



# Draft Environmental Impact Report

Proposed Richtersveld Wind Farm, Northern Cape  
DEA Ref: 12/12/20/1967

G7 Renewable Energies

Draft Report

October 2011

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Signed:

Position: Partner

Date: 18 October 2011

This report has been prepared by Environmental Resources Management the trading name of Environmental Resources Management Southern Africa (Pty) Limited, with all reasonable skill, care and diligence.

## ANNEXURES

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## ANNEXURES

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*Annex C:* Public Participation Documentation  
*Annex D:* DEA acceptance of Scoping  
*Annex E:* Ecological and Biodiversity Specialist Report  
*Annex F:* Bird Specialist Report  
*Annex G:* Bat Specialist Report  
*Annex H:* Noise Specialist Report  
*Annex I:* Visual Specialist Report  
*Annex J:* Archaeological, Heritage and Paleontological Specialist Report  
*Annex K:* Socio-economic Specialist Declaration  
*Annex L:* Environmental Management Programme (EMP)

## ACRONYMS

DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DTS	Desk top study
EEZ	Exclusive Economic Zone
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EIR	Environmental Impact Assessment Report
EMP	Environmental Management Plan
EMS	Environmental Management Systems
ERM	Environmental Resources Management
I&APs	Interested & Affected Parties
IDP	Integrated Development Plan
NEMA	National Environmental Management Act
NGOs	Nongovernmental Organisations
SEP	Stakeholder Engagement Plan
REF	Renewable Energy Facility
ToR	Terms of Reference

## ***ABBREVIATIONS***

%	Percent
R	South African Rands
MW	Mega Watt
kV	Kilovolt
cm	Centimetres
m	Metres
km	Kilometres
Kg	Kilograms

## **DEFINITIONS AND TERMS**

**Alternative:** A possible course of action, in place of another, that would meet the same purpose and need (of the proposal). Alternatives can refer to any of the following but are not limited to: alternative sites for development, alternative projects for a particular site, alternative site layouts, alternative designs, alternative processes and alternative materials.

**Blade:** The part of the turbine that is moved by the wind, there are three blades on a typical wind turbine.

**Environment:** The surroundings within which humans exist and that are made up of:

- i. the land, water and atmosphere of the earth;
- ii. micro-organisms, plant and animal life;
- iii. any part or combination of (i) and (ii) and the interrelationships among and between them; and
- iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being. This includes the economic, social, cultural, historical and political circumstances, conditions and objects that affect the existence and development of an individual, organism or group.

**Environmental Assessment:** The generic term for all forms of environmental assessment for projects, plans, programmes or policies. This includes methods/tools such as environmental impact assessment, strategic environmental assessment, sustainability assessment and risk assessment.

**Gigawatt Hour:** The gigawatt hour is a unit of energy equal to 1000 000 watt hours or 3600 megajoules. Energy in watt hours is the multiplication of power (measured in watts) and time (measured in hours). One gigawatt hour is 3600 megajoules, equal to is the amount of energy converted if work is done at an average rate of one thousand watts for one hour.

**Greenhouse Gas:** A gas that traps heat in the atmosphere is often called a greenhouse gas. Greenhouse gases naturally blanket the Earth and keep it about 33 degrees Celsius warmer than it would be without these gases in the atmosphere.

**Hub:** The centre of a wind generator rotor, which holds the blades in place and attaches to the shaft.

**Hub Height:** The distance from ground level to the centre of the hub.

**Impact:** The positive or negative effects on human well-being and / or on the environment.

***Interested and Affected Parties:*** Individuals, communities or groups, other than the proponent or the authorities, whose interests may be positively or negatively affected by the proposal or activity and/ or who are concerned with a proposal or activity and its consequences.

***Lead Authority:*** The environmental authority at the national, provincial or local level entrusted in terms of legislation, with the responsibility for granting approval to a proposal or allocating resources and for directing or coordinating the assessment of a proposal that affects a number of authorities.

***Mitigate:*** The implementation of practical measures to reduce adverse impacts or enhance beneficial impacts of an action.

***Nacelle:*** The protective covering over a generator or motor.

***Photovoltaic Cell (PV cell):*** A PV cell is a device that converts the energy of sunlight directly into electricity by the photovoltaic effect.

***A Photovoltaic Panel (PV panel)*** is a packaged interconnected assembly of PV cells.

***A Photovoltaic Array (PV array)*** is a linked collection of photovoltaic panels which will make up the solar installation on the proposed project site.

***Rotor:*** Consists of the blade and hub, the mechanical link between the blades and the low-speed shaft.

***Rotor Diameter:*** The diameter of a circle swept by the rotor measured from blade tip to blade tip.

***Scoping:*** The process of determining the spatial and temporal boundaries (i.e. extent) and key issues addressed in an environmental assessment. The main purpose of scoping is to focus the environmental assessment on a manageable number of important questions. Scoping should also ensure that only significant issues and reasonable alternatives are examined.

***Significance:*** Significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e. intensity, duration and likelihood). Impact significance is the value placed on the change by different affected parties (i.e. level of significance and acceptability). It is an anthropocentric concept, which makes use of value judgements and science-based criteria (i.e. biophysical, social and economic).

***Stakeholder engagement:*** The process of engagement between stakeholders (the proponent, authorities and I&APs) during the planning, assessment, implementation and/or management of proposals or activities.

***Wind measuring mast:*** A mast installed prior to wind farm development to monitor wind speed and direction.

# 1 INTRODUCTION

## 1.1 OVERVIEW

G7 Renewable Energies (Pty) Ltd, hereafter referred to as G7, appointed Environmental Resources Management Southern Africa (Pty) Ltd, hereafter referred to as ERM, as independent environmental consultants to undertake the Environmental Impact Assessment (EIA) process for the proposed development of a wind energy facility at the Richtersveld site, in the Namakwa District's Richtersveld Local Municipality. The proposed facility will utilise wind turbines to generate electricity that will be fed into the National Power Grid. The facility will have an energy generation capacity of up to 225 MW.

This Environmental Impact Report (EIR) has been compiled as part of the EIA process in accordance with regulatory requirements stipulated in the EIA Regulations (2006) promulgated in terms of Section 24(5) of the National Environmental Management Act (NEMA) (Act No. 107 of 1998), as amended.

## 1.2 PURPOSE OF THE REPORT

The information contained in the EIR along with comments and inputs received from stakeholders and commenting authorities will assist the competent authority, the National Department of Environmental Affairs (DEA) in deciding whether or not to grant environmental authorisation and inform the conditions associated with authorisation.

Fundamental to an environmental assessment is the identification, prediction and evaluation of the actual and potential environmental consequences of an activity and the options for mitigation of negative impacts and enhancement of positive impacts (DEAT, 2003). It is often possible to introduce measures to avoid, mitigate or compensate for many of the negative environmental impacts of a particular development provided that these potential impacts are identified early in the planning process. At the same time it is important to look at opportunities for enhancement of positive impacts or benefits.

The objectives of this document are to:

- communicate the results of the EIA process for the proposed development;
- ensure that the impacts identified during the EIA process are adequately addressed;
- show the proponents response to the environmental concerns raised, and efforts taken by the proponent towards mitigating/ enhancing the impacts/ benefits;
- provide a record of comments and responses received from Interested and Affected Parties (I&APs) during the process; and

- facilitate an informed, transparent and accountable decision-making process by the relevant authorities.

### 1.3

#### *THE PROJECT PROPONENT*

The applicant for this EIA is Richtersveld Wind Power (Pty) Ltd, a wholly owned subsidiary of G7 Renewable Energies (Pty) Ltd. G7 is a South African company specialising in wind energy project developments. Established in 2007, G7 is geared to manage industrial wind energy generation projects from the feasibility stage, to the installation stage which includes the commissioning and operating of productive wind farms. G7 has a portfolio of potential developments in the Western and Northern Cape, with the combined capacity to generate several hundred MW. The projects are designed to support the South African Government's ambition of contributing 20 percent of wind energy to the national electric grid by 2020.

G7's scientific background has enabled it to create highly specialised wind measurement and analysis tools. These include a mesoscale wind atlas, which can be used to calculate wind speed and consistency across a large area at high-resolution enabling G7 to locate and validate optimum sites for wind farm development. This assists G7 in reducing the market risk by ensuring that the sites they have earmarked for development are more likely to lead to commercially viable projects.

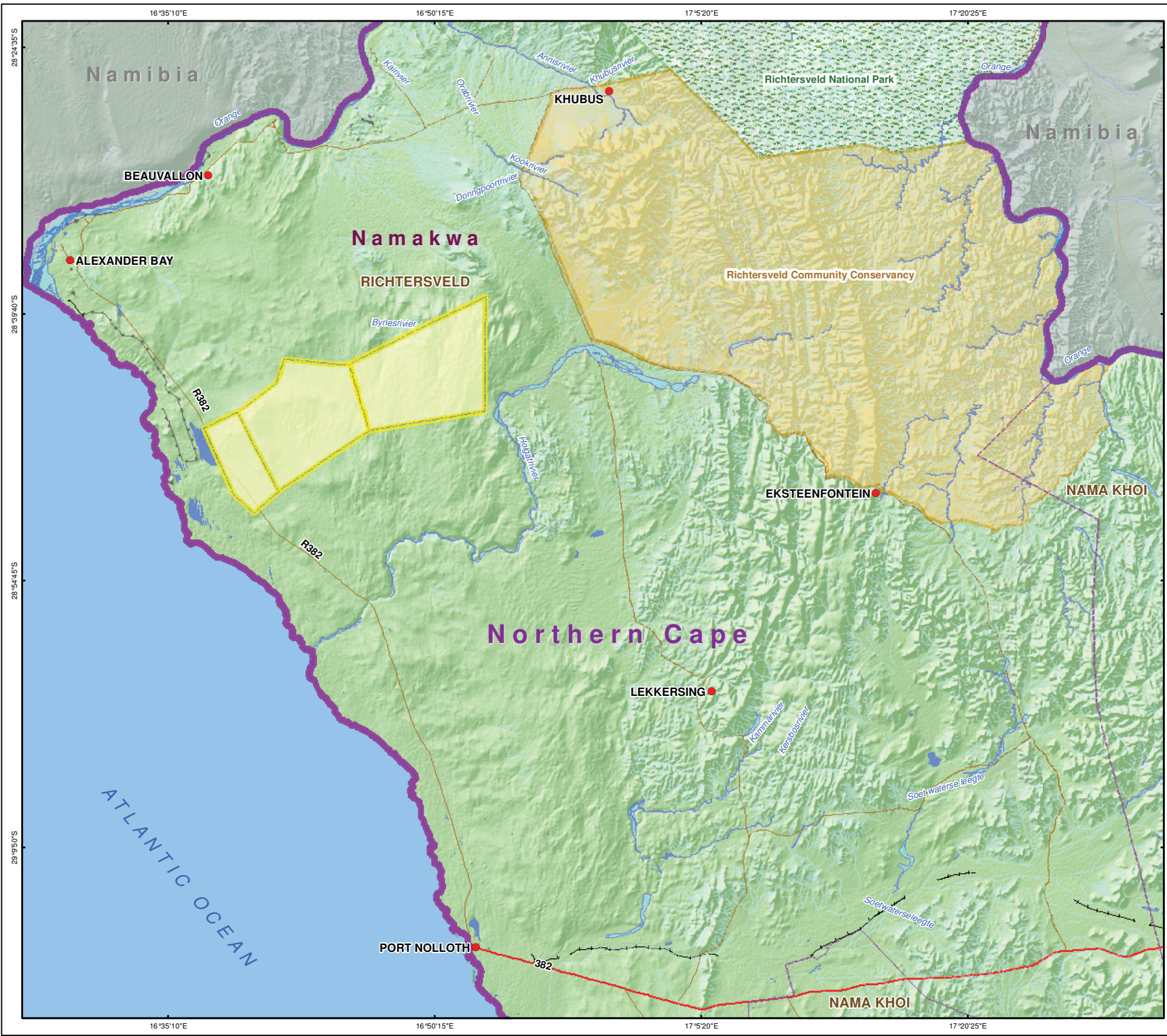
#### *G7 Vision:*

To become the leader in Renewable Energy in South Africa and to contribute to satisfying 100% of energy demand through Renewable Energy by 2050.

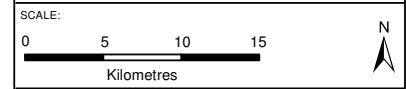
#### *G7 Mission:*

G7 aim to achieve their vision and ensure long term viability through:

- Maintaining the highest standards and professionalism in all the work we do;
- Questioning the status quo and finding new ways to achieve excellence and increase efficiency;
- Creating mutually beneficial partnerships and cooperation's to ensure benefits for everyone; and
- Minimising our footprint while contributing to global environmental sustainability.



- Legend**
- Towns
  - ▭ Provincial Boundaries
  - ▭ Northern Cape
  - ▭ Namibia
  - ▭ District Municipalities
  - ▭ Local Municipalities
  - Transmission Line
  - Main Road
  - Secondary Road
  - Railway
  - Non-Perennial River
  - Perennial River
  - Inland Water
  - River Area
  - National Park
  - Richtersveld Land Parcel



TITLE:  
**Figure 1.1: Location of Witberg Wind Farm**

CLIENT:

DATE: SEPT 2011	CHECKED: TS	PROJECT: 0134745
DRAWN: AB	APPROVED: SHC	SCALE: 1 : 380 000
DRAWING: Location of Richtersveld WF.mxd		REV: 0

ERM  
Building 32,  
The Woodlands,  
Woodlands Drive,  
Woodmead, 2148  
Johannesburg, South Africa  
Tel: +27 (0)11 798 4300  
Fax: +27 (0)11 804 2289

Projection: Geographic, Datum: WGS84  
Source: NGI, EnPAT, PPF  
Inset Map, Esri Data & Maps

SIZE:  
A3



## 1.4 DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER

### 1.4.1 ERM Southern Africa

ERM was appointed by G7 to undertake the EIA for the proposed Richtersveld Wind Farm. ERM and the specialists appointed by ERM during the course of this EIA have no financial ties to, nor are they a subsidiary, legally or financially, of G7. Remuneration for the services by the Applicant (G7) in relation to this EIA is not linked to approval by any decision-making authority and ERM has no secondary or downstream interest in the development.

ERM is a global environmental consulting organisation employing over 3500 consultants in over 145 offices in more than 41 countries. Founded in 1971, ERM has built an organisation based on the supply of a full range of environmental and social policy, scientific, technical, and regulatory expertise. Our primary focus is to provide quality work and service to our clients in these areas.

From a regional perspective ERM has been involved in numerous projects in Africa over the past 30 years and in 2003 established a permanent presence in Southern Africa to meet the growing needs of our clients. The Southern African ERM offices are based in Cape Town, Johannesburg, Pretoria and Durban. The Southern African Operating Company has a staff complement of over 120 dedicated environmental professionals offering expert skills in EIA, EMP, EMS, risk assessment, EHS management and auditing, corporate social responsibility and socio-economic impact assessment, climate change services, specialist groundwater services as well as contaminated site management.

ERM Southern Africa has undertaken or is in the process of compiling thirteen EIAs of wind farm facilities in South Africa for various developers.

### 1.4.2 Project Team

The project team for the Richtersveld Wind Farm EIA includes ERM consultants and support staff and external specialists. Details of ERM's core project team are provided below.

**Table 1.1 ERM Core Project Team**

<b>Partner in Charge</b>	<b>Stuart Heather-Clark</b> BSc Civil Eng (Hons), MPhil Environmental and Geographical Science, Registered EAPSA Practitioner
<b>Facilitator</b>	<b>Muller Coetzee</b> Practical Techniques in Environmental Impact Assessment, MSc (Geography) University of South Africa and NDT (Civil Engineering)
<b>Project Manager</b>	<b>Tania Swanepoel</b> B.Sc (Hons) (Geology); B.Sc (Hons) (Engineering & Env Geology)
<b>Project Consultant</b>	<b>Lindsey Bungartz</b> BSocSci (Hons), Environmental Management

The Partner in Charge, Stuart Heather-Clark, is a certified environmental assessment practitioner and the project has been conducted in terms of the code of ethics promulgated by the Certification Board for Environmental Assessment Practitioners of South Africa (EAPSA), which includes a requirement for independence. Stuart has overall responsibility for the team and delivery of the EIA study. Stuart has more than 15 years experience in the field of Impact Assessment in South Africa, and is the Practice Leader for Impact Assessment and Planning Team in ERM Southern Africa.

Tania Swanepoel is a Principal Consultant with ERM and has more than 13 years experience in environmental consulting and engineering geology. Tania acts as the team lead, project manager and reviewer. Tania is supported by Project Consultant, Lindsey Bungartz, who has over four years experience as an EIA practitioner in South Africa, including extensive experience of renewable energy EIAs.

## 1.5 REPORT STRUCTURE

The structure of this Draft Environmental Impact Report is as follows:

**Table 1.2** Report structure

Section	Contents
Section 1 Introduction	Contains a brief description of the proposed activity and an outline of the report structure.
Section 2 Regulatory Framework	Outlines the legislative, policy and administrative requirements applicable to the proposed development.
Section 3 Approach and Methodology	Outlines the approach to the EIA study and summarises the process undertaken for the project to date.
Section 4 Project Description	Includes a detailed description of the proposed activities and the alternatives.
Section 5 Biophysical Baseline	Describes the receiving biophysical baseline environment.
Section 6 Social Baseline	Describes the receiving socio-economic baseline environment
Section 7 Impacts on Ecology and Biodiversity (Flora and Fauna)	Describes and assesses the potential impacts of the proposed development on flora and fauna. Mitigation measures are also recommended.
Section 8 Impacts on Birds	Describes and assesses the potential impacts of the proposed development on birds and describes relevant mitigation measures.
Section 9 Impacts on Bats	Describes and assesses the potential impacts of the proposed development on bats and describes relevant mitigation measures.
Section 10 Impacts on soils, surface and groundwater	Describes and assesses the potential impacts of the proposed development on soils, surface and groundwater. Mitigation measures are also recommended.
Section 11 Noise Impacts	Describes and assesses the potential noise impacts of the proposed development and describes relevant mitigation measures.

<b>Section</b>	<b>Contents</b>
Section 12 Visual Impacts	Describes and assesses the potential visual impacts of the proposed development and describes relevant mitigation measures.
Section 13 Impacts on Archaeology, Palaeontology and Cultural Heritage	Describes and assesses the potential impacts of the proposed development on cultural heritage aspects and describes relevant mitigation measures.
Section 14 Socio-Economic Impacts	Describes and assesses the potential socio-economic impacts of the proposed development and describes relevant mitigation measures.
Section 15 Other Impacts	Describes and assesses other potential impacts of the proposed development and describes relevant mitigation measures.
Section 16 Cumulative Impacts	Qualitatively assesses potential cumulative impacts.
Section 17 Decommissioning	Indicates that decommissioning impacts would be similar to construction impacts.
Section 18 Conclusions and Recommendations	Summarises the key findings of the EIA and provides recommendations for the mitigation of potential impacts and the management of the proposed project.
Section 19 References	Contains a list of references used in compiling the report and specialist studies.

In addition, the report includes the following annexes:

- Annex A:* Legislative Framework
- Annex B:* Site Photolog
- Annex C:* Public Participation Documentation
- Annex D:* DEA acceptance of Scoping
- Annex E:* Ecological and Biodiversity Specialist Report
- Annex F:* Bird Specialist Report
- Annex G:* Bat Specialist Report
- Annex H:* Noise Specialist Report
- Annex I:* Visual Specialist Report
- Annex J:* Archaeological, Heritage and Paleontological Specialist Report
- Annex K:* Socio-economic Specialist Declaration
- Annex L:* Environmental Management Programme (EMP)

## 1.6

### ***OPPORTUNITY TO COMMENT ON THE DRAFT ENVIRONMENTAL IMPACT REPORT***

I&APs and authorities will be provided with an opportunity to comment on any aspect of the proposed activity and the Draft Environmental Impact Report (EIR). The Draft EIR will be available at Alexander Bay and Port Nolloth Libraries and on the project's website ([http://www.erm.com/G7\\_Renewable\\_Energies](http://www.erm.com/G7_Renewable_Energies)). A notification letter and non-technical summary will be sent to all registered and identified I&APs to inform them of the release of the Draft EIR and where the report could be reviewed.

Comments can be provided to ERM at the address, tel. /fax numbers or e-mail address shown below. All comments should reach ERM no later than the 30 November 2011.

Att: Lindsey Bungartz  
G7 Richtersveld Wind Farm EIA  
DEA ref: 12/12/20/1967  
ERM ref: 0117424  
ERM Southern Africa (Pty) Ltd  
Postnet Suite 90,  
Private Bag X12  
Tokai, Cape Town,  
7966  
Tel: (021) 702 9100; Fax: (021) 701 7900  
E-mail: [richtersveld.windfarm@erm.com](mailto:richtersveld.windfarm@erm.com)

A detailed description of all legislation pertaining to the proposed Richtersveld Wind Farm project, and the permitting thereof, is contained in *Annex A*. The regulatory framework relevant to the project includes the following:

### 2.1 ENERGY RELATED POLICY, PLANNING, STRATEGIES AND GUIDELINES

National Policy regarding the need for expansion of electricity generation capacity in South Africa is informed by ongoing strategic planning by the Department of Energy (DoE), the National Energy Regulator of South Africa (NERSA) and Eskom.

The following are of particular relevance to the proposed wind energy facility:

- **Integrated Energy Plan (IEP), 2003:** The IEP provides a framework in which specific energy policies, development decisions and energy supply trade-offs can be made on a project-by-project basis. Although the IEP recognises that SA is likely to be reliant on coal for at least the next 20 years as the predominant source of energy, it also recognises the potential and need to diversify energy supply.
- **National Integrated Resource Plan (NIRP), 2003/2004:** The NIRP provides a long term (2003-2022), cost effective resource plan for meeting electricity demand, which is consistent with reliable electricity supply and environmental, social and economic policies.
- **Electricity Regulation Act and Regulations (Act No. 4 of 2006):** The Electricity Regulation Act aims to achieve efficient, effective and sustainable electricity supply, development and operation to ensure the needs of electricity users in South Africa are met and their interests safeguarded. This will be achieved through the facilitation of investment in the supply industry, access to electricity, promotion of use of diverse energy sources, promotion of competitiveness and a fair balance between the players in the industry and end users.
- **White Paper on the Energy Policy of the Republic of South Africa, 1998:** identifies key objectives for energy supply within South Africa, such as increasing access to affordable energy services, managing energy-related environmental impacts and securing energy supply through diversity. The White Paper supports investment in renewable energy initiatives such as the proposed Richtersveld Wind Farm.
- **Renewable Energy Policy in South Africa, 1998:** This policy supplements the Energy Policy and sets out Government's vision, policy principles,

strategic goals and objectives for promoting and implementing renewable energy in SA. Government has set the following 10-year target for renewable energy: *“10 000 GWh renewable energy contribution to final energy consumption by 2013 to be produced mainly from biomass, wind, solar and small scale hydro. This is approximately 4% (1 667 MW) of the estimated electricity demand (41 539 MW) by 2013”* The White Paper on Renewable Energy also states that *“It is imperative for SA to supplement its existing energy supply with renewable energies to combat Global Climate Change which is having profound impacts on our planet. Wind energy is a clean, renewable resource and should be developed in SA”*.

- **White Paper for Sustainable Energy for the Western Cape (Final Draft, 2008):** Part of the PGWC’s strategy aimed at removing a number of barriers (e.g energy pricing, legal, institutional, low levels of investment confidence) currently hindering the provinces energy goals by preventing the commercialising of clean energy technologies and initiatives. It suggests that special focus should be given to these renewable sectors and associated technologies in particular to achieve critical mass of installation, and thus drive down establishment costs and ensure permanent employment opportunities. It also established targets of 15% electricity from renewable resources by 2014 and reducing carbon emissions by 10% by 2014 measured against the 2000 emission levels.
- **The Electricity Regulations on New Generation Capacity Government Notice R721 (August 2009):** provides for the establishment and regulation of power purchase agreements with independent power producers (IPPs), guidelines governing procurement and renewable feed-in tariff (REFIT) programme. The proposed renewable energy facility will provide an additional electricity supply through renewable energy sources. G7, as the IPP, will be required to comply with guidelines governing the bid programme.
- **Draft Western Cape Integrated Energy Strategy:** This document outlines the key energy concerns and opportunities facing the Western Cape and proposes a range of policies, strategies and actions that will allow the Province to develop a sustainable portfolio of energy solutions, while also reducing pollution and increasing access to energy for all citizens in the Province. The Provincial Government of the Western Cape (PGWC) support: an approach to energy planning, which takes into account environmental, social and economic considerations and research and development around renewable energy and energy efficient technologies.
- **Climate Change Strategy for the Western Cape:** Developed by PGWC, the strategy further supports renewable energy projects (such as wind) in an effort to reduce the Province’s carbon footprint. It also contains an Action Plan for pursuing economic opportunities and to pro-actively develop alternative energy resources through renewable energy projects.

- **Regional Methodology for Wind Energy Site Selection: A Guideline Document prepared by the Department of Environmental Affairs and Development Planning (DEA&DP):** The DEA&DP developed a document titled Strategic Initiative to Introduce Commercial Land Based Wind Energy Development to the Western Cape - Towards a Regional Methodology for Wind Energy Site Selection (Western Cape Provincial Government, May 2006). This document is intended to assist in the identification of areas suitable for the establishment and implementation of wind energy developments from an environmental perspective but also to encourage responsible and rational wind energy developments, which are beneficial not only to developers, but also to communities at large. It was not however, the intention of this methodology to consider local level issues in significant detail, but rather that these issues should be considered at a site specific level (through EIA).

## 2.2 NATIONAL ENVIRONMENTAL POLICY, REGULATIONS AND GUIDELINES

### 2.2.1 National Environmental Management Act (NEMA)

NEMA requires that activities be investigated that may have a potential impact on the environment, socio-economic conditions, and cultural heritage. The results of such investigation must be reported to the relevant authority and the procedures for the investigation and communication of the potential impact of activities are contained in Section 24 (7) of the Act.

Section 24(C) of the Act defines the competent decision-making authority which is normally the provincial environmental department. However, as set out in Section 4.1 of the 'Guideline on Environmental Impact Assessments for Facilities to be Included in the Electricity Response Plan', Government Notice (GN) 162 of 2010, all EIA applications from Independent Power Producers (IPPs) or those involving co-generation, where these are included in the Integrated Resource Plan (IRP), the National Department of Environmental Affairs (DEA) shall be the competent authority.

### 2.2.2 NEMA Regulations

Note that on 18 June 2010 new EIA Regulations (Government Notice No R. 543, 544, 545 and 546) were promulgated in terms of Section 24(5) of NEMA. These regulations came into effect on 1 August 2010, replacing the regulations of 21 April 2006. However the regulations provide for transitional situations and Section 76(1) of June 2010 states that: '*An application submitted in terms of the previous NEMA regulations and which is pending when these Regulations take effect, must despite the repeal of those regulations be dispensed with in terms of those previous NEMA regulations as if those previous NEMA regulations were not repealed*'.

Therefore since the application for this proposed project was submitted to the DEA on 10 June 2010, prior to the commencement of the new regulations, the

application will continue under the 2006 EIA Regulations as if they had not been replaced.

For this reason the following listed activities from the EIA Regulations (Government Notice R386 and R387) published in terms of the previous NEMA regulations would be triggered by the proposed project and may potentially have a detrimental effect on the environment:

*Regulation R386*

**Activity 1:** “The construction of facilities or infrastructure, including associated structures or infrastructure, for –  
(m) any purpose in the one in ten year flood line of a river or stream, or within 32 metres from the bank of a river or stream where the flood line is unknown, excluding purposes associated with existing residential use, but including—(i) canals; (ii) channels; (iii) bridges; (iv) dams; and (v) weirs.”

**Activity 7** – “The aboveground storage of dangerous goods, including petrol diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 cubic metres but less than 1 000 cubic metres at any one location or site.”

**Activity 12** - The transformation or removal of indigenous vegetation of 3 hectares or more or of any size where the transformation or removal would occur within a critically endangered or an endangered ecosystem listed in terms of section 52 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).

**Activity 15** - “Road construction if wider than 4m or with reserve wider than 6m unless within ambit of another listed activity or which are access roads of less than 30 m long”

**Activity 16:** The transformation of undeveloped, vacant or derelict land to -  
(b) residential, mixed, retail, commercial, industrial or institutional use where such development does not constitute infill and where the total area to be transformed is bigger than 1 hectare.

*Regulation R387*

**Activity 1:** The construction of facilities or infrastructure, including associated structures or infrastructure, for –

- (a) the generation of electricity where –
  - (i) the electricity output is 20 megawatts or more; or
  - (ii) the elements of the facility cover a combined area in excess of 1 hectare;
- (l) the transmission and distribution of above ground electricity with a capacity of 120 kilovolts or more;



**Activity 2:** “Any development activity, including associated structures and infrastructure, where the total area of the developed area is, or is intended to be, 20 hectares or more.”

In terms of Section 76 (3) of June 2010, promulgated in terms of the Environmental Impact Assessment Regulations R543 of the National Environmental Management Act, 1998 (Act No. 107 OF 1998), where an application submitted in terms of the previous NEMA regulations, is pending in relation to an activity of which a component of the same activity was not listed under the previous NEMA Notices, but is now listed in terms of section 24(2) of the Act, the competent authority must dispense of such application in terms of the previous NEMA regulations and may authorise the activity listed in terms of section 24(2) as if it was applied for, on condition that all impacts of the newly listed activity and requirements of these regulations have also been considered and adequately assessed by the applicant. For this reason ERM has indicated which listed activities from the 2010 EIA Regulations would be triggered by the project, these are included in Annexure A.

Government Notice R385 sets out the procedures and documentation for Scoping and EIA that need to be complied with.

Guidelines published in terms of NEMA EIA Regulations, in particular:

- Guideline 3: General Guide to Environmental Impact Assessment Regulations, 2006.
- Guideline 4 Public Participation in support of the Environmental Impact Assessment Regulations, 2006.
- Guideline 5: Assessment of alternatives and impacts in support of the Environmental Impact Assessment Regulations, 2006.

### 2.2.3

#### *Other Applicable Legislation and Guidelines*

##### *National Level*

- National Environmental Management: Protected Areas Act (NEMPAA) (Act 57 of 2003).
- Conservation of Agricultural Resources Act (Act 43 of 1983).
- National Water Act (Act No. 36 of 1998).
- Mineral and Petroleum Resources Development Act (Act No 28 of 2002).
- National Environmental Management: Biodiversity Act (Act No. 10 of 2004).
- Development Facilitation Act (Act No 67 of 1995).
- National Heritage Resources Act (Act No. 25 of 1999).
- Electricity Regulation Act (Act No. 4 of 2006).
- Aviation Act (Act No. 74 of 1962).
- Occupational Health and Safety Act (Act No. 85 of 1993).
- Subdivision of Agricultural Land Act (Act No. 70 of 1970).
- Noise Control Regulations promulgated in terms of the Environment Conservation Act (Act No. 73 of 1989).

### *Provincial Level*

- Department of Environmental Affairs & Development Planning (DEA&DP) NEMA EIA Regulations Guideline and Information Document Series, 2009.
- Strategic Initiative to Introduce Commercial Land Based Wind Energy Development to the Western Cape, 2006.

### *Local Level*

- Municipal Systems Act (Act No 32 of 2000).

### *International:*

- Equator Principles;
- IFC Performance Standards; and
- Clean Development Mechanism (CDM).

## 2.3 **REGULATORY HIERARCHY**

The regulatory framework governing energy generation projects such as the proposed wind farm at Richtersveld, is as follows:

### 2.3.1 **National Level**

**Department of Energy (DoE):** Responsible for policy relating to all energy forms, including renewable energy. For example the White Paper for Renewable Energy specifically provides for wind energy. Also the controlling authority in terms of the Electricity Act (Act No. 41 of 1987).

**National Energy Regulator of South Africa (NERSA):** Responsible for regulating all aspects of electricity sector and will ultimately issue licences for wind energy developments.

**Department of Environmental Affairs (DEA):** Responsible for Environmental Policy and controlling authority in terms of NEMA and EIA Regulations promulgated in terms of NEMA. In terms of GN 162, DEA is the competent authority for this project and charged with the responsibility of considering whether or not to grant environmental authorisation.

**Department of Transport and Public Works:** Responsible for roads and granting of exemption permits for the conveyance of abnormal loads on public roads.

**Department of Transport – Civil Aviation Authority:** Responsible for Aircraft movement and radar and hence needs to be consulted regarding possible measures to be taken into account to mitigate potential impacts on such activities.

**South African Heritage Resources Agency (SAHRA):** Regulating enforcement of the National Heritage Resources Act (Act No 25 of 1999) and associated provincial regulations which provides legislative protection for listed or proclaimed sites, nature reserves and proclaimed scenic routes.

### 2.3.2 *Provincial Level*

**Provincial Government of the Northern Cape – Department of Environment and Nature Conservation (DENC):** The commenting authority on this project.

**Heritage Northern Cape:** The commenting authority with respect to Section 38(8) of the National Heritage Resources Act and cultural heritage aspects including archaeology, palaeontology and cultural landscape.

### 2.3.3 *Local Level*

The towns located within the study area are Alexander Bay and Port Nolloth, which fall within Richtersveld Local Municipality. In terms of the Municipal Systems Act (Act No 32 of 2000), it is compulsory for all municipalities to conduct an Integrated Development Planning (IDP) process and prepare a five-year strategic plan for the area under their control. Bioregional Planning involves the identification of priority areas for conservation and their placement within a planning framework of core, buffer and transition areas. These could include reference to visual and scenic resources and the identification of areas of special significance. The local municipality is a commenting authority on this EIR.

## 2.4 *PERMITTING REQUIREMENTS*

Activities undertaken during site preparation, construction and operation may require additional permits, over and above the Environmental Authorisation. G7 is responsible for ensuring that the necessary permits are in place in order to comply with national and local regulations. Additional permit requirements are described below.

### 2.4.1 *Heritage*

The protection and management of South Africa's heritage resources is controlled by the National Heritage Resources Act (NHRA), 1999 (Act No. 25 of 1999). The objective of the NHRA is to introduce an integrated system for the management of national heritage resources.

#### *Archaeology, Palaeontology and Meteorites*

According to Section 35 (Archaeology, Palaeontology and Meteorites) and Section 38 (Heritage Resources Management) of the South African National Heritage Resources Act, palaeontological heritage impact assessments (PIAs)

and archaeological impact assessments (AIAs) are required by law in the case of developments in areas underlain by potentially fossiliferous (fossil-bearing) rocks, especially where substantial bedrock excavations are envisaged, and where human settlement is known to have occurred during prehistory and the historic period. Depending on the sensitivity of the fossil and archaeological heritage, and the scale of the development concerned, the palaeontological, and archaeological impact assessment required may take the form of (a) a stand-alone desktop study, or (b) a field scoping plus desktop study leading to a consolidated report. In some cases these studies may recommend further palaeontological and archaeological mitigation, usually at the construction phase. These recommendations would normally be endorsed by the responsible heritage management authority, in this case SAHRA, to whom the reports are submitted for review. *Table 2.1* outlines when a permit is required depending on the sensitivity of the heritage resources.

**Table 2.1** *Permitting requirements for fossil, built environment and Stone Age archaeology*

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**PERMIT APPLICATION SECTION 35 – FOSSILS, BUILT ENVIRONMENT FEATURES, SHIPWRECKS & STONE AGE ARCHAEOLOGY (Ref : NHRA 1999: 58):**

---

(a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;

(b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;

(c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite.

---

*Burial Grounds and Graves*

A Section 36 permit application is made to SAHRA which protects burial grounds and graves that are older than 60 years, and must conserve and generally care for burial grounds and graves protected in terms of this section, and it may make such arrangements for their conservation as it sees fit. SAHRA must also identify and record the graves of victims of conflict and any other graves which it deems to be of cultural significance and may erect memorials associated with these graves and must maintain such memorials. A permit is required under the conditions listed in *Table 2.2*.

**Table 2.2** *Permitting requirements for burial grounds and graves older than 60 years to and historic burials*

---

**PERMIT APPLICATION SECTION 36 – BURIAL GROUNDS & GRAVES**  
**(REF: NHRA 1999 : 60)**

---

(a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves

(b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or

(c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals

(d) SAHRA or a provincial heritage resources authority may not issue a permit for The destruction or damage of any burial ground or grave referred to in subsection (3)(a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant

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**Table 2.3** *Permitting requirements for heritage resources management*

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**PERMIT APPLICATION SECTION 38 (Ref: NHRA 1999 : 62)**

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(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;

(b) the construction of a bridge or similar structure exceeding 50 m in length;

(c) any development or other activity which will change the character of a site exceeding 5 000 m<sup>2</sup> in extent; or

(ii) involving three or more existing erven or subdivisions thereof; or

(iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or

(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

(d) the re-zoning of a site exceeding 10 000 m<sup>2</sup> in extent; or

(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.

---

**2.4.2** *Borrow Pits*

A borrow pit refers to an open pit where material (soil, sand or gravel rock) is removed for use at another location. G7 are likely to require the use of borrow pits for certain earthworks operations, such as the construction of roads, embankments, bunds, berms, and other structures.

The establishment of borrow pits is regarded as a mining activity and is legislated in terms of the Mineral and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA). A mining permit must be obtained from the Department of Minerals and Energy prior to the establishment of borrow pits on the site.

### 2.4.3 *Water Use*

There are licensing procedures that need to be followed for particular “water uses”. Water uses that may be of relevance to the development of wind farms and associated road construction include the following:

- taking of water from a water resource, including a water course, surface water, estuary or aquifer (i.e. borehole);
- altering the bed, banks, course or characteristics of a water course; and/or
- impeding or diverting of a flow in a water course.

### 2.4.4 *Abnormal Vehicle Loads*

Wind turbine components will be delivered to site using road transport and due to the size of the components, the vehicles used to deliver turbine components will be considered abnormal loads in terms of the Road Traffic Act (Act No 29 of 1989). A permit for a vehicle carrying an abnormal load must be obtained from the relevant Provincial Authority. The vehicle must comply with the Administrative Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads, issued by the Department of Transport, 2009.

### 2.4.5 *Site Access*

The site would be accessed via the R382. Certain intersections and sections of the roads will have to be upgraded to facilitate the transport of the turbine components (blades, tower sections, nacelle, hub) and other construction materials to the site. The access road from the R382 to the site is an existing road that will need to be widened in order to accommodate the construction vehicles and vehicles carrying wind turbine components, this is addressed as part of this EIA.

### 2.4.6 *Aviation Communications*

Written approval or a permit must be obtained from the South African Civil Aviation Authority that the wind farm will not interfere with the performance of aerodrome radio Communication, Navigation and Surveillance (CNS) equipment, especially radar. The approval or permit must be submitted to the Director: Environmental Impact Evaluation.

### 3.1 THE EIA PROCESS

EIA is a systematic process that identifies and evaluates the potential impacts (positive and negative) that a proposed project may have on the bio-physical and socio-economic environment, and identifies mitigation measures that need to be implemented in order to avoid, minimise or reduce the negative impacts and also identifies measures to enhance positive impacts. The overall EIA process required for developments in South Africa is shown schematically in *The proponent* is in the process of applying with the local municipality for appropriate zoning approvals for the wind farm. This process is outside the EIA process.

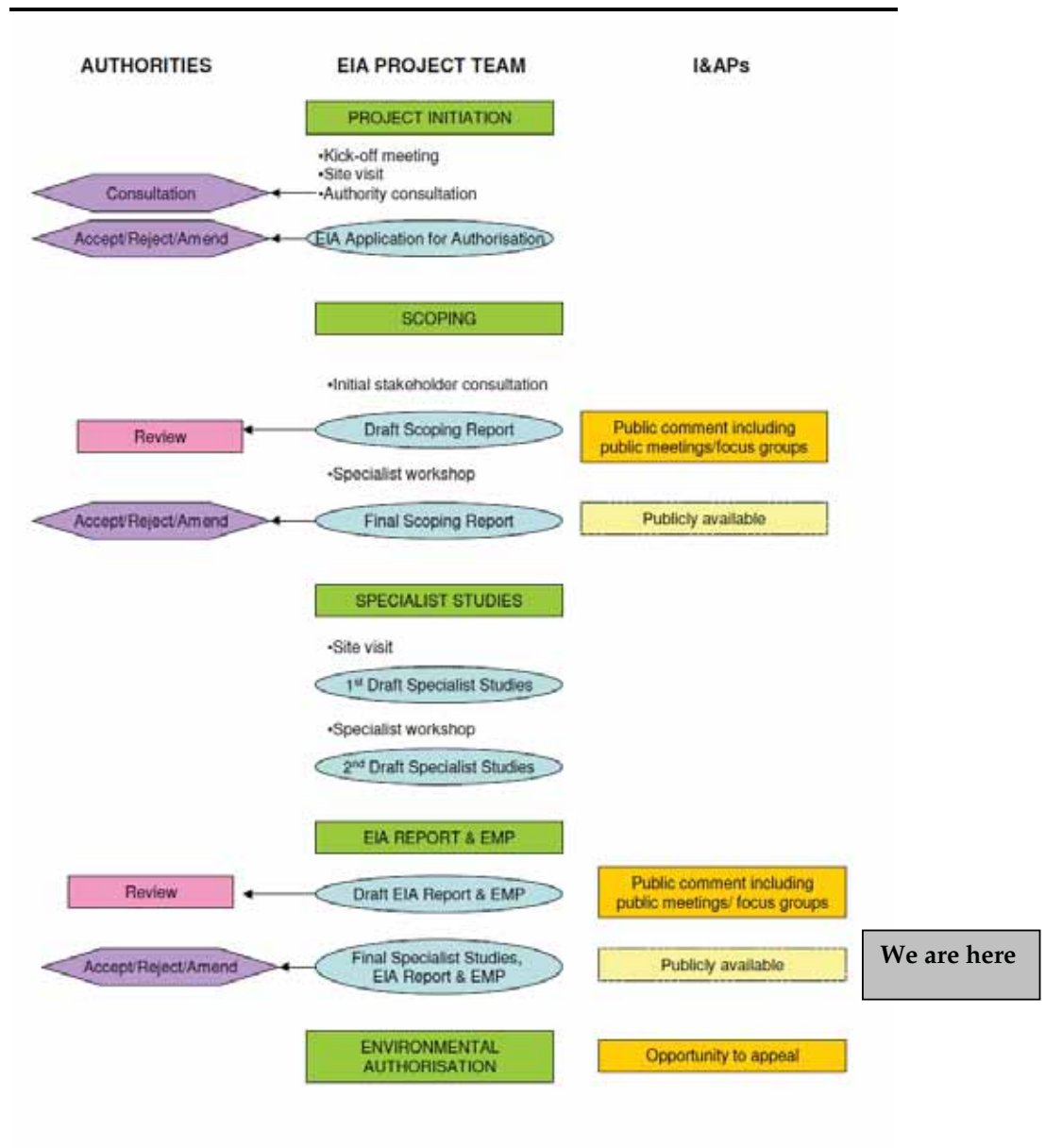
Figure 3.1. The EIA is not fully a linear process, but one where several stages are carried out in parallel and where the assumptions and conclusions are revisited and modified as the project progresses. The following sections provide additional detail regarding the key stages in the EIA process. These stages are:

- project initiation;
- scoping study phase; and
- integration and assessment phase.

Separate and prior to ERM being appointed to undertake the EIA for the proposed Richtersveld wind farm, G7 has undertaken activities regarding the erection of wind masts for wind monitoring purposes. Activities in connection with the erection of wind masts are considered outside the scope of the Richtersveld wind farm EIA currently being undertaken by ERM, i.e. activities in connection with wind masts are not considered in furtherance of proposed activities associated with the wind farm.

The proponent is in the process of applying with the local municipality for appropriate zoning approvals for the wind farm. This process is outside the EIA process.

Figure 3.1 EIA Process Flow Diagram



### 3.1.1 Project Initiation Phase

The project initiation phase began with a project inception meeting followed by a review of available and relevant project related background information. Key activities during this phase of the project included the following:

- An initial site visit by the applicant and ERM on 22 July 2010;
- Submission of an EIA Application to DEA and receipt of the DEA reference number (12/12/20/1967) for the project in June 2010;



- Authorities meeting with DEA, ERM and G7 on 29 June 2010 to discuss and agree on the proposed approach to the Scoping/EIA;
- Compilation of a preliminary database of neighbouring landowners, authorities (local and provincial), Non-Governmental Organisations and other key stakeholders into a database of registered I&APs which continues to be expanded during the ongoing EIA process; and
- Compilation of a Background Information Document (BID) for distribution to I&APs.

### 3.1.2 *Scoping Phase*

Environmental scoping has several important functions aimed at facilitating decision-making. These include the following:

- providing a description of the proposed project and associated activities;
- reviewing existing information to gain an understanding of the baseline environmental conditions;
- identifying any gaps in information and uncertainties;
- investigating and screening of alternatives;
- obtaining input from I&APs about their issues and concerns;
- identification and initial assessment of potential environmental and social impacts associated with the project; and
- identifying potential mitigation and management measures.

Accordingly the Scoping Report provided a detailed overview of the project, the associated Public Participation Process, and proposed an EIA methodology. It also included a preliminary identification and evaluation of potential impacts and Plan of Study for the EIA. The Draft Scoping Report was released for a 40-day public review period (01 October 2010 to 12 November 2010) prior to submission to the DEA. The Scoping Report was received by the DEA on 03 January 2011 and accepted by the DEA on 07 March 2011 (*Annex D*).

#### *Public Participation*

The tasks relating to public participation during the Scoping Phase and included in the Scoping Report are summarised below:

- Development and expansion of the I&AP database;

- Newspaper advertisements in Die Burger (Afrikaans) and Cape Times (English) on Wednesday 21 July 2010 and Die Plattelander (Afrikaans and English) on Friday 23 July 2010;
- Distribution of the Background Information Document (BID);
- Placement of on-site notices;
- Throughout the EIA process to date, issues and concerns raised by I&APs and authorities, and communicated to ERM via post, email or fax were recorded and submitted with the Final Scoping Report;
- The Draft Scoping Report was released for a 40-day public and authority comment period (1 October – 12 November 2010). A notification letter was sent to all registered and identified I&APs to inform them of the release of the report and that the report could be reviewed at the Richtersveld Public Library and on the project website;
- A public meeting/open day was held during the Scoping Phase (on 21 October 2010 at Alexander Bay) to afford I&APs and the general public the opportunity to comment on the proposed project and engage with the EIA team. Notification of these meetings was sent to all registered I&APs when the Draft Scoping Report was released for comment; and
- Throughout the Scoping process, issues and concerns raised by I&APs and authorities, and communicated to ERM via post, email or fax were recorded, incorporated into the report and submitted with the Final Scoping Report.

### 3.1.3 *Integration and Assessment*

The final phase of the EIA is the Integration and Assessment Phase, which is described in detail in the Plan of Study for EIA and included in the Scoping Report. A synthesis of the specialist studies, which addresses the key issues identified during the Scoping Phase, is documented in this EIR. Relevant technical and specialist studies are included as appendices to this report.

A public meeting will be held to communicate the findings of the EIA and afford stakeholders the opportunity to comment on the Draft EIR and engage with the EIA team.

The Draft EIR will be made available to I&APs for a 40-day comment period, and a notification letter will be sent to all registered and identified I&APs to inform them of the release of the Draft EIR and where the report can be reviewed.

Comments received on the Draft EIR will be assimilated and the EIA project team will provide appropriate responses to comments. A Comments and

Responses Report is appended in Annex C of this report, to be submitted to DEA for decision-making.

### *Specialist Studies*

During the Specialist Study phase, the appointed specialists gathered data relevant to identifying and assessing environmental impacts that might occur as a result of the proposed project. They assisted the project team in assessing potential impacts according to a predefined assessment methodology included in the Scoping Report. Specialists have also suggested ways in which negative impacts could be mitigated and benefits could be enhanced.

The independent specialists responsible for the specialist studies are listed in *Table 3.1*.

**Table 3.1** *Independent Specialist Studies and Appointed Specialists*

<b>Specialist Study</b>	<b>Specialists and Organisation</b>	<b>Qualifications</b>
Ecological and Biodiversity study	Simon Todd (Simon Todd Consulting)	MSc Conservation Biology, University of Cape Town
Bird study	Andrew Jenkins (AVISENSE Ornithological Consulting)	PhD Zoology, University of Cape Town
Bats study	Kate MacEwan (Natural Scientific Services)	PrSciNat - Zoology BSc Zoology Honours, University of the Witwatersrand (Wits) MSc (Bat Conservation Biology - Wits) in progress
Noise study	Adrian Jongens (Jongens Keet Associates)	M.Sc. Electrical Engineering, University of Cape Town
Visual and Landscape study	Bernard Oberholzer, (Bernard Oberholzer Landscape Architect (Bola))	B.Arch, University of Cape Town and MLA, Univ. of Pennsylvania
	Quinton Lawson (MLB Architects)	PrArch BArch, University of Natal
Archaeological, Heritage and Paleontological study	Tim Hart (ACO Associates cc.)	MA University of Cape Town and Texas A&M University
Socio-economic study	Kerryn McKune Desai (ERM Southern Africa)	MA Geography of Third World Development Royal Holloway, University of London BA Hons Environmental & Geographical Science, University of Cape Town

The specialist reports and declarations of independence are included in *Annex E – J* with the exception of the socio-economic study undertaken by ERM’s social specialist Kerryn McKune Desai which is presented in Chapters 6 and 14 of this EIR. Please note, the social specialist, is employed with and forms part of the ERM team and therefore acts as an independent environmental/social practitioner.

### *Environmental Impact Report (EIR)*

This EIR provides a description of the project, a synthesis of relevant baseline information and identifies and evaluates the key issues and opportunities associated with the wind farm development. Recommendations on the mitigation of adverse impacts and the enhancement of positive impacts associated with the proposed project are also included. These mitigation measures / enhancements are translated into specific actions in the draft Environmental Management Programme (EMP) (*Annex L*).

### *Public Participation*

The following tasks relating to public participation have been and will be undertaken as part of the EIA phase:

- The Draft EIR and EMP will be released for a 40-day comment period. Registered I&APs will be notified of the release of the Draft EIR. The full report will be made available at key locations and on the project website.
- A public meeting will be held on 15 November 2011 to afford I&APs and the general public the opportunity to comment on the proposed project and engage with the EIA team. Notification of this meeting will be sent to registered I&APs when the Draft EIR is released for comment. The meeting will be facilitated (and partly presented) in Afrikaans in order to ensure that the information is made accessible to the community.
- Comments received on the Draft EIR and EMP will be assimilated and the project team will provide an appropriate response to comments. A Comments and Responses Report will be appended to the Final EIR in Annex C.
- All registered I&APs will be notified of the submission of the Final EIR to the DEA and the availability of the Final EIR and EMP.
- All registered I&APs will be notified once a decision has been issued by the DEA. An appeal period will follow the issuing of the Environmental Authorisation.
- G7 are committed to continue to engage with local communities and stakeholders throughout construction and operation of the project. Communication with local communities and other local stakeholders will be a key part of this engagement process. Development of a Community Engagement Plan (CEP) will be important to facilitate this communication.

**Table 3.2** *Summary of Public Participation Activities undertaken to date*

<b>Activity</b>	<b>Date</b>
Site Notice Placement at Richtersveld	15 July 2010
Distribution of BID to neighbouring landowners and commenting authorities	21 July – 23 July 2010
Notification advert placed in the Die Burger	21 July 2010
Notification advert placed in the Cape Times	21 July 2010
Notification advert placed in Die Plattelander	23 July 2010
Distribution of Draft Scoping Report for comment	1 October 2010
Public Meeting in Laingsburg	22 October 2010
Notification of submission of Final Scoping Report to DEA	10 – 11 January 2011
Distribution of Draft EIR for comment	This phase

#### *Authority Consultation and Involvement*

As indicated above, the Scoping Report and Plan of Study for EIA was submitted and accepted by the DEA (see *Annex D* for the Acceptance Letter).

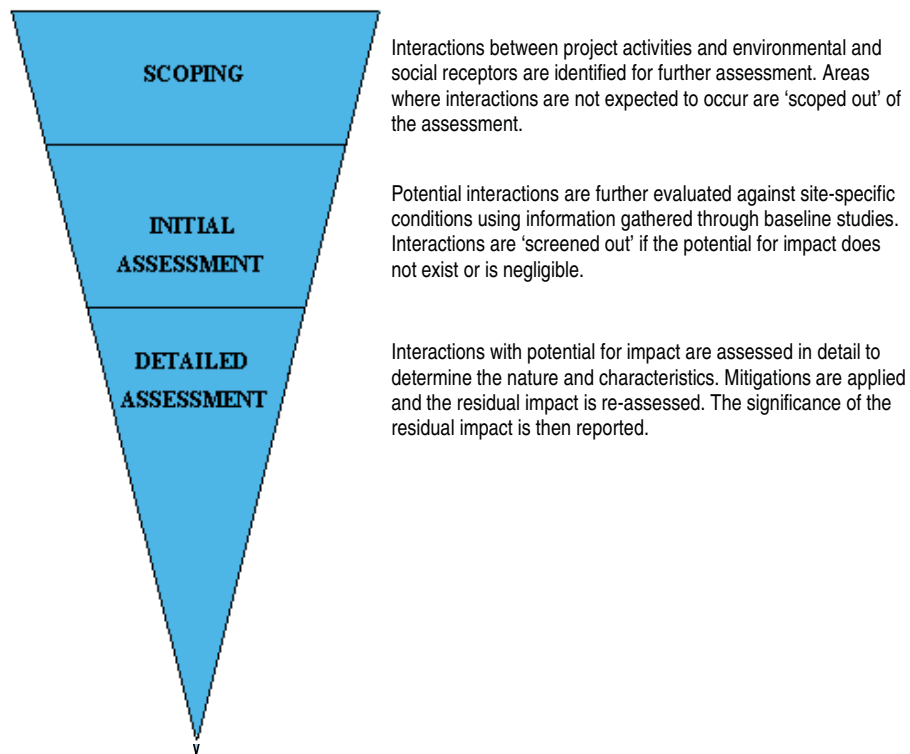
The Northern Cape Department of Environment and Nature Conservation, the provincial commenting authority, will be engaged for their comments on the Draft EIR as will other commenting authorities including but not limited to the South African Heritage Resources Agency, Department of Water Affairs and the Department of Agriculture.

## **3.2** *IMPACT ASSESSMENT METHODOLOGY*

### **3.2.1** *Impact Assessment Process*

The following diagram (*Figure 3.2*) describes the impact identification and assessment process through scoping, screening and detailed impact assessment. The methodology for detailed impact assessment is outlined in *Section Error! Reference source not found.* below.

Figure 3.2 *Impact Assessment Process*



### 3.2.2 *Impact Assessment Methodology*

The purpose of impact assessment and mitigation is to identify and evaluate the significance of potential impacts on identified receptors and resources according to defined assessment criteria and to develop and describe measures that will be taken to avoid or minimise any potential adverse effects and to enhance potential benefits.

#### *Impact Types and Definitions*

An impact is any change to a resource or receptor brought about by the presence of a project component or by the execution of a project related activity. The evaluation of baseline data provides crucial information for the process of evaluating and describing how the project could affect the bio-physical and socio-economic environment.

Impacts are described as a number of types as summarised in *Table 3.3*. Impacts are also described as *associated*, those that will occur, and *potential*, those that may occur.

**Table 3.3** *Impact Nature and Type*

<b>Nature or Type</b>	<b>Definition</b>
<b>Positive</b>	An impact that is considered to represent an improvement on the baseline or introduces a positive change.
<b>Negative</b>	An impact that is considered to represent an adverse change from the baseline, or introduces a new undesirable factor.
<b>Direct impact</b>	Impacts that result from a direct interaction between a planned project activity and the receiving environment/receptors (e.g. between occupation of a site and the pre-existing habitats or between an effluent discharge and receiving water quality).
<b>Indirect impact</b>	Impacts that result from other activities that are encouraged to happen as a consequence of the Project (e.g. in-migration for employment placing a demand on resources).
<b>Cumulative impact</b>	Impacts that act together with other impacts (including those from concurrent or planned future third party activities) to affect the same resources and/or receptors as the Project.

*Assessing Significance*

Impacts are described in terms of ‘*significance*’. Significance is a function of the **magnitude** of the impact and the **likelihood** of the impact occurring. Impact magnitude (sometimes termed *severity*) is a function of the **extent, duration and intensity** of the impact. The criteria used to determine significance are summarised in *Table 3.4*. Once an assessment is made of the magnitude and likelihood, the impact significance is rated through a matrix process as shown in *Table 3.5* and *Table 3.6*.

Significance of an impact is qualified through a statement of the **degree of confidence**. Confidence in the prediction is a function of uncertainties, for example, where information is insufficient to assess the impact. Degree of confidence is expressed as low, medium or high.

**Table 3.4** *Significance Criteria*

<i>Impact Magnitude</i>	
<b>Extent</b>	<p><b>On-site</b> – impacts that are limited to the boundaries of the development site.</p> <p><b>Local</b> – impacts that affect an area in a radius of 20km around the development site.</p> <p><b>Regional</b> – impacts that affect regionally important environmental resources or are experienced at a regional scale as determined by administrative boundaries, habitat type/ecosystem.</p> <p><b>National</b> – impacts that affect nationally important environmental resources or affect an area that is nationally important/ or have macro-economic consequences.</p>
<b>Duration</b>	<p><b>Temporary</b> – impacts are predicted to be of short duration and intermittent/occasional.</p> <p><b>Short-term</b> – impacts that are predicted to last only for the duration of the construction period.</p> <p><b>Long-term</b> – impacts that will continue for the life of the Project, but ceases when the project stops operating.</p> <p><b>Permanent</b> – impacts that cause a permanent change in the affected receptor or resource (e.g. removal or destruction of ecological habitat) that endures substantially beyond the project lifetime.</p>

<b>Intensity</b>	<p>BIOPHYSICAL ENVIRONMENT: <i>Intensity can be considered in terms of the sensitivity of the biodiversity receptor (ie. habitats, species or communities).</i></p> <p><b>Negligible</b> – the impact on the environment is not detectable.  <b>Low</b> – the impact affects the environment in such a way that natural functions and processes are not affected.  <b>Medium</b> – where the affected environment is altered but natural functions and processes continue, albeit in a modified way.  <b>High</b> – where natural functions or processes are altered to the extent that it will temporarily or permanently cease.</p> <p><i>Where appropriate, national and/or international standards are to be used as a measure of the impact. Specialist studies should attempt to quantify the magnitude of impacts and outline the rationale used.</i></p>
	<p>SOCIO-ECONOMIC ENVIRONMENT: <i>Intensity can be considered in terms of the ability of project affected people/communities to adapt to changes brought about by the Project.</i></p> <p><b>Negligible</b> – there is no perceptible change to people’s livelihood  <b>Low</b> - People/ communities are able to adapt with relative ease and maintain pre-impact livelihoods.  <b>Medium</b> - Able to adapt with some difficulty and maintain pre-impact livelihoods but only with a degree of support.  <b>High</b> - Those affected will not be able to adapt to changes and continue to maintain-pre impact livelihoods.</p>
<b>Likelihood - the likelihood that an impact will occur</b>	
<b>Unlikely</b>	The impact is unlikely to occur.
<b>Likely</b>	The impact is likely to occur under most conditions.
<b>Definite</b>	The impact will occur.

Once a rating is determined for magnitude and likelihood, the following matrix can be used to determine the impact significance.

**Table 3.5 Significance Rating Matrix**

SIGNIFICANCE				
		LIKELIHOOD		
		Unlikely	Likely	Definite
MAGNITUDE	Negligible	Negligible	Negligible	Minor
	Low	Negligible	Minor	Minor
	Medium	Minor	Moderate	Moderate
	High	Moderate	Major	Major

**Table 3.6 Significance Colour Scale**

Negative ratings	Positive ratings
Negligible	Negligible
Minor	Minor
Moderate	Moderate
Major	Major



**Table 3.7 Significance Definitions**

<b>Significance definitions</b>	
<b>Negligible significance</b>	An impact of negligible significance (or an insignificant impact) is where a resource or receptor (including people) will not be affected in any way by a particular activity, or the predicted effect is deemed to be 'negligible' or 'imperceptible' or is indistinguishable from natural background variations.
<b>Minor significance</b>	An impact of minor significance is one where an effect will be experienced, but the impact magnitude is sufficiently small (with and without mitigation) and well within accepted standards, and/or the receptor is of low sensitivity/value.
<b>Moderate significance</b>	An impact of moderate significance is one within accepted limits and standards. The emphasis for moderate impacts is on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that 'moderate' impacts have to be reduced to 'minor' impacts, but that moderate impacts are being managed effectively and efficiently.
<b>Major significance</b>	An impact of major significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. A goal of the EIA process is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (i.e. ALARP has been applied). An example might be the visual impact of a development. It is then the function of regulators and stakeholders to weigh such negative factors against the positive factors such as employment, in coming to a decision on the Project.

Once the significance of the impact has been determined, it is important to qualify the **degree of confidence** in the assessment. Confidence in the prediction is associated with any uncertainties, for example, where information is insufficient to assess the impact. Degree of confidence can be expressed as low, medium or high.

*Mitigation Measures and Residual Impacts*

For activities with significant impacts, the EIA process is required to identify suitable and practical mitigation measures that can be implemented. The implementation of the mitigations is ensured through compliance with the EMP. After first assigning significance in the absence of mitigation, each impact is re-evaluated assuming the appropriate mitigation measure/s is/are effectively applied, and this results in a significance rating for the residual impact.

**3.3 IDENTIFICATION OF MITIGATION MEASURES**

For the identified significant impacts, the project team with the input of the client, has identified suitable and practical mitigation measures that are implementable. Mitigation that can be incorporated into the project design in order to avoid or reduce the negative impacts or enhance the positive impacts

have been defined and require final agreement with the client as these are likely to form the basis for any conditions of approval by DEA.

### 3.4 *SPECIALIST STUDY METHODOLOGY*

All specialists undertook an iterative process of assessment which significantly informed the proposed turbine layout. An initial turbine layout, Layout Alternative 1, was assessed with results informing Layout Alternative 2 which incorporates inputs from specialists.

#### 3.4.1 *Ecology and Biodiversity*

A desk-based study was carried out to identify flora and fauna species likely to be found within the study area. A site visit was undertaken on 1 and 2 November 2010 to assess the flora and fauna (mammals, reptiles and amphibians) of the Richtersveld site. The site was walked and all plant species were recorded and where necessary, photographed for verification and documentation purposes. The various habitats were delineated on a satellite image of the site. Particular attention was given to potentially sensitive habitats or areas that appeared to be species-rich or harbour different or unique species, such as drainage areas and rocky ridges. All reptiles, amphibians and mammals observed were recorded as was any characteristic evidence of faunal presence or activity such as scat, diggings, burrows etc. Within certain habitats such as rocky outcrops, the area was actively searched for reptile species characteristic of these areas or species of conservation concern which were identified beforehand as potentially occurring at the site.

Sensitivity maps of the study area were compiled based upon the findings of the site visit and available literature. The impact assessment phase involved the determination and evaluation of the nature of likely impacts of the development and recommendations on mitigation.

#### 3.4.2 *Avifauna*

The study was undertaken in three phases, namely, scoping, site visit and impact assessment. During the scoping phase of the assessment, a literature review of bird and renewable energy facility interactions and bird species and habitats likely to occur in the study area was undertaken. This was followed by a site visit, which took place between 20 and 21 September 2010 to ground-truth predicted bird habitats and birds present, mainly by visiting as much of the inclusive area of the proposed development as possible, with an emphasis on sampling the avifauna in all of the primary habitats available. Additionally, the extent and direction of possible movements of birds within/through the site was estimated. The impact assessment phase involved the determination of the nature of likely impacts the development may have on birds and recommendations on mitigation.

### 3.4.3 *Bats*

A desktop review of publically available literature was undertaken during the initial phase of the assessment to understand bat and turbine interactions and the bat species and habitats likely to occur in the study area. A site visit took place on the day and night of 9 September 2010. During the day, the area was scanned for suitable roosting and foraging habitat. During the night, bat detectors and mist nets were set up at various points within the study area, in order to monitor actual bat activity. Finally the impact assessment phase involved the determination of the nature of likely impacts of the development and recommendations for mitigation.

### 3.4.4 *Noise*

The environmental noise impact investigation and assessment of the wind farm was conducted in accordance with Section 8 of SANS 10328. This procedure included determining the existing residual (ambient) levels of noise within the study area during a one-day site visit. As well as calculating the expected level of noise due to the wind turbines on the identified noise sensitive land. The impact assessment phase involved the determination and evaluation of the likely noise impacts of the development on noise receptors around the site and recommendations for mitigation.

### 3.4.5 *Visual*

The Richtersveld land parcels were plotted on a map and distance circles were overlaid in order to roughly determine the areas that would be visually affected by the proposed wind farm. Using this visual radius map, a site visit was undertaken in October 2010. During the site visit a number of critical viewpoints were identified, particularly those relating to intersections of major roads, arterial and scenic routes, as well as settlements, including farmsteads. Panoramic photographs were taken from these viewpoints both for record purposes, and for use in determining the potential visibility of the wind farm from each viewpoint during the Visual Impact Assessment (VIA) stage of the EIA.

A viewshed map was prepared based on the proposed site layout and the proposed height of the turbines. This map provides a good indication of the areas which would be visually affected by the proposed facility.

Photomontages were produced showing turbines superimposed on the panoramic photographs. These photomontages were used to assist with determining the nature of likely impacts of the development and recommendations on mitigation.

### 3.4.6 *Archaeology, Heritage and Palaeontology*

#### *Archaeology*

A desktop study was carried out of publicly available scientific publications to determine the archaeological history of the study area. In addition, an

archaeological field survey was undertaken of the study area. Archaeological materials and structures were inventoried, with GPS positions, with approximate age and descriptions recorded as necessary. The impact assessment phase involved the determination of the nature of likely impacts of the development and recommendations on mitigation.

#### *Heritage*

Publications of the history of the study area were investigated and informed the specialist study. A heritage field survey was undertaken in order to identify existing heritage structures in the study area. These heritage structures were inventoried, with their GPS positions, age and descriptions recorded. The impact assessment phase involved the determination of the nature of likely impacts of the development and recommendations on mitigation.

#### *Palaeontology*

A desktop study was undertaken assessing the potentially fossiliferous rock units (groups, formations etc) represented within the study area, determined from geological maps. The known fossil heritage within each rock unit is inventoried from the published scientific literature, previous palaeontological impact studies in the same region, and the author's field experience. Additionally, a palaeontological field survey was undertaken of the area. This data is then used to assess the palaeontological sensitivity of each rock unit to development (Provisional tabulations of palaeontological sensitivity of all formations in the Western, Eastern and Northern Cape have already been compiled by Almond & Pether (2008). Finally, the impact assessment phase involved the determination of the nature of likely impacts of the development and recommendations on mitigation.

### **3.4.7**

#### *Socio-economic*

The socio-economic specialist study was undertaken by an ERM social specialist, Kerry Desai. The study began with the compilation of a baseline description. The baseline description was derived from a range of secondary data (including but not limited to, census data, existing reports, development plans other strategic planning documents) and primary data collection. The primary data used for the baseline is based on information provided by the directly-affected landowners and issues raised through the public consultation process.

The impact assessment phase incorporated the identification and assessment of socio-economic impacts (direct, indirect and cumulative) that may result from the construction and operation phases of the project. Mitigation measures that address the local context and needs were recommended as the final phase of the study.

EIA is a process that aims to identify and anticipate possible impacts based on past and present baseline information. As the EIR deals with the future there is, inevitably, always some uncertainty about what will actually happen. Impact predictions have been made based on field surveys and with the best data, methods and scientific knowledge available at this time. However, some uncertainties could not be entirely resolved. Where significant uncertainty remains in the impact assessment, this is acknowledged and the level of uncertainty is provided.

In line with best practice, this EIR has adopted a precautionary approach to the identification and assessment of impacts. Where it has not been possible to make direct predictions of the likely level of impact, limits on the maximum likely impact have been reported and the design and implementation of the project (including the use of appropriate mitigation measures) will ensure that these are not exceeded. Where the magnitude of impacts cannot be predicted with certainty, the team of specialists have used professional experience and available scientific research from wind farms worldwide to judge whether a significant impact is likely to occur or not. Throughout the assessment this conservative approach has been adopted to the allocation of significance.

### 3.5.1

#### *Gaps and Uncertainties*

Inevitably knowledge gaps remain. For instance, there is an incomplete understanding of cumulative impacts as it is not known how many of the proposed turbines in the vicinity of Richtersveld will be granted authorisation.

##### *Gaps in Project Description*

- Turbine locations- the assessment is based on a preferred and final layout (Layout 2) based on revision of earlier layouts to accommodate environmental sensitivities. The final layout has been confirmed, however precise turbine locations may be microsituated to allow for geotechnical constraints, more detailed site assessments by ecologist and heritage specialists, and that this will seek to ensure that all locations remain in areas of low sensitivity as defined by this study and that the specialists will sign off the revised positions.
- The location and size of possible borrow pit(s) and on-site batching plants within the Richtersveld site.
- Extent of blasting required for the construction of the development.

##### *Gaps in Baseline Information*

- Limited fieldwork and understanding of bird and bat abundance and movement patterns across the area.
- Limited understanding of the locations of bat roosting caves and migration routes in South Africa are poorly known and not well documented.

### *Gaps in Understanding of Impacts*

- It should be noted that predictions are based on limited fieldwork and understanding of bird and bat abundance and movement patterns across the area, and therefore in support of the precautionary principle and international best practice, six to 12 months of preconstruction monitoring is recommended to confirm predictions and identify additional mitigation measures.
- The evidence of curtailment as an effective mitigation measure of reducing impacts on birds and bats.
- As the size and location of possible borrow pit(s) and batching plants are not as yet understood, possible impacts due to these activities could not be assessed.