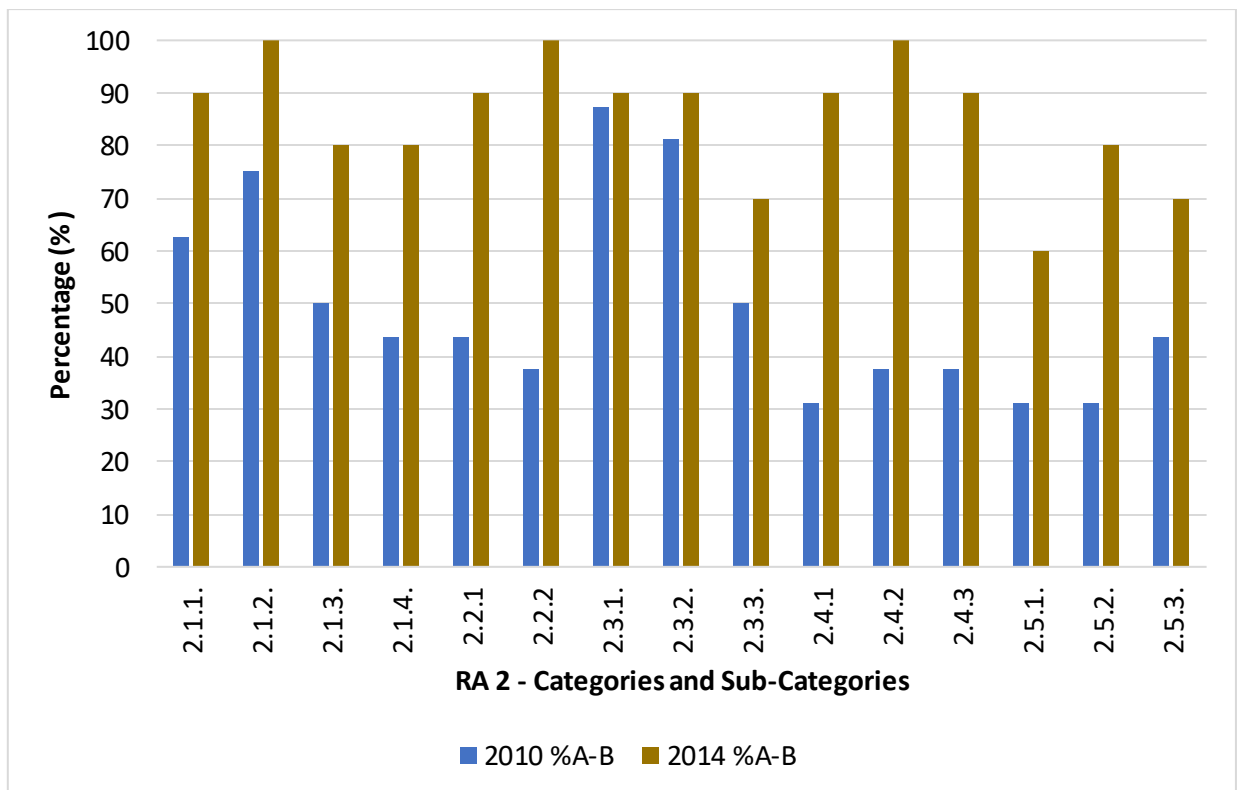


Figure 10: Well performed (A-B) grades for Review area 2

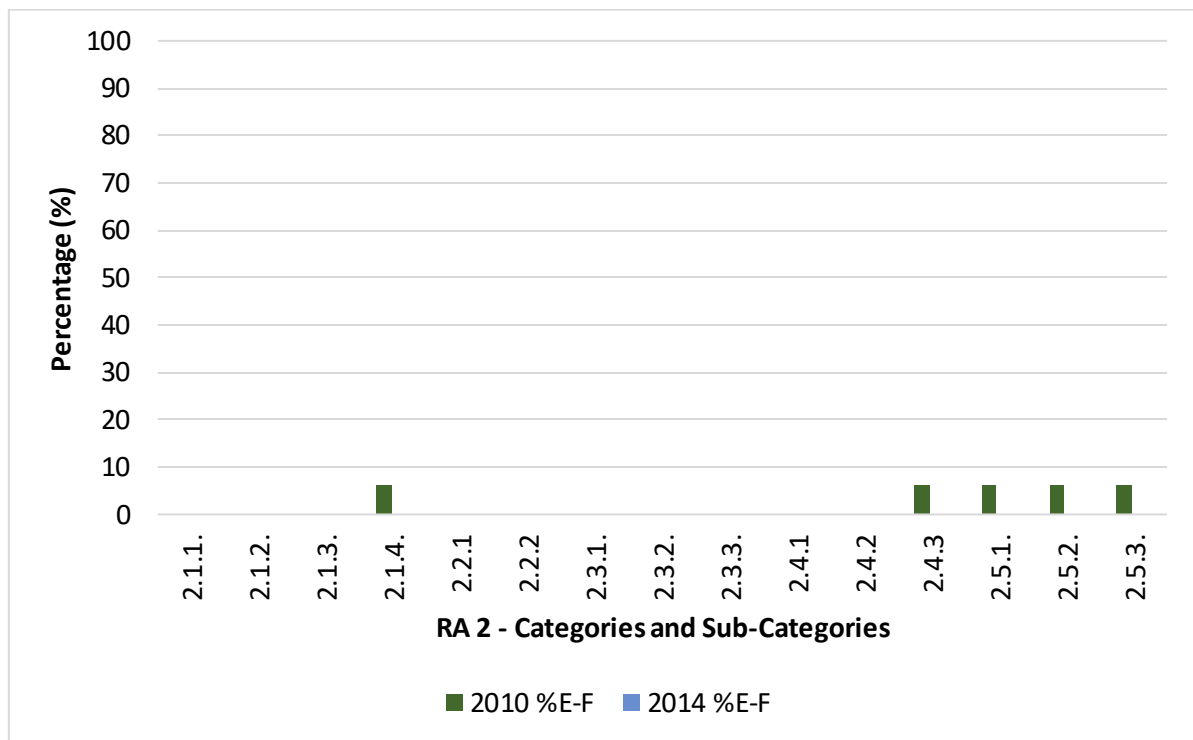


Figure 11: Poorly performed (E-F) grades for Review area 2

For the 2010 system, although more than 88% of reports had a score of C or higher, the following categories: the definition of impacts (2.1), prediction of impact magnitude (2.4) and assessment of impact significance (2.5) had contributed to hindrance of the 2010 system in achieving 100 %percentage. Categories for the 2014 system scored mostly 100% and did not have problem areas.

In particular, critical areas that influenced decision-making for review area 2 under the 2014 system (i.e. %C-D - just satisfactory or just unsatisfactory), were identified to be as follows: 30% of reports for key impacts selected for more intense investigation (2.3.3), 40% of reports for significance of impacts on affected community and society in general (2.5.1) and 30% of reports for justification of proposed method of assessing significance (2.5.3). In comparison, critical sub-categories that influenced decision-making (%C-D - just satisfactory or just unsatisfactory) for review area 2 under the 2010 system related to impacts from non-standard operating conditions (2.1.3), impacts from deviation from baseline conditions (2.1.4), impact identification methodology (2.2.1), impact identification methods used (2.2.2), key impacts selected for more intense investigation (2.3.3), data to estimate magnitude of the main impacts (2.4.1), methods used to predict

impact magnitude (2.4.2), predictions of impacts in measurable quantities (2.4.3), significance of impacts on affected community and society in general (2.5.1), significance of impact in terms of national and international quality standards (2.5.2), and justification of proposed method of assessing significance (2.5.3) (refer to Figure 12).

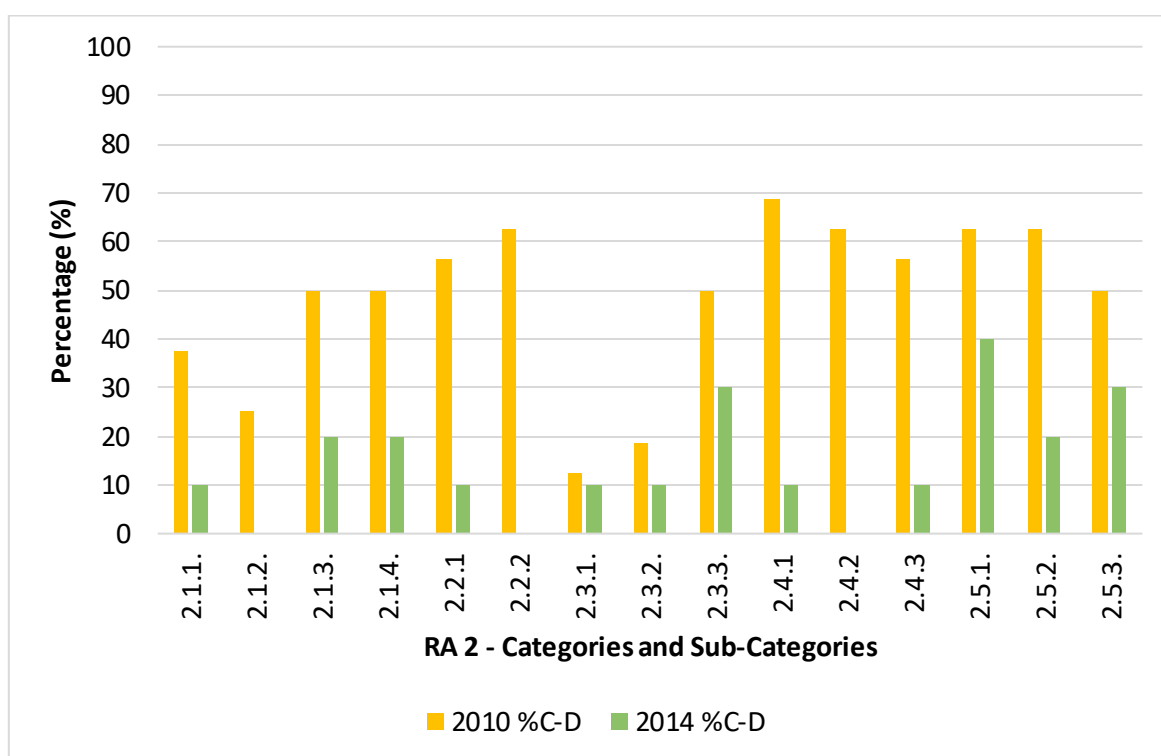


Figure 12: Critical categories (%C-D) of review area 2

In some of the reports under the 2010 system, impacts from deviation from baseline conditions (2.1.4), predictions of impacts in measurable quantities (2.4.3), significance of impacts on affected community and society in general (2.5.1), significance of impact in terms of national and international quality standards (2.5.2), and justification of proposed method of assessing significance (2.5.3) were poorly attempted or not even attempted. From the 2014 reports, there is a notable decrease of %C-D and %E-F gradings and an increase in %A-B gradings compared to that of 2010 system. There were no omissions for the 2014 reports in review area 2.

4.1.3. Review area 3: Alternatives and Mitigation

From Table 12, 94% of the 2010 sample scored C or higher which indicates that review area 3 was of relatively good report quality compared to 100% of the 2014 sample that scored C or higher, which indicates that review area 3 was a well performed area with all reports being of good quality. 80% of 2014 reports were well performed to generally satisfactory compared to 56% under the 2010 system, and 20% of 2014 reports were just satisfactory or just unsatisfactory compared to that of 44% under the 2010 system.

Table 12: Results of review area 3

	Summary of all review categories	2010				2014			
		% C or better (A-C)	% A-B	% C-D	% E-F	% C or better (A-C)	% A-B	% C-D	% E-F
RA 3	Alternatives and mitigation	94	56	44	0	100	80	20	0
3.1.	Alternatives	88	63	31	6	100	90	10	0
3.2.	Scope and effectiveness of mitigation measures	88	50	50	0	80	80	20	0
3.3	Commitment to mitigation	94	44	56	0	100	80	20	0

From the three categories (i.e. 3.1 to 3.3), alternatives (3.1) and commitment to mitigation (3.3) scored C or higher for 100% of 2014 reports compared to 88% for 2010 reports, which is an improvement in report quality compared to the 2010 system. However, scope and effectiveness of mitigation measures (3.2) scored C or higher for 80% of reports compared to 88% for the 2010 system, which is a decrease in the quality of reports for this category under the 2014 system (refer to Figure 13). The results of the Kruskal-Wallis H test determined statistically significant differences between the 2010 and 2014 review results for only one category in review area 3, i.e. alternative (3.1) ($H= 2,520$ and $p= 0,012$). For this category, 2014 reports were of better quality than the 2010 reports

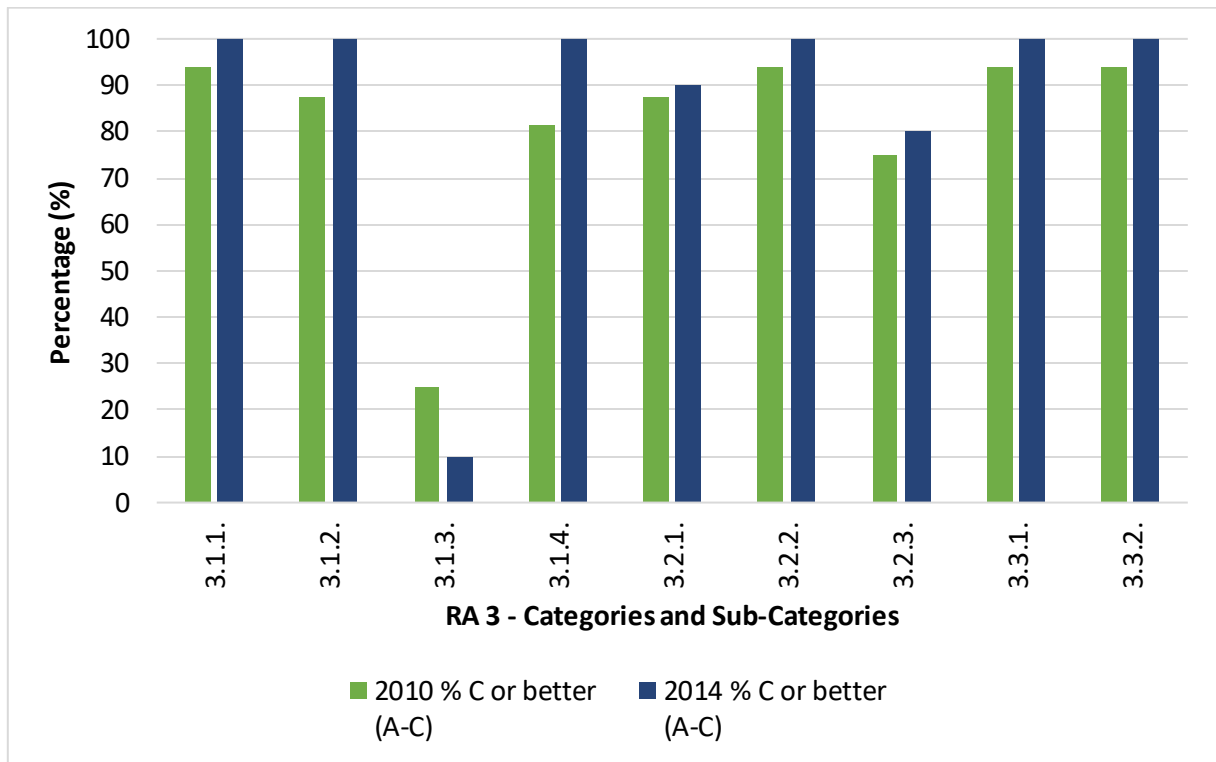


Figure 13: C or better (A-C) grades (satisfactory) achieved for review area 3

The best performing category under the 2014 system (%A-B) was alternatives (3.1) with 90% of reports attaining A and B scores, and the worst performing category (%E-F) was scope and effectiveness of mitigation measures (3.2). In comparison, the best performing category (%A-B) under the 2010 system was commitment to mitigation (3.3) and the worst performing category (%E-F) was alternatives (3.1) (refer to Figure 14 and Figure 15).

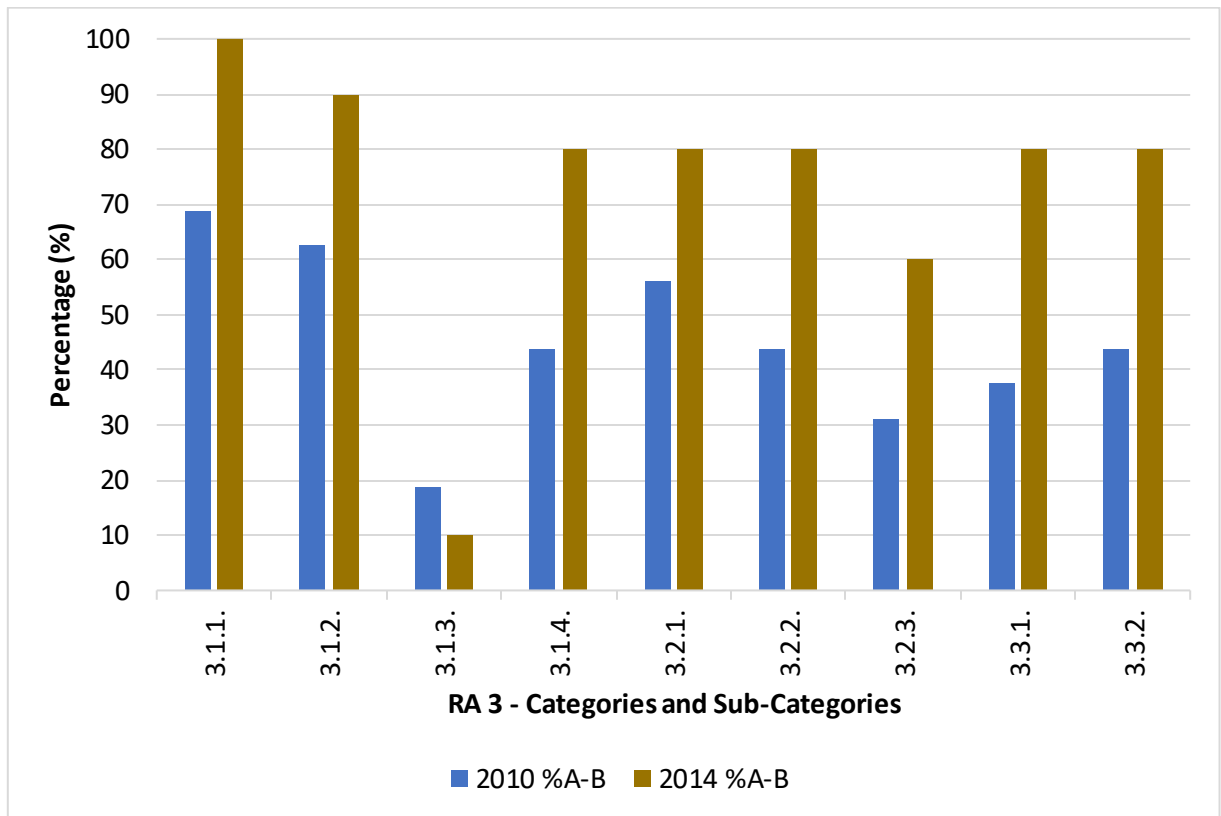


Figure 14: Well performed (A-B) grades for review area 3

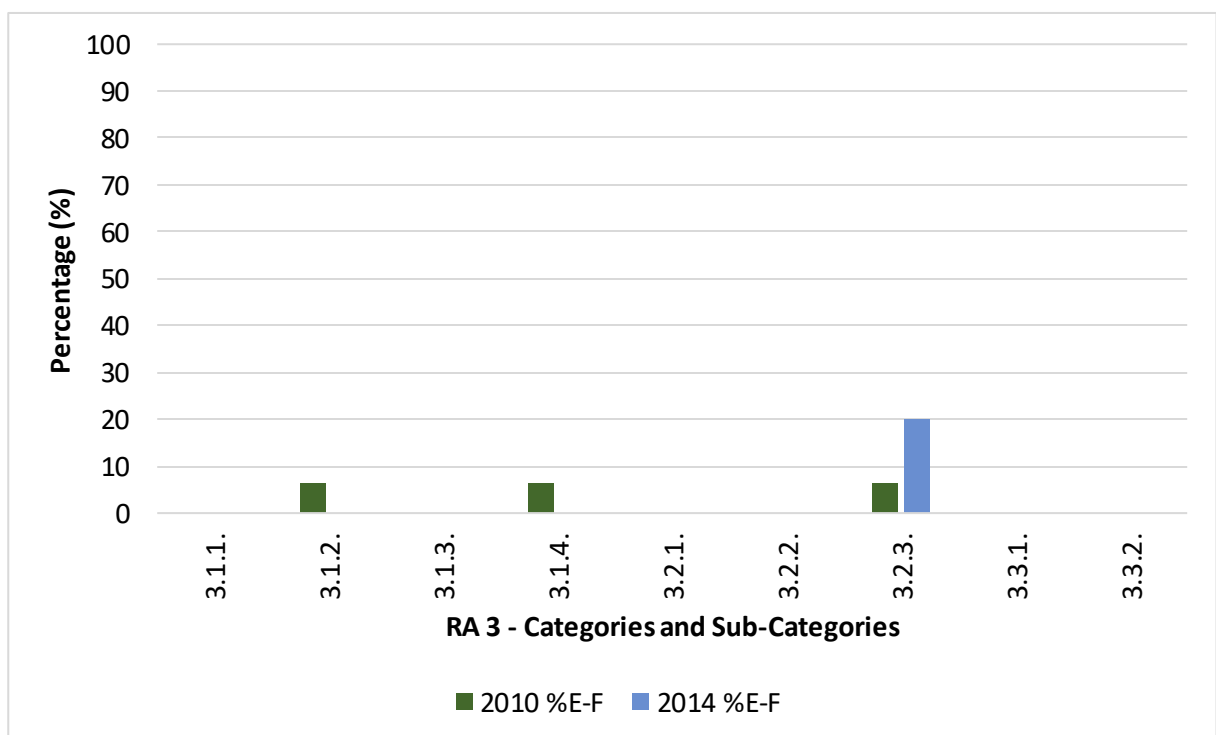


Figure 15: Poorly performed (E-F) grades for review area 3

Although all categories under the 2010 system scored 88% or more for all reports, it was identified that the sub-category- alternatives identified for severe adverse impacts rejected (3.1.3) – was not applicable for most cases and therefore had 25% of reports with a score of C or higher, which influenced the overall alternatives (3.1) category scoring.

In particular, critical categories (%C-D - just satisfactory or just unsatisfactory) that influenced decision-making for review area 3 under the 2014 system were identified to be scope and effectiveness of mitigation measures (3.2) and commitment to mitigation measures (3.1) where 20% of reports scored between C and D for all sub-categories. In comparison, critical sub-categories that influence decision-making (%C-D - just satisfactory or just unsatisfactory) for review area 3 under the 2010 system were identified to be mitigation measures (3.2.2), extent of effectiveness of mitigation when implemented (3.2.3), record of commitment to mitigation measures (3.3.1) and monitoring arrangements (3.3.2) of which 50% or more of reports had a %C-D rating (refer to Figure 16). This is an improvement from the 2010 system which had between 44-63% reports scoring C-D for the same sub-categories (refer to Figure 16).

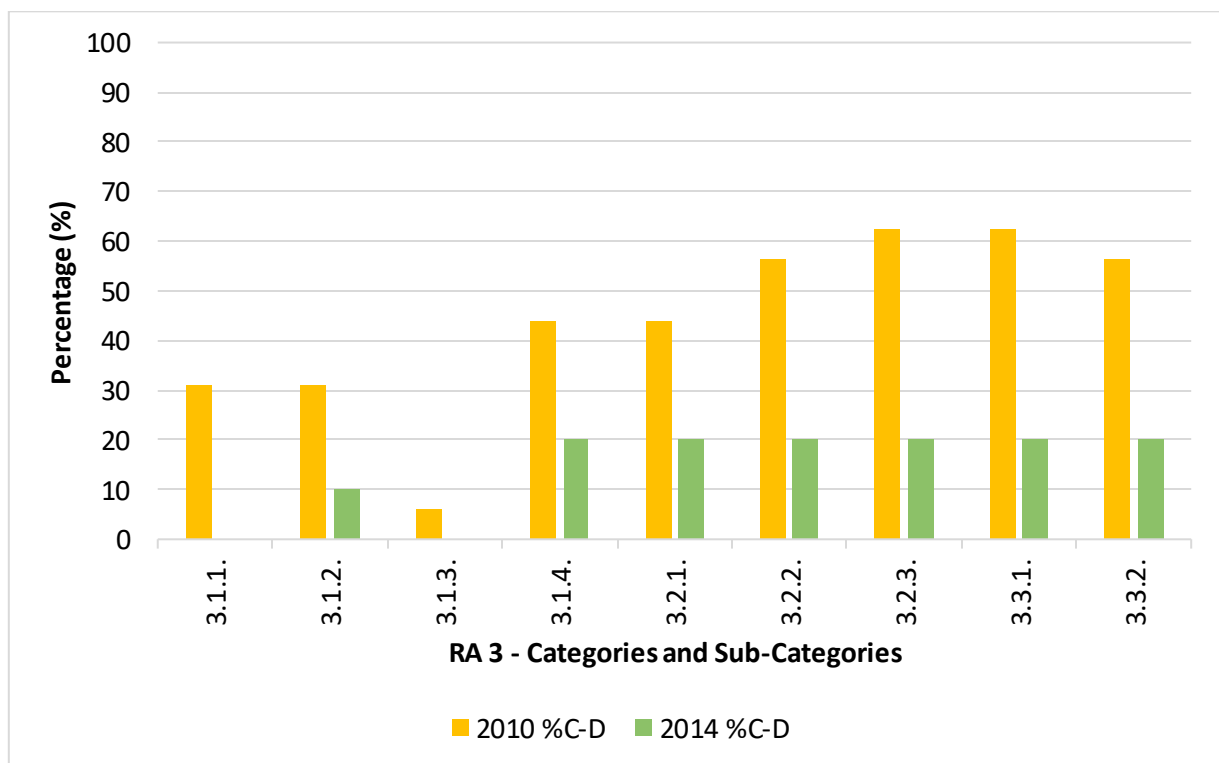


Figure 16: Critical categories (%C-D) of review area 3

For 6% of the 2010 reports, the description of alternative processes, designs and operating conditions (3.1.1), comparative assessment of all alternatives identified (3.1.4) and the extent of effectiveness of mitigation when implemented (3.2.3) were poorly attempted or not even attempted. From the 2014 reports, only the sub-category extent of effectiveness of mitigation when implemented (3.2.3) had 20% of reports being poorly or not even attempted. In comparison, this sub-category under 2010 system had 6% of reports being poorly or not even attempted which shows a decrease in quality for this particular sub-category.

4.1.4. Review area 4: Communication of results

From Table 13, 100% of the 2014 sample scored C or higher, which indicates that review area 4 was a well performed area with all reports being of good quality compared to 88% of the 2010 sample which scored C or higher which indicates that review area 4 was of relatively good report quality. 100% of the 2014 reports were well performed to generally satisfactory compared to 69% under the 2010 system, and 0% of 2014 reports were just satisfactory or just unsatisfactory compared to that of 31% under the 2010 system.

Table 13: Results of review area 4

	Summary of all review categories	2010				2014			
		% C or better (A-C)	% A-B	% C-D	% E-F	% C or better (A-C)	% A-B	% C-D	% E-F
RA 4	Communication of results	88	69	31	0	100	100	0	0
4.1	Layout of the report	88	56	44	0	100	100	0	0
4.2	Presentation	88	63	38	0	100	90	10	0
4.3.	Emphasis	100	63	38	0	100	100	0	0
4.4.	Non-technical summary	88	75	19	6	100	100	0	0

All four categories (i.e. 4.1 to 4.4), scored C or higher for 100% of 2014 reports compared to 88% of 2010 reports, which is an improvement in report quality compared to the 2010 system (refer to Figure 17). The results of the Kruskal-Wallis H test determined statistically significant differences between the 2010 and 2014 review

results for review area 4 ($H= 2,366$ and $p= 0,017$) and specifically one category of review area 4, i.e. layout of the report (4.1) ($H= 2,201$ and $p= 0,0277$), of which the 2014 reports were of better quality than the 2010 reports.

The best performing category (%A-B) under the 2014 system was emphasis (4.3) and non-technical summary (4.4) with 100% of reports attaining A and B scores for all sub-categories, and the worst performing category (%E-F) was layout of the report (4.1). In comparison, the best performing category (%A-B) under the 2010 system was non-technical summary (4.4) and the worst performing category (%E-F) was layout of the report (4.1) (refer to Figure 18 and Figure 19).

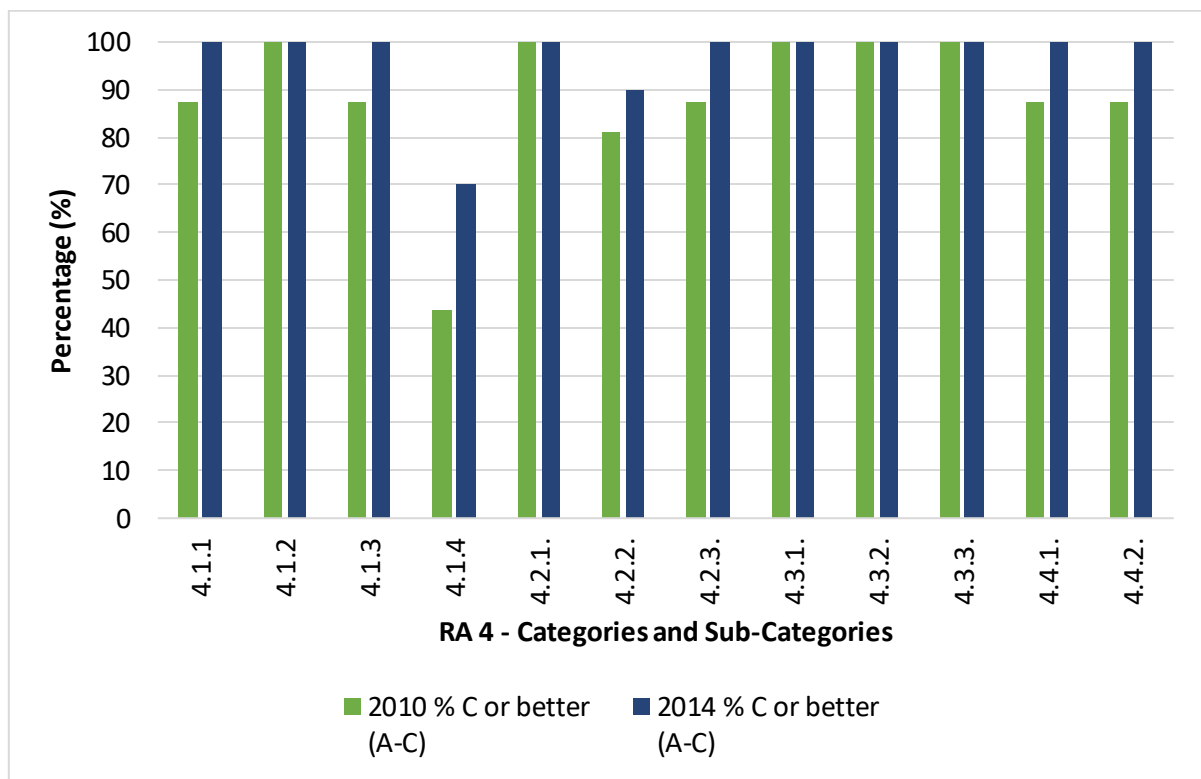


Figure 17: C or better (A-C) grades (satisfactory) achieved for review area 4

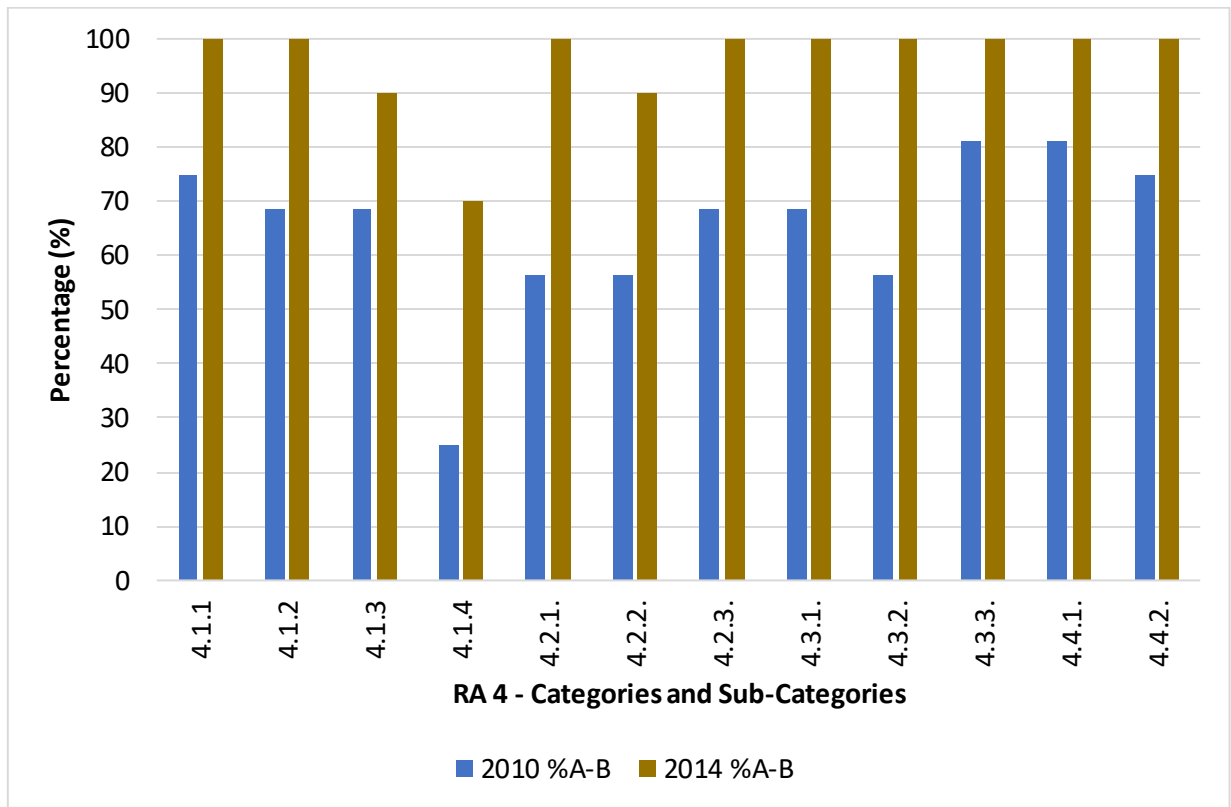


Figure 18: Well performed (A-B) grades for review area 3

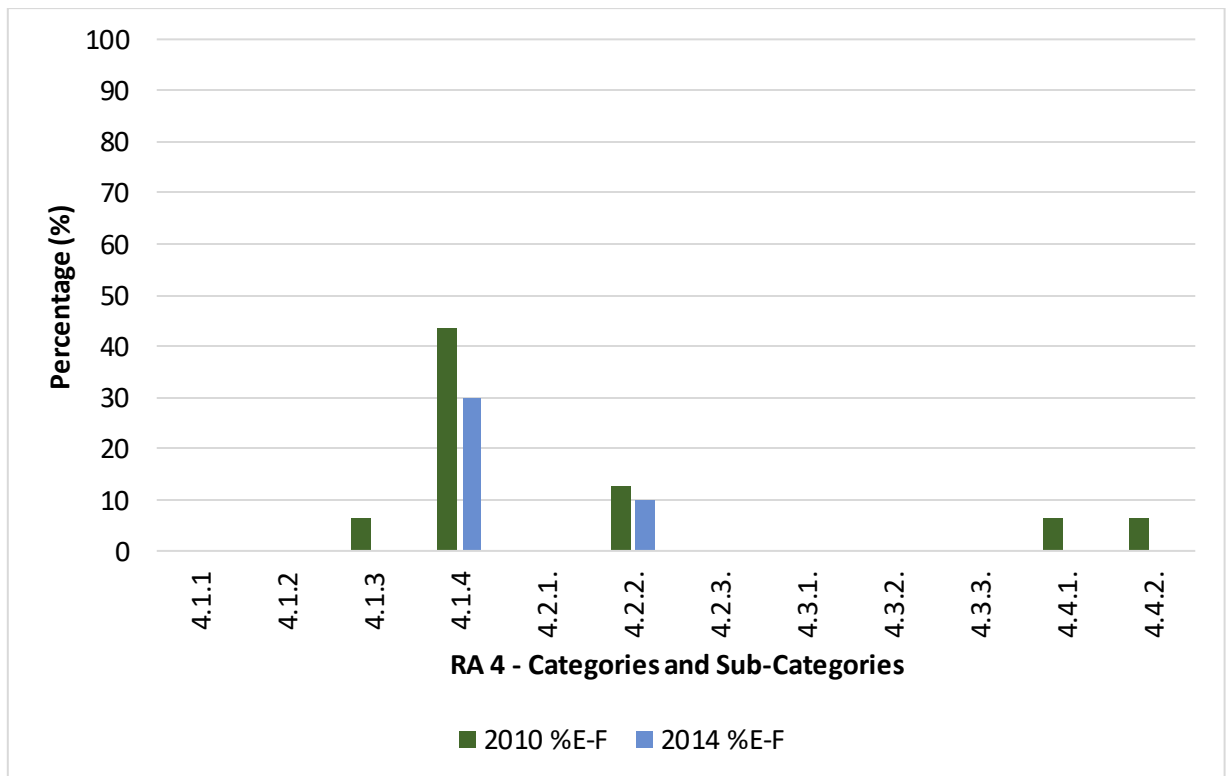


Figure 19: Poorly performed (E-F) grades for review area 4

A problem sub-category identified under the 2010 system was external sources acknowledged (4.1.4) of which 44% of reports scored C or higher, whilst 88% or more of reports for all other sub-categories had a score of C or higher. Critical sub-categories that influenced decision-making (%C-D - just satisfactory or just unsatisfactory) for review area 4 under the 2014 system were identified to be chapter summaries for very long chapters (4.1.3) where 10% of reports scored between C and D compared to 25% under the 2010 systems, which is an improvement from the 2010 system. In particular, critical sub-categories that influenced decision-making (%C-D - just satisfactory or just unsatisfactory) for review area 4 under the 2010 system were identified as presentation of information (4.2.1), and the statement must be unbiased (4.3.2) of which 44% of reports had a %C-D rating (refer to Figure 20).

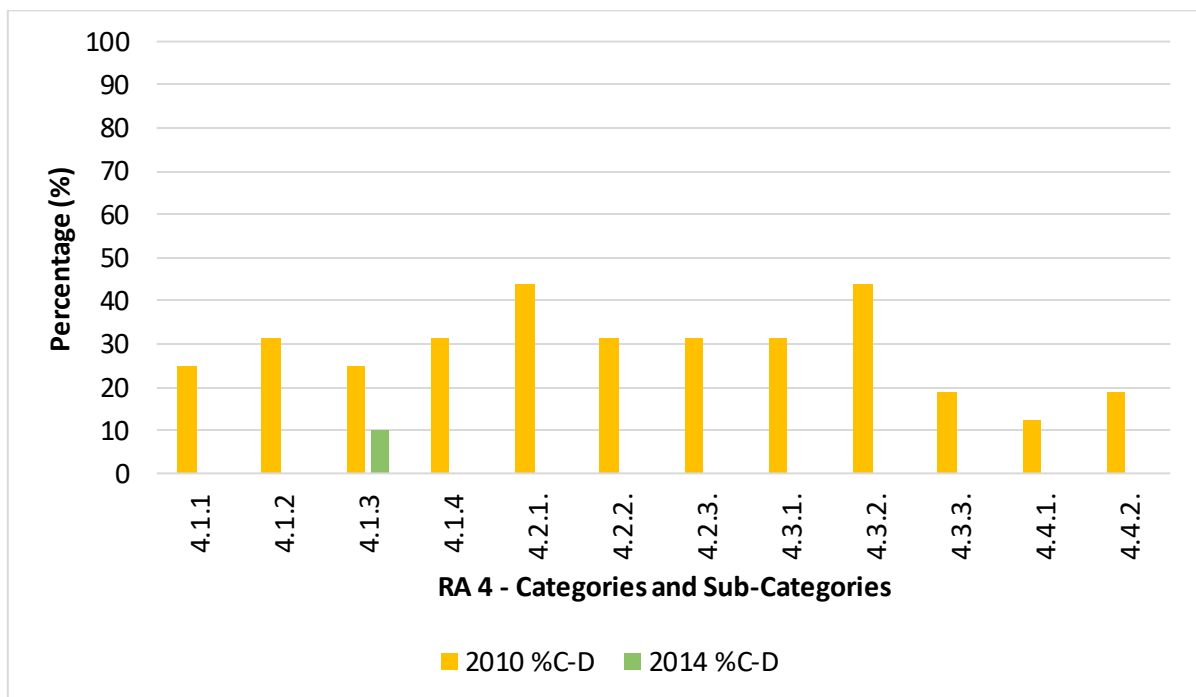


Figure 20: Critical categories (%C-D) of review area 4

From the 2014 reports, external sources acknowledged (4.1.4) had 30% of reports and technical terms, acronyms and initials defined (4.2.2) had 10% of reports that were identified as being poorly or not even attempted. In comparison, this sub-category under 2010 system had 44% and 13% of reports respectively, being poorly or not even attempted, which shows an increase in reporting quality compared to the 2010 system.

4.2. Summary of key findings

Categories that showed no improvement in 2014 (i.e. categories that had the same gradings for both 2010 and 2014 systems) were wastes (1.3); Scoping (2.3); and Emphasis (4.3). Although achieving C or higher gradings, only one category, scope and effectiveness of mitigation measures (3.2), displayed decreased quality, i.e. 88% of reports in 2010, compared to 80% in 2014. The remaining categories (i.e. 13 of 17 categories) showed improvement in report quality under the 2014 system. The best performing and worst performing categories are summarised in Table 10 below. Overall, the findings revealed environmental description, baseline conditions, identification of impacts, alternatives, emphasis and non-technical summary as strengths of the EIA system and wastes, scope and effectiveness of mitigation measures as weaknesses of the EIA system.

From the results of this study, EIA report quality has improved under the 2014 EIA system as compared to the 2010 EIA system. The reason for this improvement could be as a result of more specific, clear and defined regulatory requirements and guidelines for EIA quality reporting. One of the key aims of amending the 2010 EIA regulations and promulgating the 2014 NEMA EIA regulations was to improve EIA report quality to better inform decision-making, and thus promote effectiveness of the system (van Heerden, 2010; Sandham *et al.*, 2013).

Table 14: Comparison of the best and worst performing categories

Review area		Best Performing Categories - Strengths	Worst Performed Categories - Weaknesses
RA 1	2010	environmental description (1.4) - 94%	wastes (1.3) - 50 %
	2014	environmental description (1.4) and baseline conditions (1.5) - 100%	wastes (1.3) - 50%
RA 2	2010	scoping (2.3) - 100%	assessment of impact significance (2.5) - 94%
	2014	identification of impacts (2.2) - 100%	no worst performing category - all 100%
RA 3	2010	commitment to mitigation (3.3) - 94%	alternatives (3.1) - 88%
	2014	alternatives (3.1) - 100%	scope and effectiveness of mitigation measures (3.2) - 80%
RA 4	2010	non-technical summary (4.4) - 88%	layout of the report (4.1) - 88%
	2014	emphasis (4.3) and non-technical summary (4.4) - 100%	no worst performing category - all 100%

CHAPTER 5: DISCUSSION

South Africa has implemented regular amendments to the EIA regulations in an attempt to improve the effectiveness of the process. One way of evaluating effectiveness is to assess the quality of the EIA reports submitted for decision-making. The aim of this study was to assess whether the amendments to the EIA regulations in 2014 have contributed to better EIA report quality in South Africa. The comparative analysis of the 2010 and 2014 regulatory system revealed areas of improvement and deterioration in terms of amendment to EIA regulations in South Africa as discussed below.

This research revealed that the EIA report quality for 2010 was satisfactory, whilst the EIA report quality for 2014 was well performed. Furthermore, this research revealed that under the 2014 EIA system, review area 1 (project description) and review area 3 (alternatives and mitigation) had lower scores compared to higher scores in review area 2 (identification and evaluation of key impacts) and review area 4 (communication of results), and that overall report quality had improved under the 2014 EIA regulatory system compared to the 2010 system. The assessment of the overall quality of the EIA reports revealed that, under both the 2010 and 2014 EIA regulatory systems, all reports reviewed were graded as satisfactory (i.e. scores between A-C). However, under the 2010 system, 31% of the reports achieved C grades which were just satisfactory despite omissions and/or inadequacies, compared to 0% under the 2014 EIA system of which most reports achieved A-B grades which were well performed. Whilst only 69% of the reports under the 2010 system were well performed (i.e. achieved A-B grades), all reports (100%) reviewed under the 2014 EIA system were well performed. This indicates an improvement in EIA report quality from 2010 and 2014 in terms of the quality of critical review areas that inform decision-making during the EIA process. Compared to the 2010 reports, the 2014 reports showed better performance with a decrease in C and D grades (just satisfactory or just unsatisfactory) and a simultaneous increase in A grades (good quality reporting).

These findings differed from those of other studies undertaken on EIA quality under the 2006 EIA system in comparison to the 1997 EIA system which revealed that EIA reports in South Africa were of satisfactory quality. Previous studies also revealed

that for the 1997 and 2006 EIA regulatory systems in South African (Sandham and Pretorius, 2008; Sandham *et al.*, 2008; van Heerden, 2010; Sandham *et al.*, 2013), as well as internationally (Lee and Colley, 1992; Barker and Wood, 1999; European Commission, 1996; Lee, 2000; Canelas *et al.*, 2004; Pöhlönen *et al.*, 2010), lower scores were achieved for analytical areas (review area 2 and 3) and higher scores were achieved for the descriptive and presentational areas (review areas 1 and 4), and report quality either remained the same or deteriorated (Hoffman, 2007; Sandham and Pretorius, 2008; Sandham *et al.*, 2008; Mbhele, 2009; van Heerden, 2010; Talime, 2011; Sandham *et al.*, 2013; Madlome, 2016). The highest scoring and best performing area remains to be review area 4 in 2014 since 1997 (van Heerden, 2010; Sandham *et al.*, 2013). However, although review areas 2 and 3 were considered as the weaker areas (lowest scoring) of EIA report quality under the 1997 and 2006 systems, the findings of this research revealed that the weaker areas of report quality were review areas 1 and 3, indicating an improvement in review area 2 under the 2014 EIA system (van Heerden, 2010; Sandham *et al.*, 2013). All review areas under the 2014 EIA system were addressed to a satisfactory level, with 100% of reports scoring C or higher. In addition, all review areas performed better under the 2014 EIA system compared to the 2010 EIA system which indicates an improvement in report quality. In particular, key amendments in the 2014 EIA regulations pertain to Chapter 4 (applications for environmental authorisations), and makes reference to appendices 1 to 6 which details specifications for the content of a basic assessment report; scoping report; EIA report; EMP; closure plan; specialist report and an environmental audit report, respectively (South Africa, 2014). Key amendments to the 2014 EIA regulations that have an influence on EIA report quality include appendix 2 which outlines the objective, scope and content of a scoping report, appendix 3 which outlines the objective, scope and content of an EIA report, appendix 4 which outlines the content of an EMP, and appendix 6 which outlines the content of a specialist report. Hence, appendices 2, 3, 4 and 6 of the 2014 EIA regulations, details the specific information that must be included in an EIA report to inform decision-making and as such have contributed to an improvement in review area 4 (communication of results). In addition, Regulations 2(c), 2(d), 3(h), 3(i), 3(j), 3(l), 3(m) and 3(n) of appendix 3, provides detailed and clear specifications on the definition, identification, prediction and assessment of impacts and impact significance which have contributed to improvements in review area 2 (identification

and evaluation of key impacts). Based on the above, it is assumed that the above amendments to EIA regulations improved the quality of EIA reports.

Review area 1 (project description) and review area 3 (alternatives and mitigation) under the 2010 EIA system had poor report quality (i.e. the worst performing scores) for more than 50% of reports, compared to the 2014 system, where report quality was poor for review area 1 (project description) and review area 3 (alternatives and mitigation) for 20% of reports. When comparing key weaknesses of these review areas from 2006 studies undertaken on EIA quality to results of this study, i.e. 2010 and 2014 review of EIA quality, wastes (1.3) for review area 1 remained the same and had no improvements (50%), and scope and effectiveness of mitigation measures (3.2) for review area 3 decreased from 88% under the 2010 EIA system to 80% under the 2014 system.

The poor performance of review area 1 could be attributed to the weakness of the wastes (1.3) category which has not improved much over the years (van Heerden, 2010). The associated sub-categories (i.e. types and quantities of waste, treatment disposal and disposal routes, and methods of obtaining quantity of wastes) under wastes (1.3), are not known during the planning phase, or do not apply to a project and therefore information on it is very little or is not always included in the EIA report, lowering the overall scoring of the review area. In terms of waste management in the 2014 EIA regulations, reference for waste management activities are specified in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEMWA), of which the due processes are to be followed. Even with the poor performance of the waste category, the overall performance of review area 1 is generally satisfactory due to pre-consultation engagements with the relevant and competent authorities initiated by the project proponents and consultants at the onset of the EIA process, which allows clarity in terms of requirements for the EIA process and to ensure proper planning of the project (Mbhele, 2009).

The poor performance of review area 3 (alternatives and mitigation) is consistent with findings of other studies and could be attributed to the fact that this area is more complex and difficult in terms of the selection of alternatives, prediction of impacts per alternative, comparison of impacts across alternatives to select the most feasible alternative as well as the development of mitigation measures for impacts associated with the proposed alternative (Sandham *et al.*, 2013), or that there may be limited

alternatives that can be considered and possibly the misinterpretation of the legislation in terms of the selection of alternatives, though the different alternatives are specified in the 2014 regulations (Mbhele, 2009). Also, as the key purpose of an EIA in the planning phase of a project is to identify impacts that are harmful to the environment and to set mitigation measures to minimise the impacts (Mbhele, 2009), the poor performance of review area 3 is concerning and lies within the responsibility and competency of the EAP and/or specialist, as it is also a critical aspect to ensure EIA effectiveness (van Heerden, 2010; Sandham *et al.*, 2013).

The best performing review area, i.e. contributing to good quality reports for both the 2010 and 2014 EIA systems, was review area 4 (communication of results) with 69% and 100% of reports attaining A-B grades respectively. The improvement of A-B grades in review area 1 under the 2014 EIA regulations can be attributed to the specifications contained in appendices 2, 3, 4 and 6, on the content of information that must be included in an EIA report to inform decision-making. The second best performing review area under the 2014 EIA system was review area 2 (identification and evaluation of key impacts) with 90% of reports attaining A-B grades, compared to 44% under the 2010 system. When comparing key strengths of these review areas from 2006 studies undertaken on EIA quality to results of this study, the key areas of improvement for review area 2 included definition of impacts (2.1), identification of impacts (2.2), prediction of impacts (2.4) and assessment of impact significance (2.5) (van Heerden, 2010; Sandham *et al.*, 2013). As such, these requirements are clearly specified in regulations 2(c), 2(d), 3(h), 3(i), 3(j), 3(l), 3(m) and 3(n) of appendix 3 of the 2014 EIA regulations, which have contributed to improvements in review area 2 (identification and evaluation of key impacts). According to Mbhele (2009), the improvement for review area 2 could also be attributed to scoping reports which are generally "beefed up" and entails information required for the EIA report. According to Sandham *et al.* (2013), as there is a strong link between review criteria and the additional EIA report requirements in the 2006 EIA regulations, the areas of improvement in report quality may be attributed to having more detailed and specific EIA regulatory requirements. As such, areas of improvements from this study could be attributed to the attempt to improve EIA effectiveness in South Africa, by making the 2014 EIA regulations more specific, clear and defined and providing proper guidance to environmental practitioners in terms of EIA reporting requirements (South Africa, 2014; TMG, 2017).

In comparison to the EIA regulations 2010, the EIA regulations 2014 are more streamlined and specific in their activities, process requirements and timeframes (DEA, 2010; South Africa, 2017). Hence, the EIA regulations 2014 aims to avoid applications for less significant activities (activities with a minimal footprint and known/easily predictable impacts), synchronise and streamline the entire permitting process for environmental authorisations in South Africa, by integrating administrative and legislative requirements in terms of the NEMA and the MPRDA, and defining timeframes for both authority decision-making and for applicants reporting throughout the process, in order to reduce costs and to make the process more efficient and feasible (DEA, 2010; South Africa, 2017; TMG, 2017). In addition to the key changes in the 2014 EIA regulations highlighted above that have an influence on report quality, other changes to the regulations that could have influenced review area 2 (identification and evaluation of key impacts) and review area 4 (communication of results), also include the format of the regulations, more specified public participation requirements and the shortened timeframes regulated for authority review of EIA reports, all of which aim to enforce strict authority involvement, guidance and commitment to make the EIA reporting process more effective (South Africa, 2017; TMG, 2017). Perhaps also, the 2014 EIA legislative reporting requirements were made in line with thoughts around information that is considered during decision-making for approval of EIA applications and timeframe it takes to gather this information, therefore these requirements were specified in the amended regulations.

5.1. The effects of EIA regulation amendments on EIA report quality

Previous studies show that report quality was slightly better under the 1997 EIA system compared to the 2006 system (Sandham and Pretorius, 2008; Sandham *et al.*, 2008; van Heerden, 2010; Sandham *et al.*, 2013). Hence, more detailed regulations in 2006 did not ensure improved practice and quality reporting (Sandham and Pretorius, 2008; Sandham *et al.*, 2008; van Heerden, 2010; Sandham *et al.*, 2013). However, compliance with minimum requirements was still evident in the 1997 and 2006 EIA systems as all sampled EIA reports were approved during the decision-making process (van Heerden, 2010). Issues identified in the 1997 EIA regulations, which were not addressed in the 2006 regulations, included that

information regarding best practice was not required, such as the nature and quantity of raw materials, the duration of the different phases, the estimated number of workers and/or visitors to the site, a description of the methods used for obtaining the quantity of wastes as well as information on the treatment, disposal and disposal routes of wastes, compilation of the specialist reports, description of impacts, prediction of impacts, description of impact magnitude, estimation of impact magnitude, methods used to predict impact magnitude, commitment to mitigation measures and monitoring arrangements (van Heerden, 2010), which ultimately affected EIA report quality and EIA effectiveness. Hence, an improvement in the 2014 EIA report quality indicates that South African requirements are conforming to best practice and that the decision-making process is more well informed and holistic, which further indicates an improvement towards the effectiveness of the EIA process. However, areas for improvement or weaknesses in the system, as highlighted above, still remain which needs to be addressed. From international studies undertaken, experience has proven that the overall EIA report quality generally improves with time (Badr *et al.*, 2004; Barker and Wood, 1999; Canelas *et al.*, 2005; European Commission, 1996; Glasson *et al.*, 1997; Fuller, 1999; Morrison-Saunders *et al.*, 2001). However, based on the fact that changes to regulations did not improve report quality in previous studies, Sandham *et al.* (2013) indicated that EIA regulations may be over-detailed, too complex and rigid, hindering the potential for EIA to achieve sustainable outcomes, and that rather more flexibility in the regulations may allow better practice and room for innovation and creativity in the process from accredited practitioners. The evaluation of the effectiveness of impact prediction in terms of EIA follow-up is also a key component in EIA effectiveness to ensure that activities of a project are sustainably managed, to improve EIA practice in the future, and to ensure that the EIA is achieving its purpose (Jordaan, 2010; Morrison-Saunders *et al.*, 2001).

It is therefore important that more research on EIA report quality be undertaken in South Africa (van Heerden, 2010; Sandham *et al.*, 2013) on the 2014 regulations in comparison to the 2010 regulations, and more specifically where no research has been taken before, i.e. on the 2010 EIA regulations in comparison to the 2006 EIA regulations, in order to provide a more accurate comparison of how amendments to regulations have influenced report quality over the years and overall EIA effectiveness.

5.2. Other factors to be considered in EIA effectiveness

Report quality is only one component contributing to effectiveness in the EIA process addressed in this research, and other components such as competency and accreditation of EAPs in conducting the EIA process, EIA impact on decision-making, impact prediction and EIA follow-up, i.e. monitoring, evaluation and management of impacts and post-auditing, of which are all governed by EIA regulatory requirements, must be subjected to further research in order to determine the total effect of amended regulations on EIA effectiveness in South Africa (Sadler, 2004; Retief, 2008; Hoffman 2007; Sandham and Pretorius, 2008; Mbhele, 2009; van Heerden, 2010; Sandham *et al.*, 2013). For example, previous studies indicated that the interpretation and practice of the amended regulations by EAPs could have been a significant contributing factor that influenced report quality and EIA effectiveness and in addition, not having any qualifying criteria or a registration body for EAPs was a weakness in the South African EIA system (van Heerden, 2010; Sandham *et al.*, 2013). According to Wood (2003), EIAs which have been properly conducted, will most likely increase the standard of practice in the EIA system. Previously, EAPs were voluntarily affiliated with two key bodies, namely, the International Association for Impact Assessment and the South African Council for Natural Scientific Professions. However, since 08 February 2018, the Environmental Assessment Practitioners Association of South Africa (EAPASA) has been appointed by the Minister of Environmental Affairs, as a mandatory accreditation body for EAPs, in order to increase the standard of practice in the South African EIA system and to promote effectiveness of the EIA process (South Africa, 2018). Thus, the relationship between amendments to EIA regulations and its implementation by role players is an area of importance to be explored for improving EIA report quality and its impact on decision-making, i.e. ensuring that EAPs and other role players in the process are well trained and have accreditations to undertake the EIA process with adequate competency to ensure good practice (Sandham *et al.*, 2013).

5.3. Conclusion and recommendations

The conclusion of this research is that the quality of EIA reports has improved with the promulgation of the 2014 EIA regulations since 2010 and is similar to international findings that the overall quality of EIA reporting generally improves with time (Mbhele, 2009). Key amendments to the 2014 EIA regulations that have an influence on EIA report quality include appendix 2 which outlines the objective, scope and content of a scoping report, appendix 3 which outlines the objective, scope and content of an EIA report, appendix 4 which outlines the content of an EMP, and appendix 6 which outlines the content of a specialist report. Even though aspects such as wastes and scope and effectiveness of mitigation measures, and alternatives and mitigation as a whole, still need improvement, the overall findings of this research conclude that amendments to EIA regulations in South Africa has influenced report quality. Hence, the findings of this research can serve as a baseline for future research conducted on report quality in terms of regulatory change. Should EIA regulations address concerns highlighted in the sections above, weaknesses can be eliminated which can lead to improved EIA quality reporting in South Africa (van Heerden, 2010). However, as report quality is only one component of EIA effectiveness that formed part of this research, other components of EIA effectiveness such as the competency and accreditation of EAPs in conducting the EIA process, EIA impact on decision-making, impact prediction and EIA follow-up, i.e. monitoring, evaluation, management and monitoring of impacts, should also be explored to gain a holistic understanding of the influence of amended regulations on EIA effectiveness in South Africa. The environmental legislative framework enforced in South Africa is recognised as one of the best for a developing country, especially in terms of EIAs (Retief and Chabalala, 2009; van Heerden, 2010). Therefore, there is great opportunity to improve the standard of EIA practice in the country and be at the forefront of sustainable development in Africa (van Heerden, 2010).

5.4.Potential future research topics

- No research on the 2014 EIA regulations was previously conducted and hence not enough research was available to discuss the impacts of the prescribed timeframes on report quality against previous regulations. Hence, this can be a recommendation for future research in the field.
- A research highlighting areas of the EIA Reports that remain sub-standard as a function of the Lee and Colley review package, regardless of the changes in regulations would add value to quality reporting.

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APPENDICES

Appendix 1: Comparison of 2014 EIA regulation reporting requirements to van Heerden's (2010) adapted version of Lee and Colley review package

	2014 regulations
1. DESCRIPTION OF THE DEVELOPMENT, LOCAL ENVIRONMENT AND BASELINE CONDITIONS.	
1.1. Description of the development: the purpose(s) of the development should be described as should the physical characteristics, scale and design. Quantities of materials needed during construction and operation should be included, and where appropriate, a description of the production processes.	
1.1.1. The purpose(s) and objectives of the development should be explained, as well as the need and desirability.	Appendix 3, 3 (d) a description of the scope of the proposed activity, including- (i) all listed and specified activities triggered and being applied for; and (ii) a description of the associated structures and infrastructure related to the development; Appendix 3, 3 (e) a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context; Appendix 3, 3 (f) a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location;
1.1.2. The design and size of the development should be described. Diagrams, plans or maps will be necessary for this purpose.	Appendix 3, 3 (c) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is - (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken; Appendix 3, 3 (d) a description of the scope of the proposed activity, including- (i) all listed and specified activities triggered and being applied for; and (ii) a description of the associated structures and infrastructure related to the development; (h) a full description of the process followed to reach the proposed development footprint within the approved site, including: (i) details of the development footprint alternatives considered;
1.1.3. There should be some indication of the physical presence and appearance of the completed development within the receiving environment.	Appendix 3, 3 (c) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is - (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken; Appendix 3, 3 (d) a description of the scope of the proposed activity, including- (i) all listed and specified activities triggered and being applied for; and (ii) a description of the associated structures and infrastructure related to the development;
1.1.4. Where appropriate, the nature of the production processes intended to be employed in the completed development should be described and the expected rate of production.	
1.1.5. The nature and quantities of raw materials needed during both the construction and operational phases should be described.	
1.1.6. Identification of applicant, including name, address and contact numbers.	
1.1.7. Details of EAP to carry out environmental impact assessment, including declaration of independence and expertise of EAP.	Appendix 3, 3 a) details of- (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae; Appendix 3, 3 (s) an undertaking under oath or affirmation by the EAP in relation to: (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;
1.2. Site description: On site land requirements of development and duration of each land use	
1.2.1. The land area taken up by the development site should be defined and its location clearly shown on a map. Including description of route of linear activity/coordinates of ocean based activity	Appendix 3, 3 (b) the location of the activity, including: (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties; Appendix 3, 3 (c) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is - (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken; (l) an environmental impact statement which contains - (i) a summary of the key findings of the environmental impact assessment; (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;
1.2.2. The uses to which this land will be put should be described and the different land use areas demarcated.	
1.2.3. The estimated duration of the construction phase, operational phase and, where appropriate, decommissioning phase should be given.	Appendix 3, 3 (r) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;

1.2.4. The numbers of workers and/or visitors entering the development site during both construction and operation should be estimated. Their access to the site and likely means of transport should be given.	
1.2.5. The means of transporting raw materials and products to and from the site and the approximate quantities involved should be described.	
1.3. Wastes: Estimated types and quantities of wastes which might be produced and proposed disposal routes to the environment described [Wastes include all residual process materials, effluents and emissions, waste energy, waste heat, noise etc.]	
1.3.1. The types and quantities of waste matter, energy and other residual materials, and the rate at which these will be produced should be estimated.	
1.3.2. The ways in which it is proposed to handle and/or treat these wastes and residual should be indicated, together with the routes by which they will eventually be disposed of to the environment.	
1.3.3. The methods by which the quantities of residuals and wastes were obtained should be indicated. If there is uncertainty this should be acknowledged and ranges of confidence limits given where possible.	
1.4. Environment description: Area and location likely to be affected by development proposal	
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.	Appendix 3, 3 (c) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is - (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;
1.4.2. The affected environment should be defined broadly enough to include any potentially significant effects occurring away from the immediate construction site. These may be caused by the dispersion of pollutants, infrastructural requirements of the project, traffic, etc.	Appendix 3, 3 (h) a full description of the process followed to reach the proposed development footprint within the approved site, including: (iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;
1.5. Baseline conditions: Description of affected environment as it is currently, and as it could be expected to develop if project were not to proceed	
1.5.1. The important components of the affected environments should be identified and described. The methods and investigations undertaken for this purpose should be disclosed and should be appropriate to the size and complexity of the assessment task. Uncertainty should be indicated.	Appendix 3, 3 (h) a full description of the process followed to reach the proposed development footprint within the approved site, including: (iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; Appendix 3, 3 (p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed; Appendix 3, 3 (u) an indication of any deviation from the approved scoping report, including the plan of study, including - (i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and (ii) a motivation for the deviation;
1.5.2. Existing data sources should have been searched and where relevant utilized, including local authority records and studies carried out by, or on behalf of, conservation agencies and/or special interest groups.	
1.5.3. Local land use plans and policies should be consulted and other data collected as necessary to assist in the determination of the "baseline" conditions, i.e. the probable future state of the environment, in the absence of the project, taking into account natural fluctuations and human activities.	Appendix 3, 3 (e) a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context; Appendix 3, 3 (v) any specific information that may be required by the competent authority; and Appendix 3, 3 (w) any other matters required in terms of section 24(4)(a) and (b) of the Act.
2. IDENTIFICATION AND EVALUATION OF KEY IMPACTS	
2.1. Definition of impacts: Potential impacts of development on the environment should be investigated and described. Impacts should be broadly defined to cover all potential effects on the environment and should be determined as the predicted deviation from the baseline state.	
2.1.1. A description of the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the project should be given.	Appendix 3, 3 (h) a full description of the process followed to reach the proposed development footprint within the approved site, including: (vi) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; Appendix 3, 3 (j) an assessment of each identified potentially significant impact and risk, including - (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be mitigated;
2.1.2. The above types of effect should be investigated and described with particular regard to identifying effects on or affecting human beings, flora and fauna, soil, water, air, climate, landscape, material assets, cultural heritage (including architectural and archaeological heritage) and the interactions between them.	Appendix 3, 3 (h) a full description of the process followed to reach the proposed development footprint within the approved site, including: (vi) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;
2.1.3. Consideration should not be limited to events which will occur under design operating conditions. Where appropriate, impacts which might arise from non-standard conditions or due to accidents should be described.	
2.1.4. 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.	
2.2. Identification of impacts: Methods used for identification of all significant impacts	
2.2.1. Impacts should be identified using a systematic methodology such as project specific checklists, matrices, panels of experts, consultations, etc. Supplementary methods (e.g. cause-effect or network analyses) may be needed to identify secondary impacts.	Appendix 3, 3 (h) a full description of the process followed to reach the proposed development footprint within the approved site, including: (v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts - (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; (vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;
2.2.2. A brief description of the impact identification methods should be given as should the rationale for using them.	Appendix 3, 3 (h) a full description of the process followed to reach the proposed development footprint within the approved site, including: (vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;
2.3. Scoping: Key impacts should be identified, taking into account the views of interested parties, and main investigation centred on these.	
2.3.1. There should be a genuine attempt to contact the general public and special interest groups to appraise them of the project and its implications, <i>including a description of the advertisement, notification in the relevant provincial gazette, newspaper (local, regional, national) on site advertisement, advertisement of public meeting(s) and notification of availability of the EIA report.</i>	Appendix 3, 3 (h) a full description of the process followed to reach the proposed development footprint within the approved site, including: (ii) details of the public participation process undertaken in terms of regulation 41 of the regulations, including copies of the supporting documents and inputs; (iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;
2.3.2. Arrangements should be made to collect the opinions and concerns of relevant public agencies, special interest groups and general public. Public meetings, seminars, discussing groups, etc. may be arranged to facilitate this. <i>Steps undertaken must be in accordance with plan of study. Included must be a list of registered I&APs, summary of comments received, summary of issues raised, date of receipt of comments, response of EAP and copies of any representations, objections and comments received from registered I&APs.</i>	Appendix 3, 3 (h) a full description of the process followed to reach the proposed development footprint within the approved site, including: (ii) details of the public participation process undertaken in terms of regulation 41 of the regulations, including copies of the supporting documents and inputs; (iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;
2.3.3. Key impacts should be identified and selected for more intense investigation. Impact areas not selected for thorough study should be identified and the reasons why they require less detailed investigation be given. <i>Summary of the findings and recommendations of any specialist report should be included.</i>	Appendix 3, 3 (j) an assessment of each identified potentially significant impact and risk, including- (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be mitigated;
2.4. Prediction of impact magnitude: Likely impacts should be described in exact terms where possible	
2.4.1. The data used to estimate the magnitude of the main impacts should be sufficient for the task and should be clearly described or their sources clearly identified. Any gaps in the required data should be indicated and the means used to deal with them in the assessment be explained.	Appendix 3, 3 (p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;
2.4.2. The methods used to predict impact magnitude should be described and be appropriate to the size and importance of the projected impacts.	Appendix 3, 3 (h) a full description of the process followed to reach the proposed development footprint within the approved site, including: (vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;
2.4.3. Where possible should predictions of impacts be expressed in measurable quantities with ranges and/or appropriate confidence limits. Qualitative descriptions, where these are used, should be fully defined.	
2.5. Assessment of impact significance: Estimation of expected significance of impacts for society. The sources of quality standards, together with the rationale, assumptions and value judgements used in assessing significance should be described.	
2.5.1. The significance to the affected community and society in general should be described and clearly distinguished from impact magnitude. Where mitigation measures are proposed <i>an indication must be given of the degree to which the impact can be mitigated, reversed or to which the impact may cause irreplaceable loss of resources.</i> The significance of any impact remaining after mitigation should also be described.	Appendix 3, 3 (h) a full description of the process followed to reach the proposed development footprint within the approved site, including: (v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts - (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;
2.5.2. The significance of an impact should be assessed taking into account appropriate national and international quality standards where available. Account should also be taken of the magnitude, location and duration of the impact in conjunction with national and local societal values.	Appendix 3, 3 (j) an assessment of each identified potentially significant impact and risk, including- (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be mitigated;
2.5.3. The choice of standards, assumptions and value systems used to assess significance should be justified and any contrary opinions should be summarized. <i>Indication of the methodology used should be indicated.</i>	Appendix 3, 3 (h) a full description of the process followed to reach the proposed development footprint within the approved site, including: (vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;
3. ALTERNATIVES AND MITIGATION	
3.1. Alternatives: Feasible alternatives should be considered. These should be outlined, the environmental implications of each presented and the reasons for their rejection briefly discussed, particularly where the preferred project is likely to have significant adverse environmental impacts.	

3.1.1. Alternative sites should be considered where these are practicable and available to the developer. The main environmental advantages and disadvantages of these should be discussed and the reasons for the final choice given.	Appendix 3, 3(g) a motivation for the preferred development footprint within the approved site; Appendix 3, 3 (h) a full description of the process followed to reach the proposed development footprint within the approved site, including: (i) details of the development footprint alternatives considered;
3.1.2. Where available, alternative processes, designs and operating conditions should be considered and the environmental implications of these investigated and reported where the proposed project is likely to have significant adverse environmental impacts.	Appendix 3, 3 (h) a full description of the process followed to reach the proposed development footprint within the approved site, including: (ix) if no alternative development locations for the activity were investigated, the motivation for not considering such; and (x) a concluding statement indicating the preferred alternative development location within the approved site;
3.1.3. If unexpectedly severe adverse impacts are identified during the course of the investigation, which are difficult to mitigate, alternatives rejected in the earlier planning phases should be re-appraised.	
3.1.4. A description and comparative assessment of all alternatives identified during the environmental impact assessment process.	Appendix 3, 3 (h) a full description of the process followed to reach the proposed development footprint within the approved site, including: (x) a concluding statement indicating the preferred alternative development location within the approved site;
3.2. Scope and effectiveness of mitigation measures: All significant adverse impacts should be considered for mitigation. Evidence should be presented to show that proposed mitigation measures will be effective when implemented.	
3.2.1. The mitigation of all significant adverse impacts should be considered and where practicable, specific mitigation measures should be put forward. Any residual or unmitigated impacts should be indicated and justified. <i>Indication of extent to which impacts could be addressed by the adoption of mitigation measures</i>	Appendix 3, 3(h) a full description of the process followed to reach the proposed development footprint within the approved site, including: (v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts - (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; (viii) the possible mitigation measures that could be applied and level of residual risk;
3.2.2. <i>Mitigation methods considered should include modification of the project, compensation and the provision of alternative facilities as well as pollution control.</i>	Appendix 3, 3 (n) the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;
3.2.3. It should be clear to what extent the mitigation methods will be effective when implemented. Where the effectiveness is uncertain or depends on assumptions about operating procedures, climatic conditions, etc. data should be introduced to justify the acceptance of these assumptions. <i>A clear description of uncertainty, assumptions, and gaps in knowledge must be included.</i>	Appendix 3, 3 (p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;
3.3. Commitment to mitigation: Developers should be committed to and capable of carrying out the mitigation measures and should present plans of how they proposed to do so.	
3.3.1. There should be a clear record of the commitment of the developer to the mitigation measures presented in the EIA report. Details of how the mitigation measure will be implemented and function over the time span for which they are necessary should be given. <i>The draft EMP must comply with regulations and must include specific information required by the competent authority.</i>	Appendix 3, 3 (m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation; Appendix 3, 3 (t) where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;
3.3.2. Monitoring arrangements should be proposed to check the environmental impacts resulting from the implementation of the project and their conformity with the predictions within the EIA report. Provision should be made to adjust mitigation measures where unexpected adverse impacts occur. The scale of the monitoring arrangements should correspond to the likely scale and significance of deviations from expected impacts.	Appendix 3, 3 (m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation; Appendix 3, 3 (r) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;
4. COMMUNICATION OF RESULTS	
4.1. Layout of the report: the layout should enable the reader to find and assimilate data easily and quickly. External data sources should be acknowledged.	
4.1.1. There should be an introduction briefly describing the project, the aims of the environmental assessment and how the aims are to be achieved.	Appendix 3, 3 (d) a description of the scope of the proposed activity(d) a description of the scope of the proposed activity, including- (i) all listed and specified activities triggered and being applied for; and (ii) a description of the associated structures and infrastructure related to the development;
4.1.2. Information should be logically arranged in sections or chapters and the whereabouts of important data be signalled in a table of contents or index.	
4.1.3. Unless the chapters are very short, there should be chapter summaries outlining the main findings of each phase of the investigation.	
4.1.4. Where data, conclusions or quality standards from external sources are introduced, the original source should be acknowledged at that point in the text. A full reference should be included either with the acknowledgement, at the bottom of the page or in a list of references.	
4.2. Presentation: Presentation of the information should be accessible to the non-specialist	
4.2.1. Information should be comprehensible to the non-specialist. Tables, graphs and other devices should be used as appropriate. Unnecessarily technical or obscure language should be avoided.	
4.2.2. Technical terms, acronyms and initials should be defined, either when first introduced into the text or in a glossary. Important data should be presented and discussed in the main text.	
4.2.3. The EIA report should be presented as an integrated whole. Summaries of data presented in separately bound appendices should be introduced in the main body of the text.	
4.3. Emphasis: Information should be represented without bias and receive the emphasis appropriate to its importance in the context of the assessment.	
4.3.1. Emphasis should be given to potentially severe adverse, as well as potentially substantial favourable environmental impacts.	Appendix 3, 3 (l) an environmental impact statement which contains- (i) a summary of the key findings of the environmental impact assessment; (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of

	the preferred site indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;
4.3.2. The report should be unbiased. It should not lobby for any particular point of view. Adverse impacts should not be disguised by euphemisms or platitudes.	13. (1) An EAP and a specialist, appointed in terms of regulation 12(1) or 12(2), must- (a) be independent; (d) perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the application;
4.3.3. <i>Opinion as to whether the activity should/should not be authorized.</i>	Appendix 3, 3 (q) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;
4.4. Non-technical summary: Clearly written non-technical summary of main findings	
4.4.1. There should be a non-technical summary of the main findings and conclusion of the study. Technical terms, lists of data and detailed explanations of scientific reasoning should be avoided.	Appendix 3, 3 (l) an environmental impact statement which contains- (i) a summary of the key findings of the environmental impact assessment; (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;
4.4.2. The summary should cover all main issues discussed, a brief description of the project and the environment, an account of the main mitigation measures to be undertaken, and any significant residual impacts. A brief explanation of the methods by which these data were obtained and an indication of the confidence which can be placed in them should be included.	Appendix 3, 3 (h) a full description of the process followed to reach the proposed development footprint within the approved site, including: (x) a concluding statement indicating the preferred alternative development location within the approved site; Appendix 3, 3 (l) an environmental impact statement which contains- (i) a summary of the key findings of the environmental impact assessment; (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;

Appendix 2: Adapted version of the Lee and Colley Review Package

DESCRIPTION OF ASSESSMENT SYMBOLS	
Symbol	Explanation
A	Relevant tasks 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	Very unsatisfactory, important task(s) poorly done or not attempted.
NA	Not applicable. The Review Topic is not applicable or it is irrelevant in the context of this Statement.

	A	B	C	D	E	F	N/A
1. DESCRIPTION OF THE DEVELOPMENT, LOCAL ENVIRONMENT AND BASELINE CONDITIONS.							
1.1. Description of the development: the purpose(s) of the development should be described as should the physical characteristics, scale and design. Quantities of materials needed during construction and operation should be included, and where appropriate, a description of the production processes.							
1.1.1. The purpose(s) and objectives of the development should be explained, <i>as well as the need and desirability</i> .							
1.1.2. The design and size of the development should be described. Diagrams, plans or maps will be necessary for this purpose.							
1.1.3. There should be some indication of the physical presence and appearance of the completed development within the receiving environment.							
1.1.4. Where appropriate, the nature of the production processes intended to be employed in the completed development should be described and the expected rate of production.							
1.1.5. The nature and quantities of raw materials needed during both the construction and operational phases should be described.							
1.1.6. <i>Identification of applicant, including name, address and contact numbers.</i>							
1.1.7. <i>Details of EAP to carry out environmental impact assessment, including declaration of independence and expertise of EAP.</i>							
1.2. Site description: On site land requirements of development and duration of each land use							
1.2.1. The land area taken up by the development site should be defined and its location clearly shown on a map. <i>Including description of route of linear activity/coordinates of ocean based activity</i>							
1.2.2. The uses to which this land will be put should be described and the different land use areas demarcated.							
1.2.3. The estimated duration of the construction phase, operational phase and, where appropriate, decommissioning phase should be given.							
1.2.4. The numbers of workers and/or visitors entering the development site during both construction and operation should be estimated. Their access to the site and likely means of transport should be given.							
1.2.5. The means of transporting raw materials and products to and from the site and the approximate quantities involved should be described.							
1.3. Wastes: Estimated types and quantities of wastes which might be produced and proposed disposal routes to the environment described [Wastes include all residual process materials, effluents and emissions, waste energy, waste heat, noise etc.]							
1.3.1. The types and quantities of waste matter, energy and other residual materials, and the rate at which these will be produced should be estimated.							
1.3.2. The ways in which it is proposed to handle and/or treat these wastes and residual should be indicated, together with the routes by which they will eventually be disposed of to the environment.							
1.3.3. The methods by which the quantities of residuals and wastes were obtained should be indicated. If there is uncertainty this should be acknowledged and ranges of confidence limits given where possible.							
1.4. Environment description: Area and location likely to be affected by development proposal							
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.							
1.4.2. The affected environment should be defined broadly enough to include any potentially significant effects occurring away from the immediate construction site. These may be caused by the dispersion of pollutants, infrastructural requirements of the project, traffic, etc.							
1.5. Baseline conditions: Description of affected environment as it is currently, and as it could be expected to develop if project were not to proceed							
1.5.1. The important components of the affected environments should be identified and described. The methods and investigations undertaken for this purpose should be disclosed and should be appropriate to the size and complexity of the assessment task. Uncertainty should be indicated.							
1.5.2. Existing data sources should have been searched and where relevant utilized, including local authority records and studies carried out by, or on behalf of, conservation agencies and/or special interest groups.							
1.5.3. Local land use plans and policies should be consulted and other data collected as necessary to assist in the determination of the "baseline" conditions, i.e. the probable future state of the environment, in the absence of the project, taking into account natural fluctuations and human activities.							

	A	B	C	D	E	F	N/A
2. IDENTIFICATION AND EVALUATION OF KEY IMPACTS							
2.1. Definition of impacts: Potential impacts of development on the environment should be investigated and described. Impacts should be broadly defined to cover all potential effects on the environment and should be determined as the predicted deviation from the baseline state.							
2.1.1. A description of the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the project should be given.							
2.1.2. The above types of effect should be investigated and described with particular regard to identifying effects on or affecting human beings, flora and fauna, soil, water, air, climate, landscape, material assets, cultural heritage (including architectural and archaeological heritage) and the interactions between them.							
2.1.3. Consideration should not be limited to events which will occur under design operating conditions. Where appropriate, impacts which might arise from non-standard conditions or due to accidents should be described.							
2.1.4. 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.							
2.2. Identification of impacts: Methods used for identification of all significant impacts							
2.2.1. Impacts should be identified using a systematic methodology such as project specific checklists, matrices, panels of experts, consultations, etc. Supplementary methods (e.g. cause-effect or network analyses) may be needed to identify secondary impacts.							
2.2.2. <i>A brief description of the impact identification methods should be given as should the rationale for using them.</i>							
2.3. Scoping: Key impacts should be identified, taking into account the views of interested parties, and main investigation centred on these.							
2.3.1. There should be a genuine attempt to contact the general public and special interest groups to appraise them of the project and its implications, <i>including a description of the advertisement, notification in the relevant provincial gazette, newspaper (local, regional, national) on site advertisement, advertisement of public meeting(s) and notification of availability of the EIA report.</i>							
2.3.2. Arrangements should be made to collect the opinions and concerns of relevant public agencies, special interest groups and general public. Public meetings, seminars, discussing groups, etc. may be arranged to facilitate this. <i>Steps undertaken must be in accordance with plan of study. Included must be a list of registered I&APs, summary of comments received, summary of issues raised, date of receipt of comments, response of EAP and copies of any representations, objections and comments received from registered I&APs.</i>							

2.3.3. Key impacts should be identified and selected for more intense investigation. Impact areas not selected for thorough study should be identified and the reasons why they require less detailed investigation be given. <i>Summary of the findings and recommendations of any specialist report should be included.</i>							
2.4. Prediction of impact magnitude: Likely impacts should be described in exact terms where possible							
2.4.1. The data used to estimate the magnitude of the main impacts should be sufficient for the task and should be clearly described or their sources clearly identified. Any gaps in the required data should be indicated and the means used to deal with them in the assessment be explained.							
2.4.2. The methods used to predict impact magnitude should be described and be appropriate to the size and importance of the projected impacts.							
2.4.3. Where possible should predictions of impacts be expressed in measurable quantities with ranges and/or appropriate confidence limits. Qualitative descriptions, where these are used, should be fully defined.							
2.5. Assessment of impact significance: Estimation of expected significance of impacts for society. The sources of quality standards, together with the rationale, assumptions and value judgements used in assessing significance should be described.							
2.5.1. The significance to the affected community and society in general should be described and clearly distinguished from impact magnitude. Where mitigation measures are proposed <i>an indication must be given of the degree to which the impact can be mitigated, reversed or to which the impact may cause irreplaceable loss of resources.</i> The significance of any impact remaining after mitigation should also be described.							
2.5.2. The significance of an impact should be assessed taking into account appropriate national and international quality standards where available. Account should also be taken of the magnitude, location and duration of the impact in conjunction with national and local societal values.							
2.5.3. The choice of standards, assumptions and value systems used to assess significance should be justified and any contrary opinions should be summarized. <i>Indication of the methodology used should be indicated.</i>							

	A	B	C	D	E	F	N/A
3. ALTERNATIVES AND MITIGATION							
3.1. Alternatives: Feasible alternatives should be considered. These should be outlined, the environmental implications of each presented and the reasons for their rejection briefly discussed, particularly where the preferred project is likely to have significant adverse environmental impacts.							
3.1.1. Alternative sites should be considered where these are practicable and available to the developer. The main environmental advantages and disadvantages of these should be discussed and the reasons for the final choice given.							
3.1.2. Where available, alternative processes, designs and operating conditions should be considered and the environmental implications of these investigated and reported where the proposed project is likely to have significant adverse environmental impacts.							
3.1.3. If unexpectedly severe adverse impacts are identified during the course of the investigation, which are difficult to mitigate, alternatives rejected in the earlier planning phases should be re-appraised.							
3.1.4. <i>A description and comparative assessment of all alternatives identified during the environmental impact assessment process.</i>							
3.2. Scope and effectiveness of mitigation measures: All significant adverse impacts should be considered for mitigation. Evidence should be presented to show that proposed mitigation measures will be effective when implemented.							
3.2.1. The mitigation of all significant adverse impacts should be considered and where practicable, specific mitigation measures should be put forward. Any residual or unmitigated impacts should be indicated and justified. <i>Indication of extent to which impacts could be addressed by the adoption of mitigation measures</i>							
3.2.2. <i>Mitigation methods considered should include modification of the project, compensation and the provision of alternative facilities as well as pollution control.</i>							
3.2.3. It should be clear to what extent the mitigation methods will be effective when implemented. Where the effectiveness is uncertain or depends on assumptions about operating procedures, climatic conditions, etc. data should be introduced to justify the acceptance of these assumptions. <i>A clear description of uncertainty, assumptions, and gaps in knowledge must be included.</i>							
3.3. Commitment to mitigation: Developers should be committed to and capable of carrying out the mitigation measures and should present plans of how they proposed to do so.							
3.3.1. There should be a clear record of the commitment of the developer to the mitigation measures presented in the EIA report. Details of how the mitigation measure will be implemented and function over the time span for which they are necessary should be given. <i>The draft EMP must comply with regulations and must include specific information required by the competent authority.</i>							
3.3.2. Monitoring arrangements should be proposed to check the environmental impacts resulting from the implementation of the project and their conformity with the predictions within the EIA report. Provision should be made to adjust mitigation measures where unexpected adverse impacts occur. The scale of the monitoring arrangements should correspond to the likely scale and significance of deviations from expected impacts.							

	A	B	C	D	E	F	N/A
4. COMMUNICATION OF RESULTS							
4.1. Layout of the report: the layout should enable the reader to find and assimilate data easily and quickly. External data sources should be acknowledged.							
4.1.1. There should be an introduction briefly describing the project, the aims of the environmental assessment and how the aims are to be achieved.							
4.1.2. Information should be logically arranged in sections or chapters and the whereabouts of important data be signalled in a table of contents or index.							
4.1.3. Unless the chapters are very short, there should be chapter summaries outlining the main findings of each phase of the investigation.							
4.1.4. Where data, conclusions or quality standards from external sources are introduced, the original source should be acknowledged at that point in the text. A full reference should be included either with the acknowledgement, at the bottom of the page or in a list of references.							
4.2. Presentation: Presentation of the information should be accessible to the non-specialist							
4.2.1. Information should be comprehensible to the non-specialist. Tables, graphs and other devices should be used as appropriate. Unnecessarily technical or obscure language should be avoided.							
4.2.2. Technical terms, acronyms and initials should be defined, either when first introduced into the text or in a glossary. Important data should be presented and discussed in the main text.							
4.2.3. The EIA report should be presented as an integrated whole. Summaries of data presented in separately bound appendices should be introduced in the main body of the text.							
4.3. Emphasis: Information should be represented without bias and receive the emphasis appropriate to its importance in the context of the assessment.							
4.3.1. Emphasis should be given to potentially severe adverse, as well as potentially substantial favourable environmental impacts.							
4.3.2. The report should be unbiased. It should not lobby for any particular point of view. Adverse impacts should not be disguised by euphemisms or platitudes.							
4.3.3. <i>Opinion as to whether the activity should/should not be authorized.</i>							
4.4. Non-technical summary: Clearly written non-technical summary of main findings							
4.4.1. There should be a non-technical summary of the main findings and conclusion of the study. Technical terms, lists of data and detailed explanations of scientific reasoning should be avoided.							
4.4.2. The summary should cover all main issues discussed, a brief description of the project and the environment, an account of the main mitigation measures to be undertaken, and any significant residual impacts. A brief explanation of the methods by which these data were obtained and an indication of the confidence which can be placed in them should be included.							

Appendix 3: Raw data collected using adapted version of Lee and Colley Review Package

Summary of EIA Review Scoring for Reports compiled under 2010 EIA regulations																
Report No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Overall Score	C	C	C	B	B	C	B	A	B	C	B	B	A	B	B	B
1.	C	D	C	C	C	C	C	A	C	C	B	C	B	A	B	B
1.1	C	D	B	C	C	C	C	A	A	C	A	A	A	A	B	A
1.1.1.	C	B	B	B	A	C	A	A	A	E	A	A	A	A	A	A
1.1.2.	B	D	B	A	C	D	A	A	A	D	A	A	A	A	B	A
1.1.3.	C	D	A	A	C	C	A	A	A	C	C	A	A	A	C	A
1.1.4.	D	E	C	C	C	C	C	A	C	C	B	A	C	A	C	C
1.1.5.	E	E	C	C	E	C	C	C	F	C	B	B	C	A	C	C
1.1.6.	A	A	D	D	A	A	F	A	A	C	A	C	A	A	A	A
1.1.7.	A	A	A	C	A	A	C	A	A	C	A	A	A	A	A	A
1.2	E	D	D	D	D	D	D	B	D	C	B	D	C	B	B	D
1.2.1.	B	C	A	A	C	C	A	A	A	B	A	A	A	A	B	A
1.2.2.	D	A	A	A	B	C	A	A	A	B	A	A	A	A	B	C
1.2.3.	F	F	D	F	B	D	E	B	F	C	C	E	C	C	B	E
1.2.4.	F	E	F	E	E	F	F	B	F	D	C	E	D	A	B	F
1.2.5.	E	E	E	F	E	E	F	B	F	C	B	F	D	C	E	E
1.3	F	C	C	E	C	D	D	A	D	E	C	E	C	A	C	E
1.3.1.	F	C	C	F	C	D	E	A	E	E	D	E	C	A	C	E
1.3.2.	E	C	C	D	C	C	C	A	C	E	C	E	C	A	C	D
1.3.3.	F	C	D	D	C	D	C	A	D	E	C	E	D	A	D	E
1.4	C	D	C	B	C	C	A	A	A	A	A	A	A	A	B	A
1.4.1.	C	D	C	A	C	C	A	A	A	A	A	A	A	A	B	A
1.4.2.	C	C	C	C	C	C	A	A	A	A	A	A	A	A	B	A
1.5	C	C	D	B	C	C	A	A	C	B	A	A	A	A	B	C
1.5.1.	C	C	C	B	C	C	A	A	D	C	B	A	A	A	B	E
1.5.2.	C	C	D	B	C	C	A	A	C	A	A	A	A	A	B	A
1.5.3.	C	B	D	B	C	B	A	A	C	A	A	A	A	A	B	A
2.	D	C	C	C	C	C	A	B	B	C	A	B	A	B	C	C
2.1	D	C	C	C	C	B	A	B	B	D	A	A	A	B	B	C
2.1.1.	C	B	C	B	C	B	C	B	B	D	A	A	A	B	B	C
2.1.2.	C	B	C	B	C	B	A	A	A	B	A	A	A	B	A	C
2.1.3.	C	C	D	C	C	B	A	C	B	D	B	A	A	B	B	C
2.1.4.	F	C	C	C	C	C	A	C	B	C	A	A	A	B	B	C
2.2	D	C	C	C	C	C	A	C	A	C	A	A	A	B	C	C
2.2.1	D	C	C	C	C	B	A	C	A	D	A	A	A	B	C	C
2.2.2	C	C	C	C	C	C	A	C	A	C	A	A	A	B	C	C
2.3	C	B	C	B	B	A	A	A	A	C	A	A	A	B	B	B
2.3.1.	C	B	B	B	B	A	A	A	A	C	A	A	A	B	B	B
2.3.2.	C	B	C	B	B	A	A	A	A	D	A	A	A	B	B	B
2.3.3.	D	C	C	C	C	B	A	B	A	C	A	A	A	B	C	C
2.4	D	C	C	C	C	C	A	B	A	C	A	C	A	B	C	C
2.4.1	D	C	C	C	C	C	A	C	A	D	B	C	A	B	C	C
2.4.2	D	C	C	C	C	C	A	C	B	A	C	A	C	A	B	C
2.4.3	E	C	C	C	C	C	A	B	A	C	A	C	A	B	C	C
2.5	E	C	C	C	C	C	A	B	C	C	B	B	A	C	C	C
2.5.1.	E	C	C	C	C	C	A	B	D	D	B	B	A	C	C	C
2.5.2.	E	C	D	C	C	C	A	B	C	C	B	B	A	C	C	C
2.5.3.	E	C	C	B	C	C	B	B	C	B	B	B	A	C	C	C
3.	D	C	C	B	B	C	B	A	C	C	C	B	A	B	B	B
3.1.	E	C	D	B	A	C	B	A	C	C	B	A	A	A	B	A
3.1.1.	D	C	C	A	A	C	B	A	A	C	B	A	A	A	B	A
3.1.2.	E	C	D	B	A	C	A	A	C	C	A	A	A	A	B	A
3.1.3.	N/A	C	N/A	N/A	N/A	N/A	B	N/A	N/A	N/A	B	N/A	A	N/A	N/A	N/A
3.1.4.	F	C	N/A	C	A	C	B	A	C	D	C	A	A	A	C	A

3.2.	D	C	C	B	B	C	B	A	C	D	C	B	A	B	B	C
3.2.1.	D	C	C	B	A	B	B	A	C	D	C	A	A	B	B	C
3.2.2.	D	C	C	C	B	C	B	B	C	C	C	B	A	B	B	C
3.2.3.	D	C	C	B	C	C	B	A	D	E	D	C	A	C	B	C
3.3	D	C	C	C	C	C	B	B	C	C	C	B	B	B	B	B
3.3.1.	D	C	C	C	C	C	B	B	C	C	C	B	B	B	C	B
3.3.2.	D	C	C	C	C	C	B	B	C	C	C	B	B	B	B	B
4.	C	C	D	B	B	C	B	B	A	D	B	A	A	A	B	B
4.1	B	C	D	B	A	C	C	C	B	D	C	B	A	A	A	B
4.1.1	B	C	D	A	A	C	A	A	B	D	A	A	A	A	A	A
4.1.2	A	C	C	B	A	C	A	C	B	C	A	A	A	A	A	A
4.1.3	B	D	C	B	B	C	C	B	B	E	A	A	A	A	A	A
4.1.4	A	C	F	A	A	D	F	F	F	F	F	C	C	D	A	F
4.2	C	C	D	B	C	B	B	C	A	D	A	A	A	A	B	A
4.2.1.	C	C	C	B	C	C	B	C	A	C	A	A	A	A	B	A
4.2.2.	C	C	F	B	C	B	D	C	A	E	A	A	A	A	B	A
4.2.3.	C	C	D	B	B	B	B	C	A	D	A	A	A	A	A	A
4.3.	C	C	C	B	C	C	A	B	A	C	B	A	A	A	B	A
4.3.1.	C	C	C	B	C	B	A	B	A	C	B	A	A	A	B	B
4.3.2.	C	C	C	B	C	C	A	C	B	C	B	A	A	A	B	A
4.3.3.	B	B	B	B	C	C	A	B	A	C	A	A	A	A	B	A
4.4.	B	C	F	B	B	C	B	B	A	D	B	A	A	A	B	B
4.4.1.	B	B	F	B	B	C	B	B	A	D	A	A	A	A	B	A
4.4.2.	B	C	F	B	B	C	A	B	A	D	B	A	A	A	B	B

Summary of EIA Review Scoring for Reports compiled under 2014 EIA regulations										
Report No.	1	2	3	4	5	6	7	8	9	10
Overall Score	A	B	B	A	B	B	B	A	A	A
1.	A	B	C	A	B	C	B	B	A	A
1.1	A	A	B	A	B	A	C	B	A	A
1.1.1.	A	B	B	A	A	A	B	A	A	A
1.1.2.	A	A	A	A	A	A	B	A	A	A
1.1.3.	A	A	A	A	A	A	B	A	A	A
1.1.4.	A	C	C	A	C	B	E	E	B	A
1.1.5.	B	C	E	A	E	C	F	E	E	A
1.1.6.	D	A	A	B	B	A	E	A	A	A
1.1.7.	B	A	A	A	B	A	A	A	A	A
1.2	B	B	D	A	C	D	C	D	A	B
1.2.1.	A	A	A	A	A	A	A	A	A	A
1.2.2.	A	A	A	A	A	A	A	A	A	A
1.2.3.	A	E	E	A	E	E	F	E	E	E
1.2.4.	C	A	F	A	E	E	E	E	A	E
1.2.5.	C	C	F	A	E	E	C	D	A	B
1.3	B	D	D	D	B	E	A	D	B	A
1.3.1.	B	E	E	D	A	E	A	D	B	A
1.3.2.	B	B	C	C	A	D	A	D	A	A
1.3.3.	B	E	F	E	C	E	A	D	B	A
1.4	A	A	A	A	A	A	A	A	A	A
1.4.1.	A	A	A	A	A	A	A	A	A	A
1.4.2.	A	A	A	A	A	A	A	A	A	A
1.5	A	B	A	A	A	A	A	A	A	A
1.5.1.	A	C	B	A	A	A	A	A	A	A
1.5.2.	A	A	A	A	A	A	A	A	A	A
1.5.3.	A	A	A	A	A	A	A	A	A	A
2.	A	C	B	A	A	B	B	A	A	A
2.1	A	C	B	A	B	A	B	A	A	A
2.1.1.	B	C	B	A	B	A	A	A	A	A
2.1.2.	A	B	A	A	A	A	A	A	A	A
2.1.3.	A	C	B	A	B	C	A	A	A	A

2.1.4.	A	C	B	A	A	A	D	A	A	A
2.2	A	B	B	A	A	A	B	A	A	A
2.2.1	A	B	C	A	A	A	B	A	A	A
2.2.2	A	A	A	A	A	A	A	A	A	A
2.3	A	C	A	A	A	B	B	A	A	A
2.3.1.	A	C	A	A	A	B	B	A	A	A
2.3.2.	A	C	A	A	A	A	B	A	A	A
2.3.3.	A	C	B	A	A	C	C	A	A	A
2.4.	A	C	A	A	A	A	A	A	A	A
2.4.1	B	C	A	A	A	B	B	A	A	A
2.4.2	A	A	A	A	A	A	A	A	A	A
2.4.3	A	C	A	A	A	A	A	A	A	A
2.5	A	B	C	A	B	C	B	C	A	A
2.5.1.	A	B	C	A	C	C	A	C	A	A
2.5.2.	A	B	B	A	B	C	B	C	A	A
2.5.3.	A	B	C	A	B	C	B	C	A	A
3.	A	C	B	A	B	B	C	A	A	A
3.1.	A	B	B	A	A	A	C	A	A	A
3.1.1.	A	B	A	A	A	A	B	A	A	A
3.1.2.	A	B	A	A	A	A	C	A	A	A
3.1.3.	A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3.1.4.	A	B	C	A	A	A	C	A	A	A
3.2.	B	D	B	A	B	B	D	A	A	A
3.2.1.	A	C	B	A	B	B	D	A	A	A
3.2.2.	A	C	B	A	B	B	C	A	A	A
3.2.3.	C	E	C	A	B	B	E	A	A	A
3.3	A	C	B	A	B	B	C	A	A	A
3.3.1.	A	C	B	A	B	B	C	A	A	A
3.3.2.	B	C	B	A	B	B	C	A	A	A
4.	A	A	A	A	B	A	B	A	A	A
4.1	A	A	B	A		A	B	A	A	A
4.1.1	A	B	A	A	B	A	B	A	A	A
4.1.2	A	A	A	A	A	A	B	A	A	A
4.1.3	A	A	A	A	A	A	C	A	A	A
4.1.4	B	A	E	A	E	A	E	A	A	B
4.2	A	A	A	A	B	A	C		A	A
4.2.1.	A	A	A	A	B	A	B	A	A	A
4.2.2.	A	A	A	A	A	A	E	A	A	A
4.2.3.	A	A	A	A	B	A	B	A	A	A
4.3.	A	A	A	A	B	B	A	A	A	A
4.3.1.	A	A	A	A	B	B	A	A	A	A
4.3.2.	A	B	A	A	B	B	A	A	A	A
4.3.3.	A	A	A	A	A	A	A	A	A	A
4.4.	A	B	A	A	B	A	B	A	A	A
4.4.1.	A	B	A	A	B	A	B	A	A	A
4.4.2.	A	B	A	A	B	A	B	A	A	A

Appendix 4: Detailed results of 2010 and 2014 EIA quality review: overall score, review area and review category grades, and percentage of EIA reports in various grade groupings

	Grades for EIA Reports 1-16																Summary of Category Grades								2010			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	A	B	C	D	E	F	N/A	% C or better (A-C)	%A-B	%C-D	%E-F	
Overall Score	3	3	3	2	2	3	2	1	2	3	2	2	1	2	2	2	2	9	5	0	0	0	0	100	69	31	0	
1.	3	4	3	3	3	3	3	1	3	3	2	3	2	1	2	2	2	4	9	1	0	0	0	94	38	63	0	
1.1	3	4	2	3	3	3	3	1	1	3	1	1	1	1	2	1	7	2	6	1	0	0	0	94	56	44	0	
1.1.1.	3	2	2	2	1	3	1	1	1	5	1	1	1	1	1	1	10	3	2	0	1	0	0	94	81	13	6	
1.1.2.	2	4	2	1	3	4	1	1	1	4	1	1	1	1	2	1	9	3	1	3	0	0	0	81	75	25	0	
1.1.3.	3	4	1	1	3	3	1	1	1	3	3	1	1	1	3	1	9	0	6	1	0	0	0	94	56	44	0	
1.1.4.	4	5	3	3	3	3	3	1	3	3	2	1	3	1	3	3	3	1	10	1	1	0	0	88	25	69	6	
1.1.5.	5	5	3	3	5	3	3	3	6	3	2	2	3	1	3	3	1	2	9	0	3	1	0	75	19	56	25	
1.1.6.	1	1	4	4	1	1	6	1	1	3	1	3	1	1	1	1	11	0	2	2	0	1	0	81	69	25	6	
1.1.7.	1	1	1	3	1	1	3	1	1	3	1	1	1	1	1	1	13	0	3	0	0	0	0	100	81	19	0	
1.2	5	4	4	4	4	4	4	2	4	3	2	4	3	2	2	4	0	4	2	9	1	0	0	38	25	69	6	
1.2.1.	2	3	1	1	3	3	1	1	1	2	1	1	1	1	2	1	10	3	3	0	0	0	0	100	81	19	0	
1.2.2.	4	1	1	1	2	3	1	1	1	2	1	1	1	1	2	3	10	3	2	1	0	0	0	94	81	19	0	
1.2.3.	6	6	4	6	2	4	5	2	6	3	3	5	3	3	2	5	0	3	4	2	3	4	0	44	19	38	44	
1.2.4.	6	5	6	5	5	6	6	2	6	4	3	5	4	1	2	6	1	2	1	2	4	6	0	25	19	19	63	
1.2.5.	5	5	5	6	5	5	6	2	6	3	2	6	4	3	5	5	0	2	2	1	7	4	0	25	13	19	69	
1.3	6	3	3	5	3	4	4	1	4	5	3	5	3	1	3	5	2	0	6	3	4	1	0	50	13	56	31	
1.3.1.	6	3	3	6	3	4	5	1	5	5	4	5	3	1	3	5	2	0	5	2	5	2	0	44	13	44	44	
1.3.2.	5	3	3	4	3	3	3	1	3	5	3	5	3	1	3	4	2	0	9	2	3	0	0	69	13	69	19	
1.3.3.	6	3	4	4	3	4	3	1	4	5	3	5	4	1	4	5	2	0	4	6	3	1	0	38	13	63	25	
1.4	3	4	3	2	3	3	1	1	1	1	1	1	1	1	2	1	9	2	4	1	0	0	0	94	69	31	0	
1.4.1.	3	4	3	1	3	3	1	1	1	1	1	1	1	1	2	1	10	1	4	1	0	0	0	94	69	31	0	
1.4.2.	3	3	3	3	3	3	1	1	1	1	1	1	1	1	2	1	9	1	6	0	0	0	0	100	63	38	0	
1.5	3	3	4	2	3	3	1	1	3	2	1	1	1	1	2	3	6	3	6	1	0	0	0	94	56	44	0	
1.5.1.	3	3	3	2	3	3	1	1	4	3	2	1	1	1	2	5	5	3	6	1	1	0	0	88	50	44	6	
1.5.2.	3	3	4	2	3	3	1	1	3	1	1	1	1	1	2	1	8	2	5	1	0	0	0	94	63	38	0	
1.5.3.	3	2	4	2	3	2	1	1	3	1	1	1	1	1	2	1	8	4	3	1	0	0	0	94	75	25	0	
2.	4	3	3	3	3	3	1	2	2	3	1	2	1	2	3	3	3	4	8	1	0	0	0	94	44	56	0	
2.1	4	3	3	3	3	2	1	2	2	4	1	1	1	2	2	3	4	5	5	2	0	0	0	88	56	44	0	
2.1.1.	3	2	3	2	3	2	3	2	2	4	1	1	1	2	2	3	3	7	5	1	0	0	0	94	63	38	0	
2.1.2.	3	2	3	2	3	2	1	1	1	2	1	1	1	2	1	3	7	5	4	0	0	0	0	100	75	25	0	
2.1.3.	3	3	4	3	3	2	1	3	2	4	2	1	1	2	2	3	3	5	6	2	0	0	0	88	50	50	0	
2.1.4.	6	3	3	3	3	3	1	3	2	3	1	1	1	2	2	3	4	3	8	0	0	1	0	94	44	50	6	
2.2	4	3	3	3	3	3	1	3	1	3	1	1	1	2	3	3	5	1	9	1	0	0	0	94	38	63	0	
2.2.1	4	3	3	3	3	2	1	3	1	4	1	1	1	2	3	3	5	2	7	2	0	0	0	88	44	56	0	
2.2.2	3	3	3	3	3	3	1	3	1	3	1	1	1	2	3	3	5	1	10	0	0	0	0	100	38	63	0	
2.3	3	2	3	2	2	1	1	1	1	3	1	1	1	2	2	2	7	6	3	0	0	0	0	100	81	19	0	
2.3.1.	3	2	2	2	2	1	1	1	1	3	1	1	1	2	2	2	7	7	2	0	0	0	0	100	88	13	0	
2.3.2.	3	2	3	2	2	1	1	1	1	4	1	1	1	2	2	2	7	6	2	1	0	0	0	94	81	19	0	
2.3.3.	4	3	3	3	3	2	1	2	1	3	1	1	1	2	3	3	5	3	7	1	0	0	0	94	50	50	0	
2.4.	4	3	3	3	3	3	1	2	1	3	1	3	1	2	3	3	4	2	9	1	0	0	0	94	38	63	0	
2.4.1	4	3	3	3	3	3	1	3	1	4	2	3	1	2	3	3	3	2	9	2	0	0	0	88	31	69	0	
2.4.2	4	3	3	3	3	3	1	2	1	3	1	3	1	2	3	3	4	2	9	1	0	0	0	94	38	63	0	
2.4.3	5	3	3	3	3	3	1	2	1	3	1	3	1	2	3	3	4	2	9	0	1	0	0	94	38	56	6	
2.5	5	3	3	3	3	3	1	2	3	3	2	2	1	3	3	3	2	3	10	0	1	0	0	94	31	63	6	
2.5.1.	5	3	3	3	3	3	1	2	4	4	2	2	1	3	3	3	2	3	8	2	1	0	0	81	31	63	6	
2.5.2.	5	3	4	3	3	3	1	2	3	3	2	2	1	3	3	3	2	3	9	1	1	0	0	88	31	63	6	
2.5.3.	5	3	3	2	3	3	2	2	3	2	2	2	1	3	3	3	1	6	8	0	1	0	0	94	44	50	6	
3.	4	3	3</																									

	Grades for EIA Reports 1-10										Summary of Category Grades							2014			
	1	2	3	4	5	6	7	8	9	10	A	B	C	D	E	F	N/A	% C or better (A-C)	%A-B	%C-D	%E-F
Overall Score	1	2	2	1	2	2	2	1	1	1	5	5	0	0	0	0	0	100	100	0	0
1.	1	2	3	1	2	3	2	2	1	1	4	4	2	0	0	0	0	100	80	20	0
1.1	1	1	2	1	2	1	3	2	1	1	6	3	1	0	0	0	0	100	90	10	0
1.1.1.	1	2	2	1	1	1	2	1	1	1	7	3	0	0	0	0	0	100	100	0	0
1.1.2.	1	1	1	1	1	1	2	1	1	1	9	1	0	0	0	0	0	100	100	0	0
1.1.3.	1	1	1	1	1	1	2	1	1	1	9	1	0	0	0	0	0	100	100	0	0
1.1.4.	1	3	3	1	3	2	5	5	2	1	3	2	3	0	2	0	0	80	50	30	20
1.1.5.	2	3	5	1	5	3	6	5	5	1	2	1	2	0	4	1	0	50	30	20	50
1.1.6.	4	1	1	2	2	1	5	1	1	1	6	2	0	1	1	0	0	80	80	10	10
1.1.7.	2	1	1	1	2	1	1	1	1	1	8	2	0	0	0	0	0	100	100	0	0
1.2	2	2	4	1	3	4	3	4	1	2	2	3	2	3	0	0	0	70	50	50	0
1.2.1.	1	1	1	1	1	1	1	1	1	1	10	0	0	0	0	0	0	100	100	0	0
1.2.2.	1	1	1	1	1	1	1	1	1	1	10	0	0	0	0	0	0	100	100	0	0
1.2.3.	1	5	5	1	5	5	6	5	5	5	2	0	0	0	7	1	0	20	20	0	80
1.2.4.	3	1	6	1	5	5	5	5	1	5	3	0	1	0	5	1	0	40	30	10	60
1.2.5.	3	3	6	1	5	5	3	4	1	2	2	1	3	1	2	1	0	60	30	40	30
1.3	2	4	4	4	2	5	1	4	2	1	2	3	0	4	1	0	0	50	50	40	10
1.3.1.	2	5	5	4	1	5	1	4	2	1	3	2	0	2	3	0	0	50	50	20	30
1.3.2.	2	2	3	3	1	4	1	4	1	1	4	2	2	2	0	0	0	80	60	40	0
1.3.3.	2	5	6	5	3	5	1	4	2	1	2	2	1	1	3	1	0	50	40	20	40
1.4	1	1	1	1	1	1	1	1	1	1	10	0	0	0	0	0	0	100	100	0	0
1.4.1.	1	1	1	1	1	1	1	1	1	1	10	0	0	0	0	0	0	100	100	0	0
1.4.2.	1	1	1	1	1	1	1	1	1	1	10	0	0	0	0	0	0	100	100	0	0
1.5	1	2	1	1	1	1	1	1	1	1	9	1	0	0	0	0	0	100	100	0	0
1.5.1.	1	3	2	1	1	1	1	1	1	1	8	1	1	0	0	0	0	100	90	10	0
1.5.2.	1	1	1	1	1	1	1	1	1	1	10	0	0	0	0	0	0	100	100	0	0
1.5.3.	1	1	1	1	1	1	1	1	1	1	10	0	0	0	0	0	0	100	100	0	0
2.	1	3	2	1	1	2	2	1	1	1	6	3	1	0	0	0	0	100	90	10	0
2.1	1	3	2	1	2	1	2	1	1	1	6	3	1	0	0	0	0	100	90	10	0
2.1.1.	2	3	2	1	2	1	1	1	1	1	6	3	1	0	0	0	0	100	90	10	0
2.1.2.	1	2	1	1	1	1	1	1	1	1	9	1	0	0	0	0	0	100	100	0	0
2.1.3.	1	3	2	1	2	3	1	1	1	1	6	2	2	0	0	0	0	100	80	20	0
2.1.4.	1	3	2	1	1	1	4	1	1	1	7	1	1	1	0	0	0	90	80	20	0
2.2	1	2	2	1	1	1	2	1	1	1	7	3	0	0	0	0	0	100	100	0	0
2.2.1	1	2	3	1	1	1	2	1	1	1	7	2	1	0	0	0	0	100	90	10	0
2.2.2	1	1	1	1	1	1	1	1	1	1	10	0	0	0	0	0	0	100	100	0	0
2.3	1	3	1	1	1	2	2	1	1	1	7	2	1	0	0	0	0	100	90	10	0
2.3.1.	1	3	1	1	1	2	2	1	1	1	7	2	1	0	0	0	0	100	90	10	0
2.3.2.	1	3	1	1	1	1	2	1	1	1	8	1	1	0	0	0	0	100	90	10	0
2.3.3.	1	3	2	1	1	3	3	1	1	1	6	1	3	0	0	0	0	100	70	30	0
2.4.	1	3	1	1	1	1	1	1	1	1	9	0	1	0	0	0	0	100	90	10	0
2.4.1	2	3	1	1	1	2	2	1	1	1	6	3	1	0	0	0	0	100	90	10	0
2.4.2	1	1	1	1	1	1	1	1	1	1	10	0	0	0	0	0	0	100	100	0	0
2.4.3	1	3	1	1	1	1	1	1	1	1	9	0	1	0	0	0	0	100	90	10	0
2.5	1	2	3	1	2	3	2	3	1	1	4	3	3	0	0	0	0	100	70	30	0
2.5.1.	1	2	3	1	3	3	1	3	1	1	5	1	4	0	0	0	0	100	60	40	0
2.5.2.	1	2	2	1	2	3	2	3	1	1	4	4	2	0	0	0	0	100	80	20	0
2.5.3.	1	2	3	1	2	3	2	3	1	1	4	3	3	0	0	0	0	100	70	30	0
3.	1	3	2	1	2	2	3	1	1	1	5	3	2	0	0	0	0	100	80	20	0
3.1.	1	2	2	1	1	1	3	1	1	1	7	2	1	0	0	0	0	100	90	10	0
3.1.1.	1	2	1	1	1	1	2	1	1	1	8	2	0	0	0	0	0	100	100	0	0
3.1.2.	1	2	1	1	1	1	3	1	1	1	8	1	1	0	0	0	0	100	90	10	0
3.1.3.	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	9	10	0	0	
3.1.4.	1	2	3	1	1	1	3	1	1	1	7	1	2	0	0	0	0	100	80	20	0
3.2.	2	4	2	1	2	2	4	1	1	1	4	4	0	2	0	0	0	80	80	20	0
3.2.1.	1	3	2	1	2	2	4	1	1	1	5	3	1	1	0	0	0	90	80	20	0
3.2.2.	1	3	2	1	2	2	3	1	1	1	5	3	2	0	0	0	0	100	80	20	0
3.2.3.	3	5	3	1	2	2	5	1	1	1	4	2	2	0	2	0	0	80	60	20	20
3.3	1	3	2	1	2	2	3	1	1	1	5	3	2	0	0	0	0	100	80	20	0
3.3.1.	1	3	2	1	2	2	3	1	1	1	5	3	2	0	0	0	0	100	80	20	0
3.3.2.	2	3	2	1	2	2	3	1	1	1	4	4	2	0	0	0	0	100	80	20	0
4.	1	1	1	1	2	1	2	1	1	1	8	2	0	0	0	0	0	100	100	0	0
4.1	1	1	2	1	2	1	2	1	1	1	7	3	0	0							

Appendix 5: Detailed comparison of 2010 and 2014 EIA review results and percentage of EIA reports in various grade groupings

		2010				2014			
Summary of all review categories		% C or better (A-C)	%A-B	%C-D	%E-F	% C or better (A-C)	%A-B	%C-D	%E-F
Overall Score		100	69	31	0	100	100	0	0
1.	Description of development, local environment & baseline conditions	94	38	63	0	100	80	20	0
1.1	Description of the development	94	56	44	0	100	90	10	0
1.1.1.	Purpose and objectives	94	81	13	6	100	100	0	0
1.1.2.	Design and size	81	75	25	0	100	100	0	0
1.1.3.	Presence/appearance of completed development	94	56	44	0	100	100	0	0
1.1.4.	Nature of the production processes	88	25	69	6	80	50	30	20
1.1.5.	Nature and quantities of raw materials	75	19	56	25	50	30	20	50
1.1.6.	Identification of applicant	81	69	25	6	80	80	10	10
1.1.7.	Details of EAP to carry out assessment	100	81	19	0	100	100	0	0
1.2	Site description	38	25	69	6	70	50	50	0
1.2.1.	Area of development site	100	81	19	0	100	100	0	0
1.2.2.	Demarcation of land use areas	94	81	19	0	100	100	0	0
1.2.3.	Duration of the different phases	44	19	38	44	20	20	0	80
1.2.4.	Estimated number of workers and/or visitors	25	19	19	63	40	30	10	60
1.2.5.	Means of transporting raw materials / products and quantities	25	13	19	69	60	30	40	30
1.3	Wastes	50	13	56	31	50	50	40	10
1.3.1.	Types and quantities of wastes	44	13	44	44	50	50	20	30
1.3.2.	Treatment, disposal and disposal routes	69	13	69	19	80	60	40	0
1.3.3.	Methods of obtaining quantity of wastes	38	13	63	25	50	40	20	40
1.4	Environment description	94	69	31	0	100	100	0	0
1.4.1.	Area to be affected by development	94	69	31	0	100	100	0	0
1.4.2.	Effects occurring away from immediate affected environment	100	63	38	0	100	100	0	0
1.5	Baseline conditions	94	56	44	0	100	100	0	0
1.5.1.	Important components of the affected environment	88	50	44	6	100	90	10	0
1.5.2.	Existing data sources	94	63	38	0	100	100	0	0
1.5.3.	Local land use plans, policies consulted / other data collected	94	75	25	0	100	100	0	0
2.	Identification and evaluation of key impacts	94	44	56	0	100	90	10	0
2.1	Definition of impacts	88	56	44	0	100	90	10	0
2.1.1.	All possible effects on environment	94	63	38	0	100	90	10	0
2.1.2.	Interaction of effects	100	75	25	0	100	100	0	0
2.1.3.	Impacts from non-standard operating conditions	88	50	50	0	100	80	20	0
2.1.4.	Impacts from deviation from baseline conditions	94	44	50	6	90	80	20	0
2.2	Identification of impacts	94	38	63	0	100	100	0	0
2.2.1.	Impact identification methodology	88	44	56	0	100	90	10	0
2.2.2.	Impact identification methods used	100	38	63	0	100	100	0	0
2.3	Scoping	100	81	19	0	100	90	10	0
2.3.1.	Contact general public & special interest groups	100	88	13	0	100	90	10	0
2.3.2.	Collect opinions and concerns of I&APs	94	81	19	0	100	90	10	0

2.3.3.	Key impacts selected for more intense investigation.	94	50	50	0	100	70	30	0
2.4.	Prediction of impact magnitude	94	38	63	0	100	90	10	0
2.4.1	Data to estimate magnitude of the main impacts	88	31	69	0	100	90	10	0
2.4.2	Methods used to predict impact magnitude	94	38	63	0	100	100	0	0
2.4.3	Predictions of impacts in measurable quantities	94	38	56	6	100	90	10	0
2.5	Assessment of impact significance	94	31	63	6	100	70	30	0
2.5.1.	Significance of impacts on affected community & society in general	81	31	63	6	100	60	40	0
2.5.2.	Significance of impact in terms of national and international quality standards	88	31	63	6	100	80	20	0
2.5.3.	Justification of proposed method of assessing significance	94	44	50	6	100	70	30	0
3.	Alternatives and mitigation	94	56	44	0	100	80	20	0
3.1.	Alternatives	88	63	31	6	100	90	10	0
3.1.1.	Description of alternative sites	94	69	31	0	100	100	0	0
3.1.2.	Description of alternative processes, designs and operating conditions	88	63	31	6	100	90	10	0
3.1.3.	For severe adverse impacts rejected alternatives identified	25	19	6	0	10	10	0	0
3.1.4.	Comparative assessment of all alternatives identified	81	44	44	6	100	80	20	0
3.2.	Scope and effectiveness of mitigation measures	88	50	50	0	80	80	20	0
3.2.1.	Consider mitigation of all significant adverse impacts	88	56	44	0	90	80	20	0
3.2.2.	Mitigation measures	94	44	56	0	100	80	20	0
3.2.3.	Extent of effectiveness of mitigation when implemented.	75	31	63	6	80	60	20	20
3.3	Commitment to mitigation	94	44	56	0	100	80	20	0
3.3.1.	Record of commitment to mitigation measures	94	38	63	0	100	80	20	0
3.3.2.	Monitoring arrangements	94	44	56	0	100	80	20	0
4.	Communication of results	88	69	31	0	100	100	0	0
4.1	Layout of the report	88	56	44	0	100	100	0	0
4.1.1	Introduction	88	75	25	0	100	100	0	0
4.1.2	Information logically arranged	100	69	31	0	100	100	0	0
4.1.3	Chapters summaries for very long chapters	88	69	25	6	100	90	10	0
4.1.4	External sources acknowledged	44	25	31	44	70	70	0	30
4.2	Presentation	88	63	38	0	100	90	10	0
4.2.1.	Presentation of information	100	56	44	0	100	100	0	0
4.2.2.	Technical terms, acronyms and initials defined	81	56	31	13	90	90	0	10
4.2.3.	EIA report presented as an integrated whole.	88	69	31	0	100	100	0	0
4.3.	Emphasis	100	63	38	0	100	100	0	0
4.3.1.	Emphasis to potentially severe impacts.	100	69	31	0	100	100	0	0
4.3.2.	The statement must be unbiased.	100	56	44	0	100	100	0	0
4.3.3.	Opinion as to whether the activity should/should not be authorized.	100	81	19	0	100	100	0	0
4.4.	Non-technical summary	88	75	19	6	100	100	0	0
4.4.1.	Non-technical summary of the main findings & conclusion	88	81	13	6	100	100	0	0
4.4.2.	Summary must cover all main issues	88	75	19	6	100	100	0	0