GRID CONNECTION INFRASTRUCTURE FOR THE NAMAS WIND FARM

Northern Cape Province

14/12/16/3/3/1/2032

Final Basic Assessment Report

August 2019

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PROJECT DETAILS

Title	:	Environmental Impact Assessment Process: Final Basic Assessment Report for the Grid Connection Infrastructure for the Namas Wind Farm, Northern Cape Province
DEA Reference	:	14/12/16/3/3/1/2032
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Report Revision	:	Revision 0
Date	:	August 2019

When used as a reference this report should be cited as: Savannah Environmental (2019), Final Basic Assessment Report for the Grid Connection Infrastructure for the Namas Wind Farm, Northern Cape Province.

PURPOSE OF THE BASIC ASSESSMENT REPORT

Genesis Namas Wind (Pty) Ltd has appointed Savannah Environmental as the independent environmental consultant to undertake the Basic Assessment (BA) for the grid connection infrastructure for the Namas Wind Farm, Northern Cape. The project development site is located within the Springbok Renewable Energy Development Zone (REDZ) and within the northern corridor of the Strategic Transmission Corridors. The BA process is being undertaken in accordance with the requirements of the 2014 EIA Regulations promulgated in terms of the National Environmental Management Act (NEMA; Act No. 107 of 1998).

This final Basic Assessment (BA) report represents the findings of the BA process and contains the following chapters:

- **Chapter 1** provides background to the proposed grid connection infrastructure for the Namas Wind Farm and the basic assessment process.
- **Chapter 2** provides a description of the grid connection infrastructure.
- **Chapter 3** provides the site selection information and identified project alternatives.
- **Chapter 4** outlines the strategic regulatory and legal context for energy planning in South Africa and specifically for the grid connection infrastructure.
- **Chapter 5** describes the need and desirability of the grid connection infrastructure for the Namas Wind Farm within the grid connection corridor.
- **Chapter 6** outlines the approach to undertaking the basic assessment process.
- **Chapter 7** describes the existing biophysical and socio-economic environment within and surrounding the corridor proposed for the development.
- **Chapter 8** provides an assessment of the potential issues and impacts associated with the grid connection infrastructure and presents recommendations for the mitigation of significant impacts.
- **Chapter 9** provides an assessment of the potential for cumulative impacts.
- **Chapter 10** presents the conclusions and recommendations based on the findings of the final BA Report.
- **Chapter 11** provides references used in the compilation of the final BA Report.

The BA report was made available for review from 29 May 2019 – 01 July 2019. The report was available for review at the Kleinsee Public Library (3rd Avenue, Kleinsee) and on the Savannah Environmental website (www.savannahSA.com).

All comments received by interested and affected parties (I&APs) during the 30-day review period have been recorded, included and addressed as part of this final Basic Assessment Report.

EXECUTIVE SUMMARY

Genesis Namas Wind (Pty) Ltd proposes the construction and operation of a grid connection solution for the authorised Namas Wind Farm, near Kleinsee, Northern Cape Province. The grid connection solution will include the development of a collector substation (known as the Rooivlei Substation) and a double-circuit 132kV power line (known as the Rooivlei-Gromis 132kV power line) to connect the Namas Wind Farm to the national grid. Other associated infrastructure will also be required for the grid connection solution such as access tracks/roads and laydown areas. A corridor 300m wide and 32km long (known as the grid connection corridor) is being assessed to allow for the optimisation of the grid and associated infrastructure and to accommodate environmental sensitivities (**Figure 1**). The grid connection corridor is located within the Springbok Renewable Energy Development Zone (REDZ) and within the northern corridor of the Strategic Transmission Corridors.

The Namas Wind Farm received an Environmental Authorisation in February 2019 from the Department of Environmental Affairs, as part of a separate application for environmental authorisation undertaken for the wind farm (DEA ref.: 14/12/16/3/3/1/1971). This final Basic Assessment Report therefore focusses on the grid connection solution required to be constructed and operated in order for the Namas Wind Farm to evacuate the generated power to the national grid. In order for the Namas Wind Farm to evacuate the generated wind power to the national grid, a connection must be established between the wind farm and the grid connection point. This solution includes the development of specific infrastructure in order to enable the connection establishment. The infrastructure includes:

- a collector substation (known as the Rooivlei Substation);
- a double-circuit 132kV power line (known as the Rooivlei-Gromis 132kV double-circuit power line); and
- associated infrastructure such as access tracks/roads and laydown areas.

A corridor 300m wide and 32km long is being assessed to allow for the optimisation of the grid and associated infrastructure and to accommodate environmental sensitivities. The grid infrastructure (including the power line and collector substation) will be developed within the assessed 300m wide corridor (known as the grid connection corridor).

The full length of the assessed 300m wide corridor traverses eleven affected properties, namely:

- Portion 3 of the Farm Zonnekwa 328
- Portion 2 of the Farm Zonnekwa 328
- Portion 1 of the Farm Zonnekwa 326
- Remaining extent of the Farm Zonnekwa 326
- Remaining extent of the Farm Honde Vlei 325
- Remaining extent of the Farm Kannabieduin 324
- Remaining extent of the Farm Sand Kop 322
- Remaining extent of the Farm Mannels Vley 321
- Remaining extent of the Farm Dikgat 195
- Portion 15 of the Farm Dikgat 195
- Remaining Extent of Farm Rooivlei 327

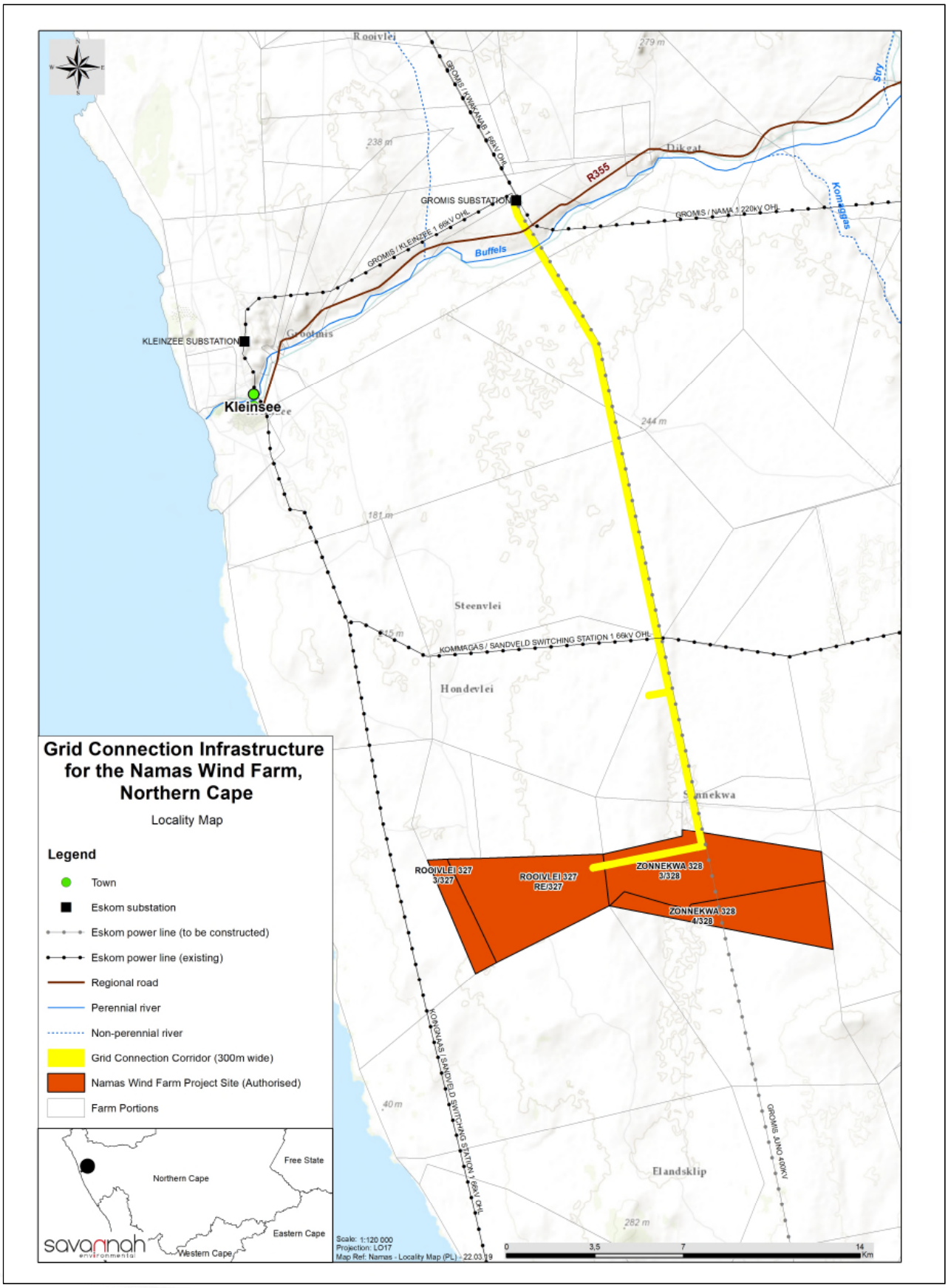

Figure 1: Locality map showing the grid connection corridor (300m wide) proposed for the development of the grid connection infrastructure (including the power line and collector substation) for the authorised Namas Wind Farm

No environmental fatal flaws were identified in the detailed specialist studies conducted for the grid connection infrastructure for the Namas Wind Farm. All impacts associated with the project establishment within the grid connection corridor can be mitigated to acceptable levels or enhanced through the implementation of the recommended mitigation or enhancement measures.

The potential environmental impacts associated with the grid connection infrastructure for the Namas Wind Farm identified and assessed through the BA process include:

Ecological Impacts - From the findings of the Ecological Impact Assessment it can be concluded that the grid connection corridor assessed for the development of the grid connection infrastructure is of low ecological sensitivity. As a result, there are no specific long-term impacts associated with the grid connection infrastructure that cannot be reduced to an acceptable level through mitigation and avoidance. There are no high residual impacts or fatal flaws associated with the development and it can be supported from a terrestrial ecology perspective. The specialist has indicated that the grid connection infrastructure for the Namas Wind Farm should be authorised, from an ecological perspective, and subject to the implementation of the recommended mitigation measures.

Avifauna Impacts - Within the grid connection corridor only one area of high avifauna sensitivity was identified. From the results of the avifauna assessment, it can be concluded that with the implementation of the recommended mitigation measures, the risks and mortalities expected with the development of the grid connection infrastructure can be reduced to acceptable levels. No long-term impacts of a high significance are expected and no fatal flaws were identified from an avifauna perspective. The specialist has indicated that the grid connection infrastructure for the Namas Wind Farm should be authorised, and subject to the implementation of the recommended mitigation measures.

Impacts on Land Use, Soil and Agricultural Potential – Impacts during the construction and operation phase will be of a low significance. The level of impact will be acceptable considering the characteristics and potential of the soils present. No fatal flaws have been identified from a soils and agricultural potential perspective. Therefore, the specialist has indicated that the development of the grid connection infrastructure for the Namas Wind Farm is considered to be acceptable from a soils and agricultural perspective.

Impacts on Heritage Resources – Impacts on archaeology, palaeontology and cultural landscape have been identified. No fatal flaws have been identified from a heritage perspective. The significance of the impacts will be low, with the implementation of the recommended mitigation measures. No heritage impacts of high significance are expected, and the development of the grid connection infrastructure is considered to be acceptable, subject to the implementation of the recommendations made by the specialist.

Visual Impacts - The Visual Impact Assessment concluded that the visual impact of the grid connection infrastructure would be most significant within a 0.5km radius from the infrastructure. The significance of the impacts will, however, be low, with the implementation of the recommended mitigation measures. No impacts of a high significance are expected to occur. The specialist indicated that the development of the grid connection infrastructure is supported from a visual perspective, subject to the implementation of the recommended mitigation measures.

Socio-Economic Impacts - Majority of the social impacts associated with the development of the grid connection infrastructure will have a very short-term duration associated with the construction and decommissioning phases, and long-term duration during the operation phase. Only positive impacts have been identified for both the construction and operation phases of the grid connection infrastructure. Overall, the development of the grid connection infrastructure will be associated with positive socio-economic impacts of medium significance during the construction, operation and decommissioning phases.

Cumulative Impacts - The contribution of the project to cumulative impacts will range from low significance to high significance, depending on the impact being considered. There are, however, no identified impacts considered as presenting an unacceptable risk. In addition, no impacts that will result in whole-scale change are expected.

Figure 2 provides an environmental sensitivity map of the grid connection corridor assessed as part of the BA process, as well as the environmental sensitivities identified.

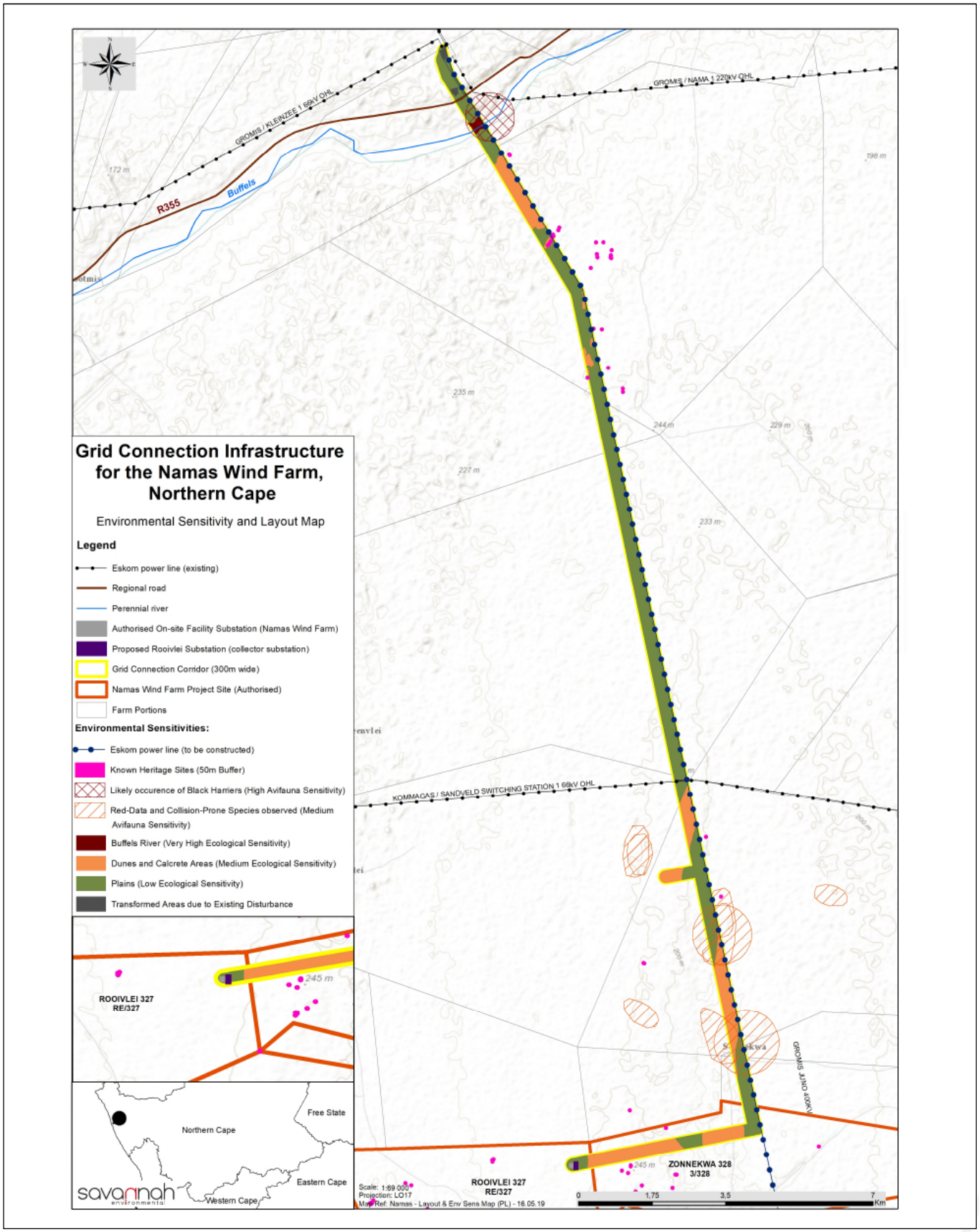

Figure 2: Environmental sensitivity map overlain with the assessed grid connection corridor within which the grid connection infrastructure for the Namas Wind Farm is proposed to be developed

DEFINITIONS AND TERMINOLOGY

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Commence: The start of any physical activity, including site preparation and any other activity on site furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

Commercial Operation date: The date after which all testing and commissioning has been completed and is the initiation date to which the seller can start producing electricity for sale (i.e. when the project has been substantially completed).

Commissioning: Commissioning commences once construction is completed. Commissioning covers all activities including testing after all components of the wind turbine are installed.

Construction: Construction means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity. Construction begins with any activity which requires Environmental Authorisation.

Cumulative impacts: Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period and can include both direct and indirect impacts.

Decommissioning: To take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned. This usually occurs at the end of the life of a facility.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation, or maintenance of an activity and are generally obvious and quantifiable.

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Emergency: An undesired/ unplanned event that results in a significant environmental impact and requires the notification of the relevant statutory body, such as a local authority.

Endemic: An "endemic" is a species that grows in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

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.

Environmental impact: An action or series of actions that have an effect on the environment.

Environmental management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental management programme: An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its ongoing maintenance after implementation.

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000).

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800.

Indirect impacts: Indirect or induced changes that may occur because of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place because of the activity.

Interested and affected party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups, and the public.

Method statement: A written submission to the ECO and the site manager (or engineer) by the EPC Contractor in collaboration with his/her EO.

Mitigation hierarchy: The mitigation hierarchy is a framework for managing risks and potential impacts related to biodiversity and ecosystem services. The mitigation hierarchy is used when planning and implementing development projects, to provide a logical and effective approach to protecting and conserving biodiversity and maintaining important ecosystem services. It is a tool to aid in the sustainable

management of living, natural resources, which provides a mechanism for making explicit decisions that balance conservation needs with development priorities

No-go areas: Areas of environmental sensitivity that should not be impacted on or utilised during the development of a project as identified in any environmental reports.

Pollution: A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted from any activity, including the storage or treatment or waste or substances.

Pre-construction: The period prior to the commencement of construction, this may include activities which do not require Environmental Authorisation (e.g. geotechnical surveys).

Rare species: Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare."

Red data species: Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Significant impact: An impact that by its magnitude, duration, intensity, or probability of occurrence may have a notable effect on one or more aspects of the environment.

Wind power: A measure of the energy available in the wind.

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CHAPTER 1: INTRODUCTION

Genesis Namas Wind (Pty) Ltd proposes the construction and operation of a grid connection solution for the proposed Namas Wind Farm, near Kleinsee, Northern Cape Province. The grid connection solution will include the development of a collector substation[1] (known as the Rooivlei Substation) and a double-circuit 132kV power line (known as the Rooivlei-Gromis 132kV power line) to connect the Namas Wind Farm to the national grid. Other associated infrastructure will also be required for the grid connection solution such as access tracks/roads and laydown areas. A corridor 300m wide and 32km long (known as the grid connection corridor) is being assessed to allow for the optimisation of the grid and associated infrastructure and to accommodate environmental sensitivities.

The Namas Wind Farm received an Environmental Authorisation in February 2019 from the Department of Environmental Affairs, as part of a separate application for environmental authorisation undertaken for the wind farm (DEA ref.: 14/12/16/3/3/1/1971). This Basic Assessment Report therefore focusses on the grid connection solution required to be constructed and operated in order for the Namas Wind Farm[2] to evacuate the generated power to the national grid.

The development of the wind farm, and the associated grid connection infrastructure (as assessed within this final Basic Assessment Report) is in response to identified objectives of the national and provincial government, and local and district municipalities to develop renewable energy facilities for power generation purposes. The project development site is located within the Springbok Renewable Energy Development Zone (REDZ) and within the northern corridor of the Strategic Transmission Corridors. From a regional perspective, this area (which includes the 300m wide corridor) is considered favourable for the development of grid infrastructure due to the location of the project development site within the northern corridor of the Strategic Transmission Corridors as well as the REDZ, the availability of a direct grid connection point (i.e. point of connection to the Eskom National grid), and the development of grid infrastructure in the general area considering the potential for the development of a number of authorised wind energy facilities.

The nature and extent of the proposed grid connection infrastructure, as well as the potential environmental impacts associated with the construction, operation and decommissioning phases of infrastructure of this nature are explored in detail in this final Basic Assessment Report. Site specific environmental issues and constraints within the grid connection corridor are considered within independent specialist studies in order to test the environmental suitability of the corridor for the development of the grid connection infrastructure for the authorised wind farm, delineate areas of sensitivity within the corridor, and ultimately inform the placement of the grid connection infrastructure (which includes both the power line and the collector substation) within the grid connection corridor.

[1] The collector substation will be either 22/132kV or 33/132kV.

[2] It is the developer's intention to bid the Namas Wind Farm under the Department of Energy's (DoE) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme with the aim of evacuating the generated power into the Eskom national electricity grid and aiding in the diversification and stabilisation of the country's electricity supply, in line with the objectives of the Integrated Resource Plan (IRP).

This final Basic Assessment (BA) report consists of the following sections:

» **Chapter 1** provides background to the proposed grid connection infrastructure for the Namas Wind Farm and the basic assessment process.
» **Chapter 2** provides a description of the grid connection infrastructure.
» **Chapter 3** provides the site selection information and identified project alternatives.
» **Chapter 4** outlines the strategic regulatory and legal context for energy planning in South Africa and specifically for the grid connection infrastructure.
» **Chapter 5** describes the need and desirability of the grid connection infrastructure for the Namas Wind Farm within the grid connection corridor.
» **Chapter 6** outlines the approach to undertaking the basic assessment process.
» **Chapter 7** describes the existing biophysical and socio-economic environment within and surrounding the corridor proposed for the development.
» **Chapter 8** provides an assessment of the potential issues and impacts associated with the grid connection infrastructure and presents recommendations for the mitigation of significant impacts.
» **Chapter 9** provides an assessment of the potential for cumulative impacts.
» **Chapter 10** presents the conclusions and recommendations based on the findings of the final BA Report.
» **Chapter 11** provides references used in the compilation of the final BA Report.

1.1 Requirements for an Environmental Impact Assessment Process

The construction and operation of the grid connection infrastructure for the Namas Wind Farm is subject to the requirements of the EIA Regulations, 2014 (as amended), published in terms of Section 24(5) of the National Environmental Management Act (NEMA) 107 of 1998. NEMA is the national legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed, and reported on to the Competent Authority (the decision-maker) charged by NEMA with granting of the relevant environmental authorisation.

The development (i.e. construction and operation) of the grid connection infrastructure is subject to the requirements of the Environmental Impact Assessment (EIA) Regulations of 2014 published in terms of Section 24(5) of NEMA. In terms of the EIA Regulations of 2014 (as amended on 07 April 2017) promulgated under Sections 24 and 24D of the NEMA, various aspects of the project are listed as activities that may have a detrimental impact on the environment. The main listed activity triggered by the proposed grid connection infrastructure is Activity 11(i) of Listing Notice 1 (GNR327 of the EIA Regulations, 2014 (as amended)), which relates to the development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.

Due to the triggering of Activity 11(i) of Listing Notice 1, of the EIA Regulations, 2014 (as amended), a Basic Assessment process must be undertaken in order to obtain Environmental Authorisation for the construction and operation of the grid connection infrastructure for the Namas Wind Farm. The grid connection corridor is also located within the northern corridor of the Strategic Transmission Corridors and the Springbok Renewable Energy Development Zone (REDZ), gazetted on 16 February 2018 (GNR113 and GNR114). These transmission corridors are considered to be of strategic importance for the rollout of the supporting large scale electricity transmission and distribution infrastructure in terms of Strategic Integrated Project 10: Electricity Transmission and Distribution.

This final Basic Assessment report (hereafter referred to as the final BA Report) is also undertaken in line with Appendix 1 of the EIA Regulations, 2014 (as amended). Genesis Namas Wind (Pty) Ltd appointed Savannah Environmental as the independent environmental consultants to conduct the BA process for the grid connection infrastructure.

A BA is an effective planning and decision-making tool for the project developer as it allows for the identification and management of potential environmental impacts. It provides the opportunity for the developer to be forewarned of potential environmental issues, and allows for resolution of the issues reported on in the BA Report as well as dialogue with interested and affected parties (I&APs).

The BA process comprises one phase and involves the identification and assessment of environmental impacts through specialist studies, as well as public participation. The process followed in the Basic Assessment involves a detailed assessment of potentially significant positive and negative impacts (direct, indirect, and cumulative). This includes detailed specialist investigations and one round of public consultation. Following the public review period of the BA Report and Environmental Management Programme (EMPr), a final BA Report and an EMPr is submitted to the Competent Authority, which includes the recommendations for practical and achievable mitigation and management measures for final review and decision-making.

The need to comply with the requirements of the EIA Regulations ensures that the competent authority is provided with the opportunity to consider the potential environmental impacts of a project early in the project development process and to assess if potential environmental impacts can be avoided, minimised or mitigated to acceptable levels. Environmental issues are considered through specialist assessments in order to: test the environmental suitability of the 300m wide corridor for the proposed development, delineate areas of sensitivity within the corridor, and ultimately inform the placement of the grid connection infrastructure within the grid connection corridor. Site specific specialist assessments of the 300m wide corridor have been undertaken during the BA process. Comprehensive, independent environmental studies are required in accordance with the EIA Regulations to provide the Competent Authority with sufficient information in order to make an informed decision.

In terms of GNR 779 of 01 July 2016, the National Department of Environmental Affairs (DEA) has been determined as the Competent Authority for all projects which relate to the Integrated Resource Plan for Electricity (IRP) 2010 – 2030, and any updates thereto. Through the decision-making process, the DEA will be supported by the Northern Cape Department of Environment and Nature Conservation (DENC) as a commenting authority.

The nature and extent of the grid connection infrastructure for the Namas Wind Farm, as well as potential environmental impacts and mitigation associated with the construction, operation and decommissioning phases of a development of this nature are explored in more detail in this final BA Report.

1.2 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This final BA Report has been prepared in accordance with the requirements of the EIA Regulations published on 08 December 2014 (as amended in April 2017) promulgated in terms of Chapter 5 of the National Environmental Management Act (Act No 107 of 1998).

This chapter of the final BA Report includes the following information required in terms of Appendix 1: Content of basic assessment reports:

Requirement	Relevant Section
3(a) the details of the (i) EAP who prepared the report and (ii) the expertise of the EAP, including a curriculum vitae.	The details of the EAP who prepared the report and the expertise of the EAP is included in section 1.5. The curriculum vitae of the EAP, project team and independent specialists are included in **Appendix A**.
3(b) the location of the activity including (i) the 21 digit Surveyor General code of each cadastral land parcel, (ii) where available the physical address and farm name and (iii) where the required information in items (i) and (ii) is not available, the co-ordinates of the boundary of the property or properties.	The location of the grid connection corridor, within which the 132kV power line and collector substation will be developed, is included in section 1.3, Table 1.1 and Figure 1.1. The information provided includes the 21-digit Surveyor General code of the affected properties and the farm names. Additional information is also provided regarding the location of the development which includes the relevant province, local and district municipalities, ward and current land zoning.

1.3 Overview of the Grid Connection Infrastructure for the Namas Wind Farm

Genesis Namas Wind (Pty) Ltd is proposing the establishment of the authorised Namas Wind Farm to add new capacity to the national electricity grid. The project is proposed to be part of the Department of Energy's (DoE) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme and is expected to be bid in the next available bidding window. In order for the Namas Wind Farm to evacuate the generated wind power to the national grid, a connection must be established between the wind farm and the grid connection point. This connection is considered to be the grid connection solution for the Namas Wind Farm and includes the development of specific infrastructure in order to enable the connection establishment. The infrastructure includes:

- a collector substation[3] (known as the Rooivlei Substation);
- a double-circuit 132kV power line (known as the Rooivlei-Gromis 132kV double-circuit power line); and
- associated infrastructure such as access tracks/roads and laydown areas.

A corridor 300m wide and 32km long is being assessed to allow for the optimisation of the grid and associated infrastructure and to accommodate environmental sensitivities. The grid infrastructure (including the power line and collector substation) will be developed within the assessed 300m wide corridor (known as the grid connection corridor).

Two grid connection options exist within the corridor, namely:

- A direct connection from the proposed Rooivlei Substation to the existing Gromis Substation located ~26km from the northern boundary of the Namas Wind Farm project site. This is considered to be the preferred option from a technical perspective due to the fact that the Gromis Substation is already existing.

[3] The collector substation is envisaged to cater as a possible feed-in point for more than one wind farm in the area.

» A direct connection from the Rooivlei Substation to a proposed collector substation (known as the Strandveld Substation) which forms part of the Zonnequa Wind Farm grid connection solution[4]. The Strandveld Substation is located ~6km from the northern boundary of the Namas Wind Farm project site. This option is only viable should the Zonnequa Wind Farm be developed.

The full length of the assessed 300m wide corridor traverses eleven affected properties, namely:
» Portion 3 of the Farm Zonnekwa 328
» Portion 2 of the Farm Zonnekwa 328
» Portion 1 of the Farm Zonnekwa 326
» Remaining extent of the Farm Zonnekwa 326
» Remaining extent of the Farm Honde Vlei 325
» Remaining extent of the Farm Kannabieduin 324
» Remaining extent of the Farm Sand Kop 322
» Remaining extent of the Farm Mannels Vley 321
» Remaining extent of the Farm Dikgat 195
» Portion 15 of the Farm Dikgat 195
» Remaining Extent of Farm Rooivlei 327

It must be noted that the assessed corridor route is located directly adjacent and parallel to the approved (however, yet to be constructed) Eskom Gromis-Juno 400kV power line.

The key infrastructure components proposed as part of the facility are described in greater detail in Chapter 2 of this final BA Report.

Table 1.1: A detailed description of the grid connection corridor for the development of the grid connection infrastructure (including the power line and collector substation) for the Namas Wind Farm

Province	Northern Cape Province
District Municipality	Namakwa District Municipality
Local Municipality	Nama Khoi Local Municipality
Ward number(s)	8
Nearest town(s)	Kleinsee (~14km west), Komaggas (~24km east) and Koingnaas (~40km south)
Affected Properties: Farm name(s), number(s) and portion numbers	**Grid Connection Corridor (300m wide):** » Portion 3 of the Farm Zonnekwa 328 » Portion 2 of the Farm Zonnekwa 328 » Portion 1 of the Farm Zonnekwa 326 » Remaining extent of the Farm Zonnekwa 326 » Remaining extent of the Farm Honde Vlei 325 » Remaining extent of the Farm Kannabieduin 324 » Remaining extent of the Farm Sand Kop 322 » Remaining extent of the Farm Mannels Vley 321 » Remaining extent of the Farm Dikgat 195 » Portion 15 of the Farm Dikgat 195

[4] The grid connection infrastructure for the Zonnequa Wind Farm is being assessed as part of a separate Basic Assessment Process.

	» Remaining Extent of Farm Rooivlei 327
SG 21 Digit Code (s)	**Grid Connection Corridor (300m wide):** » Portion 3 of the Farm Zonnekwa 328 - C05300000000032800003 » Portion 2 of the Farm Zonnekwa 328 - C05300000000032800002 » Portion 1 of the Farm Zonnekwa 326 - C05300000000032600001 » Remaining extent of the Farm Zonnekwa 326 - C05300000000032600000 » Remaining extent of the Farm Honde Vlei 325 - C05300000000032500000 » Remaining extent of the Farm Kannabieduin 324 - C05300000000032400000 » Remaining extent of the Farm Sand Kop 322 - C05300000000032200000 » Remaining extent of the Farm Mannels Vley 321 - C05300000000032100000 » Remaining extent of the Farm Dikgat 195 - C05300000000019500000 » Portion 15 of the Farm Dikgat 195 - C05300000000019500015 » Remaining Extent of Farm Rooivlei 327 - C05300000000032700000
Current zoning and land use	Agricultural (with some mining activities taking place within the area)

Table 1.2 below provides the technical details of the proposed infrastructures. This has been included to comply with the requirements of the DEA, as per their comments dated 01 July 2019.

Table 1.2: Technical details for the proposed double-circuit power line and other associated infrastructure

Component	**Description / dimensions**
Length of the power line	Up to 32km
Area of the servitude	Up to 36m wide and 32km in length (i.e. 36m x 32 000m)
Clearance height of power line	Up to 32m.
Area occupied by inverter / transformer stations / substations	The collector substation will have a footprint of 100m x 200m.
Capacity of power line	132kV
Area occupied by both permanent and construction laydown areas	Temporary laydown areas will be located within previously transformed areas or areas that have been identified as being of low sensitivity.

1.4 Objectives of the Basic Assessment Process

Appendix 1 of the EIA Regulations, 2014 (as amended), contains the objectives to be achieved through the undertaking of a BA process. The following objectives have been considered, undertaken and achieved through a consultative process within this final BA Report for the grid connection infrastructure for the Namas Wind Farm:

- The identification and consideration of the policies and legislative context associated with the location of the grid connection solution (i.e. 300m wide grid connection corridor) and the manner in which the proposed development complies with and responds to the relevant policies and legislative context.
- The identification and consideration of feasible alternatives associated with the grid connection infrastructure for the Namas Wind Farm that relate to the specific proposed activity and the location of where the development is proposed.
- The consideration of the need and the desirability of the grid connection infrastructure for the Namas Wind Farm considering the alternatives identified, including the desirability for the development within the grid connection corridor.
- The identification and consideration of the nature, consequence, extent, duration and probability of the impacts associated with the grid connection infrastructure, as well as the degree to which the

impacts can be reversed, result in irreplaceable loss of resources and be avoided, managed or mitigated.

- Motivation for the preferred site (i.e. grid connection corridor) and proposed activity.
- Consideration and identification of the environmental sensitivities to provide input in terms of measures to avoid, manage and mitigate the impacts and the residual risks that need to be managed and monitored.

The release of the BA Report for a 30-day review period has provided stakeholders with an opportunity to review and provide input in terms of potential issues and concerns that may be associated with the establishment of the grid connection infrastructure for the Namas Wind Farm. This final BA Report considers and incorporates all issues, concerns and responses raised during the review period of the BA Report. The DEA will consider these issues, concerns and responses in their decision-making of the application for Environmental Authorisation.

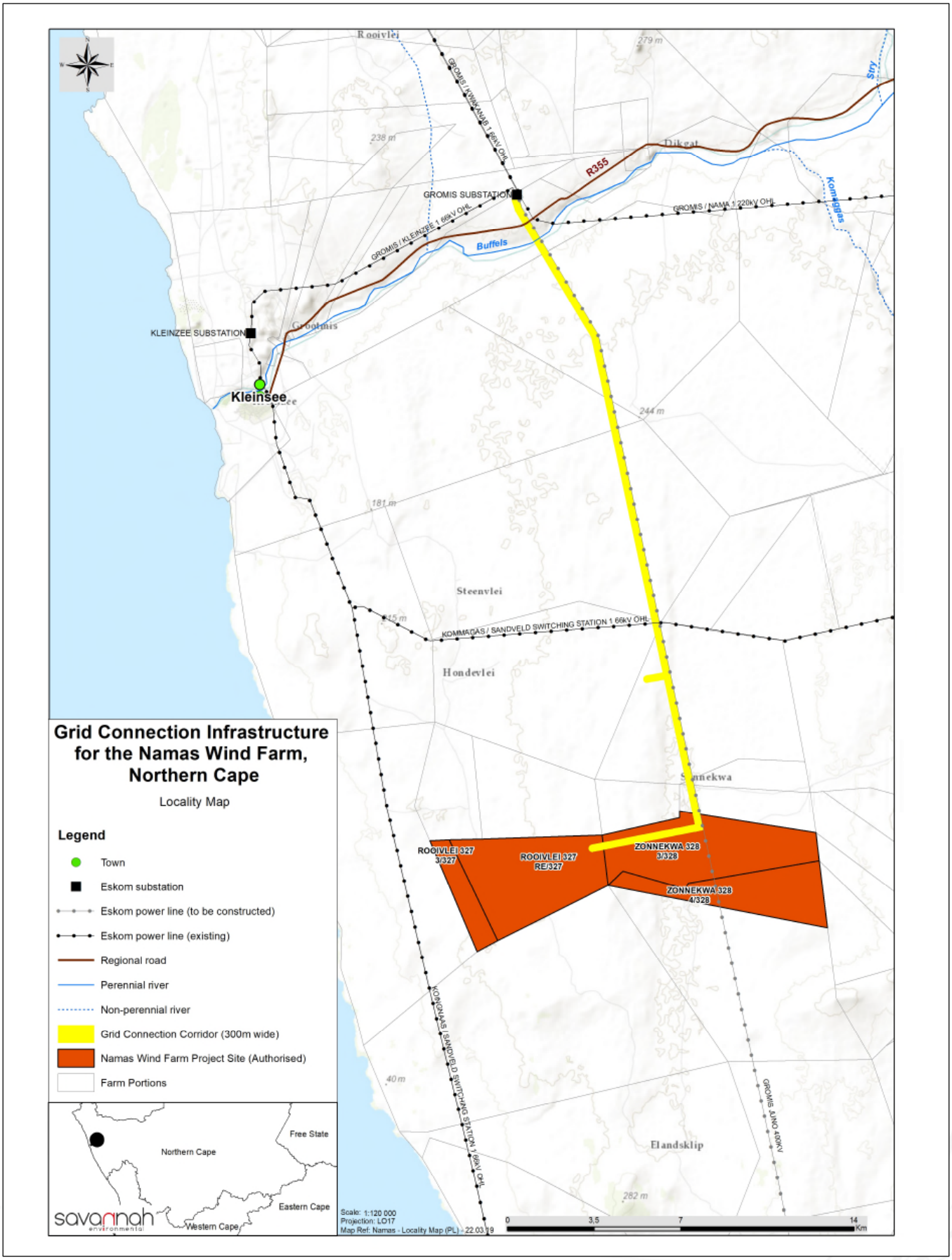

Figure 1.1: Locality map showing the grid connection corridor (300m wide) proposed for the development of the grid connection infrastructure (including the power line and collector substation) for the authorised Namas Wind Farm

1.5 Details of the Environmental Assessment Practitioner and Expertise to conduct the BA process

In accordance with Regulation 12 of the 2014 EIA Regulations (GNR 326), Genesis Namas Wind (Pty) Ltd has appointed Savannah Environmental (Pty) Ltd (Savannah Environmental) as the independent Environmental Assessment consultant to undertake the Basic Assessment and prepare the BA Report for the grid connection infrastructure for the authorised Namas Wind Farm. Neither Savannah Environmental nor any of its specialists are subsidiaries of, or are affiliated to Genesis Namas Wind. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed project.

Savannah Environmental is a specialist environmental consulting company providing a holistic environmental management service, including environmental assessment and planning to ensure compliance and evaluate the risk of development, and the development and implementation of environmental management tools. Savannah Environmental benefits from the pooled resources, diverse skills and experience in the environmental field held by its team.

The Savannah Environmental team have considerable experience in basic assessments and environmental management, and have been actively involved in undertaking environmental studies, for a wide variety of projects throughout South Africa, including those associated with electricity generation.

- *Lisa Opperman*, the principle author of this report. She holds a Bachelors degree with Honours in Environmental Management and has 4 years of experience in the environmental field. Her key focus is on environmental impact assessments, public participation, environmental management plans and programmes, as well as mapping using ArcGIS for a variety of environmental projects. She is currently involved in several EIAs for renewable energy and large infrastructure projects across the country.
- *Nicolene Venter* is responsible for the public participation process for the BA. She is a Board Member of IAPSA (International Association for Public Participation South Africa). She has over 21 years of experience in public participation, stakeholder engagement, awareness creation processes and facilitation of various meetings (focus group, public meetings, workshops, etc.). She is responsible for project management of public participation processes for a wide range of environmental projects across South Africa and neighbouring countries.
- *Karen Jodas* is a registered Professional Natural Scientist and holds a Master of Science degree. She has 21 years of experience consulting in the environmental field and is the EAP for the project. Her key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and guideline development. She is currently responsible for the project management of EIAs for several renewable energy and large infrastructure projects across the country.

The EAP Declaration of Independence and Affirmation is included in **Appendix M**.

In order to adequately identify and assess potential environmental impacts associated with the proposed Namas Wind Farm, the following specialist consultants have provided input into this final Basic Assessment report:

Specialist	Area of Expertise
Simon Todd of Simon Todd Consulting	Ecology
Rob Simmons and Marlei Martins of Birds and Bats Unlimited Environmental Consultants	Avifauna
Garry Paterson of the Agricultural Research Council (ARC)	Soils and Agricultural Potential
Jayson Orton of ASHA Consulting (with input from John Pether)	Heritage (including archaeology and palaeontology)
Lourens du Plessis of LOGIS	Visual
Elena Broughton of Urban-Econ	Socio-economic

Specialist declarations of the independent specialists is included in **Appendix L.**

Appendix A includes the curricula vitae for the environmental assessment practitioners from Savannah Environmental and the specialist consultants.

CHAPTER 2: PROJECT DESCRIPTION

This chapter provides an overview of the grid connection infrastructure for the Namas Wind Farm and details the project scope, which includes the planning/design, construction, operation and decommissioning activities required for the development.

2.1. Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter of the final BA report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of basic assessment reports:

Requirement	Relevant Section
3(b) the location of the activity including (i) the 21 digit Surveyor General code of each cadastral land parcel, (ii) where available the physical address and farm name and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.	The location of the proposed grid connection infrastructure for the Namas Wind Farm is detailed in Chapter 1, **Table 1.1**, as well as section 2.2.1 below.
3(c)(i)(ii) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or on land where the property has not been defined, the coordinates within which the activity is to be undertaken	A layout map illustrating the grid connection corridor (300m wide) within which the grid connection infrastructure is planned to be developed for the Namas Wind Farm is included as **Figure 2.2**.
3(d)(ii) a description of the scope of the proposed activity, including a description of the activities to be undertaken including associated structures and infrastructure	A description of the activities to be undertaken with the development of the grid connection infrastructure is included in **Table 2.1** and **Table 2.2**.

2.2 Nature and extent of the Grid Connection Infrastructure for the Namas Wind Farm

Genesis Namas Wind (Pty) Ltd is proposing the development of grid connection infrastructure in order to enable the evacuation of the generated power from the Namas Wind Farm into the national grid. This is considered as the grid connection solution for the wind farm and includes a collector substation and a 132kV double-circuit power line.

The grid connection infrastructure will be located within a grid connection corridor[5] located directly adjacent and parallel to the Eskom Gromis-Juno 400kV power line, which is planned to be constructed in

[5] The grid connection corridor will be 300m wide and will house both the proposed collector substation and the 132kV double-circuit power line.

2021 as per the Eskom Transmission Development Plan 2019-2028[6]. The corridor is 32km in length, and extends between the authorised Namas Wind Farm and the Eskom Gromis Substation. The height of the power line towers of the 132kV double-circuit power line will be up to 32m and the servitude width of the power line will be up to 36m. The extent of the collector substation footprint (i.e. Rooivlei Substation, located on the authorised Namas Wind Farm project site) will be 100m x 200m and the capacity of the substation will be 132kV.

2.2.1. Project Site

The grid connection corridor is located within the Nama Khoi Local Municipality and the Namakwa District Municipality and comprises the following 11 affected properties[7]:

- Portion 3 of the Farm Zonnekwa 328
- Portion 2 of the Farm Zonnekwa 328
- Portion 1 of the Farm Zonnekwa 326
- Remaining extent of the Farm Zonnekwa 326
- Remaining extent of the Farm Honde Vlei 325
- Remaining extent of the Farm Kannabieduin 324
- Remaining extent of the Farm Sand Kop 322
- Remaining extent of the Farm Mannels Vley 321
- Remaining extent of the Farm Dikgat 195
- Portion 15 of the Farm Dikgat 195
- Remaining Extent of Farm Rooivlei 327

The corridor identified for the grid connection infrastructure for the Namas Wind Farm is located approximately 14km west of Kleinsee. The entire extent of the corridor proposed for the development is located within the Springbok Renewable Energy Development Zone (REDZ) and within the northern corridor of the Strategic Transmission Corridors (**Figure 2.1**).

Access to the grid connection corridor is possible via numerous existing roads in close vicinity to the corridor. Apart from these existing roads, the authorised Namas Wind Farm contains access roads that can also be used to access the corridor. Formal roads will not be constructed underneath the power line for maintenance purposes; access for maintenance purposes will be limited to jeep tracks.

2.2.2. Components of the Grid Infrastructure for the Namas Wind Farm

The grid connection corridor is proposed to accommodate both the collector substation and the double-circuit 132kV power line, as well as the associated infrastructure, and will include:

[6] Eskom Transmission Development Plan, 2019-2028 :
http://www.eskom.co.za/Whatweredoing/TransmissionDevelopmentPlan/Documents/2019-2028PublicTDPreport1.pdf

7 The 300m wide grid connection corridor traverses limited sections of the 11 affected properties. This is a comprehensive listing of these properties.

» a double-circuit 132kV power line (known as the Rooivlei-Gromis 132kV double-circuit power line);
» a collector substation (known as the Rooivlei Substation); and
» associated infrastructure such as access tracks/roads and laydown areas.

A summary of the details and dimensions of the planned infrastructure associated with the project is provided in **Table 2.1.**

Table 2.1: Confirmed details or dimensions of the proposed grid connection infrastructure for the Namas Wind Farm[8]

Infrastructure	Footprint, dimensions and details
Corridor width (for assessment purposes)	A 300m wide grid connection corridor is being assessed within which the grid connection infrastructure will be constructed and operated.
Double-circuit power line	The double-circuit power line will be known as the Rooivlei-Gromis 132kV double-circuit power line.
Double-circuit power line capacity	132kV
Power line servitude width	Up to 36m
Length of the power line	Up to 32km
Height of the towers	Up to 32m. Power line towers (or pylons) are an average distance of 200m apart but can exceed 500m depending on the topography and terrain to be spanned.
Collector substation	The collector substation will be known as the Rooivlei Substation. The collector substation will be located directly adjacent and to the east of the authorised on-site substation associated with the Namas Wind Farm.
Collector substation capacity	22kV/132kV or 33kV/132kV
Substation footprint	100m x 200m
Access roads/ tracks	Access for maintenance purposes will be limited to jeep tracks.

Figure 2.2 illustrates the grid connection corridor proposed for the development of the grid infrastructure for the Namas Wind Farm assessed as part of this final BA report.

Table 2.2 overleaf provides the details regarding the requirements and the activities to be undertaken during the grid connection infrastructure development phases (i.e. construction phase, operation phase and decommissioning phase).

[8] The confirmed details and dimensions of the grid connection infrastructure was assessed as part of the independent specialist studies.

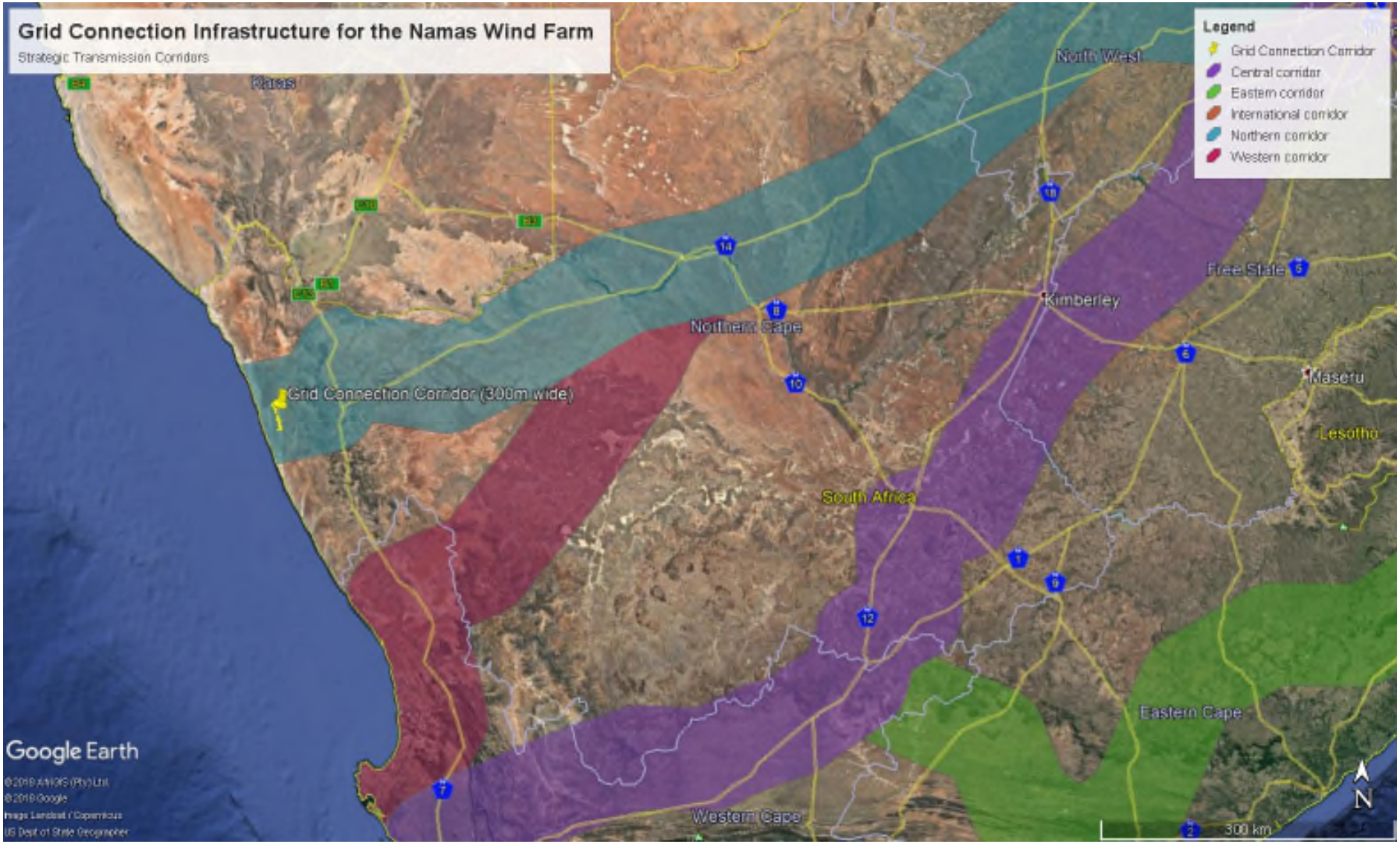

Figure 2.1: The location of the grid connection corridor within the northern corridor of the Strategic Transmission Corridors

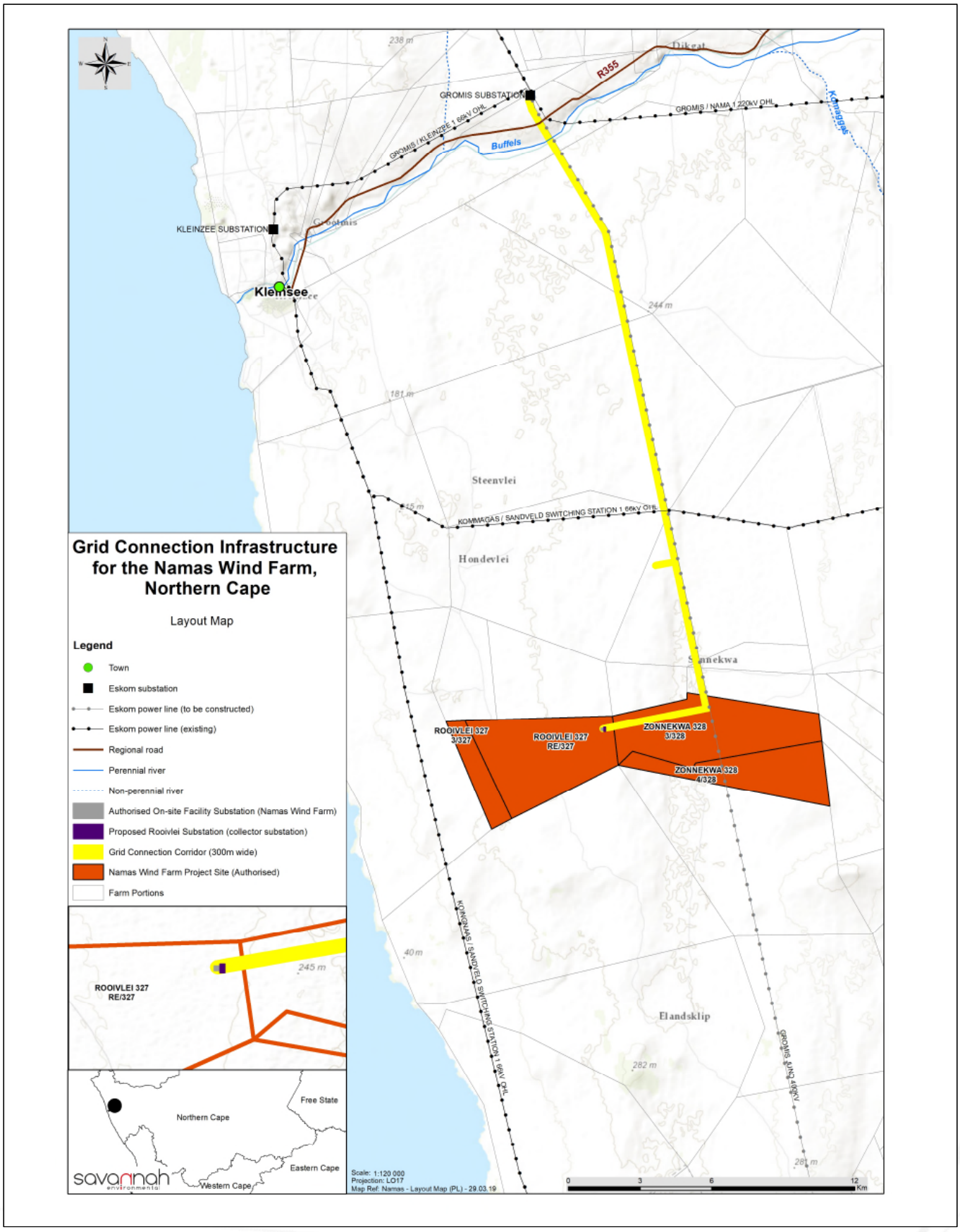

Figure 2.2: Grid Connection corridor associated with the grid connection solution of the Namas Wind Farm. The grid connection infrastructure (collector substation and 132kV double-circuit power line) will be constructed and operated within the 300m wide corridor.

2.2.3 Project Development Phases associated with the Grid Connection Infrastructure for the Namas Wind Farm

Table 2.2: Details of the grid connection infrastructure development phases (i.e. construction, operation and decommissioning)

Construction Phase	
Requirements	» Duration of the construction phase is expected to be up to 12 months. » Create direct construction employment opportunities. Up to 130 employment opportunities will be created during the construction phase. » No on-site labour camps. Employees to be accommodated in the nearby towns such as Kleinsee, and transported to and from site on a daily basis. » Overnight on-site worker presence would be limited to security staff. » Construction waste will be stored on site and waste removal and sanitation will be undertaken by a sub-contractor or the municipality. » Electricity required for construction activities will be generated by a generator or will be sourced from available 11kV or 22kV Eskom distribution networks in the area. » Negligible water will be required for the construction phase and potable needs. If required, water will be sourced from the Nama Khoi Local Municipality, an existing borehole on the Namas Wind Farm project site, or water will be extracted from any bulk water supply pipelines near the corridor.
Construction sequence	Overhead power lines are constructed in the following simplified sequence: » Step 1: Surveying of the development area and negotiating with affected landowners; » Step 2: Final design and micro-siting of the infrastructure based on geo-technical, topographical conditions and potential environmental sensitivities; » Step 3: Vegetation clearance and construction of access roads/tracks (where required); » Step 4: Construction of tower foundations; » Step 5: Assembly and erection of infrastructure on site; » Step 6: Stringing of conductors; » Step 7: Rehabilitation of disturbed areas; » Step 8: Continued maintenance. It is anticipated that the construction of the double-circuit 132kV power line will take up to 12 months to complete. The construction period will

	however depend on the season and the climatic conditions on site. The final definition of the centre line for the power line and co-ordinates of each bend in the line (if applicable) will be determined on receipt of an environmental authorisation of the assessed corridor by the competent authority and after negotiations with landowners and final environmental and technical surveys[9]. Collector substations are constructed in the following simplified sequence: » Step 1: Conduct geotechnical investigations to determine founding conditions; » Step 2: Conduct site survey; » Step 3: Vegetation clearance and construction of access road; » Step 4: Site grading and levelling; » Step 5: Construction of foundations; » Step 6: Import of collector substation components; » Step 7: Construction of collector substation; » Step 8: Rehabilitation of disturbed area and protection of erosion sensitive areas; and » Step 9: Testing and commissioning. The footprint of the collector substation may include administrative buildings required for the operation and management of the collector substation.
Activities to be undertaken	
Conduct surveys prior to construction	» Including, but not limited to: a geotechnical survey, site survey (including the location of the collector substation within the grid connection corridor) and confirmation of the power line servitude, and all other associated infrastructure.
Establishment of access roads	» Access roads/tracks to be established within the grid connection corridor (underneath the final confirmed power line route) for construction and/or maintenance activities required. » Access roads/tracks will be established as construction commences at the various locations within the corridor. » Existing access roads will be utilised where possible to minimise impact, and upgraded where required. » Access roads/ tracks will be limited to jeep tracks.
Undertake site preparation	» Including the clearance of vegetation along the final power line route, the establishment of access roads/tracks and excavations for foundations. » Stripping of topsoil to be stockpiled, backfilled, removed from site and/or spread on site.

[9] The start, middle and end coordinates of the grid connection corridor is included in **Appendix N**.

	» To be undertaken in a systematic manner to reduce the risk of exposed ground being subjected to erosion. » Include search and rescue of floral species of concern (where required) and the identification and excavation of any sites of cultural/heritage value (where required) along the final power line route and within the collector substation footprint.
Establishment of laydown areas and batching plant on site	» A laydown area for the storage of grid infrastructure components, including the civil engineering construction equipment. » The laydown area will also accommodate building materials and equipment associated with the construction of buildings. » No borrow pits will be required. Infilling or depositing materials will be sourced from licenced borrow pits within the surrounding areas. » A temporary concrete batching plant of 50m x 50m in extent to facilitate the concrete requirements for grid infrastructure foundations. Other options include the use of mobile batching plants that allow for *in situ* batching of concrete
Undertake site rehabilitation	» Commence with rehabilitation efforts once construction is completed in an area, and all construction equipment is removed. On commissioning, access points to the site that will not be required for the operation phase will be closed and prepared for rehabilitation.
<u>Operation Phase</u>	
Requirements	» Duration will be 20-25 years, or longer as needed for the operation of the wind farm. » Requirements for security and maintenance of the grid connection infrastructure. » Employment opportunities relating mainly to operation activities and maintenance. Very limited employment opportunities will be available [10]. » Current land-use activities, i.e. grazing, can continue in the areas adjacent to the infrastructure.
Activities to be undertaken	
Operation and Maintenance	» Part-time security and maintenance staff, especially for the collector substation. » Disposal of waste products (e.g. oil) in accordance with relevant waste management legislation. » On-going rehabilitation of those areas which were disturbed during the construction phase. » During this operation phase vegetation within the power line servitude (up to 36m), and around the collector substation will require management only if it impacts on the safety and operational objectives of the project. » The maintenance of the grid connection infrastructure will be the responsibility of the holder of the Environmental Authorisation.
<u>Decommissioning Phase</u>	
Requirements	» Decommissioning of the grid connection infrastructure for the Namas Wind Farm at the end of its economic life.

[10] It must be noted that the Genesis Namas Wind (Pty) Ltd will construct the 132kV double-circuit power line, however ownership of the line will be transferred to Eskom following the completion of the construction. The operation and maintenance of the line will then be undertaken by Eskom.

	» Expected lifespan of approximately 20 - 25 years (with maintenance) before decommissioning is required. » Decommissioning activities to comply with the legislation relevant at the time.
Activities to be undertaken	
Site preparation	» Confirming the integrity of access to the grid connection infrastructure to accommodate the required equipment. » Mobilisation of decommissioning equipment.
Disassemble components and rehabilitation	» The grid connection infrastructure components will be disassembled, and reused and recycled (where possible). » Where components cannot be reused or recycled it will be disposed of in accordance with the regulatory requirements at the time of decommissioning. » Disturbed areas, where infrastructure has been removed, will be rehabilitated, if required and depending on the future land-use of the affected areas and the relevant legislation applicable at the time of decommissioning.

It is expected that the areas affected by the grid connection infrastructure will revert back to its original land-use (i.e. primarily sheep farming and grazing) once the Namas Wind Farm (and by implication the proposed grid connection infrastructure) has reached the end of its economic life and all infrastructure has been decommissioned.

CHAPTER 3: ALTERNATIVES

This chapter details the preferred location, grid connection, activity and technology alternatives as well as the 'do nothing' option for the grid connection infrastructure for the Namas Wind Farm.

3.1. Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter of the final BA report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of basic assessment reports:

Requirement	Relevant Section
3(g) a motivation for the preferred site, activity and technology alternative	The motivations for the alternatives associated with the development of the grid infrastructure for the Namas Wind Farm are included in section 3.4. It must be noted that no activity or technology alternatives are associated with the development of the grid connection infrastructure due to the specific requirements for the infrastructure to connect the Namas Wind Farm to the national grid. Therefore, no activity and technology alternatives are considered for the project.
3(h)(i) details of the alternative considered	The details of all alternatives considered as part of the grid connection infrastructure for the Namas Wind Farm are included in section 3.4. A summary of the alternatives is also included in section 3.2.
3(h)(ix) the outcome of the site selection matrix	The site selection process followed by the developer in order to identify the grid connection corridor for the development of the grid connection infrastructure is described in section 3.3.
3(h)(x) if no alternatives, including alternative locations for the activity were investigation, the motivation for not considering such	Where no alternatives have been considered, motivation has been included. This is included in section 3.4.

3.2 Summary of all Alternatives considered as part of the Grid Connection Infrastructure for the Namas Wind Farm

The sections below describe the alternatives being considered as part of the grid connection solution. **Table 3.1** provides an overview of the alternatives being considered as part of the project:

Table 3.1: Summary of the alternatives considered as part of the grid connection infrastructure for the Namas Wind Farm project.

Nature of Alternatives Considered	Description of the Alternatives relating to the Grid Connection Infrastructure for the Namas Wind Farm
Location Alternatives (site-specific)	One preferred 300m wide grid connection corridor has been identified for the development of the grid connection infrastructure for the Namas Wind Farm. No other corridors have been considered for the grid connection solution based on the fact that the corridor provides for the most efficient connection of the Namas Wind Farm to the national grid via the existing Gromis Substation. The corridor also provides for the shortest connection route to the Gromis Substation. In addition, the corridor is approximately 10 times the width of the servitude required for the construction and operation of the power line, and therefore allows for site-specific constraints to be observed and avoided within

Nature of Alternatives Considered	Description of the Alternatives relating to the Grid Connection Infrastructure for the Namas Wind Farm
	this assessed area, as needed. Therefore, no location alternatives have been considered for the development of the grid connection infrastructure for the Namas Wind Farm.
Grid Connection Alternatives	Within the grid connection corridor two grid connection options are being considered. The two options include: i. Construction of the Rooivlei Substation, plus a direct connection from the Rooivlei Substation to the existing Gromis Substation (preferred option from a technical perspective); or ii. Construction of the Rooivlei Substation, plus a direct connection from the Rooivlei Substation to the proposed collector substation (known as the Strandveld Substation) which forms part of the Zonnequa Wind Farm grid connection solution (assessed as part of a separate Basic Assessment Process).
'Do-nothing' Alternative	The option to not construct the grid connection infrastructure for the Namas Wind Farm. The opportunities associated with the development of the grid connection solution for the Namas Wind Farm will not be made available, and it will therefore lead to the inability of the facility to evacuate the generated power into the national grid. It will not be possible to operate the authorised Namas Wind Farm should the "do-nothing" alternative be implemented.

3.3 Site Selection process

The selection of the grid connection corridor proposed for the development of the grid infrastructure was informed by the closest and most feasible grid connection point into the national grid, consultation with Eskom network planners and the consideration of the planned route of the authorised Gromis-Juno 400kV power line which traverses the larger Namas Wind Farm project site. Through consultation with Eskom it was confirmed by the development team that the 300m wide grid connection corridor can be located directly adjacent to the Gromis-Juno 400kV power line route (authorised, but not yet constructed) and follow the 400kV power line to the preferred grid connection point, which is the existing Gromis Substation (planned to be upgraded in the future).

3.4 Project Alternatives under Consideration for the Grid Connection Infrastructure for the Namas Wind Farm

The following alternatives have been considered as part of the final BA report for the grid connection infrastructure of the Namas Wind Farm.

3.4.1 Location (site-specific) Alternatives

The preferred grid connection corridor for the grid connection solution was identified through consultation with Eskom and through the consideration of future power infrastructure developments in the Kleinsee area. The identification of the corridor was also based on the location of the grid connection point into the national grid in relation to the authorised Namas Wind Farm.

The placement of the grid connection corridor adjacent and parallel to the Gromis-Juno 400kV power line also provides an opportunity for the consolidation of linear electrical infrastructure within the area, and the clustering of associated impacts to the environment. This is seen as a benefit to the development of the grid connection infrastructure from an environmental and social perspective.

The specific characteristics considered, and the results thereof, are discussed in the sections below. The developer considered that should these characteristics not be favourable for the development of the grid connection solution, then some limitations and challenges may be expected.

» *Land Availability and Land Use* – In order to develop the grid connection infrastructure, sufficient space and access to land outside of the wind farm project site (and along the 300m wide grid connection corridor) is required. The land use along the corridor mainly includes agriculture (i.e. grazing) and mining activities, however the corridor does not infringe on sections of land currently being mined.

» *Access to the National Grid* – The developer consulted with the Eskom network planners to understand the future demand centres and the strategic plans to upgrade and strengthen the local networks in the area. Through this consultation it was confirmed that Eskom are in the process of moving forward with the construction of the authorised Gromis-Juno 400kV power line. It was also identified that Eskom plans to upgrade the existing Gromis Substation located ~26km north of the Namas Wind Farm, which will be the connection point for the Gromis-Juno 400kV power line. Considering these developments in line with the local grid infrastructure, the developer identified the existing Gromis Substation as the preferred grid connection point for the Namas Wind Farm via the proposed Rooivlei-Gromis 132kV double-circuit power line. The developer considered the consolidation of linear infrastructure as a benefit in minimising impacts to the environment.

» *Geographical and topographical considerations* – The terrain traversed by the grid connection corridor is fairly flat, providing good conditions for power line construction. The exception is the area where the corridor crosses over the Buffels River in the northern portion of the corridor, as well as near the existing Gromis Substation. The developer has confirmed that it will be possible to span over the Buffels River.

» *Consideration of sensitive environmental features* – Through the assessment of a much larger corridor within which the grid connection infrastructure can be placed, an opportunity has been created by the applicant for the avoidance of sensitive environmental features and areas. The consideration of the grid connection corridor which is approximately 10 times the width of the required power line servitude enables the avoidance of the environmental sensitivities, thereby ensuring that the grid connection infrastructure can be appropriately placed without resulting in an unacceptable environmental impact. This consideration is in line with the mitigation strategy and enables the achievement of the objectives of the mitigation hierarchy (i.e. avoid, minimise, mitigate). This application of the mitigation strategy will result in the identification of the optimised placement of the grid connection infrastructure within the grid connection corridor.

Therefore, considering the above, no location alternatives for the placement of the grid connection infrastructure have been identified. Only the already indicated 300m wide grid connection corridor will be assessed as part of this final BA Report.

3.4.2 Grid Connection Alternatives

Within the grid connection corridor, two options are being considered for the connection of the authorised Namas Wind Farm to the national grid. These options include:

- Construction of the Rooivlei Substation, plus a direct connection from the proposed Rooivlei Substation to the existing Gromis Substation located ~26km from the northern boundary of the Namas Wind Farm project site. This is considered to be the preferred option from a technical perspective due to the fact that the Gromis Substation is an existing substation with capacity.
- Construction of the Rooivlei Substation, plus a direct connection from the Rooivlei Substation to the proposed collector substation (known as the Strandveld Substation) which forms part of the Zonnequa Wind Farm grid connection solution[11]. The Strandveld Substation is located ~6km from the northern boundary of the Namas Wind Farm project site. This option is only viable should the Zonnequa Wind Farm be developed and the Strandveld Substation be constructed and connected to the national grid.

Both of these options are being considered as part of this BA process.

3.4.3 The 'do-nothing' Alternative

The 'do-nothing' alternative is the option of Genesis Namas Wind (Pty) Ltd not constructing the grid connection infrastructure of the Namas Wind Farm within the 300m wide grid connection corridor. This would result in no environment or social impacts (positive or negative) as a result of the development of the double-circuit 132kV power line and collector substation within the corridor. This alternative is assessed in detail within Chapter 8 of this BA Report.

The main reasons why the 'do-nothing' alternative is not considered as a preferred alternative in relation to the development of the grid infrastructure for the Namas Wind Farm is related to the fact that the grid connection infrastructure is considered as specifically required infrastructure in order to enable the evacuation of the generated power into the national grid. The activities associated with the development of the Namas Wind Farm have already received Environmental Authorisation from the Department of Environmental Affairs. The wind farm authorisation did not assess the grid connection infrastructure required for the development. Should the 'do-nothing' alternative be implemented for the grid connection infrastructure, it will result in the inability of the authorised wind farm to connect to the national grid and therefore result in the wind farm not being feasible for operation.

It would also be an undesirable option from a socio-economic perspective as it would result in a situation where the electricity generated from the authorised wind farm would not be fed into the national Eskom grid resulting in the loss of additional renewable power generation capacity. This would result in negative impacts or foregone opportunities at a local, regional and national scale from a social and economic perspective in terms of limiting job creation, socio-economic upliftment, and development fostering generation of renewable energy and as such is not considered desirable. The negative impacts of the 'do-nothing' alternative are considered to outweigh the positive impacts of this alternative.

The option of not developing the grid connection solution required for the operation of the Namas Wind Farm is not preferred and is considered to restrict the development of the authorised Namas Wind Farm.

[11] The grid connection infrastructure for the Zonnequa Wind Farm is being assessed as part of a separate Basic Assessment Process.

CHAPTER 4: REGULATORY AND PLANNING CONTEXT

This chapter provides insight into the policy and legislative context within which the development of the grid connection infrastructure for the Namas Wind Farm is located, and documents the manner in which the development of the grid connection infrastructure for the wind farm complies with and responds to these policies and legislation.

4.1. Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter of the final BA report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of basic assessment reports:

Requirement	Relevant Section
3(e)(i) a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report	Chapter 4 as a whole provides an overview of the policy and legislative context which is considered to be associated and relevant to the development of the grid connection solution for the Namas Wind Farm. The regulatory and planning context has been considered at international, national, provincial and local level.
3(e)(ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools, frameworks and instruments.	Tables 4.1, 4.2, 4.3 and 4.4 illustrate the compliance of the proposed grid connection infrastructure with the legislation, policies, plans, guidelines, tools, frameworks and instruments.

4.2. Strategic Electricity Planning in South Africa

The regulatory hierarchy of policy and planning documentation that support the development of a project of this nature consists of three tiers of authority who exercise control through both statutory and non-statutory instruments – that is National, Provincial and Local levels. These policies are discussed in more detail in the following sections, along with the provincial and local policies or plans that have relevance to the development of the grid connection infrastructure proposed for the Namas Wind Farm.

At **National Level**, the main regulatory agencies are:

- *Department of Environmental Affairs (DEA):* DEA is responsible for environmental policy and is the controlling authority in terms of NEMA and the 2014 EIA Regulations (GNR 326). As per GNR 779 of 01 July 2016, DEA is the Competent Authority, and is charged with making a decision regarding the granting of the relevant EA for this project based on its association with the authorised Namas Wind Farm.
- *South African Heritage Resources Agency (SAHRA):* SAHRA is a statutory organisation established under the National Heritage Resources Act (No. 25 of 1999) (NHRA), as the national administrative body responsible for the protection of South Africa's cultural heritage.
- *Department of Water and Sanitation (DWS):* DWS is responsible for effective and efficient water resources management to ensure sustainable economic and social development. DWS is also responsible for evaluating and issuing licenses pertaining to water use (i.e. Water Use Licenses (WULs) and / or registration of General Authorisations (GAs)).

- *Department of Agriculture, Forestry and Fisheries (DAFF):* DAFF is the custodian of South Africa's agricultural, forestry, and fishery resources and is primarily responsible for the formulation and implementation of policies governing the Agriculture, Forestry and Fisheries Sector. DAFF is also responsible for the issuing of permits for the disturbance or destruction of protected tree species.
- *Department of Mineral Resources (DMR):* Approval from DMR will be required to use land surface contrary to the objects of the Mineral and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA) in terms of Section 53 of the Act. In terms of the MPRDA approval from the Minister of Mineral Resources is required to ensure that proposed activities do not sterilise a mineral resource that may occur on site.
- *Department of Rural Development and Land Reform (DRDLR):* DRDLR is dedicated to the social and economic development of rural South Africa, and is responsible for providing a framework for rural development.
- *South African National Roads Agency Limited (SANRAL):* SANRAL is responsible for the regulation and maintenance of all national roads and routes.

At **Provincial Level**, the main regulatory agencies are:

- *Northern Cape Department of Environment, and Nature Conservation (DENC):* DENC is the Commenting Authority for the project, and is also responsible for issuing any biodiversity and conservation-related permits. DENC's involvement relates specifically to sustainable resource management, conservation of protected species and land care.
- *Northern Cape Department of Roads and Public Works (NCDRPW):* NCDRPW is responsible for roads and the granting of exemption permits for the conveyance of abnormal loads on public roads.
- *Ngwao Boswa Kapa Bokone (NBKB):* NBKB, the Northern Cape Provincial Heritage Resources Authority is responsible for the identification, conservation and management of heritage resources, as well as commenting on heritage related issues within the Province.

At the **Local Level** the local and municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. In the Northern Cape, both the local and district municipalities play a role.

- The local municipality is the Nama Khoi Local Municipality.
- The district municipality is the Namakwa District Municipality.

In terms of the Municipal Systems Act (Act No 32 of 2000) it is compulsory for all municipalities to go through an Integrated Development Planning (IDP) process to prepare a five-year strategic development plan for the area under their governance.

4.3. Policy and Planning Considerations on International, National, Provincial and Local Levels

4.3.1. Policy and Planning on an International Level

South Africa has committed to various international policies which relate to environmental concerns, specifically that of climate change and global warming. **Table 4.1** below provides a summary of the international policies and plans that South Africa has made commitments towards, and how the development of the grid connection infrastructure for the Namas Wind Farm aligns with the thinking or commitments of these agreements.

Table 4.1: International policies and plans relevant to the grid connection infrastructure for the Namas Wind Farm

Policy or Plan	Is the development of the grid connection infrastructure for the Namas Wind Farm aligned with this policy or plan?
The Kyoto Protocol, 1997	Yes. The protocol calls for the reduction of South Africa's greenhouse gas emissions through actively cutting down on using fossil fuels, or by utilising more renewable resources. The development of the grid connection infrastructure for the Namas Wind Farm will enable the evacuation of additional capacity to the renewable energy sector of the country and strengthen the commitment and action plan to achieve the requirements as set out in the protocol.
United Nations Framework Convention on Climate Change and COP21 – Paris Agreement	Yes. South Africa supports the adoption of the Paris Agreement which has the main objective of addressing the climate change issue and marks the first international political response to climate change. South Africa has set out a goal of 17GW of renewable energy by 2030 within the IRP of 2011[12]. Through the development of renewable energy projects (including the Namas Wind Farm) additional renewable energy will be made available to the country, which in turn will demonstrate the contribution that South Africa is making to the global response to climate change specifically relating to the development of the renewable energy sector. The development of the proposed grid connection infrastructure is required in order to enable the evacuation of the generated wind power of the Namas Wind Farm to the national grid.
The Equator Principles III, June 2013	Yes. The Equator Principles (EPs) III constitute a financial industry benchmark used for determining, assessing, and managing a project's environmental and social risks. The EPs are primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making. The EPs are applicable to large infrastructure projects and apply globally to all industry sectors. In terms of the EPs, South Africa is a non-designated country, and as such the assessment process for projects located in South Africa evaluates compliance with the applicable IFC Performance Standards on Environmental and Social Sustainability and Environmental Health and Safety (EHS) Guidelines. The grid connection infrastructure for the Namas Wind Farm is currently being assessed in accordance with the requirements of the 2014 EIA Regulations, as amended (GNR 326), published in terms of Section 24(5) of the National Environmental Management Act (No. 107 of 1998) (NEMA), which is South Africa's national legislation providing for the authorisation of certain controlled activities. Through this assessment, all potential social and environmental risks are identified and assessed, and appropriate mitigation measures proposed.
International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability, January 2012	Yes. The overall objectives of the IFC performance standards are to fight poverty, do no harm to people or the environment, fight climate change by promoting low carbon development, respect human rights, promote gender equality, provide information prior to project development, collaborate with the project developer in order to achieve the performance standard, provide advisory services and notify countries of trans boundary impacts. When considering the development of the grid connection infrastructure

[12] The draft IRP 2030 released for public comment in August 2018 includes a target of 37GW of wind energy as part of the energy mix by 2050.

Policy or Plan	Is the development of the grid connection infrastructure for the Namas Wind Farm aligned with this policy or plan?
	associated with the development of the Namas Wind Farm the following performance standards are anticipated to be applicable at this stage of the BA process: » *Performance Standard 1:* Assessment and Management of Environmental and Social Risks and Impacts » *Performance Standard 2:* Labour and Working Conditions » *Performance Standard 3:* Resource Efficiency and Pollution Prevention » *Performance Standard 4:* Community Health, Safety and Security » *Performance Standard 6:* Biodiversity Conservation and Sustainable Management of Living Natural Resources » *Performance Standard 8:* Cultural Heritage

4.3.2. Policy and Planning on a National Level

National policies and plans adopted by South Africa, which are considered to be relevant to the development of the grid connection infrastructure for the Namas Wind Farm have been summarised in **Table 4.2**.

Table 4.2: National policies, plans and legislation relevant to the grid connection infrastructure for the Namas Wind Farm

Policy, Plan or Legislation	Is the development of the grid connection infrastructure for the Namas Wind Farm aligned with this policy, plan or legislation?
The National Energy Act (2008)	Yes. One of the objectives of the Act is to promote the diversity of the supply of energy and its sources. In this regard, the preamble makes direct reference to renewable resources and states that provision must be made for increased generation and consumption of renewable energies. The development of the grid connection infrastructure for the Namas Wind Farm project enables the evacuation of renewable power into the national grid and thereby promotes diversity of supply of energy and the source of supply, in line with the Act's objectives.
White Paper on the Energy Policy of South Africa, 1998	Yes. The South African Energy Policy of 1998 identifies five key objectives, namely increasing access to affordable energy services, improving energy sector governance, stimulating economic development, managing energy related environmental impacts and securing supply through diversity. In order to meet these objectives South Africa needs to optimally use available energy resources. The development of the grid connection infrastructure for the Namas Wind Farm will enable the contribution, albeit only to a limited extent, to the achievement of the five objectives of the Energy Policy of the country.
White Paper on the Renewable Energy Policy of the Republic of South Africa (2003)	Yes. This White Paper fosters the uptake of renewable energy in the economy and has a number of objectives that need to be met, including that equitable resources are invested in renewable technologies. South Africa is also endowed with renewable energy resources that can be sustainable alternatives to fossil fuels. The development of additional renewable energy projects (including the Namas Wind Farm) will promote the use of the abundant South African renewable energy resources and contribute to long-term energy security and diversification of the energy mix. The development of the grid connection infrastructure enables the evacuation of the generated power into the national grid and thereby enables the use of renewable energy technologies for the country.
The Electricity Regulation	Yes. The Act establishes a national regulatory framework for the electricity supply industry

Policy, Plan or Legislation	Is the development of the grid connection infrastructure for the Namas Wind Farm aligned with this policy, plan or legislation?
Act, 2006 (Act No. 4 of 2006), as amended	of the country and introduces the National Energy Regulator as the custodian and enforcer of the National Electricity Regulatory Framework. The Act also provides for licences and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated. The developer of the Namas Wind Farm project grid connection infrastructure will have to ensure compliance with this Act for the distribution of the generated power into the national grid.
Renewable Energy Policy in South Africa	Yes. Support for the Renewable Energy Policy is guided by a rationale that South Africa has a very attractive range of renewable energy resources, particularly solar and wind, and that renewable applications are, in fact, the least cost energy service in many cases from a fuel resource perspective (i.e. the cost of fuel in generating electricity from such technology); more so when social and environmental costs are taken into account. However, the National Energy Policy acknowledges that the development and implementation of renewable energy applications has been largely neglected in South Africa. Challenges regarding the implementation of renewable energy have been identified. Through the development of renewable energy projects (including the Namas Wind Farm project and the associated proposed grid connection infrastructure), additional renewable energy will be made available which will assist with the further growth and development of the renewable energy sector.
National Development Plan (NDP)	Yes. The NDP aims at eliminating poverty and reducing inequality by 2030 and identifies 9 key challenges and associated remedial plans. Managing the transition towards a low carbon national economy is identified as one of the 9 key national challenges. Expansion and acceleration of commercial renewable energy is identified as a key intervention strategy. The plan also sets out steps that aim to ensure that, in 20 years, South Africa's energy system looks very different to the current situation: coal will contribute proportionately less to the primary-energy needs, while gas and renewable energy resources – especially wind, solar and imported hydroelectricity – will play a much larger role. Through the development of renewable energy projects (including the Namas Wind Farm project and the associated proposed grid connection infrastructure) additional renewable energy will be available which will assist in expanding the renewable energy sector of the country and add to the diversification of the energy mix, which is moving away from coal and towards the use of gas and renewable energy.
Integrated Energy Plan (IEP)	Yes. The IEP takes into consideration the crucial role that energy plays in the entire economy of the country and is informed by the output of analyses founded on a solid fact base. Eight key objectives were identified which relate mainly to the security, cost, access, diversity, efficiency, impact in terms of emissions, conservation and social benefits in terms of energy planning. The IEP recognises the potential of renewable energy for power generation. With the additional renewable energy to be generated by the Namas Wind Farm and to be evacuated to the national grid via the proposed grid connection infrastructure, a contribution to this objective will be made. Also, with the development of the Namas Wind Farm and the proposed grid connection infrastructure, the eight key objectives in terms of energy planning will be met, even if only to a limited extent.
Integrated Resource Plan (IRP) 2010 - 2030	Yes. The Integrated Resource Plan (IRP) for Electricity 2010 – 2030 constitutes a subset of the IEP and is South Africa's national electricity plan. The document outlines the proposed generation new-build fleet for South Africa. The adopted scenario was derived based on a cost-optimal solution for new-build options (considering the direct costs of new build power plants), which was then "balanced" in accordance with qualitative measures such as local job creation. The IRP essentially drives the assortment of energy to be implemented for South Africa which is known as the energy mix of the country, considering various generation technologies. The plan includes 17.8GW of renewables,

Policy, Plan or Legislation	Is the development of the grid connection infrastructure for the Namas Wind Farm aligned with this policy, plan or legislation?
	9.6GW of nuclear; 6.25GW of coal, and approximately 8.9GW of other generation sources such as hydro, and gas. On this basis, Ministerial determinations have called for a procurement of 8 100MW of wind energy by the end of 2030 (Department of Energy, 2018[13]). The development of the proposed grid connection infrastructure for the Namas Wind Farm has the potential to evacuate up to 140MW of wind energy into the national grid which will support the Government's target for electricity generated by wind energy facilities.
Strategic Integrated Projects (SIP)	Yes. In 2010, a National Development Plan was drafted to address socio-economic issues affecting development in South Africa. These issues were identified and placed under 18 different Strategic Integrated Projects (SIPs) to address the spatial imbalances of the past by addressing the needs of the poorer provinces and enabling socio-economic development. The development the Namas Wind Farm grid connection infrastructure will support the Strategic Integrated Projects within one SIP, which relates to the development of the associated infrastructure. This is known as SIP 10 – electricity transmission and distribution for all. In support of SIP 10, the Department of Environmental Affairs undertook a Strategic Environmental Assessment (SEA) which aims to provide guidance for the efficient and sustainable expansion of strategic electricity grid infrastructure in South Africa. This SEA identified the optimal location for strategic corridors where transmission infrastructure expansion is needed to enable the balancing of future demand and supply requirements, while minimising negative impacts to the environment. These areas are referred to as Power Corridors, and were gazetted within GNR113 of February 2018. The grid connection corridor proposed for the development of the grid connection infrastructure is located within the Northern Transmission Corridor and is therefore considered to be in line with national planning in this regard.
New Growth Path (NGP) Framework, 2010	Yes. The purpose of the New Growth Path (NGP) Framework is to provide effective strategies towards accelerated job-creation through the development of an equitable economy and sustained growth. The target of the NGP is to create 5 million jobs by 2020. With economic growth and employment creation as the key indicators identified in the NGP. To achieve this, government will seek to, amongst other things, identify key areas for large-scale employment creation, as a result of changes in conditions in South Africa and globally, and to develop a policy package to facilitate employment creation in these areas. The Namas Wind Farm, as well as the proposed associated grid connection infrastructure, will assist with the creation of both temporary and permanent employment opportunities during the construction and operation phases, which will contribute, albeit to a limited extent, to the economy and sustainable growth.
National Climate Change Response Strategy	Yes. This strategy aims to address issues identified as priorities for dealing with climate change in the country. The focus of the strategy is adapting to climate change; developing a sustainable energy programme; adopting an integrated response by the relevant government departments; compiling inventories of greenhouse gases; accessing and managing financial resources; and research, education, and training. The development the grid connection infrastructure for the Namas Wind Farm will enable

[13] An updated IRP was released in August 2018 for review and comment. A new IRP is expected to be promulgated shortly.

Policy, Plan or Legislation	Is the development of the grid connection infrastructure for the Namas Wind Farm aligned with this policy, plan or legislation?
	additional uptake of renewable energy into the national grid which will reduce the need for the use of coal as an energy resource and thereby assist in addressing climate change and global warming.
Climate Change Bill, 2018	Yes, with limited relevance. The Bill provides a framework for climate change regulation in South Africa aimed at governing South Africa's sustainable transition to a climate resilient, low carbon economy and society. The Bill provides a procedural outline that will be developed through the creation of frameworks and plans. The bill aims to provide for the coordinated and integrated response to climate change and its impacts, provide effective management of inevitable climate change impacts and to make a fair contribution to the global effort to stabilise greenhouse gas concentrations. The grid connection infrastructure for the Namas Wind Farm relates only to the evacuation of renewable energy into the national grid, and would therefore not result in the generation or release of emissions during its operation.

4.3.3. Policy and Planning at a Provincial Level

Policies and plans have been adopted by the Northern Cape Province for the management of the area and are considered to be relevant to the development of the grid connection infrastructure for the Namas Wind Farm. **Table 4.3** provides a summary of the relevant provincial plans and policies.

Table 4.3: Provincial policies and plans relevant to the grid connection infrastructure of the Namas Wind Farm

Policy or Plan	Is the development of the grid connection infrastructure for the Namas Wind Farm aligned with this policy or plan?
Northern Cape Provincial Spatial Development Framework (PSDF), 2012	Yes. The PSDF seeks to advance the establishment of renewable energy supply schemes within the Province and identifies that the Northern Cape holds a potential comparative advantage due to the regular occurrence of strong winds which could be a source of renewable energy, specifically for sustainable electricity production. The PSDF also aims for renewable energy sources to constitute 25% of the Province's energy production capacity by 2020. The REIPPPP focus on Northern Cape Provincial Report Volume 1 (June 2017) indicates that the Northern Cape Province has contributed 16 991GWh actual energy to the national grid which amounts to approximately 42% of the renewable energy contribution to the grid. Of this 42%, 13% (i.e. 958 GWh) was generated by wind energy facilities and 73% (i.e. 5 218 GWh) was generated by solar energy facilities. With the developed and proposed independent power producer capacity (including the Namas Wind Farm and the proposed associated grid connection infrastructure), the Province will produce more than 100% of its own electrical power needs from renewable energy resources (although this energy will be fed into the national grid).

4.3.4. Policy and Planning on a District and Local Level

Strategic policies at the district and local level have similar objectives for the respective areas, namely the delivery of basic services, including the provision of electricity. The development of the proposed grid connection infrastructure is considered to align with the aims of these policies.

Table 4.4 below provides a summary of the district and local level policies and plans considered to be relevant to the development of the grid connection infrastructure for the Namas Wind Farm.

Table 4.4: District and local policies and plans relevant to the grid connection infrastructure for the Namas Wind Farm

Policy or Plan	Is the development of the grid connection infrastructure for the Namas Wind Farm aligned with this policy or plan?
Namakwa District Municipality Rural Development Plan (RDP), 2017	Yes. Renewable energy developments are considered to be development priorities within the RDP. The need to evaluate localisation possibilities for all renewable energy technologies is emphasised in the Plan. The development of renewable energy projects (including the proposed associated grid connection infrastructure for the Namas Wind Farm) will contribute to the achievement of the need for the development of renewable energy developments within the Province.
Namakwa District Municipality Integrated Development Plan (IDP), 2017 - 2022	Yes. The plan identifies the need for support to the local municipalities to deliver basic services such as water, sanitation, housing, electricity and waste management. The IDP also seeks to establish good governance by enforcing the climate change response plan. The development of the grid connection infrastructure for the Namas Wind Farm may contribute to the delivery of basic services, however only to a limited extent. The proposed wind farm and the associated grid infrastructure will contribute to the application of the climate change response plan through zero production of greenhouse gas emissions during the operation of the facility.
Nama Khoi Municipality Draft Integrated Development Plan (IDP), 2018/2019	Yes. The IDP seeks to provide sustainable delivery of services such as water and sanitation, electricity, and solid waste management amongst others. The plan also identifies possible high wind energy generation zones to the south of Vioolsdrift, and around Springbok and Koingnaas, and proposes an analysis of the areas for the development of wind farms. The development of the grid connection infrastructure for the Namas Wind Farm may contribute to the delivery of basic services, however only to a limited extent. The Namas Wind Farm and the grid connection corridor proposed for the development of the grid connection infrastructure is located near Kleinsee which is located west of Springbok, and which is considered to be the area in the Local Municipality suitable for the development of wind farms (including the associated required grid connection infrastructure).

CHAPTER 5: NEED AND DESIRABILITY

One of the requirements of Appendix 1 of the EIA Regulations, 2014, as amended, is to motivate for "*the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location*". The need and desirability of a development needs to consider whether it is the right time and place for locating the type of land-use / activity being proposed within the proposed location.

This Chapter provides an overview of the anticipated suitability of the grid connection infrastructure for the Namas Wind Farm to be developed within the assessed grid connection corridor from a national, regional, and site specific perspective. It provides an overview of the need and desirability, and perceived benefits of the project specifically.

The need and desirability of the grid connection infrastructure for the Namas Wind Farm is directly linked to the need and desirability of the authorised Namas Wind Farm. This direct connection between the two projects relates to the operational aspects and requirements of the wind farm in that the authorised Namas Wind Farm will not be able to operate without the development of the proposed associated grid connection infrastructure in terms of the evacuation of the generated electricity into the national grid.

5.1. Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter of the final BA Report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of basic assessment reports:

Requirement	Relevant Section
3(f) a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location.	The need and desirability of the grid connection infrastructure for the Namas Wind Farm is included and discussed as a whole within this chapter. The need and desirability for the development of the grid connection infrastructure for the Namas Wind Farm has been considered from a national, regional and site-specific perspective.

5.2. Need and Desirability of the Proposed Project

The grid connection infrastructure will facilitate the transmission of the electricity generated by the authorised Namas Wind Farm into the national grid, and is considered essential infrastructure to the wind farm operation phase. Therefore, the need for the grid connection infrastructure is directly linked to the need and desirability of the authorised Namas Wind Farm, which is aligned with national, regional and local policies and plans. This can be summarised as follows[14]:

[14] Note that the need and desirability of the Namas Wind Farm has been considered in detail within a separate Basic Assessment Report. The Namas Wind Farm received Environmental Authorisation from the Department of Environmental Affairs on 18 February 2019.

- The need for the country to respond to the international commitments regarding climate change and reduction in carbon emissions.
- The need at a national level to diversify the power generation technology mix to include up to 17.8GW of renewables, as defined in the Integrated Resource Plan (IRP), 2010 (as discussed in detail in **Chapter 4**).
- The need to align development with the requirements of the National Development Plan in order to address the identified socio-economic issues affecting development in South Africa.
- The need for sustainable development at a Provincial level, including the need to utilise its extensive resources for the benefits of the local area.
- The identification of renewable energy developments as one of the development priorities within the Namakwa District Municipality Rural Development Plan (RDP) (2017).
- The identification of high wind energy generation zones within the local municipality areas which requires the analysis of the areas for the development of wind farms. This is as per the Nama Khoi Municipality Draft Integrated Development Plan (IDP), 2018/2019.

5.3. Receptiveness and Desirability of the identified Grid Connection Corridor to develop the Grid Connection Infrastructure

The feasibility of the identified grid connection corridor for the development of the grid connection infrastructure also provides an indication of the desirability of the development within the area. The section below provides a description of the specific considerations that contribute to the desirability of the identified and assessed corridor.

The identified corridor being assessed for the development of the grid connection infrastructure displays characteristics that contribute to the overall desirability. These include:

- *Land Availability and Land Use* – In order to develop the grid connection infrastructure, sufficient space and access to land between the Namas Wind Farm and the existing Gromis Substation (and along the identified corridor) is required. The affected properties traversed by the grid connection corridor provides sufficient space for the placement of the collector substation (100m x 200m) and a double-circuit power line (up to 36m servitude). The corridor falls outside of the urban edge of the surrounding towns (i.e. Kleinsee). The land use along the grid connection corridor mainly includes agriculture (i.e. grazing) and mining activities, however the corridor does not infringe on sections of land currently being mined. As far as could be ascertained, the affected properties have not been considered for an alternative land use such as urban development or crop production. The corridor does not infringe on sections of land currently being mined.

  The placement of the corridor adjacent and parallel to the Gromis-Juno 400kV power line (yet to be constructed) also provides an opportunity for the consolidation of linear electrical infrastructure within the area, and the clustering of associated impacts to the environment. This is seen as a benefit to the development of the grid connection infrastructure from an environmental and social perspective.

- *Access to the National Grid* – Through consultation with Eskom it was confirmed that the authorised Namas Wind Farm will be able to connect to the existing Gromis Substation located in the northern section of the grid connection corridor. The Gromis substation will also be upgraded in the future to cater for the capacity requirements in the area. Therefore, access to the national grid in order to evacuate the generated electricity from the Namas Wind Farm to the national grid via the proposed collector substation and double-circuit 132kV power line has been confirmed through consultation.

The availability of the electrical infrastructure within the area provides an opportunity and desirability for the development of the proposed grid connection infrastructure associated with the Namas Wind Farm.

» *Geographical and topographical considerations* – The terrain traversed by the grid connection corridor is fairly flat, providing good conditions for the collector substation and double-circuit power line construction. The exception is the area where the corridor crosses over the Buffels River in the northern portion of the corridor near the existing Gromis Substation. The developer has confirmed that it will be possible to span the power line over the Buffels River in order to connect to the national grid.

» *Consideration of sensitive environmental features* – Through the assessment of a much larger corridor within which the grid connection infrastructure can be placed, an opportunity has been created by the applicant for the avoidance of sensitive environmental features and areas. The consideration of the corridor, which is approximately 10 times the width of the required power line servitude and much wider than the collector substation width, enables the avoidance of the environmental sensitivities, thereby ensuring that the grid connection infrastructure can be appropriately placed without resulting in an unacceptable environmental impact. This consideration is in line with the mitigation strategy and enables the achievement of the objectives of the mitigation hierarchy (i.e. avoid, minimise, mitigate). This application of the mitigation strategy will result in the identification of the optimised placement of the grid connection infrastructure within the grid connection corridor.

» *Planning* – From a planning perspective, the proposed grid connection infrastructure is considered to be appropriately located as it is located within the northern corridor of the Strategic Transmission Power Corridors (refer to **Figure 5.1**).

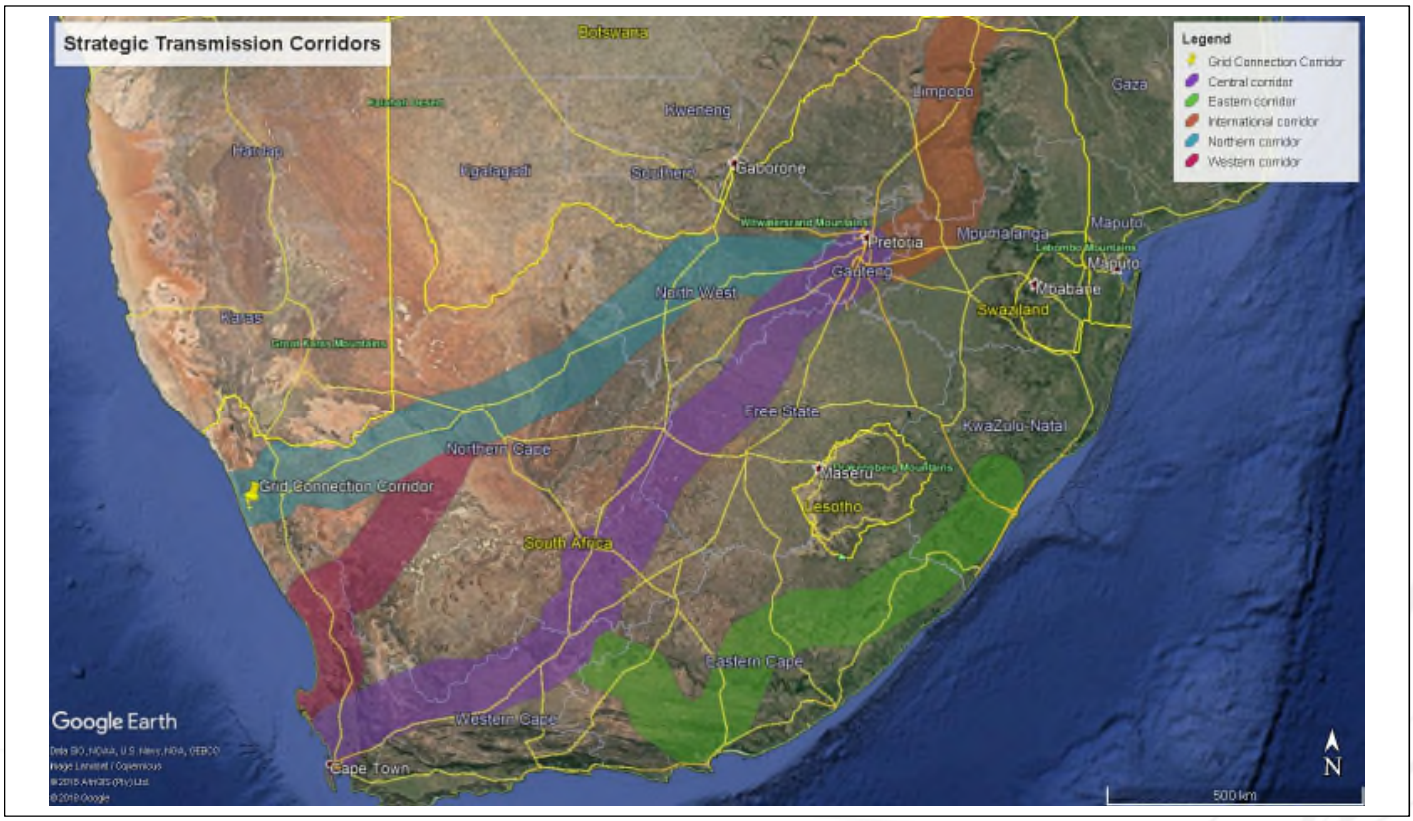

Figure 5.1: Strategic Transmission Corridors identified as the optimal locations where power infrastructure expansion is needed to enable the balancing of future demand and supply requirements, while minimising negative impacts to the environment

CHAPTER 6: APPROACH TO UNDERTAKING THE BASIC ASSESSMENT PROCESS

In terms of the EIA Regulations of December 2014 published in terms of NEMA (Act No. 107 of 1998) as amended, the construction and operation of the grid connection infrastructure for the authorised Namas Wind Farm is a listed activity requiring environmental authorisation. Due to the triggering of Activity 11(i) of Listing Notice 1, of the EIA Regulations, 2014 (as amended), a BA process must be undertaken in support of the application for authorisation.

The BA process aims at identifying and describing potential environmental issues associated with the development of the proposed collector substation and double-circuit power line and associated infrastructure[15]. In order to ensure that a comprehensive assessment is provided to the competent authority and I&APs regarding the impacts of the proposed infrastructure, detailed independent specialist studies were undertaken as part of the BA process. In addition, a comprehensive consultation process has been commenced, and includes I&APs, the competent authority, directly impacted landowners/occupiers, adjacent landowners/occupiers, relevant Organs of State departments, ward councillors and other key stakeholders. This chapter serves to outline the process that was followed during the BA process.

6.1 Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter of the final BA Report includes the following information required in terms of Appendix 1: Content of the BA Report:

Requirement	Relevant Section
3(d)(i) a description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for.	All listed activities triggered as a result of the development of the grid connection infrastructure have been included in section 6.2, **Table 6.1**. The specific project activity relating to the relevant triggered listed activity has also been included in **Table 6.1**.
3(h)(ii) details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs.	The details of the public participation process undertaken for the grid connection infrastructure has been included and described in section 6.3.2.
3(h)(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.	All comments raised during the 30-day review period of the BA Report and through consultation with I&APs has been included as part of the Comments and Responses (**Appendix C8**) of this final BA Report. The Comments and Responses report also includes the relevant responses on the submitted comments from the relevant responding party.
3(h)(vi) the methodology used in determining and ranking the nature, significance, consequences, extent,	The methodology used to assess the significance of the impacts of the grid connection infrastructure has been

[15] Namas Wind Farm associated with the grid connection infrastructure was assessed as part of a separate Basic Assessment process and has received Environmental Authorisation from the Department of Environmental Affairs.

Requirement	Relevant Section
duration and probability of potential environmental impacts and risks associated with the alternatives.	included in section 6.4.
(o) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed.	The assumptions and limitations of the BA process being undertaken for the grid connection infrastructure is included in section 6.5.

6.2 Relevant legislative permitting requirements

The legislative permitting requirements applicable to the development of the grid connection infrastructure for the Namas Wind Farm, as identified at this stage in the process, are described in more detail under the respective sub-headings.

6.2.1 National Environmental Management Act (No. 107 of 1998) (NEMA)

NEMA is South Africa's key piece of national environmental legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of NEMA, the potential impact on the environment associated with listed activities must be considered, investigated, assessed and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant EA.

The need to comply with the requirements of the EIA Regulations published under NEMA ensures that developers are provided the opportunity to consider the potential environmental impacts of their activities early in the project development process, and also allows for an assessment to be made as to whether environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental studies are required to be undertaken in accordance with the EIA Regulations to provide the competent authority with sufficient information in order for an informed decision to be taken regarding the project.

The BA process being conducted for the grid connection infrastructure is being undertaken in accordance with Section 24 (5) of NEMA. Section 24 (5) of NEMA pertains to Environmental Authorisations (EAs), and requires that the potential consequences for, or impacts of, listed or specified activities on the environment be considered, investigated, assessed, and reported on to the competent authority. Listed Activities are activities identified in terms of Section 24 of NEMA which are likely to have a detrimental effect on the environment, and which may not commence without an EA from the competent authority subject to the completion of an environmental assessment process (either a Basic Assessment (BA) or full Scoping and EIA).

Table 6.1 details the listed activities in terms of the EIA Regulations of December 2014 (as amended) that apply to the grid connection infrastructure for the Namas Wind Farm, and for which an Application for Environmental Authorisation has been submitted. The table also includes a description of the specific project activities that relate to the applicable listed activities.

Table 6.1: Listed activities as per the EIA regulations that are triggered by the grid connection infrastructure

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice):	Describe each listed activity as per the project description
GN 327, 08 December 2014 (as amended on 07 April 2017)	11(i)	The development of facilities or infrastructure for the transmission and distribution of electricity - (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts. ***The grid connection infrastructure will include the construction and operation of a collector substation and a double-circuit power line (up to 132kV in capacity) to facilitate the connection of the Namas Wind Farm to the national grid. The development will take place outside of urban areas.***
GN 327, 08 December 2014 (as amended on 07 April 2017)	12(ii)(a)(c)	The development of (ii) infrastructure or structures with a physical footprint of 100 square meters or more; where such development occurs within (a) a watercourse and (c) within 32 meters of a watercourse, measured from the edge of a watercourse. ***The double-circuit power line will need to cross the Buffels River in order to connect the Namas Wind Farm to the national grid. This will result in Intringement within the watercourse and/or within 32m of the watercourse.***
GN 327, 08 December 2014 (as amended on 07 April 2017)	19	The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse. ***The development of grid connection infrastructure will require the removal or moving of ~10m^3 of soil within a watercourse during the construction of the infrastructure. The Buffels River is located in the northern portion of the grid connection corridor.***
GN 327, 08 December 2014 (as amended on 07 April 2017)	27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation. ***The development of the collector substation will require the clearance of up to 2ha of indigenous vegetation. Clearance of vegetation will also be required within the grid connection corridor during power line construction.***
GN 327, 08 December 2014 (as amended on 07 April 2017)	28(ii)	Residential, mixed, retail, commercial, industrial, or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare. ***The total area of land to be developed for the collector substation is larger than 1 hectare and is currently used for agricultural purposes. The collector substation will have an extent of up to 2ha.***

6.2.2 National Water Act (No. 36 of 1998) (NWA)

In accordance with the provisions of the National Water Act (No. 36 of 1998) (NWA), all water uses must be licensed with the Competent Authority (i.e. the Regional DWS). Water use is defined broadly, and includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities that impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation.

Table 0.1 lists those Water Uses which may be relevant to the proposed project, and which may require the registration of the water use, or licensing. The table also includes a description of those project activities that relate to the applicable Water Uses.

Table 0.1: List of applicable Water Uses published under Section 21 of NWA, as amended.

Notice No.	Activity No.	Description of Water Use
NWA (No. 36 of 1998)	Section 21 (c)	Impeding or diverting the flow of water in a watercourse. ***The Buffels River is located within the northern section of the grid connection corridor and will be traversed by the double-circuit power line.***
	Section 21 (i)	Altering the bed, banks, course or characteristics of a watercourse. ***The Buffels River is located within the northern section of the grid connection corridor and will be traversed by the double-circuit power line.***

In the event that the flow of water in the Buffels River is affected and the bed, banks or course characteristics are altered, application would need to be made for a WUL in accordance with the requirements of the Regulations Regarding the Procedural Requirements for Water Use License Applications and Appeals (GNR 267), or a GA registered in accordance with the requirements of Revision of General Authorisation. The process of applying for a WUL or GA registration will only be completed once a positive EA has been received and the authorised Namas Wind Farm is selected as a Preferred Bidder. This is in line with the requirements of the DWS.

6.2.3 National Heritage Resources Act (No. 25 of 1999) (NHRA)

The National Heritage Resources Act (No. 25 of 1999) (NHRA) provides an integrated system which allows for the management of national heritage resources and to empower civil society to conserve heritage resources for future generations. Section 38 of NHRA provides a list of activities which potentially require the undertaking of a Heritage Impact Assessment.

Section 38: Heritage Resources Management

1). Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as –

- *a. the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;*
- *b. the construction of a bridge or similar structure exceeding 50m in length;*
- *c. any development or other activity which will change the character of a site –*

i). exceeding 5 000m² 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;

Must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

In terms of Section 38(8), approval from the heritage authority is not required if an evaluation of the impact of a development on heritage resources is required in terms of any other legislation (such as NEMA), provided that the consenting authority ensures that the evaluation of impacts fulfils the requirements of the relevant heritage resources authority in terms of Section 38(3) and any comments and recommendations of the relevant resources authority with regard to such development have been taken into account prior to the granting of the consent. However, should heritage resources of significance be affected by the proposed grid connection infrastructure, a permit is required to be obtained prior to disturbing or destroying such resources as per the requirements of Section 48 of the NHRA, and the SAHRA Permit Regulations (GNR 668).

6.3 Overview of the Basic Assessment Process for the grid connection infrastructure for the Namas Wind Farm

Key tasks undertaken for the BA included:

- Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
- Submission of the completed Application for Environmental Authorisation to the competent authority (i.e. DEA) in terms of Regulations 5 and 6 of the EIA Regulations, 2014 (GNR 326), as amended.
- Undertaking a public participation process in accordance with Chapter 6 of GNR326, and the Department of Environmental Affairs (2017), Public Participation guidelines in terms of the NEMA EIA Regulations, Department of Environmental Affairs, Pretoria, South Africa (hereinafter referred to as "the Guidelines") in order to identify issues and concerns associated with the proposed project.
- Undertaking of independent specialist studies in accordance with Appendix 6 of the EIA Regulations, 2014 (GNR326), as amended.
- Preparation of a BA Report and EMPr in accordance with the requirements of Appendix 1 and Appendix 4 of GNR326.
- 30-day public and authority review period of the BA Report.
- Compilation of a C&R report detailing the comments raised by I&APs, addressing these comments in detail and finalisation of the BA Report.
- Submission of a final BA Report to the DEA for review and decision-making.

The tasks are discussed in detail in the sub-sections below.

6.3.1. Authority Consultation and Application for Authorisation in terms of the 2014 EIA Regulations (as amended)

In terms of GN R779 of 01 July 2016, the National Department of Environmental Affairs (DEA) has been determined as the Competent Authority for all projects that relate to the Integrated Resource Plan for Electricity (IRP) 2010 – 2030, and any updates thereto. Through the decision-making process, the DEA will be supported by the Northern Cape Department of Environment and Nature Conservation (DENC) as a commenting authority.

Consultation with the regulating authorities (i.e. DEA and DENC) as well as with all other relevant Organs of State will continue throughout the BA process. To date, this consultation has included the following:

- Submission of the project notification letters and application form for Environmental Authorisation to the DEA and DENC.
- Submission of the BA Report for review and comment by:
  - The competent and commenting authorities.
  - State departments that administer laws relating to a matter affecting the environment relevant to an application for Environmental Authorisation.
  - Organs of State that have jurisdiction in respect of the activity to which the application relates.

A record of all authority correspondence undertaken during the BA process is included in **Appendix B** and **Appendix C**.

6.3.2. Public Participation Process

Public Participation is an essential and regulatory requirement for an environmental authorisation process and is guided by Regulations 41 to 44 of the EIA Regulations 2014 (GNR 326) (as amended). The purpose of public participation is clearly outlined in Regulation 40 of the EIA Regulations 2014 (GNR 326) (as amended) and is being followed for this project.

The sharing of information forms the basis of the public participation process and offers the opportunity for I&APs to become actively involved in the BA process from the outset. The public participation process is designed to provide sufficient and accessible information to I&APs in an objective manner. The public participation process affords I&APs opportunities to provide input into and receive information regarding the BA process in the following ways:

During the BA process:
- provide an opportunity to submit comments regarding the project;
- assist in identifying reasonable and feasible alternatives;
- contribute relevant local information and knowledge to the environmental assessment;
- allow registered I&APs to verify that their comments have been recorded, considered and addressed, where applicable, in the environmental investigations;
- foster trust and co-operation;
- generate a sense of joint responsibility and ownership of the environment; and
- comment on the findings of the environmental assessments.

During the decision-making phase:

» to advise I&APs of the outcome of the competent authority's decision, and how and by when the decision can be appealed.

The public participation process therefore aims to ensure that:

» Information containing all relevant facts in respect of the application is made available to potential stakeholders and I&APs for their review.
» The information presented during the public participation process is presented in such a manner, i.e. local language and technical issues, which ensures that the information is carried over to all parties in an understandable manner such that it avoids the possible alienation of the public and prevents them from participating.
» Public participation is facilitated in such a manner that I&APs are provided with a reasonable opportunity to comment on the project.
» Various ways are provided to I&APs to correspond and submit their comments i.e. fax, post, email.
» An adequate review period is provided for I&APs to comment on the findings of the BA Report.

In terms of the requirement of Chapter 6 of the EIA Regulations of December 2014, as amended, the following key public participation tasks have been undertaken:

» Fix a notice board at a place conspicuous to the public at the boundary or on the fence of—
    (i) the site where the activity to which the application relates is or is to be undertaken; and
    (ii) any alternative site mentioned in the application;
» Give written notice to:
    (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
    (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
    (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
    (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
    (v) the municipality which has jurisdiction in the area;
    (vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
    (vii) any other party as required by the competent authority.
» Place an advertisement in one local newspaper.
» Open and maintain a register of I&APs and Organs of State.
» Release a BA Report for a 30-day review period.
» Prepare a Comments and Responses (C&R) report which documents the comments received on the BA process and the responses provided by the project team.

In compliance with the requirements of Chapter 6: Public Participation of the EIA Regulations, 2014 (as amended), the following summarises the key public participation activities conducted to date.

i. Stakeholder identification and Register of Interested and Affected Parties

42. A proponent or applicant must ensure the opening and maintenance of a register of I&APs and submit such a register to the competent authority, which register must contain the names, contact details and addresses of –
    (a) All persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP;
    (b) All persons who have requested the proponent or applicant, in writing, for their names to be placed on the register; and
    (c) All organs of state which have jurisdiction in respect of the activity to which the application relates.

I&APs have been identified through a process of networking and referral, obtaining information from Savannah Environmental's existing stakeholder database, liaison with potentially affected parties in the greater study area and a registration process involving the completion of a reply form. Key stakeholders and affected and surrounding landowners have been identified and registered on the project database. Other stakeholders and/or I&APs are required to formally register their interest in the project. An initial list of key stakeholders identified and registered is listed in **Table 6.2**.

Table 6.2: List of Stakeholders identified for the inclusion in the project database during the public participation process for the Grid Connection Infrastructure for the Namas Wind Farm

Organs of State
National Government Departments
Department of Agriculture, Forestry and Fisheries (DAFF)
Department of Energy (DoE)
Department of Environmental Affairs (Biodiversity & Conservation Directorate)
Department of Mineral Resources (DMR)
Department of Rural Development and Land Reform (DRDLR)
Department of Water and Sanitation (DWS)
Department of Science and Technology
Government Bodies and State-Owned Companies
Eskom Holdings SOC Limited
National Energy Regulator of South Africa (NERSA)
South African Civil Aviation Authority (CAA)
South African Heritage Resources Agency (SAHRA)
South African National Roads Agency Limited (SANRAL)
South African National Parks (SANParks)
Provincial Government Departments
Northern Cape Department of Agriculture
Northern Cape Department of Environment and Nature Conservation (DENC)
Northern Cape Department of Roads and Public Works
Ngwao Boswa Kapa Bokone (NBKB)
Local Government Departments
Namakwa District Municipality
Nama Khoi Local Municipality
Key Stakeholders
BirdLife South Africa

Endangered Wildlife Trust (EWT)
Wildlife and Environment Society of South Africa (WESSA)
South African Radio Astronomy Observatory (SARAO) – previously known as Square Kilometre Array (SKA)
Landowners
Affected landowners, tenants and occupiers
Neighbouring landowners, tenants and occupiers

As per Regulation 42 of the EIA Regulations, 2014 (as amended), all relevant stakeholder and I&AP information has been recorded within a register of I&APs (refer to **Appendix C1** for a listing of the recorded parties). In addition to the above-mentioned EIA Regulations, point 4.1 of the Public Participation Guidelines has also been followed. The register of I&APs contains the names, contact details and addresses of:

- all persons who requested to be registered on the database in writing and disclosed their interest in the project;
- all Organs of State which hold jurisdiction in respect of the activity to which the application relates; and
- all persons who submitted written comments or attended meetings during the public participation process.

I&APs have been encouraged to register their interest in the BA process from the onset of the project, and the identification and registration of I&APs will be on-going for the duration of the BA process. The database of I&APs will be updated throughout the BA process, and will act as a record of the I&APs involved in the public participation process.

ii. Advertisements and Notifications

40.(2)(a)	Fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of – (i) The site where the activity to which the application or proposed application relates is or is to be undertaken; and (ii) Any alternative site.
40.(2)(b)	Giving written notice, in any of the manners provided for in section 47D[16] of the Act, to –

[16] Section 47D of NEMA pertains to the delivery of documents, and states that:

(1) A notice or other document in terms of this Act or a specific environmental management Act may be issued to a person –
(a) By delivering it by hand;
(b) By sending it by registered mail –
(i) To that person's business or residential address; or
(ii In the case of a juristic person, to its registered address or principal place of business;
(bA) By faxing a copy of the notice or other document to the person, if the person has a fax number;
(bB) By e-mailing a copy of the notice or other document to the person, if the person has an e-mail address; or
(bC) By posting a copy of the notice or other document to the person by ordinary mail, if the person has a postal address;
(c) Where an address is unknown despite reasonable enquiry, by publishing it once in the Gazette and once in a local newspaper circulating in the area of that person's last known residential or business address.

(i) The occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;
(ii) Owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;
(iii) The municipal councillor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area;
(iv) The municipality which has jurisdiction in the area;
(v) Any organ of state having jurisdiction in respect of any aspect of the activity; and
(vi) Any other party as required by the competent authority.

40.(2)(c) Placing an advertisement in –
(i) One local newspaper; or
(ii) Any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;

40.(2)(d) Placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph (c)(ii); and

40.(2)(e) Using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desirous of but unable to participate in the process due to –
(i) Illiteracy;
(ii) Disability; or
(iii) Any other disadvantage.

The BA process was announced with an invitation to the Organs of State, potentially affected and neighbouring landowners and general public to register as I&APs and to actively participate in the process. This was achieved via the following:

- Compilation of a background information document (BID) providing technical and environmental details on this project (in the context of the wind farm project) and how to become involved in the BA process (refer to **Appendix C3**). The BID was distributed to identified stakeholders and I&APs. The BID was also made available electronically on the Savannah Environmental website (http://www.savannahsa.com/public-documents/energy-generation).
- Placement of site notices regarding the BA process at visible points along the grid connection corridor, in accordance with the requirements of the EIA Regulations. Photographs and the GPS co-ordinates of the site notices are contained in **Appendix C2**.
- BA process notification letters announcing the BA process, notifying Organs of State, potentially affected and neighbouring landowners, as well as registered stakeholders/I&APs of the grid connection infrastructure, providing background information of the project and inviting I&APs to register on the project's database, were distributed via email on 27 March 2019. The evidence of the distribution of the process notification letters are contained in **Appendix C** of this final BA Report.

(2) A notice or other document issued in terms of subsection (1)(b), (bA), (bB), (bC) or (c) must be regarded as having come to the notice of the person, unless the contrary is proved."

- » Placement of advertisement announcing the availability of, and inviting comment on the BA Report in the Gemsbok Newspaper on 31 May 2019. The details of the newspaper advert placement are contained in **Appendix C2** of this final BA Report.
- » The BA Report was made available for review by I&APs for a 30-day review period from **29 May 2019 to 01 July 2019**. Notification of the availability of the BA Report for review was undertaken through the distribution of notification letters to all registered I&APs, as well as the placement of an advert in one local newspaper. CD and hard copy versions of the BA Report were circulated to Organs of State via courier at the commencement of the review period. The BA Report was also made available on the Savannah Environmental website. The evidence of distribution of the BA Report is included in this final BA Report (**Appendix C**), which has been submitted to the DEA.

iii. Public Involvement and Consultation

In order to accommodate the varying needs of stakeholders and I&APs within the greater study area, as well as capture their views, comments, issues and concerns regarding the project, various opportunities were provided to I&APs to note their comments and issues. I&APs are being consulted through the following means:

Table 6.3: Consultation undertaken for the Grid Connection Infrastructure for the Namas Wind Farm

Activity	Date
Distribution of the BID	17 August 2018
Focus Group Meetings[17]: » Affected Landowners; » Adjacent Landowners; » Key Stakeholders (including the Northern Cape Department of Environment and Nature Conservation, Nama Khoi Local Municipality, Kleinsee Community Representatives, Sandveld Farmers' Association).	13 November 2018 and 14 November 2018
Placement of site notices along the grid connection corridor at visible and accessible areas	05 February 2019
Distribution of process notification letters and stakeholder reply form announcing the BA process and inviting I&APs to register on the project database.	27 March 2019
Distribution of notification letters announcing the availability of the BA Report for a 30-day public review and comment period. These letters were distributed to Organs of State, Government Departments, Ward Councillors, landowners within the greater study area (including neighbouring landowners) and key stakeholder groups.	29 May 2019
Advertising of the availability of the BA Report for a 30-day review period in	31 May 2019

[17] The Focus Group Meetings for the proposed grid infrastructure was consolidated with the Focus Group Meetings for the authorised Namas Wind Farm. The proposed grid connection infrastructure was fully described and meeting attendees were provided with the opportunity to raise comments on the proposed project. The purpose of consolidated meetings was to allow stakeholders to understand the context and need for the grid connection infrastructure.

Activity	Date
the Gemsbok Newspaper.	
30-day review period for the BA Report for comment.	29 May 2019 – 01 July 2019

The purpose of the abovementioned meetings was to engage with key stakeholders to ensure that key requirements/comments are noted and addressed as part of the BA process. The meetings were held prior to the release of the BA Report for review and comment in order to provide the EAP and applicant with an opportunity to address the comments as part of the BA Report, and to provide I&APs the opportunity to confirm that their issues have been recorded, included, considered and addressed as part of the BA Report. Records of all consultation undertaken are included in **Appendix C**.

iv. Registered I&APs entitled to Comment on the BA Report and Plans

43.(1) A registered I&AP is entitled to comment, in writing, on all reports or plans submitted to such party during the public participation process contemplated in these Regulations and to bring to the attention of the proponent or applicant any issues which that party believes may be of significance to the consideration of the application, provided that the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.

(2) In order to give effect to section 24O of the Act, any State department that administers a law relating to a matter affecting the environment must be requested, subject to regulation 7(2), to comment within 30 days.

44.(1) The applicant must ensure that the comments of interested and affected parties are recorded in reports and plans and that such written comments, including responses to such comments and records of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these Regulations.

(2) Where a person desires but is unable to access written comments as contemplated in subregulation (1) due to –

(a) A lack of skills to read or write;
(b) Disability; or
(c) Any other disadvantage;

Reasonable alternative methods of recording comments must be provided for.

I&APs registered on the database were notified by means of a notification letter (sent via e-mail as all I&APs have valid email addresses) of the release of the BA Report for a 30-day review period, invited to provide comment on the BA Report, and informed of the manner in which, and timeframe within which such comment must be made. The notification was distributed prior to the commencement of the 30-day review period, on 29 May 2019.

v. Identification and Recording of Comments

Comments raised by I&APs over the duration of the BA process have been synthesised into a Comments and Responses (C&R) report which is included in **Appendix C8** of this final BA Report. The C&R report includes detailed responses from members of the EIA project team and/or the project proponent to the issues and comments raised during the public participation process.

The C&R report consists of written comments received.

Meeting notes of all the meetings conducted prior to the release of the BA Report for the 30-day review period are included in **Appendix C7**.

6.4 Assessment of Impacts Identified through the BA Process

Impacts identified as requiring investigation, as well as the specialist consultants involved in the assessment of these impacts are indicated in **Table 6.5** below.

Table 6.5: Specialist consultants appointed to evaluate the potential impacts associated with the Grid Connection Infrastructure for the Namas Wind Farm

Specialist Name	Specialist Company	Specialist Area of Expertise	Appendices
Simon Todd	Simon Todd Consulting	Ecology	Appendix D
Rob Simmons and Marlei Martins	Birds and Bats Unlimited Consultants	Avifauna	Appendix E
Garry Paterson	Agricultural Research Council (ARC)	Soils and Agricultural Potential	Appendix F
Jayson Orton (with input from John Pether)	ASHA Consulting	Heritage (including archaeology and palaeontology)	Appendix G
Lourens du Plessis	LOGIS	Visual	Appendix H
Elena Broughton	Urban-Econ	Socio-Economic	Appendix I

Specialist studies considered direct and indirect environmental impacts associated with the development of all components of the grid connection infrastructure. Impacts were assessed in terms of the following criteria:

- The **nature**, a description of what causes the effect, what will be affected, and how it will be affected;
- The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score of between 1 and 5 is assigned as appropriate (with a score of 1 being low and a score of 5 being high);
- The **duration**, wherein it is indicated whether:
  - The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - Medium-term (5–15 years) – assigned a score of 3;
  - Long term (> 15 years) - assigned a score of 4;
  - Permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  - 0 is small and will have no effect on the environment;
  - 2 is minor and will not result in an impact on processes;
  - 4 is low and will cause a slight impact on processes;
  - 6 is moderate and will result in processes continuing but in a modified way;
  - 8 is high (processes are altered to the extent that they temporarily cease);
  - 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability of occurrence**, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
  - Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
  - Assigned a score of 2 is improbable (some possibility, but low likelihood);
  - Assigned a score of 3 is probable (distinct possibility);
  - Assigned a score of 4 is highly probable (most likely);
  - Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).

- The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high;
- The **status**, which is described as either positive, negative or neutral;
- The degree to which the impact can be reversed;
- The degree to which the impact may cause irreplaceable loss of resources;
- The degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:

S = (E+D+M) P; where

S = Significance weighting.
E = Extent.
D = Duration.
M = Magnitude.
P = Probability.

The **significance weightings** for each potential impact are as follows:

- **< 30 points:** Low (i.e. where this impact would not have a direct influence on the decision to develop in the area);
- **30-60 points:** Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated);
- **> 60 points:** High (i.e. where the impact must have an influence on the decision process to develop in the area).

As the Applicant has the responsibility to avoid or minimise impacts and plan for their management (in terms of the EIA Regulations, 2014 (as amended)), the mitigation of significant impacts is discussed. Assessment of impacts with mitigation is made in order to demonstrate the effectiveness of the proposed mitigation measures. An Environmental Management Programme (EMPr) is included as **Appendix J**.

6.5 Assumptions and Limitations of the BA Process

The following assumptions and limitations are applicable to the studies undertaken within this BA process:

- All information provided by the developer and I&APs to the environmental team was correct and valid at the time it was provided.
- It is assumed that the grid connection corridor identified by the developer represents a technically suitable corridor for the establishment of the grid connection infrastructure for the authorised Namas Wind Farm.
- This report and its investigations are project-specific, and consequently the environmental team did not evaluate any other grid connection technology alternatives.

Refer to the specialist studies in **Appendices D – I** for specialist study specific limitations.

6.6 Legislation and Guidelines that have informed the preparation of this final Basic Assessment Report

The following legislation and guidelines have informed the scope and content of this final BA Report:

- National Environmental Management Act (Act No. 107 of 1998);
- EIA Regulations of December 2014, published under Chapter 5 of NEMA (as amended in GNR R326 in Government Gazette No 40772 of April 2017);
- Department of Environmental Affairs (2017), Public Participation guidelines in terms of NEMA EIA Regulations; and
- International guidelines – the Equator Principles, the IFC Performance Standards, the Sustainable Development Goals, World Bank Environmental and Social Framework, and the and World Bank Group Environmental, Health, and Safety Guidelines (EHS Guidelines).

Table 6.6 provides an outline of the legislative permitting requirements applicable to the grid connection infrastructure as identified at this stage in the project process.

Table 6.6: Applicable Legislation, Policies and/or Guidelines associated with the development of the Grid Connection Infrastructure for the Namas Wind Farm

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Legislation			
Constitution of the Republic of South Africa (No. 108 of 1996)	In terms of Section 24, the State has an obligation to give effect to the environmental right. The environmental right states that: "*Everyone has the right –* » *To an environment that is not harmful to their health or well-being, and* » *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:* * *Prevent pollution and ecological degradation,* * *Promote conservation, and* * *Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development*."	Applicable to all authorities	There are no permitting requirements associated with this Act. The application of the Environmental Right however implies that environmental impacts associated with proposed developments are considered separately and cumulatively. It is also important to note that the "right to an environment clause" includes the notion that justifiable economic and social development should be promoted, through the use of natural resources and ecologically sustainable development.
National Environmental Management Act (No 107 of 1998) (NEMA)	The 2014 EIA Regulations have been promulgated in terms of Chapter 5 of NEMA. Listed activities which may not commence without EA are identified within the Listing Notices (GNR 327, GNR 325 and GNR 324) which form part of these Regulations (GNR 326). In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation. A Basic Assessment Process is required to be undertaken for the proposed project.	Department of Environmental Affairs (DEA) – Competent Authority Northern Cape Department of Environment and Nature Conservation (DENC) – Commenting Authority	The listed activities triggered by the proposed project have been identified and are assessed through the BA process for the grid connection infrastructure for the authorised Namas Wind Farm. The BA process culminates in the submission of a final BA Report to the competent authority in support of the Application for Environmental Authorisation.
National Environmental	In terms of the "Duty of Care and Remediation of	DEA	While no permitting or licensing

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
Management Act (No 107 of 1998) (NEMA)	Environmental Damage" provision in Section 28(1) of NEMA every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment. In terms of NEMA, it is the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.	DENC	requirements arise directly by virtue of the proposed grid connection infrastructure, this section finds application through the consideration of potential cumulative, direct, and indirect impacts.
Environment Conservation Act (No. 73 of 1989) (ECA)	The Noise Control Regulations in terms of Section 25 of the ECA contain regulations applicable for the control of noise in the Provinces of Limpopo, North West, Mpumalanga, Northern Cape, Eastern Cape, and KwaZulu-Natal Provinces. The Noise Control Regulations cover the powers of a local authority, general prohibitions, prohibitions of disturbing noise, prohibitions of noise nuisance, use of measuring instruments, exemptions, attachments, and penalties. In terms of the Noise Control Regulations, no person shall make, produce or cause a disturbing noise, or allow it to be made, produced or caused by any person, machine, device or apparatus or any combination thereof (Regulation 04).	DEA DENC Nama Khoi Local Municipality	Noise impacts are expected to be associated with the construction phase of the project. Considering the location of the grid connection corridor in relation to residential areas and provided that appropriate mitigation measures are implemented, construction noise is unlikely to present a significant intrusion to the local community. There is therefore no requirement for a noise permit in terms of the legislation.
National Water Act (No. 36 of 1998) (NWA)	A water use listed under Section 21 of the NWA must be licensed with the Regional DWS, unless it is listed in Schedule 1 of the NWA (i.e. is an existing lawful use), is permissible under a GA, or if a responsible authority waives the need for	Regional Department of Water and Sanitation	The grid connection corridor traverses the Buffels River in the northern section. The double-circuit 132kV power line will need to span over the River to enable the

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	a licence. Water use is defined broadly, and includes consumptive and non-consumptive water uses, taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation. Consumptive water uses may include taking water from a water resource (Section 21(a)), and storing water (Section 21(b)). Non-consumptive water uses may include impeding or diverting of flow in a water course (Section 21(c)), and altering of bed, banks or characteristics of a watercourse (Section 21(i)).		connection of the authorised Namas Wind Farm to the existing Gromis Substation. Where development activities impede or divert the flow of water in a watercourse, or alter the bed, banks, course or characteristics of a watercourse, Section 21(c) and 21 (i) of the NWA would be triggered, and the project proponent would need to apply for a WUL or register a GA with the DWS.
Minerals and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA)	In accordance with the provisions of the MPRDA a mining permit is required in accordance with Section 27(6) of the Act where a mineral in question is to be mined, including the mining of materials from a borrow pit.	Department of Mineral Resources (DMR)	Any person who wishes to apply for a mining permit in accordance with Section 27(6) must simultaneously apply for an Environmental Authorisation in terms of NEMA. No borrow pits are expected to be required for the construction of the grid connection infrastructure, and as a result a mining permit or EA is not required to be obtained.
	Section 53 of the MPRDA states that any person who intends to use the surface of any land in any way which may be contrary to any object of the Act, or which is likely to impede any such object must apply to the Minister for approval in the prescribed manner.		In terms of Section 53 of the MPRDA, approval is required from the Minister of Mineral Resources to ensure that the proposed grid connection infrastructure does not sterilise a mineral resource that might be present within the grid

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			connection corridor.
National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM:AQA)	The National Dust Control Regulations (GNR 827) published under Section 32 of NEM:AQA prescribe the general measures for the control of dust in all areas, and provide a standard for acceptable dustfall rates for residential and non-residential areas. In accordance with the Regulations (GNR 827) any person who conducts any activity in such a way as to give rise to dust in quantities and concentrations that may exceed the dustfall standard set out in Regulation 03 must, upon receipt of a notice from the air quality officer, implement a dustfall monitoring programme. Any person who has exceeded the dustfall standard set out in Regulation 03 must, within three months after submission of the dustfall monitoring report, develop and submit a dust management plan to the air quality officer for approval.	DENC / Namakwa District Municipality	In the event that the construction of the grid connection infrastructure results in the generation of excessive levels of dust, the possibility could exist that a dustfall monitoring programme would be required for the project, in which case dustfall monitoring results from the dustfall monitoring programme would need to be included in a dust monitoring report, and a dust management plan would need to be developed. However, with mitigation measures implemented, construction of the grid connection infrastructure is not anticipated to result in significant dust generation.
National Heritage Resources Act (No. 25 of 1999) (NHRA)	Section 07 of the NHRA stipulates assessment criteria and categories of heritage resources according to their significance. Section 35 of the NHRA provides for the protection of all archaeological and palaeontological sites, and meteorites. Section 36 of the NHRA provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority. Section 38 of the NHRA lists activities which require developers or any person who intends to undertake a listed activity to notify the responsible heritage resources authority and furnish it with details regarding the location, nature,	South African Heritage Resources Agency Ngwao Boswa Kapa Bokone (NBKB)	A full Heritage Impact Assessment (HIA) (with field work) has been undertaken as part of the BA process (refer to **Appendix G** of this final BA Report). Palaeontological materials were not observed along the grid connection corridor but isolated fossil bones could occur within the various sand formations of the area. The corridor does include a number of archaeological sites and some may require sampling if they are to be disturbed. Impacts to isolated fossils and unmarked graves are possible but cannot be predicted. No other significant impacts

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	and extent of the proposed development. Section 44 of the NHRA requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction.		are expected. Should a heritage resource be impacted upon, a permit may be required from SAHRA or Ngwao Boswa Kapa Bokone (NBKB) in accordance with Section 48 of the NHRA, and the SAHRA Permit Regulations (GNR 668). This will be determined once the final location of the grid connection infrastructure within the grid connection corridor has been determined.
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)	Section 53 of NEM:BA provides for the MEC / Minister to identify any process or activity in such a listed ecosystem as a threatening process. Three government notices have been published in terms of Section 56(1) of NEM:BA as follows: » Commencement of TOPS Regulations, 2007 (GNR 150). » Lists of critically endangered, vulnerable and protected species (GNR 151). » TOPS Regulations (GNR 152). It provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), and vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (NEM:BA: National list of ecosystems that are threatened and in need of	DEA DENC	Under NEM:BA, a permit would be required for any activity which is of a nature that may negatively impact on the survival of a listed protected species. Four species of conservation concern have been identified within the grid connection corridor. This includes *Aloe arenicola* (NT), *Leucoptera nodosa* (NT), *Wahlenbergia asparagoides* (VU) and *Babiana hirsuta* (NT). However, the abundance of these species is low across most of the corridor and the local populations would not be compromised by the development. (Ecological Impact Assessment included as **Appendix D**).

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	protection, (Government Gazette 37596, GNR 324), 29 April 2014).		
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)	Chapter 5 of NEM:BA pertains to alien and invasive species, and states that a person may not carry out a restricted activity involving a specimen of an alien species without a permit issued in terms of Chapter 7 of NEM:BA, and that a permit may only be issued after a prescribed assessment of risks and potential impacts on biodiversity is carried out. Applicable, and exempted alien and invasive species are contained within the Alien and Invasive Species List (GNR 864).	DEA DENC	Restricted Activities and the respective requirements applicable to persons in control of different categories of listed invasive species are contained within the Alien and Invasive Species Regulations (GNR 598) published under NEM:BA, together with the requirements of the Risk Assessment to be undertaken.
Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA)	Section 05 of CARA provides for the prohibition of the spreading of weeds. Regulation 15 of GNR 1048 published under CARA provides for the classification of categories of weeds and invader plants, and restrictions in terms of where these species may occur. Regulation 15E of GNR 1048 published under CARA provides requirement and methods to implement control measures for different categories of alien and invasive plant species.	Department of Agriculture, Forestry and Fisheries (DAFF)	CARA will find application throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies need to be developed and implemented. In addition, a weed control and management plan must be implemented. The permission of DAFF will be required if the grid connection infrastructure requires the draining of vleis, marshes or water sponges on land outside urban areas. However, this is not anticipated to be relevant for the project. In terms of Regulation 15E (GNR 1048) where Category 1, 2 or 3 plants occur a land user is required to control such plants by means of one or more of the following methods:

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			» Uprooting, felling, cutting or burning. » Treatment with a weed killer that is registered for use in connection with such plants in accordance with the directions for the use of such a weed killer. » Biological control carried out in accordance with the stipulations of the Agricultural Pests Act (No. 36 of 1983), the ECA and any other applicable legislation. » Any other method of treatment recognised by the executive officer that has as its object the control of plants concerned, subject to the provisions of sub-regulation (4). » A combination of one or more of the methods prescribed, save that biological control reserves and areas where biological control agents are effective shall not be disturbed by other control methods to the extent that the agents are destroyed or become ineffective.
National Forests Act (No. 84 of 1998) (NFA)	According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. Notice of the List of Protected Tree Species under the National Forests Act (No. 84 of 1998) was published in GNR 734. The prohibitions provide that "no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree,	DAFF	A licence is required for the removal of protected trees. It is therefore necessary to conduct a survey that will determine the number and relevant details pertaining to protected tree species present in the grid connection corridor that cannot be reasonably avoided for the submission of relevant permits to authorities prior to the disturbance of these individuals.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	except under a licence granted by the Minister".		The Ecological Impact Assessment included a site visit which allowed for the identification of any protected tree species that may require a license in terms of the NFA within the project development corridors (refer to **Appendix D** of this final BA Report). No NFA-protected tree species were identified within the grid connection corridor.
National Veld and Forest Fire Act (No. 101 of 1998) (NVFFA)	Chapter 4 of the NVFFA places a duty on owners to prepare and maintain firebreaks, the procedure in this regard, and the role of adjoining owners and the fire protection association. Provision is also made for the making of firebreaks on the international boundary of the Republic of South Africa. The applicant must ensure that firebreaks are wide and long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land, it does not cause soil erosion, and it is reasonably free of inflammable material capable of carrying a veldfire across it. Chapter 5 of the Act places a duty on all owners to acquire equipment and have available personnel to fight fires. Every owner on whose land a veldfire may start or burn or from whose land it may spread must have such equipment, protective clothing and trained personnel for extinguishing fires, and ensure that in his or her absence responsible persons are present on or near his or her land who, in the event of fire, will extinguish the fire or assist in doing so, and take all reasonable steps to alert the owners of adjoining land and the relevant fire protection association, if any.	DAFF	While no permitting or licensing requirements arise from this legislation, this Act will be applicable during the construction and operation of the grid connection infrastructure, in terms of the preparation and maintenance of firebreaks, and the need to provide appropriate equipment and personnel for firefighting purposes.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
Hazardous Substances Act (No. 15 of 1973) (HAS)	This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger, to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products. » Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared as Group I or Group II substance » Group IV: any electronic product, and » Group V: any radioactive material. The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.	Department of Health (DoH)	It is necessary to identify and list all Group I, II, III, and IV hazardous substances that may present with the development of the grid connection infrastructure and in what operational context they are used, stored or handled. If applicable, a license would be required to be obtained from the Department of Health (DoH).
National Environmental Management: Waste Act (No. 59 of 2008) (NEM:WA)	The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. The Minister may amend the list by – » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. In terms of the Regulations published in terms of NEM:WA (GNR 912), a BA or EIA is required to be undertaken for	DEA – hazardous waste DENC – general waste	No listed activities are triggered by the grid connection infrastructure and therefore no Waste Management License is required to be obtained. General and hazardous waste handling, storage and disposal will be required during construction and operation of the grid connection infrastructure. The National Norms and Standards for the Storage of Waste (GNR 926) published under Section 7(1)(c) of NEM:WA will need to be considered in this regard.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	identified listed activities. Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that: » The containers in which any waste is stored, are intact and not corroded or in » Any other way rendered unlit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise, and » Pollution of the environment and harm to health are prevented.		
National Road Traffic Act (No. 93 of 1996) (NRTA)	The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also	SANRAL – national roads Northern Cape Department of Roads and Public Works	An abnormal load / vehicle permit may be required to transport the various components to site for construction. These include route clearances and permits will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads (transport vehicles exceeding the dimensional limitations (length) of 22m). Depending on the trailer configuration and height when loaded, some of the collector substation components may not meet specified dimensional limitations (height and width) and will therefore require a permit.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations.		
	Provincial Policies / Legislation		
Northern Cape Nature Conservation Act (Act No. 9 of 2009)	This Act provides for the sustainable utilisation of wild animals, aquatic biota and plants; provides for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; provides for offences and penalties for contravention of the Act; provides for the appointment of nature conservators to implement the provisions of the Act; and provides for the issuing of permits and other authorisations. Amongst other regulations, the following may apply to the current project: » Boundary fences may not be altered in such a way as to prevent wild animals from freely moving onto or off of a property; » Aquatic habitats may not be destroyed or damaged; » The owner of land upon which an invasive species is found (plant or animal) must take the necessary steps to eradicate or destroy such species; The Act provides lists of protected species for the Province.	Northern Cape Department of Environment and Nature Conservation (DENC).	A collection/destruction permit must be obtained from Northern Cape Nature Conservation for the removal of any protected plant or animal species found on site. Four species of conservation concern have been identified within the grid connection corridor. This includes *Aloe arenicola* (NT), *Leucoptera nodosa* (NT), *Wahlenbergia asparagoides* (VU) and *Babiana hirsuta* (NT). However, the abundance of these species is low across most of the corridor and the local populations would not be compromised by the development. (Ecological Impact Assessment included as **Appendix D**).

CHAPTER 7: DESCRIPTION OF THE RECEIVING ENVIRONMENT

This chapter provides a description of the local environment. This information is provided in order to assist the reader in understanding the possible effects of the project on the environment within which it is proposed to be developed. Aspects of the biophysical, social and economic environment that could be directly or indirectly affected by, or could affect, the grid connection infrastructure for the Namas Wind Farm have been described. This information has been sourced from both existing information available for the area as well as collected field data by specialist consultants, and aims to provide the context within which this BA process is being conducted.

7.1 Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter of the final BA Report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of Basic Assessment Reports:

Requirement	Relevant Section
3(h)(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	The environmental attributes associated with the grid connection corridor and the broader environment are described and considered within this chapter and include the following:
	» The regional setting within which the grid connection corridor is located is described in section 7.2.
	» The climatic conditions of the area within which the grid connection corridor is located is discussed in section 7.3.
	» The biophysical characteristics of the grid connection corridor and the surrounding areas are described in section 7.4. This includes the topography and terrain, soils and agricultural potential and the ecological profile of the grid connection corridor (i.e. vegetation, fine-scale habitats, critical biodiversity areas and broad-scale processes, terrestrial fauna and avifauna).
	» The heritage of the affected environment (including the archaeology, palaeontology and cultural landscape) is discussed in section 7.5.
	» The visual quality of the affected environment is discussed in section 7.6.
	» The social context within which the grid connection corridor is located is described in section 7.7.

A more detailed description of each aspect of the affected environment is included in the specialist reports contained within the **Appendices D - I**.

7.2. Regional setting

The broader study area and the grid connection proposed for the development of the grid connection infrastructure for the Namas Wind Farm is located along the west coast in the Northern Cape Province. The Province is situated in the north-western corner of South Africa and has a land area of 372,889 km^2,

therefore occupying approximately 30% of South Africa's land area and making it the largest province in South Africa even though it has the smallest population.

The grid connection infrastructure is located within Ward 8 of the Nama Khoi Local Municipality and the Namakwa District Municipality. Refer to **Figure 7.1** for a regional map of the study area and the grid connection corridor. The Nama Khoi local Municipality is a Category B municipality, which means it shares executive and legislative authority with a Category C municipality. The Namakwa District Municipality is a Category C municipality, which denotes that the municipality has executive and legislative authority in an area that includes more than one municipality. Namakwa is the largest of the five district municipalities in the Northern Cape. It is comprised of six local municipalities, namely Nama Khoi, Hantam, Khâi-Ma, Kamiesberg, Karoo Hoogland, and Richtersveld.

The major towns located within the study area, and within the surrounding areas of the corridor include Kleinsee, Port Nolloth, Koingnaas, Komaggas, Springbok and Nigramoep. The towns of Kleinsee, Port Nolloth and Koingnaas are coastal towns located on the west coast. Kleinsee is the town closest to the project site and is located ~14km to the north-west, with Komaggas located~24km to the east and Koingnaas located ~40km to the south.

Kleinsee was previously viewed as one of the flourishing mining towns, solely managed by De Beers, and characterised as "paradise, an oasis in the desert" by both previous and current residents. Residents had many benefits such as free rent, free water, and free electricity. De Beers also funded recreation activities, which brought communities together. The town, however, experienced a sharp decline in population between 2007 and 2009. By 2007, the diamond production decreased, which led to retrenchment of workers in the same year. By 2010 mining operations ceased completely, leading to the sale of the mines. The population of the town began decreasing as people sought employment in other places within and outside the Province, and foreigners employed in the area returned to their homes. To avoid total loss, the mining town was proclaimed as a public town in 2012 under the Nama Khoi Local Municipality to allow people to continue living in the area. Currently, the region has a very low population density of 3 people per km^2.

Kleinsee was previously visited often by tourists as a part of the diamond route, however, now it is included in the 'shipwreck and daisies route'. The town holds and is located near various tourist attractions such as the Buffels River estuary, which has an abundant bird life, and the Seal colony, which is the largest on-land colony in South Africa with more than 450 000 animals on the beach. In addition, the town boasts a Nature Reserve that has more than 100 indigenous plant species. Other attractions within the district include among others the Molyneux Nature Reserve, Namaqua National Park, Orange River, Blue Mine, and the Goegap Nature Reserve. None of these conservation areas are in close proximity to, or traversed by the grid connection corridor, however the northern section of the grid connection corridor traverses the Buffels River before it connects to the existing Gromis Substation.

The area is also well-known for its scenic natural beauty (West Coast as a whole) and annual wild flower displays (Namaqualand). This occurs once a year between July and October, depending on a number of environmental factors, including the occurrence and duration of rainfall.

The mining activities along the coastline have significantly disturbed the area due to the scale and nature of the surface based mining. Other than the mining and prospecting activities, industrial infrastructure within the region includes a network of distribution power lines, a distribution substation at Kleinsee and the

Gromis Transmission Substation north of the R355 regional road. Other existing power lines within the area include the Koingnaas Sandveld 66kV power line located to the west of the corridor, the Kommagas Sandveld 66kV power line which traverses through the grid connection corridor in the south section of the corridor, the Gromis Kleinzee 66kV power line located to the north of the corridor, the Gromis Nama22kV power line located to the east of the corridor and the Gromis Oranjemund 22kV power line located to the north. Also, the yet to be constructed Juno Gromis 400kV power line must be noted, which is located parallel to the grid connection corridor, has been authorised and will be constructed in the near future.

With the construction of multiple renewable energy facilities within the area and within the Springbok Renewable Energy Development Zone (REDZ) a new 'layer' would be added to the cultural landscape which will intensify the presence of industrial and infrastructure development within the area.

7.3. Climatic Conditions

The climate in Kleinsee is considered to be a desert climate. The town receives virtually no rainfall throughout the year. The average annual temperature of the town is 15.9°C, with an average annual rainfall of 93mm. The driest month for the town is January, with an average temperature of 18.5°C. The coldest month is July with an average temperature of 13°C. **Figure 7.2** below provides a climate graph for the town of Kleinsee.

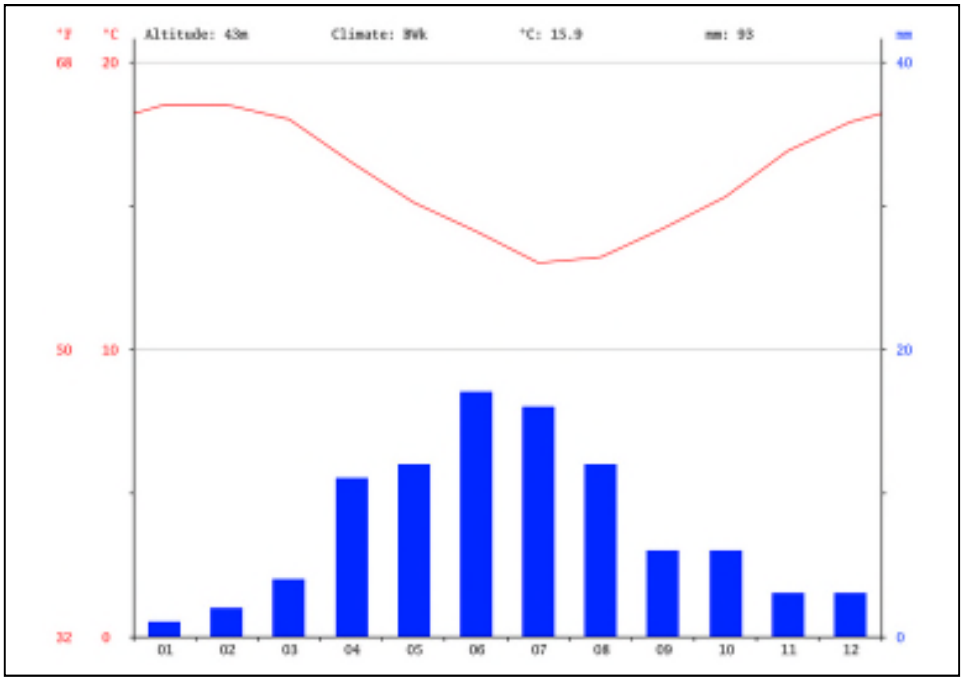

Figure 7.2: Climate graph for the town of Kleinsee, Northern Cape

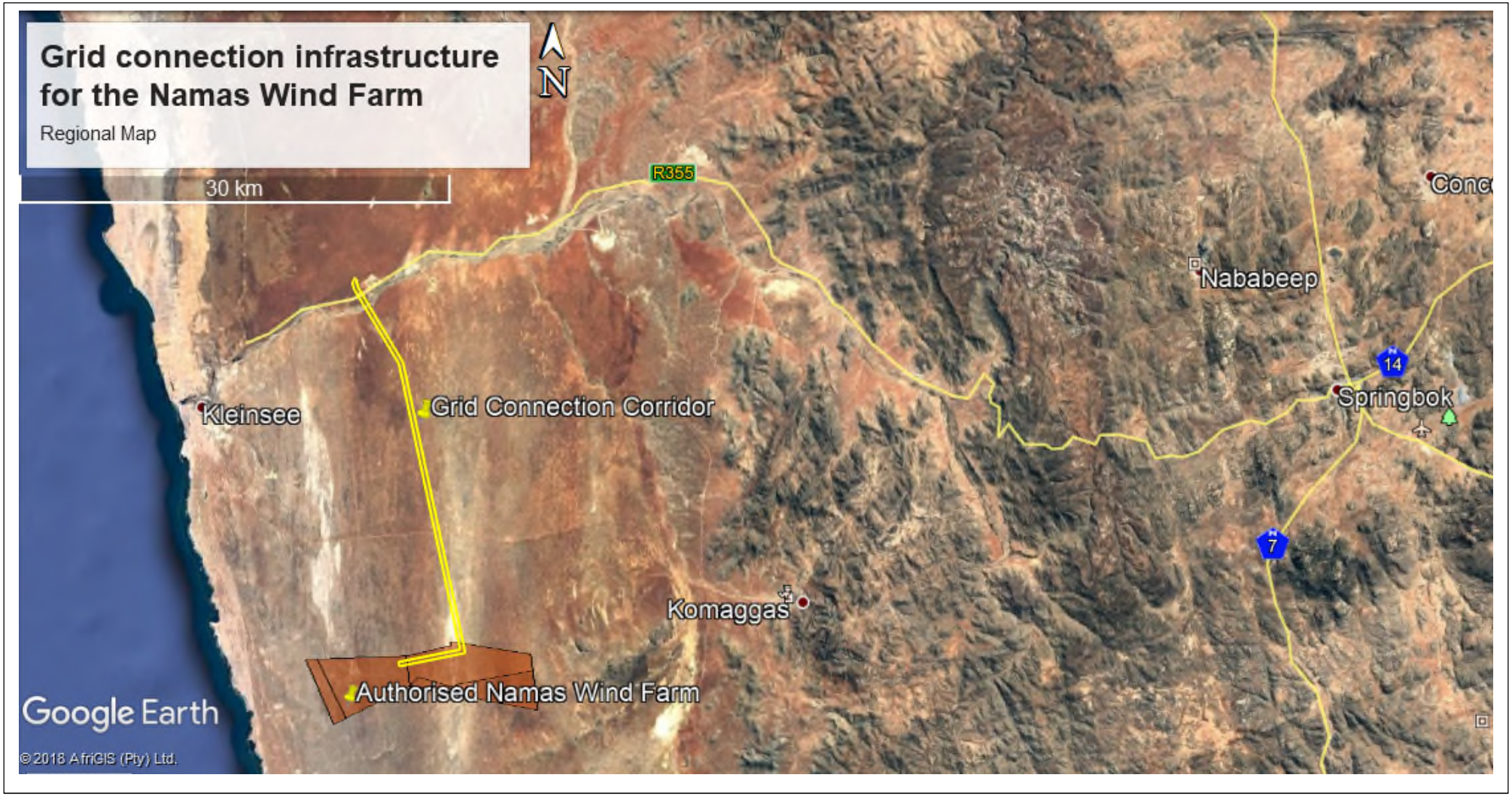

Figure 7.1: Map indicating the regional setting of the grid connection corridor proposed for the development of the grid connection infrastructure for the Namas Wind Farm

7.4. Biophysical Characteristics of the Grid Connection Corridor

7.4.1. Topography, Terrain and Land Use

The area consists of slightly undulating topography, with slopes of less than 5% over most of the area, and with an altitude above sea level of between 120 and 246 m.

The current land use being undertaken within the corridor is extensive grazing (specifically sheep grazing) and the corridor is dominated by natural vegetation. The corridor also includes a significant proportion of vegetated sand dunes/fields.

The most prominent water features are the Buffels River located at the northern section of the corridor and the Komaggas River located to the east and outside of the corridor.

7.4.2. Soils and Agricultural Potential

Soils and Agricultural Potential of the Grid Connection Corridor

The area is underlain by Quaternary sediments, mostly sandy in nature. The grid connection corridor is covered by four land types, namely (**Figure 7.3**):

- Af17 - high base status and red and yellow soils with dunes
- Ah38 - high base status with red and yellow soils
- Ai13 - high base status with yellow soils
- Hb80 - grey sands and other soils

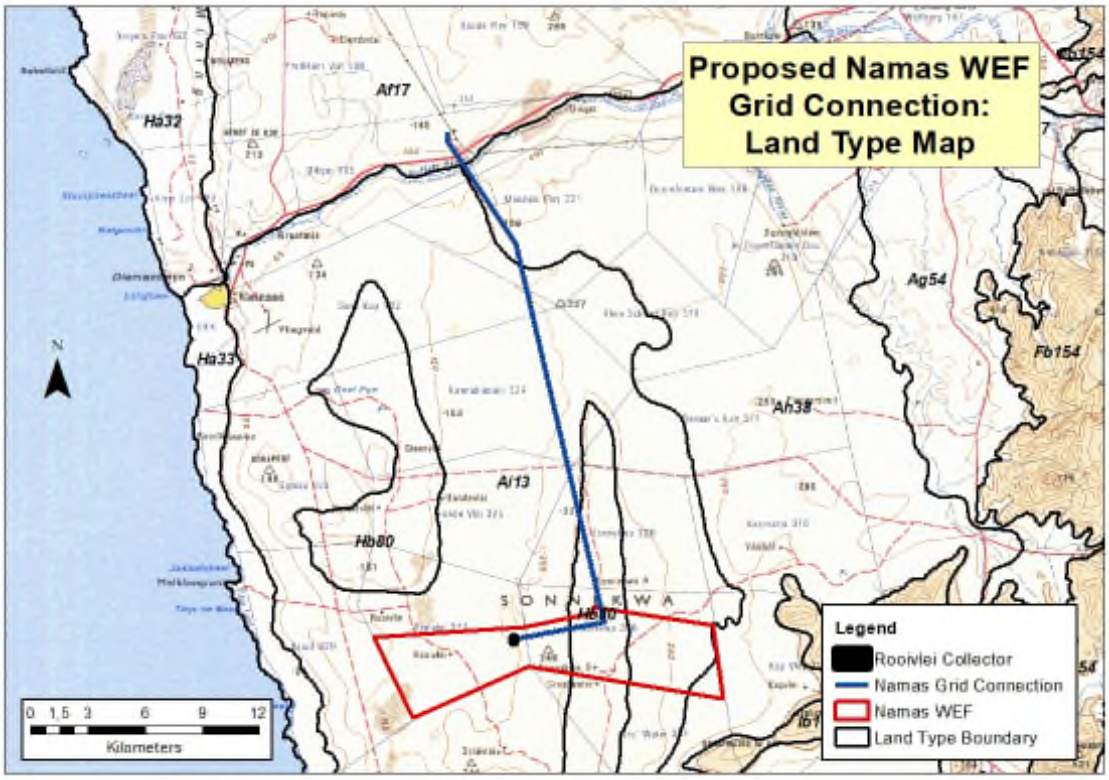

Figure 7.3: Land types present within the grid connection corridor

Table 7.1 provides the details of the soils and land types present within the grid connection corridor.

Table 7.1: Details of the soils and land types present within the grid connection corridor

Land Type	Dominant Soils	Depth (mm)	Percent of land type	Characteristics	Agricultural Potential (%)
Af17	Hutton & Clovelly 31/41	>1200	95%	Red and yellow brown, sandy, structureless soils, sometimes calcareous, with occasional dunes	High: 0.0 **Moderate: 95.0** Low: 5.0
	Vilafontes 11/31	>1200	5%	Grey-brown, sandy, structureless soils	
Ah38	Hutton & Clovelly 31/41	400-1200	67%	Red and yellow brown, sandy, structureless soils, sometimes calcareous	High: 0.0 **Moderate: 100.0** Low: 0.0
	Vilafontes 11/31	>1200	20%	Grey-brown, sandy, structureless soils	
Ai13	Clovelly 31/34/41/44	600-1200	63%	Yellow brown, sandy, structureless soils, sometimes calcareous	High: 0.0 **Moderate: 92.7** Low: 7.3
	Pinedene 31/34	400-800	13%	Yellow brown, sandy, structureless soils, on gleyed clay	
Hb80	Fernwood 20/21	>1200	36%	Grey-brown, sandy, structureless soils	High: 0.0 **Moderate: 76.0** Low: 24.0
	Pinedene/Kroonstad	400-800	24%	Yellow brown and grey, sandy, structureless soils, on gleyed clay	

There are no high potential soils present along the grid connection corridor and the soils are of moderate potential due mainly to the sandy texture which will lead to rapid water infiltration and the soils drying out. In addition, the low rainfall in the area means that there is little potential for rain-fed arable agriculture in the area. Arable production would therefore be possible only by irrigation, and no indications of any irrigated areas, within and surrounding the corridor, can be identified

In general, the soils that do occur along the corridor are suited for extensive grazing at best and furthermore the grazing capacity of the area is very low, at around 26-40 ha/large stock unit.

The soils present along the corridor are not considered susceptible to erosion by water. However, if the vegetation cover is disturbed (for example by overgrazing or construction activities) and considering the sandy nature of the topsoils and the dry climate, there is a significant possibility of removal of some or all of the topsoil by wind action.

7.4.3. Ecological Profile of the Broader Study Area and the Grid Connection Corridor

i. Broad-Scale Vegetation Patterns

The national vegetation types that occur along the grid connection corridor (**Figure 7.4**) are briefly described below. The common and characteristic species associated with each as described in Mucina and Rutherford (2006) is not repeated here as the actual vegetation as observed at the corridor is described in Section (ii) below.

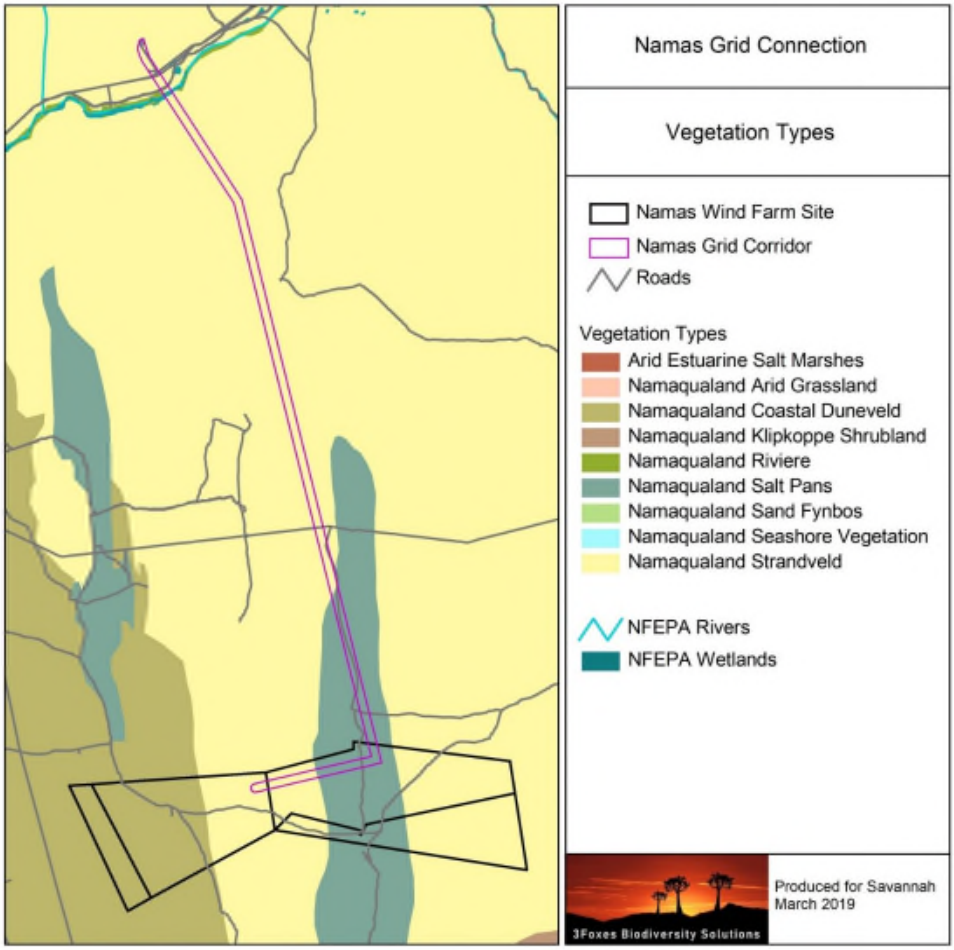

Figure 7.4: The national vegetation map for the grid connection corridor

Namaqualand Strandveld

The majority of the corridor is restricted to the Namaqualand Strandveld vegetation type. Namaqualand Strandveld occurs in the Northern and Western Cape Provinces from the southern Richtersveld as far south as Donkins Bay. Especially in the north of this unit it penetrates up to 40km inland and approaches the coast only near the river mouths of the Buffels, Swartlintjies, Spoeg, Bitter and Groen Rivers. In the south of the unit it is variably narrow. It consists of flat to undulating coastal peneplain. The vegetation consists of a low species richness shrubland dominated by a plethora of erect and creeping succulent shrubs as well as woody shrubs and in wet years annuals are also abundant. It is associated with deep red or yellowish-red Aeolian dunes and deep sand overlying marine sediments and granite gneisses. The area is a combination of Ah, Ae, Af, Ai and Ag land types. Eight endemic species are associated with this vegetation type. Namaqualand Strandveld is classified as Least Threatened and ~10% of this vegetation type has been lost mainly to coastal mining for heavy metals and it is not currently listed. There are specific plant habitants present but are limited and contain specialised associated species. Within the broader area of the grid connection corridor, this unit occurs in two broad bands separated by the low-lying valley which traverses the centre of the corridor and which is classified as Namaqualand Salt Pans.

Namaqualand Salt Pans

The low-lying areas are mapped as the Namaqualand Salt Pans vegetation type. The Namaqualand Salt Pans vegetation type occurs in the Northern and Western Cape Provinces on the coastal plain including the Sonnekwa, Hindevlei, Bloupan, Dryerspan, and Soutpan as well as parts of the Olifants River mouth. This unit occupies the flat surfaces of depressions, mostly without vegetation and is only occasionally covered with sparse salt-tolerant succulent shrubs. Namaqualand Salt Pans are nearly permanently dry and especially in the Kleinsee area they disappear and are buried under layers of wind-borne sand. While the low-lying valley that traverses the corridor may have had its origin as a salt pan type feature, it clearly does not correspond to this feature today and cannot be considered to be a salt pan any longer as it is well-vegetated and the original basement is no longer apparent, except where it has been uncovered by excavation.

Namaqualand Riviere

The riparian vegetation along the Buffels River is classified as Namaqualand Riviere. The Namaqualand Riviere vegetation type is a complex of alluvial shrubland (*Suaeda fruticosa, Zygophyllum morgsana, Ballota africana*) and patches of tussock graminoids occupying riverbeds and banks of intermittent rivers, throughout Namaqualand. It occurs on alluvial sandy soils on Quarternary fluviatile sediments and is seasonally wet (late winter). It is considered Least Threatened although only a very small portion has been formally conserved and almost 20% has been transformed for cultivation. The riparian vegetation is susceptible to invasion by indigenous and alien invasive plant species.

ii. Habitats and vegetation types

The different vegetation types and habitats present within the corridor are illustrated and described below.

Typical Namaqualand Strandveld

The corridor consists of typical Namaqualand Strandveld on gently undulating plains (**Figure 7.5**). These areas are fairly homogenous but there are some shifts in the dominance of the different plant species present depending on soil texture, depth etc. Typical and dominant species include *Zygophyllum morgsana, Tripteris oppositifolia, Asparagus capensis, Othonna sedifolia, Hermannia sp., Lebeckia spinescens, Eriocephalus racemosus, Searsia longispina, Leipoldtia sp., Cladoraphis cyperoides, Salvia lanceolata, Anthospermum spathulatum, Tetragonia spicata, Ruschia sp., Helichrysum hebelepis, Wahlenbergia asparagoides, Asparagus lignosus and Euphorbia burmannii*. There are some species of conservation concern present.

Figure 7.5: The vegetation present within the collector substation location as well as majority of the corridor is typical Namaqualand Strandveld

Namaqualand Dune Strandveld

There is a distinct plant community associated with the larger, more mobile dune fields of the grid connection corridor (**Figure7.6**). These areas are more dynamic than the areas of flatter strandveld and have areas of alternating low cover associated with areas of greater sand movement and areas of taller vegetation occurring in the dune slacks and other more stable situations. Typical and dominant species include *Zygophyllum morgsana, Searsia longispina, Tripteris oppositifolia, Cladoraphis cyperoides, Othonna sedifolia, Conicosia pugioniformis, Asparagus lignosus, Hermannia sp. nov., Babiana hirsuta, Leucoptera nodosa, Eriocephalus racemosus, Asparagus capensis, Lycium cinereum, Lebeckia spinescens, Tetragonia spicata* and *Diospyros ramulosa.*

Figure 7.6: Sections of the grid connection corridor traverse areas of dunes and deep sands with a specific associated plant community

Strandveld on Namaqualand Salt Pans

The vegetation of the area classified as Namaqualand Salt Pans clearly represents a distinct community but the naming is not appropriate and the unit should be called something other than a salt pan as the

vegetation does not correspond with a salt pan environment (**Figure 7.7**). These areas occur on shallow white sands overlaying weathered calcrete or lime. Water does not collect in these areas as evidenced by observation. Although they are currently freely drained, they may once have represented salt pans that have been overlain with wind-blown sands. Typical and dominant species include *Amphibolia rupis-arcuatae, Euphorbia brachiata, Othonna sedifolia, Asparagus capensis, Zygophyllum morgsana, Ruschia goodiae, Cheirodopsis denticulata, Aridaria nociflora, Othonna cylindrica* and *Ruschia sp*. This habitat is of a limited extent and offers features not found elsewhere in the grid connection corridor and general area.

Figure 7.7: The low-lying area within the south of the grid connection corridor consists of low strandveld.

Buffels River

The northern section of the grid connection corridor traverses the Buffels River. The river valley is however steep and it is highly likely that the river can be easily spanned by the double-circuit power line (**Figure 7.8**). Species present within the river include *Acacia karoo, Suaeda fruticosa, Salsola aphylla, Tamarix useneoides, Hermannia trifurca, Stipagrostis namaquensis, Galenia africana, Codon royenii, Argemone ochroleuca, Scirpoides dioecus* and *Forsskaolea candida*.

Figure 7.8: Crossing point of the grid connection corridor over the Buffels River

iii. Listed Plant Species

More than 500 plant species have been recorded from the broader area from Komaggas in the east to Kleinsee in the west. This includes 25 species of conservation concern of which four can be confirmed present within or near the grid connection corridor (**Figure 7.9**). This includes *Aloe arenicola* (NT), *Leucoptera nodosa* (NT), *Wahlenbergia asparagoides* (VU) and *Babiana hirsuta* (NT). However, the abundance of these species is low across most of the corridor.

Figure 7.9. Common plant species of concern present within or near the grid connection corridor include *Aloe arenicola* which is common near the collector substation location, *Babiana hirsuta* which occurs on deep sands throughout the corridor and *Leucoptera nodosa* which occurs sporadically along the corridor.

iv. Critical Biodiversity Areas (CBA) and Broad-Scale Processes

The majority of the grid connection corridor occurs within areas that are classified as "Other Natural Areas" and as such have not been identified as priority areas for biodiversity conservation. The initial section of the corridor and the northern section of the corridor (where the corridor crosses the Buffels River) falls within an Ecological Support Area (ESA). No CBAs are present within the grid connection corridor. Refer to **Figure 7.10**. In addition, the grid connection corridor does not fall within a Northern Cape Protected Area Expansion Strategy (NC-PAES) focus area and has therefore not been identified as an important area for future conservation area expansion.

v. Terrestrial Fauna

Mammals

Mammals captured by the camera traps on the authorised Namas Wind Farm project site, in order of decreasing abundance, includes Steenbok, Cape Hare, Cape Fox, Bat-eared fox, Striped Polecat, Suricate, Cape Porcupine, Common Duiker, Honey Badger, Small Spotted Genet, Grey Mongoose, Caracal, Yellow Mongoose, African Wild Cat and Slender Mongoose. More than half the observations are from Steenbok and Cape Hare, with Cape Fox, Bat-eared fox, Striped Polecat, Suricate and Cape Porcupine being moderately abundant and the remaining species uncommon (**Figure 7.11**). This

represents a typical mammalian community and is similar to that obtained at other areas along the West Coast. A notable absence is the Black-backed Jackal which occurs in the area but is likely absent as a result of persecution. Small mammals observed or caught in the area with Sherman traps include Hairy-footed Gerbil, Western Rock Elephant Shrew, Namaqua Rock Mouse, Four-striped Mouse, Karoo Bush Rats and Brants' Whistling Rat.

Apart from the species that were observed, four red-listed species of conservation concern are known from the wider area. This includes the Leopard *Panthera pardus* (Vulnerable), Littledale's Whistling Rat *Parotomys littledalei* (Near Threatened), African Clawless Otter *Aonyx capensis* (Near Threatened) and Grants' Golden Mole *Eremitalpa granti granti* (Vulnerable). It is not likely that either the Leopard or Otter are present within the corridor on account of human disturbance or lack of suitable habitat. Golden Moles are confirmed present within the grid connection corridor, but it is not clear if these are the more common Cape Golden Mole or Grants' Golden Mole.

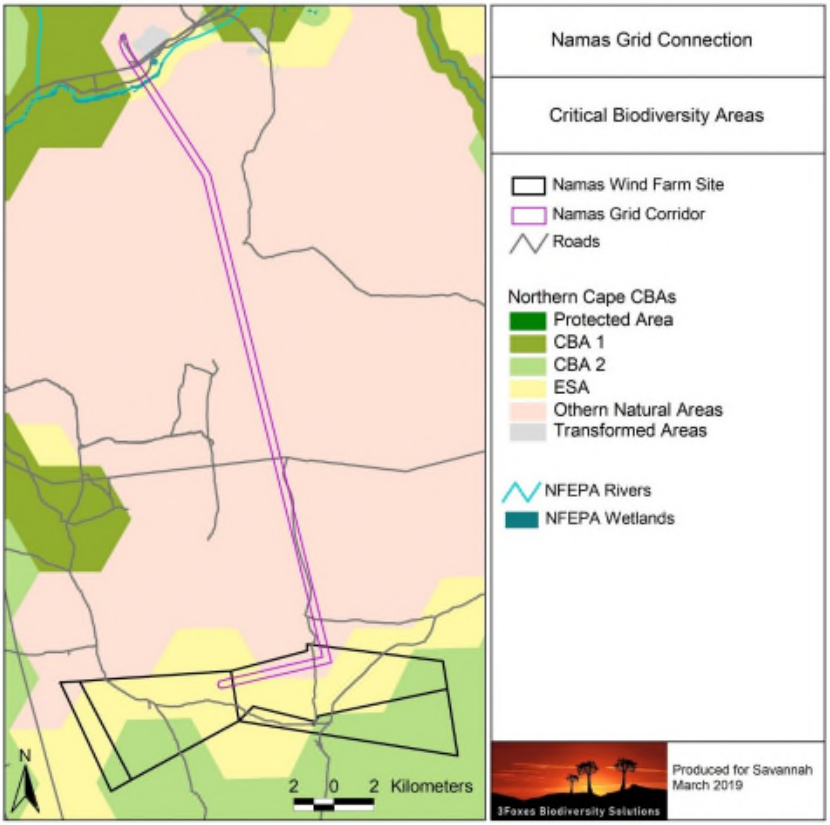

Figure 7.10: Extract of the Northern Cape Critical Biodiversity Areas map (2017) for the grid connection corridor

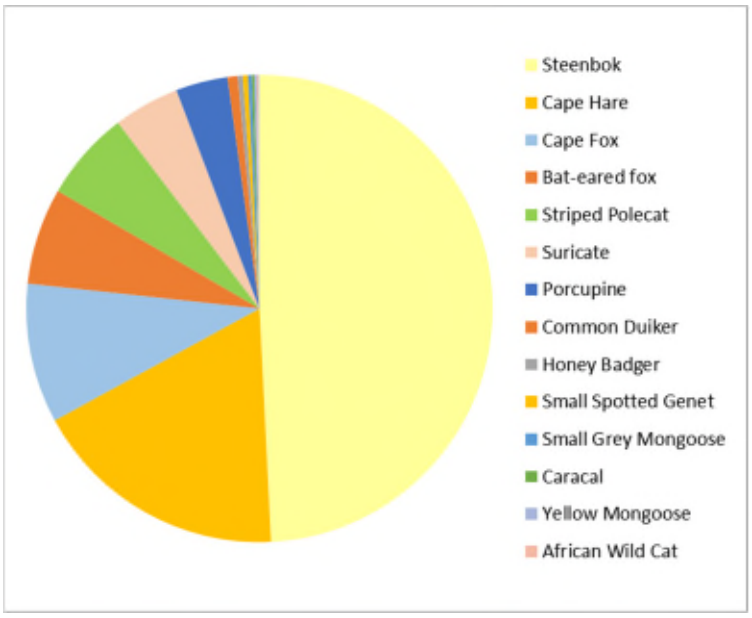

Figure 7.11: Pie chart showing the relative abundance of mammals based on more than 1100 camera trap observations

Reptiles

45 reptile species are known to occur in the wider area, no species of conservation concern have been recorded from the area although it is possible that the Speckled Padloper *Chersobius signatus* is present, however there is very little rocky habitat available for this species and as a result it is not likely to be present. Namaqualand is known as a centre of endemism and diversity for reptiles and the wider area has a high diversity and abundance of local endemics. This appears to be generated at least partly through the high habitat diversity of the area, which includes rocky hills, heuweltjie veld on fine-textured firm soils, loose sands and dunes, stable and vegetated dunes, well-vegetated drainage lines etc. Within the grid connection corridor, habitat diversity is however low and restricted to various sandy substrates from firm sand lowlands and heuweltjie veld to fairly loose dunes. Apart from the Buffels River, there are no rocky outcrops present along the corridor and the reptile community is likely to be restricted largely to those associated with sandy substrates.

Species observed within the corridor (**Figure 7.12**) include Angulate Tortoise, Giant Desert Lizard, Common Giant Ground Gecko, Knox's Desert Lizard, Common Sand Lizard, Cape Skink, Coastal Dwarf Legless Skink, Namaqua Sand Lizard, Pink Blind Legless Skink, Dwarf Beaked Snake and Many-horned Adder.

Figure 7.12: Common reptiles include the Angulate Tortoise, Giant Desert Lizard and two colour morphs of the Coastal Dwarf Legless Skink *Acontias litoralis*, a West Coast endemic.

Amphibians

Within the majority of the grid connection corridor the characteristic sandy substrate results in a lack of drainage features where water can gather, and as such there is no natural permanent or even seasonal standing water across the vast majority of the area. As a result, the amphibian community within the corridor is restricted to species that are relatively independent of water and is consequently of low diversity. The only species confirmed present in the immediate area is the Namaqua Rain Frog which appears to be relatively widespread within the coastal strandveld vegetation types on sandy soils. In the north, the Buffels River flows on occasion and there may be pools where amphibians can breed in such years. Species that are possibly present in the area include the Cape Sand Frog *Tomopterna delalandii* and the Desert Rain Frog *Breviceps macrops* which is classified as Vulnerable. The Desert Rain Frog is however restricted to the coastline and is not known to occur so far inland and as a result is unlikely to occur within the grid connection corridor, although this cannot be discounted as the area has not been well investigated. The amphibian habitats are scarce within the corridor and therefore there is a low diversity of species.

vi. Avifauna

Avian Microhabitats

Bird habitat in the region and along the corridor consist of fairly uniform vegetation types of coastal shrubs and succulent plants. The vegetation includes succulents such as *Tertragonia, Cephalophyllum* and *Didelta* and non-succulents such as *Eriocephalus, Pteronia* and *Salvia*. There are a few alien trees within the area (Eucalyptus), found around the farmsteads, and some artificial farm dams and water points for sheep. Water in the Buffels River occurs seasonally and only after good rains. Therefore, for the majority of

the year it is dry. Few grasses are found, making the lark species diversity rather slim. Raptors and bustards were the main species observed including the Least Concern Booted Eagle *Aquila pennatus* (left*)* and red data bustards (right) (**Figure 7.13**).

Figure 7.13: Booted Eagle *Aquila pennatus* (left). Highly collision-prone red data bustards (right)

Species Diversity

Over the course of 12-months only 45 avian species were recorded in the corridor during four equally-spaced site visits over the year. This is a very low total compared with other arid areas in the Northern and Western Capes that have been sampled. Species richness varied over the seasons with higher totals recorded in Spring (26 species) and the lowest in summer (12 species). All were typical residents of the arid Karoo landscape including chats, prinias, cisticolas, titbabblers, warblers, flycatchers, Karoo Larks and Tits.

Bird abundance indices were higher in the spring (September) than any other month. Bird species richness stayed relatively constant throughout the year, with summer showing the highest numbers. This is not typical for arid areas, where spring is often the most species-rich season following winter rains. These totals are lower in terms of diversity and numbers than in a typical year, and more raptors are likely to be present.

Collision-prone and red-listed species

Among the 48-species recorded on the 37 SABAP2 bird atlas cards for the region (June 2013-March 2018) were 8 priority collision-prone species (CPS). Five of the eight species were recorded within the grid connection corridor over the course of the year (**Table 7.2**). These included two Red Data species (Secretarybird and Ludwig's Bustard *Neotis ludwigii*). The Ludwig's Bustards were recorded twice, and the Secretarybirds just once in November 2017; a pair, however, was observed in flight together in August 2017.

Table 7.2: Red-listed bird species (in red) and collision-prone species recorded on 37 cards by SABAP2 in the four pentads that cover the grid connection corridor. Those species shaded were recorded within the corridor during the four site visits (total 20 field-days) from June 2017 to March 2018. Reporting Rate from SABAP2 is given in brackets. The Lanner Falcon was not recorded within the grid connection corridor but has been included in the table below as it was observed 3% of the time on bird atlas cards.

				Susceptibility to:	
Common Name	**Scientific Name**	**Red-list status**	**Reporting Rate ***	**Collision (Rank **)**	**Disturbance**
Ludwig's Bustard	*Neotis ludwigii*	Endangered	2/20 = 10% (11%)	10	Medium
Secretarybird	*Sagittarius serpentarius*	Vulnerable	1/20 = 5% (5%)	12	High
Lanner Falcon	*Falco biarmicus*	Vulnerable	0/20 = 0% (3%)	22	Medium
Southern Black Korhaan	*Afrotis afra*	-	6/20 = 30% (8%)	35	Low
Booted Eagle	*Aquila pennatus*	-	0/20 = 0% (11%)	55	Medium
Black-chested Snake Eagle	*Circaetus cinerescens*	-	0/20 = 0% (8%)	56	Medium
Pale Chanting Goshawk	*Melierax canorus*	-	6/20 = 30% (22%)	73	Low
Greater Kestrel	*Falco rupicolloides*	-	3/20 = 25% (16%)	97	low

* Reporting rate is a measure of the likelihood of occurrence and is based on the number of times seen in 20 days field work over 4 seasons. It is compared with the number of times it was recorded/in 18 atlas cards (on SABAP2 cards).
** Collision rank derived from the BARESG 2014 guidelines. Smaller numbers denote higher collision-risk.
a. Black Harriers were not recorded on the atlas cards but are known to breed in the Buffels River (R.E. Simmons Unpubl data).

7.5. Integrated Heritage including Archaeology, Palaeontology and the Cultural Landscape

7.5.1 Heritage and the cultural landscape

The grid connection corridor is situated in a remote location and, being only very minimally developed, is largely considered a natural landscape rather than a rural one. The main exception, is the mining landscape located at the northern end of the corridor where the human imprint is far greater. Aside from rare farm buildings, the only other anthropogenic features on the landscape are farm tracks/roads and fences, along with occasional borrow pits alongside the larger gravel roads. The landscape conveys a sense of remoteness and in-hospitability that is a result of the very frequent strong winds, the low scrubby vegetation and seemingly endless sand flats and dunes. Importantly, it is a fairly flat landscape with the tallest anthropogenic features being wind pumps – aside from the mine dump near the existing Gromis Substation. The only major change to the natural landscape is the Buffels River.

7.5.2. Archaeology

In the south the grid connection corridor begins on a belt of red sand dunes with many archaeological sites present. Marine shell was largely absent, with ostrich eggshell fragments and stone artefacts dominating the scatters. The sites tended to be located on dune tops with the artefacts visible in deflated areas. These areas varied from lightly deflated and slightly less vegetated than the surrounding areas to

proper deflation hollows, although the latter were in the minority and tended to be quite small compared to the deflation hollows located further north. Only one small scatter of ostrich eggshell fragments with a cone flake demonstrating that the egg was broken from the outside was found within the southern part of the grid connection corridor (waypoint 046).

Inland of this dune belt is an area of low-lying flat terrain characterised by pale sand. Although only a small section of this area was surveyed where it is traversed by the corridor, this band is generally devoid of archaeological sites, even in places where low sand hills occur. Two occurrences were recorded in this zone, but both outside of the corridor. One was of some background scatter artefacts in quartz and CCS and some ostrich eggshell fragments at an area where the cover sands had been removed (waypoint 057). The second, ZK2018/003 (waypoint 103), was on a low sand hill at the eastern edge of the flat plain and about 200m east of the grid connection corridor. It consisted of a small cache of two ostrich eggshells, one of them whole and one broken. The flask mouths were not as smoothly rounded as is normally expected.

At the north end of the grid connection corridor there is a red dunefield with many large deflation hollows. These hollows also contained many artefact scatters but again with very dense sites being generally rare. The finds in these hollows included scatters of flaked artefacts, largely in quartz but with other materials also present, occasional grindstones and hammer stones, some pottery, and some historical glass and ceramics. Retouched tools were rare and the nature of the assemblages suggest that all or most were from the late Holocene. Whether the historical material is overprinted or related to the LSA material remains unknown.

In the far north, on either side of the Buffels River, there were places where the dorbank was exposed at the surface. In these areas MSA and ESA artefacts were seen. An example of an artefact stuck into the dorbank was noted to the south of the river, while to the north an area stripped of topsoil during mining activities displays an extensive scatter of Pleistocene-aged material, including handaxes. Within a few hundred metres on either side of the Buffels River there were a few light shell scatters. It was not possible to tell whether there were stone artefacts associated with them because of both the natural quartz gravel and the low density background scatter of quartz artefacts present. Two small quartz outcrops displaying flaking were also noted to the south of the river.

No precolonial graves were discovered. No historical graves or graveyards were present. The graveyard on the farm Zonnekwa 326 contains a single grave dated 2008 (waypoint 109). It is quite likely that unmarked precolonial graves will be present in the sand dunes but their locations cannot be predicted.

No buildings are present within the grid connection corridor. Only one farm complex, on the farm Zonnekwa 326, lies close to but outside of the corridor (the nearest structures are about 100 m west of the edge of the corridor).

7.5.3. Palaeontology

The affected surficial formations present within the grid connection corridor include early to mid-Holocene dunes of the Hardevlei Formation and earlier late Quaternary coversands of the Koekenaap Formation. Beneath these unconsolidated sands are compact, pedogenically-altered aeolianites termed "Dorbank Units" which are fossil dune plumes of later mid-Quaternary age. An older dorbank dune plume underlies the eastern part of the grid connection corridor, while a later dorbank dune plume underlies the western

part. Between these dune plume ridges is a non-depositional area which is closely underlain by pale pedocrete which is likely to have formed in early mid-Quaternary aeolianites equivalent to the Olifantsrivier Formation. The south-eastern section of the corridor overlies this area.

Fossil bones are sparsely distributed in these aeolian deposits. The fossil material in these deposits is a sample of the middle and late Quaternary fauna of the Namaqualand coast.

7.6. Visual Quality

The most prominent topographical features of the grid connection corridor are the Brandberg hill and Langberg hill further south. The terrain surrounding the corridor is generally flat, sloping gently westwards towards the shore. The terrain type of the region is described as *slightly undulating plains*. Land cover is primarily low shrubland with localised areas of exposed rock and sand and limited woodland or open bushland. The most prominent water features are the Buffels River at the northern section of the grid connection corridor and the Komaggas River to the east of the corridor.

Diamond mining activities are evident in the 7km band along the coast north of Kleinsee due to the mine dumps and mining activity. The greater region is generally seen as having a high scenic value and high tourism potential. It is well known for its scenic natural beauty (West Coast as a whole) and annual wild flower displays (Namaqualand)[18]. This occurs once a year between July and October, depending on a number of environmental factors, but mainly the occurrence and duration of rainfall. The length of the display is also highly variable.

Within this scenic context, it is noteworthy that the mining areas along the coastline are significantly disturbed and visually apparent due to the scale and nature of the surface based mining. In this respect the visual quality of the receiving environment is already compromised to some extent.

Individual homesteads/farmsteads are scattered throughout the region. Some of these in closer proximity to the 300m corridor include:

- Manelsvlei
- Taaiboskrop
- Hoë Heuwel
- Lewies se Duin
- Sonnekwa A
- Sonnekwa
- Graafwater

[18] Namaqualand stretches from the small town of Garies in the south to the Orange River to the north, its western border is the wild Atlantic coast, the remote town of Pofadder marks the eastern border (http://www.discoverthecape.com/namaqualand/flower-route.html)

7.7 Social Context

The grid connection corridor is located in a remote area. Kleinsee is the nearest town to the grid connection corridor, and is located ~14km to the west. The Kleinsee population is as follows:

- Black African 18.1%
- Coloured 61.1%
- Indian/Asian 1.1%
- White 17.9%
- Other 1.8%

The population size generally consisted of around 2000 residents but has continuously declined over the past ten years, attributed to the mine closures and limited other job opportunities, which resulted in net out-migration of people.

A greater proportion of the population is comprised of females. Furthermore, the majority of the population are aged between 35 and 64, and the minority of the population are aged below four years. This is indicative of a predominantly adult population with a relatively small youth population. This insinuates the migration of young adults. The working age population (15-64) constitutes just over 67% of the population. Numerous push factors are at play in the region, therefore leading to migration, however, the upsurge in renewable energy projects in the Province will most likely attract job seekers and slightly shift the demographics in the next coming years.

In Kleinsee, 4% of the households had no income and 38% earned up to R3 200 per month. The largest range of income earned in the Northern Cape is between R1 and R3 200 per month. In contrast, a minority of the population can be classified as middle-income earners and high-income earners.

In Kleinsee, the adult population with no schooling constitutes 2%, the majority of residents have some secondary schooling and 7% have acquired higher education qualifications. Close to half of the labour force in the formal sector are semi-skilled and only a fifth of the labour force are skilled.

CHAPTER 8: ASSESSMENT OF IMPACTS

This chapter serves to assess the significance of the positive and negative environmental impacts (direct and indirect) expected to be associated with the grid connection infrastructure for the authorised Namas Wind Farm.

This assessment has considered the construction and operation of grid connection infrastructure within a 300m wide and 32km long corridor. The grid connection infrastructure will comprise the following key infrastructure and components:

- a collector substation[19] (known as the Rooivlei Substation);
- a double-circuit 132kV power line (known as the Rooivlei-Gromis 132kV double-circuit power line); and
- associated infrastructure such as access tracks/roads and laydown areas.

The collector substation footprint will be 100m x 200m and the double-circuit power line will have a servitude width of up to 36m.

Two grid connection options to connect the Namas Wind Farm to the existing Gromis Substation have been identified within the corridor, namely:

- A direct connection from the proposed Rooivlei Substation to the existing Gromis Substation located ~26km from the northern boundary of the Namas Wind Farm project site. This is considered to be the preferred option from a technical perspective due to the fact that the Gromis Substation is already existing.
- A direct connection from the Rooivlei Substation to a proposed collector substation (known as the Strandveld Substation) which forms part of the Zonnequa Wind Farm grid connection solution[20]. The Strandveld Substation is located ~6km from the northern boundary of the Namas Wind Farm project site. This option is only viable should the Zonnequa Wind Farm be developed.

The full extent of the grid connection corridor (including the grid connection infrastructure) (refer to **Figure 8.1**) was considered through the specialist assessments undertaken as part of this BA process. Sensitivities within the corridor were identified through the review of existing information, desk-top evaluations and field surveys. The grid connection infrastructure (i.e. collector substation and double-circuit power line) will be appropriately sited within the grid connection corridor through the consideration of the sensitive environmental features present.

[19] The collector substation is envisaged to cater as a possible feed-in point for more than one wind farm in the area.

[20] The grid connection infrastructure for the Zonnequa Wind Farm is being assessed as part of a separate Basic Assessment Process.

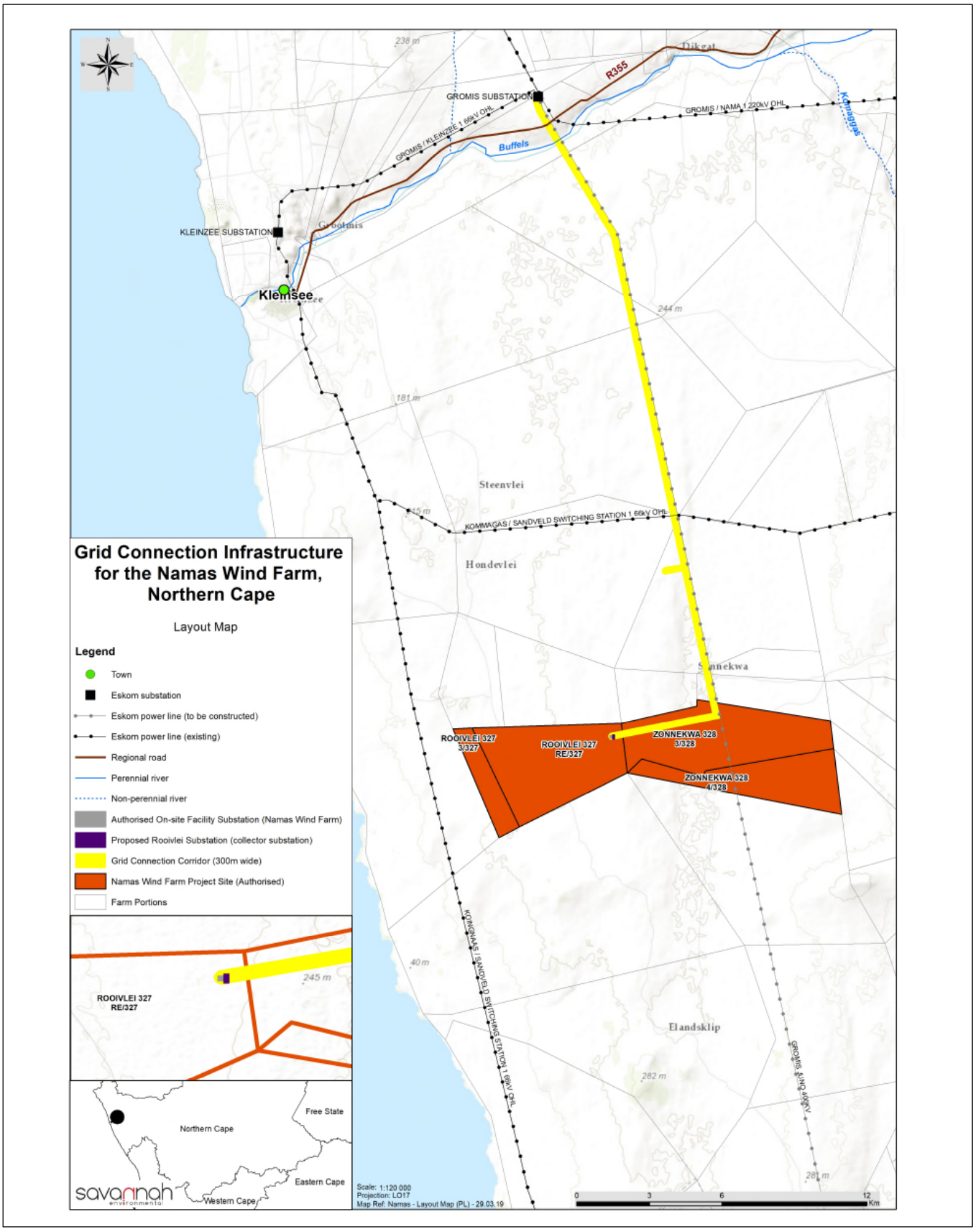

Figure 8.1: Grid connection corridor associated with the grid connection solution for the Namas Wind Farm. The grid connection infrastructure (collector substation and 132kV double-circuit power line) will be constructed and operated within the 300m wide corridor. The entire extent of the corridor was assessed as part of the BA process (refer to **Appendix K** for A3 maps).

The development of the grid connection infrastructure for the Namas Wind Farm will comprise the following phases:

- *Pre-Construction and Construction* – will include pre-construction surveys; site preparation; establishment of access roads (where required), laydown area, the collector substation and power line infrastructure; construction of foundations involving excavations; the transportation of components/construction equipment to site, manoeuvring and operating vehicles for unloading and installation of equipment; laying cabling; and commissioning of new equipment and site rehabilitation. The construction phase for the grid connection infrastructure for The Namas Wind Farm is estimated to be up to 12 months.
- *Operation* – will include the operation of the collector substation and the double-circuit power line, which will include evacuating electricity from the Namas Wind Farm into the national grid. The operation phase of the grid connection infrastructure is expected to be approximately 20 years (with maintenance).
- *Decommissioning* – depending on the economic viability and Eskom's plans for the collector substation, the length of the operation phase may be extended beyond a 20 year period. This would also require the extension of the operation phase for the grid connection infrastructure. At the end of the project's life, decommissioning will include site preparation, disassembling of the components of the grid connection infrastructure, clearance of the relevant infrastructure at the collector substation and along the power line servitude, and rehabilitation. Note that impacts associated with decommissioning are expected to be similar to those associated with construction activities. Therefore, these impacts are not considered separately within this chapter.

Environmental issues associated with construction and decommissioning activities may include, among others, threats to biodiversity and ecological processes, including habitat alteration and impacts to fauna and avifauna, impacts to sites of heritage value, soil erosion and loss of agricultural land, and nuisance from the movement of vehicles transporting equipment and materials.

Environmental impacts associated with the operation phase include visual impacts, night-time lighting impacts, habitat alteration and impacts to fauna and avifauna, and potential invasion by alien and invasive plant species.

8.1. Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter of the final BA report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of basic assessment reports:

Requirement	Relevant Section
3(h)(v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts (aa) can be reversed, (bb) may cause irreplaceable loss of resources, and (cc) can be avoided, managed or mitigated.	The impacts and risk associated with the development of the grid connection infrastructure for the Namas Wind Farm, including the nature, significance, consequence, extent, duration and probability of the impacts and the degree to which the impact can be reversed and cause an irreplaceable loss of resources are included in sections 8.3.3, 8.4.3, 8.5.3, 8.6.3, 8.7.3 and 8.8.3.
3(h)(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing	The positive and negative impacts associated with the development of the grid connection infrastructure for the Namas Wind Farm are included in sections 8.3.3, 8.4.3,

Requirement	Relevant Section
on the geographical, physical, biological, social, economic, heritage and cultural aspects	8.5.3, 8.6.3, 8.7.3 and 8.8.3.
3(h)(viii) the possible mitigation measures that could be applied and the level of residual risk.	The mitigation measures that can be applied to the impacts associated with the development of the grid connection infrastructure are included in sections 8.3.3, 8.4.3, 8.5.3, 8.6.3, 8.7.3 and 8.8.3.
3(i) a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures,.	A description of all environmental impacts identified for the development of the grid connection infrastructure for the Namas Wind Farm during the BA process, and the extent to which the impact significance can be reduced through the implementation of the recommended mitigation measures provided by the specialists are included in sections 8.3.3, 8.4.3, 8.5.3, 8.6.3, 8.7.3 and 8.8.3.
3(j) an assessment of each identified potentially significant impact and risk, including (i) cumulative impacts, (ii) the nature, significance and consequences of the impact and risk, (iii) the extent and duration of the impact and risk, (iv) the probability of the impact and risk occurring, (v) the degree to which the impact and risk can be reversed, (vi) the degree to which the impact and risk may cause irreplaceable loss of resources and, (vii) the degree to which the impact and risk can be avoided, managed or mitigated.	An assessment of each impact associated with the development of the grid connection infrastructure, including the nature and significance, the extent and duration, the probability, the reversibility, and the potential loss of irreplaceable resources, as well as the degree to which the significance of the impacts can be mitigated are included in sections 8.3.3, 8.4.3, 8.5.3, 8.6.3, 8.7.3 and 8.8.3.
3(m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr.	Mitigation measures recommended by the various specialists for the reduction of the impact significance are included in sections 8.3.3, 8.4.3, 8.5.3, 8.6.3, 8.7.3 and 8.8.3.

8.2. Quantification of Areas of Disturbance on the Site

Site-specific impacts associated with the construction and operation of the grid connection infrastructure for the Namas Wind Farm relate to the direct loss of vegetation and species of special concern, disturbance of animals and loss of habitat, and impacts on soils. In order to assess the impacts associated with the development of the grid connection infrastructure, it is necessary to understand the extent of the affected grid connection corridor. In this regard, the following is relevant:

- The collector substation will occupy an area of 100m x 200m (i.e. 2ha) in extent.
- The double-circuit power line will be constructed within a servitude of up to 36m in width over a distance of up to 32km. The power line towers are an average distance of 200m apart but can exceed 500m depending on the topography and terrain to be spanned.

8.3. Potential Impacts on Ecology (Ecology, Flora and Fauna)

The majority of the ecological impacts associated with the development would occur during the construction phase as a result of the disturbance associated with site clearance, excavations, the

operation of heavy machinery and the presence of construction personnel. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix D** for more details). The ecological impact assessment assessed the entire extent of the grid connection corridor, as well as the grid connection infrastructure, including the collector substation and double-circuit power line.

8.3.1 Results of the Ecological Impact Assessment

Vegetation and landscape features:

The location of the collector substation and majority of the grid connection corridor is located within areas consisting of typical Namaqualand Strandveld on gently undulating plains. These areas are not considered to be sensitive habitat and while some species of conservation concern may occur in the area, a significant impact on the local populations of these species is not likely as this is a widespread vegetation type.

There is a distinct plant community associated with the larger, more mobile dune fields present within the corridor. These areas are more dynamic than the areas of flatter strandveld and have areas of alternating low cover associated with areas of greater sand movement and areas of taller vegetation occurring in the dune slacks and other more stable conditions. These areas are considered somewhat more sensitive than the typical surrounding Strandveld due to the large dunes which are vulnerable to disturbance. No specific avoidance of this habitat is recommended, but some additional mitigation is likely to be required to reduce wind erosion risk during the construction phase of the grid connection infrastructure.

The vegetation of the area classified as Namaqualand Salt Pans clearly represents a distinct community but the naming is not appropriate and the unit should be called something other than a salt pan as the vegetation does not correspond with a salt pan environment. This habitat is of a limited extent and offers features that are not found elsewhere in the corridor and general area, it is considered more sensitive than the surrounding Strandveld but is not of high concern.

The Buffels River, located in the northern section of the grid connection corridor is considered to be a sensitive habitat and disturbance to the riparian environment should be minimised. The valley is, however, considered to be steep enough in order for the double-circuit power line to span over the sensitive feature.

Critical Biodiversity Areas and Broad-Scale Processes:

The majority of the grid connection corridor occurs within areas that are classified as "Other Natural Areas" and as such have not been identified as priority areas for biodiversity conservation. The initial section of the corridor is located within an Ecological Support Area (ESA). Given that there are no CBAs within the corridor, there would not be an impact on CBAs from the development of the grid connection infrastructure. The collector substation and initial section of the double-circuit power line within the corridor would result in some habitat loss within the ESA, but this would amount to less than 3ha. This is not considered highly significant and the ecological functioning of the ESA would not be significantly affected by the development. Therefore the development of the grid connection infrastructure within the ESA is considered to be acceptable.

Fauna:

The mammalian community observed is fairly typical and is similar to that obtained at other sites along the West Coast. A notable absence is the Black-backed Jackal which occurs in the area but is likely absent as a result of persecution. The majority of impacts on mammals would occur during the construction phase when there would be significant noise and disturbance generated along the grid connection corridor. However, in the long-term, impacts on mammals would be low as additional habitat loss would be minimal.

No reptile species of conservation concern have been recorded although it is possible that the Speckled Padloper *Chersobius signatus* (Vulnerable) is present in the area, there is very little rocky habitat available within the corridor for this species and as a result it is not likely to be present. For most reptile species the major impact of the development would be the loss of some habitat equivalent to the footprint of the grid connection infrastructure. For most species this is not considered significant as the footprint of the development is low and there are large intact tracts of similar habitat available in the area. Overall, the impacts of the development on reptiles are likely to be of local significance only as there are no species with a very narrow distribution range or of high conservation concern present within the corridor and surrounding areas which may be compromised by the development.

The only amphibian species confirmed present in the immediate area is the Namaqua Rain Frog which appears to be relatively widespread within the coastal strandveld vegetation types on sandy soils. In the north of the corridor, the Buffels River flows on occasion and there may be pools where amphibians can breed in such years. However, there would not likely be any direct impact on the Buffels River as the double-circuit power line would span the river and there would not be any towers/pylons situated near the river bed. Species which are possibly present in the area include the Cape Sand Frog *Tomopterna delalandii* and the Desert Rain Frog *Breviceps macrops* which is classified as Vulnerable. The Desert Rain Frog is, however, restricted to the coastline and is not known to occur so far inland and as a result is unlikely to occur within the corridor, although this cannot be discounted as the area has not been well investigated. Given the scarcity of important amphibian habitats within the grid connection corridor and the low diversity of amphibians, a significant impact on amphibians is not likely.

The ecological sensitivity map for the corridor within which the grid connection infrastructure for the Namas Wind Farm is proposed is included as **Figure 9.2**[21]. The majority of the corridor consists of Namaqualand Strandveld considered to be of a low sensitivity. The development of the double-circuit power line through these areas would generate low ecological impacts as this habitat is widely available in the area and has a generally low abundance of species of conservation concern. The dune habitat and the areas classified as Namaqualand Salt Pans are considered to be of a medium sensitivity and while large amounts of habitat loss in these habitats is undesirable, the footprint of the grid connection infrastructure would be low and a significant impact on these habitats would not occur. The Buffels River in the north of

[21] Two site visits were undertaken for the grid connection corridor within two different seasons. The dates of the site visits were 28-29 October 2017 and 7-11 July 2018. Two site visits were undertaken in order to reduce the limitations associated with field assessment within areas experiencing drought conditions. This enabled the specialist to well-characterise the vegetation and therefore the results are considered to be reliable and comprehensive.

the corridor is considered the most sensitive feature along the grid connection corridor. The river is, however, deeply incised and the existing power lines of the area are able to span the river without directly impacting on the bed or the rocky sides of the river and the proposed double-circuit power line is likely to do the same. As there are no highly sensitive features along the grid connection corridor that cannot be avoided, the overall impacts associated with the development of the grid connection infrastructure (including both the double-circuit power line and collector substation) would be low. There are no high sensitivity habitats that would be significantly impacted by the development.

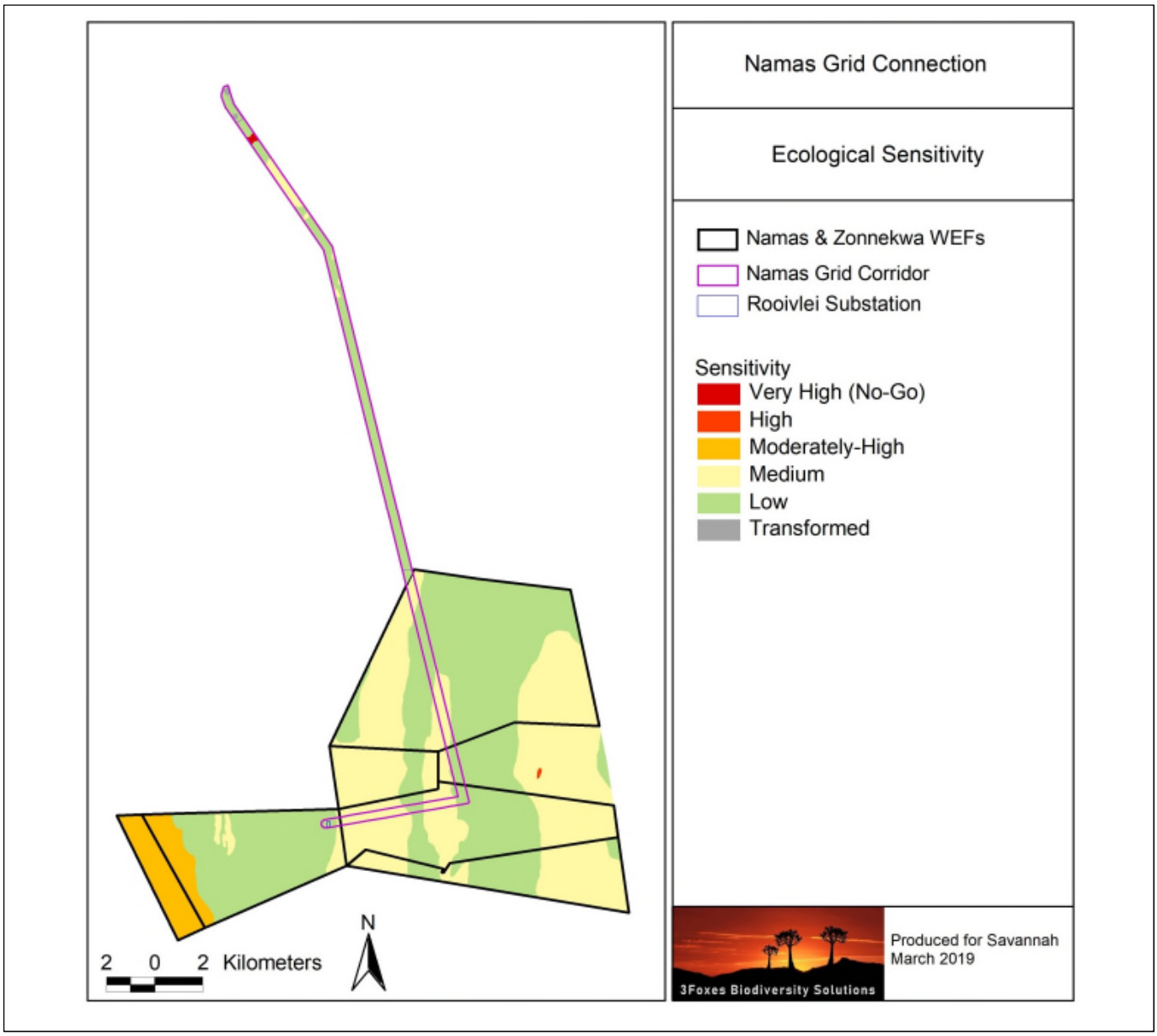

Figure 9.2: Ecological sensitivity map of the grid connection corridor proposed for the development of the grid connection infrastructure for the Namas Wind Farm

8.3.2 Description of Ecological Impacts

Impacts on the ecology of the grid connection corridor are expected to occur during the construction, operation and decommissioning phases of the project.

During the construction phase the following impacts are expected:

» Impacts on vegetation and plant species of conservation concern due to construction activities – The development of the grid connection infrastructure would require vegetation clearing for the collector substation, power line towers and access roads/tracks. Apart from the direct loss of vegetation within the development footprint, listed and protected species are likely to be impacted. As the abundance of species of conservation concern in the area is low, the impact on species of conservation concern is likely to be low. As the surrounding landscape is still largely intact and there are no very high value plant habitats within the corridor, post-mitigation impacts are likely to be of a low significance.

» Faunal impacts due to construction activities - Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna. Sensitive and shy fauna are likely to move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Traffic during construction will be high and will pose a risk of collisions with susceptible fauna. Slower types such as tortoises, snakes and amphibians would be most susceptible. Some mammals and reptiles would be vulnerable to illegal collection or poaching during the construction phase as a result of the large number of construction personnel that are likely to be present. Many of these impacts can however be effectively managed or mitigated. After mitigation, faunal impacts are likely to be of a low significance.

» Increased soil erosion risk during construction - The disturbance created during construction would leave the cleared areas vulnerable to soil erosion, especially given the sandy soils and high winds the area experiences. Normal dust suppression techniques do not work well in this environment as the major agent of erosion is wind and the soil binders that are usually used for dust suppression may not be very effective on the sandy soils. Once mobilised, the sand may suffocate the vegetation, creating additional sources of sand through the loss of vegetation, allowing such erosion to propagate in the dominant wind direction. Measures to limit erosion will need to be a key element of mitigation measures during construction as well as operation. Although this impact is potentially an impact of concern it is likely that it can be mitigated to a low significance.

During the operation phase the following impacts are expected:

» Faunal impacts due to operation - Noise and disturbance levels during operation will be significantly reduced compared to construction. There may however be some disturbance due to maintenance and operation activities. The post-mitigation operation impacts on fauna are however likely to be of a low significance.

» Negative impact on ESAs, CBAs and broad-scale ecological processes - The grid connection corridor lies partly within an ESA but would not impact any CBAs. Development of those parts of the grid connection infrastructure within the ESA would have a low footprint and are not likely to compromise the overall functioning of the ESA. No parts of the footprint are within NC-PAES focus areas and as such there would be no impact on current conservation priority areas. With mitigation, this impact is likely to be of a low significance.

» Increased soil erosion risk during operation - The disturbance created during construction would leave the grid connection servitude vulnerable to soil erosion for some years into the operation phase,

especially given the sandy soils and high winds that the area experiences. The soil disturbance associated with the development will render the impacted areas vulnerable to wind erosion and measures to limit erosion will need to be a key element of mitigation within the grid connection servitude. Although this impact is of potential concern it can be mitigated to a low significance.

During the decommissioning phase the following impacts are expected:

» Faunal Impacts due to decommissioning - The impacts on fauna during decommissioning would be similar to those at construction, but of a lower severity as the activity will be taking place only within the grid connection infrastructure footprint. The increased levels of noise, pollution, disturbance and human presence during decommissioning will be detrimental to fauna. Sensitive and shy fauna are likely to move away from the area during this period as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the decommissioning activities and might be killed. Vehicular traffic would be high and will pose a risk of collisions with susceptible fauna. Slower fauna types such as tortoises, snakes and amphibians would be most susceptible. Some mammals and reptiles would be vulnerable to illegal collection or poaching during the decommissioning phase as a result of the large number of personnel that are likely to be present. This would however be a transient impact which would ultimately result in an increase in available habitat for some fauna. After mitigation, faunal impacts due to decommissioning are likely to be of a low significance.

» Soil erosion risk due to decommissioning - The removal and clearing of the grid connection infrastructure would create some soil disturbance which would leave these areas vulnerable to erosion, which if left unchecked could spread significantly. The disturbed areas should be rehabilitated at decommissioning with indigenous species sourced from the local environment to reduce this risk. Although this is an impact of potential concern it can be well mitigated to a low significance.

8.3.3 Impact tables summarising the significance of impacts on ecology during construction and operation (with and without mitigation)

The impacts assessed below apply to the development of the grid infrastructure for the Namas Wind Farm within the assessed grid connection corridor. Due to the avoidance of sensitive ecological features by the grid connection corridor, the significance of the impacts before and after mitigation is medium to low.

Construction Phase Impacts

Nature: *Impacts on vegetation and plant species of conservation concern (SCC) due to construction activities* Impacts on vegetation will occur due to disturbance and vegetation clearing associated with the construction of the grid connection infrastructure. In addition, it is highly likely that some loss of individuals of plant species of conservation concern will occur.		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Medium (4)	Low (2)
Probability	Highly Likely (4)	Highly Likely (4)
Significance	**Medium (36)**	**Low (28)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Moderate

Irreplaceable loss of resources?	Low	Low
Can impacts be mitigated?	Impacts on SCC and habitats of concern can be mitigated to a large extent but the loss of vegetation is unavoidable and is a certain outcome of the development, however the loss will be minimal considering the development footprint of the grid connection infrastructure.	

Mitigation:

» The final footprint and power line route should be subject to a preconstruction walk-through before construction commences and adjusted where required to reduce impacts on SCC and high value habitats.
» Search and Rescue of species of conservation concern (SCCs) should be conducted prior to clearing activities.
» Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes topics such as no littering, appropriate handling of pollution and chemical spills, remaining within the demarcated construction areas etc.
» Temporary laydown areas should be located within previously transformed areas or areas that have been identified as being of low sensitivity.
» Minimise disturbance as far as possible and rehabilitate disturbed areas that are no longer required by the operation phase.

Residual Impacts:

As the loss of currently intact vegetation is an unavoidable consequence of the development, the habitat loss associated with the development remains a residual impact even after mitigation and avoidance of more sensitive areas. The significance of this loss and residual impact is however low.

Nature: *Faunal impacts due to construction activities*

Disturbance, transformation and loss of habitat will have a negative effect on resident fauna during construction. Due to noise and operation of heavy machinery, faunal disturbance will extend beyond the footprint and into adjacent areas. This will however be transient and restricted to the construction phase.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (1)	Short-term (1)
Magnitude	Low (4)	Low (4)
Probability	Highly Probable (4)	Probable (3)
Significance	**Low (24)**	**Low (18)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Although the noise and disturbance generated during construction is largely unavoidable, impacts such as those resulting from the presence of construction personnel in the grid connection servitude can be easily mitigated.	

Mitigation:

» Site access should be controlled and no unauthorised persons should be allowed onto the site.
» Any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person.
» The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the demarcated construction site.
» Fires should not be allowed on site.
» All hazardous materials should be stored in the appropriate manner to prevent contamination of the environment. Any accidental chemical, fuel and oil spills that occur during construction should be cleaned up in the appropriate manner as related to the nature of the spill.
» All construction vehicles should adhere to a low speed limit (30km/h max) to avoid collisions with susceptible species such as snakes and tortoises.

» If the collector substation is to be fenced, then no electrified strands should be placed within 30cm of the ground as some species such as tortoises are susceptible to electrocution from electric fences as they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks.
Residual Impacts: It is probable that some individuals of susceptible species will be lost to construction-related activities despite mitigation. However, this is not likely to impact the viability of the local population of any fauna species.

Nature: *Increased soil erosion risk during construction* Disturbance created during construction will leave the cleared areas vulnerable to erosion.		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (3)
Magnitude	Medium (4)	Low (3)
Probability	Certain (5)	Likely (3)
Significance	**Medium (45)**	**Low (21)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	Moderate	Low
Can impacts be mitigated?	Yes, with proper management and avoidance, this impact can be mitigated to a low level.	
Mitigation: » Erosion management within the grid connection servitude should take place according to the Erosion Management Plan and Rehabilitation Plan. » All roads and other hardened surfaces should have runoff control features which redirects water flow and dissipate any energy in the water that may pose an erosion risk. » Regular monitoring for erosion during construction must be undertaken to ensure that no erosion problems are developing as a result of the disturbance, as per the Erosion Management and Rehabilitation Plans for the project. » All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. » All cleared areas should be revegetated with indigenous perennial species from the local area.		
Residual Impacts: Some erosion is likely to occur even with the implementation of erosion control measures, due to the strong winds the area experiences and the likely in difficulty in re-establishing vegetation cover in cleared areas.		

Operation Phase Impacts

Nature: *Faunal impacts due to operation* The operation and presence of the grid connection may lead to disturbance or persecution of fauna within or the areas adjacent to the grid connection infrastructure.		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low to Minor (3)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (24)**	**Low (21)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	To a large extent, but some low-level residual impact due occasional human disturbance is likely.	
Mitigation:		

» Any potentially dangerous fauna such as snakes or fauna threatened by the maintenance and operation activities should be removed to a safe location. » If the collector substation must be lit at night for security purposes, this should be done with low-UV type lights (such as most LEDs), which do not attract insects. » All hazardous materials should be stored in the appropriate manner to prevent contamination of the environment. Any accidental chemical, fuel and oil spills that occur during construction should be cleaned up in the appropriate manner as related to the nature of the spill. » All vehicles accessing the construction areas should adhere to a low speed limit (30km/h max) to avoid collisions with susceptible species such as snakes and tortoises.
Residual Impacts: Disturbance from maintenance activities would occur at a very low level with the result that residual impacts would be minimal.

Nature: *Negative impact on ESAs, CBAs and broad-scale ecological processes*

Development of the grid connection infrastructure may impact ESAs and broad-scale ecological processes such as the ability of fauna to disperse.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Low-Minor (3)
Probability	Probable (3)	Improbable (2)
Significance	**Low (27)**	**Low (16)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Largely as there would be minimal long-term impact after mitigation.	

Mitigation:

» Disturbance within the corridor should be minimised as far as possible.
» Alien and erosion management should be regularly implemented within the grid connection servitude.

Residual Impacts:

The operation and maintenance of the grid connection infrastructure will cause a low-level impact on some fauna, but this is not likely to be of high consequence.

Nature: *Increased soil erosion risk during operation*

Disturbance created during construction will leave the grid connection servitude vulnerable to erosion for several years into the operation phase.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (3)
Magnitude	Low (4)	Low (4)
Probability	Highly Likely (4)	Likely (3)
Significance	**Medium (36)**	**Low (24)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	Moderate	Low
Can impacts be mitigated?	Yes, with proper management and avoidance, this impact can be mitigated to a low level.	

Mitigation:

» Erosion management within the grid connection servitude should take place according to the Erosion Management Plan and Rehabilitation Plan.

- All roads and other hardened surfaces should have runoff control features which redirects water flow and dissipate any energy in the water which may pose an erosion risk.
- Regular monitoring for erosion during operation must be undertaken to ensure that no erosion problems have developed as result of the disturbance, as per the Erosion Management and Rehabilitation Plans for the project.
- All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques.
- There should be follow-up rehabilitation and revegetation of any remaining bare areas with indigenous perennial shrubs and succulents from the local area.

Residual Impacts:
Some erosion is likely to occur even with the implementation of erosion control measures, due to the strong winds the area experiences and the likely difficulty in re-establishing vegetation cover in cleared areas.

Decommissioning Phase Impacts

Nature: *Faunal impacts due to decommissioning*
The decommissioning of the grid connection infrastructure may lead to disturbance or persecution of fauna within or the areas adjacent to the grid infrastructure.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (1)	Short-term (1)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (18)**	**Low (12)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?		

Mitigation:
- Any potentially dangerous fauna such as snakes or fauna threatened by the decommissioning activities should be removed to a safe location.
- The collection, hunting or harvesting of any plants or animals in the area that is being decommissioned or in the surrounding areas should be strictly forbidden.
- If the decommissioning area must be lit at night for security purposes, this should be done with low-UV type lights (such as most LEDs), which do not attract insects.
- All hazardous materials should be stored in the appropriate manner to prevent contamination of the environment. Any accidental chemical, fuel and oil spills that occur during decommissioning should be cleaned up in the appropriate manner as related to the nature of the spill.
- All vehicles accessing the decommissioning area should adhere to a low speed limit (30km/h max) to avoid collisions with susceptible species such as snakes and tortoises.

Residual Impacts:
As the intact habitats around the grid connection infrastructure will not be significantly affected, residual risks on fauna would be very low.

Nature: *Soil erosion risk due to decommissioning*
Decommissioning of the grid connection infrastructure will create a lot of disturbance in the decommissioning area which will leave the affected areas vulnerable to erosion.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (3)	Long-term (3)
Magnitude	Medium (4)	Low (4)
Probability	Highly Probable (4)	Improbable (2)

Significance	**Medium (32)**	**Low (16)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	Low	No
Can impacts be mitigated?	Yes, with the proper erosion control and management, erosion can be reduced to a low level.	

Mitigation:

» Erosion management within the decommissioned area should take place according to the Erosion Management Plan and Rehabilitation Plan.
» Regular monitoring for erosion after decommissioning for at least 5 years is required to ensure that no erosion problems have developed as a result of the disturbance, as per the Erosion Management and Rehabilitation Plans for the project.
» All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques.
» All cleared areas resulting from decommissioning should be revegetated with indigenous perennial species from the local area.

Residual Impacts:

It is likely that some soil erosion will occur regardless of the mitigation implemented, due to the high winds that the area experiences. However, this can be reduced to a low level and residual risks can be reduced to an acceptable level.

8.3.4 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the significance of ecological impacts of the grid connection infrastructure can be reduced to low. From the outcomes of the studies undertaken, it is concluded that the grid connection infrastructure can be developed as impacts will be of low significance. On-site mitigation is viewed as the most practical and appropriate action, and viable options for reducing the overall impact of the development on these areas is detailed below:

» The final power line route should be subject to a preconstruction walk-through before construction commences and adjusted where required to reduce impacts on SCC and habitats of concern.
» Search and Rescue of species of conservation concern (SCCs) should be conducted prior to clearing activities.
» If the collector substation is to be fenced, then no electrified strands should be placed within 30cm of the ground as some species such as tortoises are susceptible to electrocution from electric fences as they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks.
» Erosion management within the grid connection servitude should take place according to the Erosion Management Plan and Rehabilitation Plan.
» Alien and erosion management should be regularly implemented within the grid connection servitude.

8.4. Potential Impacts on Avifauna

The significance of the impacts on avifauna expected with the development of the grid connection infrastructure for the Namas Wind Farm has been assessed as medium to low with the implementation of mitigation measures, depending on the impact being considered. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix E** for more details). The avifauna impact assessment assessed the entire extent of the grid connection corridor, as well as the grid connection infrastructure, including the collector substation and double-circuit power line.

8.4.1 Results of the Avifauna Impact Assessment

The bird community located along the grid connection corridor has been confirmed through an avifauna pre-construction monitoring campaign undertaken for the authorised Namas Wind Farm from June 2017 to March 2018. Rainfall was scarce during the site visits undertaken as part of the pre-construction monitoring, which may reduce the overall numbers and diversity of birds. However, the specialist made use of previous experience from surveying bird communities in arid areas to extrapolate more normal diversity conditions and, therefore, was able to consider impacts on avifauna during periods of typical rainfall.

Over the course of 12-months, only 45 avian species were recorded in the corridor during four equally-spaced site visits over the year. This is a very low total compared with other arid areas in the Northern and Western Capes that have been sampled. Species richness varied over the seasons with higher totals recorded in spring (26 species) and the lowest in summer (12 species). All were typical residents of the arid Karoo landscape including chats, prinias, cisticolas, titbabblers, warblers, flycatchers, Karoo Larks and Tits.

Among the 48-species recorded on the 37 SABAP2 bird atlas cards for the region were 8 priority collision-prone species (CPS). Five of the eight species were recorded within the grid connection corridor over the course of the year. These included two Red Data species (Secretarybird and Ludwig's Bustard *Neotis ludwigii*). The Ludwig's Bustards were recorded twice, and the Secretarybirds just once in November 2017; a pair of Secretarybirds, however, was observed in flight together in August 2017.

The flight heights recorded as part of the site visits indicate that if Ludwig's Bustards occurred along the grid connection corridor, they would be the most at-risk species with 100% of their flights recorded within the height of the power line tower. The Red Data Ludwig's Bustards and Secretarybirds all flew often within the power line tower heights, but exhibited low Passage Rates, and are therefore at low risk of colliding with the lines when populations are low.

Along the power line corridor, areas of high and medium sensitivity were identified. One area of high sensitivity was identified within the northern section of the corridor. Black Harriers occur and breed along the Buffels River and birds probably forage along the river margins. A harrier nest occurs at S29°34'21.44" E17°17'39.63", 11 km east of the corridor. Wetland birds typically fly along river lines and therefore may impact power lines strung over the wetland features. In more recent field work at this river crossing a collision-prone African Harrier Hawk *Polyboroides typus* was recorded in the river and a Vulnerable Lanner Falcon *Falco biarmicus* was seen on a power line tower 350m from the river. Therefore, the crossing here is deemed a high-risk area and must be mitigated.

Areas of medium sensitivity were identified within the southern section of the corridor. These areas include sections of the corridor where Secretarybirds were observed circling and in courtship flight and a red-data Lanner Falcon was also recorded. Regarding the observations of the Secretarybirds in flight, the specialist has noted that this is not considered to be an issue given that the proposed double-circuit power line will be located parallel to a 400kV power line (to be constructed), which will increase the visibility of both lines.

All of these risk areas are designed to highlight areas where disturbance to priority species must be minimised during the construction and operation of the grid connection infrastructure. **Figure 9.3** provides an avifaunal sensitivity map of the grid connection corridor within which the grid connection infrastructure for the Namas Wind Farm will be developed.

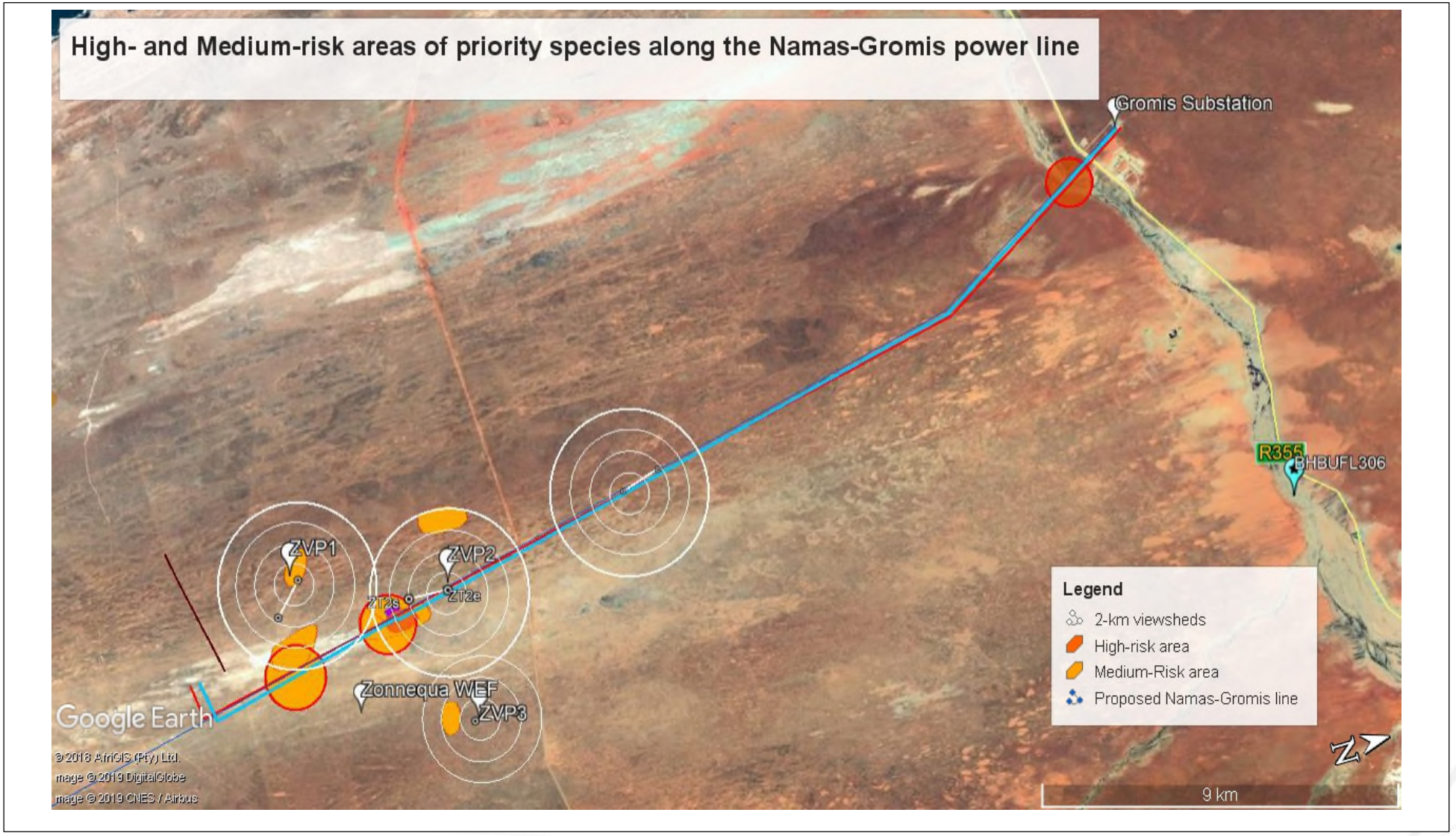

Figure 9.3: Map illustrating the avifaunal sensitivity within the grid connection corridor proposed for the development of the grid connection infrastructure for the authorised Namas Wind Farm

8.4.2 Description of Avifaunal Impacts

The nature of the avifauna impacts associated with the grid connection infrastructure will generally be negative given that priority birds may be susceptible to collision with the power line. However, the extent of the negative impacts will be local (i.e. along the 32km long double-circuit power line). The duration of the impact will be long-term, for the life-time of the power line, for all collision-prone species, however the significance of the impact can be reduced.

The magnitude of the impact expected with the development of the grid connection infrastructure will be medium to high, specifically for bustards and raptors. The probability that interaction between the grid infrastructure and raptors and bustards will occur is considered to be probable, due to the passage rates and occurrence of the species along the grid connection corridor.

Impacts to avifauna are expected to occur during both the construction and operation phases of the development. During the construction phase impacts will relate to the avoidance of the affected area by birds due to construction activities. During the operation phase impacts will relate to direct impact with infrastructure and mortality.

8.4.3 Impact tables summarising the significance of impacts on avifauna during construction and operation (with and without mitigation)

Construction Phase Impacts

Nature: *Impact of construction activities on avifauna*
During the construction phase a negative impact on red-listed bird groups is expected to occur that relates to the avoidance of the area due to human activity, noise and predation threat.

The nomadic Ludwig's and Kori Bustards and Secretarybird and possibly other collision-prone raptors such Black Harriers may be disturbed due to anthropogenic disturbance caused on the ground during the construction phase of the grid connection infrastructure.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate (6)	Low (5)
Probability	Highly probable (4)	Probable (3)
Significance	**Medium (44)**	**Low (30)**
Status (positive or negative)	Negative	Negative
Reversibility	Medium for bustards and raptors	Medium for all raptors Some raptors are attracted to new perching and nesting sites
Irreplaceable loss of resources?	No, the raptors are infrequent in this area and are likely to be attracted back into the area post-disturbance. Bustards will return once the disturbance is gone depending on the background level of	Once human disturbance is removed, as long as the habitat remains relatively un-altered then the raptors and bustards will return.

	disturbance.	
Can impacts be mitigated?	Yes, by reducing the extent of construction disturbance in the areas of high and medium sensitivity identified. For bustards and raptors this occurs shortly after the winter rains (July-September).	
Mitigation: » Add bird diverters or spirals (diurnal and nocturnal) to all new lines, as they are constructed. » Reduce the extent of the human disturbance to around the line itself (i.e. within the grid connection corridor). » Avoid the areas identified as high-risk wherever possible during breeding times (typically spring). » Avoid any nests that are active (some ground-nesters may be found if rainfall is high). » Avoid polluting the area with plastics or human waste of any kind – all material to be disposed of at suitable waste disposal sites.		
Residual Impacts: After mitigation, direct mortality may still occur through collision or area avoidance and further research and mitigation for any high-risk sections (where more than one bustard is killed per km of power line) of the double-circuit 132kV power line will be needed.		

Operation Phase Impacts

Nature: *Operation phase avifauna impacts*
Negative impacts during the operation phase of the grid connection infrastructure includes mortality of birds due to direct impact and the avoidance of the area due to the presence of the new power line. This is relevant for the red-listed bird groups.

The nomadic Ludwig's and Kori Bustards are the most likely to be impacted by overhead power lines, while the Secretarybird and possibly other collision-prone raptors such Black Harriers may be impacted.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	High (8)	Moderate (6)
Probability	Highly probable (4)	Highly probable (4)
Significance	**Medium-High (52)**	**Medium (44)**
Status (positive or negative)	Negative	Negative
Reversibility	Medium for raptors and high for collision-prone bustards	Medium for all raptors Medium for collision-prone bustards because of their propensity for impacting even marked power lines
Irreplaceable loss of resources?	No, the raptors are infrequent in this area and rarely hit power lines. Thousands of bustards are killed on power lines per year in South Africa so every effort must be made to reduce this high mortality.	Bustards need more attention to reduce fatalities, or a local loss of species could occur. Mitigations are therefore essential.
Can impacts be mitigated?	Yes, by staggering the position of power line towers of adjacent or parallel power lines could reduce bustard mortality by >50% and by marking all future power lines with bird diverters as they are constructed.	

Mitigation:

» Re-position the lines to avoid high- or medium-risk areas for birds.
» Maintain bird diverters or spirals (diurnal and nocturnal).
» Where existing lines occur (or are planned e.g. Gromis-Juno 400 kV from the south), construct the proposed double-circuit 132kV power line adjacent to the lines and stagger the power line towers to reduce bustard deaths.

Residual Impacts:

After mitigation, direct mortality may still occur through collision or area avoidance and further research on mitigation for the high-risk section of the double-circuit 132kV power line will be needed.

8.4.4 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the significance of avifauna impacts associated with the grid connection infrastructure for the Namas Wind Farm can be reduced to medium or low, depending on the impact being considered. Only one area has been identified as high risk, which is associated with the presence of the Buffels River.

From the outcomes of the studies undertaken, it is concluded that the grid connection infrastructure can be developed and impacts on avifauna managed by taking the following into consideration:

» Where a power line traverses a risk area (medium and high) bird spirals or dynamic bird diverters/flappers must be installed on the earth wires to reduce the risk of impacting birds, especially for the Endangered Black Harriers or wetland birds.
» Should the proposed double-circuit 132kV power line be developed parallel to the approved (to still be constructed) Eskom Gromis-Juno 400 kV line then the two lines must be aligned and the power line towers staggered. This is especially important where the power line traverses the Buffels River. An existing line crosses the Buffels River – the proposed 132 kV line must be aligned as closely as possible with this existing line and run parallel to this line.

8.5. Assessment of Impacts on Land Use, Soil and Agricultural Potential

The impact of the grid connection infrastructure for the Namas Wind Farm on the soils, land use, land capability and agricultural potential has been assessed as low (after mitigation). Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix F** – Soils Impact Assessment for more details). The soils impact assessment assessed the entire extent of the grid connection corridor, as well as the grid connection infrastructure, including the collector substation and double-circuit power line.

8.5.1 Results of the Land Use, Soil and Agricultural Potential Study

The current land use being undertaken within the grid connection corridor is extensive grazing (specifically sheep grazing) and the corridor is dominated by natural vegetation. The corridor also includes a significant proportion of sand dunes.

The soils present in most of the project site are not considered susceptible to erosion by water. However, if the vegetation cover is disturbed (for example by overgrazing or construction activities) and considering the sandy nature of the topsoils, as well as the dry climate, there is a significant possibility of removal of some or all of the topsoil by wind action. This can be mitigated by ensuring that a minimum area is disturbed, and that rehabilitation of surface vegetation is carried out as soon as possible.

There are no high potential soils present within the project site and the soils are of moderate potential at best, due mainly to the sandy texture which will lead to rapid water infiltration and the soils drying out. In addition, the low rainfall in the area means that there is little potential for rain-fed arable agriculture in the area. Arable production would, therefore, be possible only by irrigation, and no indications of any irrigated areas, within and surrounding the grid connection, can be identified on aerial imagery, including Google Earth.

In general, the soils that do occur along the corridor are suited for extensive grazing at best and furthermore the grazing capacity of the area is very low, at around 26-40 ha/large stock unit.

The prevailing potential of the soils for rain-fed cultivation throughout most of the area, as well as the use of irrigation activities for cultivation, is low. Considering the land types and soils located along the grid connection corridor and the current land-use activities, it is recommended that no further detailed soil investigation is required for the grid connection infrastructure for the Namas Wind Farm.

8.5.2 Description of Land Use, Soil and Agricultural Potential Impacts

Two impacts have been identified to be associated with the development of the grid connection infrastructure for the Namas Wind Farm from a soils perspective. These impacts include:

» *Loss of potential agricultural land* - the major impact on the natural soil resources of the grid connection corridor would be the loss of potential agricultural land due to the construction power line towers, collector substation and other associated infrastructure. However, considering the grid connection corridor, this impact would be of extremely limited significance and would be local in extent, if at all.

» *Increased risk of wind erosion* - In this area, the sandy soils, coupled with the dry climate, means that a possible impact would be the increased risk of wind erosion of the topsoil when vegetation cover is removed or disturbed. This would be especially relevant for the construction of access roads for access to the double-circuit power line and collector substation.

The main activity that will result in the impacts on soil relates to the excavations required for the collector substation, power line towers and access roads which could lead to wind erosion.

8.5.3 Impact tables summarising the significance of impacts on Land Use, Soil and Agricultural Potential during construction and operation (with and without mitigation)

Nature: *Loss of agricultural land* The loss of potentially productive agricultural land during both the construction and operation phases of the grid connection infrastructure for the Namas Wind Farm.		
	Without mitigation	**With mitigation**
Extent	Low (1)	Low (1)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Improbable (2)
Significance	**Low (27)**	**Low (14)**
Status (positive or negative)	Negative	Negative

Reversibility	Low	High
Irreplaceable loss of resources?	No, due to the low agricultural potential of the land	No, due to the low agricultural potential of the land
Can impacts be mitigated?	Yes	
Mitigation: » Avoid any cultivated land (if present). » Minimise the footprint of construction as much as possible.		
Residual Impacts: Likely to be low since the implementation of the appropriate mitigation measures will enable more or less complete rehabilitation during and after the life of the project.		

Nature: *Soil erosion* Increases in soil erosion by wind during the construction and operation phases of the grid connection infrastructure for the Namas Wind Farm.		
	Without mitigation	**With mitigation**
Extent	Medium (3)	Low (1)
Duration	Permanent (5)	Short term (2)
Magnitude	High (8)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**High (64)**	**Low (10)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	High
Irreplaceable loss of resources?	Very possible	No
Can impacts be mitigated?	Yes	
Mitigation: » Minimise the footprint of construction as much as possible. » Where soil is removed/disturbed, ensure it is stored for rehabilitation and re-vegetated as soon as possible. » Implement all appropriate soil conservation measures, including contouring, culverts etc. (for road construction), geotextiles and slope stabilisation (for all infrastructure).		
Residual Impacts: If mitigation is not carried out, long-term wind erosion, with results such as loss of valuable topsoil, may occur.		

8.5.4 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the significance of impacts of the grid connection infrastructure for the Namas Wind Farm can be reduced to low. From the outcomes of the studies undertaken, it is concluded that the grid connection infrastructure can be developed and impacts on soils managed by taking the following into consideration:

» Avoid any cultivated land (if present).
» Minimise the footprint of construction as much as possible.
» Where soil is removed/disturbed, ensure it is stored for rehabilitation and re-vegetated as soon as possible.
» Implement all appropriate soil conservation measures, including contouring, culverts etc. (for road construction), geotextiles and slope stabilisation (for all infrastructure), where required.

8.6. Assessment of Impacts on Heritage Resources

Negative impacts on heritage resources will be due to loss during construction activities and an impact on the cultural landscape during the operation of the grid connection infrastructure for the Namas Wind Farm. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix G**). The heritage impact assessment assessed the grid connection corridor, as well as the grid connection infrastructure, including the collector substation and double-circuit power line.

8.6.1 Results of the Heritage Impact Assessment (including archaeology, palaeontology and cultural landscape)

Palaeontological materials were not observed along the grid connection corridor but isolated fossil bones could occur within the various sand formations of the area. The corridor does include a number of archaeological sites and some may require sampling if they are to be disturbed. Impacts to isolated fossils and unmarked graves are possible but cannot be predicted. No other significant impacts are expected.

In terms of the cultural landscape, the grid connection corridor is situated in a remote location and, being only very minimally developed, is largely considered a natural landscape rather than a rural one. The exception, of course, is the mining landscape located to the north where the human imprint is far greater. Natural heritage also requires consideration because of the visual amenity provided by aesthetically pleasing landscapes. The landscape conveys a sense of remoteness and inhospitability that is a result of the very frequent strong winds, the low scrubby vegetation and seemingly endless sand flats and dunes. The archaeological cultural landscape consists of a multitude of individual archaeological sites classifiable as a Type 3 precolonial cultural landscape.

8.6.2 Description of the Heritage Impacts

The impacts expected to occur on heritage resources with the development of the grid connection infrastructure for the Namas Wind Farm will include impacts to palaeontological resources, impacts to archaeological resources, impacts to graves and impacts to the cultural landscape.

Impacts to palaeontological resources would occur only during the construction phase when foundations are excavated and the service road cleared. The impacts would be direct since the excavations might damage or destroy fossils as they are uncovered. The probability of impacts occurring is probable with the resultant significance of impacts being low. With mitigation, the status becomes positive because of the potential gain in knowledge from access to deposits and fossils that would otherwise have remained buried and undiscovered. The significance of the impacts, after the implementation of the recommended mitigation measures, will be low. There are no fatal flaws expected from a palaeontological perspective.

Impacts to archaeological resources would occur only during the construction phase when foundations are excavated and the service road is cleared. The impacts would be direct since the excavations might damage or destroy archaeological materials. The probability of impacts occurring is probable with the resultant significance of impacts being medium. With mitigation the magnitude and probability of the impact will be reduced and the significance will become low. There are no fatal flaws expected to occur with regards to archaeological resources.

Impacts on graves would occur only during the construction phase when foundations are excavated and land is cleared for the service road. The impacts would be direct since the excavations might damage or destroy graves. The probability of impacts occurring is very improbable with the resultant significance of impacts being low. With mitigation the magnitude of the impact would be reduced but the significance will remain low. There are no fatal flaws for the development considering graves.

Impacts to the cultural landscape would occur during all phases of the proposed project. Impacts would arise due to the presence in the landscape of incompatible features (i.e. the power line and substation) and from the clearing of natural vegetation for the service road and substation. The impacts would be direct and occur both through the destruction of elements of the natural landscape such as vegetation and dunes and through contextual impacts where the visual qualities of the landscape deteriorate as a result of the presence of incompatible infrastructure and equipment. If the double-circuit power line and collector substation are built then the impacts will definitely occur. However, because the double-circuit 132kV power line would be constructed alongside an already authorised and much larger power line the clustering of lines means that the impact is less likely to be an issue. As such, the probability of the impact occurring has been reduced. The resultant significance of impacts would be of medium significance. With mitigation, which would aim to reduce visual scarring, the magnitude of the impact would be reduced slightly and the significance becomes low. Due to the fact that the area has been identified for renewable energy development through a Strategic Environmental Assessment, power lines and substations (and wind farms) can be expected to occur here and there are therefore no fatal flaws in terms of the cultural landscape.

8.6.3 Impact tables summarising the significance of impacts on heritage related to the grid connection infrastructure during construction and operation (with and without mitigation)

Nature: *Impacts to Palaeontological Resources* Direct destruction of or damage to fossil bones or other palaeontological resources through excavation of foundations and clearing of service roads.		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2). If an important fossil find occurs, the rating will increase to regional – international (3-5)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Low (4)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (22)**	**Low (22)**
Status (positive or negative)	Negative	Positive
Reversibility	Irreversible	Irreversible
Irreplaceable loss of resources?	Yes	Partly
Can impacts be mitigated?	Yes, but only partial mitigation is possible. Valuable fossils may be lost in spite of management actions to mitigate such loss.	
Mitigation: » Monitoring of all construction-phase excavations by project staff and ECO. » Inspection, sampling and recording of selected exposures in the event of fossil finds. » Reports and fossils deposited in scientific institution.		
Residual Impacts: It will never be possible to spot and rescue all fossils which means that there will always be some loss and therefore residual impact. This would be of unknown significance because of the sparse distribution of fossils in the broader		

landscape. Positive impacts would continue to be felt with successful mitigation because of the scientific implications of the resulting research opportunities.

Nature: *Impacts to archaeological resources*
Direct destruction of or damage to archaeological resources during excavation of foundations and clearing of service roads could occur.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Improbable (2)
Significance	**Medium (33)**	**Low (16)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	

Mitigation:
» A walk down survey of the final authorised double-circuit 132kV power line alignment and collector substation location must be undertaken.
» Any mitigation still required should be effected prior to construction.

Residual Impacts:
Entirely buried archaeological sites within the grid connection corridor would likely be damaged or destroyed but the chances of significant buried sites being present in this landscape is deemed to be very low. Impacts to remaining materials after mitigation has been carried out at specific sites are insignificant.

Nature: *Impacts to graves*
Direct destruction of or damage to graves during excavation of foundations and the clearing of service roads.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Very high (10)	Moderate (6)
Probability	Very improbable (1)	Very improbable (1)
Significance	**Low (16)**	**Low (12)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	

Mitigation:
» Rescue of any graves found during construction.

Residual Impacts:
There may still be graves that are not seen during earthworks and that get lost entirely.

Nature: *Impacts to the cultural landscape*
Direct impacts to the landscape through the introduction of generally incompatible electrical infrastructure (power lines and substation).

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate (4)	Low (2)
Probability	Probable (3)	Improbable (2)

Significance	**Medium (30)**	**Low (14)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Not fully	
Mitigation: » Mitigation measures should include rehabilitation of any disturbed areas not in use during operation and any other measures as listed in the Visual Impact Assessment.		
Residual Impacts: Regardless of mitigation measures, the double-circuit power line and collector substation will still be visible in the cultural landscape and therefore create an impact.		

8.6.4 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the significance of impacts of the grid connection infrastructure for the Namas Wind Farm will be low. From the outcomes of the studies undertaken, it is concluded that the grid connection infrastructure can be developed and impacts on heritage managed by taking the following into consideration:

» An archaeologist must be appointed to conduct a final pre-construction survey of the approved layout (i.e. the route of the double-circuit 132kV power line and the location of the collector substation within the grid connection corridor) at least 6 months prior to commencement of construction.
» A chance finds procedure must be implemented for the rescuing of any fossils discovered during construction.
» All work is to be carried out within the authorised construction footprint (i.e. grid connection corridor). Any new areas, outside of the corridor, that may need to be disturbed must be surveyed for archaeological sites prior to disturbance.
» Any disturbed areas not required during operation must be rehabilitated after construction.
» If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

8.7. Assessment of Visual Impacts

Negative impacts on visual receptors will occur during the undertaking of construction activities and the operation of the grid connection infrastructure for the Namas Wind Farm. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix H**). The visual impact assessment assessed the entire extent of the grid connection corridor, as well as the grid connection infrastructure, including the collector substation and double-circuit power line.

8.7.1 Results of the Visual Impact Assessment

The greater environment has a rural, undeveloped character and a natural appearance. These generally undeveloped landscapes are considered to have a high visual quality.

The area within which the development of the grid connection infrastructure is located has a low development density and low viewer incidence. The viewer incidence may fluctuate according to the

tourism activity experienced within the area. The land use of the area includes limited farming practises and mining activities. The down-scaling of mining operations within the Kleinsee area has resulted in an out-migration of people which contributes to the low viewer incidence and the low development density present.

The construction and operation of the grid connection infrastructure (including the collector substation and double-circuit power line) for the Namas Wind Farm will have a visual impact on the surrounding area, especially within (but not restricted to) a 0.5km radius. The visual impact will differ between viewpoints, depending on the distance from the gird connection infrastructure.

Overall, the significance of the visual impact is expected to range from medium to low as a result of the generally undeveloped character of the landscape. No visual impacts of a high significance are expected to occur. The grid connection infrastructure would be visible within an area that incorporates certain sensitive visual receptors who would consider visual exposure to this type of infrastructure to be intrusive. Such visual receptors include people travelling along roads (including the R355 arterial road and the Komaggas-Kleinsee secondary road), residents of rural homesteads (including Sonnekwa A, Hoë Heuwel, Lewies se Duin, Taaiboskrop and Manelsvlei) and settlements (including Kleinsee), and tourists passing through or holidaying in the region.

8.7.2 Visual Assessment

Visual impacts associated with the development of the grid connection infrastructure are expected to occur during both the construction and operation phases.

During the construction phase of the grid connection infrastructure, there may be an increase in heavy vehicles utilising the roads associated with the grid connection corridor that may cause, at the very least, a visual nuisance to other road users and landowners in the area.

During the operation phase observers travelling along the roads and residents of homesteads within a 0.5km-3km radius of the grid connection infrastructure will experience a visual impact. Roads that may be impacted include the R355 arterial road and the Komaggas-Kleinsee secondary road. Homesteads that may be impacted include Sonnekwa A, Hoë Heuwel, Lewies se Duin, Taaiboskrop and Manelsvlei.

An impact on the sense of place is also expected during the operation phase of the grid connection infrastructure. An impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently and in a less appealing or positive light.

8.7.3 Impact table summarising the significance of visual impacts during construction and operation (with and without mitigation)

Construction Phase Impacts

Nature: *Visual impact of construction activities on sensitive visual receptors* A visual impact of construction activities is expected on sensitive visual receptors in close proximity to the proposed grid connection infrastructure. This relates to an increase in heavy vehicles and the associated visual nuisance to road users and landowners. Roads that may be impacted include the R355 arterial road and the Komaggas-Kleinsee secondary road. Homesteads that may be impacted include Sonnekwa A, Hoë Heuwel, Lewies se Duin, Taaiboskrop

and Manelsvlei.		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (20)**	**Low (16)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable (3)	Recoverable (3)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

Planning:

» Retain and maintain natural vegetation immediately adjacent to the development footprint/servitude.

Construction:

» Ensure that vegetation is not unnecessarily removed during the construction phase.
» Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.
» Restrict the activities and movement of construction workers and vehicles to the immediate construction area and existing access roads.
» Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at licensed waste facilities.
» Reduce and control construction dust using approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).
» Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts.
» Rehabilitate all disturbed areas immediately after the completion of construction works.

Residual Impacts:

None, provided rehabilitation works are carried out as specified.

Operation Phase Impacts

Nature: *Visual impact on sensitive visual receptors located within 0.5km of the grid connection infrastructure*

A visual impact on observers travelling along the roads and residents at homesteads in close proximity to the grid connection infrastructure and within 0.5km is expected to occur. Roads that may be impacted include the R355 arterial road and the Komaggas-Kleinsee secondary road. Homesteads that may be impacted include Sonnekwa A, Hoë Heuwel, Lewies se Duin, Taaiboskrop and Manelsvlei.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	High (8)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (28)**	**Low (28)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable (3)	Recoverable (3)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented	

Mitigation:

Planning:

» Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint/servitude.

Operation:

» Maintain the general appearance of the servitude as a whole.

Decommissioning:

» Remove infrastructure not required for the post-decommissioning use.
» Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.

Residual Impacts:

The visual impact will be removed after decommissioning, provided the grid connection infrastructure is removed. Failing this, the visual impact will remain.

Nature: *Visual impact on sensitive visual receptors within the region*

A visual impact on observers travelling along the roads and residents at homesteads within a 0.5 – 3km radius of the grid connection infrastructure is expected to occur. Roads that may be impacted include the R355 arterial road and the Komaggas-Kleinsee secondary road. Homesteads that may be impacted include Sonnekwa A, Hoë Heuwel, Lewies se Duin, Taaiboskrop and Manelsvlei.

	Without mitigation	**With mitigation**
Extent	Regional (3)	Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (22)**	**Low (22)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable (3)	Recoverable (3)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented.	

Mitigation:

Planning:

» Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint/servitude.

Operation:

» Maintain the general appearance of the servitude as a whole.

Decommissioning:

» Remove infrastructure not required for the post-decommissioning use.
» Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.

Residual Impacts:

The visual impact will be removed after decommissioning, provided that the grid connection infrastructure is removed. Failing this, the visual impact will remain.

Nature: *Visual impact on the sense of place of the region*

The potential impact of grid connection infrastructure on the sense of place of the region.

This is not considered to be a significant impact due to the relative low viewer incidence within close proximity of the grid connection corridor and the presence of existing mining activities and electricity infrastructure.

	Without mitigation	**With mitigation**
Extent	Regional (3)	Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (22)**	**Low (22)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable (3)	Recoverable (3)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented.	

Mitigation: Planning: » Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint/servitude. Operation: » Maintain the general appearance of the servitude as a whole. Decommissioning: » Remove infrastructure not required for the post-decommissioning use. » Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.
Residual Impacts: The visual impact will be removed after decommissioning, provided the grid connection infrastructure is removed. Failing this, the visual impact will remain.

8.7.4 Implications for Project Implementation

The primary visual impact, namely the appearance of the grid connection infrastructure within the landscape is not possible to mitigate. Overall, the significance of the visual impacts is expected to be low as a result of the generally undeveloped character of the landscape. No impacts of high significance are expected to occur. The following mitigation is, however, possible:

» Retain/re-establish and maintain natural vegetation in all areas immediately adjacent to the development footprint/servitude.
» Mitigation of visual impacts associated with the construction phase, albeit temporary, entails proper planning, management and rehabilitation of the construction site.
» During operation, the maintenance of the grid connection infrastructure will ensure that the infrastructure does not degrade, therefore aggravating visual impact.
» Roads must be maintained to forego erosion and to suppress dust, and rehabilitated areas must be monitored for rehabilitation failure. Remedial actions must be implemented as a when required.
» Once the grid connection infrastructure has exhausted its life span, all associated infrastructure not required for the post rehabilitation use of the site/servitude should be removed and all disturbed areas appropriately rehabilitated. An ecologist should be consulted to give input into rehabilitation specifications.
» All rehabilitated areas should be monitored for at least a year following decommissioning, and remedial actions implemented as and when required.

8.8. Assessment of Socio-economic Impacts

Potential social and socio-economic impacts and the relative significance of the impacts associated with the development of the grid connection infrastructure for the Namas Wind Farm are summarised below (refer to **Appendix I**). The socio-economic impact assessment assessed the entire extent of the grid connection corridor, as well as the grid connection infrastructure, including the collector substation and double-circuit power line.

8.8.1 Results of the Socio-economic Impact Assessment

The area within which the development of the grid connection infrastructure is proposed has a low development density. The land use of the area includes limited farming practises and mining activities. The down-scaling of mining operations within the Kleinsee area has resulted in an out-migration of people which contributes to the low development density present.

Through the assessment of the socio-economic impacts only positive socio-economic impacts were identified to be associated with the construction, operation and decommissioning phases. The identification of only positive impacts is based on the remoteness of the area within which the project is proposed and the lack of social receptors. These impacts include:

» Construction Phase
  * Stimulation of the economy
  * Temporary employment creation due to construction activities

» Operation Phase
  * Creation/support of long-term employment

» Decommissioning Phase
  * Temporary increase in production in the economy and reuse of recovered metallic and non-metallic materials

8.8.2 Description of Socio-economic Impacts

The significance of the positive impacts expected during the construction phase will be of a medium significance with the implementation of the recommenced enhancement measures. The positive impacts will however only be temporary and is expected to have a very short duration. This is also true for the socio-economic impacts expected during the decommissioning phase of the grid connection infrastructure.

The significance of the positive impacts will be low during the operation phase. These impacts will have a local extent and will be of a long-term duration (i.e. for the duration of the authorised Namas Wind Farm).

8.8.3 Impact tables summarising the significance of socio-economic impacts during construction and operation (with and without mitigation measures)

Construction Phase Impacts

Nature: *Increase in production and GDP-R* Expenditure associated with the construction of the grid connection infrastructure will impact on the production of the local and national economies directly and indirectly.		
	Without enhancement	**With enhancement**
Extent	National (5)	National (5)
Duration	Very short (1)	Very short (1)
Magnitude	Minor (2)	Minor (2)
Probability	Definite (5)	Definite (5)
Significance	**Medium (40)**	**Medium (40)**
Status (positive or negative)	Positive	Positive
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes, enhanced	
Mitigation/Enhancement: » The project developer should procure goods and services, as far as practically possible, from the entities located		

in the local municipality.
» Local Small and Medium Enterprises should be approached to investigate the opportunities for supplying inputs required for the construction of the double-circuit 132kV power line and collector substation, as far as feasible.

The above mitigation (enhancement) measures are meant to increase the positive impact on the local municipality, but it will not change the rating of the impact on the "national" scale.

Residual Impacts:
Production in the economy will continue.

Nature: *Creation of temporary employment*
The construction of the grid connection infrastructure will positively impact on the local and national economies by creating temporary job opportunities directly and indirectly (albeit temporary).

	Without enhancement	**With enhancement**
Extent	National (5)	National (5)
Duration	Very short (1)	Very short (1)
Magnitude	Minor (2)	Minor (2)
Probability	Highly probable (4)	Highly probable (4)
Significance	**Medium (32)**	**Medium (32)**
Status (positive or negative)	Positive	Positive
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes, enhanced	

Mitigation/Enhancement:
» Organise local community meetings to inform the local labour force of the project that is planned and the jobs that can potentially be applied for.
» Establish a local skills desk to identify the skills set of the local residents available for the construction of the grid connection infrastructure.

Residual Impacts:
No residual impacts are applicable.

Operation Phase Impacts

Nature: *Creation/support of long-term employment*
During operations, maintenance of the servitude will create seasonal opportunities for employment of a small number of low-skilled labour. This is likely to be secured from the local communities.

	Without enhancement	**With enhancement**
Extent	Local (1)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Highly probable (4)	Highly probable (4)
Significance	**Low (28)**	**Low (28)**
Status (positive or negative)	Positive	Positive
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes, enhanced	

Mitigation/Enhancement:
» Organise local community meetings to inform the local labour force of the project that is planned and the jobs that can potentially be applied for.
» Establish a local skills desk to identify the skills set of the local residents available for the construction of the grid connection infrastructure.

Residual Impacts:

No residual impacts are applicable.

Decommissioning Phase Impacts

Nature: *Temporary increase in production in the economy and reuse of recovered materials*
During the decommissioning phase, the project will create a number of temporary employment opportunities and will stimulate the demand for services of transport and construction companies. The cost of the removal and disconnection of the grid connection infrastructure will stimulate economic activity. Jobs will be required to fulfil the required decommissioning activities. Some of the project components will be of recyclable value. Importantly, recovery of valuable metallic and non-metallic materials will lead to the generation of revenue and allow for savings in production costs of companies that will use the recovered materials in their processes.

	Without enhancement	**With enhancement**
Extent	National (5)	National (5)
Duration	Very short (1)	Very short (1)
Magnitude	Minor (2)	Minor (2)
Probability	Highly probable (4)	Highly probable (4)
Significance	**Medium (32)**	**Medium (32)**
Status (positive or negative)	Positive	Positive
Reversibility	Reversible	Reversible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes, enhanced.	

Mitigation:

» Develop and implement a material recovery strategy to optimise the use of valuable metallic materials and, where applicable, recycle non-metallic materials comprising various components of the grid connection infrastructure.

Residual Impacts:
No residual impacts are applicable.

8.8.4 Implications for Project Implementation

The significance of the positive impacts associated with the socio-economic aspects that will be affected by the development of the grid connection infrastructure for the Namas Wind Farm ranges from medium to low with the implementation of the enhancement measures recommended. No negative impacts or impacts with a high significance are expected to occur. These enhancement measures include:

» The project developer should procure goods and services, as far as practically possible, from the entities located in the local municipality.
» Local Small and Medium Enterprises should be approached to investigate the opportunities for supplying inputs required for the construction of the double-circuit 132kV power line and collector substation, as far as feasible
» Establish a local skills desk to identify the skills set of the local residents available for the construction of the grid connection infrastructure.
» Develop and implement a material recovery strategy to optimise the use of valuable metallic materials and, where applicable, recycle non-metallic materials comprising various components of the grid connection infrastructure.

8.9. Assessment of the 'Do Nothing' Alternative

The 'do-nothing' alternative (i.e. no-go alternative) is the option of not constructing the grid connection infrastructure for the Namas Wind Farm. Should this alternative be selected, there would be no environmental impacts within the grid connection corridor due to the construction and operation activities of grid connection infrastructure. The implementation of the 'do-nothing' alternative will result in the authorised Namas Wind Farm not being able to evacuate the generated electricity to the national grid and will, therefore, render the development of the associated and already authorised wind farm and the operation thereof unfeasible.

The 'do-nothing' alternative will do little to influence the renewable energy targets set by government due to competition in the sector, and the number of renewable energy projects being bid to the Department of Energy. In addition, the Northern Cape Province will not benefit from additional generated power being evacuated through the proposed grid connection infrastructure directly into the Province's grid. Therefore, from a regional perspective, the 'do-nothing' alternative is not preferred as there is a perceived loss of benefits for the regional area.

From the specialist studies undertaken, no environmental fatal flaws or impacts of a high significance were identified to be associated with the development of the grid connection infrastructure. All impacts associated with the project can be mitigated to acceptable levels. If the grid connection infrastructure is not developed the following positive impacts will not be realised, which are also associated with the larger wind farm project:

- The operation of the authorised Namas Wind Farm and the associated generation of renewable energy.
- Job creation from the construction and operation phases.
- Meeting of energy generation mix in a most economic and rapid manner.
- Provision of clean, renewable energy in an area where it is optimally available.

The implementation of the 'do nothing' alternative would be an undesirable option from a socio-economic perspective as it would result in a situation where the electricity generated from the Namas Wind Farm would not be fed into the national Eskom grid resulting in the loss of additional renewable power generation capacity. This would result in negative impacts or foregone opportunities at a local, regional and national scale from a social and economic perspective in terms of limiting job creation, socio-economic upliftment and development fostering the generation of renewable energy and as such is not considered desirable.

As detailed above, the 'do-nothing' alternative will result in lost opportunities. The negative impacts associated with the 'do nothing' alternative are considered to outweigh the positive impacts of this alternative. The 'do nothing' alternative is, therefore, not preferred and not proposed to be implemented for the development of the grid connection infrastructure for Namas Wind Farm.

CHAPTER 9: ASSESSMENT OF POTENTIAL CUMULATIVE IMPACTS

As identified and assessed in Chapter 8, the development of the grid connection infrastructure for the authorised Namas Wind Farm may have effects (positive and negative) on natural resources, the social environment and on the people living in a project area. The preceding impact assessment chapter has reported on the assessment of the impacts associated with the grid connection infrastructure for the Namas Wind Farm largely in isolation (from other similar developments).

This chapter assesses the potential for the impacts associated with the grid connection infrastructure for the Namas Wind Farm to become more significant when considered in combination with the other known or proposed projects within the area.

9.1. Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter of the final BA report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of basic assessment reports:

Requirement	Relevant Section
3(j)(i) an assessment of each identified potentially significant impact and risk, including cumulative impacts.	The cumulative impacts associated with the development of the grid connection infrastructure for the Namas Wind Farm are included and assessed within this chapter.

9.2. Approach taken to Assess Cumulative Impacts

The cumulative impacts of the proposed grid connection infrastructure for the Namas Wind Farm have been assessed through the consideration of other wind energy facilities and their associated grid connection infrastructure, as the grid connection infrastructure is associated infrastructure to the wind energy facilities and related to the larger projects[22].

The cumulative impacts that have the potential to be compounded through the development of the grid connection infrastructure in proximity to other similar developments include impacts such as those listed below. The role of the cumulative assessment is to test if such impacts are relevant to the grid connection infrastructure:

- Unacceptable loss of threatened or protected vegetation types, habitat or species through clearing, resulting in an impact on the conservation status of such flora, fauna or ecological functioning;
- Unacceptable risk to water features through disturbance associated with construction activities and increased runoff and erosion during the operation phase;
- Unacceptable risk to avifauna through disturbance and collision with the power line;

[22] The assumption is made that without the wind energy facilities, there will be no need for the grid connection infrastructure.

- Unacceptable loss of high agricultural potential areas presenting a risk to food security and increased soil erosion;
- Unacceptable loss of heritage resources (including palaeontological and archaeological resources);
- Complete or whole-scale change in sense of place and character of an area and unacceptable visual intrusion; and
- Unacceptable impact to socio-economic factors and components.

It is important to explore the potential for cumulative impacts as this will lead to a better understanding of these impacts and the potential for mitigation that may be required. The scale at which the cumulative impacts are assessed is important. For example, the significance of the cumulative impact on the regional or national economy will be influenced by grid connection infrastructure development throughout South Africa, while the significance of the cumulative impact on visual amenity may only be influenced by grid connection infrastructure developments that are in close proximity to each other and in close proximity to the viewer. For practical purposes a sub-regional scale of 30km has been selected for this cumulative impact evaluation.

The grid connection corridor assessed for the grid connection infrastructure for the Namas Wind Farm is located within a Renewable Energy Development Zone (REDZ) (i.e. the Springbok REDZ), and a Strategic Transmission Corridor (i.e. the Northern Transmission Corridor). These areas form part of the areas identified by the DEA as geographical areas of strategic importance for the development of commercial renewable energy developments (REDZ) and large scale grid infrastructure development projects (transmission corridors). Therefore, these areas are considered as nodes for the development of renewable energy and grid infrastructure projects.

Figure 9.1 indicates the location of other known and viable (i.e. projects in process and with a valid Environmental Authorisation) wind energy developments and associated grid connection infrastructure, as well as existing grid infrastructure located within a radius of 30km from the grid connection corridor. The renewable projects were identified using the Department of Environmental Affairs Renewable Energy Database and current knowledge of projects being proposed in the area. Details of these projects are provided in **Table 9.1.** All projects being considered have received approval from the Department of Environmental Affairs[23]. The potential for cumulative impacts is summarised in the sections that follow and has been considered within the specialist studies (refer to **Appendices D – I**).

Table 9.1: Wind farms located within the broader area (within a 30km radius) of the Namas Wind Farm and the grid connection corridor assessed as part of the project

Project Name	Capacity	Location from the grid connection corridor	Project Status
Eskom Kleinzee Wind Farm	300MW	Adjacent to the west	Authorised
Genesis Zonnequa Wind Farm	140MW	Directly adjacent to the north	Authorised
Juwi Kap Vley Wind Farm	up to 300MW	Directly adjacent to the south and east	Authorised

[23] Applications for Environmental Authorisation for numerous grid connection and renewable energy projects have been undertaken within the area, however some of these applications have lapsed and are no longer considered to be valid and are therefore not considered as part of the cumulative impact assessment.

Other than the grid connection infrastructure associated with the wind farms included in the table above there is existing and proposed national grid infrastructure located within the 30km radius from the grid connection corridor assessed as part of this project. These include:

Project Name	Capacity	Location from the grid connection corridor	Project Status
Gromis Substation	220kV	Northern end of the corridor	Existing Eskom Substation
Juno Gromis power line[24].	400kV	Parallel and directly adjacent to the east of the corridor	Authorised, to be constructed
Kleinzee Substation	66kV	To the west of the corridor and located within the town of Kleinsee	Existing Eskom Substation
Kommagas Substation	66kV	To the east of the corridor	Existing Eskom Substation
Kommagas Sandveld power line	66kV	Traverses the southern section of the corridor	Existing Eskom Power Line
Koingnaas Sandveld power line	66kV	To the west of the corridor	Existing Eskom Power Line
Gromis Kleinzee power line	66kV	To the north west of the corridor	Existing Eskom Power Line
Gromis Nama power line	220kV	To the east of the corridor	Existing Eskom Power Line
Gromis Oranjemund power line	220kV	Northern end of the corridor	Existing Eskom Power Line

It should be noted that not all the renewable energy projects and associated grid infrastructure projects presently under consideration by various developers will be built for operation. Not all proposed developments will be granted the relevant permits by the relevant authorities (DEA, DOE, NERSA and Eskom) due to the following reasons:

- There may be limitations to the capacity of the existing or future Eskom grid;
- Not all applications will receive a positive environmental authorisation;
- There are stringent requirements to be met by applicants in terms of the REIPPP Programme and a highly competitive process that only selects the most competitive projects;
- Not all proposed renewable energy projects will be able to reduce the associated negative impacts to acceptable levels or be able to mitigate the impacts to acceptable levels (fatally flawed);
- Not all proposed renewable energy projects will eventually be granted a generation license by NERSA and sign a Power Purchase Agreement with Eskom; and
- Not all developers will be successful in securing financial support to advance their projects further.

As there is, therefore, a level of uncertainty as to whether all the above-mentioned grid connection infrastructure will be implemented, this results in it being difficult to quantitatively assess the potential

[24] The proposed double-circuit 132kV power line will be developed directly adjacent and parallel to the Juno Gromis 400kV power line to be constructed.

cumulative impacts. The cumulative impacts of the other known grid infrastructure and renewable energy projects in the broader area are, however, qualitatively assessed in this Chapter. The following potential impacts are considered:

- Cumulative impacts on ecological processes
- Cumulative impacts on avifauna
- Cumulative impacts on soil and agricultural potential
- Cumulative impacts on heritage resources
- Cumulative visual impacts
- Cumulative socio-economic impacts

In the sections below the potential for cumulative impacts resulting from the development of grid connection infrastructure within a 30km radius of the assessed grid connection corridor for the Namas Wind Farm are explored.

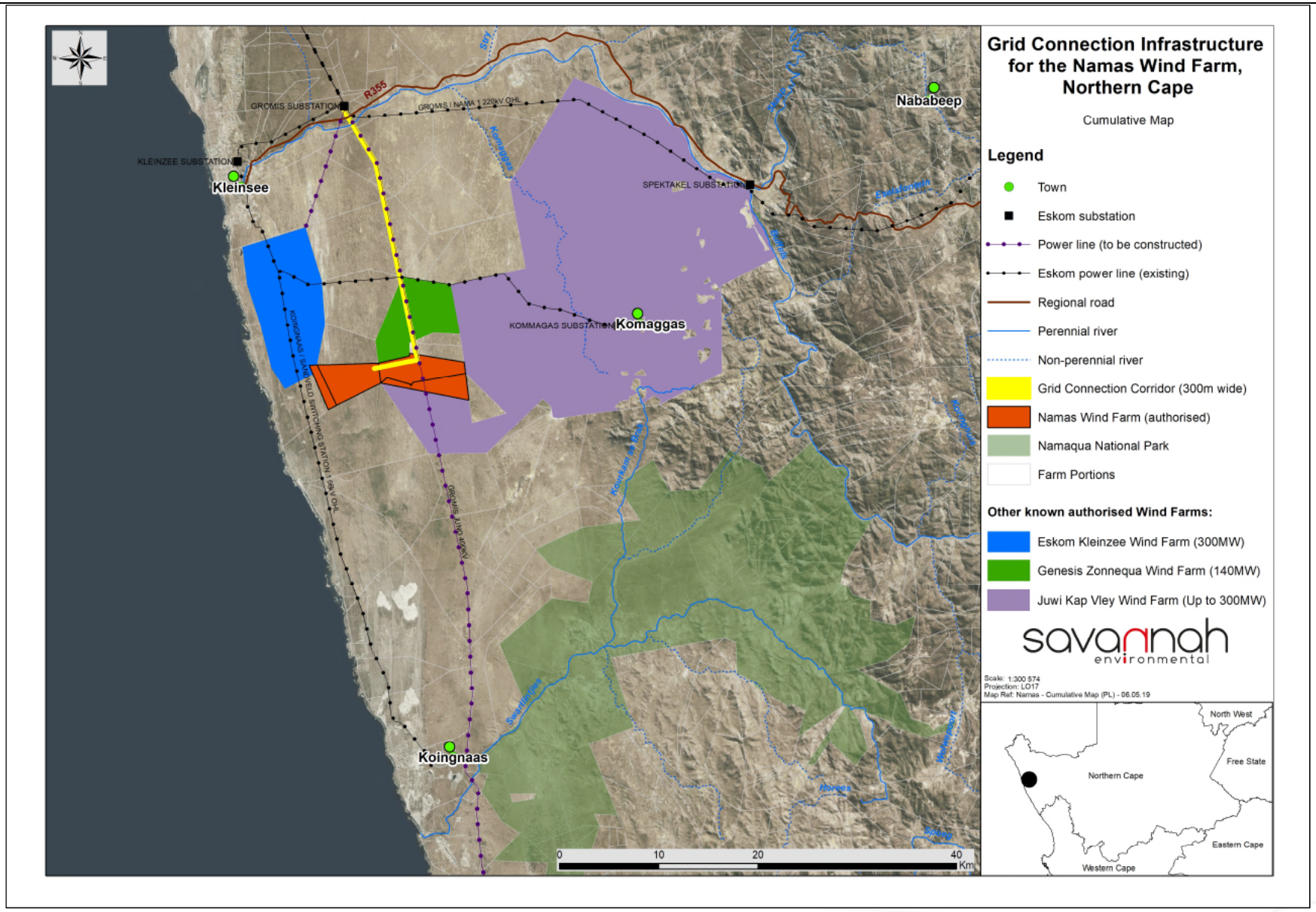

Figure 9.1: Cumulative map for the grid connection infrastructure for the Namas Wind Farm

9.3. Cumulative Impacts on Ecological Processes

From an ecological perspective, and considering the area, the main cumulative impact will be habitat loss and an impact on the ecological functioning of the area due to the development of grid connection infrastructure associated with numerous wind farms within the area. The impacts will occur due to the construction and operation of the wind energy facilities. This impact will also be applicable to national grid infrastructure being developed within the area.

The development of the grid connection infrastructure for the Namas Wind Farm will result in approximately 10ha of habitat loss and fragmentation of the receiving environment. In addition, there are three other planned wind farms in the wider area with associated grid connections. Although each may generate an acceptable, low impact when considered alone, this does not account for the potential for cumulative impacts to generate significant impacts on fauna and flora as well as future conservation-use options for the wider area. Although the affected vegetation types are not listed ecosystems, they are not well protected. With mitigation, this impact is likely to be of a low significance.

Nature: *Cumulative impact of habitat loss and on ecological functioning*
The development of the grid connection infrastructure for the Namas Wind Farm will potentially contribute to cumulative habitat loss and other cumulative impacts in the wider Kleinsee-coastal plain area.

	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low(3)	Medium (4)
Probability	Improbable (2)	Probable (3)
Significance	**Low (16)**	**Low (27)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources?	Low	Low
Can impacts be mitigated?	Yes, to a large degree, but through direct avoidance (with little other avenue for mitigation	

Mitigation:
- Promote sustainable land use practices in the area and especially on the wind farm properties to improve the quality of the habitat for fauna and flora.
- Ensure that the alien management plan and erosion management plan are effectively implemented for the grid connection infrastructure.

9.4. Cumulative Impacts on Avifauna

Cumulative impacts from an avifauna perspective are those impacts that will affect the general avian communities in and around the grid connection corridor due to the combined cumulative effect of all the grid infrastructure developments located within the areas. These impacts will be due to collision, avoidance and displacement. The main species of concern from a cumulative perspective are bustards.

With the development of the proposed double-circuit power line in consideration with other power lines operating within the area it is expected that a total of 99 red data bustards will be killed per year. The proposed double-circuit 132kV power line is estimated to kill ~10.4 bustards per year. Without the implementation of appropriate mitigation measures the chances of bustard mortality will increase greatly.

It is estimated that during high rainfall years about 100 bustard fatalities may occur annually based on average South African fatality rates. Nevertheless, where adjacent power lines can be aligned and the towers/pylons staggered to reduce avian mortalities, the development of the grid connection infrastructure is considered to be acceptable. This must be accompanied by a full 12-24 months of systematic post-construction monitoring by competent ornithologists familiar with the area. This will determine the efficacy of the mitigations and provide input to any further mitigations required if problems arise.

Nature: *Negative cumulative impacts on avifauna due to disturbance, displacement and collision*
The impact of the grid connection infrastructure (including a double-circuit 132kV power line and collector substation) in the coastal Nama Karoo is expected to be generally negative and arise from disturbance, and collision for birds around power lines. The associated infrastructure will also affect species in the form of impacts with un-marked power lines. It will simultaneously provide nesting sites for some avian species (crows, kestrels and goshawks).

An estimated 99 bustards are expected to be killed annually considering the power lines of the area (raptor fatalities could not be gauged). Careful mitigation can reduce this high mortality to low levels.

	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Low (1)	Medium (3)
Duration	Long-term (4)	Long-term (4)
Magnitude	High (8)	High (9)
Probability	Probable (4)	Likely (4)
Significance	**Medium-High (52)**	**High (64)**
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources?	Likely	Likely
Can impacts be mitigated?	Yes, probably	

Mitigation:
Reducing avian impacts at power lines can be achieved several ways. The recommended measures include:
- aligning the proposed power line with the existing line where it spans the Buffels River and installing bird diverters to the earth wire in the high risk area;
- avoiding all medium-risk areas (wherever possible); or
- marking all new overhead power lines with bird diverters and
- staggering the power line towers/pylons, along parallel lines to increase visibility in order to reduce the risk of large-bird collisions.

9.5. Cumulative Impacts on Land Use, Soil and Agricultural Potential

The most significant cumulative impact from a soils perspective will be the effects of wind erosion. When considering the impact of wind erosion solely within the Namas Wind Farm project site and the associated grid connection corridor, the impact is identified as having a medium extent with a permanent duration without the implementation of appropriate mitigation measures. With the implementation of the appropriate mitigation measures the impact will have a low extent with a short-term duration.

When considering the other wind farm developments (and the associated grid infrastructure) within the surrounding area, it is assumed that the impact of erosion and appropriate mitigation measures at a site-specific level have been considered and the mitigation measures recommended are sufficient for the

management and mitigation of erosion. Therefore, considering that the impact of erosion at each facility (including grid infrastructure) will be low in extent, subject to the implementation of the recommended mitigation measures, and managed separately, the cumulative impact for erosion is considered to be low. Under these circumstances, the loss of soils associated with erosion is therefore considered to be acceptable loss, without detrimental consequences.

It must be noted that, if there is large scale development of wind energy facilities (and the associated grid connection infrastructure) in the area, any failure to prevent wind erosion of topsoil on one project or within the grid connection infrastructure servitude could lead to that material being deposited on any or all neighbouring properties.

A residual risk associated with the cumulative impacts is a significant risk of accelerated soil erosion by wind, should mitigation measures not be applied correctly.

Regarding loss of agricultural potential, the prevailing natural resources (mainly climate, but also soil) mean that the level of potential is very low, so that there will be little or no significant cumulative impacts on agricultural potential.

Nature: *Cumulative wind erosion impacts*
The main cumulative impact expected to occur with the development of the grid connection infrastructure for the Namas Wind Farm is wind erosion.

	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Low (1)	Low (2)
Duration	Short term (2)	Short term (2)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (10)**	**Low (12)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

- Minimise the footprint of construction as much as possible.
- Where soil is removed/disturbed, ensure it is stored for rehabilitation and re-vegetated as soon as possible.
- Implement all appropriate soil conservation measures, including contouring, culverts etc. (for road construction), geotextiles and slope stabilisation (for all infrastructure).
- Ensure that equal responsibility and co-operation is accepted if more than one facility will be using the same access road, or if the possibility exists of sediment transfer (by wind or water) from one area to another.

9.6. Cumulative Impacts on Heritage (including archaeology, palaeontology and cultural landscape)

Cumulative Impacts to palaeontology are likely to be of low significance because of the generally sparse distribution of fossils in the broader landscape. With mitigation the significance is reduced because of the positive aspect of rescuing scientific samples and the retrieval of data. Nevertheless, negative impacts will continue to accumulate when numerous projects commence with construction.

The development of many renewable energy projects and grid connection infrastructure in the area could result in the loss of many archaeological sites. Although data from coastal and near-coastal archaeological sites is sufficiently available, the loss of many sites further away from the coast where most energy-related developments are planned could result in significant cumulative impacts if no mitigation is carried out. It is also notable that the density of archaeological sites reduces away from the coast with impacts becoming consequently less likely. Although impacts to individual archaeological sites are still negative after mitigation, if many sites are sampled over multiple renewable energy projects (including the associated grid connection infrastructure) then a positive cumulative impact could be realised because of the advance of scientific knowledge that may result from the mitigation work.

Because graves are very sparsely distributed, very few get impacted. This means that cumulative impacts are of low significance.

Several other wind farms (including the grid connection infrastructure) have been proposed in the region but clustering of impacts is more desirable than spreading them widely from a cultural landscape perspective. Although cumulative impacts are likely to occur, having them concentrated reduces their significance. Also, the area is a declared REDZ and also falls within the northern Strategic Transmission Corridor which means that clustering of energy-related developments here will help reduce impacts in other areas and the associated cultural landscapes.

Overall the impacts to all heritage for the proposed grid connection infrastructure alone are considered to be of low significance, while impacts when considering all proposed projects would calculate to a medium significance. Because of the diversity of heritage resources, the effectiveness of mitigation measures is likely to be variable with archaeology and graves being the easiest to successfully mitigate. Effective mitigation of palaeontology relies on the reporting of fossils found during earthworks. While it is impossible to hide the grid connection infrastructure in the landscape, a small degree of mitigation can be effective through the application of best practice measures such as the rehabilitation of disturbed areas not required for the operation phase.

Nature: *Cumulative heritage impacts*
Direct impacts to fossils, archaeology and graves during construction work and direct impacts to the landscape through the introduction of generally incompatible electrical infrastructure (i.e. double-circuit power line and collector substation).

	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (1)	Local (3)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (2)	Moderate (5)
Probability	Highly probable (4)	Definite (5)
Significance	**Low (28)**	**Medium (60)**
Status (positive or negative)	Negative (but with some positive aspects after mitigation)	Negative (but with some positive aspects after mitigation)
Reversibility	Low for some aspects and high for others	Low for some aspects and high for others
Irreplaceable loss of resources?	Yes for some aspects and no for others	Yes for some aspects and no for others
Can impacts be mitigated?	Yes for some aspects and no for others	

Mitigation:

» Monitoring of all construction-phase excavations by project staff and ECO.
» Inspection, sampling and recording of selected exposures in the event of fossil finds.
» Reports and fossils deposited in scientific institution.
» A walk down survey of the final authorised double-circuit 132kV power line alignment and collector substation location must be undertaken.
» Any mitigation still required should be implemented prior to construction.
» Rescue of graves found during construction.
» Rehabilitation of any disturbed areas not in use during operation and any other measures as listed in the Visual Impact Assessment.

9.7. Cumulative Visual Impacts

The construction of the grid connection infrastructure for the Namas Wind Farm will increase the cumulative visual impact of industrial type infrastructure within the region. There will also be an impact on the visual quality of the landscape.

On the other hand the location of the double-circuit 132kV power line adjacent to the (much larger) authorised Gromis Juno 400kV power line (yet to be constructed) is expected to mitigate the potential visual impact to some degree, or at the very least, the smaller double-circuit 132kV power line is not expected to aggravate the visual impact.

The anticipated cumulative visual impact of the proposed power line is expected to be of medium significance, which is considered to be acceptable from a visual perspective. This is once again due to the relatively low viewer incidence within close proximity to the proposed alignment and the presence of the existing mining activities and electricity infrastructure.

Nature: *Potential cumulative visual impacts*
The potential cumulative visual impact of the grid connection infrastructure on the visual quality of the landscape.

	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	High (8)
Probability	Improbable (2)	Probable (3)
Significance	**Low (28)**	**Medium (42)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable (3)	Recoverable (3)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented.	

Mitigation:

Planning:

» Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint/servitude.

Operation:

» Maintain the general appearance of the servitude as a whole.

Decommissioning:

» Remove infrastructure not required for the post-decommissioning use.
» Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.

9.8. Cumulative Socio-Economic Impacts

Both positive and negative cumulative socio-economic impacts are expected to occur. The positive cumulative impacts include job creation and economic stimulus and GDP growth, while the negative cumulative impacts include a potential increase in crime and an influx of migrant labour and job seekers. The positive cumulative impacts associated with the grid connection infrastructure will be of a low negligible significance and are not considered to be meaningful for the assessment of cumulative impacts. As such no impact table for the positive cumulative socio-economic impacts is included below.

The only impact of concern is the potential influx of migrant labour and job seekers to the area if the various renewable energy projects (and the associated grid connection infrastructure) are to be developed at the same time. This may likely result in an influx of people that the local communities will not be able to absorb or the local government would not be able to manage adequately, considering the potential increase in demand for various services (accommodation, utilities, etc.), as well as the potential increase in social ills that are generally associated with an influx of male-dominated workers located far away from their families.

Considering that the area has been designated as a Renewable Energy Development Zone (REDZ), and is also located within the northern corridor of the Strategic Transmission Corridors, it is highly likely that it will see heightened development in the future irrespective of whether the proposed double-circuit 132kV power line and collector substation are developed or not. This means that the issue of in-migration into the area will likely be notable, but the proposed project is unlikely to have a significant influence on this trend alone and will not unacceptably increase the impact or result in an unacceptable risk or loss of resources. The impact cannot be reversed completely, as some of the workers may decide to remain in the area in the hope of finding employment opportunities at other projects that may be developed in the future.

Nature: *Socio-economic cumulative impacts* Influx of migrant labour and job seekers due to job opportunities presented by numerous projects may lead to an increase in social ills. A potential residual risk is that job seekers may remain in search of other opportunities in the area.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Regional (3)	Regional (3)
Duration	Very short-term (2)	Medium-term (3)
Magnitude	Negligible (0)	High (8)
Probability	Very improbable (1)	Highly probable (4)
Significance	**Low (5)**	**Medium (56)**
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation/Enhancement: » Engage with other project developers and prominent community members, including West Coast Resources, the Local Municipality, etc. to form a forum to discuss the concerns and possible mitigation measures that could be introduced collectively to manage the potential adverse effects of in-migration, and to plan and deal with other potential negative consequences, as well as to discuss opportunities to develop the local communities.		

9.9. Conclusion regarding Cumulative Impacts

Cumulative impacts are expected to occur with the development of the grid connection infrastructure for the Namas Wind Farm throughout all phases of the project life cycle and within all areas of study considered as part of this BA report. The main aim for the assessment of cumulative impacts considering the development of the grid connection infrastructure for the Namas Wind Farm is to test and determine whether the development will be acceptable within the landscape proposed for the development, and whether the loss, from an environmental and social perspective, will be acceptable without whole-scale change.

All cumulative impacts associated with the grid connection infrastructure for the Namas Wind Farm will be of a medium or low significance, with only one impact identified as being of a high significance which relates to the mortality of bustards along the double-circuit power line. A summary of the cumulative impacts are included in **Table 9.2** below.

Table 9.2: Summary of the cumulative impact significance of the grid connection infrastructure for the Namas Wind Farm within the assessed grid connection corridor

Specialist assessment	Overall significance of impact of the proposed project considered in isolation	Cumulative significance of impact of the project and other projects in the area
Ecology	Low	Low
Avifauna	Medium-High	High
Land use, soil and agricultural potential	Low	Low
Heritage (archaeology, palaeontology and cultural landscape)	Low	Medium
Visual	Low	Medium
Socio-Economic	Low	Medium

The main aim for the assessment of cumulative impacts considering the grid connection infrastructure for the Namas Wind Farm is to test and determine whether the cumulative development will be acceptable within the landscape proposed for the development, and whether the cumulative loss, from an environmental and social perspective, will be acceptable without whole-scale change. The following can be concluded regarding the cumulative impacts of the grid connection for the Namas Wind Farm:

- ***Ecological processes:*** Cumulative impacts on habitat and ecological functioning will be of a low significance. There will be no unacceptable loss of habitat or impact to ecological functioning due to the development of the proposed project and other wind energy facilities and associated grid infrastructure developments within the surrounding area.
- **Avifauna:** Cumulative impacts as a result disturbance, displacement and collision ranges from medium-high to high significance. There will be no unacceptable risk to avifauna or loss of avifauna species due to the proposed project and other wind energy facilities and associated grid infrastructure developments within the surrounding area, subject to the implementation of the recommended mitigation measures.
- **Soils and Agricultural Potential:** Cumulative impacts in terms of soil erosion will be of a low significance. There will be no unacceptable loss of soil resources or increased soil erosion associated with the development of the proposed project and other wind energy facilities and associated grid infrastructure developments within the surrounding area.

- **Heritage (including archaeology, palaeontology and the cultural landscape):** Cumulative impacts on heritage resources relate to direct impacts to heritage resources and the introduction of generally incompatible electrical infrastructure into the landscape. The significance of the cumulative impacts will be medium. There will be no unacceptable loss of heritage resources associated with the proposed project and other wind energy facilities and associated grid infrastructure developments within the surrounding areas.
- **Visual:** Cumulative visual impacts relate to a change in the visual quality of the landscape. The significance of the visual cumulative impacts will be medium. There will be no unacceptable impact on the visual quality of the landscape associated with the proposed project and other wind energy facilities and associated grid infrastructure developments within the surrounding areas.
- **Social:** Both positive and negative social cumulative impacts have been identified. The positive impacts will be negligible and will relate to positive economic impacts and job creation and the negative impacts relate to an increase in crime and an influx of migrant labour and job seekers. There will be no unacceptable risk or impacts to the social aspects and characteristics of the town of Kleinsee with the development of the proposed project and other wind energy facilities and associated grid infrastructure developments within the surrounding area. The significance of the cumulative impacts will be medium.

Based on the specialist cumulative assessment and findings, the development of the grid infrastructure for the Namas Wind Farm and its contribution to the overall impact of all wind energy facilities and associated grid infrastructure to be developed within a 30km radius, it can be concluded that the contribution of the project to cumulative impacts will be of a low to high significance depending on the impact being considered. There are, however, no impacts or risks identified to be considered as unacceptable with the development of the proposed grid connection infrastructure within the assessed grid connection corridor. In addition, no impacts that will result in whole-scale change are expected to occur.

CHAPTER 10: CONCLUSIONS AND RECOMMENDATIONS

Genesis Namas Wind (Pty) Ltd proposes the construction and operation of a grid connection solution for the authorised Namas Wind Farm, near Kleinsee, Northern Cape Province. In order for the Namas Wind Farm to evacuate the wind generated power to the national grid, a connection comprising the following infrastructure must be established between the wind farm and the grid connection point:

- a collector substation (known as the Rooivlei Substation);
- a double-circuit 132kV power line (known as the Rooivlei-Gromis 132kV double-circuit power line); and
- associated infrastructure including access tracks/roads, administrative buildings and laydown areas.

A corridor 300m wide and 32km long is being assessed to allow for the optimisation of the grid connection infrastructure layout and to accommodate environmental sensitivities. The grid infrastructure (including the power line and collector substation) will be developed within the assessed 300m wide corridor (known as the grid connection corridor).

The full length of the assessed 300m wide corridor traverses eleven affected properties, namely:

- Portion 3 of the Farm Zonnekwa 328
- Portion 2 of the Farm Zonnekwa 328
- Portion 1 of the Farm Zonnekwa 326
- Remaining extent of the Farm Zonnekwa 326
- Remaining extent of the Farm Honde Vlei 325
- Remaining extent of the Farm Kannabieduin 324
- Remaining extent of the Farm Sand Kop 322
- Remaining extent of the Farm Mannels Vley 321
- Remaining extent of the Farm Dikgat 195
- Portion 15 of the Farm Dikgat 195
- Remaining Extent of Farm Rooivlei 327

It must be noted that the assessed corridor route is located directly adjacent and parallel to the approved (however, yet to be constructed) Eskom Gromis-Juno 400kV power line.

The grid connection infrastructure is considered as essential infrastructure to the authorised Namas Wind Farm in order to enable the operation of the facility within the project site which has been authorised for the development. The proposed grid connection infrastructure will be developed within the assessed grid connection corridor. The assessed grid connection corridor is located within the Springbok Renewable Energy Development Zone (REDZ), and within the northern corridor of the Strategic Transmission Corridors.

A summary of the recommendations and conclusions for the proposed project as determined through the BA process is provided in this Chapter.

10.1. Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter of the final BA Report includes the following information required in terms of Appendix 1: Content of basic assessment reports:

Requirement	Relevant Section
3(k) where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report	A summary of the findings of the specialist studies undertaken for the grid connection corridor has been included in section 10.2.
3(l) an environmental impact statement which contains (i) a summary of the key findings of the environmental impact assessment, (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	An environmental impact statement containing the key findings of the environmental impacts of the grid connection corridor has been included as section 10.5. An Environmental Sensitivity and Layout map of the grid connection infrastructure has been included as **Figure 10.1** which overlays the assessed grid connection corridor with the sensitive environmental features present within the corridor. A summary of the positive and negative impacts associated with the development of the grid connection infrastructure has been included in section 10.2.
3(n) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	All conditions required to be included in the Environmental Authorisation for the grid connection infrastructure have been included in section 10.6.
3(p) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	A reasoned opinion as to whether the grid connection infrastructure should be authorised has been included in section 10.6.

10.2. Evaluation of the grid connection infrastructure for the Namas Wind Farm

The preceding chapters of this report together with the specialist studies contained within **Appendices D-I** provide a detailed assessment of the potential impacts that may result from the development of the grid connection infrastructure for the authorised Namas Wind Farm. This chapter concludes the environmental assessment of the development of the grid connection infrastructure within the grid connection corridor by providing a summary of the results and conclusions of the assessment. In doing so, it draws on the information gathered as part of the BA process, the knowledge gained by the environmental specialists and the EAP, and presents a combined and informed opinion of the environmental impacts associated with the project.

No environmental fatal flaws were identified in the detailed specialist studies conducted, and no impacts of unacceptable significance are expected to occur with the implementation of the recommended mitigation measures. These measures include, amongst others, the avoidance of sensitive features and the undertaking of monitoring, as specified by the specialists.

The potential environmental impacts associated with the grid connection infrastructure identified and assessed through the BA process include:

» Impacts on ecology, flora and fauna.

- Impacts on avifauna.
- Impacts to soils and agricultural potential.
- Impacts on heritage resources, including archaeology and palaeontology.
- Visual impacts on the area as a result of the grid connection infrastructure.
- Socio- economic impacts.

10.2.1 Impacts on Ecology (Fauna and Flora)

The Ecological Impact Assessment (**Appendix D**) is based on the findings of two site visits undertaken within two different seasons and assessed the impact of the grid connection infrastructure on the sensitive ecological features present within the grid connection corridor for the life-cycle of the project. The assessment identified impacts within the construction, operation and decommissioning phases of the project.

During the construction phase (and the decommissioning phase) the impacts include impacts on vegetation and plant species of conservation concern, faunal impacts and an increased soil erosion risk. The significance of the construction phase and decommissioning phase impacts will be low with the implementation of the mitigation measures recommended by the specialist. No impacts of high significance were identified prior to the implementation of mitigation.

During the operation phase, the anticipated impacts include faunal impacts, impacts on ESAs, CBAs and broad-scale ecological processes and an increased soil erosion risk. The significance of the impacts for the operation phase will be low with the implementation of the mitigation measures recommended by the specialist. No impacts of a high significance were identified.

From the findings of the Ecological Impact Assessment it can be concluded that the grid connection corridor assessed for the development of the grid connection infrastructure is of low ecological sensitivity. As a result, there are no specific long-term impacts associated with the grid connection infrastructure that cannot be reduced to an acceptable level through mitigation and avoidance. There are no high residual impacts or fatal flaws associated with the development and it can be supported from a terrestrial ecology perspective. The specialist has indicated that the grid connection infrastructure for the Namas Wind Farm should be authorised, from an ecological perspective, and subject to the implementation of the recommended mitigation measures.

10.2.2 Impacts on Avifauna

The Avifauna Impact Assessment (**Appendix E**) is based on the findings of the long-term avifauna pre-construction monitoring campaign undertaken for the authorised Namas Wind Farm (from June 2017 to March 2018). The avifauna impacts identified to be associated with the grid connection infrastructure will be negative and local in extent. The duration of the impact will be long-term, for the lifetime of the grid connection infrastructure, for all collision-prone species, however the significance of the impact can be reduced. The magnitude of the impact expected with the development of the grid connection infrastructure will be medium to high, specifically for bustards and raptors. The probability that interaction between the grid infrastructure and raptors and bustards will occur is considered to be probable, due to the passage rates and occurrence of the species along the grid connection corridor.

During the construction phase a negative impact on red-listed bird groups is expected to occur, which specifically relates to the avoidance of the area due to human activity, noise and predation threat. The significance of the impact will be medium prior to mitigation, but can be reduced to a low significance with the implementation of the recommended appropriate mitigation measures. No impacts of a high significance are expected during the construction phase.

Impacts on avifauna during the operation phase of the grid connection infrastructure will be negative and includes the mortality of birds due to direct impact with the infrastructure and the avoidance of the area due to the presence of the double-circuit 132kV power line. The nomadic Ludwig's and Kori Bustards are the most likely to be impacted by overhead power lines, while the Secretarybird and possibly other collision-prone raptors such Black Harriers may be impacted. The significance of the operation phase impact will be reduced to medium with the implementation of the recommended design mitigation measures for the construction of the double-circuit power line. No avifauna impacts of a high significance are expected during the operation phase.

Within the grid connection corridor only one area of high avifauna sensitivity was identified. From the results of the avifauna assessment, it can be concluded that with the implementation of the recommended mitigation measures, the risks and mortalities expected with the development of the grid connection infrastructure can be reduced to acceptable levels. No long-term impacts of a high significance are expected and no fatal flaws were identified from an avifauna perspective. The specialist has indicated that the grid connection infrastructure for the Namas Wind Farm should be authorised, and subject to the implementation of the recommended mitigation measures.

10.2.3 Impacts on Soil and Agricultural Potential

The Soils and Agricultural Potential Impact Assessment (**Appendix F**) assessed the impact of the grid connection infrastructure on soil resources within the grid connection corridor for the life-cycle of the project, and identified two impacts; these include the loss of potentially productive agricultural land and increased soil erosion by wind due to disturbance of the soil. Both impacts are expected during the construction and operation phases, and can be mitigated to be within low and acceptable levels of impact considering the characteristics and potential of the soils present within the grid connection corridor and the lack of productive agricultural land. No fatal flaws have been identified from a soils and agricultural potential perspective. Therefore, the specialist has indicated that the development of the grid connection infrastructure for the Namas Wind Farm is considered to be acceptable from a soils and agricultural perspective.

10.2.4 Impacts on Heritage Resources (including archaeology and palaeontology)

The Heritage Impact Assessment (**Appendix G**) assessed the impact of the grid connection infrastructure on the heritage features (archaeology, palaeontology and cultural landscape) associated with the assessed grid connection corridor. The heritage impacts expected during the construction phase include impacts to palaeontological resources, archaeological resources and graves. Impacts to the cultural landscape would occur during all phases of the project.

Palaeontological materials were not observed along the grid connection corridor but isolated fossil bones could occur within the various sand formations of the area. The corridor does include a number of

archaeological sites and some may require sampling if they are to be disturbed. Impacts to isolated fossils and unmarked graves are possible but cannot be predicted. No other significant impacts are expected.

In terms of the cultural landscape, impacts would be associated with the presence of incompatible features in the landscape (i.e. the double-circuit power line and collector substation) and from the clearing of natural vegetation for the service road and substation.

No fatal flaws have been identified from a heritage perspective. The significance of the impacts will be low, with the implementation of the recommended mitigation measures. No heritage impacts of high significance are expected, and the development of the grid connection infrastructure is considered to be acceptable, subject to the implementation of the recommendations made by the specialist.

10.2.5 Visual Impacts

The Visual Impact Assessment (**Appendix H**) identified negative impacts on visual receptors during the construction and the operation phases of the grid connection infrastructure for the Namas Wind Farm. The impacts include visual impacts due to construction activities, as well as impacts on sensitive visual receptors located within 0.5km to 3km from the grid connection infrastructure, as well as a visual impact on the sense of place. The Visual Impact Assessment concluded that the visual impact of the grid connection infrastructure would be most significant within a 0.5km radius from the infrastructure. The significance of the impacts will, however, be low, with the implementation of the recommended mitigation measures. No impacts of a high significance are expected to occur.

The specialist indicated that the development of the grid connection infrastructure is supported from a visual perspective, subject to the implementation of the recommended mitigation measures.

10.2.6 Socio-Economic Impacts

The Socio-economic Impact Assessment (**Appendix I**) identified that majority of the social impacts associated with the development of the grid connection infrastructure will have a very short-term duration associated with the construction and decommissioning phases, and long-term duration during the operation phase. Only positive impacts have been identified for both the construction and operation phases of the grid connection infrastructure.

During the construction phase the significance of the positive impacts can be enhanced to be of a medium significance. The impacts will however be of a very short duration. During the operation phase the significance of the positive impacts will be low with the implementation of the recommended enhancement measures. The significance of the impacts expected during the decommissioning phase will be medium, with the implementation of the recommended enhancement measures, but will however be of a very short duration.

Overall, the development of the grid connection infrastructure will be associated with positive socio-economic impacts of medium significance during the construction, operation and decommissioning phases. Best practice measures for the project must be implemented in all phases.

10.2.7 Assessment of Cumulative Impacts

The cumulative impacts of the grid connection infrastructure for the Namas Wind Farm and other known grid infrastructure and renewable energy projects in the broader area have been qualitatively assessed. There are three renewable energy developments within a 30km radius, as well as a number of existing power lines and substations.

The assessed grid connection corridor is located within a Strategic Transmission Corridor (i.e. the Northern Transmission Corridor, as well as a Renewable Energy Development Zone (REDZ) (i.e. the Springbok REDZ). These areas form part of the areas identified by the DEA as geographical areas of strategic importance for the development of commercial renewable energy developments (REDZ) and large scale grid infrastructure development projects (power transmission corridors). Therefore the area is considered to be a node for the development of renewable energy and grid infrastructure.

Table 10.1 provides a summary of the findings of the cumulative impact assessment undertaken by the various specialists (refer to Chapter 9 for more details).

Table 10.1: Summary of the cumulative impact significance for the grid connection infrastructure for the Namas Wind Farm

Specialist assessment	Overall significance of impact of the proposed project considered in isolation	Cumulative significance of impact of the project and other projects in the area
Ecology	Low	Low
Avifauna	Medium-High	High
Land use, soil and agricultural potential	Low	Low
Heritage (archaeology, palaeontology and cultural landscape)	Low	Medium
Visual	Low	Medium
Socio-Economic	Low	Medium

Based on the specialist cumulative assessment and findings, the development of the grid infrastructure for the Namas Wind Farm and its contribution to the overall impact of all wind energy facilities and associated grid infrastructure to be developed within a 30km radius, it can be concluded that the contribution of the project to cumulative impacts will range from low significance to high significance, depending on the impact being considered. There are, however, no identified impacts considered as presenting an unacceptable risk. In addition, no impacts that will result in whole-scale change are expected.

10.2.8 Consideration of Alternatives

Two grid connection options exist within the assessed corridor, namely:

» A direct connection from the proposed Rooivlei Substation to the existing Gromis Substation located ~26km from the northern boundary of the Namas Wind Farm project site. This is considered to be the preferred option from a technical perspective due to the fact that the Gromis Substation is already existing.

» A direct connection from the Rooivlei Substation to a proposed collector substation (known as the Strandveld Substation) which forms part of the Zonnequa Wind Farm grid connection solution[25]. The Strandveld Substation is located ~6km from the northern boundary of the Namas Wind Farm project site. This option is only viable should the Zonnequa Wind Farm be developed.

These two options were considered as part of this BA process and fall within the assessed grid connection corridor. Both options for connecting the authorised Namas Wind Farm to the national grid are considered to be acceptable from an environmental perspective considering the sensitive environmental features present. Considering the fact that both options are acceptable from a bio-physical and social perspective, the technically preferred option will be nominated as the preferred option for the development of the grid connection infrastructure for the Namas Wind Farm. The preferred option is therefore the direct connection of the collector substation to the existing Gromis Substation.

10.3. Environmental Sensitivity of the Assessed Grid Connection Corridor

From the specialist investigations undertaken for the grid connection infrastructure, the following sensitive areas/environmental features have been identified and demarcated within the grid connection corridor (refer to **Figure 10.1**, **Appendix K**). The high sensitivity features would need to be considered by the developer for the location of the grid connection infrastructure within the assessed grid connection corridor.

» **Ecology**
The most sensitive ecological feature present within the grid connection corridor is the Buffels River, located within the northern portion of the corridor. This sensitive feature has been identified as being of a very high ecology sensitivity (no-go), however the specialist has indicated that with the spanning of the double-circuit power line over the River (i.e. no power line towers placed within the River) the feature may be traversed.

Areas of medium ecological sensitivity, associated with dunes and calcrete areas are present within the northern and southern sections of the grid connection corridor. Areas of low sensitivity, associated with plains are present throughout the entire extent of the grid connection corridor. The proposed collector substation will be located within the plains habitat.

Areas that have been transformed due to existing disturbance have also been identified. These areas are considered to carry very little ecological value due to the disturbance. The transformed areas are mainly located within the northern section of the corridor and are associated with the existing Gromis Substation, mining activities and the R355 Regional Road.

» **Avifauna**
Areas of high and medium sensitivity were identified along the power line corridor. One area of high sensitivity was identified within the northern section of the corridor. Black Harriers occur and breed

[25] The grid connection infrastructure for the Zonnequa Wind Farm is being assessed as part of a separate Basic Assessment Process.

along the Buffels River and birds probably forage along the river margins. A harrier nest occurs at S29°34'21.44" E17°17'39.63", 11 km east of the corridor. Wetland birds typically fly along river lines and therefore may be impacted on by power lines strung over the wetland features. In more recent field work at the Buffels River crossing a collision-prone African Harrier Hawk *Polyboroides typus* was recorded in the river and a Vulnerable Lanner Falcon *Falco biarmicus* was seen on a power line tower 350m from the river. Therefore, the crossing here is deemed a high-risk area. The specialist has indicated that the power line towers of the proposed double-circuit 132kV power line and the Eskom Gromis Juno 400kV power line (to be constructed) must be staggered which will increase the visibility of the infrastructure for birds and reduce the significance of the operation phase impacts to medium.

Areas of medium sensitivity were identified within the southern section of the corridor. These areas include sections of the corridor where Secretarybirds were observed circling and in courtship flight and a red-data Lanner Falcon was also recorded. Regarding the observations of the Secretarybirds in flight, the specialist has noted that this is not considered to be an issue given that the proposed double-circuit power line will be located parallel to an Eskom 400kV power line (to be constructed), which will increase the visibility of both lines.

» **Heritage**
Known archaeological sites have been identified within and adjacent to the grid connection corridor. A buffer of 50m was set from the waypoint in order to allow for the area of the site plus a 30m buffer zone. Where infringement of the grid connection infrastructure may occur on these sites a permitting process for the removal of the sites will need to be undertaken.

10.4. Environmental Costs of the grid connection infrastructure versus Benefits of the grid connection infrastructure

No fatal flaws have been identified. Environmental costs (including those to the natural, economic and social environment) can, however, be anticipated at a local and site-specific level, and are considered acceptable provided the mitigation measures as outlined in the BA Report and the EMPr are implemented and adhered to. These environmental costs could include:

» *A loss of biodiversity, flora and fauna due to the clearing of land for the construction and utilisation of land for grid connection infrastructure* - The cost of loss of biodiversity is considered to be limited due to the limited footprint of the development which will facilitate the placement of infrastructure within vegetation considered to be of a low sensitivity where possible.
» *Visual impacts associated with the grid connection solution* - The development of the grid connection infrastructure may have a visual impact within a 0.5km to 3km radius of the grid connection corridor, which will be of a low significance with the implementation of the recommended mitigation measures. As the development of the grid connection infrastructure will largely impact visually on an area where there currently is a low viewer incidence (due to down-scaling of mining activities and the associated out-migration) and low development density, changes to the landscape quality are unlikely to be problematic.
» *Change in land-use and loss of land available for agricultural activities within the development footprint* - The environmental cost is anticipated to be very limited due the fact that the grid connection corridor does not impact on any areas of high agricultural potential, and that grazing activities can continue undisturbed within the power line servitude during the operation phase of the grid connection infrastructure.

Benefits of the grid connection infrastructure include the following:

» The project will facilitate the connection of 140MW of renewable energy to the national grid. South Africa's per capita greenhouse gas emissions are amongst the highest in the world due to the reliance on fossil fuels. The authorised Namas Wind Farm (and the associated grid connection solution) will contribute to achieving goals for implementation of renewable energy and sustaining a 'green' economy within South Africa. Without the grid connection infrastructure, this will not be possible.
» The project will result in important economic benefits at a local (specifically Kleinsee) and national scale through an increase in production and GDP-R and employment. These will persist during the construction, operation and decommissioning phases of the project.
» The project indirectly contributes towards the Provincial and Local goals for the development of renewable energy as outlined in the respective IDPs.

The benefits of the grid connection infrastructure for the Namas Wind Farm are expected to occur at a national, regional and local level. As the costs to the environment at a site-specific level have been largely limited through the appropriate placement of the grid connection corridor within areas considered to be acceptable for the development of the grid connection infrastructure, as well parallel to an already authorised corridor for an Eskom 400kV power line, the benefits of the project are expected to outweigh the environmental costs of the grid connection infrastructure.

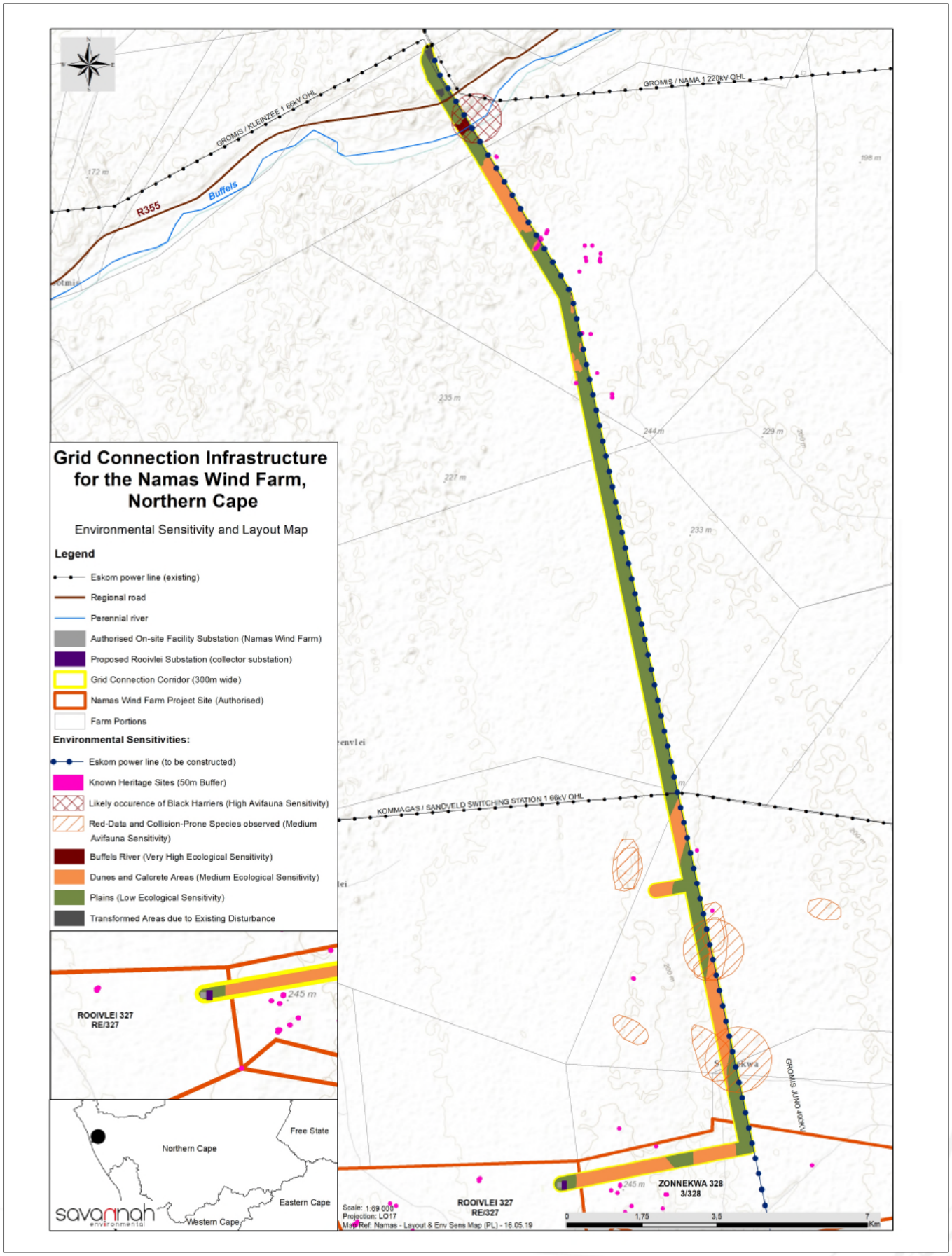

Figure 10.1: Environmental sensitivity map overlain with the assessed grid connection corridor within which the grid connection infrastructure for the Namas Wind Farm is proposed to be developed (**Appendix K**)

10.5. Overall Conclusion (Impact Statement)

The construction and operation of the grid connection solution for the authorised Namas Wind Farm in the Northern Cape has been proposed by Genesis Namas Wind (Pty) Ltd. A technically viable grid connection corridor within which the infrastructure could be developed was proposed by the developer and assessed as part of the BA process. The assessment of the environmental suitability of the grid connection corridor for the development of the proposed grid connection infrastructure was undertaken by independent specialists and their findings have informed the results of this final BA Report.

The specialist findings have indicated that there are no identified environmental fatal flaws associated with the implementation of the grid connection infrastructure or either of the grid connection options (as discussed under section10.2.8). The preferred grid connection option is therefore the technically preferred option, which is a direct connection of the collector substation to the existing Gromis Substation. All impacts associated with the project establishment within the grid connection corridor can be mitigated to acceptable levels or enhanced through the implementation of the recommended mitigation or enhancement measures. The preferred layout map (including the details of the project) is included as **Figure 10.2.** The preferred layout overlain with the environmental sensitivities is included as **Figure 10.1**.

Through the assessment of the development of the grid connection infrastructure within the grid connection corridor and the implementation of the preferred grid connection option (i.e. a direct connection to the existing Gromis Substation) it can be concluded that the proposed project is environmentally acceptable (subject to the implementation of the recommended mitigation measures).

10.6. Overall Recommendation

Considering the findings of the independent specialist studies, the impacts identified, the grid connection corridor proposed by the developer, the avoidance of sensitive environmental features within the grid connection corridor, as well as the potential to further minimise the impacts to acceptable levels through mitigation, it is the reasoned opinion of the EAP that the development of the grid connection infrastructure for the authorised Namas Wind Farm is acceptable within the landscape and can reasonably be authorised to be developed within the assessed grid connection corridor (**Figure 10.2**). A direct connection to the existing Gromis Substation is nominated as the preferred grid connection option to be developed within the corridor.

The following infrastructure would be included within an authorisation issued for the project:

- a collector substation[26] (known as the Rooivlei Substation);
- a double-circuit 132kV power line (known as the Rooivlei-Gromis 132kV double-circuit power line); and
- associated infrastructure such as access tracks/roads and laydown areas.

[26] The collector substation is envisaged to cater as a possible feed-in point for more than one wind farm in the area.

The following key conditions would be required to be included within an authorisation issued for the grid connection infrastructure:

- The grid connection infrastructure for the Namas Wind Farm must be developed and optimised within the assessed grid connection corridor.
- All mitigation measures detailed within this final BA Report, as well as the specialist reports contained within **Appendices D to I**, are to be implemented.
- The EMPr as contained within **Appendix J** of this final BA Report should form part of the contract with the Contractors appointed to construct and maintain the grid connection infrastructure in order to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for all life cycle phases of the infrastructure is considered key in achieving the appropriate environmental management standards as detailed for this project.
- Following the final design of the grid connection infrastructure, a final layout must be submitted to DEA for review and approval prior to commencing with construction.
- A pre-construction walk-through of the final power line alignment for species of conservation concern that would be affected and that can be translocated must be undertaken prior to the commencement of the construction phase.
- A pre-construction walk-through of the power line route to identify heritage sites that will be impacted by the grid connection infrastructure must be undertaken prior to the commencement of the construction phase.
- Monitoring of the double-circuit 132kV power line must be undertaken as per the requirements included in the Avifauna Impact Assessment Report (**Appendix E**).
- Before construction commences individuals of listed species within the development footprint that would be affected by the infrastructure and associated servitudes must be counted and marked and translocated, where deemed necessary, by the ecologist conducting the pre-construction walk-through survey. Permits from the relevant provincial authorities, i.e. the Northern Cape Department of Environment and Nature Conservation (DENC), must be obtained before the individuals are disturbed.
- The necessary water use license or general authorisation must be obtained from the Department of Water and Sanitation (DWS) for impacts to the Buffels River prior to construction.
- A chance find procedure must be developed and implemented in the event that archaeological or palaeontological resources are found during the construction of the grid connection infrastructure. In the case where the proposed development activities bring these materials to the surface, work must cease and SAHRA must be contacted immediately.
- This final Basic Assessment Report pertains to the Grid Connection Infrastructure for the Namas Wind Farm, which is intended to be bid into the Department of Energy's (DoE) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme. The construction of the Namas Wind Farm and Grid Connection Infrastructure is therefore contingent on the Project being awarded Preferred Bidder status, timelines of which are uncertain. Therefore, the Grid Connection Infrastructure Environmental Authorisation, if awarded, must follow the same date and period prescribed in the Namas Wind Farm Environmental Authorisation (DEA Ref.: 14/12/16/3/3/1/1971), namely i) activity commencing within a period of five (05) years from the date of issue of the Environmental Authorisation, and ii) construction to be completed within five (05) years of the commencement of the activity on site.

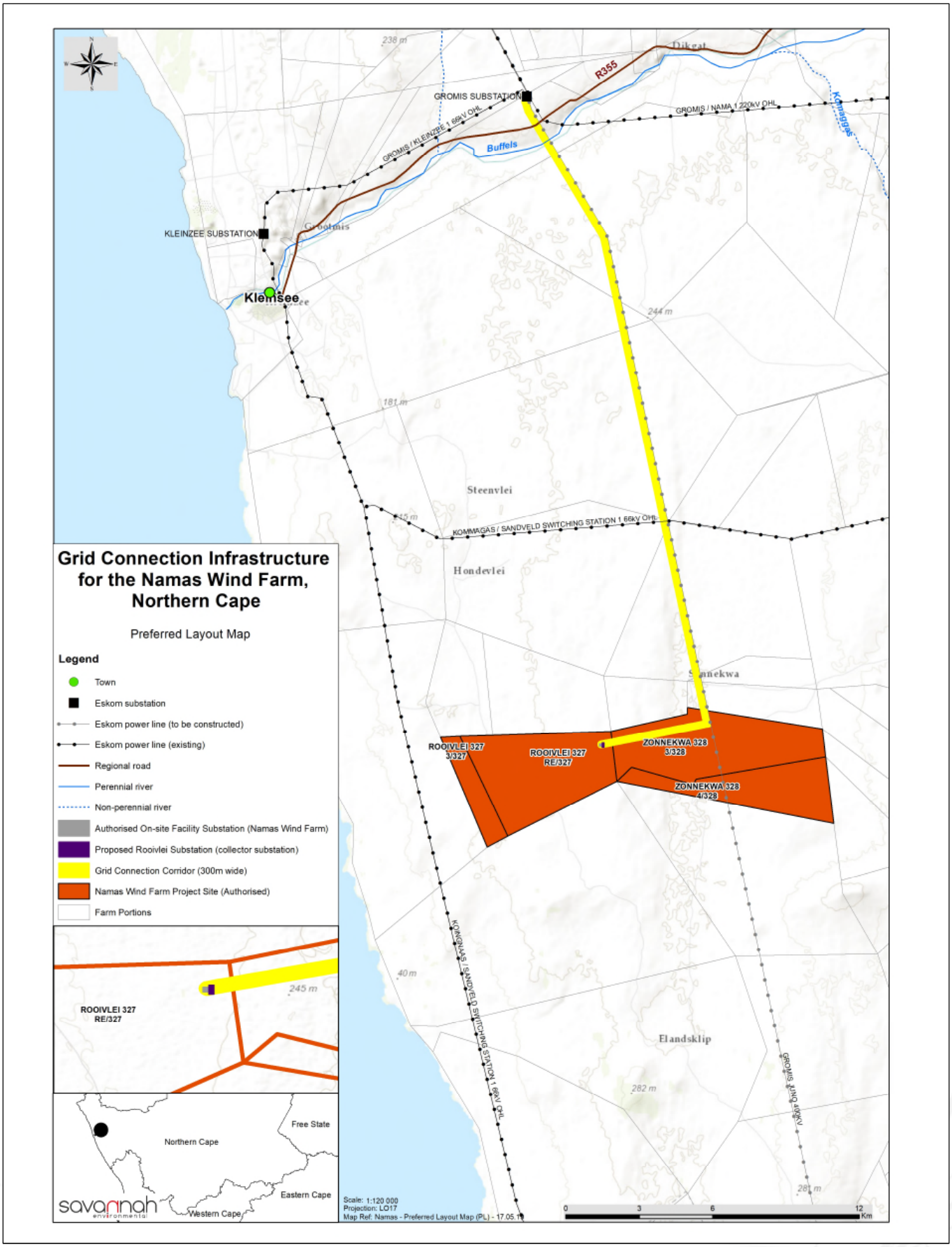

Figure 10.2: Preferred layout map for the grid connection infrastructure for the Namas Wind Farm, as was assessed as part of the BA process (A3 map included in **Appendix K**)

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