Towards sustainability follow-up - The Port of Ngqura Evaluation

Y Robbetze

20700989

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Supervisors: Prof FP Retief

Co-supervisor: Prof A Morrison-Saunders

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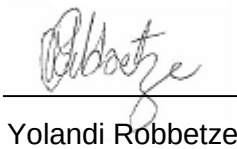
PREFACE

Declaration

I, Yolandi Robbetze, hereby declare that the work contained in this mini-dissertation is my own original work and that I have not submitted it previously in its entity or in part to any other university.



Yolandi Robbetze

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ABSTRACT

Sustainability assessment has become more prominent in recent years, in the wake of the general requirement to introduce sustainability thinking into environmental assessment (EA). Although sustainability assessment practice has expanded globally, there has been very little follow-up research on the outcomes of sustainability assessment. The aim of this research is therefore, to conduct sustainability assessment follow-up through the application of the eight sustainability assessment principles described by Gibson (2006). This was achieved by evaluating a particular EIA case study in the South African context, namely the EIA for the development of the Port of Ngqura. An evaluation matrix was developed based on the fundamentals of the eight sustainability assessment principles. The results suggest that sustainability thinking was reflected in the EIA and that six of the eight principles were addressed to some extent however, two of the principles were unacceptable. The best performing principles related to '1. socio-ecological system integrity', '6. socio-ecological civility and democratic governance' and '7. precaution and adaptation'. The weakest results related to 'resource maintenance and efficiency', '2. livelihood sufficiency and opportunity' as well as '8. immediate and long-term integration'. This research succeeded in taking the first steps towards advancing sustainability assessment follow-up, especially within the South African context. The results suggest the following main contributions to knowledge in relation to the main research aim*:* 1. The research results seem to support those who have suggested that Environmental Assessments in South Africa is, due to our broad definition of the environment, similar to what is internationally understood to be sustainability assessment; 2. There seems to be a clear focus on the social impacts and implications of the particular development, with provided support to the notion that the brown agenda is, as least in the South African context, central to EIA; and 3. The research results suggest that longer term thinking and dealing with the uncertainties it raises remains a constant challenge for EIA. The research concludes by making recommendations for future research.

Keywords: Sustainability assessment, follow-ups, sustainability assessment principles, post-approval phase, sustainability assessment follow-up, evaluation matrix.

OPSOMMING

Volhoubaarheid assesseering het meer prominent geword in die afgelope jaar, as gevolg van die algemene vereiste om volhoubaarheid denke in die omgewing assessering (OA) bekend te stel. Hoewel volhoubaarheid assesseringspraktyk wêreldwyd uitgebrei het, is daar nog baie min opvolg navorsing oor die uitkomste van volhoubaarheids-assessering gedoen. Die doel van hierdie navorsing is om ‘n volhoubaarheid-assessering opvolg te doen deur middel van die toepassing van die agt volhoubaarheid-assessering-beginsels soos beskryf deur Gibson (2006). Dit is bereik deur die evaluering van 'n bepaalde Omgewings Impak Assesseering (OIA) gevallestudie in die Suid-Afrikaanse konteks, naamlik die OIA vir die ontwikkeling van die hawe van Ngqura. 'n Evaluering matriks is ontwikkel wat gebaseer is op die beginsels van die agt volhoubaarheid-assessering-beginsels. Die resultate dui daarop dat volhoubaarheid denke weerspieël in die OIA en dat ses van die beginsels aangespreek was tot 'n mate. Die beste presterende beginsels wat verband hou met die ‘1. sosio-ekologiese stelsel integriteit’, ‘6. sosio-ekologiese beleefdheid en demokratiese staatsbestuur’ en ‘7. voorsorgmaatreël en aanpassing’. Die swakste resultate is in verband van die ‘2. hulpbron onderhoud en doeltreffendheid’, ‘ 8. lewensbestaan genoegsaamheid en die geleentheid’ sowel as die ‘onmiddellike en lang termyn integrasie’. Die navorsing sluit deur aanbevelings te maak vir toekomstige navorsing.

Sleutelwoorde: Volhoubaarheid assessering, vervolg, volhoubaarheid assessering beginsels, post-goedkeuring fase volhoubaarheid assessering follow-up, evaluering matriks.

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Acronyms/Abbreviations

CEMP	Construction Environmental Management Plan
EA	Environmental Approval
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMC	Environmental Monitoring Committee
EMP	Environmental Management Programme
ERM	Enterprise Risk Management
I&APs	Interested and Affected Parties
IDZ	Industrial Development Zone
NEMA	National Environmental Management Act, 107 of 1998
NEC 3 - ECC	New Engineering Contract 3 - Engineering and Construction Contract
PES	Project Environmental Specification
RoD	Record of Decision
SEA	Strategic Environmental Assessment
SOC	State Owned Company
TCP	Transnet Capital Projects
TEU's	Twenty-foot equivalent units
TNPA	Transnet National Port Authority
TCP	Transnet Capital Projects
TPT	Transnet Port Terminal

Definitions

Socio-ecological:	Deals with the interaction among the members of a species, and between them and the environment (Oxford Dictionary. 2014).
Sustainability:	Sustainability means the on-going function of an ecosystem or use of a resource (Borrow, 2006:29).
Sustainability Assessment Process:	Explicitly incorporating a clear articulation of the concept of sustainability; at the minimum including environmental, social and economic dimensions (Morrison-Saunders *et al.* 2014).

CHAPTER 1
INTRODUCTION

1.1 Background and Research Context

Sustainability, sustainability assessment and follow-up are concepts that have been recognised and being used more regularly worldwide (Bond *et al.* 2012; Gibson. 2006:170). According to Barrow (2006:29) in the Western world prior to the 1950's the view was that nature and the environment should be used to the advantage of the human race. Barrow (2006:29) states "… nature was to be studied, catalogued, tamed and exploited. The frontier was still 'open', with land to settle and relatively few signs of environmental stress, other than localised pollution and some loss of biodiversity". Between 1930 and 1960, people's perspectives were that nature was to be exploited. After 1960 people became aware of environmental issues and their outlook on exploiting the environment faltered. People realised that they had no clear understanding of the difficulties, weaknesses and confines of the earth's ecosystems (Barrow, 2006:29).

Gibson (2006a:171) states that today the pursuit of sustainability has changed. In a world where there are constant changes with immediate pressures, specialised knowledge, and strict obligations, the shift towards sustainability has changed and is now driven by the demand for improvement instead of preserved traditions. The idea of this research originated from international literature on sustainability assessment follow-up. To date sustainability assessment follow-up have only been conceptualised, hence the study approach was mainly derived from literature published by Pope *et al.* (2004), Morrison-Saunders *et al. (*2014), Gibson *et al.* (2005) and Gibson *et al.* (2006).

1.2 Sustainability assessment approach within impact assessment

According to Gibson (2006a:171) the present concept of sustainability is a reaction to significant concerns regarding the negative unintentional social, environmental and economic impacts associated with rapid population, economic growth and consumption of natural resources, providing proof that existing conditions and trends are not feasible in the long run (icsi, 2013). Gibson (206a:171) states " … as a result, current sustainability efforts are not merely integrative and forward looking, they are also attempts to push us onto a different and more hopeful path".

The challenges in the way traditional impact assessment has been perceived, is mainly due to the constant evolution in awareness of sustainability and sustainable development over the

last twenty years. This led to the development of 'sustainability assessment' procedures, which could add to the move towards a more sustainable society (Pope *et al*., 2004:596).

The idea that an EIA itself adds to sustainability, supports the view that '' … environmental impacts are at the centre of sustainability concerns'' and that '' … incorporating the environment into strategic decision-making is a key required for moving towards sustainable development'' (Sadler, 1999, cited by Pope *et al.,* 2004:598-599; & Sheate *et al.*, 2001, p. 5). Through the literature review, it became evident that sustainability assessment has been incorporated into some assessment tools and techniques through the inclusion of various aspects of the three pillars of sustainable development into the assessment process (Bebbington *et al.,* 2007, cited by Bond *et al.,* 2012:55).

This is consistent with the three dimensions of the triple bottom line that, divide sustainability into three pillars – ecological, social and economic – with efforts to define more specific needs in each category. The three pillar areas are recognised to be interconnected and they underline the need to find a balance between the three pillars (Pope *et al.,* 2004:598-599; Gibson, 2006b:16). However, merely considering the three pillars of sustainable development is inappropriate as it encourages trade-offs between the pillars (Bond *et al.,* 2012:55). In 2004, Pope *et al.* published an article that reflected on the different approaches of sustainability assessment.

The theory of sustainability assessment, as conveyed in the 2004 literature, has grown primarily from work undertaken by EIA practitioners and in strategic environmental assessments (SEA) (Sheate *et al.,* 2001 & 2003, cited by Pope *et al.,* 2004:597). Environmental assessment sets out a step-by-step process for identifying case-specific purposes and alternatives, describing the relevant environment, determining what is most important in the context, predicting the effect of particular options on particular environments, and also other aspects (Farrel *et al.,* 2001: Lawrence, 2003).

Due to the limitations in other types of assessments, there has been a call for the development of 'sustainability assessment' procedures that would ultimately enable a more sustainable society. Sadler (1999 cited by Bond *et al.*, 2012) referred to sustainability assessment as the third generation of impact assessment following on environmental impact assessment (EIA) and strategic environmental assessment (SEA). This is a new and evolving concept. As a response to challenges posed by research on sustainability assessments (see Bond & Morrison-Saunders. 2011; Gibson. 2006b; Morrison-Saunders & Pope. 2013; Pope *et al*., 2004; Sala *et al.* 2015), sustainability assessment initiatives are spreading rapidly in many

parts of the world e.g. Hong, Kong, Canada, South Africa, Namibia and the United Kingdom in different forms and under numerous titles (Gibson, 2006a:170; Pope *et al*., 2004:596).

1.3 Approach to sustainability assessment

Research on sustainability has found to be challenging due to the elusiveness of a globally agreed definition of sustainability. Most articles, research papers or books on sustainability concluded that the concept is broad and lacks consensus (Bell & Morse, 2008:10; HEC Global Learning Centre, 2009; Hacking & Guthrie, 2008:73; Thwink.org, 2014). An internet search on the definition of sustainability provides over a million sites. Gibson *et al.* (2005:63) says sustainability cannot be defined as a single set of characteristics and requirements. Therefore Gibson *et al.* (2005:63) states " … in defining and applying the sustainability concept, the core basics are necessary but insufficient. Specification in context is also needed". The concept of sustainability, as described by Gibson *et al.* (2005:63), is a challenge to conventional thinking about the long- as well as short-term wellbeing. It covers all of the comprehensive issues of decision-making while recognising the interdependencies between humans and the biophysical. The precautionary approach is necessary when considering the limitations and opportunities for creative improvements. Sustainability is about an open-ended process and not a single destination; it is about interdependent means and ends, both on an international and context specific scale (Gibson *et al.* 2005:63).

Morrison-Saunders *et al.* (2014) defines the sustainability assessment process as the "explicitly *incorporating a clear articulation of the concept of sustainability, at the minimum including environmental, social and economic dimensions*". Sustainability assessment should seek to make positive overall contributions, to achieve multiple gains, and to minimise regrettable losses. Sustainability assessment should address the full suite of sustainability criteria while applying the basic trade-off rules with due sensitivity to their particular circumstances (Gibson *et al.* 2006a:176). Gibson *et al.* (2006a:172) further state that the reduction of negative effects is not adequate: the purpose of a sustainability assessment should inspire positive steps towards better community and ecological sustainability; to a future that is more feasible, pleasant and secure.

According to Gibson (2005:149) the purposes of sustainability assessment are to:

- improve decision making on all activities that may, individually or in combination, have a substantial effect on progress towards sustainability;
- ensure broad and joined attention to all factors affecting long-term as well as immediate desirability and durability;

- provide the core framework (the main structure, criteria and process) for discussions and decisions on important activities (in contrast to environmental assessment's usual role as one among many contributions to a broader decision making process);
- promote overall stability and productivity in decision making from policy and programme design to post-approval project implementation monitoring (through application of a common set of fundamental requirements), while also supporting flexibility and decentralisation by respecting insecurities and context, working with the relevant stakeholders, and adjusting to different ecosystems and communities, new understandings and developing challenges and opportunities;
- promote efficient public engagement in the outset, planning, approval and implementation of activities that can have an extensive effect on progress towards sustainability; and
- foster and enable creative improvement as well as change to more sustainable practices.

In assessing sustainability, the "end/final outcome" needs to be assessed to determine whether the measures implemented during the start and the middle (planning and execution) of a project has contributed to sustainability. By doing this, it can determine whether sustainability have truly been achieved. However, the tools that are required to assess the goals of sustainability need to be reliable and effective; the practice of assessing sustainability has however posed important challenges. Sustainability assessment has become a fast emerging area of research as a response to these challenges (Ness *et al*., 2007:498-499).

According to Gibson (2006b:3-4) sustainability assessments have been carried out in many ways under different circumstances. Any attempt to set out a list for sustainability assessments would be debated, and Gibson *et al.* (2005) state that "there will always be openings for learning and revision, however, after years of deliberation and experimentation, it is not difficult to discern a limited number of common themes and broadly acceptable general positions". Eight common characteristics of serious attempts to conduct a sustainability assessment can be summarised as the core requirements, all of which would have to be elaborated on and specified for particular places and applications. Gibson *et al.'s* (2005) list for sustainability assessment is based on a combination of arguments drawn from the sustainability literature and practical experience. Gibson *et al.'s* (2005) eight principles for growth towards sustainability are:

1. Socio-ecological system integrity (Gibson *et al.*, 2005; Gibson. 2006b:20-23)

build on the socio-ecological connection between people and the biophysical system while maintaining the durability of the biophysical systems and preserving the unique life-support functions on which human as well as ecological welfare depends.

2. Livelihood sufficiency and opportunity guarantee that individuals and communities have enough without compromising the need for future generations, and that both the current and future generation has the opportunity to pursue improvement and opportunities.
3. Intergenerational equity ensures that choices and decisions relating to behaviour are made to reduce dangerous gaps in adequacy and opportunity between the rich and the poor.
4. Intergenerational equity supports existing options and actions; that it will positively contribute to future generations.
5. Resource maintenance and efficiency provides a wider foundation for guaranteeing sustainable income while reducing pressures on the socio-ecological systems in the end.
6. Socio-ecological civility and democratic governance build the capacity, motivation and characteristic to provide decision makers, communities and individuals with the necessary information to apply the sustainability principles.
7. Precaution and adaptation: Gibson *et al.* (2005:112) advise to "respect uncertainty, avoid even poorly understood risks of serious or irreversible damage to the foundations for sustainability, plan to learn, design for surprise and manage for adaption".
8. Immediate and long-term integration: Apply all principles of sustainability at once; look for common helpful benefits and various gains.

The fundamental purpose of sustainability-based assessment is to deliver a positive outcome as the ultimate goal. This is normally done through equally supported benefits and prevention of significant negative impacts. On a case-by-case basis, this can raise the question of what each individual/community regards as a positive outcome or significant negative impact (Gibson. 2006b:20). The current focus of sustainability assessments is in the pre-approval decision phase of new development proposals, and on how sustainability concepts and principles are addressed in the development and assessment of these proposals (Morrison-Saunders *et al.,* 2014:38).

1.4 Follow-up

According to Arts *et al.* (2001:176) 'the term "follow-up" has been in use for a long time". Follow-up has generally been used as a term to describe various post-approval EIA activities, e.g. monitoring, auditing, post-decision analysis, and post-decision management. Arts *et al.*

(2001) states that there is no single definition for follow-up; it generally relates to activities in the post-decision phase of a project (Arts *et al.*, 2001). The same features that characterise EIA follow-up can be applied to sustainability assessment follow-up (Morrison-Saunders. *et al.* 2014:43).

According to Arts *et al.* (2001:177) EIA follow-up comprises of four key activities:

- "Monitoring: the collection of data and comparison with standards, predictions or expectations";
- "Evaluation: the appraisal of the conformance with standards, predictions or expectations as well as the environmental performance of the activity";
- "Management: making decisions and taking appropriate action in response to issues arising from monitoring and evaluation activities"; and
- "Communication: informing the stakeholders as well as the general public about the results of EIA follow-up".

According to Morrison-Saunders *et al.* (2003:44) the purpose of follow-up includes:

- better project management (control);
- feedback on the processes (learn); and
- communicating environmental performance (inform).

1.5 Conceptualising sustainability assessment follow-up

Morrison-Saunders *et al. (*2014:38) state that the emphasis in literature, to date, on sustainability assessment was on the pre-approval decision phases of new development proposals and specifically how sustainability concepts and principles are reflected in the development and assessment of these proposals. The literature cited to this point further support the latter statement, as Pope *et al.* (2004:607) state that sustainability assessment could be conducted in a reactive sense as an alternative to conventional EIA or SEA. In this notion, it would be applied at the conclusion of decision-making, perhaps by regulators to determine whether a proposal is sustainable. In another notion, it could be applied proactively during the decision-making process to assess the sustainability of the various options proposed to meet a series of sustainability criteria (Pope *et al.,* 2004:607).

In 2004 Pope *et al.* published a paper on *Conceptualising sustainability assessment.* In this paper Pope *et al.* (2004) identifying three models for sustainability assessment. Morrison-Saunders *et al.* (2014) drew on Pope *et al.* (2004) paper and publishing their paper on *Towards Impact Assessment Follow-up for Sustainability,* focusing on the post-approval stages and

considered how the sustainability outcomes of implemented proposals might be monitored and managed.

In their 2014 paper, Morrison-Saunders *et al. (*2014:38) considered how the basic principles of impact assessment follow-up could be applied to sustainability assessment follow-up and conceptualised what can be called sustainability assessment follow-up. Morrison-Saunders *et al. (*2014:38) define the term 'sustainability assessment follow-up' as the consideration of how the sustainability outcomes of implemented proposals might be monitored and managed during the post-approval stage. Morrison-Saunders *et al. (*2014:38) base their follow-up concept on the three models of sustainability assessment. However, this research is based on the eight sustainability assessment principles as described by Gibson *et al.* (2005) and outlined in section 1.3 above.

1.6 Sustainable development and EIA in South Africa

Internationally there is an increasing request for EIA's to shift from its normal focus on the biophysical environment towards delivering more sustainable outcomes. For example, South Africa is a country where the EIA system appears to have incorporated the idea of sustainability (Morrison-Saunders & Retief, 2013:36). The status that the term 'sustainability' has gained in international debate is largely due to its use in the Brundtland Commission's report, *Our Common Future,* which linked the term to development (Becker, 1997:1). Principles for sustainability in various forms have also been incorporated into the South African legislation, such as Section 24 of the Constitution of the Republic of South Africa (No. 108 of 1996), and in many acts of parliament for specific governance functions, for example the National Environmental Management Act 107 of 1998, Chapter 2: Principles (Morrison-Saunders and Retief, 2012:34-35). Section 24 states:

"Everyone has the right -

(a) to an environment that is not harmful to their health or well-being; and

(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -

(i) prevent pollution and ecological degradation;

(ii) promote conservation; and

(iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development".

The contribution of this research is to move away from conceptual thinking and to contribute to learning from the practical implementation of sustainability assessment follow-up. The

undertaking of sustainability assessment follow-up in South Africa could potentially aid the country in truly supporting section 24 of the Constitution (1996).

1.7 Port of Ngqura

All commercial ports in South Africa form part of an integrated national harbour system under the custodianship of the Transnet National Ports Authority. Transnet National Ports Authority is one of several Transnet Business Units in the state owned enterprise, Transnet SOC Ltd. Transnet is both an operating and controlling freight transport company responsible for ensuring that the country's transport industries operate according to world-class standards and form an integral part of the national economy (Transnet, 2007:2). The Port of Ngqura is one of three deep-water ports in South Africa and is situated next to the Coega Industrial Development Zone (IDZ) in Algoa Bay in the Eastern Cape Province. The port is just over 20km from Port Elizabeth (Manaadiar, 2013). The port was South Africa's first new port constructed in over 25 years. Transnet aimed with the construction of the port to create an excellent trans-shipment hub with world-class equipment that would support the port to operate to the highest international standards (Tholet, 2012:32). At that time Transnet invested over R10 billion (USD 1.3 billion) to develop the port which was a green fields project, that took approximately 12 years to be constructed (Transnet, 2012). Even though planning and design already started in 1996, construction of the Port only commenced in 2002. Figure 1 shows an aerial view of the Port of Ngqura (GPH, 2007:i).

Figure 1: Port of Ngqura (Google Earth)

1.7.1 Environmental Authorisation for the Port of Ngqura

The EIA for the development of the deep-water port at the mouth of the Coega River commenced in 2000. The Minister of Environmental Affairs and Tourism at the time granted the Record of Decision (RoD) in terms of Section 21 of the Environmental Conservation Act, 73 of 1989 in May 2002.

Subsequent to the 2002 RoD, a second RoD was granted for the construction of a railway line and the port control building in September 2004. The extension of the existing quay wall at the container terminal and the construction of an administration craft basin (CSIR, 2007) were authorised in 2007. There are currently more than 200 conditions of compliance imposed on Transnet by the aforementioned Authorisations, which place a number of regulatory constraints on both construction and operational activities (De Klerk. 2014).

1.7.2 Port of Ngqura in Operation

President Jacob Zuma officially opened/launched the Port of Ngqura in 2012. However, formal operation of the harbour commenced in October 2009 when the first commercial vessel

offloaded its cargo at the Port of Ngqura (TNPA, 2013). To learn more on the Port of Ngqura please visit:

- www.transnet.net
- http://www.transnetnationalportsauthority.net/OurPorts/Ngqura/Pages/Overview.aspx
- http://ports.co.za/coega.php

1.8 Problem Statement

Over the last two decades the commitment to sustainability, internationally and in South Africa, has increased with some of the commitments included in legislation, e.g. the National Environmental Management Principles in the National Environmental Management Act, 107 of 1998, of South Africa (Gibson *et al.,* 2005:12; Retief, 2013:186). Ness *et al.* (2007:498) state that*,* for the move towards sustainability, a clear understanding of the broader objective of integration between environmental, social and economic is required. Provision of effective and reliable sustainability assessment tools has created challenges for the scientific community. Research on sustainability assessment has become a fast developing area as a response to these challenges. The countless number of tools available currently for assessing sustainability has increased. At the same time many of the tools have been refined, providing more dynamic application guidelines, information and case study practices.

Most of these tools are assessment tools; therefore the tools are mainly used in the pre-approval phase of new development proposals. The tools focus on how sustainability theories and principles can be incorporated into the development and assessment of these proposals (Morrison-Saunders *et al.,* 2014:38). International practice shows that sustainability assessment has been carried out in countless ways in different circumstances. Initial examples of sustainability assessment are found in England, Western Australia and Canada (Bond *et al*., 2013:26; Gibson *et al.,* 2005). Gibson (2005) states that any attempt to standardise sustainability assessments would lead to a disagreement. Gibson *et al.* (2005) however summarised the notable commonalities found in various attempts to conduct sustainability assessments and through this, developed eight principles for sustainability assessment. Retief (2013:184) however states that, although in the South African context, the terminology of 'sustainability assessment', as such, does not exist, tools such as EIA and SEA have because of the broad definition of the 'environment' been utilised to promote more sustainable outcomes (Ness *et al.,* 2007:499). However, the extent to which it is being achieved is uncertain.

1.9 Research aim

In view of the problem statement the aim of this research is to conduct an sustainability assessment follow-up through the application of the eight sustainability assessment principles described by Gibson *et al.* (2005). This will be done by evaluating a particular case study in the South African context.

1.10 Outline of Mini-dissertation

This mini-dissertation is structured along six chapters comprising the following:

Chapter 1: Introduction and Background to the research – this chapter introduces the context of this research, problem statement, and the aim of the research. It provides relevant information and outlines existing knowledge background on previous research relating to sustainability assessments and follow-up.

Chapter 2: **Research Methodology** – this chapter describes the methods applied to select a case study, developing the sustainability assessment follow-up evaluation criteria, describes how the evaluation was conducted, and highlights limitations to the research.

Chapter 3: Presentation of results – the case study is evaluated against each of the eight sustainability assessment principles and the results of the evaluation are discussed and presented in this chapter.

Chapter 4: Conclusion and Recommendations – this chapter provides recommendations for further research on this topic and conclude the research by addressing the research aim.

1.11 Conclusion

It seems that the theory is quite clear; however, the practice is still rather vague and therefore, besides the literature study, the main methodology for this research included the development of an evaluation matrix with the focus placed on the eight principles of sustainability assessment (Arts *et al.,* 2001:176; Jikijela, 2013:4). This evaluation matrix will be applied to the case study to conduct sustainability assessment follow-up.

CHAPTER 2
RESEARCH METHODOLOGY

This chapter describes the methodology followed to address the research aim.

2.1 Pragmatic approach to research

A pragmatic approach to research involves the use of the best suited method answer the research problem. The AE (2009) states that "*Pragmatic researchers therefore grant themselves the freedom to use any of the methods, techniques and procedures typically associated with quantitative or qualitative research*".

A pragmatic approach to research can use various techniques simultaneously or consecutively e.g. the researcher might start with interviews and then use the findings to create a questionnaire (AE. 2009).

2.2 Evaluation Research

Trochim (2006) states that "the generic goal of most evaluations is 'to provide useful feedback' to a variety of audiences". Evaluation research enables special techniques unique to the evaluation of case-specific information; in this case the evaluation of the eight sustainability assessment principles against a case study. It is, however, important to note that there is no one-size-fits-all process for evaluation research. Each evaluation criterion needs to be tailored to the purpose for which the evaluation will be used (Patton, 1990).

When developing evaluation criteria it is important to consider all the steps required during evaluation research, namely

- planning (how to create the evaluation criteria and what to include);
- conducting an evaluation study (using the criteria against a case study); and
- the measurement process (this will be used to determine to what extent each of the eight principles have been addressed) (Trochim, 2006).

2.2.1 Development of the evaluation criteria

When developing an evaluation criterion, it involves four main steps:

1) Clearly articulate the purpose;
2) Who to involve;
3) Identify key evaluation questions; and
4) Identify data sources and information gathering methods.

Although the steps are chronological, they are also interlinked (Trochim, 2006)0.

2.3 Case study research

According to Soy (2006) case study research excels at bringing us to an understanding of a difficult issue or object and can broaden experience or add strength to what is already known through previous research. Yin (1984:23) defines the case study research method as “an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used”.

In the research a single case study was used to consider to what extent, each of the eight principles of sustainability assessment have been incorporated and addressed to close the gap between conceptual research and practical implementation of the research. However, single case study exploration have advantages and limitations. Some of the advantages and limitations include:

- Advantages:
  - Capturing reality – moving from a conceptual idea to actual implementation;
  - A single case study can be studied in depth, through observation which can be supported by interviews;
  - Selecting a single case study can contribute to a specific research question and purpose;
- Limitations:
  - the concern of interconnected issues of practical objectivity, researcher subjectivity, and external validity;
  - the researcher might be bias;
  - issues of concept validity, the reliability and replicability of various forms of single case study analysis; and
  - the most important issue relates to external validity or generalization (Hsieh;. Willis. 2014).

2.3.1 Selecting a case study

For this research, a case study was selected that:

- has been in operation for at least five years to provide the reviewer with a more tangible illustration of taking this research from the conceptual to the practical;
- a project with Environmental Approvals in order to use the information in the documentation produced during the EIA phase; and
- has to have positive and negative environmental, social and economic impact.

The construction and operation of the Port of Ngqura in the Eastern Cape of South Africa was selected as the case study on the basis as outlined above. Permission to use the construction and operation of the Port of Ngqura case study was granted by Transnet Capital Projects (TCP), which is one of the specialist units in Transnet Limited, which is a State-owned Company. Due to the magnitude of the construction activities required for the Port of Ngqura, a number of Environmental Approvals were required. Records of Decision for the Port of Ngqura were in terms of both the Environmental Conservation Act 73 of 1989 and the NEMA.

The construction and operation of the Port of Ngqura is similar to many other authorised projects in South Africa as it followed a legislated environmental authorisation process to obtain a Record of Decision (RoD), as referred to prior to the 2006 amendment of EIA regulations; and during construction a monitoring process had been implemented. Furthermore, the case study has been operational for approximately six years, since 2009, and documentation and information on the project is readably available. The case study also has positive and/or negative environmental, social and economic impacts with links between the environmental, social and economic impact, to ensure the triple bottom line of sustainability is also addressed. For example, if environmental impact is evident (constructing a new port) a link should exist with social (job opportunities for the community) and/or economic impact (a new port for importing and exporting in South Africa).

2.4 Interview research

According to DiCicco-Bloom and Crabtree (2006:314) interviews have been characterised amongst the most common approaches for gathering qualitative data. The drive behind research interviews is to discover the observations, experiences, opinions and/or drive of individuals on specific matters. Qualitative methods, such as interviews, are thought to offer a better understanding of common occurrences that would normally be obtained from only quantitative methods, such as surveys (Gill *et al.,* 2008:291). DiCicco-Bloom and Crabtree (2006:314) further state that interviews have been regarded in a variety of ways; many of the modern texts loosely separating qualitative interviews into three categories namely: unstructured, semi-structured and/or structured. This research has made use of unstructured and semi-structured interviews.

2.5 Data Collection

As stated above this research mainly focuses on qualitative data methods such as interviews, content analysis of official documents provided by Transnet, and web-based research. The official documents included the EIA application form, Environmental Management Programme (EMP), final scoping report, RoD, environmental specifications for the port of Ngqura, project

environmental specifications – Port of Ngqura construction, Port of Ngqura development framework plan and environmental and social evaluation of the Central Port and Rail Corridor Port layout options. Information was collected over a period of 18 months.

2.5.1 Literature review

According to Randolph (2009:2), a literature review is conducted to demonstrating an author's knowledge regarding a specific field of study, including terminology, theories, key variables and history. LeCompte *et al.* (cited by Randolph, 2009:2) further state that a literature review can also informs the reviewer of the dominant researchers and research groups in a specific field. The literature review section should describe, summarize, evaluate and clarify relevant literature in the specific field of study. It should give a theoretical basis for the research and help determine the nature of the research (Boote and Beile, 2005:3).

The literature review for this research included international academic literature based on sustainable development, sustainability, sustainability assessments and EA follow-up, however, due to limited information in the South African literature the main focus of the study was based on international literature and where possible supported or elaborated on in the South African context.

The internet, academic journals, academic articles and published books were used to gather relevant information which contributed to the background of the study, the literature review as well as the development of the sustainability assessment follow-up evaluation matrix.

2.5.2 Document review

The review of documents and records containing information on the case study provided the reviewer with the necessary information to address the research aim and reach a conclusion. The main documents reviewed to gather information included

- Record of Decisions (DEAT. 2001; DEAT. 2007);
- Subsequent environmental impact report for the proposed Port of Ngqura (CSIR. 2001); and
- Final scoping report (CSIR. 2007).

Other projects documents and records were also used to provide an understanding of the project and assisted in answering the questions as outlined in the evaluation matrix.

2.5.3 Interviews

To gain a more thorough understanding of the information provided in the documentation and to provide for the triangulation of data interviews were conducted with key interviewees, which included the TCP Environmental Manager (who has been involved in various phases of the Port of Ngqura and is currently still responsible for environmental management on a number of new and proposed Port expansion projects), and the Independent Environmental Control Officer responsible for the development. Unstructured and semi-structured interviews were conducted during a weeklong site visit in January 2014 and the Independent Environmental Control Officer in October 2015 during a telecom. The information gathered during the interviews was used to further develop and answer the questions in the evaluation matrix (Anon. 2012:40). Therefore the questions asked during the interviews related directly and mirrored the evaluation criteria.

2.6 Developing the sustainability assessment follow-up evaluation matrix

The evaluation matrix was developed based on the eight sustainability assessment principles of Gibson (2006). Each of the eight sustainability assessment principles were listed as a review category and under each of the eight review categories, review questions were developed.

The evaluation was set up in a simple evaluation matrix in which findings could be made regarding the extent to which net gains had been achieved under each of the principles:

A – Best - positive results (there are well-founded evidence expecting value-added outcomes, and no notable harm or risks in any aspect are expected);

B – Good - net gains but with some negative impacts and risks that should be mitigated through tested methods;

C – Limited - no guarantee of net gains (substantial damages or risks are probable, and sufficient improvement of positive impact and/or mitigation of adverse impact may depend on more information or stringent enforced conditions);

D – Unacceptable - expected net losses, plus substantial negative effects or risks that are not effectively mitigated using tested methods; and

N/A – Not applicable - the topic is not applicable or it has no relevance in the context of the project (Gibson, 2006b:5).

The evaluation matrix was developed in such a way that the score grades and related comments could be captured by completing the collation sheet (Table 1). The assessment scores were allocated a letter rather than number to discourage the reviewers from crude aggregation (Mbhele, 2009:13).

Table 1:Sustainability Assessment Follow-up evaluation matrix (adapted from Gibson et al., 2005; Gibson, 2006b; Sandham & Pretorius. 2008 & Mbhele, 2009)

Sustainability Assessment Follow-up Principle	Review question	Performance Indicators					Comments
Review criteria	Review category	Best performed/positive results	Good/gains but with some negative effects	Limited/no assurance of net gains	Unacceptable/expected net losses	Not Applicable	
		A	B	C	D	N/A	
1. Socio-ecological system integrity	Build human-ecological relations to launch and preserve the long-term integrity of socio-biophysical systems						
	Safeguard the unique life-support functions on which people as well as ecological well-being depends						
	Determine the socio-ecological impacts relative to baseline conditions						
2. Livelihood sufficiency and opportunity	Ensure that individuals and communities have enough for a decent life						
	Everyone has the chance to pursue improvement in ways that do not compromise future generations						
	Determine the ESE needs for human well-being						
3. Intergenerational equity	Guarantee that adequate and actual choices for all have been pursued in ways that reduce dangerous gaps in adequacy						
	Enhancement of measures that deliver material improvements where there is deprivation						
4. Intergenerational equity	Support existing choices and actions that are most likely to reserve or improve the opportunities and abilities of future generations to live sustainably						
5. Resource maintenance and efficiency	Identify pressures on the long-term integrity of socio-ecological systems						
	Decrease extensive damage, avoiding waste and reducing the overall material and energy use per unit of benefit.						
6. Socio-ecological civility and democratic governance	Conduct Public Participation (pre-approval)						
	Stakeholder engagement to apply sustainability requirements through better and more open deliberations						
7. Precaution and adaptation	Identify possible ESE risks						
	Mitigations for identified ESE risks						
8. Immediate and long-term integration	Apply all principles of sustainability at once, look for common helpful benefits and various gains.						

2.6.1 Implementation of evaluation matrix

According to Gibson (2006b:5), while each of the categories are important, it is also important for sustainability assessment purposes to treat the problems and answers as interconnected since the contribution-to-sustainability objective is to maximise mutually strengthening positive effects, while avoiding negative effects. This same idea can be applied to conducting a sustainability assessment follow-up. Through the insight and understanding gained during the literature and documents reviewed, as well as information gathered during the interviews, a first-time reviewer completed the evaluation matrix.

Each of the questions on the evaluation matrix were answered to determine to what extent each of the eight sustainability assessment principles were implemented in the Port of Ngqura case study.

2.7 Limitations for this research

As in any research, this research also experienced obstacles and limitations. Most of the limitations were experienced during the data collection and analysis phase of the research. The limitations include:

2.7.1 Single case study selected

As outlined in section 2.2, selecting a single case study has certain limitations. However, due to nature of this research "moving from conceptual to implementation" a decision was taken to only select one case study to test the feasibility of sustainability assessment follow-up. In Chapter 4, section 4.2, recommendations is made for future studies based on this research.

2.7.2 Verification of data

Interviews were conducted with the TCP Environmental Manager and the Independent Environmental Control Officer. The information provided during interviews was checked and triangulated against the documented information provided as part of the verification process. However, some of the information provided by the TCP Environmental Manager could not be verified in documentation. In such cases the Independent Environmental Control Officer was asked to verify the information as far as possible.

The reason for only interviewing the TCP Environmental Manager and the Independent Environmental Control Officer relates to access to information and knowledge regarding the project:

- Prior to becoming the TCP Environmental Manager, Renee de Klerk, worked for HATCH GOBA Ltd. who was appointed by Transnet to undertake the planning phase

of the project, including the management of the Independent Environmental Assessment Practitioner for the EIA; and further to this

- Both the TCP Environmental Manager and the Independent Environmental Control Officer were involved in this project from the commencement of construction.

2.7.3 Dealing with trade-offs

Data relating to trade-offs were inadequate and therefore the need for trade-offs were not dealt with in detail. The reason for the inadequacy is that some of the trade-offs are yet to take place and therefore the effectiveness of the trade-offs are still not certain.

2.7.4 Practical implementation of sustainability assessment follow-up

To date sustainability assessment follow-up has only been conceptualised and has not yet been implemented in South Africa. This research is the first attempt at practically applying sustainability assessment follow-up in the South African context and therefore there was little past experience to draw on. There is also very limited peer reviewed literature on sustainability assessment follow-up and therefore there was no readily available methodological blue print to draw on.

CHAPTER 3
PRESENTATION AND DISCUSSION OF RESULTS

This chapter presents the results of the case study analysis, based on the application of the evaluation matrix (**Table 1**). The evaluation matrix and the results are provided in **Table 1** and **Annexure A** respectively.

3.1 Introduction

As stated above, the eight sustainability assessment principles described by Gibson *et al.* (2005) are generic criteria found across sustainability assessments (Gibson *et al.,* 2005:113). The eight principles can be reorganised or broken down into numerous sub criteria. However, it is important that the principles of each of the eight principles be captured in a sustainability assessment (Gibson *et al.,* 2005:96).

3.2 Evaluation results and findings

The overall results for the case study appear in Table 2. Just like Wessels *et.al.* (2015:182), a decision was made to make use of the analysis method that provided qualitative results (informative results of case study observations, input from the interviewee and input from the project documents) to make sense of the data and information provided for this case study. **Annexure A** provides an overview of the extent to which each of the eight sustainability assessment follow-up principles were achieved. The findings of Annexure A are based on the interviews conducted and the information provided as outlined under section 2.4 and the evaluation matrix with the scoring grades, as described in Chapter 2, section 2.5. It is important to note that, when a research question received a N/A, it only indicates that the specific aspects was not applicable in this specific case study and not that the question was not addressed.

Table 2: Overall results for each principle

	Collective outcome per principle
1. Socio-ecological integrity	**B – Good** - net gains but with some negative impacts and risks that should be mitigated through tested methods.
2. Livelihood sufficiency and opportunity	**B – Good** - net gains but with some negative impacts and risks that should be mitigated through tested methods.
3. Intra-generational equity	**C – Limited** - no guarantee of net gains (substantial damages or risks are probable, and sufficient improvement of positive

	Collective outcome per principle
	impact and/or mitigation of adverse impact may depend on more information or stringent enforced conditions).
4. Inter-generational equity	**B – Good** - net gains but with some negative impacts and risks that should be mitigated through tested methods.
5. Resource maintenance and efficiency	**D – Unacceptable** - expected net losses, plus substantial negative effects or risks that are not effectively mitigated using tested methods.
6. Socio-ecological civility and democratic governance	**A – Best** - positive results (there are well-founded evidence expecting value-added outcomes, and no notable harm or risks in any aspect are expected).
7. Precaution and adaptation	**B – Good** - net gains but with some negative impacts and risks that should be mitigated through tested methods.
8. Immediate and long-term integration	**D – Unacceptable** - expected net losses, plus substantial negative effects or risks that are not effectively mitigated using tested methods.
Overall	**C – Limited** - no guarantee of net gains (substantial damages or risks are probable, and sufficient improvement of positive impact and/or mitigation of adverse impact may depend on more information or stringent enforced conditions).

3.3 Results

The key findings of the interviews and documentation review as it relates to each of the eight sustainability assessment follow-up principles are presented below:

3.3.1 Principle1: Socio-ecological system integration

Gibson *et al.* (2005:96) state the reliability of the surrounding environment determines human well-being on every scale, whether locally or globally. This principle focused on the socio-ecological connection between people and the biophysical system, while maintaining the long-term integrity of the biophysical systems and protecting the unique life-support functions upon which human as well as ecological well-being depends (Gibson *et al.,* 2005:96).

3.3.1.1 Socio-ecological identification and planning

Communities in the Port Elizabeth region are dependent on the biophysical system in the area and they contribute to these functions. Therefore, when the development of the Port of Ngqura was planned, it was clear to Transnet that these biophysical systems would be interfered with during construction and operation (GPH. 2007).

As part of the National Ports Act, 12 of 2005, Transnet National Ports Authority (TNPA), as the custodian of South African ports, had to plan how to respond to prevailing environmental constraints (GPH. 2007:2). To address the objective as outlined above, various specialist studies were undertaken as part of the EIA process to identify the interconnection and the impact that the port development will have on both the environment and the people involved. Several environmental sensitive areas were identified. They include among others the

- Coega River valley slopes;
- Coastal dune area;
- Areas with pristine vegetation types; and
- The area within a 500 m radius of Jahleel Island.

TNPA planned the future development of the port in such a way that it will avoid damaging the remaining sensitive environmental systems in the area. It is therefore possible to develop the port further and, should any of the sensitive environmental systems be infringed, stringent mitigation measures will be implemented (GPH. 2007:i;17). These mitigation measures will have to be developed in conjunction with the stakeholders in the area (Martin, 2014).

Gibson *et al.* (2005:97) postulate, “For sustainability, the objective is not to prevent system changes but to organise and manage our activities so that the changes we influence still preserve the system conditions and services upon which we rely”.

3.3.1.2 Socio-ecological interaction

Through the various development phases of the port of Ngqura, opportunities were identified to implement environmental monitoring and management programmes in the harbour that would contribute strongly to Ngqura becoming a green port, specifically due to the sensitive nature of the environment in which the port has been developed. The aim of these programmes was to ensure, as far as possible, that the natural biophysical systems remain functional in the port boundaries and to find a balance between development and the environment (Martin, 2015).

Klages and Bornman (2005) state that TNPA had to design and implement the seawater quality and biological monitoring programme for the Port of Ngqura as one of the authorised conditions during the EIA process. The programme followed on the baseline studies conducted during 2000 – 2003 in the area prior to construction. Dicken (cited by Hammerl, 2011) states “the Port of Ngqura has become an extraordinary magnet for marine life and could point the way to an important new role for harbours”. The rich diversity of species found

in the harbour of Ngqura suggests the use of Ports and other man-made structures to improve local fisheries in South Africa (Dicken cited by Hammerl, 2011).

3.3.2 Principle 2: Livelihood sufficiency and opportunity

This principle relates very closely to Brundtland's definition for sustainability. It focusses on providing enough for current communities without compromising future generations (Gibson *et al.,* 2005:99).

3.3.2.1 Identifying opportunities

The South African coastline is constantly exposed to hazards from the sea; that threatens the security of coastal communities through the loss of infrastructure and services and can have detrimental and long-lasting social, economic and environmental implications (Mather and Theron). The dunes on the Coega dune belt do not replenish the beach sand because the dunes are landward of the storm berm and therefore the erosion on the beaches are mainly caused by wave action, longshore movement and sand deposits (Coastal and Environmental Service, 2001).

When the port of Ngqura was developed a sand bypass system was designed to simulate the natural movement of sand in the area of Algoa Bay. Ngqura was the first deep-water port in the world to have a system in place to maintain the beaches on either side of the man-made harbour (Anon, 2005). The idea of the sand bypass system is to mitigate the effect of climate change to the coastal area and to maintain the beaches in the Ngqura area for years to come (Martin, 2015).

3.3.2.2 Livelihood sufficiency

The port operator, Transnet Port Terminals (TPT), puts energy back into the grind through the operation of the ship-to-shore cranes and in this regard frees up electricity to be used elsewhere in the Ngqura area (TPT, 2013).

Through the TPT energy management plan, TPT is reducing its energy consumption and in turn minimising its use of resources to produce energy.

3.3.3 Principle 3: Intra-generational equity

This principle refers to choices and decisions relating to behaviour that reduces dangerous gaps in adequacy and opportunity between the rich and the poor (Gibson *et al.,* 2005:101).

3.3.3.1 Determining the Gap - Baseline data

The Socio-Economic impact assessment undertaken as part of the EIA process identified gaps between the rich and the poor in the region. The Subsequent Environmental Impact Report for the Proposed Port of Ngqura, as developed by Coastal and Environmental Service (2001:x), states that the Eastern Cape Province is one of South Africa's most poverty stricken and least developed areas with 64% of the population living in poverty. The report further lists the negative and positive impacts anticipated by the development of the harbour (Coastal and Environmental Service, 2001).

3.3.3.2 Addressing the Gap

Coastal and Environmental Service (2001:xiii) states that there was a possibility that the development and operation of the Port of Ngqura would not produce a large number of employment opportunities and the impact of the port on the local scale could be negligible. Coastal and Environmental Service (2001:xiii) explained that this could be because of the outsourcing of work to international companies. In 2002, however, the IDZ signed the labour agreement that specifies the prioritisation of local employment. This addressed the concern raised by Coastal and Environmental Service in the EIA as TNPA as the port custodian in the IDZ had to comply (ECDC. 2002).

A survey conducted in 2000 by Transnet, also showed that many of the people who were relocated due to the development of the port now have better access to housing and facilities such as water, sanitation and transport (Coastal and Environmental Service, 2001: xiii).

Transnet further contributed to the community in the area during 2007 when the second development phase of the Port of Ngqura was undertaken and the EIA for the "Proposed extension to the container berth and construction of an administration craft basin at the Port of Ngqura" was conducted. In this EIA the CSIR (2007:iv) states that "between 840 to 960 jobs would be created during construction, and approximately 320 permanent jobs in the operating phase". Further to this the CSIR (2007:xi) also listed positive and negative socio-economic impacts e.g. opportunities for local contractors, increased potential for corporate social investment, and on the negative side, induced migration, effects on health and safety, increased pressure on infrastructure and services, etc.

Since the IDZ signed the labour agreement in 2002 the Port of Ngqura has increased trade between South Africa and the world, generating jobs in the economy while encouraging international trade. In 2013 the terminal employed 500 workers and had the capacity to accommodate an additional 500 jobs once the Ngqura Expansion Project was completed.

Approximately 98% of the labourers for these jobs would be from the Eastern Cape (Transnet, 2013).

3.3.4 Principle 4: Intergenerational equity

This principle is based on conducting activities in such a manner that it will contribute positively to future generations (Gibson *et al.,* 2005:104). Gibson *et al.* (2005:104) state it best when they say, “treat as you would be treated”.

3.3.4.1 Planning for the future

The future development of the Ngqura harbour was based on the demand forecast for the port of Ngqura. The port master plan was developed over 30 years and included the planning objectives, review of opportunities and impact, and a 30-year cargo demand forecast (PRDW, 2004).

3.3.4.2 Contributing to the future of South Africa

In a country like South Africa, where there is so much room for development and improvement, corporate social investment has become the core element of business. Transnet, through Transnet Foundations, creates and implement corporate social investment in the communities where Transnet develops and operates. The main focus areas for Transnet’s corporate social investment are:

- investment in communities around the ports;
- investment in previously disadvantaged communities;
- programmes that engender development; and
- programmes that foster empowerment and growth (Transnet Foundations, 2015).

The investments focus on education, training and development, environmental management, arts and culture, and sports development (CSIR, 2007). Transnet Foundations (2015) states that, when we look back on the lack of education opportunities in the past, South Africa has come a long way and there is reason for celebration. One of the success stories for the Transnet Foundation is their own education portfolio which runs a number of programmes that are contributing to the future of South African youth.

One of these programmes was established during the 2004/2005 financial year when Transnet committed to a maritime education programme through TNPA and South African Port Operations. To date this education programme is still thriving and making a difference in young peoples’ lives. The current Siyaloba maritime training academy is located in Port Elizabeth,

approximately 20 km away from the Port of Ngqura. This education programme was developed to train future marine engineers, specifically in the Eastern Cape region.

3.3.4.3 Planning for minimal damage

Transnet designed the layout of the Port of Ngqura through the public participation process to minimise the impact on the paleo-channel and to avoid impact on the Jahleel Island, which is approximately 1 km from the harbour. No construction could take place within 500 m of Jahleel Island due to the sensitive birdlife and penguin population on the island (Martin, 2015).

3.3.5 Principle 5: Resource maintenance and efficiency

The focus of this principle falls on ensuring sustainable income while reducing threats to the socio-ecological systems in the end (Gibson *et al.,* 2005:106).

3.3.5.1 Port of Ngqura location

According to Coastal and Environmental Service (2001:6) the Port of Ngqura has been developed in the paleo-channel at the mouth of the Coega River and this made the economic development of a deep-water port possible. Due to the depth of the harbour, the protected environment of Algoa Bay and the IDZ, Coega has been recognised as one of the best locations for a port on the South African coast (Coastal and Environmental Service, 2001:6). This port will aid economic growth in South Africa while promoting ecological conservation.

3.3.5.2 Addressing resource maintenance and efficiency

In the EIA report Coastal and Environmental Service (2001:77) states it clearly that various impacts will occur due to construction and port operation activities. However, mitigation measures have been included in the EIA to minimise the impact. Included in each of the mitigation measures are monitoring conditions to ensure the effectiveness of the mitigation measures. By including monitoring measures into mitigation, it ensures that Transnet could build and improve mitigation measures as technology advances and knowledge of the impact on the environment grows.

De Klerk (2014) also says that environmental interfaces were established with key stakeholders such as the CDC, SANParks and others to ensure further cooperation, best practice and minimise negative impacts on sensitive ecosystems as far as possible.

3.3.6 Principle 6: Socio-ecological civility and democratic governance

This principle outlines the requirements to build capacity, motivation and characteristics to provide decision makers, communities and individuals with the necessary information to apply the sustainability principles (Gibson *et al.,* 2005:108).

3.3.6.1 EIA regulated Public Participation

As part of the South African EIA process there is a few mandatory steps that need to be taken to include and inform Interested and Affected Parties (I&APs) of a project. The Subsequent Environmental Impact Assessment Report for the Port of Ngqura outlines the process followed during this EIA to inform I&APs. The participation of I&APs in major projects like this plays an important role as their input can contribute in making a development more environmentally sustainable (Coastal and Environmental Service. 2001:13).

3.3.6.2 Going beyond EIA regulated Public Participation

In 2004 Transnet for the first time embraced the move towards the triple bottom line in their Annual Report (Transnet. 2005:21). Transnet (2005:21) states that it included the interests of their shareholders, customers, employees, suppliers, society and the community into decisions. De Klerk (2014) states as part of stakeholder engagement, outside of the regulated EIA public participation process, environmental interfaces were formed with key stakeholders to communicate progress on port development, implementation of environmental monitoring and management plans, and best environmental practices as well as compliance with requirements of the Port Environmental Authorisations.

In addition to the public participation process that was part of the pre-decision-making phase, an Independent Environmental Monitoring Committee had to be established to monitor Transnet's compliance throughout the entire project with the requirements of the environmental authorisations and EMP's. The EMC is represented by all relevant environmental authorities, NGO's, Algoa Bay users and the developers, and report their findings to the National DEA (Coastal and Environmental Service, 2001:25).

3.3.6.3 Environmental Monitoring committee

Even though EMC's have no power to make decisions they are generally applied to provide authorities with advice and information to enable them to make the necessary decisions (DEAT. 2005:3). EMC's are included in RoD's to ensure that the proponent does not stop environmental management once the RoD has been received, but that the proponent complies with the conditions in the RoD. The EMC is a monitoring body that checks compliance to RoD

conditions and since they report to DEAT, they have all the necessary information to inform decision makers (DEAT, 2005:3; Martin, 2015).

3.3.7 Principle 7: Precaution and adaptation

For this principle, Gibson *et al.* (2005:112) advise, “Respect uncertainty, avoid even poorly understood risks of serious or irreversible damage to the foundations for sustainability, plan to learn, design for surprise and manage for adaption”.

3.3.7.1 Identifying and planning for the unknown

TNPA developed and implemented a Project Environmental Specification (PES) for the construction phase of the Port of Ngqura to ensure compliance with the requirements of the Environmental Authorisations and to minimise unnecessary environmental risks. TNPA enforced compliance with the PES by including this, as well as risk management clauses, in contracts with appointed contractors. Subsequently, in 2007 when phase 2 of construction commented, the contractors were appointed under the New Engineering Contract 3 - Engineering and Construction Contract (NEC 3 - ECC) framework that included risk management under clause 80 and 81 (De Klerk, 2014; Thomas Telford; TNPA, 2002).

Environmental risks were also managed during phase 2 by enforcing implementation of a Construction Environmental Management Plan (CEMP) and Environmental Specifications as part of TCP’s environmental due diligence. Transnet also incorporates and applies the Enterprise Risk Management (ERM) across the various levels of the organisation (Anon., 2010; De Klerk, 2014; Patel, 2015).

The Environmental Monitoring Committee, and the independent Environmental Control Officer (ECO) contribute to risk management by monitoring compliance and making recommendations for the improvement of mitigation measures where required. The ECO undertakes bi-annual RoD compliance audits. As part of these audits the ECO checks the inclusion of RoD conditions and compliance with the CEMP and Environmental Specifications in contracts between Transnet and appointed contractors (De Klerk, 2014; Martin, 2015).

3.3.8 Principle 8: Immediate and long-term integration

Apply all principles of sustainability at once, look for common helpful benefits and various gains (Gibson *et al.,* 2005:114).

3.3.8.1 Trade-offs

Gibson *et al.* (2005:115) state that an overall positive/net-gain outcome is impracticable as there is always something that makes way for something "more important". Even though authorising authorities approve the loss of something, they normally motivate their decision based on the overall outcome of a development, e.g. a wetland might be lost but the port serves the economy of South Africa. This is normally where trade-offs come in. (Gibson *et al.,* 2005:115).

3.3.8.2 Trade-offs for the Port of Ngqura

The most significant trade-off for the development of the Port of Ngqura was the acceptance of disturbance of habitats due to the overall economic contribution the port will provide to South Africa (Martin, 2015).

De Klerk (2014) states that biodiversity offsets were not identified as a need for the development of the Port of Ngqura in terms of the 2002 and 2007 RoDs. However, Coastal and Environmental Service (2001:85) states that during future phases, offsets might have to occur. These offsets will relate to alternative sites within 20 km from the port of Ngqura and these sites will most likely focus on bird habitats.

3.4 Outcome and findings

It is clear from the discussion and the summary of table 2 that six of the eight sustainability assessment principles were addressed to a certain extent in the Port of Ngqura case study. However, two of the principles namely: *5. Resource maintenance and efficiency* and *8. Immediate and long-term integration*, were found to be "Unacceptable". In general, the sustainability assessment for the Port of Ngqura has been done to a "C - Limited - no guarantee of net gains".

Principles 5. Resource Maintenance and Efficiency, and 8. Immediate and Long-term Integration, are the only two principles that were addressed to a "D - Unacceptable/expected net losses" score grade. The findings can possibly be explained due to the current situation found in EIA practice, and because South Africa is a developing country. Current EIA practice accepts the word "minimising impact" instead of forcing proponents to contribute positively or avoiding impact altogether, especially when the impact contributes to the development of South Africa.

Principle 6. Socio-ecological Civility and Democratic Governance, is the only principle that was addressed to an "A - Best/positive results" score grade. It can possibly be explained because of the regulatory requirements for Public Participation in the National Environmental

Management Act 107 of 1998, and the RoD included conditions like the establishing of the Environmental Monitoring Committee and the Coega Development Committee. Both these committees are still meeting.

Overall, the research results supports the statements of Bond *et al.* (2012:53) and Ness *et al.* (2007:498) that EIA's incorporate sustainability assessment to a certain extent. This is evident in the South African context of this specific project.

By including the three pillars of sustainable development into tools like the EIA, sustainability assessments can be addressed in every project that requires an authorisation (Bebbington *et al.,* 2007, cited by Bond *et al.,* 2012:55).

3.5 Summary of results

The outcome of this sustainability assessment follow-up is not in line with the observation made by Arts and Faith-Ell (2012:3239) – that "many infrastructure projects have problems to deliver sustainability commitments made earlier in the planning process". However, the findings can be explained when considering Wessels e*t al.'s* (2015:182) statement that in developing countries, such as South Africa, the reluctance to commit to sustainability is normally found in the private sector and the Port of Ngqura is one of the ports owned by Transnet, which is a State Owned Company. In addition, Transnet went to the open market to obtain funding for the project and this could influence the sustainable outcome of this project because funding institutes normally enforce sustainable criteria that should be met by the applicant (De Klerk, 2014).

This chapter presented the results obtained through conducting interviews, reviewing project documents, completing the evaluation matrix, and by highlighting the main findings that informed the reviewer's score on each of the principles. It is concluded that six of the eight sustainability assessment principles of Gibson *et al.* (2005) was addressed to a certain extent in the Port of Ngqura case study. There is also a link between the findings and general trends in South Africa, e.g. the trade-off between environmental and economic impact to develop South Africa, and the legislative process of Public Participation and incorporation of decisions into RoDs.

CHAPTER 4
CONCLUSION AND RECOMMENDATIONS

The aim of this research was to conduct sustainability assessment follow-up through the application of the eight sustainability assessment principles described by Gibson. This was done by evaluating a particular case study in the South African context.

This chapter addresses the research aim and concludes with recommendations for future research.

4.1 Contribution to knowledge

This research project was exceedingly ambitious and the reasons for this are two-fold. The first reason is that dealing with the concept of sustainability remains extremely elusive, and therefore difficult to define and evaluate. Drawing on the literature of Gibson (2006) and Morrison Saunders *et al*. (2014) assisted greatly in focussing the research, and producing a research design and methodology, which was both clear (in relation to the evaluation criteria) and pragmatic (in terms of the data gathering). The second challenge was that sustainability assessment follow-up has hardly been conducted internationally, let alone within South Africa. There is also very limited peer reviewed literature on sustainability assessment follow-up and therefore there was no readily available methodological blue print to draw on.

However, this research succeeded in taking first steps towards advancing sustainability assessment follow-up, especially within the South African context. The results suggest the following main contributions to knowledge in relation to the main research aim:

- *Design of a methodology for sustainability assessment follow-up*: The research aim required the development of a research methodology which includes evaluation criteria and scales of measurement. The lack of methods for sustainability assessment follow-up suggests that this is a potentially significant contribution to knowledge.
- *Sustainability and Environmental Assessment in South Africa*: The research results seem to support those who have suggested that Environmental Assessments in South Africa is, due to our broad definition of the environment, similar to what is internationally understood to be sustainability assessment.
- *Clear focus on social dimension*: There seems to be a clear focus on the social impacts and implications of the particular development, with provided support to the notion that the brown agenda is, as least in the South African context, central to EIA.

- *Challenges in dealing with longer term issues*: Clearly the research results suggest that longer term thinking and dealing with the uncertainties it raises remains a constant challenge for EIA.

In terms of the contribution in terms of my understanding in relation to each of the eight Gibson (2006) principles I conclude as follows:

1. *Social-ecological system integrity*: There is clear evidence from the review that it is possible to plan for and implement mitigation aimed at protecting and enhancing the long-term integrity of the biophysical systems and the unique life-support functions on which people as well as ecological well-being depends.
2. *Livelihood sufficiency and opportunity*: The preservation initiatives around the beaches as well as energy suggest that thinking about longer-term sufficiency and opportunities has been part of the EIA.
3. *Intra-generational equity*: The review suggest that the intra-generational equity principle of sustainability assessment was addressed. The resettlement of some of the communities resulted in some positive consequences. These communities now have water, sanitation and transport services (Coastal and Environmental Service, 2001:20). The development of the port also created job opportunities. However, the gap between the rich and the poor still remains a significant issue as these job opportunities were mostly general workers who earn minimum wages (NUMSA, 2013). The development of the Port of Ngqura might have attempted to address the gap, however, no evidence of a positive contribution could be sourced.
4. *Inter-generational equity*: The information above shows that Transnet has considered future generations of South Africa through the provision of educational programmes and the preservation and protection of biodiversity and landscapes where possible. In 2005 Transnet further committed to sustainability by embedding sustainability into their strategic management instrument like the Project lifecycle Process (Transnet, 2005:24). Transnet (2005:24) states “when our focus on sustainability becomes our way of life, we will be satisfied that our operations in itself will be sustainable”.
5. *Resource maintenance and efficiency*: The case study suggest that EIA practice still seems to focus on minimising impacts instead of optimising opportunities, which remains one of the weaknesses of standard EIA practice. By simply minimising, you are not avoiding and maintaining or contributing positively; you are destroying, it just on an “acceptable” scale. Since the purpose of sustainability assessment is to contribute positively, merely minimising impact suggests that the Port of Ngqura does not satisfy the requirements of the Resource Maintenance and Efficiency principle.

6. *Socio-ecological civility and democratic governance*: Transnet provide decision makers and stakeholders with information through the publication of their annual sustainability report. However, since one of the RoD conditions was to establish an EMC for the Port of Ngqura, the stakeholders in the area have access to relevant information more readily than just the annual report. The EMC is a committee consisting of ordinary people who have an interest in the project. The EMC shares information and ensures that the project is monitored. The annual report and the EMC contribute positively to the sharing of information. This principle was considered to be addressed for that reason.
7. *Precaution and adaptation*: The inclusion of risk management thinking into the EIA, with special reference to contracts and environmental monitoring programmes, Transnet has, to some extent addressed the precaution and adaptation principle. However, adaptation is covered more in relation to adaptive management arrangements that explicit understandings of the adaptive capacity of socio-ecological systems, which remains a weakness to EIA.
8. *Immediate and long term integration*: When considering the overall outcome of the evaluation it seems like the development of the Port of Ngqura did engage with six of the eight sustainability assessment principles. The economic and social benefits for South Africa seemed to have outweighed the negative environmental impacts on a local and regional scale. However, EIA practice is still some way off from having a fully integrated understanding of the different dimensions of sustainability.

4.2 Areas of future research

The main areas of future research would involve:

- The wider application of the evaluation matrix to different contexts and/or types of developments to broaden and strengthen the generalizability of the data.
- Evaluation research on each of the different principles, because there is sufficient richness to be explored.
- Comparative research in terms of different scale developments thereby testing if the size of the particular development influences its sustainability thinking.
- The expansion of the sustainability thinking / principles to also cover more strategic level assessment and even EMFs.

BIBLIOGRAPHY

AE (Alzheimer Europe). 2009. The four main approaches. http://www.alzheimer-europe.org/Research/Understanding-dementia-research/Types-of-research/The-four-main-approaches Date of access: 27 Mar. 2016.

Anon. 2005. Sand bypass scheme replicates nature. http://www.engineeringnews.co.za/article/sand-bypass-scheme-replicates-nature-2005-07-01 Date of access: 07 Nov. 2015.

Anon. 2010. Presentation to portfolio committee on public enterprises – Transnet risk management plan. http://pmg-assets.s3-website-eu-west-1.amazonaws.com/docs/101014 transnetrisk.pdf Date of access: 30 Sep. 2015.

Anon. 2012. A critical analysis of the application of S24G provisions of the National Environmental Management Act (NEMA) – the Gauteng Province experience. Potchefstroom: NWU. (Dissertation – Masters in Environmental Management).

Arts, J., Caldwell, P. & Morrison-Saunders, A. 2001 Environmental Impact Assessment Follow-up: good practice and future directions – findings from a workshop at IAIA 2000 conference', *Impact Assessment and Project Appraisal,* 19 (3): 175-185.

Arts, J. & Faith-Ell, C. 2012. New governance approach for sustainable project delivery. *Social and Behavioural Sciences,* 48: 3239-3250.

Barrow, C.J. 2006. Environmental Management for Sustainable Development. Second Ed. New York, NY: Routledge.

Becker, B. 1997. Sustainability Assessment: A review of Values, Concepts, and Methodological Approaches. http://www.worldbank.org/html/cgiar/publications/issues/issues 10.pdf Date of access: 17 Feb. 2014.

Bell, S. & Morse, S. 2008. Sustainability Indicators: Measuring the immeasurable? Second Ed. London: Earthscan.

Bond, A. & Morrison-Saunders, A. 2011. Re-evaluating Sustainability Assessment: Aligning the vision and the practice. *Environmental Impact Assessment Review,* 31: 1-7.

Bond, A., Morrison-Saunders, A. & Pope, J. 2012. Sustainability Assessment: The state of the art. *Impact Assessment and Project Appraisal*, 30(1): 53-62.

Boote, D.N. and Beile, P. 2005. Scholars before researchers: On the centrality of the dissertation literature review in research preparation. *Educational Researcher,* 34(6):3.

Canadian Environmental Assessment Act ***see*** Canada.

Constitution ***see*** South Africa.

Coastal and Environmental Service. 2001. Subsequent Environmental Impact Report for the Proposed Port of Ngqura. http://www.coega.co.za/DataRepository/Documents/YkolHUuyI6wVkgoDDmd32BtzP.pdf Date of access: 28 Sep. 2015.

CSIR (Council for Scientific and Industrial Research. 2007. Environmental Impact Assessment for the proposed extension of the container berth and construction of an administration craft basin at the Port of Ngqura. (Unpublished).

Dedola Global Logistics. 2011. What is a TEU? http://www.dedola.com/2011/10/what-is-a-teu/ Date of access: 19 Jan. 2014.

DEAT. (Department of Environmental Affairs and Tourism). 2001. The proposed development of the Port of Ngqura. (Unpublished).

DEAT (Department of Environmental Affairs and Tourism). 2005. Environmental Monitoring Committees. Department of Environmental Affairs and Tourism: Pretoria. (Integrated Environmental management Information Series 21).

DEAT (Department of Environmental Affairs and Tourism). 2007. Granting of conditional authorisation for project reference 12/12/20/690: Construction of two additional berths at the container terminal and an administrative craft basin at the Port of Ngqura, near Port Elizabeth. (Unpublished).

De Klerk, R. 2014. Development and operation of the Port of Ngqura [personal interview]. Jan., Port Elizabeth.

DiCicco-Bloom, B. & Crabtree. B.F. 2006. The qualitative research interview. *Medical Education,* 40(4): 314-321.

ECDC (Eastern Cape Development Corporation). 2002. Historic zone labour agreement for Coega. http://www.ecdc.co.za/ecdc/news_article/1188/Historic_zone_labour_agreement_for_Coega/01_November_2002 Date of access: 30 Sep. 2015.

Gibson, R.B. & Hassan, S.; Holtz, S.; Tansey, J. and Whitelaw, G. 2005. Sustainability assessment: Criteria and Processes. London: Earthscan.

Gibson, R.B. 2006a. Sustainability assessment: basic components of a practical approach. *Impact Assessment and Project Appraisal,* 24(3): 170-182.

Gibson, R.B. 2006b. Sustainability-based assessment criteria and associated framework for evaluations and decisions: theory, practice and implications for the Mackenzie Gas Project Review. http://www.ceaa-acee.gc.ca/155701CE-docs/Robert_B_Gibson-eng.pdf Date of access: 27 Apr. 2014.

Gibson, R.B. 2011. Application of a contribution to sustainability test by the Joint Review Panel for the Canadian Mackenzie Gas Project. *Impact Assessment and Project Appraisal,* 29(3):231-244.

Gill, P.; Stewart, K.; Treasure, E. & Chadwick, B. 2008. Methods of data collection in qualitative research: interviews and focus groups. *British Dental Journal*, 204:291-295.

Glasson, J.; Therivel, R., and Chadwick, A. 2008. Introduction to Environmental Impact Assessment. Third Ed. New York, NY: Routledge.

GPH (Prestedge Retief Dresner WijnBerg (Pty) Ltd). 2007. Port Development Framework. Transnet: Central Ports Rail Corridor Study.

HEC (Humanities Education Centre) Global Learning Centre. 2009. What is sustainability? http://www.globalfootprints.org/sustainability Date of access: 04 Aug. 2015.

Hacking, T. & Guthrie, P. 2008. A framework for clarifying the meaning of Triple Bottom-Line, Integrated, and Sustainability Assessment. *Environmental Impact Assessment Review*, 28:73-89.

Hammerl, A. 2011. Ngqura a fish magnet. *Herald Live.* 23 May. http://www.heraldlive.co.za/ngqura-a-fish-magnet/ Date of access: 07 Nov. 2015.

Hsieh, C. Strengths and Weaknesses of Qualitative Case Study Research. University of Leicester: (Research Article – PhD).

icsi (The Institute of Company Secretaries of India). 2013. Sustainability – A Present Concept for Future. http://www.icsi.edu/Portals/0/grapes/Sustainability%20&%20%20Reporting%20Series-1.pdf Date of access: 06 Jan. 2014.

iisd (International Institution for Sustainability Development). 2013. What is sustainable development? https://www.iisd.org/sd/ Date of access: 09 Nov. 2015.

Investopedia. 2013. Dry-bulk Commodity Definition. http://www.investopedia.com/terms/d/dry-bulk-commodity.asp Date of access: 19 Jan. 2014.

Jikijela, S.M.L. 2013. Co-operative environmental governance: alignment of environmental authorisations in the province of KwaZulu/Natal. Potchefstroom: NWU. (Mini-dissertation – Master in Environmental Management).

Klages, N.T.W. & Bornman, T.G. 2005. Port of Ngqura Marine Biomonitoring Programme. http://fred.csir.co.za/project/CIP_EIA/pages/Biomon_Ngqura_Annual_Report_2004-05.pdf Date of access: 07 Nov. 2015.

Manaadiar, H. 2013. Port of Ngqura officially opened. *Shipping News & Views.* http://shippingnewsandviews.wordpress.com/2013/03/08/port-of-ngqura-officially-opened/ Date of access: 19 Jan. 2014.

Mansurov, A. 2004. Placing EIA follow-up into the EMS structure of the organization. Budapest: Central European University. (Thesis – Master of Science).

Mather, A. & Theron, A. Recent extreme events along the coast of South Africa. http://www.cfoo.co.za/docs/stormsurge/Item%203%20Extreme%20events%20AM%20et%20al%20revised.pdf Date of access: 07 Nov. 2015

Martin, L. 2013. Investigating the value and influence of informal strategic advice for environmental assessment in Western Australia. Australia: Murdoch University. (Thesis – Master of Science in Environmental Science).

Martin, P. 2015. Port of Ngqura [personal interview]. Oct., Telecom.

Miller, G.T.; Scott, E. & Spoolman, E. 2009. Living in the environment. 16th ed. Belmont: Brooks/Cole Cengage Learnings.

Morrison-Saunders, A.; Baker, J. and Arts, J. 2003. Lessons from practice: towards successful follow-up. *Impact Assessment and Project Appraisal,* 21:43-56.

Morrison-Saunders, A. & Pope, J. 2004. Contributing to sustainability. *Environmental Impact Assessment Review,* 24(6):595-616.

Morrison-Saunders, A. & Pope, J. 2013. Conceptualising and managing trade-offs in sustainability assessment. *Environmental Impact Assessment Review,* 38: 54-63.

Morrison-Saunders, A.; Pope, J.; Bond, A, and Retief, F. 2014. Towards Impact Assessment Follow-up for Sustainability. *Environmental Impact Assessment Review,* 45: 38-45.

Morrison-Saunders, A. & Retief, F. 2013. Walking the sustainability assessment talk – Progressing the practice of environmental impact assessment (EIA). *Environmental Impact Assessment Review,* 36: 34-41.

National Environmental Management Act: ***see*** South Africa.

Ness, B., Urbel-Pirrsalu, E., Anderberg, S. & Olsson, L. 2007. Categorising tools for sustainability assessment. *Ecological Economics* 60:498:508.

NSCC International. 2013. Quay Walls. http://nsccme.com/solutions/marine-works/quay-walls/ Date of access: 19 Jan. 2014.

NUMSA (National Union of Metalworkers of South Africa). 2013. NUMSA statement on victory scored at Capital Outsourcing workers. http://www.numsa.org.za/article/numsa-statement-on-victory-scored-at-capital-outsourcing-workers/ Date of access: 08 Nov. 2015.

Oxford Dictionary. 2014. Socioecology. http://www.oxforddictionaries.com/definition/english/socioecology date of access: 07 Nov. 2014.

Patel, Z. 2015. NEC 3 [personal interview]. Sep. Johannesburg.

Patton, M.Q. 1990. Qualitative evaluation and research methods. Second ed. California: Sage Publications.

Pope, J.; Annandale, D. & Morrison-Saunders, A. 2004. Conceptualising sustainability assessment. *Environmental Impact Assessment Review,* 24: 595-616.

PRDW. 2004. South African Ports Master Plan Study. http://za.prdw.com/sites/default/files/SA%20PORTS%20Master%20Plan%20Study%20Rev%2004%202013-07-02.pdf Date of access: 30 Sept. 2015.

Randolph, J.J. 2009. A Guide to Writing the Dissertation Literature Review. *Practical Assessment, Research & Evaluation*. 14(13): 1-13.

Retief, F. 2013. Sustainability Assessment in South Africa. (*In* Bond, A., Morrison-Saunders, A. and Howitt, R., *ed*. Sustainability Assessment: Pluralism, practice and progress. London: Routledge. p. 185-192).

Sala, S., Ciuffo, B. & Nijkamp, P. 2015. A systematic framework for sustainability assessment. *Ecological Economics,* 119: 314-325.

Sandham, L.A. & Pretorius, H.M. 2008. A review of EIA report quality in the North West province of South Africa. *Environmental Impact Assessment Review*, 28(4-5): 229-240. Available: ScienceDirect.

South Africa. 1996. Constitution of the Republic of South Africa 1996.

South Africa. 1996. Environmental Conservation Act 1989 (Act no. 73 of 1989): Notice in terms of Section 21: Identification of Activities which may have a detrimental effect on the environment. (Government notice no. R879). Government gazette, 17213, 31 May.

South Africa. 1998. National Environmental Management Act 107 of 1998.

Soy, S. 2006. The Case Study as a Research Method. https://www.ischool.utexas.edu/~ssoy/usesusers/l391d1b.htm Date of access: 22 Mar. 2014.

Tholet, D. 2012. Port of Ngqura - Transnet's R10 billion investment. *Civil Engineering.* http://www.civildesigner.com/Publications/ngqura_may12.pdf Date of access: 19 Jan. 2014.

Thomas Telford Ltd. 2005. Nec 3 – Engineering and construction contract. Second ed. Glasgow: Bell & Bain.

Thwink.org. 2014. Sustainability. http://www.thwink.org/sustain/glossary/Sustainability.htm Date of access: 04 Aug. 2015.

TNPA (Transnet National Ports Authority). 2002. Environmental Specifications for Construction of Bulk Infrastructure and Tenant/Concessionaire Projects at the Port of Ngqura. (Unpublished).

TNPA (Transnet National Ports Authority). 2013. Port Report: Port of Ngqura/Coega. http://portoverview.com/data/73.pdf Date of access: 19 Jan. 2014.

TPT (Transnet Port Terminal). 2013. Sustainability. http://www.transnetportterminals.net/About/Pages/Sustainability.aspx Date of access: 07 Nov. 2015.

Transnet. 2005. Annual Report. http://www.transnet.net/InvestorRelations/Annual%20Results/Transnet%20Annual%20Report%202004%20-%202005%20.pdf Date of access: 28 Sep. 2015.

Transnet. 2007. Port of Ngqura Development Framework Plan. (Unpublished).

Transnet. 2011. Sustainable Development Report. http://www.transnet.net/InvestorRelations/Transnet%20Reports/Sustainability%20Report%202011.pdf Date of access: 28 Sep. 2015.

Transnet. 2012. President Zuma Launches The Port of Ngqura. http://www.pmaesa.org/information/news/news.htm?nid=54 Date of access: 21 Jun. 2012

Transnet. 2013. Ngqura Container Terminal. http://www.transnetportterminals.net/Ports/Pages/Ngqura_Container.aspx Date of access: 07 Nov. 2015.

Transnet Foundations. 2015. The corporate social investment unit of Transnet SOC Ltd. http://www.transnetfoundation.co.za/about.html Date of access: 08 Nov. 2015.

Transnet. 2015. Transnet Foundations – Frequently asked questions. http://www.transnetfoundation.co.za/faq.html Date of access: 27 Sep. 2015.

Transnet Group. 2014. Transnet Long-term Planning Framework. http://www.transnet.net/BusinessWithUs/LTPF%202012/1.LTPF%202014_Chapter%2001__Introduction_Final%20Proof_Sept%202014.pdf Date of access: 28 Sep. 2015.

Trochim, W.M.K. 2006. Introduction to Evaluation. http://www.socialresearchmethods.net/kb/intreval.php Date of access: 22 Mar. 2014.

University of Akron. 2014. Project Life Cycle Defined. https://www.uakron.edu/pmo/plc/ Date of access: 31 Jan. 2014.

Vincent, I.V. & Morrison-Saunders, A. 2013. Applying sustainability thinking to a community-governed development: a sea cucumber farm in Madagascar. *Impact Assessment and Project Appraisal*, 31: 208-213.

Wessels, J.A. 2013. Factors that influence the independence of EIA follow-up verifiers: a developing country perspective. *Impact Assessment and Project Appraisal*, 32: 169-179.

Wessels, J.A.; Retief, F. & Morrison Saunders, A. 2015. Appraising the value of independent EIA follow-up verifiers. E*nvironmental Impact Assessment Review*, 50: 178-189.

Wikipedia. 2013. Dry-bulk. http://en.wikipedia.org/wiki/dry_bulk Date of access: 19 Jan. 2014.

Willis, B. 2014. The advantages and limitations of single case study analysis. http://www.e-ir.info/2014/07/05/the-advantages-and-limitations-of-single-case-study-analysis/ Date of access: 27 Mar. 2016.

Annexure A: Application of evaluation criteria

Sustainability Assessment Follow-up Principle	Review question	Performance indicators					Comments
Review criteria	Review category	Best performed/positive results	Good/gains but with some negative effects	Limited/no assurance of net gains	Unacceptable/expected net losses	Not Applicable	
		A	B	C	D	N/A	
1. Socio-ecological system integrity	Build human-ecological relations to launch and preserve the long-term integrity of socio-biophysical systems		x				Specialist studies, RoD Conditions
	Safeguard the unique life-support functions on which people as well as ecological well-being depends		x				Green port activities
	Determine the socio-ecological impacts relative to baseline conditions	x					Pre-project planning, Specialist studies
2. Livelihood sufficiency and opportunity	Ensure that individuals and communities have enough for a decent life			x			Transnet Corporate Social Investments
	Everyone has the chance to pursue improvement in ways that do not			x			Sustainable planning, Transnet procurement

Sustainability Assessment Follow-up Principle	Review question	Performance indicators					Comments
Review criteria	**Review category**	Best performed/positive results	Good/gains but with some negative effects	Limited/no assurance of net gains	Unacceptable/expected net losses	**Not Applicable**	
		A	**B**	**C**	**D**	**N/A**	
	compromise future generations						strategies, green port operations
	Determine the ESE needs for human well-being		**x**				Specialist studies
3. Intragenerational equity	Guarantee that adequate and actual choices for all have been pursued in ways that reduce dangerous gaps in adequacy			**x**			Numerous jobs created and material sourced locally, where possible (De Klerk. 2014)
	Enhancement of measures that deliver material improvements where there is deprivation		**x**				Transnet Foundation – CSI
4. Intergenerational equity	Support existing choices and actions that are most likely to reserve or improve the opportunities and abilities of future generations to live sustainably		**x**				At that stage, Transnet long term planning framework and currently the Market Demand Strategy in Transnet
	Identify pressures on the long-term integrity				**x**		Specialist studies, On-going monitoring

Sustainability Assessment Follow-up Principle	Review question	Performance indicators					Comments
Review criteria	Review category	Best performed/positive results	Good/gains but with some negative effects	Limited/no assurance of net gains	Unacceptable/expected net losses	Not Applicable	
		A	B	C	D	N/A	
5. Resource maintenance and efficiency	of socio-ecological systems						in the port, however some mitigation measures could be improved (Martin. 2015).
	Decrease extensive damage, avoiding waste and reducing the overall material and energy use per unit of benefit.			x			Waste management plans, Green port operations & Transnet Project Lifecycle Process for future developments
6. Socio-ecological civility and democratic governance	Conduct Public Participation (pre-approval)	x					PPP as part of EIA
	Stakeholder engagement to apply sustainability requirements through better and more open deliberations	x					Ongoing engagements through an Environmental Management Committee (on-going)
7. Precaution and adaptation	Identify possible ESE risks	x					Specialist studies & Project risk assessment.
	Mitigations for identified ESE risks		x				Specialist studies, Project risk assessment,

Sustainability Assessment Follow-up Principle	Review question	Performance indicators					Comments
Review criteria	Review category	Best performed/positive results	Good/gains but with some negative effects	Limited/no assurance of net gains	Unacceptable/expected net losses	Not Applicable	
		A	B	C	D	N/A	
							operational risk assessment (ISO 14001).
8. Immediate and long-term integration	Apply all principles of sustainability at once, look for common helpful benefits and various gains.				x		Green port operations, biological pest control, local job creation. However, environmental impact only minimised; not avoided.

Annexure B: Interview questions

1. Background and qualifications of interviewee. (open discussion)
2. Since when have you been involved in the project?
3. Your experience with Port related development? (open discussion)
4. How will you define sustainability?

   2.1 In your opinion how does Transnet (and indirectly TCP) define sustainability?

   2.2 What do you understand sustainability assessments to be?
5. What is your understanding of follow-ups especially relating to sustainability assessments follow-ups?
6. At what stage of the project phase would you consider sustainability assessment follow-up?
7. Who should be responsible for sustainability assessment follow-up?
8. How relevant or useful will sustainability assessment follow-up be in South Africa?
9. To what extend was project planning (in Transnet referred to the Project lifecycle process) done?
10. To what extend and how was sustainability considered throughout the various project phases in the Port?
11. Which specialist studies were conducted for the Port of Ngqura EIA?
12. To what extend was stakeholder engagement done, outside of the EIA process?
13. Compliance with RoD conditions. (open discussion)

    8.1 General attitude of Contractors/Transnet regarding RoD's and sustainability? (open discussion)
14. Since when has the Port been in operation?
15. Define green port activities?

    15.1 Elaborate on the following:

    - Biological pest control?
    - Local workforce employment? (Employed in which positions)
16. General – challenges and shortcomings relating to sustainability? (open discussion)