ENVIRONMENTAL BASIC ASSESSMENT PROCESS
FINAL BASIC ASSESSMENT REPORT

PROPOSED KOINGNAAS WIND ENERGY FACILITY

NORTHERN CAPE PROVINCE
(DEA Reference No: 12/12/20/2154)

FINAL FOR SUBMISSION TO DEA
NOVEMBER 2011

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Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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Basic assessment report in terms of the Environmental Impact Assessment Regulations, 2010, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

Kindly note that:

1. This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2010 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.

2. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.

3. Where applicable **tick** the boxes that are applicable in the report.

4. An incomplete report may be returned to the applicant for revision.

5. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.

6. This report must be handed in at offices of the relevant competent authority as determined by each authority.

7. No faxed or e-mailed reports will be accepted.

8. The report must be compiled by an independent environmental assessment practitioner.

9. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.

10. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.

PROJECT DETAILS

DEA Reference No.	:	12/12/20/2154
Title	:	Environmental Basic Assessment Process Final Basic Assessment Report: Proposed Koingnaas Wind Energy Facility, Northern Cape Province
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Client	:	Just Palm Tree Power
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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.

Ambient sound level: The reading on an integrating impulse sound level meter taken at a measuring point in the absence of any alleged disturbing noise at the end of a total period of at least 10 minutes after such meter was put into operation.

Betz Limit: It is the flow of air over the blades and through the rotor area that makes a wind turbine function. The wind turbine extracts energy by slowing the wind down. The theoretical maximum amount of energy in the wind that can be collected by a wind turbine's rotor is approximately 59%. This value is known as the Betz Limit

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 of time and can include both direct and indirect impacts.

Cut-in speed: The minimum wind speed at which the wind turbine will generate usable power.

Cut-out speed: The wind speed at which shut down occurs.

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

Disturbing noise: A noise level that exceeds the ambient sound level measured continuously at the same measuring point by 7 dB or more.

'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.

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 impact assessment: Environmental Impact Assessment (EIA), as defined in the NEMA EIA Regulations and in relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application.

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 programme 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.

Generator: The generator is what converts the turning motion of a wind turbine's blades into electricity

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

Indirect impacts: Indirect or induced changes that may occur as a result 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 as a result 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 general public.

Nacelle: The nacelle contains the generator, control equipment, gearbox and anemometer for monitoring the wind speed and direction.

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).

Rotor: The portion of the wind turbine that collects energy from the wind is called the rotor. The rotor converts the energy in the wind into rotational energy to turn the generator. The rotor has three blades that rotate at a constant speed of up to 50 revolutions per minute (rpm).

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.

Tower: The tower, which supports the rotor, is constructed from steel. It is approximately 32 m tall. The nacelle and the rotor are attached to the top of the tower. The tower on which a wind turbine is mounted is not just a support structure. It also raises the wind turbine so that its blades safely clear the

ground and so it can reach the stronger winds at higher elevations. The tower must be strong enough to support the wind turbine and to sustain vibration, wind loading and the overall weather elements for the lifetime of the wind turbine.

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

Wind rose: The term given to the diagrammatic representation of joint wind speed and direction distribution at a particular location. The length of time that the wind comes from a particular sector is shown by the length of the spoke, and the speed is shown by the thickness of the spoke.

Wind speed: The rate at which air flows past a point above the earth's surface.

ABBREVIATIONS AND ACRONYMS

BID	Background Information Document
CBOs	Community Based Organisations
CDM	Clean Development Mechanism
CFR	Cape Floristic Region
CSIR	Council for Scientific and Industrial Research
CO_2	Carbon dioxide
D	Diameter of the rotor blades
DENC	Northern Cape Department of Environmental Affairs and Nature Conservation
DEA	National Department of Environmental Affairs
DMR	Department of Mineral Resources
DOT	Department of Transport
DWA	Department of Water Affairs
EIA	Environmental Impact Assessment
EMP	Environmental Management Programme
GIS	Geographical Information Systems
GG	Government Gazette
GN	Government Notice
GWh	Giga Watt Hour
Ha	Hectare
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IEP	Integrated Energy Planning
IRP	Integrated Resource Plan
km^2	Square kilometres
km/hr	Kilometres per hour
kV	Kilovolt
m^2	Square meters
m/s	Meters per second
MW	Mega Watt
NEMA	National Environmental Management Act (Act No 107 of 1998)
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act (Act No 25 of 1999)
NGOs	Non-Governmental Organisations
NIRP	National Integrated Resource Planning
NWA	National Water Act (Act No 36 of 1998)
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency Limited
SDF	Spatial Development Framework
VAC	Visual Absorption Capacity

SUMMARY AND OVERVIEW OF THE PROPOSED PROJECT

Just Palm Tree Power has identified a site approximately 3km south west of the town of Koingnaas within a De Beers diamond mining area in the Namakwa District Municipality in the Northern Cape for the establishment of a commercial wind energy facility. The facility is proposed to accommodate up to 24 appropriately spaced turbines over an extent of approximately 100 hectares for the purpose of electricity generation up to 7.2 MW. The facility is to be referred to as the **Koingnaas Wind Energy Facility**.

The identified site is regarded as favourable due to the wind resource, the disturbed nature of the site due to mining activities, and proximity to a suitable electricity connection point. The proposed facility is proposed to be constructed on the farm Koingnaas 745 (refer to Figure 1).

The facility will utilise small turbines with a generating capacity of 300 kW (0.3 MW), each with a hub height of 35m and a rotor diameter of 32m (i.e. each blade up to 16 m in length). The facility would have a capacity of less than 10MW.

Other infrastructure associated with the wind energy facility is proposed to include:

» **Cabling** between the turbines, to be lain underground where practical, which will connect to existing new on-site switching station;
» A **switching yard** 50m x 40m will be constructed;
» A **short power line** 11kV to connect the facility to the Koingnaas Substation;
» **Existing roads** will be used as far as possible. However, where required, internal access roads of approximately 6m wide will be constructed between the turbines and the on-site substation;
» **Workshop** area for maintenance and storage purposes; and
» A component **laydown area** of approximately 1250m^2 (50m x 25m) will be required next to each turbine location.

The project intends to make use of South African designed and built wind turbine generators, and provides an opportunity for South Africa to take a market share in the renewable industry. Just Palm Tree Power is a South African turbine manufacturing company.

Activities and Components associated with the proposed Koingnaas Wind Energy Facility

The main activities/components associated with the wind energy facility comprise the following:

Main Activity/Project Component	Components of Activity	Details
	Planning	
Conduct surveys	» Geotechnical survey by geotechnical engineer » Site survey and confirmation of the turbine micro-siting footprints in consultation with a botanist, ornithologist and archaeologist » Survey of on-site switching yard (1) and selected power line route » Survey of new internal access routes	» Surveys to be undertaken prior to initiating construction.
	Construction	
Establishment of access roads to the site	» Upgrade access/haul roads to the site » Establish internal access roads: up to 6 m wide permanent roadway within the site between the turbines for use during construction and operation phase. » If required, temporary track (adjacent to and utilising part of the permanent road) of up to 13m in width for use by the crane during construction phase only.	» Access roads will be constructed in advance of any components being delivered to site, and will remain in place after completion for future access and possibly access for replacement of parts if necessary. » Existing access roads to the site will be utilised, and upgraded where required. Special haul roads may need to be constructed to and within the site to accommodate abnormally loaded vehicle access and circulation. » The internal service road alignment will be informed by the final micro-siting/positioning of the wind turbines (as well as by surveys undertaken by ecological and archaeological specialists).
Undertake site preparation	» Site establishment of offices/ workshop with ablutions and stores, contractors yards » Establishment of internal access roads	» These activities will require the stripping of topsoil, which will need to be stockpiled, backfilled and/or spread on site.

Main Activity/Project Component	Components of Activity	Details
	(permanent and temporary roads) » Clearance of vegetation at the footprint of each turbine » Excavations for foundations	
Establishment of lay down areas on site	» Lay down areas (temporary footprint 1250m^2 (50m x 25m)) at each turbine position for the storage of wind turbine components and accommodation of construction and crane lifting equipment. » Construction of site office.	» The lay down area will need to accommodate the cranes required in tower/turbine assembly. » Lay down and storage areas will be required to be established for the normal civil engineering construction equipment which will be required on site. » A small lay down area will be required at each position where the main lifting all terrain crane may be required to be erected and/or disassembled. This area would be required to be compacted and levelled to accommodate the assembly crane.
Construct wind turbine foundations	» Turbine foundations will be up to 13 m x 13m (octagonal shape). » Foundation holes will be excavated to a depth of approximately 5m, depending on the underlying geotechnical conditions on site.	» Foundation holes will be mechanically excavated. » Shoring and safety barriers will be erected.
Transport of components and equipment to site	» Articulated trucks will be used to transport all components to site: » The normal civil engineering construction equipment for the civil works (e.g. excavators, trucks, graders, compaction equipment, cement mixers, etc.) to be transported to site. » The components required for the establishment of the switching yard (including transformers).	» Turbine units consist of a lattice tower comprised of segments, a nacelle, and three rotor blades. » Components of various specialised construction, lifting equipment and counter weights etc. are required on site (e.g. mobile assembly crane and a crawler crane) to erect the wind turbines. » Other components include components required for the establishment of the switching yard (including transformers) and those required for the establishment of the power line (including towers and cabling). » The wind turbine, including tower, will be brought to site by the supplier in sections. As the PalmTree 300kW turbine is a relatively

Main Activity/Project Component	Components of Activity	Details
	» Components required for the establishment of the power line (including towers and cabling).	small turbine, the parts can be transported on standard articulated trucks. The generator will be the largest part of the turbine being transported on a standard low bed trailer. The developer intends to use standard horse and trailer transport vehicles, which include 12m tri-axle trailers. The blades will be delivered on an extendable 16m twin-axle trailer. » For a small turbine like the PalmTree 300kW, the vehicles being used to transport the turbine parts from origin of manufacture to site will be within the legal limitations and therefore specific permits for abnormal loads will not be required.
Erect turbines	» Lifting crane used for lifting of large, heavy components. » A small crane for the assembly of the rotor.	» The large lifting crane will lift the tower sections into place. » The nacelle, which contains the gearbox, generator and yawing mechanism, will then be placed onto the top of the assembled tower. » The rotor (i.e. the blades of the turbine) will then be assembled or partially assembled on the ground by a crane. It will then be lifted to the nacelle by the crane, and bolted in place. » It will take approximately 3-4 weeks to erect each turbine, although this will depend on the climatic conditions as a relatively wind-free day will be required for the installation of the rotor.
Construct switching yard and ancillary infrastructure.	» Switching yard components. » Security fencing around high-voltage (HV) Yard. » Workshop.	» Will require the clearing of vegetation and levelling of the development site and the excavation of foundations prior to construction. » A lay down area for building materials and equipment associated with these buildings will also be required. » The switching yard will be constructed within a high-voltage (HV) yard footprint of up to (50m x 40m). » The switching yard would be constructed in the following simplified sequence: * Step 1: Survey of the site

Main Activity/Project Component	Components of Activity	Details
		* Step 2: Site clearing and levelling and construction of access road to switching yard site * Step 3: Construction of terrace and foundations * Step 4: Assembly, erection and installation of equipment * Step 5: Connection of conductors to equipment * Step 6: Rehabilitation of any disturbed areas and protection of erosion sensitive areas.
Connection of wind turbines to the on-site substation	» Wind turbines. » 11 kV underground electrical cabling connecting each turbine to the substation.	» The installation of these cables will require the excavation of trenches, approximately 1m in depth within which these cables can then be laid. » The underground cables would follow the internal access roads as far as reasonably possible.
Connect substation to power grid	» An 11 kV overhead distribution power line is proposed to connect the switching yard at the facility to the electricity distribution network/grid at the mine-owned Koingnaas Substation.	» The route for the power line will be assessed, surveyed and pegged prior to construction.
Commissioning of the facility	» Wind energy facility commissioning.	» Prior to the start up of a wind turbine, a series of checks and tests will be carried out, including both static and dynamic tests to make sure the turbine is working within appropriate limits. » Grid interconnection and unit synchronisation will be undertaken to confirm the turbine and unit performance. Physical adjustments may be needed such as changing the pitch of the blades.
Undertake site remediation	» Remove all construction equipment from the site. Rehabilitation of temporarily disturbed areas where practical and reasonable.	» On full commissioning of the facility, any access points to the site which are not required during the operation phase will be closed and prepared for rehabilitation.
	Operation	
Operation	» Operation of turbines within the wind energy facility.	» Once operational, the wind energy facility will be monitored remotely. Based on information provided by the proponent, the

Main Activity/Project Component	Components of Activity	Details
	» Operation of the power line and switching station.	proposed project will employ approximately 10 full time employees over the ~20 year operational phase of the project. It is anticipated that there will be full time security, maintenance and control room staff required on site. » Each turbine in the facility will be operational, except under circumstances of mechanical breakdown, extreme weather conditions or maintenance activities.
Maintenance	» Oil and grease – turbines. » Transformer oil – switching yard. » Waste product disposal.	» The wind turbines will be subject to periodic maintenance and inspection. Periodic oil changes will be required and any waste products (e.g. oil) will be disposed of in accordance with relevant waste management legislation. » The turbine infrastructure is expected to have a lifespan of approximately 20 years, with maintenance.
Decommissioning		
Site preparation	» Confirming the integrity of the access to the site to accommodate required equipment and lifting cranes. » Preparation of the site (e.g. lay down areas, construction platform). » Mobilisation of decommissioning equipment.	» Equipment associated with this facility would only be decommissioned once it has reached the end of its economic life. » It is most likely that decommissioning activities of the infrastructure of the facility would comprise the disassembly and replacement of the turbines with more appropriate technology/infrastructure available at that time.
Disassemble and remove existing turbines	» A large crane will be used to disassemble the turbine and tower sections.	» Turbine components would be reused, recycled or disposed of in accordance with regulatory requirements.

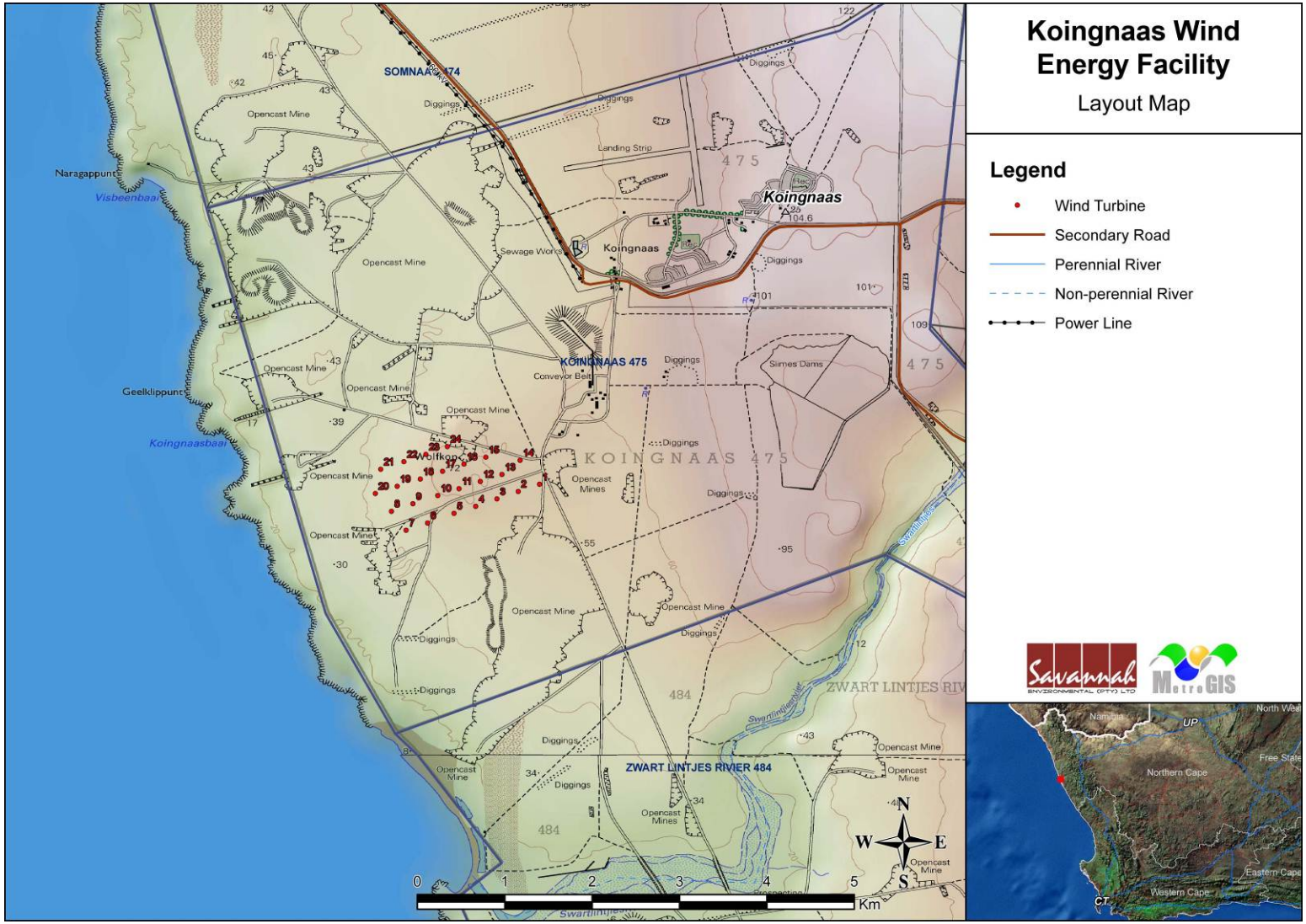


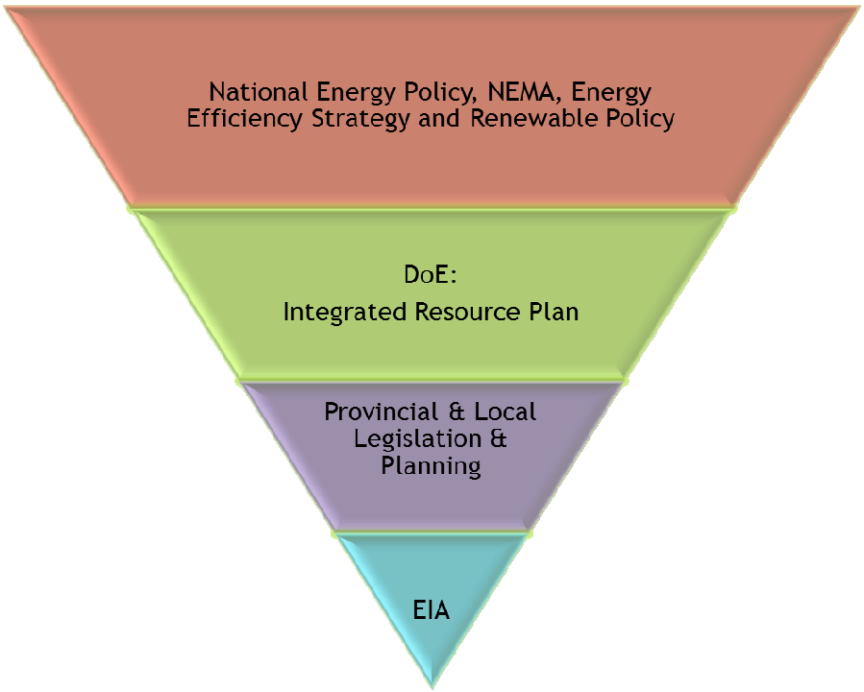
Figure 1: Locality map showing the preliminary layout and location of the proposed Koingnaas Wind Energy Facility in the Northern Cape Province

The facility is proposed to take approximately 9 months to construct and commission, and will require a small workforce comprising low, semi-skilled and highly skilled staff. The operational phase is estimated at approximately 20 years. Each turbine is designed to operate continuously and with low maintenance.

This Basic Assessment Report investigates this proposed facility in more detail. Site-specific studies and assessments have been undertaken through this Basic Assessment process in order to confirm the environmental feasibility of the proposed project and to delineate any areas of environmental sensitivity within the study area. Although a preliminary layout has been assessed within this Basic Assessment Report, the exact positioning or detailed layout of the components of this proposed wind energy facility will be developed by taking cognisance of the wind resource on the site as well as the environmental sensitivities and mitigation measures identified through the EIA process. A final layout of the turbines within the facility would be prepared prior to construction.

1. WHY WIND ENERGY?

The need to expand electricity generation capacity in South Africa is based on **national policy** and informed by on-going strategic planning undertaken by the Department of Energy (DoE). The hierarchy of policy and planning documentation that support the development of renewable energy projects such as wind and solar energy facilities is illustrated below.



In order to meet the long-term goal of a sustainable renewable energy industry, the South African Government has set a target of 17GW renewable energy contribution to new power generation capacity by 2030. This is to be produced mainly from biomass, **wind**, solar and small-scale hydro. The proposed Koingnaas Wind Energy Facility will assist government in meeting this goal.

Wind turbines use the energy from the wind to generate electricity. In essence, the blades of the turbine are turned by the wind and the energy captured is converted into electrical energy and supplied to the electricity grid for use in homes and elsewhere. Wind power is regarded as a non-consumptive use of a natural resource, which produces an insignificant quantity of greenhouse gases in its life cycle. Wind power consumes no fuel for continuing operation, and has no emissions directly related to electricity production.

2. MAIN COMPONENTS OF A WIND TURBINE

The turbine consists of the following major components:

» The rotor
» The nacelle
» The tower
» The foundation unit

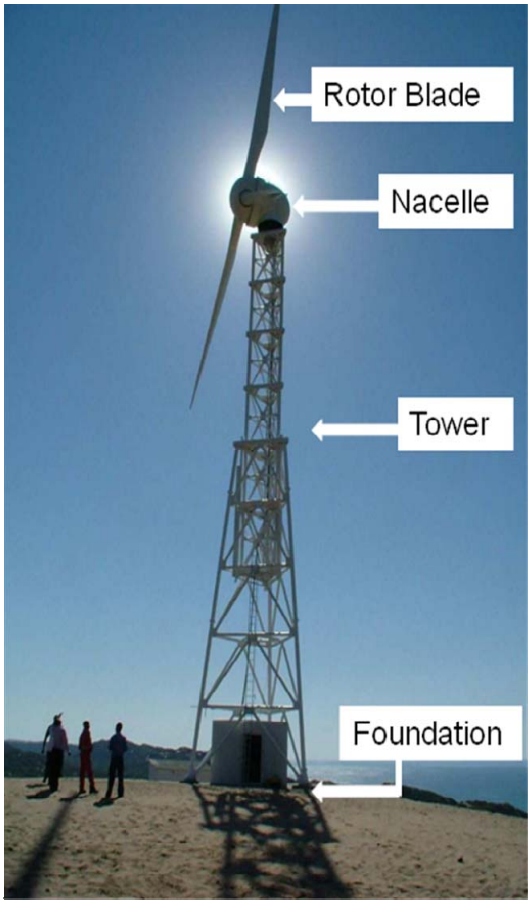


Figure 2: Illustration of the main components of a small wind turbine, as proposed for the Koingnaas site

The Rotor

The portion of the wind turbine that collects energy from the wind is called the rotor. The rotor converts the energy in the wind into rotational energy to turn the generator. The rotor has three blades that rotate at a constant speed of up to 50 revolutions per minute (rpm). The speed of rotation of the blades is controlled by the nacelle, which can turn the blades to face into the wind ('yaw control'), and change the angle of the blades ('pitch control') to make the most use of the available wind.

The rotor blades function in a similar way to the wing of an aircraft, utilising the principles of **lift** (Bernoulli). When air flows past the blade, a wind speed and pressure differential is created between the upper and lower blade surfaces. The pressure at the lower surface is greater and thus acts to "lift" the blade. When blades are attached to a central axis, like a wind turbine rotor, the lift is translated into rotational motion. Lift-powered wind turbines are well suited for electricity generation.

The rotation of the rotor blades produces a characteristic 'swishing' sound as the blades pass in front of the tower roughly once a second. The other moving parts, the gearbox and generator, cannot be heard unless the observer is physically inside the turbine tower.

The tip-speed is the ratio of the rotational speed of the blade to the wind speed. The larger this ratio, the faster the rotation of the wind turbine rotor at a given wind speed. Electricity generation requires high rotational speeds.

The nacelle

The nacelle contains the generator, control equipment, gearbox and anemometer for monitoring the wind speed and direction. The generator is what converts the turning motion of a wind turbine's blades into electricity. Inside this component, coils of wire are rotated in a magnetic field to produce electricity. The generator's rating, or size, is dependent on the length of the wind turbine's blades because more energy is captured by longer blades.

The tower

The tower, which supports the rotor, is a steel lattice structure for this proposed facility. The nacelle and the rotor are attached to the top of the tower.

The tower on which a wind turbine is mounted is not just a support structure. It also raises the wind turbine so that its blades safely clear the ground and so it can reach the stronger winds at higher elevations. The tower must be strong enough to support the wind turbine and to sustain vibration, wind loading and the overall weather elements for the lifetime of the wind turbine.

3. BASIC ASSESSMENT PROCESS

Just Palm Tree Power requires authorisation from the National Department of Environmental Affairs (DEA) (in consultation with the Northern Cape Department of Environmental Affairs and Nature Conservation (DENC) as a commenting authority) for the undertaking of the proposed project. In order to obtain authorisation for this project, comprehensive, independent environmental studies must be undertaken in accordance with the EIA Regulations. This project has been registered with the National DEA under application reference number **12/12/20/2154**.

In terms of the Environmental Impact Assessment Regulations published in Section 24(5) of the National Environmental Management Act (NEMA, No 107 of 1998), it is a legal requirement that environmental impacts be investigated and assessed for any activity which may have a potentially detrimental impact on the environment. The construction of a wind energy facility with a generating capacity of less than 20 MW is listed as such an activity. A development of more than 20ha may require a Scoping and EIA Process to be undertaken. However, due to the siting of this facility within a disturbed diamond mining area (i.e. land which is disturbed and/or transformed), activity 15 of Listing Notice 2 (GN R545) does not apply, and a **Basic Assessment Process is applicable**. This approach has been confirmed with DEA for this project (refer to minutes of the pre-consultation meeting contained in Appendix G).

In terms of GNR544, the following listed activities are applicable:

Government Notice	Listed Activity No	Listed Activity	Applicability to the project
GN 544, 18 June 2010	1	*The construction of facilities or infrastructure for the generation of electricity where:* *i. the output is 10 megawatts or less but the total extent of the facility covers an area in excess of 1 hectare.*	Just Palm Tree Power is proposing the establishment of the wind energy facility up to 7.2 MW.
GN 544, 18 June 2010	13	*The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres.*	The onsite storage of diesel and fuel in containers for construction machinery and vehicles.
GN 544, 18	22 (ii)	*The construction of a road*	Internal access roads

Government Notice	Listed Activity No	Listed Activity	Applicability to the project
June 2010		*outside urban areas* *(ii) where no reserve exists and the road is wider than 8 meters.*	between turbines need to be constructed.

Refer to Appendix G2 (authority consultation) in reference to a letter to DEA which gives reasons for exemption from listed activities from an EIA process.

4. DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP) AND EXPERTISE TO CONDUCT THE SCOPING AND EIA PHASES

Savannah Environmental was contracted by Just Palm Tree Power as the independent environmental consultant to undertake the Basic Assessment Process for the proposed project. Neither Savannah Environmental nor any its specialist sub-consultants on this project are subsidiaries of or are affiliated to Just Palm Tree Power. 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 holistic environmental management services, including environmental impact assessments 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 environmental impact 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.

The EAPs from Savannah Environmental who are responsible for this project are:

» Jo-Anne Thomas - a registered Professional Natural Scientist and holds a Master of Science degree. She has 13 years of consulting experience in the environmental field. 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 projects across the country.

» Alicia Govender – the principle author of this report, holds an Honours Bachelor of Science degree in Environmental Management and has about 4 years experience in environmental management. She is currently the responsible EAP for several renewable energy projects and other EIAs across the country.

In order to adequately identify and assess potential environmental impacts associated with the proposed project, Savannah Environmental has appointed the following specialist sub-consultants to conduct specialist impact assessments:

» Desk-top terrestrial fauna study – David Hoare Consulting cc
» Flora study - Bergwind Botanical Surveys & Tours cc.
» Geology, soils and agricultural potential study – Terra Soil Science cc
» Heritage study – Archaeology Contracts Office (ACO)
» Noise study– MENCO (M2 Environmental Connections cc)
» Visual study– MetroGIS (Pty) Ltd
» Social study– Tony Barbour Environmental Consulting and Research
» Avifauna study – Rob Simmons
» Palaeontological study - John Pether

The following sections detail the activity description; the site, area and property description; the public participation process; the impact assessment; and the recommendations of the assessment practitioner. An Environmental Management Programme (EMP) for construction and operation is contained in Appendix F.

SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section?	YES	NO ✓

If YES, please complete the form entitled "Details of specialist and declaration of interest"

for appointment of a specialist for each specialist thus appointed:
Any specialist reports must be contained in Appendix D.

1. ACTIVITY DESCRIPTION

Describe the activity, which is being applied for, in detail[1]:

Just Palm Tree Power has identified a site approximately 3km south west of the town of Koingnaas within a De Beers diamond mining area in the Namakwa District Municipality in the Northern Cape for the establishment of a commercial wind energy facility.

The facility is proposed to accommodate up to 24 appropriately spaced turbines, for the purpose of electricity generation of up to 7.2 MW to be constructed over an extent of approximately 100 hectares, within the farm Koingnaas 745. The facility is expected to have a lifespan of 20 years. The facility will be linked to the existing Koingnaas substation in the mine by a new 11 kV power line running northwards to the substation. Two alternatives for this power line have been identified passing either side of the large tailings dam in the mine. The facility is to be referred to as the Koingnaas Wind Energy Facility.

Each turbine proposed to be used at the Koingnaas Wind Energy Facility will have a capacity of 0,3MW (300 kW), and will consist of a concrete foundation, a steel lattice tower and nacelle (hub height at a height of 35m), and a rotor (32m diameter, consisting of 3 blades of 16m in length). The rotational power generated by the turbine blades is transmitted to the generator housed within the nacelle via a gearbox and drive train.

Other infrastructure associated with the wind energy facility is proposed to include:

- **Cabling** between the turbines, to be lain underground where practical, which will connect to existing new on-site switching station;
- A **switching yard** 50m x 40m will be constructed
- A **short power line** 11kV to connect the facility to the Koingnaas Substation;
- **Existing roads** will be used as far as possible. However, where required, internal access roads of approximately 6m wide will be constructed between the turbines and the on-site substation.
- **Workshop** area for maintenance and storage purposes.
- A component **laydown area** of approximately 1250m^2 (50m x 25m) will be required next to each turbine location.

[1] Please note that this description should not be a verbatim repetition of the listed activity as contained in the relevant Government Notice, but should be a brief description of activities to be undertaken as per the project description.

The identified site is regarded as favourable due to the wind resource, the disturbed nature of the site, and proximity to a suitable electricity connection point i.e. Koingnaas substation.

The project intends to make use of South African designed and built wind turbine generators, and provides an opportunity for South Africa to take a market share in the renewable industry. Just Palm Tree Power is a South African turbine manufacturing company. Although a preliminary layout has been provided by the developer for assessment within this Basic Assessment process, the exact positioning or detailed layout of the components of this proposed wind energy facility will be developed by taking cognisance of the wind resource on the site as well as the environmental sensitivities and mitigation measures identified through the EIA process. A final layout of the turbines within the facility would be prepared prior to construction.

2. FEASIBLE AND REASONABLE ALTERNATIVES

"alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

(a) the property on which or location where it is proposed to undertake the activity;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and
(f) the option of not implementing the activity.

Describe alternatives that are considered in this application. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. The determination of whether site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Paragraphs 3 – 13 below should be completed for each alternative.

The site for the proposed Koingnaas Wind Energy Facility has been identified by Just Palm Tree Power through a pre-feasibility study as a highly desirable site. In addition, the feasibility of the proposed site within the mining area has been confirmed by De Beers. As a result no site alternatives are considered for the proposed project.

The characteristics which make the proposed development site preferred include:

» **Wind resource:** According to a pre-feasibility study conducted in 2009, the estimated average wind speed for the site is 7.6m/s at a hub height of 35m. The average is considered high and thus excellent for wind energy generation. The coastal foreland is

subject to winds from the north-west, north-east, south and south-east with a switch in wind direction related to the summer and winter seasons.

» **Topography:** The study site is within 1.5 km of the Namaqualand coastline and is located on the coastal foreland. Elevation of the site is between 40 and 72 m (Wolfkop, the highest point) above mean sea level (a.m.s.l.). Overall, the topography of the proposed site is relatively flat apart from some localised variations in ground level across the site, i.e. Wolfkop hill and the spoil heaps. The site is already disturbed, and as such, the landscape is well suited to absorbing the proposed wind energy facility. The site will allow for the avoidance of shielding of the wind resource as it is situated on elevated terrain which is directly exposed to the wind resource.

» **Extent of site:** the proposed site which covers an area of approximately 100 ha will allow for the installation of the entire facility including associated infrastructure in one central location as the extent of the site is larger than the development footprint required for the facility.

» **Power transmission and grid connection considerations:** The closest electrical infrastructure in the area is at Koingnaas town, where De Beers have a privately owned substation, approximately 4km from the proposed site boundary at -30.205 Latitude(South); 17.263 Longitude (East). Koingnaas Substation is a 66/22kV substation, with 2x4.0MVA transformers. The minimum current load is approximately 1.0MVA. A new 11kV overhead power line is proposed to connect the proposed Koingnaas facility from the on-site switching yard to the Koingnaas Substation (a distance of approximately 3km), thus reducing the length of new power line infrastructure that would be required as part of the proposed project.

» **Site access:** There are no numbered routes through the study area, but secondary roads do connect Hondeklip Bay and Koingnaas with one another and with the N7 which lies some 60km to the east of the site. The site has a network of existing un-surfaced tracks constructed for the operation of the mining works. The existing roads are hard-padded with a design capacity for 80 tons (i.e.40t truck plus 40t load).

» **Local labour and economic stimulus:** the site is located in close proximity to the towns of Koingnaas, Kleinsee, Komaggas, Soebatsfontein and Noop. These are mining towns and will act as a ready source of local labour during construction of the proposed facility. If labour and/or required skills levels are limited in the surrounding towns, Garies and Springbok may have to be considered for sourcing labour.

Site selection draws on macro-level assessment of broad constraints, but also requires that micro-siting issues are considered in order to determine whether the project can constitute a potentially viable site. In addition, the consideration of potential impacts on the mining activities of de Beers is an important consideration for this project. Therefore the micro-siting of the facility has been undertaken in consultation with the mine to ensure minimal impact.

From the site identification process undertaken by Just Palm Tree Power, as well as the analysis of monitored wind data at the site, Just Palm Tree Power considers the site to be a highly preferred site for the development of a wind energy facility. The suitability of the site is intended to be verified through long-term monitored data from the on-site wind monitoring mast to be recorded at a height of up to 32 m. Wind monitoring includes the following activities:

» Atmospheric studies (resource scale studies).
» Installation of wind monitoring mast/s on the site.
» Correlation of atmospheric data to the wind mast monitored data.
» Collection of up to 12 to 48 months of data in order to consider and confirm long-term trends.

3. ACTIVITY POSITION

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

List alternative sites, if applicable.

Alternative:	**Latitude (S):**		**Longitude (E):**	
Alternative S1[2] (preferred or only site alternative)	30°	13.314‘	17°	15.426‘
Alternative S2 (if any)	°	‘	°	‘
Alternative S3 (if any)	°	‘	°	‘

In the case of linear activities: Two alternatives for the power line have been identified passing either side of the large tailings dam in the mine

Power line Alternatives:

Alternative:	**Latitude (S):**		**Longitude (E):**	
Alternative P1[3] (preferred or only route alternative) **(passes west of the large tailings dam)**				
• Starting point of the activity	30°	13.230‘	17°	16.022‘
• Middle/Additional point of the activity	30°	12.558‘	17°	16.169‘
• End point of the activity	30°	12.082‘	17°	16.281‘

No- go alternative:

The no-go alternative would maintain status quo and would represent a lost opportunity for South Africa to supplement is current energy needs with clean, renewable energy. Given South Africa’s position as one of the highest per capita producer of carbon emissions in the world, this would represent a High negative social cost.

The no-go alternative also represents a lost opportunity in terms of the employment and business opportunities (construction and operational phase) and for the establishment of a Community Trust. This also represents a negative social cost.

The project intends to make use of South African designed and built wind turbine generators, and provides an opportunity for South Africa to take a market share in the

[2] “Alternative S..” refer to site alternatives.(Please note there are no site alternatives assessed)
[3] “Alternative P..” refers to Power line alternatives

renewable industry. Just Palm Tree Power is a South African turbine manufacturing company. Should the project not be implemented, this would result in a loss of opportunity for use of locally manufactured turbines.

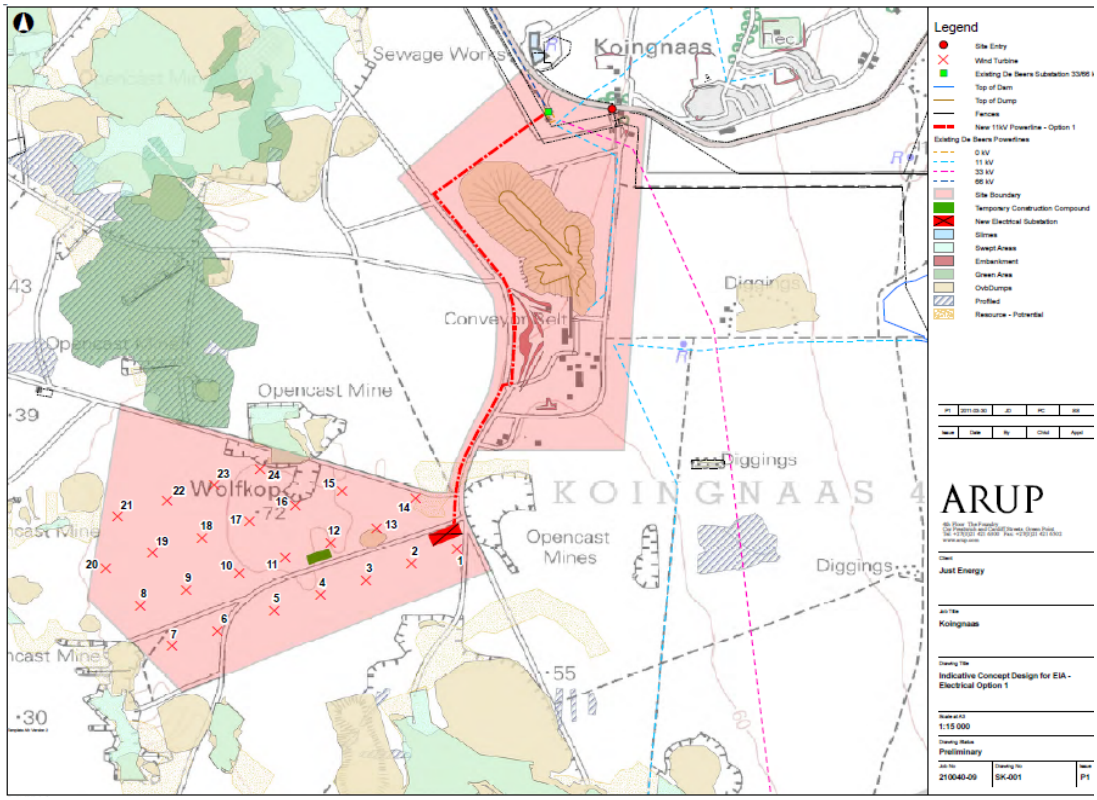


Figure 3: Map showing the proposed turbine layout and route of power line option 1 (passes west of the large tailings dam)

Alternative P2 (if any) **(skirts east of the tailings dam)**

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

30°	13.230‘	17°	16.022‘
30°	12.509‘	17°	16.453‘
30°	12.082‘	17°	16.281‘

Alternative S3 (if any)

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

0	‘	0	‘
0	‘	0	‘
0	‘	0	‘

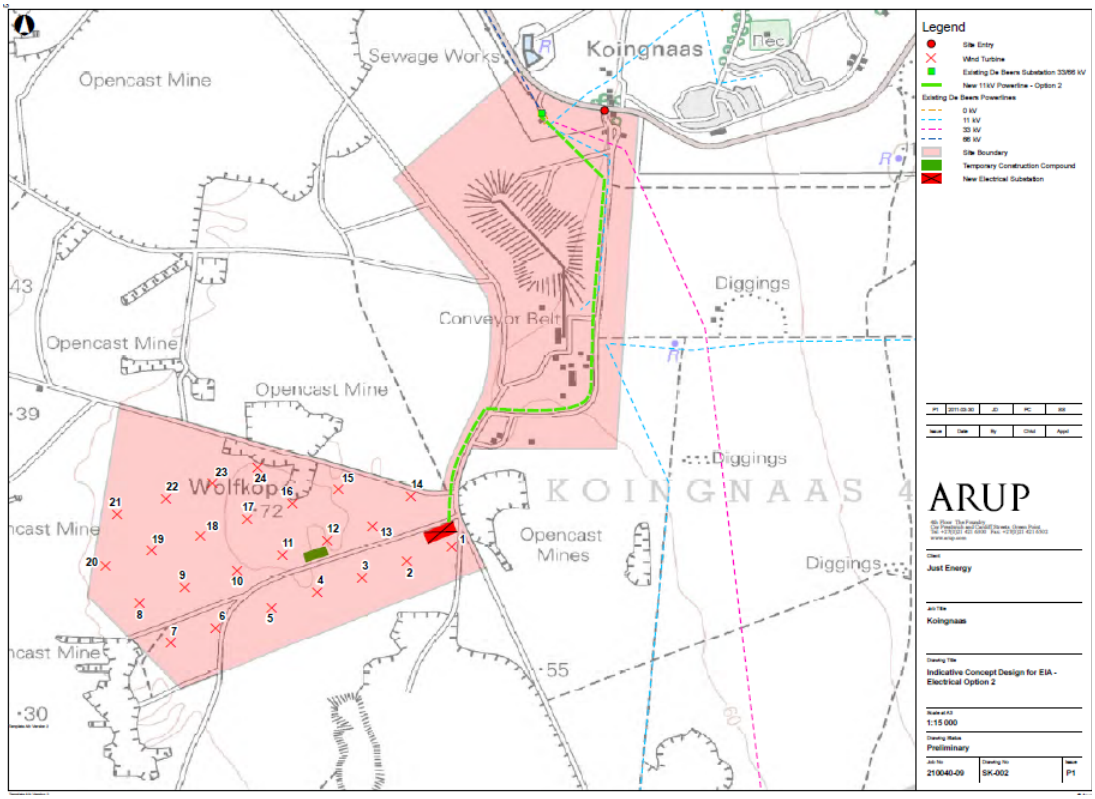


Figure 4: Map showing the proposed route of power line option 2 (skirts east of the tailings dam)

Road Alternatives:

Alternative:	**Latitude (S):**		**Longitude (E):**	
Alternative R1[4] (two loops around turbine layout)				
• Starting point of the activity	30°	13.329‘	17°	16.027‘
• Middle/Additional point of the activity	30°	13.471‘	17°	14.996‘
• End point of the activity	30°	13.329‘	17°	16.027‘

[4] “Alternative R” refers to internal access road alternatives

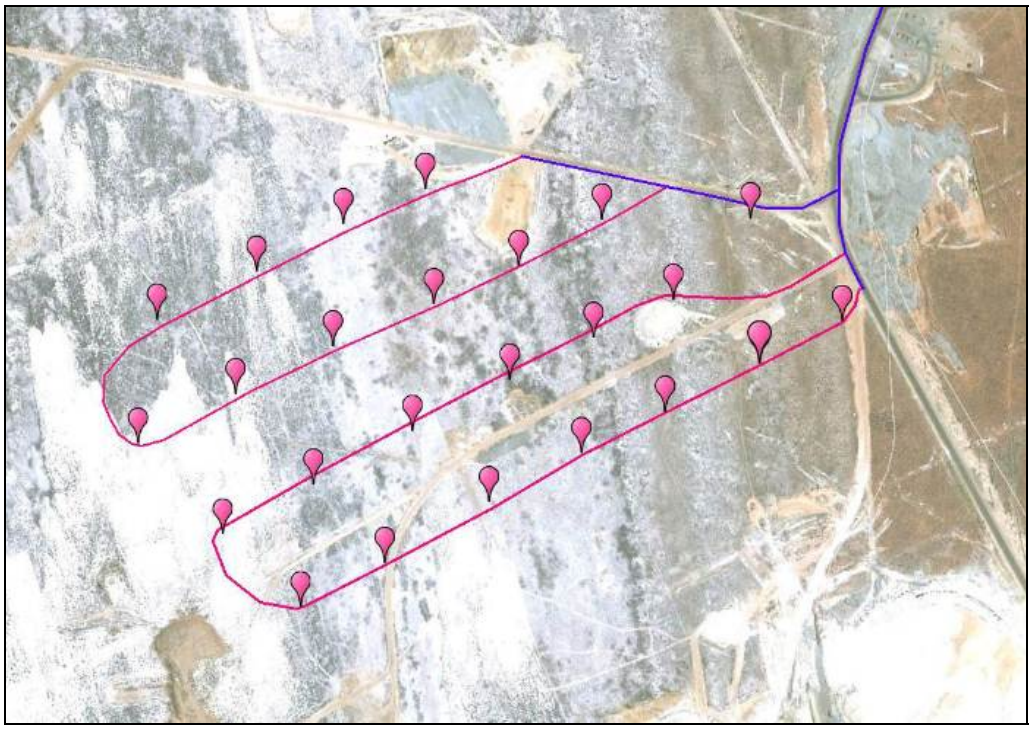


Figure 5: Map showing the proposed route of internal access roads to each turbine (road option 1- looping roads)

Alternative R2 (use of existing access road for southern turbines)

• Starting point of the activity	30°	13.329‘	17°	16.027‘
• Middle/Additional point of the activity	30°	13.471‘	17°	14.996‘
• End point of the activity	30°	13.329‘	17°	16.027‘

Alternative S3 (if any)

• Starting point of the activity	°	‘	°	‘
• Middle/Additional point of the activity	°	‘	°	‘
• End point of the activity	°	‘	°	‘

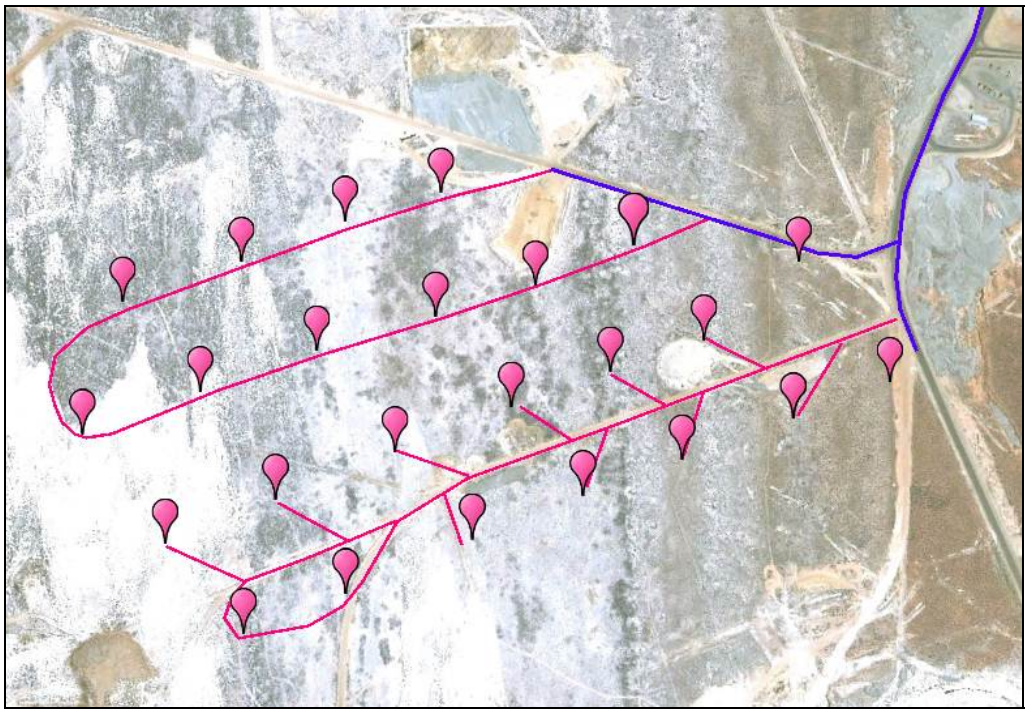


Figure 6: Map showing the proposed route of internal access roads to each turbine (road option 2 – use of existing access road for southern turbines)

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment.

4. PHYSICAL SIZE OF THE ACTIVITY

Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Alternative:	**Size of the activity:**
Alternative A1[5] (preferred activity alternative)	1 000 000m^2
Alternative A2 (if any)	m^2
Alternative A3 (if any)	m^2

In order to assess the areas where impacts could occur on the site, a site layout optimisation exercise revealed the best possible positions for the turbines, substation and other infrastructure from a technical perspective (refer to Figure 1). This exercise considered the on-site wind resource, local topography and environmental sensitivities identified during the pre-feasibility phase of the process. This layout is expected to be approximately 80% accurate and would be

[5] "Alternative A.." refer to activity, process, technology or other alternatives.

refined in the final design phase of the process in terms of additional on-site wind data and any additional environmental sensitivities identified through this assessment.

In order to assess the potential impacts associated with the proposed facility, it was necessary to understand the extent of the area affected by the proposed development. This affected area will include the area infrastructure (i.e. wind turbines, concrete foundations, underground cabling, internal access roads, substation, and the office workshop), as well as temporary disturbance areas (i.e. laydown areas, temporary access roads for mobile construction equipment, etc.). A wind energy facility is dissimilar to all other power generation facilities in that it does not result in the disturbance of an entire site and agricultural activities can continue undisturbed around the installed turbines.

A broader site of ~100 hectares was originally identified by the project developer for the purposes of establishing the proposed facility. From the results of the facility layout determination, it is apparent that the effective utilised area within the identified farm portion associated with the preliminary layout assessed within this Basic Assessment Report is only approximately 4.2 ha of the 100 ha extent. This amounts to 4.2% of the total 100 ha study area, and is illustrated in Figure 1.

The bulk of the study area required for the wind energy facility footprint would therefore not suffer any level of disturbance as a result of the required activities on site. In terms of the preliminary layout provided by Just Palm Tree Power at this stage, permanently affected areas comprise 24 turbine footprints (i.e. 24 foundation areas of 13 m x 13 m in extent), permanent internal access roads (up to 6 m in width). The footprint of the onsite switching station will be approximately 50m x 40m. Provision has been made within the design for a single-storey ancillary building within the substation area of approximately 2 000m^2 to accommodate the following:

» Control room
» Workshop
» HV switchgear Room
» Mess Room
» Toilets
» SCADA Room
» Storeroom

The area of permanent disturbance is estimated as follows:

	Road Access for both road options
Permanent Component –Within the facility	**Approximate extent (in m^2)**
24 Turbine footprints (each 13 m x 13m)	4 056
Permanent access roads (6 000 m x 6m wide)	36 000
Switching yard footprint (50m x 40m) including Office/ Workshop area	2 000
TOTAL (m^2)	**42 056** (of a total area of 1000000 m^2) **≈ 4.2% of site**

Temporarily affected areas comprise a laydown areas alongside each turbine of 1250m2 (50 m x 25 m); laydown area adjacent to the on-site switching station (with a footprint of up to 3000m2) as well as a track of up to an additional 6 m in width for the all terrain crane to move across the site. Turbines will be interconnected via a 315V:11kV step-up transformer and 3 or 4 way Ring Main Unit (RMU) will be located at the base of each tower. Turbines RMUs's will be interconnected via 11kV medium voltage cable buried approximately 1m below ground. The underground cables will be routed to follow the existing and proposed internal access roads as far as possible. The area of temporary disturbance is as follows:

Facility Component -Temporary	**Approximate area/extent (in m^2)**
1 laydown area near switching yard	3 000
24 Laydown areas (1 at each turbine) (50 m x 25 m)	1 250
Temporary crane travel track (6 000 x 6 m wide)	36 000
TOTAL	**39 000** (of a total area of 1000000m^2) **≈ 3.9% of site**

Therefore, a total area of 39 000 m^2 (i.e. ~0.0039 ha) can be anticipated to be disturbed to some extent during the construction of the wind energy facility. This amounts to ~**3.9%** of the total 100 ha area which will form part of the total wind energy facility site.

In addition to the above, two power line alternatives of approximately 2.7km and 3 km respectively in length is proposed.

or, for linear activities:

Alternative (power line alternatives):	**Length of the activity:**
Alternative P1 (preferred activity alternative)	2700m
Alternative P2 (if any)	3000m
Alternative P3 (if any)	m

Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Alternative (internal access road Alternatives:	**Size of the site/servitude:**
Alternative R1 (preferred activity alternative)	~6000m
Alternative R2 (if any)	~6000 m
Alternative R3 (if any)	m^2

Both road Alternatives will require approximately 6km (6000 m) of new access track to be constructed. Whilst Option 1 utilises an existing track, the resulting spurs result in little to no savings in new build. Considering this and transport/construction logistics, it is recommend that Option 2 be proposed as the preferred option from a technical perspective. Furthermore, Option 1 will clearly be more laborious in terms of construction traffic logistics, time and resulting degradation of road surfaces.

5. SITE ACCESS

Does ready access to the site exist?	YES ✓	NO
If NO, what is the distance over which a new access road will be built	m	

Describe the type of access road planned:

As the site falls within the De Beers Mining area, it is accessible through existing unnamed mine access roads. There are no numbered routes through the study area, but secondary roads do connect Hondeklip Bay and Koingnaas with one another and with the N7 which lies some 60km to the east of the site. The site has a network of existing un-surfaced tracks constructed for the operation of the mining works. The existing roads are hard-padded with a design capacity for 80t (i.e.40t truck plus 40t load).

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

6. SITE OR ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document.

The site or route plans must indicate the following:

6.1 the scale of the plan which must be at least a scale of 1:500;
6.2 the property boundaries and numbers of all the properties within 50 metres of the site;
6.3 the current land use as well as the land use zoning of each of the properties adjoining the site or sites;
6.4 the exact position of each element of the application as well as any other structures on the site;
6.5 the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, street lights, sewage pipelines, storm water infrastructure and telecommunication infrastructure;
6.6 all trees and shrubs taller than 1.8 metres;
6.7 walls and fencing including details of the height and construction material;
6.8 servitudes indicating the purpose of the servitude;
6.9 sensitive environmental elements within 100 metres of the site or sites including (but not limited thereto):
- rivers;
- the 1:100 year flood line (where available or where it is required by DWA);
- ridges;
- cultural and historical features;
- areas with indigenous vegetation (even if it is degraded or invested with alien species);

6.10 for gentle slopes the 1 metre contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the plan; and
6.11 the positions from where photographs of the site were taken.

A detailed site plan has been included as part of this report as **Appendix A**.

7. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this form**.** It must be supplemented with additional photographs of relevant features on the site, if applicable.

Colour photographs taken in the eight major compass directions with a description of each photograph are attached within **Appendix B**.

8. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of 1:200 as Appendix C for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

A facility illustration which represents a realistic image of the planned is attached within **Appendix C**.

9. ACTIVITY MOTIVATION

9(a) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	The capital cost will be ~R105 million	
What is the expected yearly income that will be generated by or as a result of the activity?	Revenues will be ~R20 million (revenues as opposed to profits) / year	
Will the activity contribute to service infrastructure?	YES ✓	NO
Is the activity a public amenity?	YES	NO ✓
How many new employment opportunities will be created in the development phase of the activity?	83 in total (excluding manufacturing team) **Breakdown as follows:** Specialists / Senior Management – 3 Skilled Workers – 5 Semi Skilled – 30 Un-skilled – 45 (Labourers) Manufacturing team will include: unskilled - 20 semi skilled - 10 and skilled - 3	
What is the expected value of the employment opportunities during the development phase?	R4.2 million	
What percentage of this will accrue to previously disadvantaged individuals?	Estimated between 65 – 75%	

How many permanent new employment opportunities will be created during the operational phase of the activity?	7
What is the expected current value of the employment opportunities during the first 10 years?	R 8 million
What percentage of this will accrue to previously disadvantaged individuals?	80%

9(b) Need and desirability of the activity

Motivate and explain the need and desirability of the activity (including demand for the activity):

NEED:			
1.	Was the relevant provincial planning department involved in the application?	YES ✓	NO
2.	Does the proposed land use fall within the relevant provincial planning framework?	YES ✓	NO
3.	If the answer to questions 1 and / or 2 was NO, please provide further motivation / explanation:		
	The proposed wind energy facility falls within the De Beers mining area. Liaison with the relevant provincial planning departments is however still necessary i.e. Provincial and District levels. The main issues associated with policy and planning is as follows: » *Agriculture and Agro-processing* » *Fishing and Mariculture* » *Mining and mineral processing* » *Transport* » *Manufacturing* » *Tourism*		

DESIRABILITY:			
1.	Does the proposed land use / development fit the surrounding area?	YES ✓	NO
2.	Does the proposed land use / development conform to the relevant structure plans, SDF and planning visions for the area?	YES ✓	NO
3.	Will the benefits of the proposed land use / development outweigh the negative impacts of it?	YES ✓	NO
4.	If the answer to any of the questions 1-3 was NO, please provide further motivation / explanation:		

	At the local level the Namakwa District Municipality IDP (Integrated Development Plan) identifies the need for a Renewable Energy Cluster and sets a target of establishing wind farms with a capacity to generate 200 MW within 3 Municipal areas, including the Kamiesberg Local Municipality.		
5.	Will the proposed land use / development impact on the sense of place?	YES	NO ✓
6.	Will the proposed land use / development set a precedent?	YES	NO ✓
7.	Will any person's rights be affected by the proposed land use / development?	YES	NO ✓
8.	Will the proposed land use / development compromise the "urban edge"?	YES	NO ✓
9.	If the answer to any of the question 5-8 was YES, please provide further motivation / explanation.		
	*The components associated with the proposed Koingnaas wind energy facility will have a **low** negative visual impact and, in so doing, impact on the landscape and rural sense of the place of the area will also be low.* *The proposed facility is located in an area that has been disturbed by diamond mining over the last 70 years. As such, the proposed Koingnaas wind energy facility site is located in an area where the natural landscape has been impacted upon by overburden dumps associated with diamond mining activities that have taken place over the past 70 years.* *In addition the proposed wind energy facility will be screened from the houses in Koingnaas by the existing tailings dump. The site will however be visible from the N7-Hondeklip road that provides access to the town of Koingnaas.* *The proposed wind energy facility is therefore located in an area that is not pristine and is, in many regards, very well suited for the establishment of wind turbines. The area is also sparsely populated. The significance of the potential cumulative social impacts, specifically the impact on the landscape and sense of place, is therefore rated as being low (refer to Social Impact Assessment contained in Appendix D9).*		

BENEFITS:			
1.	Will the land use / development have any benefits for society in general?	YES ✓	NO
2.	Explain:		
	Just Palm Tree Power is a South African turbine manufacturing company.		

	Therefore, the project intends to make use of South African designed and built wind turbine generators, and provides an opportunity for South Africa to take a market share in the renewable industry. In addition, the proposed project will provide a small contribution towards the government's goal of 17GW renewable energy by 2030. This will have a benefit at a national level.		
3.	Will the land use / development have any benefits for the local communities where it will be located?	YES ✓	NO
4.	Explain:		
	As far as possible local labour will be used. Former mine workers that are now unemployed will particularly be chosen. The only requirement from De Beers is that they are given safety induction by De Beers and have appropriate medicals to comply with the Mine Health and Safety Act. Just Palm Tree Power would aim to source general workers where possible, primarily from Koingnaas, Komagas, Hondeklip Bay and other surrounding areas, and will source workers from further afield if skills not available locally or cannot be reasonably trained for local people. Just Palm Tree Power has indicated that they are committed to establishing a Community Trust as a part owner of the project. In terms of the agreement a percentage of the dividends from the project will accrue to the Community Trust. This revenue will in turn be used to fund and support local economic development. The Community Trust will own ~ 10% of the project.		

10. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

Legislation	*Applicable Requirements*	*Relevant Authority*	*Compliance requirements*
National Legislation			
» National Environmental Management Act (Act No. 107 of 1998)	» NEMA requires, inter alia, that: ∗ Development must be socially, environmentally, and economically sustainable." ∗ Disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied." ∗ A risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions." » EIA Regulations have been promulgated in terms of Chapter 5. Activities which may not commence without an environmental authorisation are identified within these Regulations. » In terms of S24(1) of NEMA, the potential impact on the environment associated with these listed activities	» National Department of Environmental Affairs » Northern Cape Department of Environment and Nature Conservation (DENC)	» This EIA Report is to be submitted to the DEA for review and decision making. » The DENC will act as the commenting authority.

Legislation	*Applicable Requirements*	*Relevant Authority*	*Compliance requirements*
	must be considered, investigated, assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation. » In terms of GNR 543 of 18 June 2010, a full Scoping and EIA Process is required to be undertaken for the proposed project.		
» National Environmental Management Act (Act No. 107 of 1998)	» A project proponent is required to consider a project holistically and to consider the cumulative effect of potential impacts. » In terms of the Duty of Care provision in S28(1) the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with a project is avoided, stopped or minimised.	» National Department of Environmental Affairs	» While no permitting or licensing requirements arise directly, the holistic consideration of the potential impacts of the proposed project has found application in the EIA Phase. » The implementation of mitigation measures are included as part of the Draft EMP and will continue to apply throughout the life cycle of the project.
» National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	» In terms of the Biodiversity Act, the developer has a responsibility for: * The conservation of endangered ecosystems and restriction of activities according to the categorisation of the area (not just	» National Department of Environmental Affairs	» As the applicant will not carry on any restricted activity in terms of S57, no permit is required to be obtained in this regard. » In terms of GNR 152 specialist flora and fauna studies have

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
	by listed activity as specified in the EIA regulations). * The application of appropriate environmental management tools to ensure integrated environmental management of activities. * Limit further loss of biodiversity and conserve endangered ecosystems. » In terms of S57, a person may not carry out a restricted activity involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 4. In this regard the Minister of Environmental Affairs has published a list of critically endangered, endangered, vulnerable, and protected species in GNR 151 in Government Gazette 29657 of 23 February 2007 and the regulations associated therewith in GNR 152 in GG29657 of 23 February 2007, which came into effect on 1 June 2007. » In terms of S75, (1) The control and eradication of a listed invasive species must be carried out by means of methods that are appropriate for the species concerned and the environment in which it occurs. (2) Any action taken		been undertaken as part of the EIA process. These studies have been undertaken as part of the previously EIAs undertaken for the power station site. » A permit may be required should any protected plant species on site be disturbed or destroyed because of the proposed development.

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
	to control and eradicate a listed invasive species must be executed with caution and in a manner that may cause the least possible harm to biodiversity and damage to the environment. (3) The methods employed to control and eradicate a listed invasive species must also be directed at the offspring, propagating material and re-growth of such invasive species in order to prevent such species from producing offspring, forming seed, regenerating, or re-establishing itself in any manner. » In terms of GNR 152 of 23 February 2007: regulations relating to listed threatened and protected species, the relevant specialists must be employed during the EIA Phase to incorporate the legal provisions as well as the regulations associated with listed threatened and protected species (GNR 152) into specialist reports in order to identify permitting requirements. » In terms of GNR 1477 of 2009: Draft National List of Threatened Ecosystems published under S52(1)(a) of the Act provides for the listing of threatened or protected ecosystems based on national		

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
	criteria. The list of threatened terrestrial ecosystems supersedes the information regarding terrestrial ecosystem status in the National Spatial Biodiversity Assessment (2004). » GNR1187 Amendment of Critically Endangered, Endangered, Vulnerable and Protected Species List published under S56(1)of the Act.		
» National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)	» 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. » In terms of the regulations published in terms of this Act (GN 718), a Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities. » Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that (a) 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; (b) Adequate measures are taken to prevent accidental spillage or leaking; (c) The waste cannot be blown away;	» National Department of Water and Environmental Affairs » Provincial Department of Environmental Affairs	» A waste license will be required for the storage of waste, and for the waste water treatment plant. » By virtue of these volumes an EIA process is required to be undertaken. » Waste handling, storage and disposal during construction and operation is required to be undertaken in accordance with the requirements of this Act, as detailed in the EMP.

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
	(d) Nuisances such as odour, visual impacts and breeding of vectors do not arise; and (e) Pollution of the environment and harm to health are prevented.		
» National Environmental Management: Air Quality Act (Act No. 39 of 2004)	» S18, S19 and S20 of the Act allow certain areas to be declared and managed as "priority areas" » Declaration of controlled emitters (Part 3 of Act) and controlled fuels (Part 4 of Act) with relevant emission standards » The Act provides that an air quality officer may require any person to submit an atmospheric impact report if there is reasonable suspicion that the person has failed to comply with the Act.	» National Department of Environmental Affairs » Local authority	» While no permitting or licensing requirements arise from this legislation, this act will find application during the construction phase of the project.
» National Water Act (Act No. 36 of 1998)	» Under S21 of the act, water uses must be licensed unless such water use falls into one of the categories listed in S22 of the Act or falls under the general authorisation. » In terms of S19, the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to prevent and remedy the effects of pollution to water resources from occurring, continuing, or recurring.	» National Department of Water Affairs » Northern Cape Department of Water Affairs	» No water will be required for the operational phase of the Wind Energy Facility.
» Environment	» National Noise Control Regulations (GN	» National Department of	» There is no requirement for a

Legislation	*Applicable Requirements*	*Relevant Authority*	*Compliance requirements*
Conservation Act (Act No. 73 of 1989)	R154 dated 10 January 1992)	Environmental Affairs » Northern Cape Department of Environment and Nature Conservation » Local Authorities	noise permit in terms of the legislation.
» Minerals and Petroleum Resources Development Act (Act No. 28 of 2002)	» A mining permit or mining right may be required where a mineral in question is to be mined (i.e. materials from a borrow pit) in accordance with the provisions of the Act. » Requirements for Environmental Management Programmes and Environmental Management Plans are set out in S39 of the Act.	» Department of Minerals and Energy	» As no borrow pits are expected to be required for the construction of the facility, no mining permit or mining right is required to be obtained.
» National Heritage Resources Act (Act No. 25 of 1999)	» S38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including » The construction of a road, power line, pipeline, canal or other similar linear development or barrier exceeding 300 m in length; » Any development or other activity which will change the character of a site exceeding 5 000 m^2 in extent » The relevant Heritage Authority must be notified of developments such as linear developments (i.e. roads and power	» South African Heritage Resources Agency	» As per S38 an HIA has been undertaken as part of the EIA Phase. » A permit may be required should identified cultural/heritage sites on site be required to be disturbed or destroyed as a result of the proposed development. » If concentrations of archaeological heritage material and human remains are uncovered during construction,

Legislation	*Applicable Requirements*	*Relevant Authority*	*Compliance requirements*
	lines), bridges exceeding 50 m, or any development or other activity which will change the character of a site exceeding 5 000 m^2; or the re-zoning of a site exceeding 10 000 m^2 in extent. This notification must be provided in the early stages of initiating that development, and details regarding the location, nature and extent of the proposed development must be provided. » Stand alone HIAs are not required where an EIA is carried out as long as the EIA contains an adequate HIA component that fulfils the provisions of S38. In such cases only those components not addressed by the EIA should be covered by the heritage component.		all work must cease immediately. The find must be reported to a heritage specialist so that systematic and professional investigation/ excavation can be undertaken.
» National Forests Act (Act No. 84 of 1998)	» In terms of S5(1) no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a license granted by the Minister to an (applicant and subject to such period and conditions as may be stipulated".	» National Department of Forestry	» This Act has found application during the EIA Phase and a recommendation will be made that a permit would need to be obtained for any protected trees that are affected.

Legislation	*Applicable Requirements*	*Relevant Authority*	*Compliance requirements*
	» GN 1042 provides a list of protected tree species.		
» National Veld and Forest Fire Act (Act 101 of 1998)	» Provides requirements for veldfire prevention through firebreaks and required measures for fire-fighting. Chapter 4 places a duty on landowners to prepare and maintain firebreaks, and Chapter 5 places a duty on all landowners to acquire equipment and have available personnel to fight fires. » In terms of S21 the applicant would be obliged to burn firebreaks to ensure that should a veldfire occur on the property, that it does not spread to adjoining land. » In terms of S12 the firebreak would need to be wide and long enough to have a reasonable chance of preventing the fire from spreading, not causing erosion, and is reasonably free of inflammable material. » In terms of sS17ection 17, the applicant must have such equipment, protective clothing, and trained personnel for extinguishing fires.	» Department of Forestry	» While no permitting or licensing requirements arise from this legislation, this act will find application during the operational phase of the project in terms of fire prevention and management.
» Government Notice No. 1477 of 2009: Draft National List of	» Published under S52(1)(a) of NEMA: Biodiversity Act (Act No. 10 of 2004), it provides for the listing of threatened or	» Provincial Department of Environmental Affairs	» N/A

Legislation	*Applicable Requirements*	*Relevant Authority*	*Compliance requirements*
Threatened Ecosystems	protected ecosystems based on national criteria. The list of threatened terrestrial ecosystems supersedes the information regarding terrestrial ecosystem status in the National Spatial Biodiversity Assessment (2004).		
» Subdivision of Agricultural Land Act (Act No. 70 of 1970)	» Details land subdivision requirements and procedures. Applies for subdivision of all agricultural land in the province	» National Department of Agriculture	» Subdivision will have to be in place prior to any subdivision approval in terms of S24 and 17 of LUPO. » Subdivision is required to be undertaken following the issuing of an environmental authorisation for the proposed project.
» Hazardous Substances Act (Act No. 15 of 1973)	» 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,	» Department of Health	» It is necessary to identify and list all the Group I, II, III, and IV hazardous substances that may be on the site and in what operational context they are used, stored or handled.

Legislation	*Applicable Requirements*	*Relevant Authority*	*Compliance requirements*
	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 to be Group I or Group II hazardous substance; » Group IV: any electronic product; » 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.		
» National Road Traffic Act (Act No 93 of 1996)	» 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.	» South African National Roads Agency Limited (national roads) » Provincial Department of Transport	» No abnormal load/vehicle permit will be required to transport the various components to site for construction as the turbine components are small and abnormal loads will not be necessary.

Legislation	*Applicable Requirements*	*Relevant Authority*	*Compliance requirements*
	» 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 made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations.		
» Development Facilitation Act (Act No 67 of 1995)	» Provides for the overall framework and administrative structures for planning throughout the Republic » S2- 4 provide general principles for land development and conflict resolution.	» Local and District Municipality	» The applicant must submit a land development application in the prescribed manner and form as provided for in the Act. » A land development applicant who wishes to establish a land development area must comply with procedures set out in the Act.
» Promotion of Access to	» All requests for access to information	» National Department of	» No permitting or licensing

Legislation	***Applicable Requirements***	***Relevant Authority***	***Compliance requirements***
Information Act (Act No. 2 of 2000)	held by state or private body are provided for in the Act under S11.	Environmental Affairs	requirements.
» Promotion of Administrative Justice Act (Act No. 3 of 2000)	» In terms of S3 the government is required to act lawfully and take procedurally fair, reasonable, and rational decisions. » Interested and affected parties have right to be heard.	» National Department of Environmental Affairs	» No permitting or licensing requirements.
Provincial Legislation			
» Northern Cape Nature Conservation Act, No. 9 of 2009	» This Act provides for: * The sustainable utilisation of wild animals, aquatic biota and plants. * Offences and penalties for contravention of the Act. * The appointment of nature conservators to implement the provisions of the Act. » The Act provides lists of protected species for the Province.	» Northern Cape Department of Environmental Affairs	» No permitting requirements have been identified however several mitigation measures will find place in the management of the project in terms of: * Erection of boundary fences. * Impact on aquatic habitats. * Management of invasive species.
Nature Conservation Ordinance (Act No. 19 of 1974)	» Article 63 prohibits the picking of certain fauna (including cutting, chopping, taking, and gathering, uprooting, damaging, or destroying). » Schedule 3 lists endangered flora and Schedule 4 lists protected flora. » Articles 26 to 47 regulate the use of wild animals.	» Provincial Department of Environmental Affairs	» No permitting or licensing requirements arise from this legislation for the proposed activities to be undertaken for the proposed project.

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
Guideline Documents			
» Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads	» Outlines 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.	» Provincial Department of Transport	» N/A
Policies and White Papers			
» The White Paper on the Energy Policy of the Republic of South Africa (December 1998)	» Investment in renewable energy initiatives, such as the proposed solar energy facility, is supported by this white Paper.	» N/A	» N/A
» The White Paper on Renewable Energy (November 2003)	» This Paper sets out Government's vision, policy principles, strategic goals and objectives for promoting and implementing renewable energy in South Africa.	» N/A	» N/A
» Kamiesberg Local Municipality, Integrated Development Plan (2005)	» According to the Municipal Systems Act of 2000, all Municipalities have to undertake an Integrated Development Planning (IDP) process to produce Integrated Development Plans (IDPs). As the IDP is a legislative requirement it has a legal status and it supersedes all other plans that guide development at local	» Kamiesberg Local Municipality	» N/A

Legislation	*Applicable Requirements*	*Relevant Authority*	*Compliance requirements*
	government level.		
» Namkwa District Municipality's Environmental Management Framework (2008)	» The purpose of the EMF is to ensure that future development in the Namakwa DM area occurs in a manner that is appropriate to the unique features and character of the area. The objectives of the EMF include: » The provision of strategic guidance for the area. » Assisting in the identification of "identified geographical areas" in terms of NEMA. » Assisting in the identification of "specified activities" within "identified geographical areas" in terms of NEMA. » The provision of a decision support system in respect to environmental attributes, issues, and priorities in the EMF area.	» Namakwa District Municipality	» N/A
» The White Paper on the Energy Policy of the Republic of South Africa (December 1998)	» Investment in renewable energy initiatives, such as the proposed solar energy facility, is supported by this white Paper.	N/A	N/A

11. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

11(a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?	YES ✓	NO
If yes, what estimated quantity will be produced per month?	~144m^3 is expected to be the total amount of waste to be generated from the construction of 24 wind turbines as no major earthworks will be required on the site for the construction of the installation of the Wind Energy Facility.	

How will the construction solid waste be disposed of (describe)?

Trucks will be used to transport the waste to a suitable waste disposal facility.

Where will the construction solid waste be disposed of (describe)?

Waste will be minimal. Any solid construction waste will be removed from site and disposed of at the mine's waste facility. If necessary, the waste will be taken back to Springbok and disposed of there at a suitable waste disposal site in terms of their municipal regulations.

Will the activity produce solid waste during its operational phase?	YES	NO ✓
If yes, what estimated quantity will be produced per month?	m^3	

How will the solid waste be disposed of (describe)?

Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?	YES	NO ✓

If yes, inform the competent authority and request a change to an application for scoping and EIA.

Is the activity that is being applied for a solid waste handling or treatment facility?	YES	NO ✓

If yes, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

11(b) Liquid effluent

	YES	NO
Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?		✓
If yes, what estimated quantity will be produced per month?	m^3	
Will the activity produce any effluent that will be treated and/or disposed of on site?		✓

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

	YES	NO
Will the activity produce effluent that will be treated and/or disposed of at another facility?		✓

If yes, provide the particulars of the facility:

Facility name:			
Contact person:			
Postal address:			
Postal code:			
Telephone:		Cell:	
E-mail:		Fax:	

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

11(c) Emissions into the atmosphere

	YES	NO
Will the activity release emissions into the atmosphere?		✓
If yes, is it controlled by any legislation of any sphere of government?	YES	NO

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the emissions in terms of type and concentration:

Wind energy installations operate by converting wind energy into electricity. This is characterised as a non-consumptive use of a natural resource and consumes no fuel for its continuing operation. Wind power produces an insignificant quantity of greenhouse gases over its lifecycle as compared to conventional coal-fired power stations. The operational phase of a wind energy facility does not produce carbon dioxide, sulphur dioxide, mercury, particulates, or any other type of air pollution.

11(d) Generation of noise

	YES	NO
Will the activity generate noise?	✓	
If yes, is it controlled by any legislation of any sphere of government?	✓	

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.
If no, describe the noise in terms of type and level:

A Screening noise impact assessment based on a desktop study as defined in SANS 10328:2008 was undertaken by MENCO (Refer to Appendix D). The study concluded the following:

» *The proposed wind turbine is relatively small;*
» *The proposed wind turbine is not very high (comparing to the larger 60 – 120 meters above ground level turbine);*
» *The area already has an industrial noise source situated between the proposed WEF and the closest noise-sensitive receptor (i.e. the town of Koningaas);*
» *The proposed WEF would be too far from any potentially noise-sensitive receptor to pose any significant risk of a noise disturbance being created by either the construction or operational phase.*

It was therefore recommended that no further noise studies are required.

12. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es)

municipal	water board	groundwater	river, stream, dam or lake	other	the activity will not use water
					✓

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate
the volume that will be extracted per month: litres

	YES	NO
Does the activity require a water use permit from the Department of Water Affairs?		✓

If yes, please submit the necessary application to the Department of Water Affairs and attach proof thereof to this application if it has been submitted.

13. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

The proposed facility is for the generation of electricity.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

This is not applicable as the installation itself is a renewable/alternative energy project.

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

1. For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section C and indicate the area, which is covered by each copy No. on the Site Plan.

Section C Copy No. (e.g. A):

2. Paragraphs 1 - 6 below must be completed for each alternative.

3. Has a specialist been consulted to assist with the completion of this section?	YES	NO ✓

If YES, please complete the form entitled "Details of specialist and declaration of interest"
for each specialist thus appointed:
All specialist reports must be contained in Appendix D.

Property description/physical address:	The proposed site lies within the De Beers Mining Area located ~ 3 km southwest of the town of Koingnaas, 10 km north of Hondeklipbaai and ~104 northwest of Garies in the Northern Cape Province, within the Namakwa District Municipality and Kamiesberg Local Municipality.
	(Farm name, portion etc.) Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application.
	Koingnaas 745
	In instances where there is more than one town or district involved, please attach a list of towns or districts to this application.
Current land-use zoning:	Agriculture, currently utilised for mining
	In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to , to this application.

Is a change of land-use or a consent use application required?	YES	NO ✓
Must a building plan be submitted to the local authority?	YES	NO ✓

Locality map: An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.) The map must indicate the following:

- an indication of the project site position as well as the positions of the alternative sites, if any;
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection)

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
✓ (Except for small section - Wolfkop hill, which is an isolated feature found on the site)	✓ Around foot of hill					

Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

2.1 Ridgeline
2.2 Plateau
2.3 Side slope of hill/mountain
2.4 Closed valley
2.5 Open valley
2.6 Plain
2.7 Undulating plain / low hills
2.8 Dune
2.9 Seafront

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following (tick the appropriate boxes)?

	Alternative S1:		**Alternative S2 (if any):**		**Alternative S3 (if any):**	
Shallow water table (less than 1.5m deep)	YES	NO ✓	YES	NO	YES	NO
Dolomite, sinkhole or doline areas	YES	NO ✓	YES	NO	YES	NO
Seasonally wet soils (often close to water bodies)	YES	NO ✓	YES	NO	YES	NO
Unstable rocky slopes or steep slopes with loose soil	YES	NO ✓	YES	NO	YES	NO
Dispersive soils (soils that dissolve in water)	YES	NO ✓	YES	NO	YES	NO
Soils with high clay content (clay fraction more than 40%)	YES	NO ✓	YES	NO	YES	NO
Any other unstable soil or geological feature	YES	NO ✓	YES	NO	YES	NO
An area sensitive to erosion	YES	NO ✓	YES	NO	YES	NO

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

4. GROUNDCOVER

Indicate the types of groundcover present on the site:

The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld - ~~good condition~~[E] ✓ Most of the site is impacted by mining activities	Natural veld with scattered aliens[E]	Natural veld with heavy alien infestation[E]	Veld dominated by alien species[E]	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an "[E] "is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

Most of the site has no aliens present, but the area has been impacted by mining activities. A botanical specialist study has been conducted and was used for the completion of this section (Refer to Appendix D).

5. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that does currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

5.1 Natural area
5.2 Low density residential
5.3 Medium density residential
5.4 High density residential
5.5 Informal residential[A]
5.6 Retail commercial & warehousing
5.7 Light industrial
5.8 Medium industrial [AN]
5.9 Heavy industrial [AN]
5.10 Power station
5.11 Office/consulting room
5.12 Military or police base/station/compound

5.13 Spoil heap or slimes dam[A]
5.14 Quarry, sand or borrow pit
5.15 Dam or reservoir
5.16 Hospital/medical centre
5.17 School
5.18 Tertiary education facility
5.19 Church
5.20 Old age home
5.21 Sewage treatment plant[A]
5.22 Train station or shunting yard [N]
5.23 Railway line [N]
5.24 Major road (4 lanes or more) [N]
5.25 Airport [N]
5.26 Harbour
5.27 Sport facilities
5.28 Golf course
5.29 Polo fields
5.30 Filling station [H]
5.31 Landfill or waste treatment site
5.32 Plantation
5.33 Agriculture
5.34 River, stream or wetland
5.35 Nature conservation area
5.36 Mountain, koppie or ridge
5.37 Museum
5.38 Historical building
5.39 Protected Area
5.40 Graveyard
5.41 Archaeological site
5.42 Other land uses (describe)

If any of the boxes marked with an "[N] "are ticked, how will this impact / be impacted upon by the proposed activity?

If any of the boxes marked with an "[An]" are ticked, how will this impact / be impacted upon by the proposed activity?

The proposed site falls within a De Beers diamond mining area. De Beers have given Just Palm Tree Power permission to develop the wind energy facility on the proposed site, which takes the mining activities into consideration. No current or future mining activities will therefore be impacted upon by the proposed development.

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity.
If YES, specify and explain:
If YES, specify:

6. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or palaeontological sites, on or close (within 20m) to the site?	YES ✓	NO
	Uncertain	

If YES, explain :	Archaeological material is abundant on the site and surrounds and will potentially be impacted negatively by the proposed wind energy facility. The distribution of archaeological sites is focused on the Wolfkop hill with the result that most impacts will occur in this area. A number of neighbouring archaeology sites on the summit of Wolfkop were all listed for mitigation because of the strong likelihood that they could be related. Although no sites of high archaeological significance were located, some mitigation will be required to rescue material and data. Sites requiring mitigation are mapped in the Heritage Specialist Report (Refer to Appendix D).

If uncertain, conduct a specialist investigation by a recognised specialist in the field to establish whether there is such a feature(s) present on or close to the site.

Briefly explain the findings of the specialist:	The proposed wind energy facility is certainly feasible from a heritage perspective. There are a number of archaeological sites that require mitigation (as described in the specialist report contained within appendix D). The listing makes an estimate of mitigation required based on roads and cable trenches following the turbine rows as shown in Figures 38 and 39 of the heritage specialist report. Should the final turbine layout be different from the preliminary layout provided by the developer, then a new estimate of mitigation requirements will need to be provided. Since no sites requiring in situ conservation were found, it is advisable that any reconfiguration of the layout that is required in terms of other impacts should be finalised and then the new layout sent to the heritage consultant for further examination. At this time it will be possible to provide a final estimate of mitigation requirements.

Will any building or structure older than 60 years be affected in any way?	YES	NO ✓

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	YES	NO
	✓ If sites are directly affected by infra-structure	

If yes, please submit or, make sure that the applicant or a specialist submits the necessary application to SAHRA or the relevant provincial heritage agency and attach proof thereof to this application if such application has been made.

In terms of the NHRA, SAHRA will require a permit application from the heritage specialist to mitigate impacts and a separate permit application submitted by the developer to destroy non-mitigated heritage. One of the mitigation measures included in the heritage impact assessment states that the developer is advised to conserve all heritage sites that can easily be avoided.

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT

The person conducting a public participation process must take into account any guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of the application which is subjected to public participation by—

(a) fixing a notice board (of a size at least 60cm by 42cm; and must display the required information in lettering and in a format as may be determined by the competent authority) 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;
(b) giving 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;
(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;
(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 local 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 subregulation 54(c)(ii); and

(e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desiring of but unable to participate in the process due to—
  (i) illiteracy;
  (ii) disability; or
  (iii) any other disadvantage.

2. CONTENT OF ADVERTISEMENTS AND NOTICES

A notice board, advertisement or notices must:

(a) indicate the details of the application which is subjected to public participation; and
(b) state—
  (i) that the application has been submitted to the competent authority in terms of these Regulations, as the case may be;
  (ii) whether basic assessment or scoping procedures are being applied to the application, in the case of an application for environmental authorisation;
  (iii) the nature and location of the activity to which the application relates;
  (iv) where further information on the application or activity can be obtained; and
  (iv) the manner in which and the person to whom representations in respect of the application may be made.

The above requirements were met through placement of adverts. Two rounds of adverts were placed as follows:

» EIA process advert which detailed the Basic Assessment process, the nature, and location of the proposed project, where further information on the proposed activity could be obtained and the manner in which representations on the application could be made (Refer to Figure 7 for content of the advert and site notice).
» Advert indicating the availability of the draft Basic Assessment Report and public meeting.

Please note that the newspaper adverts were just placed in Afrikaans as the area is Afrikaans dominated. This was confirmed in consultation with De Beers.

Copies of the advertisement and proof of placement is included within Appendix E.

KENNISGEWING VAN BASIESE OMGEWINGSIMPAKEVALUERINGSPROSES
OPENBARE DEELNAMEPROSES
VOORGESTELDE KOINGNAAS WINDKRAGAANLEG NABY KLEINSEE, NOORD-KAAPPROVINSIE
DEA Verwysingsnommer 12/12/20/2154

Projeknaam: **Koingnaas Windkragaanleg**

Applikant: Just Palm Tree Power

Voorgestelde aktiwiteit: Die oprigting van 'n windkragaanleg en gepaardgaande infrastruktuur in 'n De Beers mynbougebied suid van Kleinsee in die Noord-Kaapprovinsie. Die voorgestelde aanleg sal oor 'n opwekkingsvermoë van <20 MW beskik en uit die volgende gepaardgaande infrastruktuur bestaan:

- Windturbines en gepaardgaande fondasies;
- Kabels tussen die turbines, wat ondergronds gelê sal word waar prakties moontlik en aan 'n gesentraliseerde punt (d.i. 'n substasie op die terrein) gekoppel sal wees;
- 'n Baie kort 66 kV kraglyn, hetsy oorhoofs of ondergronds, om die aanleg met die myn se substasie te verbind;
- **Interne paaie** (sowat 6 m wyd) wat die windturbines en ander infrastruktuur op die terrein sal verbind. Bestaande paaie sal sover moontlik gebruik word; en
- **'n 33/66 kV substasie** wat binne die windkragaanleg geleë is. 'n Hoëspanningwerf (HS-werf) met 'n voetspoor van sowat 80 m x 90 m word aan die hand gedoen (indien die bestaande substasie oor genoeg kapasiteit beskik sal dit opgradeer en gebruik word, andersins sal 'n nuwe substasie opgerig moet word).
- 'n Werkswinkelgebied vir instandhouding en berging.

Ligging: Die windkragaanleg word voorgestel op die plaas Koingnaas 745, Somnaas 474 en Zwart Lintjes Rivier 484. **(NB: Geen alternatiewe perseële word oorweeg vir hierdie projek nie).**

Ingevolge die OIE-regulasies wat kragtens Artikel 24 (5) van die Nasionale Wet op Omgewingsbestuur (NEMA, Wet 107 van 1998) gepubliseer is, word magtiging van die Nasionale Departement Omgewingsake (DEA) (in oorleg met die tersaaklike provinsiale departement) verlang ten einde die voorgestelde aanleg te verwesenlik. Ingevolge Artikel 24 en 24D van NEMA, saamgelees met die OIE-regulasies van Staatskennisgewing R543, R544, R545 en R546, word verlang dat 'n Basiese Evalueringsproses onderneem word. Die projek is by die Nasionale Departement Omgewingsake geregistreer onder Aansoekverwysingsnommer **12/12/20/2154**.

In hierdie verband onderneem **Savannah Environmental** die verlangde omgewingsevaluering en openbare deelnameproses. Ten einde meer inligting te bekom en op die projek se databasis te registreer, verstrek asseblief u naam, kontakbesonderhede en belang by die projek aan:

Alicia Govender
Posadres: Posbus 148, Sunninghill, 2157
Tel: 011 234 6221 / Faks: 086 684 0547
E-pos: alicia@savannahsa.com
www.savannahSA.com

Savannah ENVIRONMENTAL (PTY) LTD

Figure 7: Content of Afrikaans newspaper advert and site notice

3. PLACEMENT OF ADVERTISEMENTS AND NOTICES

Where the proposed activity may have impacts that extend beyond the municipal area where it is located, a notice must be placed in at least one provincial newspaper or national newspaper, indicating that an application will be submitted to the competent authority in terms of these regulations, the nature and location

of the activity, where further information on the proposed activity can be obtained and the manner in which representations in respect of the application can be made, unless a notice has been placed in any *Gazette* that is published specifically for the purpose of providing notice to the public of applications made in terms of the EIA regulations.

Advertisements and notices must make provision for all alternatives.

The proposed facility is unlikely to result in any impacts that extend beyond the municipal area where it is located, apart from a small contribution to renewable energy provision at a national level. Therefore, placement of adverts in local and regional newspapers was considered adequate in terms of the requirements of the EIA Regulations.

The process adverts were placed accordingly in the following newspapers in Afrikaans only:

» Die Burger: 02 June 2011
» Die Namwakalander: 03 June 2011
» Namakwa Kletz: July 2011 edition

Meeting invitation and review period was advertised in the same newspapers as follows:

» Die Burger: 28 September 2011
» Die Namwakalander: 30 September 2011

Site notices were placed around the proposed site and surrounding areas within the De Beers mining area (Refer to Appendix B- Photographic record) as follows:

» English and Afrikaans site notices placed at De Beers office in Koingnaas
» Site notices placed on notice board within Koingnaas restricted area
» Site notices placed on the notice board at the FNB atm machine within Koingnaas restricted area
» Site notices placed on notice board within Koingnaas restricted area

4. DETERMINATION OF APPROPRIATE MEASURES

The practitioner must ensure that the public participation is adequate and must determine whether a public meeting or any other additional measure is appropriate or not based on the particular nature of each case. Special attention should be given to the involvement of local community structures such as Ward Committees, ratepayers associations and traditional authorities where appropriate. Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was inadequate.

» The Savannah team held a meeting with the Kamiesburg Local Municipality on the 7 March 2011.
» A site visit was undertaken on the 08 March 2011.
» Site notices were erected around the site and surrounding communities.
» Flyers and site notices were handed out/placed in Koingnaas town (i.e. FNB, security office, spar).
» BIDs (Background Information Documents) were distributed on the 11 October 2011 as follows:
  - 50 BIDs were left in each mail box at the Soebatsfontein post office,
  - ward councillor of Soebatsfontein (Elsabe Steenkamp) and a ward committee member (Mr Piet Claasen),
  - Koingnaas spar
  - Koingnaas petrol station,
  - Hondehokke guest house in Hondeklipbaai with Mr Attie Hough,
  - Rooispinnekop Restaurant in Hondeklipbaai
  - Houdhoop Skuur guest house near Koingnaas with Mrs Veronica van Dyk- one of the ward councillors for the Springbok area,
  - De Beers Mine with Magda van Wyk
  - Namakwa District Municipality in Springbok Office of the Municipal Manger with Madeleinne Brandt
  - Kamiesberg Local Municipality

A public meeting was held during the review period as follows:

Date: 11 October 2011
Venue: Koingnaas Chruch
Time: 17:00 -18:30

A focus group meeting were held as follows:
» Kamiesberg Local Municipality (7 March 2011)
» Namakwa National Park (11 October 2011)
» Soebatsfontein- with ward councillor (Elsabe Steenkamp) and ward committee member (Piet Claasen) on 11 October 2011

(Refer to Appendix E5 for minutes of all meetings)

The use of a stakeholder database and letters, an advertisement, and site notices, fliers and BIDs was deemed adequate for the involvement of the public in the process.

5. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments and respond to each comment of the public before the application is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to this application. The comments and response report must be attached under Appendix E.

A detailed comments and response report is included in Appendix E6.

6. AUTHORITY PARTICIPATION

Please note that a complete list of all organs of state and or any other applicable authority with their contact details must be appended to the basic assessment report or scoping report, whichever is applicable.

Authorities are key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input.

List of authorities informed:

- Northern Cape Department of Environment Affairs and Nature Conservation (DENC)
- Kamiesberg Local Municipality
- Namakwa District Municipality
- Department of Agriculture, Land Reform and Rural Development
- South African Civil Aviation Authority
- South African Heritage Resources Agency
- Heritage Northern Cape
- Eskom
- Northern Cape- Department of Water Affairs
- Namakwa National Park
- Department of Transport, Roads &Public Works
- Department of Energy- northern cape
- Department of Mineral Resources

(Refer to Appendix G2 for a list of organs of state that were contacted for comment)

List of authorities from whom comments have been received:

Comments from the Kamiesberg local municipality was collected during a Focus Group meeting held at the municipality on the 7 March 2011 (Refer to Appendix E5)

7. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for linear activities, or where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that subregulation to the extent and in the manner as may be agreed to by the competent authority.
Proof of any such agreement must be provided, where applicable.

Has any comment been received from stakeholders?	YES	NO
	✓	

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

1. Service provider for Transportation.
2. Supplier of sand for project.
3. Job creation for locals
4. Specialist service providers for rehabilitation and restoration in the Namaqualand Area, Concerns about studies: Namakwa dwarf adder – herpetology, vulnerable plant species – Fenestraria, heritage sites, geological stability.
5. Enquiry about start date of project.
6. Adequate consideration of potential impacts on bats.

(Refer to appendix E6 for a detailed comments and response report)

SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2010, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

List the main issues raised by interested and affected parties.

1. Connection to the Eskom Grid.
2. How would the community benefit from the proposed project?
3. Are there any benefits for the municipality?
4. Will local communities benefit from the proposed project?
5. Take town of Soebatsfontein into consideration for job opportunities.
6. Job creation and skills development.
7. Local labour/ companies can be sourced for Rehabilitation measures and transportation.
8. Issue with gravel access roads to the site should be upgraded.
9. Concerns about studies: Namakwa dwarf adder – herpetology, vulnerable plant species – Fenestraria, heritage sites, geological stability.
10. Bat study.
11. Bird and bat monitoring.
12. Site infrastructure and technical issues.

Response from the practitioner to the issues raised by the interested and affected parties (A full response must be given in the Comments and Response Report that must be attached to this report as Annexure E):

1. An 11kV overhead power line will be used to connect the Wind Energy Facility to the Eskom Grid at the Koingnaas Substation.
2. Communities can mostly benefit from the construction phase with the increase in jobs. They would not benefit in terms of getting electricity at a cheaper rate.
3. No direct benefits for the municipality have been established through the BAR process.
4. Communities can mostly benefit from the construction phase with the increase in jobs. They would not benefit in terms of getting electricity at a cheaper rate.
5. Councillors and ward committee members from Soebatsfontein was met with to discuss project scope.
6. The developer is currently looking at a social responsibility programme for its project and this will be clarified with the surrounding communities as the project develops.

7. Details of local companies will be forwarded to the developer for consideration.
8. All access routes to the proposed Koingnaas site will be investigated. The project intends to use existing roads to the site.
9. Various specialists studies have been undertaken, i.e. fauna; flora; heritage and soils studies. Potential impacts have been assessed and recommendations to mitigate impact on the surrounding environment have been made. A geotechnical study will be undertaken by the developer as part of the technical design phase. All specialist studies appended to the draft and final Basic Assessment Reports (Refer to Appendix D).
10. The potential impacts on bats from the proposed development has been considered in the Terrestrial fauna and bat study
11. Dr Rob Simmons who undertook the bird study (Refer to Appendix D7 of the draft basic assessment report) has recommended pre-construction bird monitoring. Due to the low probability of bat activity in the area, bat monitoring is not considered necessary on this site.
12. The Koingnaas Wind Energy Facility is proposed to be up to 7.2MW and use wind turbines constructed in South Africa. Each turbine will be up to 35 m in height.

(Refer to Appendix E6 for a detailed comments and response report)

2. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

List the potential direct, indirect and cumulative property/activity/design/technology/operational alternative related impacts (as appropriate) that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed.

The following methodology was used in assessing impacts related to the proposed development.

All impacts are assessed according to 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; or;
  * 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); and
  * 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); and
- 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).

2.1. Impacts that may Result from the Planning and Design Phase

Alternative (preferred alternative)

No impacts are anticipated that may result from the planning and design phase of the proposed development. The identified site has already been transformed by mining activities and therefore no excavation/exploratory work which may affect the environment is anticipated to be required.

2.2. Impacts that may Result from the Construction and Operational Phases

The total construction timescale is estimated at 32 – 40 weeks, subject to material availability and weather impacts.

The following primary construction activities will be undertaken:

1. Establish site construction compound (offsite).
2. Construct Internal Access Roads and crane laydown areas.
3. Construct turbine foundations.
4. Install below-ground electrical cables between turbine sites.
5. Establish onsite electrical substation compound.
6. Install onsite electrical substation infrastructure.
7. Complete building extension works at Koingnaas substation.
8. Construct 11kV overhead power lines connecting from site to De Beers Koingnaas substation.
9. Erect turbines.
10. Connect turbines to the on-site electrical substation
11. Commission site.
12. Site remediation.

The sections which follow provide a summary of the findings of the assessment undertaken for potential impacts associated with the construction and operation of the proposed Koingnaas Wind Energy Facility on the identified site. The nature of the potential impact is discussed; and the significance calculated with and without the implementation of mitigation measures. Recommendations are made regarding mitigation and management measures for potentially significant impacts and the possibility of residual and cumulative impacts are noted.

2.2.1. Assessment of Potential Impacts on Vegetation

Two vegetation types are found at the Koingnaas study area, namely Namaqualand Coastal Duneveld and Namaqualand Strandveld. Although heavily impacted by diamond mining within their range, and with low levels of statutory conservation status, both these vegetation types are classified as Least Threatened in the National Spatial Biodiversity Assessment (Rouget et. al. 2004) and are not mentioned in the Draft National List of Threatened Ecosystems (Notice 1477 of 2009, Government Gazette No. 32689).

The Koingnaas Marine Complex has been heavily impacted by diamond-mining. This is one of the reasons for selecting the wind energy facility footprint as has been proposed. There are however botanically sensitive habitats within the

proposed development area. They must be recognised at a local scale as important and should be avoided wherever possible.

Nature of Impact: Loss of sensitive natural vegetation and habitat arising from the construction of the WEF as proposed by the client

If the development of the wind energy facility is pursued there would be a **LOW NEGATIVE** impact in that part of the area rated as having low sensitivity whereas in the botanically sensitive part (refer to Figure 8), the impact would be **MEDIUM NEGATIVE** since vegetated dunes with old and well-established vegetation would be affected.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	High (2)
Probability	Highly probable (4)	Very improbable (1)
Significance	**Medium (56)**	**Low (13)**
Status (positive or negative)	Negative	Negative
Reversibility	Non-reversible	Reversible
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	

Mitigation:

» An alternative layout is suggested where 6 (six) turbines are moved to alternative positions (Refer to table Figure 8 below) in order to avoid sensitive botanical areas.

Cumulative impacts:

» Loss of natural habitat would occur but compared with the impacts of mining in the region this impact would be localised and small.

Residual impacts:

» Some loss of natural habitat but no anticipated loss of species

Nature of Impact: Loss of vegetation type and habitat including plant species due to construction and operation of roads for the Wind Energy Facility

The access roads required to reach the respective turbines will have a greater negative impact on the landscape than the turbines themselves. The result would be a Medium negative impact on the natural vegetation if the botanically sensitive area is not taken into account. The difference of impacts resulting from the layout of road Alternatives 1 and 2 (as indicated in Figures 5 and 6) are insignificant. The impact is expected to be high, but with mitigation proposed to realign the roads (as proposed in Figure 8) is recommended as a result of this botanical assessment, with its own pattern of access roads. If the turbines and associated access roads are relocated outside of sensitive areas, the overall effect would be Low negative impact.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Minor(2)

Probability	Probable (3)	Probable (3)
Significance	**Medium (36)**	**Low (24)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: » An alternative layout is suggested to avoid sensitive botanical areas identified (Refer to table Figure 8 below).		
Cumulative impacts: » Loss of natural habitat would occur but compared with the impacts of mining in the region this impact would be localised and small.		
Residual impacts: » Some loss of natural habitat but no anticipated loss of species		

Nature of Impact: Loss of vegetation type and habitat including plant species due to construction of the power line

The proposed power line routes mainly follow existing roads and will therefore not have any impact on natural flora or habitat except between waypoints KMC3 and KMC4 (Figure 9) on the north side of the tailings dump. Route 2b (Option 2 as discussed in the BA report – refer to Figure 4) has very little impact on natural vegetation, only near the substation. Route 2A (Option 1 as discussed in the BA report – refer to Figure 3) would traverse natural vegetation from KMC4 to KMC3 but it is not sensitive (Refer to Flora report for reference of points –Appendix D3).

The anticipated impacts would be LOW negative without and with mitigation. The only mitigation that is recommended is that if any old established vegetation on white dunes is likely to be affected, the route (applicable to 2A) should be slightly adjusted. A second mitigation would be to relocate any plants of *Aloe arenicola* that could be affected on route 2A. For these reasons route 2B (Option 2 as discussed in the BA report) would be more botanically acceptable.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Minor (1)	Minor (1)
Probability	Probable (3)	Very improbable (1)
Significance	**Low (21)**	**Low (7)**
Status (positive or negative)	Negative	Negative
Reversibility	Non-reversible	Non-reversible
Irreplaceable loss of resources?	Yes	
Can impacts be mitigated?	Yes	

Mitigation:
» Minor adjustment to Power line route to avoid any sensitive vegetation near substation.
» Sensitive species such as *Aloe arenicola* can be relocated.
Cumulative impacts:
» None
Residual impacts:
» None

Implications for project implementation

» A layout of 24 possible positions for wind-turbines has been designed for the Koingnaas wind energy facility (Refer to Figures 2, 3, 7 36, 38 & 39 of Botanical Report- Appendix D3). These positions would be linked by a road network required for construction of the infrastructure and for its maintenance during the operational phase. Three-quarters (18) of the proposed positions for turbines are located in areas considered to have low botanical sensitivity whereas six are located in an area of high botanical sensitivity as mapped in Figure 8.

» Where the proposed wind turbines would be located on non-botanically sensitive areas, the impact would be Low negative. In contrast, where this infrastructure would be located in areas of sensitive natural vegetation the local impact would be High negative. A certain amount of mitigation (by restoration) would be possible and is strongly recommended even in the botanically non-sensitive zone. Relocation of the six turbines (as a proposed third alternative) that would otherwise have high impact if Alternative 1 or 2 (as indicted in Figures 5 and 6) were followed, would be an immediate pre-construction mitigation.

» Despite the general Least Threatened status of the vegetation, it is still considered prudent to observe local vegetation patterns and ecological processes on the proposed Koingnaas wind energy facility site. It is for this reason that a map of sensitivity has been compiled and that it is recommended that the footprint of the facility be enlarged to accommodate alternative locations for six wind turbines and their associated access roads.

» Construction of the turbines must be carried out with caution and construction roads must be kept to a minimum. The construction phase should be closely monitored by an Ecological Control Officer who should identify any areas that would require rehabilitation in the post-construction phase. The restoration of those areas must follow the construction phase.

» The preferred power line route option is Option 2.

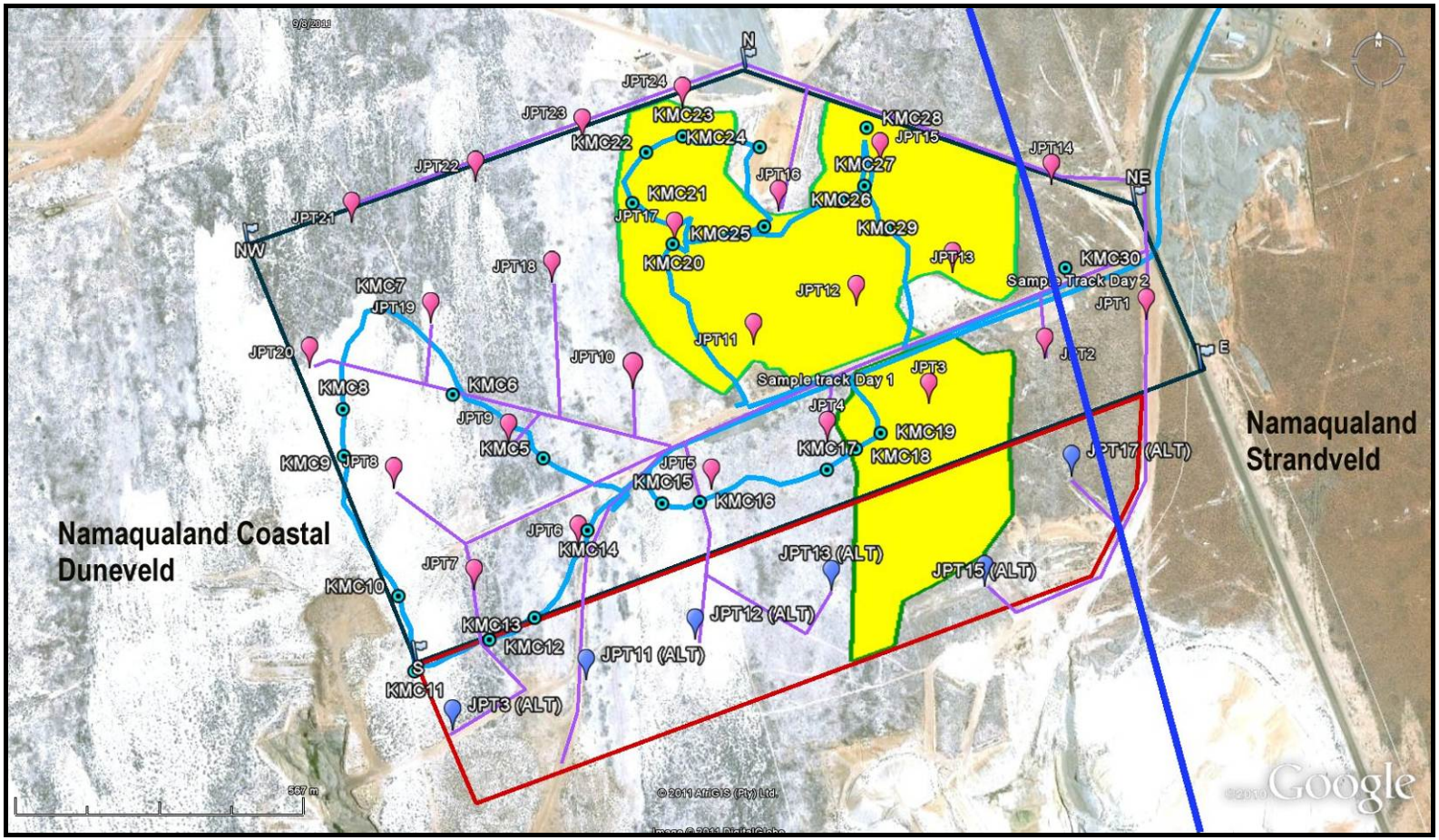


Figure 8: (Alternative 3 as proposed by Botanical Specialist) Proposed Alternative layout. The red markers the labels JPT# are the original positions of the turbines. The blue markers are the proposed relocated positions (JPT#ALT) for six turbines. The yellow area is the botanically sensitive zone. The sample waypoints are labelled KMC# with the light blue line, the sample track. The dark blue line denotes the approximate boundary between Namaqualand Coastal Duneveld and Namaqualand Strandveld.

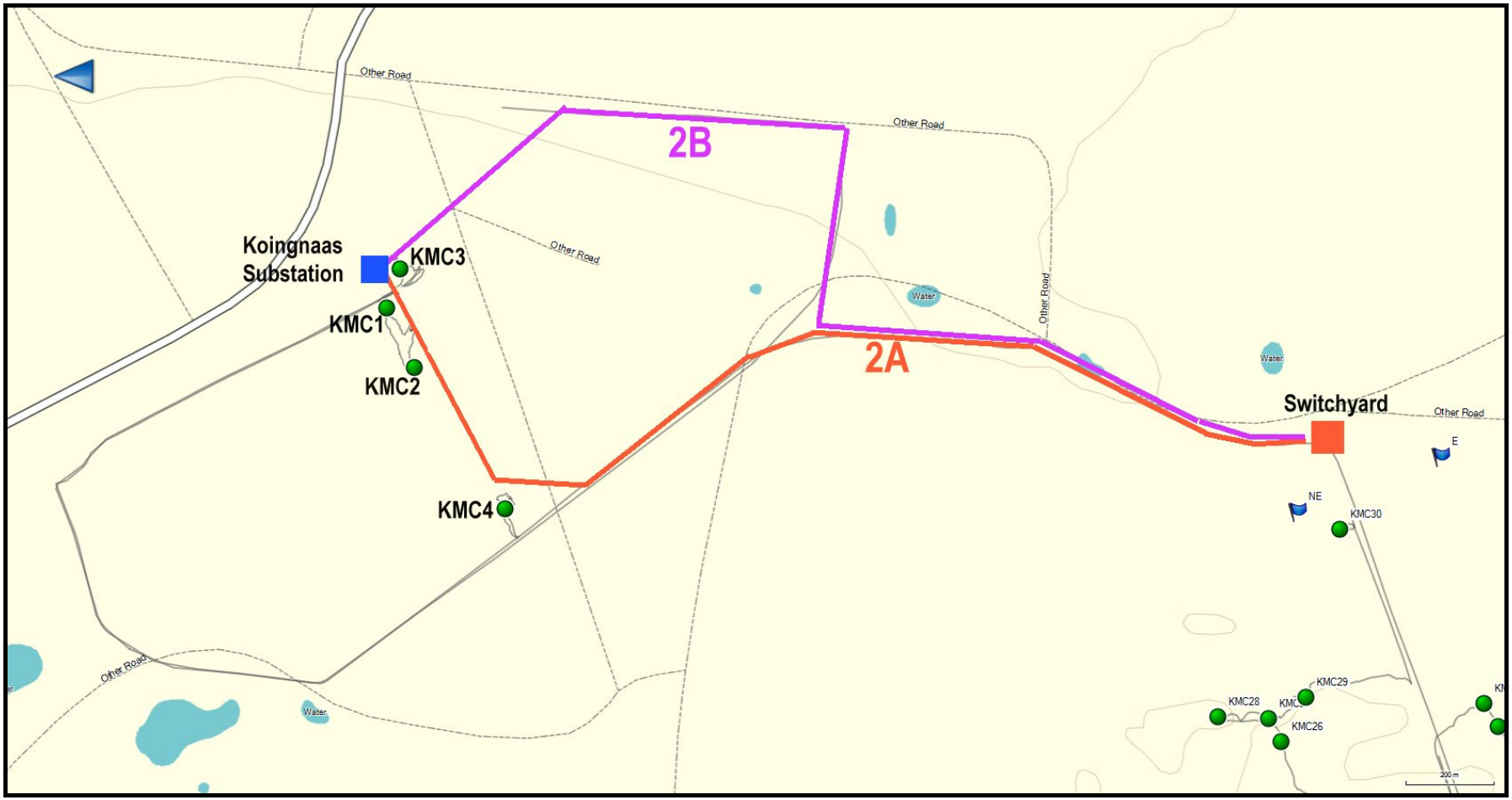


Figure 9: Alternative overhead power-line routes from the 'Switchyard' near the winjd energy facility to the Koingnaas Substation. Route 2b (Option 2 as discussed in the BA report) has very little impact on natural vegetation, only near the substation. Route 2A (option 1 as discussed in the BA report) would traverse natural vegetation from KMC4 to KMC3 but it is not sensitive.

2.2.2. Assessment of Potential Impacts on Terrestrial Fauna

There are five animal species of conservation concern that have a geographical distribution that includes the site and habitat preference that includes the type of habitat that could potentially occur on site. This includes the following species:

» Grant's Golden Mole (VU),
» Littledale's Whistling Rat (NT),
» Desert Rain Frog (VU),
» Namaqua Dwarf Adder (VU),
» Namaqua Plated Lizard (NT).

Most of the study area is in a disturbed condition. There is a small area of natural vegetation on site, but this appears to have been impacted upon by mining activities and is likely to be in poor condition. The remaining habitat on site is secondary or consists of mined areas. There is therefore a low probability of encountering any of the species of concern on site.

A risk assessment was undertaken which identified two potential negative impacts on threatened and/or protected terrestrial fauna species. The potential impacts are loss of habitat for potentially affected species due to construction and loss of individuals of potentially affected species due to construction and/or the activities of personnel on site. The significance of these impacts was assessed and it was determined both of these impacts are likely to be of low significance for all infrastructure components (refer to Appendix D4 for Faunal Report). On condition there is compliance with the relevant National and Provincial legislation with respect to individuals of threatened / protected species, it is unlikely that the proposed project will have any significant impacts on threatened and/or protected terrestrial fauna species.

Nature of Impact: Destruction/permanent loss of individuals of threatened plant species

Loss of individuals of threatened/protected terrestrial fauna caused due to the following proposed infrastructure:

» Wind Turbines,
» Internal access roads and underground cables between turbines,
» Ancillary infrastructure, including substation, and
» Overhead power lines

A total of 24 turbines have been proposed for the site. Internal access roads and underground cable will be between these turbines. At the most, two turbines (turbine 1 and 2) affect natural habitat, although in poor condition. The remainder is in disturbed areas or secondary habitat. Internal access roads will therefore affect only a small area of natural habitat.

	Without mitigation	With mitigation
Extent	Regional (3)	Regional (3)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Low (3)
Probability	Highly improbable (1)	Highly improbable (1)
Significance	**low (11)**	**low (10)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	

Mitigation:

» Personnel must be educated on the conservation value and/or protected status of potentially affected species and the fact that individuals of sensitive species may not be impacted on in any way that may affect the survival of the species (according to the National Environmental Management: Biodiversity Act) and that individuals of protected species may not be in the possession of any individual (Northern Cape Nature Conservation Act)..

Cumulative impacts:

» Extensive loss of habitat due to mining has already occurred. The current project may lead to additional loss of habitat that will exacerbate this impact, but the effect is insignificant compared to existing impacts on the landscape.

Residual impacts:

» Some loss of natural habitat will occur, but this is insignificant relative to the total extent of available habitat.

Nature of Impact: Loss of habitat within indigenous natural vegetation

Loss of habitat for threatened/ protected terrestrial fauna caused due to the following proposed infrastructure:

» Wind Turbines,
» Internal access roads and underground cables between turbines,
» Ancillary infrastructure, including substation, and
» Overhead power lines

A total of 24 turbines have been proposed for the site. Internal access roads and underground cable will be between these turbines. At the most, two turbines affect natural habitat (Turbines 1 and 2), although in poor condition. The remainder is in disturbed areas or secondary habitat. Internal access roads will therefore affect only a small area of natural habitat.

	Without mitigation	With mitigation
Extent	local (1)	N/a
Duration	permanent (5)	N/a
Magnitude	small (1)	N/a
Probability	Highly Improbably (1) -	N/a

	Improbable (2)	
Significance	**low (7 -14)**	**N/a**
Status (positive or negative)	negative	N/a
Reversibility	Not reversible	N/a
Irreplaceable loss of resources?	Yes	N/a
Can impacts be mitigated?	Not required	N/a
Mitigation: » None		
Cumulative impacts: » Extensive loss of habitat due to mining has already occurred. The current project may lead to additional loss of habitat that will exacerbate this impact, but the effect is insignificant compared to existing impacts on the landscape.		
Residual impacts: » Some loss of natural habitat will occur, but this is insignificant relative to the total extent of available habitat.		

Implications for project implementation

» The proposed project may impact on habitats of terrestrial fauna species. the effect is considered to be insignificant compared to existing impacts on the landscape.
» Comply with the relevant National and Provincial legislation with respect to individuals of threatened / protected species.

2.2.3. Assessment of Potential Impacts on Bats

Bats have been found to be particularly vulnerable to being killed by wind turbines. It has long been a mystery why they should be so badly affected since bat echo-location allows them to detect moving objects very well. A recent study in America has found that the primary cause for mortality is a combination of direct strikes and barotrauma (bats are killed when suddenly passing through a low air pressure region surrounding the turbine blade tips causing low pressure damage to the bat's lungs, Baerwald *et al*. 2008). The relative importance of this impact on bat populations depends on which species are likely to be affected, the importance of the site for those species and whether the site is within a migration corridor for particular bat species.

There are four bat species of potential conservation concern that could occur on site or in the surrounding areas namely:

» Angolan Wing-gland Bat,
» Natal Long-fingered Bat,
» Cape Horseshoe Bat and
» Geoffroy's Horseshoe Bat.

The Angolan Wing-gland Bat is listed as Vulnerable in South Africa (Friedmann & Daly 2004, Monadjem et al. 2010) and Near Threatened globally (www.iucn.org). The other three species are listed nationally as Near Threatened (Friedmann & Daly 2004, Monadjem et al. 2010) and globally as Least Concern (www.iucn.org).

The Angolan Wing-gland Bat is restricted to the arid western parts of southern Africa, typically in desert and semi-desert conditions. It is associated with riverine vegetation along dry river beds, which occur nearby in the Swartlintjiesrivier, and may roost in buildings, which also occur nearby. It is therefore highly likely to be found on site.

The Natal Long-fingered Bat occurs widely in the region, but more often in the southern and eastern parts than the arid west. It is predominantly a temperate to sub-tropical species with the core of its distribution in the savannas and grasslands of southern Africa. It is cave-dependent and congregates in huge numbers in suitable sites.

The Cape Horseshoe Bat roosts in caves and mine adits where it may form colonies of a thousand or more individuals. Its distribution is closely tied to the fynbos and succulent karoo biomes, it but forages predominantly in the canopy of trees.

Geoffroy's Horseshoe Bat occurs widely in southern African region, but less often in arid parts. It roosts in caves and subterranean habitats, such as mine adits, as well as rock hollows.

Nature of Impact: Collision of bats with turbine blades

These species discussed above could potentially be be affected by the **operation** of the Wind Energy Facility. These species may be negatively impacted by collisions with turbine blades. For two of the three cave-dwelling species (Natal Long-fingered Bat and Geoffroy's Horseshoe Bat), the site may constitute marginal foraging habitat. Loss of some individuals on site is therefore unlikely to have an effect on population numbers. Of greater concern is cumulative impacts from many wind energy facilities, most notably on the Cape Horseshoe Bat. The Angolan Wing-gland Bat is especially vulnerable to effects from the wind energy facility.

	Without mitigation	**With mitigation**
Extent	Regional (3)	Regional (3)
Duration	Long-term (4)	Long-term (4)
Magnitude	NT spp: Low (4) VU spp: Moderate (6)	NT spp: minor (2) VU spp: Low (4)
Probability	NT spp: probable (3) VU spp: highly probable (4)	NT spp: improbable (2) VU spp: probable (3)
Significance	**NT spp: medium (33)** **VU spp: medium (52)**	**NT spp: low (18)** **VU spp: medium (33)**
Status (positive or	Negative	Negative

negative)		
Reversibility	To some degree	To some degree
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Partially	

Mitigation:

» A preconstruction survey for bats should be undertaken to determine whether bat species of concern occur on site or not and whether roosting habitats or known important maternity roosts occur within close proximity to the site.
» If this preconstruction survey finds that the presence of bats or roosting habitats of concern occur, then a monitoring programme must be implemented to document the effect on bats of the turbines.
» The detail of this monitoring programme must be informed by the outcomes of the preconstruction survey.
» If the turbines are found to have a significant negative impact on bats then further measures will need to be implemented to control the impact, for example, halting operation during low wind conditions.
» A study done recently showed a 73% drop in bat fatalities when wind farm operations were stopped during low wind conditions, when bats are most active (Arnett et al. 2009).

Cumulative impacts:

» High number of proposed wind energy facilities will cause cumulative impacts on bats. Some species are more vulnerable to cumulative impacts than others. Of the species potentially affected by this project, the Cape Horseshoe Bat and Angolan Wing-gland Bat are most vulnerable to cumulative impacts.

Residual impacts:

» Some loss of individuals likely to occur, but the magnitude of this depends on the degree to which mitigation measures are applied.

Implications for project implementation

» Areas where caves are likely to be found in relation to the site are inland of the site (a minimum of 25 km away).
» It is possible that the site forms part of a migration route or foraging area for these species, but it is unlikely that they roost anywhere on site.
» It is therefore unlikely that the site forms an important locality for the three cave-dwelling species (Natal Long-fingered Bat, Cape Horseshoe Bat and Geoffroy's Horseshoe Bat), although they could be found on site and foraging individuals may be affected by the proposed wind energy facility.

2.2.4. Assessment of Potential Impacts on Avifauna

A suite of (4) raptors, two wetland birds and a bustard and korhaan were identified as being at risk from the proposed development given their presence in the area and their vulnerability to collision. The probability that they will be affected by the wind farm is sufficient to warrant mitigation measures in all cases, particularly for the bustard.

Nature of Impact: Direct mortality or avoidance of area around the wind farm for

the bird groups identified as at risk above, due to noise, or impacts with turbine blades

The following avifauna species are most likely to be impacted upon by the proposed Wind Energy Facility:

» Flamingo (LF)
» Raptors (R)
» Shelduck (SD)
» Ludwig's Bustard (LB)

	Without mitigation	**With mitigation**
Extent	**1**(LF, R, SD) **3** (LB)	**1** (LF, R, SD) **2** (LB)
Duration	**5** (LF, R, SD)	**5** (LF, R, SD, LB)
Magnitude	**4** (LF, R, SD) **8** (LB)	**3** (LF, R, SD) **6** (LB)
Probability	**3** (LF, SD, R) **4** (LB)	**3** (LF, SD, R) **4** (LB)
Significance	**Moderate** (**30** (LF, R, SD)) to **High** (**64** (LB))	**Low** (**27** (LF, R, SD)) to **Moderate** (**52** (LB))
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Reduced
Can impacts be mitigated?	Partially	

Mitigation:

» There are three classes of mitigation for birds around wind farms:
  (i) re-position the turbines to avoid intersecting the movements of the birds
  (ii) redesign the turbines to alter the present pattern/shape/size of the turbines so birds see them more readily and avoid contact or
  (iii) close down turbines when these birds approach.

  It is suggested that further research be undertaken as part of the pre-construction phase to determine where the flamingos fly on moving north and south and where the raptors and bustards forage. On present (limited) evidence, the development area is small and far enough from the coastal flyways that it will avoid impacting flamingo flyways. However, passage rates will need to be assessed through the pre-construction monitoring phase for the presence of bustards, korhaans and the raptors in the area.

» The following is also recommended:
  (i) As far as technically feasible, re-orientating the turbine strings more north-west and south-east to reduce the "barrier" effect for north-south flying birds while maximising wind energy production. This will also move the western-most turbine farther from the coast. Should this not be possible, the other forms of mitigation recommended should be considered.
  (ii) Painting one turbine blade with ultra-violet paint, (invisible to the human eye) readily seen by birds day and night.
  (iii) Cover the towers so they are smooth-sided, and thus do not provide birds with perch, roost or nest sites.

» Power lines: The proposed burying of the line between the turbines is positive for reducing bird impacts, but all above ground lines, even the small 11 kV line require bird flappers to reduce possible impacts. There is little difference expected in the

impacts to birds of the overhead lines Option 1 and Option 2. They are similar length (2.7 km vs 3.0 km) and follow boundaries near the tailings dam. Bird flappers are the only mitigation measure required.

Cumulative impacts:

» If resident territorial birds are killed by turbines then other individuals will be pulled in to take up the vacant territory. Thus for bustards that may reside in the area, the impact may be greater than just around the immediate vicinity of the wind farm. A local population reduction may occur as a result.
» Furthermore, if the wind farm is enlarged, or mine scrapes fill with water that attract wetland birds, then bird movements can change.
» Lattice towers, if not covered to prevent birds perching, roosting or nesting on them, could increase cumulative impacts for raptors and crows that build nests there in this tree-less environment. The present study assumes that the land use here will remain stable and no further mine scrapes will be placed near the wind farm.
» Cumulative impacts of the overhead power lines and the construction of a substation are expected to be minimal.

Residual impacts:

» After mitigation, direct mortality or area avoidance by the species identified above may still occur and further mitigation will be needed.

Implications for project implementation

» All turbines should be painted with UV paint (invisible to the human eye) that is highly visible to birds.
» Further monitoring in the pre-construction phase will give better data on the use of different parts of the wind farm by sensitive bird species.
» There is little difference expected in the impacts to birds of the overhead lines Option 1 and Option 2.
» Above ground power lines are not expected to impact birds but all should be fitted with bird flappers to reduce all possible impacts.

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

The agricultural potential of the site is very low due to climatic constraints, Therefore, the proposed development of a wind energy facility on the site will have no negative impacts on agricultural activities. The impacts on soils are small in comparison to historical mining impacts. The impacts should be limited to the immediate construction sites and rehabilitation measures should be implemented in line with those to be implemented by the mine.

Nature of Impact: Loss of agricultural potential and land capability owing to the proposed development

In the context of the impacts of the mining activities the additional impacts of the wind energy infrastructure will be negligible. Due to the sandy nature of the topsoil, rehabilitation of construction sites will have to be done to limit wind erosion. This will have to tie in with rehabilitation approaches followed by the mine.

	Without mitigation	**With mitigation**
Extent	Low (1) – Site	Low (1) – Site
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (2)	Low (2)
Probability	Highly probable (4)	Highly probable (4)
Significance	**32 (Low)**	**32 (Low)**
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Low (1) – Site	Low (1) – Site
Mitigation: » The loss of land is a long term loss and there are no mitigation measures that can be put in place to combat this loss. Mitigation is restricted to the limitation of the extent of the impact to the immediate area of impact and minimisation of off-site impacts.		
Cumulative impacts: » Soil erosion may arise due to altered surface water runoff. Adequate management and erosion control measures should be implemented.		
Residual impacts: » The loss of land is a long term loss. This loss extends to the post-construction phase. The agricultural potential is variable though and negative impacts can be limited through adequate planning for this within the layout.		

Implications for project implementation

» Limit physical impacts to as small a footprint as possible.
» Site management has to be implemented with the appointment of a suitable environmental control officer (ECO) to oversee the process, address problems and recommend and implement corrective measures.
» Implement site-specific erosion and water control measures to prevent excessive surface runoff from the site (turbines and roads).
» Plan the road and site layout in such a way as to make maximum use of existing roads to keep natural units as intact as possible.
» Prevent dust generation and vehicle associated pollution and spillages.

2.2.6. Assessment of Potential Visual Impacts

The combined results of the visual exposure, viewer incidence/perception and visual distance of the proposed wind energy facility are displayed on **Figure 10**. Here the weighted impact and the likely areas of impact have been indicated as a visual impact index. Values have been assigned for each potential visual impact per data category and merged in order to calculate the visual impact index.

An area with short distance, high frequency of visual exposure to the proposed facility, a high viewer incidence and a predominantly negative perception would

therefore have a higher value (greater impact) on the index. This helps in focussing the attention to the critical areas of potential impact when evaluating the issues related to the visual impact.

The following is of relevance:

» The visual impact index map clearly indicates potential areas of **moderate** visual impact within a 3 km radius of the proposed facility. This is mining land, already significantly impacted upon by surface-based mining.
» Areas of potentially high visual impact are limited to the western section of the small town of Koingnaas, and a small section of secondary road to the north east of the proposed wind energy facility.
» The extent of potential visual impact is somewhat reduced between the 3km and 6km radius. Areas to the east are shielded by the topography, while areas to the north south, and south east are likely to be exposed to **low** visual impact.
» Short stretches of secondary road and the eastern part of Koingnaas may be exposed to **moderate** visual impact within this zone. One small corner of the Namaqua National Park also falls within this zone, and will thus be exposed to moderate visual impact.
» The Swartlintjes River will be visually screened for its entire length through the study area, except near to the coast, where a short stretch may be exposed to moderate visual impact.
» Between 6km and 12km, the magnitude of visual impact is mostly reduced to **very low**.
» Exceptions are the secondary roads within 10km of the coastline, the towns of Hondeklip Bay and Noop, and some patches within the western Namaqua National Park. Potential visual impact within these areas is expected to be **low**.
» Remaining impacts beyond the 12km radius are expected to be **very low** to **negligible**.

It is important to note the overall high visual quality of the natural environments of the region, and specifically the Namaqua National Park. The environment possesses a harsh and rugged beauty which lends to the area to a specific sense of place and tourism value. Within this scenic context, the existing mining areas along the coastline are disturbed and visually apparent due to the scale and nature of the surface based mining activity. In this respect the visual quality of the receiving environment is already impacted upon to some extent.

Notwithstanding, it is envisaged that the proposed facility would be visible to observers travelling along roads, residing in the small towns or visiting the region (i.e. the National Park), especially within 6km of the site.

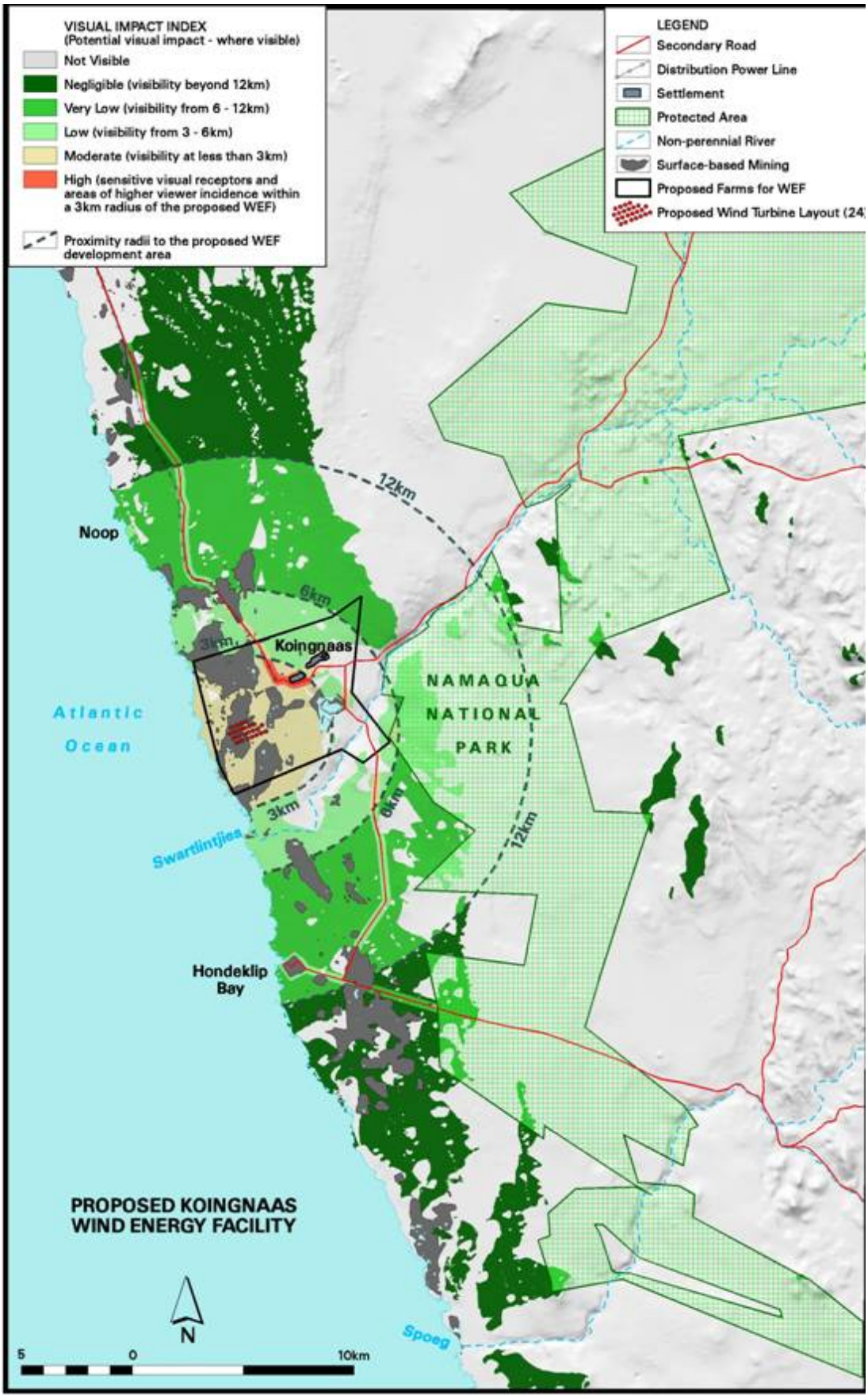


Figure 10: Visual Impact Index of the Proposed wind energy facility

Photo Simulations

Photo simulations (Refer to Figures 11-12 for an example) were undertaken (in addition to the spatial analyses provided in the Visual Impact Assessment- Refer to Appendix D6) in order to illustrate the potential visual impact of the proposed Koingnaas wind energy facility (24 turbines) within the receiving environment. These simulations indicate the potential visual significance of the alteration of the landscape from various sensitive visual receptors and over varying distances. The simulations are based on the wind turbine dimensions and the preliminary layout provided by the developer. The approximate viewing distances indicated were measured from the closest wind turbine(s) to the vantage point.

The simulated views show the placement of the wind turbines during the longer-term operational phase of the facility's lifespan. It is assumed that the necessary post-construction phase rehabilitation and mitigation measures, as proposed by the various specialists in the environmental impact assessment report, have been undertaken. It is imperative that the natural vegetation be restored to its original status for these simulated views to ultimately be realistic. These photographs can therefore be seen as an ideal operational scenario (from a visual impact point of view) that should be aspired to. Refer to Visual Assessment (Appendix D6) for the remainder of the photo-simulations and description of methodology used.

The purpose of the photo simulation exercise is to support the findings of the VIA, and is not an exercise to illustrate what the facility will look like from all directions.

NB. ***Viewpoint 1:*** *Viewpoint 1 is located on the secondary road which bypasses Koingnaas in the south. The point is located approximately 3km away from the closest turbine and is indicative of a close range view that residents of and visitors to Koingnaas will potentially see when travelling towards the town from the east. The viewing direction is south westerly and 12 turbines are fully to partially visible in the landscape.*

Figure 11: Pre construction panoramic overview from Viewpoint 1

Figure 12: Post construction panoramic overview from Viewpoint 1.

This viewpoint is located 3km away from the closest turbine. Note the Visual Absorption Capacity of the existing topographic disturbance (as a result of surface based mining activities) and visual clutter (as a result of mining related structures and infrastructure).

Nature of Impact: Potential visual impact on users of secondary roads and on residents of small towns in close proximity to the proposed facility

Visual impacts on secondary roads within a radius of 6km of the proposed facility; and on the town of Koingnaas are expected to be of moderate significance. Ordinarily, visual clutter within a more urban context will offer some absorption of the visual impact. However, the town is so small that this amelioration will be negligible.

The Visual Absorption Capacity (VAC) of the topographic disturbance (due to surface based mining activities) and visual clutter (as a result of mining related structures and infrastructure) in the immediate vicinity of the proposed wind energy facility will reduce the probability of this impact occurring.

	Without mitigation	**With mitigation**
Extent	Local (4)	N/a
Duration	Long term (4)	N/a
Magnitude	High (8)	N/a
Probability	Probable (3)	N/a
Significance	**Moderate (48)**	**N/a**
Status (positive or negative)	Negative	N/a
Reversibility	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a
Can impacts be mitigated?	No	N/a

Mitigation:

» Decommissioning: removal of the wind turbines and ancillary infrastructure after 20 years.

Cumulative impacts:

» The construction of 24 wind turbines together with the associated infrastructure will increase the cumulative visual impact of industrial type infrastructure within the region. This is relevant in light of the existing mining as well as the power line infrastructure already present in the area.

» Two other wind energy facilities are proposed further north near Kleinsee. These are also undergoing EIA. Should either or both of these facilities be approved and constructed, then they, in addition to the proposed Koingnaas wind energy facility will result in a cumulative visual impact within the region.

Residual impacts:

» None. The visual impact will be removed after decommissioning.

Nature of Impact: Potential visual impact on sensitive visual receptors (users of roads and residents of small towns) within the region and on the Namaqua National Park

The visual impact on users of secondary roads and on small towns within the region (i.e. beyond the 6km radius), as well as on tourists and visitors to the Namaqua National Park is expected to be of low significance.

The VAC (Visual Absorption Capacity) of the topographic disturbance (due to surface based mining activities) and visual clutter (as a result of mining related structures and infrastructure) in the immediate vicinity of the proposed wind energy facility will reduce the probability of this impact occurring.

Of relevance is the location of the proposed wind energy facility within this Park's *Viewshed Protection Zone*. However, it should also be noted that this area, which lies within a mining area, is already transformed by existing surface based mining. In addition, it is unlikely that visitors to the park would be impacted by views of the proposed facility.

	Without mitigation	**With mitigation**
Extent	Regional (3)	N/a
Duration	Long term (4)	N/a
Magnitude	Low (4) - Moderate (6)	N/a
Probability	Improbable (2)	N/a
Significance	**Low (22 - 26)**	**N/a**
Status (positive or negative)	Negative	N/a
Reversibility	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a
Can impacts be mitigated?	No	N/a

Mitigation:

» Decommissioning: removal of the wind turbines and ancillary infrastructure after 20 years.

Cumulative impacts:

» The construction of 24 wind turbines together with the associated infrastructure will increase the cumulative visual impact of industrial type infrastructure within the region. This is relevant in light of the existing mining as well as the power line infrastructure already present in the area.

» Two other wind energy facilities are proposed further north near Kleinsee. These are also undergoing EIA. Should either or both of these WEF's be approved and constructed, then they, in addition to the proposed Koingnaas wind energy facility will result in a cumulative visual impact within the region.

Residual impacts:

» None. The visual impact will be removed after decommissioning.

Nature of Impact: Potential visual impact of ancillary buildings and access roads on observers in close proximity to the proposed facility.

The construction of the workshop, maintenance and storage area, the office and internal access roads (where new roads are required) may be visible to observers in close proximity to the wind energy facility.

Although no dedicated viewshed has been generated for the above infrastructure, it will all be located within the proposed wind energy facility development footprint, and will be overshadowed by the much taller wind turbine structures. It is thus expected that the area of potential visual exposure will lie within that of the primary infrastructure (i.e. the

turbines).

The VAC of the topographic disturbance (due to surface based mining activities) and visual clutter (as a result of mining related structures and infrastructure) in the immediate vicinity of the proposed wind energy facility will reduce the probability of this impact occurring.

	Without mitigation	**With mitigation**
Extent	Local (4)	N/a
Duration	Long term (4)	N/a
Magnitude	Low (4)	N/a
Probability	Improbable (2)	N/a
Significance	**Low (24)**	**N/a**
Status (positive or negative)	Negative	N/a
Reversibility	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a
Can impacts be mitigated?	No	N/a

Mitigation:

» Planning: layout and construction of roads and infrastructure with due cognisance of the topography.
» Construction: rehabilitation.
» Decommissioning: removal of the unnecessary ancillary buildings and ripping and rehabilitation of the road and servitude after 20 years.

Cumulative impacts:

» The construction of ancillary infrastructure will increase the cumulative visual impact of industrial type infrastructure within the region. This is relevant in light of the existing mining as well as the power line infrastructure already present in the area.

Residual impacts:

» None. The visual impact will be removed after decommissioning.

Nature of Impact: Potential visual impact of the power line option 1 (Preferred option)

The preferred option for the overhead power line (Option 1) will run from the switching yard at the proposed wind energy facility to the existing Koingnaas Substation (located just west of Koingnaas adjacent to the secondary road).

No dedicated viewshed has been generated for this infrastructure, however, the power line will follow an existing road alignment for most of its length. In general, placing the new infrastructure adjacent to existing infrastructure is considered preferable from a visual perspective, as this will negate the need for additional disturbance and thus reduce potential additional visual impact.

	Without mitigation	**With mitigation**
Extent	Local (4)	N/a
Duration	Long term (4)	N/a
Magnitude	Moderate (6)	N/a

Probability	Probable (3)	N/a
Significance	**Moderate (42)**	**N/a**
Status (positive or negative)	Negative	N/a
Reversibility	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a
Can impacts be mitigated?	No	N/a

Mitigation:

» Planning: Implementing the preferred option for the alignment of the power line (i.e. option 1), along an existing road.

» Decommissioning: removal of the wind turbines and ancillary infrastructure after 20 years.

Cumulative impacts:

» The construction of 24 wind turbines together with the associated infrastructure will increase the cumulative visual impact of industrial type infrastructure within the region. This is relevant in light of the existing mining as well as the power line infrastructure already present in the area.

Residual impacts:

» None. The visual impact will be removed after decommissioning.

Nature of Impact: Potential visual impact of lighting on visual receptors in close proximity of the proposed WEF.

The area surrounding the proposed facility has a relatively low incidence of receptors. In this respect, light trespass and glare from the security and after-hours operational lighting for the facility infrastructure will have some significance for residents and tourists in the area. Guest houses and tourist accommodation along secondary roads are likely to be sensitive visual receptors.

Another source of glare light, albeit not as intense as direct lighting, is the aircraft warning lights mounted on top of the hub of the wind turbines. These lights are less aggravating due to the toned-down red colour, but have the potential to be visible from a great distance.

The Civil Aviation Authority (CAA) prescribes these warning lights and the potential to mitigate their visual impacts is low (see discussion on 'the potential to mitigate visual impacts' below). The WEF is not required to have a light fitted to each turbine, but it is compulsory to have synchronous flashing / fading lights on the turbines representing the outer perimeter of the facility. In this manner, fewer warning lights may be utilised to delineate the facility as one large obstruction, thereby lessening the potential visual impact.

The regulations for the CAA's Marking of Obstacles should be strictly adhered to (unless otherwise agreed with the CAA), as the failure to comply with these guidelines may result in the developer being required to fit additional light fixtures at closer intervals thereby aggravating the visual impact.

Last is the potential lighting impact known as sky glow. Sky glow is the condition where the night sky is illuminated when light reflects off particles in the atmosphere such as moisture, dust or smog. The sky glow intensifies with the increase in the amount of light sources. Each new light source, especially upwardly directed lighting, contribute to the increase in sky glow. The WEF may contribute to the effect of sky glow in an otherwise dark environment.

Mitigation of this impact entails the pro-active design, planning and specification of lighting for the facility by a lighting engineer. The correct specification and placement of lighting and light fixtures for both the turbines and the ancillary infrastructure will go far to contain rather than spread the light.

Of relevance to all of the above, however, is the location of the proposed WEF within an active mining area. In this respect, some visual impact as a result of lighting already exists. This existing lighting impact will reduce the probability of the new impact occurring.

	Without mitigation	**With mitigation**
Extent	Local (4)	Local (4)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Improbable (2)
Significance	**Moderate (42)**	**Low (28)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable (3)	Recoverable (3)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

» Planning: pro-active design and planning

» A lighting engineer must be consulted to assist in the planning, placement and specification of light fixtures for the facility and all ancillary infrastructure in order to reduce visual impacts associated with glare and light trespass. Mitigation measures include the following:

- Shielding the sources of light by physical barriers (walls, vegetation, or the structure itself);
- Limiting mounting heights of lighting fixtures, or alternatively using foot-lights or bollard level lights;
- Making use of minimum lumen or wattage in fixtures;
- Making use of down-lighters, or shielded fixtures;
- Making use of Low Pressure Sodium lighting or other types of low impact lighting.
- Making use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.

» Decommissioning: removal of the wind turbines and ancillary infrastructure after 20 years.

Cumulative impacts:

» In context of the existing mining in the area, which generates its own lighting impact at night, the impact of the WEF lighting will contribute to a regional increase in lighting impact.

Residual impacts:

» None. The visual impact will be removed after decommissioning.

Nature of Impact: Potential visual impact of construction on visual receptors in close proximity to the proposed facility.

Construction impacts on visual receptors in close proximity to the proposed facility is likely to be of moderate significance, and may be mitigated to low. The duration of the construction phase of the wind energy facility is expected to take a total of 9 months to complete (a conservative estimation not taking natural weather conditions etc. into account). During this time there will be a noticeable increase in heavy vehicles utilising the roads to the development site that may cause, at the very least, a visual nuisance to other road users and land owners in the area.

In this environment, dust from construction work is also likely to represent a significant visual impact.

The VAC of the topographic disturbance (due to surface based mining activities) and visual clutter (as a result of mining related structures and infrastructure) in the immediate vicinity of the proposed WEF will reduce the probability of this impact occurring.

	Without mitigation	**With mitigation**
Extent	Regional (3)	N/a
Duration	Long term (4)	N/a
Magnitude	Low (4)	N/a
Probability	Improbable (2)	N/a
Significance	**Low (22)**	**N/a**
Status (positive or negative)	Negative	N/a
Reversibility	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a
Can impacts be mitigated?	No	N/a

Mitigation:

» Reduce the construction period through careful planning and productive implementation of resources.
» Plan the placement of lay-down areas and any potential temporary construction camps in order to minimise vegetation clearing.
» Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
» Ensure that rubble, litter and disused construction materials are managed and removed regularly.
» Ensure that all infrastructure and the site and general surrounds are maintained in a neat and appealing way

» Reduce and control construction dust through the use of approved dust suppression techniques. » Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting. » Rehabilitate all disturbed areas, construction areas, road servitudes and cut and fill slopes to acceptable visual standards.
Cumulative impacts: » The construction of 24 wind turbines together with the associated infrastructure will increase the cumulative visual impact of industrial type infrastructure within the region. This is relevant in light of the existing mining as well as the power line infrastructure already present in the area. » Two other WEF's are proposed further north near Kleinsee. These are also undergoing EIA. Should either or both of these WEF's be approved and constructed, then they, in addition to the proposed Koingnaas WEF will result in a cumulative visual impact within the region.
Residual impacts: » None. The visual impact will be removed after decommissioning.

Nature of Impact: Potential visual impact of the proposed facility on the visual character and sense of place of the region, as well as on tourist routes, tourist destinations and tourism potential within the region.

Sense of place refers to a unique experience of an environment by a user, based on his or her cognitive experience of the place. Visual criteria, and specifically the visual character of an area (informed by a combination of aspects such as topography, level of development, vegetation, noteworthy features, cultural / historical features, etc.) play a significant role.

A visual 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 more specifically, in a less appealing or less positive light.

Specific aspects contributing to the sense of place of this region include the rugged natural beauty of the west coast environment and the undeveloped, wide open spaces beyond.

It should be noted, however, that this sense of place is lost within the 5km wide strip along the coast line, within which the proposed wind energy facility is located. The visual quality of this zone has been altered due to topographic disturbance (as a result of surface based mining activities) and visual clutter (as a result of mining related structures and infrastructure). This existing disturbed state will reduce the probability of this impact occurring. Therefore, the anticipated visual impact of the facility on the regional visual character, and by implication, on the sense of place, is expected to be low.

The west coast as a whole is seen as a tourist destination, and in this respect, many of the secondary roads along the coast attract 4x4 tourists in search of adventure. In addition, the annual Namaqualand Flower displays afford the area a unique aesthetic appeal, and a resultant tourism value and potential. This tourism potential may not yet be optimised within the study area, but limited tourist facilities do exist in the small coastal towns and

within the National Park. There is certainly potential for more to develop.

Visual intrusion through the development of industrial type infrastructure within this environment could jeopardise the area's tourism value and potential. It is important to note, however, that the existing surface based mining has already done much to alter the visual quality of the 5km strip along the coastline, within which the facility is proposed to be located.

Therefore, the anticipated visual impact of the facility on existing tourist routes, as well as on the tourism potential of the region takes cognisance of the visual status quo of the mining areas, and is expected to be low.

	Without mitigation	**With mitigation**
Extent	Regional (3)	N/a
Duration	Long term (4)	N/a
Magnitude	Low (4)	N/a
Probability	Improbable (2)	N/a
Significance	**Low (22)**	**N/a**
Status (positive or negative)	Negative	N/a
Reversibility	Recoverable (3)	N/a
Irreplaceable loss of resources?	No	N/a
Can impacts be mitigated?	No	N/a

Mitigation:

» Decommissioning: removal of the wind turbines and ancillary infrastructure after 20 years.

Cumulative impacts:

» The construction of 24 wind turbines together with the associated infrastructure will increase the cumulative visual impact of industrial type infrastructure within the region. This is relevant in light of the existing mining as well as the power line infrastructure already present in the area.

» Two other wind energy facilities are proposed further north near Kleinsee. These are also undergoing EIA. Should either or both of these facilities be approved and constructed, then they, in addition to the proposed Koingnaas wind energy facility will result in a cumulative visual impact within the region.

Residual impacts:

» None. The visual impact will be removed after decommissioning.

Implications for project implementation

» The proposed Koingnaas wind energy facility will have a visual impact on the surrounding environment. This impact will be partly mitigated by the existing impacts associated with mining in the area.

» Visual impacts are expected to be of moderate to low significance but are considered acceptable considering the relatively contained area of potential visual exposure, the low occurrence of visual receptors and the already transformed nature of the mining areas.

» The preferred option (option 1) for the power line, which follows an existing mine road (passes west of the large tailings dam), must be implemented.
» A lighting engineer must be consulted to assist in the planning, placement and specification of light fixtures for the facility and all ancillary infrastructure in order to reduce visual impacts associated with glare and light trespass.
» The construction phase, albeit temporary, and the construction site must be planned, managed and rehabilitated so as to reduce / minimise visual impact during the phase.
» Once the WEF plant has exhausted its life span, the main facility and all associated infrastructure not required for the post rehabilitation use of the site should be removed and all disturbed areas appropriately rehabilitated.

2.2.7. Assessment of Potential Impacts on Heritage

Palaeontology

No palaeontological resources were noted on the surface and given the bedrock topography here it is assumed that such resources are unlikely to be present within the proposed development area.

Prehistoric archaeology

Vast numbers of occurrences of prehistoric archaeological material were recorded in the study area. The majority are related in some way or another to landscape features, be they dune ridges or, more frequently, the prominent hill, Wolfkop. The recorded sites are not discussed individually (Refer to Appendix D1 for Heritage Impact Assessment which details the archaeology recorded on the proposed site). It should be noted that none of the sites recorded are significant enough to merit in situ conservation and only some of them are significant enough to warrant any mitigation measures. Of course only those sites that will be directly or indirectly impacted will need mitigation.

Cultural landscape and sense of place

The sense of place around the proposed site has been heavily impacted upon by the mining activities with the result that mine dumps, roads, industrial infrastructure and the Koingnaas town have been erected in the vicinity. The largest mine dump is some 100 m taller than Wolfkop and essentially, much of the prominent topography in the local area is man-made. This distinctly industrial character lends the site to further similar uses, and, as such, the site is deemed suitable for the proposed wind energy facility.

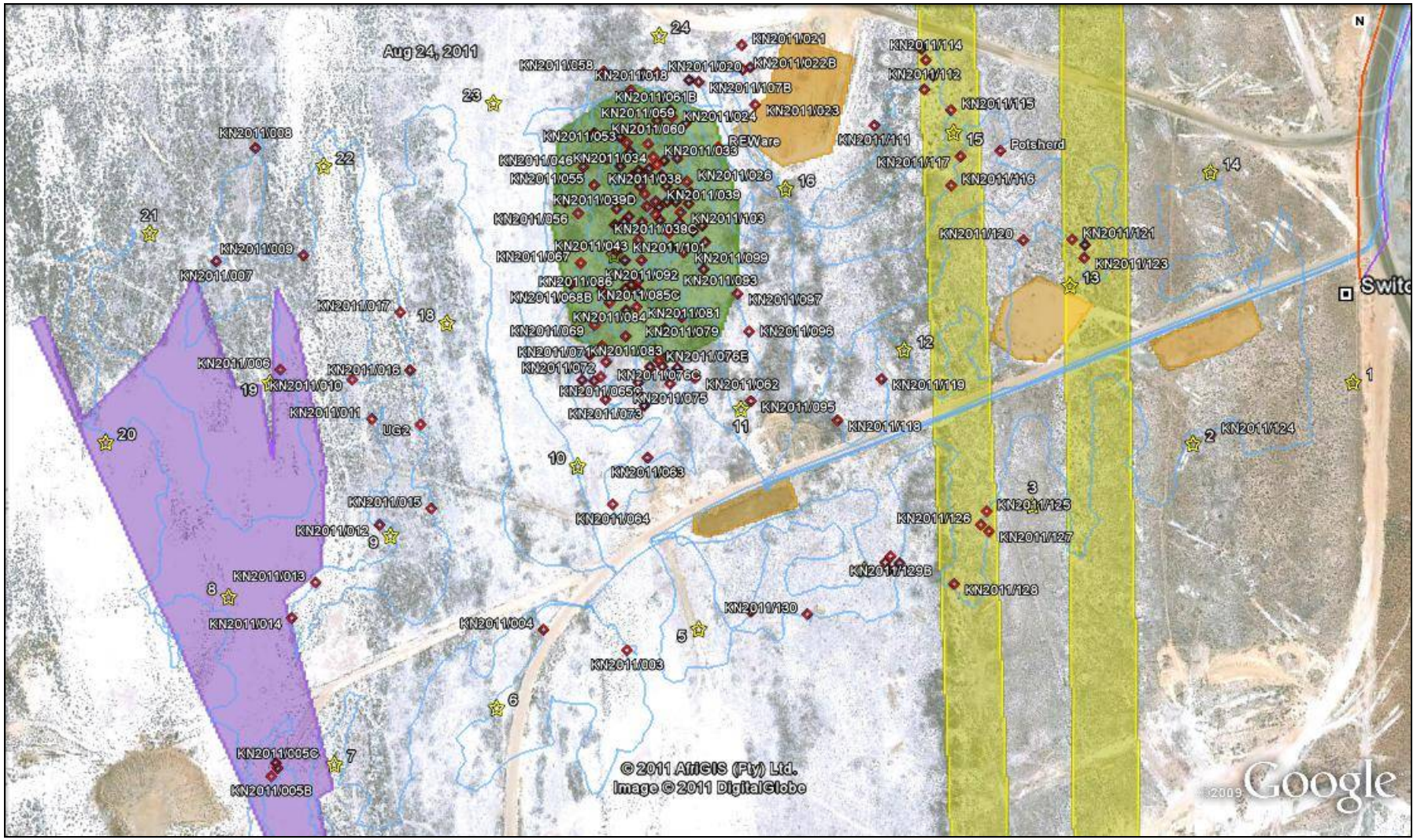


Figure 13: Locations of sites (red diamonds) and walk and drive paths (blue lines) on the proposed dev;lopment site undertaken by the Heritage Impact Practitioner. The yellow stars are the turbine positions (**Shaded area:** two longitudinal dune ridges (yellow), the approximate extent of Wolfkop (green), land disturbed by mining activities (orange) and land covered by recent wind-blown sand (purple)).

Impact tables summarising the significance of heritage impacts associated with the wind energy facility (with and without mitigation)

Nature of Impact: Impacts to paleontological material

Impacts to paleontological material could involve displacement or destruction of material at turbine locations and in the paths of power lines and access roads.

Palaeontological material is highly unlikely to be impacted by the proposed wind energy facility. The foundations will be very small and will not penetrate deeply beneath the surface sands. Where bedrock is exposed this is gneiss and not deemed fossiliferous. In some areas calcrete is present and recent fossils of limited importance could be impacted.

	Without mitigation	**With mitigation**
Extent	Local (1)	n/a
Duration	Permanent (5)	n/a
Magnitude	Minor (1)	n/a
Probability	Very improbable (1)	n/a
Significance	**Low (7)**	**n/a**
Status (positive or negative)	Negative	n/a
Reversibility	Non-reversible	n/a
Irreplaceable loss of resources?	Yes	n/a
Can impacts be mitigated?	Not required	n/a

Mitigation:
No mitigation is required.

Cumulative impacts:
None

Residual impacts:
None

Nature of Impact: Impacts on archaeology

Impacts to archaeological material could involve displacement or destruction of material at turbine locations and in the paths of power lines and access roads.

Archaeological material is abundant and will certainly be impacted negatively by the proposed wind energy facility. The distribution of sites is focused on the Wolfkop hill with the result that most impacts will occur there. A number of neighbouring sites on the summit of Wolfkop were all listed for mitigation because of the strong likelihood that they could be related. They also tended to contain more material than many others, perhaps because of their location. Archaeological sites are point-resources and occur at just one place. Every site is unique and contains different data, but some have more research potential than others. Although no sites of high archaeological significance were located, some mitigation will be required to rescue material and data. Sites requiring mitigation are mapped in Figures 14 and 15.

	Without mitigation	**With mitigation**
Extent	Local (3)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Very improbable (1)
Significance	**Medium (56)**	**Low (8)**
Status (positive or negative)	Negative	Positive
Reversibility	Non-reversible	Non-reversible
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	

Mitigation:

» Several sites requiring mitigation were encountered. Some are out of the line of the turbines and associated roads but others will need excavation to rescue material and data.
» The final layout needs to be submitted to the archaeologist for consideration of required mitigation which can then be planned and implemented.
» Some radiocarbon dating is likely to be required for the most informative excavated sites.
» If the western part of the site is flattened prior to construction then the possibility of exposing sites (identified by marine shells) exists. Should this occur then clearing in the immediate vicinity should cease and photographs of the sites should be submitted to the archaeologist for evaluation of possible mitigation requirements).
» If any unmarked graves are intersected then work in the immediate area should cease and the find be reported to the authorities such that an appropriate course of action may be followed.

Two types of mitigation can be carried out as needed. These are as follows:

Altering the facility layout

Given the distribution and generally low significance of archaeological sites relative to the proposed wind energy facility layout, it may not be desirable to avoid impacts. This form of mitigation is certainly not insisted on here as there are no sites worthy of *in situ* preservation. However, it should be ensured that the road between turbines 16 and 17 does not impact upon the southern edge of the large cluster of mitigation-worthy sites on the hill top if their mitigation is to be avoided.

Excavation of archaeological sites

As mentioned in the Heritage Impact Assessment (Refer to Appendix D1), no sites worthy of *in situ* conservation were located, although many do have research potential. This means that excavation of these sites is a viable mitigation measure. In this case, no large sites with well-preserved material were located on the surface. This means that most, if not all, excavations will be fairly limited and aim only to document the types of material present within the sites. Extensive, time-consuming excavations are highly unlikely, although one cannot discount the possibility of finding better preserved material beneath

the surface. Some radiocarbon dates will also need to be carried out in order to date the period of occupation of the most informative sites.
Cumulative impacts: » Many archaeological sites have been excavated from the area and, as such, loss of further *in situ* archaeological sites will not pose serious cumulative impacts.
Residual impacts: None

Nature of Impact: Impacts on Cultural landscapes and sense of place

Impacts will be through visual intrusion into the landscape which results in erosion of landscape context and decreasing quality of sense of place.

The region is generally compromised by the presence of extensive mining infrastructure, roads and dumps. The proposed wind energy facility is thus in keeping with the established (recent) cultural landscape and the site is well suited to such development. The impacts are reversible if the wind energy facility is disassembled and removed after its operational life has been reached.

	Without mitigation	**With mitigation**
Extent	Local (2)	n/a
Duration	Long term (4)	n/a
Magnitude	Minor (2)	n/a
Probability	Definite (5)	n/a
Significance	**Medium (40)**	**n/a**
Status (positive or negative)	Negative	n/a
Reversibility	Reversible	n/a
Irreplaceable loss of resources?	No	n/a
Can impacts be mitigated?	No	n/a

Mitigation:

» Only very minor mitigation is suggested. This would involve attempting to site the access roads on the hill in such a way as to reduce their visibility from a distance. Given the receiving environment, this mitigation is not insisted on.

Cumulative impacts:

» If other wind energy facilities were constructed in the area then the erosion of context and sense of place would escalate but, given the already compromised environment, this is not seen as significant. The area is well suited to the proposed type of development.

Residual impacts:

» Will only occur if turbines and concrete footings are left standing after decommissioning and rehabilitation does not take place.

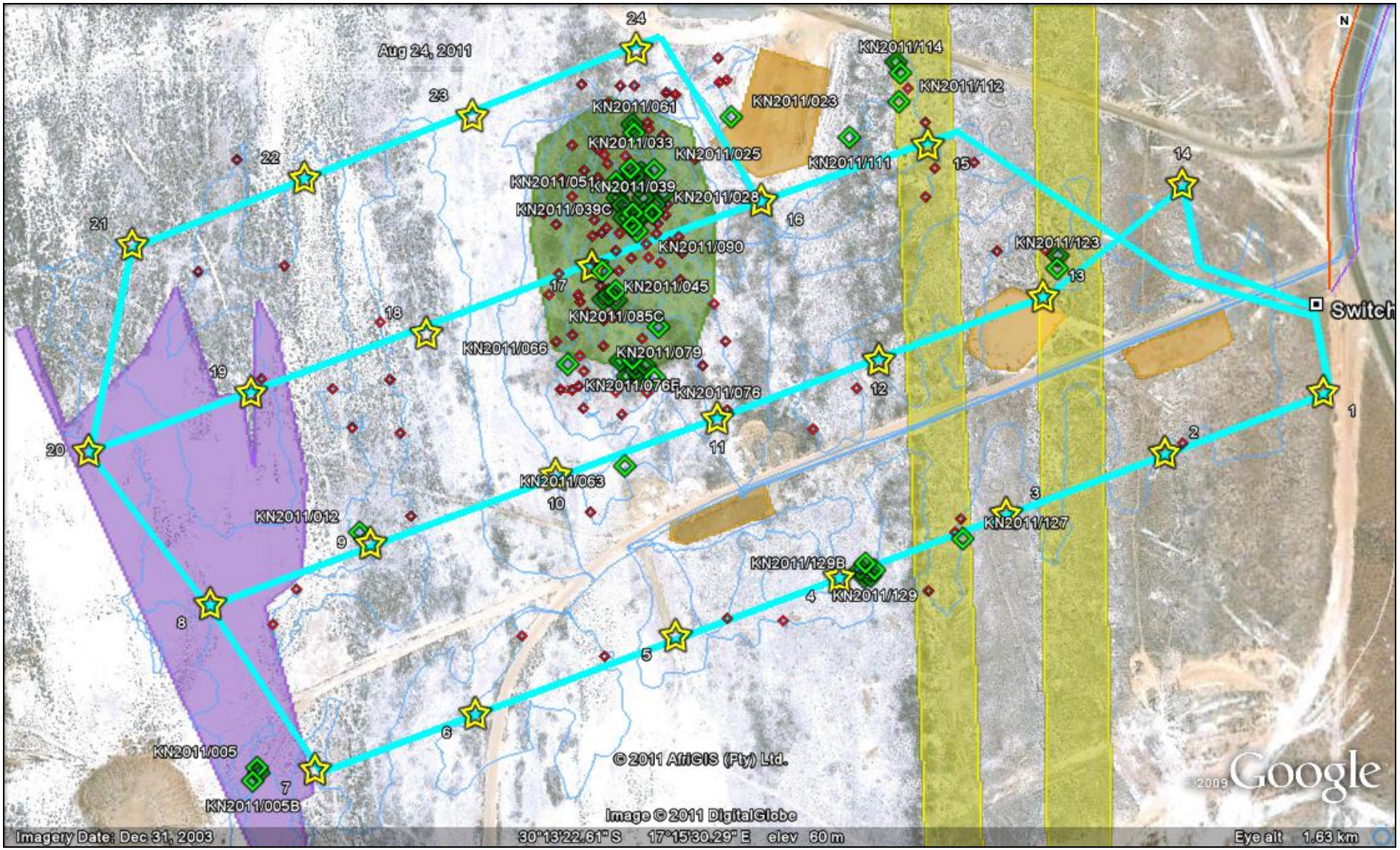


Figure 14: Aerial view of the study area showing turbine positions (yellow stars), road and power line alignments (turquoise), archaeological sites requiring mitigation (green diamonds) and other sites (red diamonds).

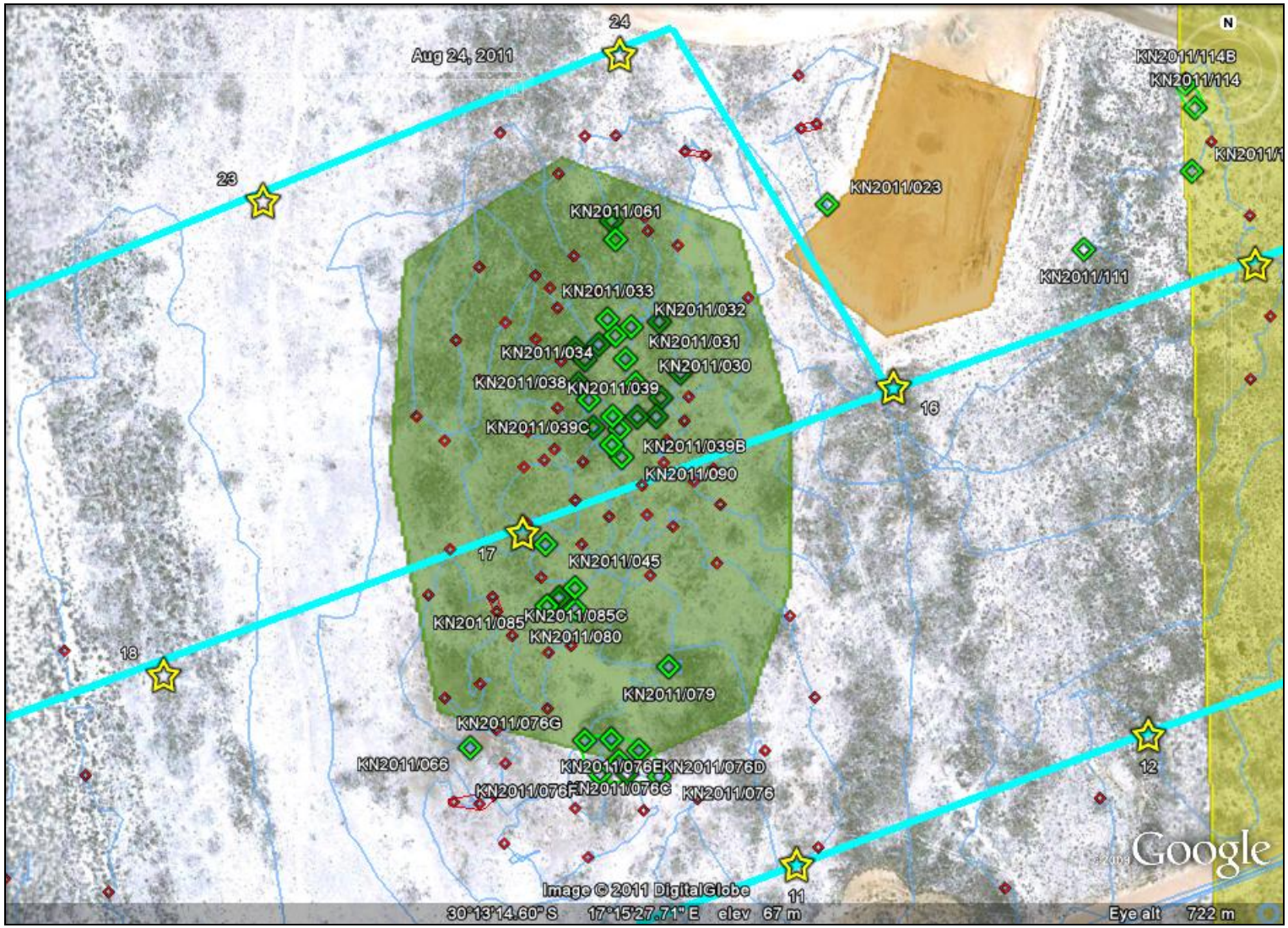


Figure 15: Aerial view of the most sensitive part of the study area showing turbine positions (yellow stars), road and power line alignments (turquoise), archaeological sites requiring mitigation (green diamonds) and other sites (red diamonds). The large cluster of green diamonds on the summit of the hill indicating archaeological sites is evident.

Implications for project implementation

» Impacts on some archaeological sites identified during the heritage impact assessment are likely. These impacts can be mitigated through the relocation of turbines (not essential), or through the recording of the sites by an archaeologist prior to destruction (in accordance with any requirements of a heritage permit).
» The final layout needs to be submitted to the archaeologist for consideration of required mitigation which can then be planned and implemented;
» Some radiocarbon dating is likely to be required for the most informative excavated sites;
» If the western part of the site is flattened prior to construction then the possibility of exposing sites (identified by marine shells) exists. Should this occur then clearing in the immediate vicinity should cease and photographs of the sites should be submitted to the archaeologist for evaluation of possible mitigation requirements); and
» If any unmarked graves are intersected then work in the immediate area should cease and the find be reported to the authorities such that an appropriate course of action may be followed.

2.2.8. Assessment of Potential Noise Impacts

The Screening Noise Assessment (Refer to Appendix D5) is based on a desktop administrative assessment as defined in SANS 10328:2008 and considered the following:

» The proposed wind turbine is relatively small in terms of generating capacity;
» The proposed wind turbine is not very high (comparing to the typical 60 – 120 meters above ground level turbine);
» The area already has an industrial noise source situated between the proposed wind energy facility and the closest noise-sensitive receptor (Koningaas);
» The proposed wind energy facility would be too far (more than 1 km) from any potentially noise-sensitive receptor to pose any significant risk of a noise disturbance being created by either the construction or operational phase.

The information contained in the noise report was considered sufficient to conclude that the potential noise impact from the proposed Koingnaas Wind Energy Facility would be insignificant, and that no additional Noise Impact Assessment is required.

2.2.9. Assessment of Potential Impacts on Social Environment

The key social issues associated with the **construction** phase include:

Potential positive impacts:

» Creation of employment and business opportunities and opportunity for skills development and on-site training

Potential negative impacts:

» Impacts associated with the presence of construction workers on site;
» Impact of heavy vehicles, including damage to roads, safety, noise and dust;

The key social issues affecting the **operational** phase include:

Potential positive impacts:

» Creation of employment and business opportunities. The operational phase will also create opportunities for skills development and training;
» Establishment of a Community Trust and source of income for the local communities;
» The establishment of renewable energy infrastructure.

Potential negative impacts:

» The visual impacts and associated impact on sense of place;
» Potential impact on tourism.

Social Impact Assessment for Construction Phase:

Nature of Impact: Creation of employment and business opportunities during the construction phase

Based on the information provided by the proponent the construction phase is expected to extend over a period of 9 months and create approximately 83 employment opportunities. The work associated with the construction phase will be undertaken by contractors and will include the establishment of the WEF and the associated components, including, access roads, services and power line.

Based on other renewable energy projects it is anticipated that approximately 53% (43) of the employment opportunities will be available to low-skilled workers (construction labourers, security staff etc.), 37% (30) for semi-skilled (drivers, equipment operators etc.) and 10% (8) to skilled personnel (engineers, land surveyors, project managers etc.). The majority of the low and semi-skilled employment opportunities are likely to taken up by members from the local community. In this regard the majority of the beneficiaries are likely to be historically disadvantaged (HD) members of the community. The skilled positions are likely to be taken up by people from outside the area and be linked to the contactors appointed to construct the proposed WEF and associated infrastructure.

However, the low education and skills levels in the area have the impact on the potential opportunities for local communities. In this regard the proponents have indicated that training will be provided to ensure all work is undertaken to the specifications required for the wind farm. Given that wind turbines have very specific requirements related to both foundation construction and assembly, which most of the available labour will be unfamiliar with, training will be an important part of the process for most employees. The proponents have also indicated that further wind farms are planned for the area (at least 4) and these skills will therefore be in demand for a number of years to come.

	Without mitigation	**With Enhancement**
Extent	Local – Regional (2) (Rated as 2 due to potential opportunities for local communities and businesses)	Local – Regional (3) (Rated as 3 due to potential opportunities for local communities and businesses)
Duration	Very Short Term (1)	Very Short Term (1)
Magnitude	Low (4)	Low (4)
Probability	Highly probable (4)	Highly probable (4)
Significance	**Low (28)**	**Medium (32)**
Status (positive or negative)	Positive	Positive
Reversibility	N/A	N/A
Irreplaceable loss of resources?	N/A	N/A
Can impacts be mitigated?	Yes	

Enhancement:

In order to enhance local employment and business opportunities associated with the construction phase the following measures should be implemented:

Employment

» Where reasonable and practical, Just Palm Tree Power should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.
» Where feasible, efforts should be made to employ local contactors that are compliant with Black Economic Empowerment (BEE) criteria;
» Before the construction phase commences Just Palm Tree Power should meet with representatives from De Beers and the Kamiesberg Municipality to establish the existence of a skills database for the area. If such as database exists it should be made available to the contractors appointed for the construction phase.
» The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that Just Palm Tree Power intends following for the construction phase of the project.
» Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.
» The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.

Business

» Just Palm Tree Power should seek to develop a database of local companies, specifically BEE companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work;
» Where possible, Just Palm Tree Power should assist local BEE companies to complete and submit the required tender forms and associated information.
» The Kamiesberg Municipality, in conjunction with the local Chamber of Commerce, should identify strategies aimed at maximising the potential benefits associated with the project.

Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the construction phase.

Cumulative impacts:

» Opportunity to up-grade and improve skills levels in the area. However, due to relatively small number of local employment opportunities this benefit is likely to be limited.

Residual impacts:

» Improved pool of skills and experience in the local area. However, due to relatively small number of local employment opportunities this benefit is likely to be limited.

Nature of Impact: Potential impacts on family structures and social networks associated with the presence of construction workers

While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on the local community. In this regard the most significant negative impact is associated with the disruption of existing family structures and social networks. This risk is linked to the potential behaviour of male construction workers, including:

» An increase in alcohol and drug use
» An increase in crime levels
» The loss of girlfriends and or wives to construction workers
» An increase in teenage and unwanted pregnancies
» An increase in prostitution
» An increase in sexually transmitted diseases (STDs)

The findings of the SIA indicate that the potential risk posed by construction workers to local family structures and social networks is regarded as low. This is due to the relatively small number of construction workers (83), of which approximately 60-70 can be sourced from the local area. These workers will be from the local community and form part of the local family and social network and, as such, the potential impact will be low. Employing members from the local community to fill the low and semi-skilled job categories will therefore significantly reduce the risk and mitigate the potential impacts on the local communities. However, due to the potential mismatch of skills and low education levels,

the potential employment opportunities for the members from these local communities may be low.

	Without mitigation	**With Mitigation**
Extent	Local (3) (Rated as 3 due to potential severity of impact on local communities)	Local (2) (Rated as 1 due to potential severity of impact on local communities)
Duration	Very Short term for community as a whole (1) Long term-permanent for individuals who may be affected by STD's etc (5)	Very Short term for community as a whole (1) Long term-permanent for individuals who may be affected by STD's etc (5)
Magnitude	Low for the community as a whole (4) High-Very High for specific individuals who may be affected by STD's etc (10)	Low for community as a whole (4) High-Very High for specific individuals who may be affected by STD's etc (10)
Probability	Probable (3)	Probable (3)
Significance	**Low for the community as a whole (24) Moderate-High for specific individuals who may be affected by STD's etc (57)**	**Low for the community as a whole (21) Moderate-High for specific individuals who may be affected by STD's etc (51)**
Status (positive or negative)	Negative	Negative
Reversibility	No in case of HIV and AIDS	No in case of HIV and AIDS
Irreplaceable loss of resources?	Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods	
Can impacts be mitigated?	Yes, to some degree. However, the risk cannot be eliminated	

Mitigation:

The potential risks associated with construction workers can be mitigated. The aspects that should be covered include:

» Where possible, Just Palm Tree Power should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically semi and low-skilled job categories. This will reduce the potential impact that this category of worker could have on local family and social networks.

» Just Palm Tree Power should consider the establishment of a Monitoring Forum (MF) for the construction phase which should be established before the construction phase commences and should include key stakeholders, including representatives from the local community, local councillors, De Beers and the contractor. The role of the MF would be to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should also be briefed on the potential risks to the local community associated with construction workers.

- » Just Palm Tree Power and the contractor should, in consultation with representatives from the MF, develop a Code of Conduct for the construction phase. The code should identify what types of behaviour and activities by construction workers are not permitted. Construction workers that breach the code of good conduct should be dismissed. All dismissals must comply with the South African labour legislation.
- » Just Palm Tree Power and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase.
- » The movement of construction workers on and off the site should be closely managed and monitored by the contractors. In this regard the contractors should be responsible for making the necessary arrangements for transporting workers to and from site on a daily basis.
- » The contractor should make the necessary arrangements for allowing workers from outside the area to return home over weekends and or on a regular basis during the 9 month construction phase. This would reduce the risk posed by construction workers to local family structures and social networks.
- » The contractor should make the necessary arrangements to ensure that workers from outside the area leave the area on completion of the construction phase. This would reduce the risk posed by construction workers to local family structures and social networks.
- » It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay overnight on the site. This will make it possible to manage the potential impacts effectively.

Cumulative impacts:

- » Impacts on family and community relations that may, in some cases, persist for a long period of time. Also in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.

Residual impacts:

- » Same as for cumulative impacts.

Nature of Impact: Potential noise, dust and safety impacts associated with movement of construction related traffic to and from the site

The movement of heavy construction vehicles during the construction phase has the potential to damage roads and create noise, dust, and safety impacts for other road users and local communities in the area, specifically the residents living adjacent to the N7-Hondeklip Bay Road. However, the findings of the SIA indicate that the number of potentially affected households is low. In addition, the current road use frequency is low. The social impacts associated with the movement of construction related traffic are therefore likely to be low.

	Without mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Very Short Term (1)	Very Short Term (1)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (21)**	**Low (12)**
Status (positive or	Negative	Negative

negative)		
Reversibility	Yes	
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

The potential impacts associated with heavy vehicles and dust can be effectively mitigated. The aspects that should be covered include:

» The contractor must ensure that damage caused to roads by the construction related activities, including heavy vehicles, is repaired before the completion of the construction phase. The costs associated with the repair must be borne by the contractor.

» Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.

» All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.

Cumulative impacts:

» If damage to roads is not repaired then this will affect the farming activities in the area and result in higher maintenance costs for vehicles of local farmers and other road users. The costs will be borne by road users who were no responsible for the damage.

Residual impacts:

» Same as for cumulative impacts.

Proposed Social Impact Assessment for Operational Phase:

Nature of Impact: Creation of employment and business opportunities associated with the operational phase

Based on information provided by the proponent the wind energy facility would employ approximately 10 fulltime employees. Of this total 3 of the posts will low skilled, 5 semi-skilled and 2 skilled. The potential employment opportunities will therefore be limited. The proponent has indicated that they are committed to employing people from the local communities and implementing a training and skills development program for local community members. This would support the strategic goals of promoting local employment and skills development contained in the Northern Cape Growth and Development Plan.

	Without mitigation	**With Enhancement**
Extent	Local and Regional (2)	Local and Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (24)**	**Low (27)**
Status (positive or negative)	Positive	Positive
Reversibility	N/A	

Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Yes	

Enhancement:

The enhancement measures listed in the above table to enhance local employment and business opportunities during the construction phase, also apply to the operational phase. In addition, Just Palm Tree Power should implement a training and skills development programme for locals during the first 5 years of the operational phase. The aim of the programme should be to maximise the number of South African's and locals employed during the operational phase of the project.

Cumulative impacts:

» Creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area

Residual impacts:

» Same as for cumulative impacts.

Nature of Impact: Creation of a Community Trust that can be used to fund development initiatives in the area

Just Palm Tree Power has indicated that they are committed to establishing a Community Trust as a part owner of the project. In terms of the agreement a percentage of the dividends from the project will accrue to the Community Trust. This revenue will in turn be used to fund and support local economic development. The Community Trust will own ~ 10% of the project. Project partner, Just Energy, is establishing similar trusts on its other wind projects around the country and has invested significant effort in ensuring that these trusts are well run and managed to ensure that they are open, equitable and accountable in their use of funds. In terms of the funding model, a percentage of the ownership will be donated to the community, while the remainder will be funded via a loan sourced at a competitive interest rate. The dividends from the project will then be used to pay off the loan. Once the loan has been repaid all of the dividends will accrue to the Trust. This is likely to be after year 5-6 of the project. Although this is a relatively small project, these revenues will still provide a real and on-going support to local economic development activities. In an area that has been dependent upon mining and where there are limited employment opportunities this is regarded as a significant social benefit.

De Beers is the current land owner, but is in the process of disposing of the site. They are charging the project a market based lease which they have previously committed to donate to community projects as part of their Corporate Social Responsibility programme. If the site is donated to the community, the money from the lease will also benefit the community.

As indicated above, mining stopped at the Koingnaas Mine in June 2009 and more than 3 600 people retrenched. The mine now only employs ~90 permanent staff at the Koingnaas/Kleinsee operations and only 8 households still live in Koingnaas. The rest of the town is vacant. The mine should reopen in June 2012 when Transhex takes over operations from De Beers. However, the scale of mining will be significantly smaller. The

establishment of the proposed wind energy facility is therefore strongly supported (Kenny McDonald Mine SHE Manager, pers. comm.)

	Without mitigation	**With Enhancement** (Assumes establishment of well managed Community Trust)
Extent	Local and Regional (2)	Local and Regional (4)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Moderate (6)
Probability	Probable (3)	Definite (5)
Significance	**Low (24)**	**High (70)**
Status (positive or negative)	Positive	Positive
Reversibility	N/A	
Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Yes	

Enhancement:

» The key enhancement measure is the establishment of a well-managed Community Trust. The revenue for the Trust would be derived from the income generated from the sale of energy from the wind energy facility. The Community Trust should be linked to funding and supporting local community projects and initiatives in the area.

Cumulative impacts:

» Generation of income that can be used to fund and support economic initiatives and projects in the area, which in turn can create employment, skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area

Residual impacts:

» Same as for cumulative impacts.

Nature of Impact: Promotion of clean, renewable energy

South Africa currently relies on coal-powered energy to meet more than 90% of its energy needs. As a result South Africa is one of the highest per capita producers of carbon emissions in the world (19th) and Eskom, as an energy utility, has been identified as the world's second largest producer carbon emissions (Cape Times, 15 November 2007). The establishment of a clean, renewable energy facility will therefore reduce, albeit minimally, South Africa's reliance on coal-generated energy and the generation of carbon emissions into the atmosphere.

The overall contribution to South Africa's total energy requirements of the proposed WEF is relatively small. However, the 10 MW produced will help to offset the total carbon emissions associated with energy generation in South Africa. Given South Africa's reliance on Eskom as a power utility, the benefits associated with an IPP based on renewable energy are regarded as an important contribution.

The proposed establishment of the Koingnaas wind energy facility also support the

objective set out in the Namakwa DM of developing a Renewable Energy Cluster and establishing wind farms with a capacity to generate 200 MW within 3 Municipal areas, including the Kamiesberg LM.

	Without mitigation	**With Mitigation** (The provision of renewable energy infrastructure is in itself a mitigation measure)
Extent	Local, Regional and National (4)	Local, Regional and National (4)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	**Medium (48)**	**Medium (48)**
Status (positive or negative)	Positive	Positive
Reversibility	Yes	
Irreplaceable loss of resources?	Yes, impact of climate change on ecosystems	
Can impacts be mitigated?	Yes	

Mitigation:

The establishment of the proposed facility is a mitigation measure in itself. In order to maximise the benefits of the proposed project Just Palm Tree Power should:

» Use the project to promote and increase the contribution of renewable energy to the national energy supply.

» Implement a training and skills development programme for locals during the first 5 years of the operational phase. The aim of the programme should be to maximise the number of South African's employed during the operational phase of the project.

Cumulative impacts:

» Reduce carbon emissions via the use of renewable energy and associated benefits in terms of global warming and climate change.

Residual impacts:

» Same as for cumulative impacts.

Nature of Impact: Visual impact associated with the proposed Wind Energy facility and the potential impact on the areas rural sense of place.

The components associated with the proposed facility will have a visual impact and, in so doing, impact on the landscape and rural sense of the place of the area. As indicated previously, the NCPGDS does indicate that the province does have the potential to become the preferred adventure and ecotourism destination in South Africa. Care therefore needs to be taken to ensure that the development of large renewable energy projects not impact on visual character and sense of place of the landscape.

However, having said this, the proposed Koingnaas wind energy facility is located in an area that has been disturbed by diamond mining over the last 70 years. In this regard, the proposed site is compatible with a key consideration listed in the Western Cape Strategic Regional Methodology for Wind Energy Site Selection (May 2006). This strategy

recommends focusing on existing disturbed rural landscapes, and in particular, those rural landscapes that have already been "vertically compromised" by the location, for example, of transmission lines, railway lines, and all phone towers. In this regard, the proposed Koingnaas wind energy facility site is located in an area where the natural landscape has been impacted upon by overburden dumps associated with diamond mining activities.

	Without mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	**Medium (40)**	**Medium (40)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes, facility can be removed.	
Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Yes	

Mitigation:

» Recommendations contained in the visual impact assessment should be implemented.

Cumulative impacts:

» Reduce carbon emissions via the use of renewable energy and associated benefits in terms of global warming and climate change.

Residual impacts:

» Same as for cumulative impacts.

Nature of Impact: Potential impact of the WEF on local tourism

The NCPGDS notes that the sustainable utilisation of the natural resource base on which agriculture depends is critical in the Northern Cape with its fragile eco-systems and vulnerability to climatic variation. The document also indicates that due to the provinces exceptional natural and cultural attributes, it has the potential to become the preferred adventure and ecotourism destination in South Africa. Care therefore needs to be taken to ensure that the development of large renewable energy projects, such as the proposed wind energy facility, do not affect the tourism potential of the province.

	Without mitigation	**With Enhancement / Mitigation**
Extent	Local (2)	Local (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Low (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (24) (Applies to both – and +)**	**Low (27) (Applies to both – and +)**
Status (positive or negative)	Negative (Potential to distract from the tourist experience of the area) Positive	Negative (Potential to distract from the tourist experience of the area) Positive

	(Potential to attract people to the area)	(Potential to attract people to the area)
Reversibility	Yes	
Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Yes	

Enhancement:

In terms of mitigating the visual impacts, it is virtually impossible to hide the facility. The impact on the sense of place of the area cannot therefore be effectively mitigated. In terms of efforts to enhance the proposed benefits to tourism:

» Just Palm Tree Power should liaise with representatives from the Kamiesberg Municipality and local tourism representatives to raise awareness of the proposed facility and the Community Trust.

» Just Palm Tree Power should investigate the option of establishing a renewable energy information board near the site. The information board should include information on the Community Trust.

Cumulative impacts:

» Potential negative and or positive impact on tourism in the Kamiesberg Municipality Area.

Residual impacts:

» Same as for cumulative impacts.

Proposed Social Impact Assessment - Power line options:

Nature of Impact: Potential visual impact and impact on sense of place associated with power lines

The proposed Koignaas wind energy facility will require a short power line to connect the facility to the De Beers mine's existing Koingnaas substation. Two alternatives have been identified, namely, Alternative 1 (preferred alternative), ~2.7 km in length, and Alternative 2, ~3 km in length. Both alternatives follow existing roads for the most part. Alternative 1 is however screened from the N7-Hondeklip Bay Road by an existing overburden dump for the majority of its length and is therefore the preferred option. However, the social impacts associated with both Alternative 1 and 2 are both regarded as low given the existing mining related disturbances.

The findings of the VIA indicate that the visual impacts associated with the power line alternatives is of **moderate** significance.

	Without mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (24)**	**Low (21)**
Status (positive or negative)	Negative	Negative

Reversibility	Yes	
Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Yes	
Enhancement: In terms of mitigating the visual impacts, it is virtually impossible to hide the facility. The impact on the sense of place of the area cannot therefore be effectively mitigated. In terms of efforts to enhance the proposed benefits to tourism: » Just Palm Tree Power should liaise with representatives from the Kamiesberg Municipality and local tourism representatives to raise awareness of the proposed facility and the Community Trust. » Just Palm Tree Power should investigate the option of establishing a renewable energy information board near the site. The information board should include information on the Community Trust.		
Cumulative impacts: » Potential negative and or positive impact on tourism in the Kamiesberg Municipality Area.		
Residual impacts: » Same as for cumulative impacts.		

Implications for project implementation

» The Koingnaas wind energy facility will create employment and business opportunities for locals during both the construction and operational phases of the project.
» The proposed development will also create an opportunity to establish a Community Trust that will be funded from revenue generated by the wind energy facility.
» The revenues will provide funding to support local economic development activities. In an area that has been dependent upon mining and where there are limited employment opportunities this is regarded as a significant social benefit.
» The proposed wind energy facility is located in an area that has been disturbed by diamond mining and is, in many regards, very well suited for the establishment of wind turbines.
» The area is sparsely populated. The proposed development also represents an investment in clean, renewable energy infrastructure, which, given the challenges created by climate change, represents a positive social benefit for society as a whole. The establishment of the proposed Koingnaas wind energy facility is therefore supported by the findings of the SIA.
» However, the potential impacts associated with wind energy facilities on an area's sense of place and landscape cannot be ignored. These impacts are an issue that will need to be addressed by the relevant environmental authorities.

3. IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING PHASE

Impacts associated with the decommissioning phase are expected to typically be the same as those impacts for construction phase and relate mainly to disturbance of habitats and soils and impacts on the social environment.

The major social impacts associated with the decommissioning phase are linked to the loss of jobs and associated income. This has implications for the households who are directly affected, the communities within which they live, and the relevant local authorities. However, in the case of the proposed facility the decommissioning phase is likely to involve the disassembly and replacement of the existing components with more modern technology. This is likely to take place in the 20 years post commissioning. The decommissioning phase is therefore likely to create additional, construction type jobs, as opposed to the jobs losses typically associated with decommissioning.

In addition, the social impacts associated with final decommissioned are likely to be limited due to the relatively small number of permanent employees (10) affected. The potential impacts associated with the decommissioning phase can also be effectively managed with the implementation of a retrenchment and downscaling programme. With mitigation, the impacts are assessed to be Low (negative).

Just Palm Tree Power should also investigate the option of establishing an Environmental Rehabilitation Trust Fund to cover the costs of decommissioning and rehabilitation of disturbed areas. The Trust Fund should be funded by a percentage of the revenue generated from the sale of energy to the national grid over the 25-30 year operational life of the facility. The rationale for the establishment of a Rehabilitation Trust Fund is linked to the experiences with the mining sector in South Africa and failure of many mining companies to allocate sufficient funds during the operational phase to cover the costs of rehabilitation and closure.

4. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Just Palm Tree Power has identified a site approximately 3km south west of the town of Koingnaas within a De Beers diamond mining area in the Namakwa District Municipality in the Northern Cape for the establishment of a commercial wind energy facility. The facility is proposed to accommodate up to 24 appropriately spaced turbines over an extent of approximately 100 hectares for the purpose of electricity generation up to 7.2 MW. The facility is to be referred to as the Koingnaas Wind Energy Facility.

Other infrastructure associated with the wind energy facility is proposed to include:

» **Cabling** between the turbines, to be lain underground where practical, which will connect to the existing on-site substation);
» A **switching yard** 50m x 40m will be constructed;
» **short power line** 11kV to connect the facility to the Koingnaas Substation;
» **Existing roads** will be used as far as possible. However, where required, internal access roads of approximately 6m wide will be constructed between the turbines and the on-site substation.
» **Workshop** area for maintenance and storage purposes.
» A component **laydown area** of approximately 1250m^2 (50m x 25m) will be required next to each turbine location.

The generating capacity of the facility will be up to 7.2 MW based on the Model of turbine that Just Palm Tree Power has chosen for the Proposed Koingnaas Wind Energy Facility.

The EIA for the proposed facility has been undertaken in accordance with the EIA Regulations published in Government Notice 33306 of 18 June 2010, in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998). The EIA Phase aimed to achieve the following:

» Provide an overall assessment of the social and biophysical environments affected by the proposed alternatives put forward as part of the project.
» Assess potentially significant impacts (direct, indirect and cumulative, where required) associated with the proposed Koingnaas Wind Energy Facility.

» Evaluate the associated infrastructure (including the substation site, power line, associated underground cabling and internal access roads) for consideration by the decision-making authorities.
» Identify and recommend appropriate mitigation measures for potentially significant environmental impacts.
» Undertake a fully inclusive public involvement process to ensure that I&APs are afforded the opportunity to participate, and that their issues and concerns are recorded.

The preceding chapters of this report together with the specialist reports contained within Appendices D1 – D9 provide a detailed assessment of the environmental impacts on the social and biophysical environment as a result of the proposed project. This chapter concludes the Final Basic Assessment Report by providing an overall evaluation of the proposed site for the wind energy facility and associated infrastructure. In so doing, it draws on the information gathered as part of the EIA process and the knowledge gained by the environmental consultants during the course of the EIA and presents an informed opinion of the environmental impacts associated with the proposed project. The conclusions and recommendations of this EIA are the result of assessment of identified impacts by specialists, and the parallel process of public participation. The public consultation process has been extensive and every effort has been made to include representatives of all stakeholders in the study area.

12.1. Evaluation of the Proposed Project

The significance of impacts associated with a particular wind energy facility is dependent on site-specific factors, and therefore impacts can be expected to vary significantly from site to site. It must be noted that there are a number of unavoidable impacts on environmental resources as a result of the development of a facility of this nature, e.g. visual impacts due to the size of the wind turbine structures. Generally, however, the unavoidable adverse environmental impacts likely to result from the development of a wind energy facility are balanced by the long-term benefits to be provided through the production of renewable energy.

Through the assessment of impacts associated with the proposed Koingnaas Wind Energy Facility, both potentially positive and negative impacts have been identified. Due to the remote location of the proposed wind energy facility, and the nature of the surrounding land use, the majority of environmental impacts are expected to be of low to moderate significance (refer to Table 1). However, areas of potential sensitivity within the proposed development site have been identified through this BA process. These are reflected on the Sensitivity map (Refer to Figure 16).

Table 1: Table summarising significance of impacts

Issue	Significance Without Mitigation	Significance With Mitigation
Impact on vegetation	Medium - low	Low
Impact on fauna and habitats	Low	Low
Impact on bats	Medium	Low
Impacts on avifauna	Low	Low
Impacts on soils & erosion potential	Low	Low
Visual impacts	Medium - high	N/A for wind energy facility Low for ancillary infrastructure & lighting
Heritage impacts	Medium - low	Low
Noise impacts	Low	N/A
Social impacts (positive & negative)	Low - high	Low - high

From an evaluation of the assessment undertaken, it can be concluded that the most significant environmental impacts associated with the proposed project include:

» Impacts on ecology as a result of the construction and operation of the wind energy facility.
» Visual impacts on the scenic resources of the region imposed by the components of the facility.
» Heritage impacts associated with the construction of the wind energy facility.
» Impacts on the social environment.
» Benefits of the proposed wind energy facility

Impacts on ecology as a result of the construction and operation of the wind energy facility

Direct impacts would occur directly on the vegetation of the site as a result of the proposed development. The impacts of the proposed development at Koingnaas Marine Complex on the vegetation and habitat are considered with respect to loss of vegetation type and habitat including important plant species due to construction and operational activities arising from the Wind Energy Facility. Loss of vegetation type and habitat including important plant species due to construction of the Power line route, and loss of vegetation type and habitat

including important plant species due to construction and operational activities of internal Access Roads.

If the development of the proposed Wind Energy Facility is pursued there would be a low negative impact in that part of the area rated as having low sensitivity whereas in the botanically sensitive part, the impact would be **MEDIUM NEGATIVE** since vegetated dunes with old and well-established vegetation would be affected.

Visual Impacts associated with the Wind Energy Facility and associated Infrastructure

The most significant impact associated with the proposed wind energy facility and associated infrastructure is the visual impact on the scenic resources and landscape of this region imposed by the components of the facility. The facility is likely to be visible for up to 6km from the site. The majority of potentially significant impacts are however restricted to within 12km of the site. The visual impact is expected to be very low beyond the 12km radius. This impact is mitigated to some extent by the presence of mining infrastructure within the region.

The visibility of the wind energy facility could also have a minor visual impact on the secondary roads within 10km of the coastline, the towns of Hondeklip Bay and Noop, and some patches within the western Namaqua National Park. Potential visual impact within these areas is expected to be low.

In light of the results and findings of the Visual Impact Assessment undertaken for the Proposed Koingnaas Wind Energy Facility, it is acknowledged that the views surrounding the site will be visually impacted upon for the entire operational lifespan (approximately 20 years) of the facility. Of note is that the topographic disturbance (due to surface based mining activities) and visual clutter (as a result of mining related structures and infrastructure) in the immediate vicinity of the proposed wind energy facility constitutes an existing visual impact. In this respect, the visual impact is somewhat 'absorbed' on the one hand, but contributes to the cumulative visual impact of industrial type infrastructure on the other. Visual impacts are expected to be acceptable considering the relatively contained area of potential visual exposure, the low occurrence of visual receptors and the already transformed nature of the mining areas.

Heritage Impacts associated with the Wind Energy Facility and associated Infrastructure

Visual impacts to sense of place and scenic routes are typically the greatest

concern with wind energy facilities, but here the site is so remote and contains so little historical heritage that no significant impacts to these aspects are anticipated. Also, the area has been transformed to some degree through the current mining operations.

Archaeological material is abundant and will certainly be impacted by the proposed Wind Energy Facility. The distribution of sites is focused on the Wolfkop hill with the result that most impacts will occur there. A number of neighbouring sites on the summit of Wolfkop were all listed for mitigation because of the strong likelihood that they could be related. They also tended to contain more material than many others, perhaps because of their location. Archaeological sites are point-resources and occur at just one place. Every site is unique and contains different data, but some have more research potential than others. Although no sites of high archaeological significance were located, some mitigation will be required to rescue material and data. Sites requiring mitigation are mapped in the Heritage Impact Assessment (Refer to Appendix D1).

Impacts to archaeology as a result of the construction of the proposed wind energy facility are rated as being of Medium – low significance. However, mitigation can be very easily implemented and achieved should any sites requiring it not be avoided by the development. Those sites that will not be impacted and thus mitigated will need to be protected from further disturbance during the construction and operation phases.

Impacts on the Social Environment

The proposed Koingnaas wind energy facility site is located in an area where the natural landscape has been impacted upon by overburden dumps associated with diamond mining activities. The site is therefore located in an area that is well suited for the establishment of wind energy facilities. In addition, the wind energy facility is relatively small in terms of both the total number of turbines (23) and the height (32 m).

The proposed development is supported at a national, provincial and local level from a policy and planning perspective. In addition, the facility is located within an area which has already been disturbed. This siting is considered preferable from an environmental perspective.

Impacts on the social environment are expected to be both positive and negative and will manifest during both the construction and operational phases of the project. Impacts are expected at both a local and regional scale. Potential impacts include:

» *Potential positive impacts*

- Creation of employment and business opportunities, and opportunity for skills development and on-site training during both construction and operation.
- Community Trust
- The establishment of renewable energy infrastructure.

» *Potential negative impacts*

- Impacts associated with the presence of construction workers employed on the project.
- Impact of heavy vehicles, including damage to roads, safety, noise and dust.
- Visual impacts.

Mitigation and enhancement measures include the employment of local community members as far as possible, the implementation of a training and skills development programme for locals during the first 5 years of the operational phase, and the establishment of a Community Trust.

No potentially sensitive noise receptors are located in close proximity of the proposed wind turbines. Noise impacts associated with construction and operation of the proposed facility are therefore expected to be of low significance.

Benefits of the Proposed Project

The need to expand electricity generation capacity in South Africa is based on national policy and informed by on-going strategic planning undertaken by the Department of Energy (DoE) and the National Energy Regulator of South Africa (NERSA). In order to meet the long-term goal of a sustainable renewable energy industry, the South African Government has set a target of 17GW renewable energy contribution to new power generation capacity by 2030. This is to be produced mainly from biomass, **wind,** solar and small-scale hydro.

Through pre-feasibility assessments and research, the viability of establishing a 7.2MW wind energy facility west of Koingnaas in the Northern Cape Province has been established by Just Palm Tree Power. The positive implications of establishing a wind energy facility on the demarcated site within the Northern Cape include:

» The project would assist the South African government in reaching their set targets for renewable energy.
» The potential to harness and utilise good wind energy resources at an inland site would be realised.
» The National electricity grid in the Northern Cape would benefit from the additional generated power.

» Promotion of clean, renewable energy in South Africa.
» Positive impacts on the tourism economy of the area.
» Creation of local employment and business opportunities for the area.

The proposed development represents an investment in clean, renewable energy infrastructure, which, given the challenges created by climate change, represents a positive social benefit for society as a whole. The proposed project will not consume energy, but will instead provide a new source of clean, renewable electricity to the South African power grid. This generation of renewable power will aid in reducing the dependency on other power generation fuels and enhancing the reliability of the regional energy supply.

Overall Conclusion (Impact Statement)

The findings of the specialist studies undertaken within this BA report to assess both the benefits and potential negative impacts anticipated as a result of the proposed project conclude that:

» The majority of impacts associated with the establishment of the wind energy facility are of **moderate to low significance** and are restricted to the site itself. These impacts can be avoided or reduced in significance through the implementation of recommended mitigation measures (Refer to Appendix F for Environmental Management Programme).
» The main unavoidable impact associated with the establishment of the wind energy facility on the identified site is the visual impact associated with the wind turbines and associated infrastructure. The visual impact is expected to be restricted to within a distance of 6 km of the site. Mitigation of the visual impact associated with the wind turbines is not possible. Impacts associated with secondary impacts can, however, be mitigated.
» Areas of high ecological sensitivity have been identified through the EIA process (refer to Figure 16). In terms of the current preliminary layout, these areas are impacted on to a limited extent. The final design of the facility should ensure that these areas are avoided as far as possible (i.e. through relocation of the southern row of turbines to the positions proposed as proposed in the flora study) and rerouting of the internal access roads as proposed according to Figure 8).
» No areas of bird/bat sensitivity have been identified through the BA process, although some potentially sensitive bird species have been recorded as being present in the study area. The bird sensitivity of the area is not fully understood at this stage, and the movement of birds across the site can only be verified once bird pre-construction monitoring programmes are put into place.
» A number of heritage sites were identified on the proposed site. As far as possible, the final layout of the facility should avoid the placement of

infrastructure in these areas. Where this is not possible, impacts can be easily mitigated through the appropriate recording of these sites in accordance with the requirements of Heritage requirements.

» There are no noise sensitive receptors that would be affected by the proposed wind energy facility.

» There are **no environmental fatal flaws** that should prevent the proposed wind energy facility and associated infrastructure from proceeding on the identified sites, provided that the recommended mitigation, monitoring and management measures are implemented, and given due consideration during the process of finalising the wind energy facility layout.

» In order to enhance the positive impacts associated with the proposed facility, the mitigation measures listed in the report should be implemented.

» The proposed development also represents an investment in clean, renewable energy, which, given the challenges created by climate change, represents a positive social benefit for society as a whole.

The significance levels of the majority of identified negative impacts can generally be reduced by implementing the recommended mitigation measures. With reference to the information available at this planning approval stage in the project cycle, the **confidence** in the environmental assessment undertaken is regarded as **acceptable**.

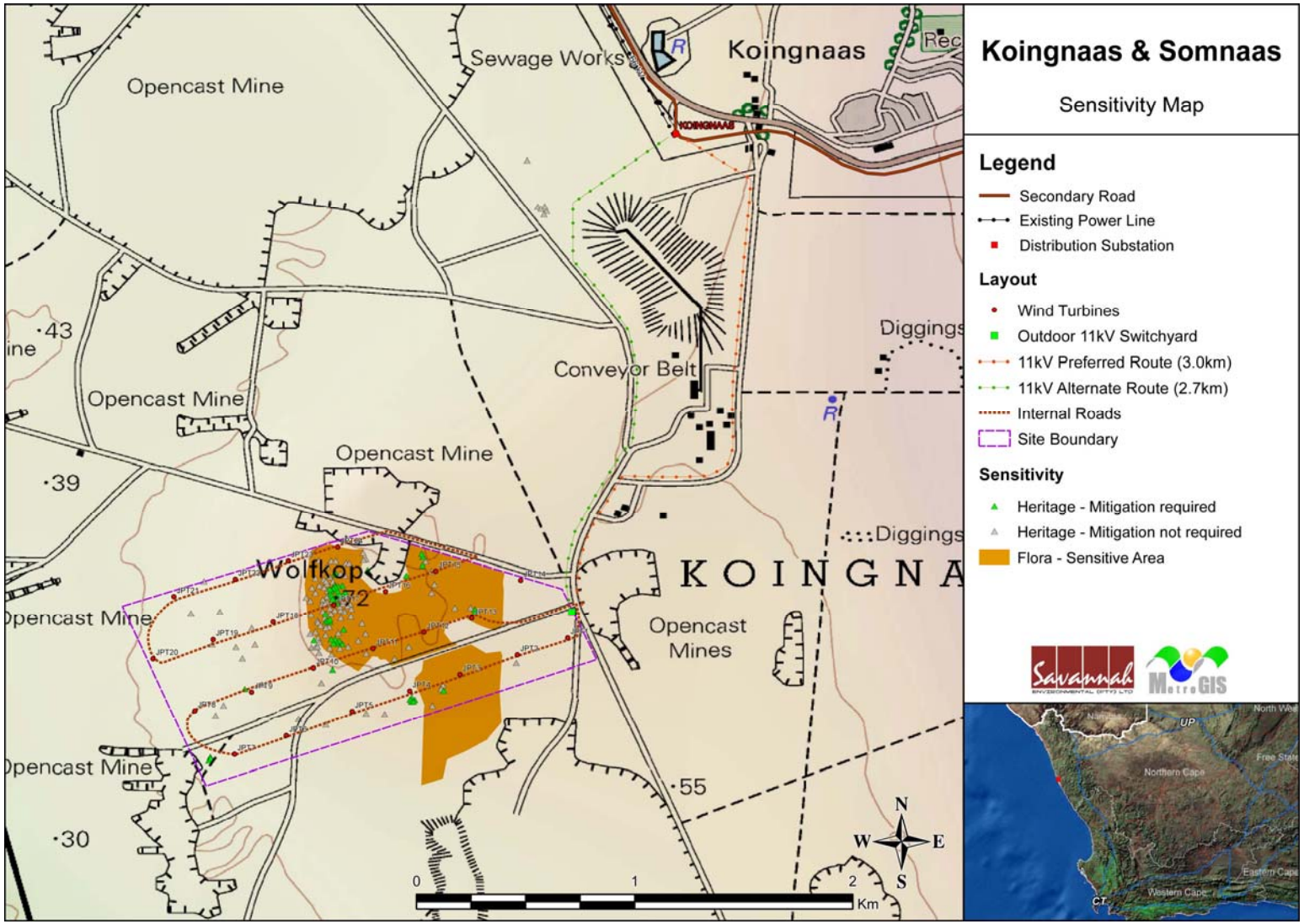


Figure 16: Sensitivity Map produced for the proposed Koingnaas Wind Energy Facility

Alternative P[6] (preferred Power line alternative)

The preferred route for the proposed power line is **option 2**. This route passes east of the large tailings dam. This is the longer power line alternative of 3km, but and has fewer botanical impacts as compared to option1.

Alternative R[7] (preferred road alternative)

Evaluation of both road layout alternatives suggests that the option of using the existing road and branch out to each turbine (Alternative R1) may slightly reduce mitigation requirements. However, given that the mitigation time estimates involved are quite small, this is unlikely to change the overall required mitigation project very much. Both Road alternatives are therefore considered to be acceptable from an environmental perspective.

No-go alternative (compulsory)

The 'no-go' alternative is the option of not undertaking the proposed activity or any of its alternatives. This alternative would result in no environmental impacts on the site or surrounding area.

The electricity demand in South Africa is placing increasing pressure on the country's existing power generation capacity. The need for the project is real. The demand for electricity in the country as a whole is expected to continue to increase. There is therefore a need for additional electricity generation options to be developed throughout the country. The decision to expand South Africa's electricity generation capacity, and the mix of generation technologies is based on national policy and informed by on-going strategic planning undertaken by the national Department of Energy (DoE). As part of the electricity planning for the country, the DoE has determined that the mix of power generation technologies must include renewable energy, including wind. In terms of the Integrated Resource Plan (IRP), a total a generating capacity of 8,4GW of power is to come from wind energy generation technology by 2030.

The 'no go' alternative will not assist the South African government in reaching their set targets for renewable energy. The No-go option would represent a lost opportunity for South Africa to supplement is current energy needs with clean, renewable energy. Given South Africa's position as one of the highest per capita producer of carbon emissions in the world, this would represent a High negative social cost.

The no-go option also represents a lost opportunity in terms of the employment and business opportunities (construction and operational phase) and for the

[6] Power line alternatives

[7] Road Alternatives

establishment of a Community Trust. In addition, the opportunity for a South African wind turbine manufacturer to obtain a market share in the wind energy industry would be lost. This also represents a negative social cost.

The no-go alternative is not recommended for this project.

SECTION E: RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?	YES	NO
	✓	

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment):

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application:

Overall Recommendation

Based on the nature and extent of the proposed project, the local level of disturbance predicted as a result of the construction and operation of the facility and associated substation, the findings of the Basic Assessment Report, and the understanding of the significance level of potential environmental impacts, it is the opinion of the EIA project team that the application for the proposed Koingnaas Wind Energy Facility and associated infrastructure be authorised by DEA. The following conditions must be required to be included within an authorisation issued for the project:

» All relevant practical and reasonable mitigation measures detailed within this report and the specialist reports contained within Appendices D1 to D9 must be implemented.
» The draft Environmental Management Programme (EMP) as contained within Appendix F of this report should form part of the contract with the Contractors appointed to construct and maintain the proposed wind energy facility, and will be used to ensure compliance with environmental specifications and management measures. The implementation of this EMP for all life cycle phases of the proposed project is considered to be key in achieving the appropriate environmental management standards as detailed for this project. This document should be considered as a dynamic document and must be updated as required throughout the life cycle of the facility.
» As far as possible, areas of sensitivity identified through the botanical and heritage studies should be avoided. Where this is not possible, appropriate mitigation must be implemented to minimise impacts.
» Pre-construction monitoring should be undertaken to confirm the bird species which are present in the area. The duration of this pre-construction

monitoring should be confirmed in consultation with an appropriately qualified avifaunal specialist, and should take cognisance of the size of the proposed facility and the bird species expected to be present in the area.

» The final location of the wind turbines and associated infrastructure must be informed by surveys undertaken by an ecological, avifaunal and heritage specialist. The EMP for construction must be updated to include site-specific information and specifications resulting from the final walk-though surveys. This EMP must be submitted to DEA for approval prior to the commencement of construction.
» Following the final design of the facility, a revised layout must be submitted to DEA for review and approval prior to commencing with construction.
» During construction, unnecessary disturbance to habitats should be strictly controlled and the footprint of the impact should be kept to a minimum.
» Disturbed areas should be kept to a minimum and rehabilitated as soon as possible once construction is complete in an area.
» An on-going monitoring programme should be established to detect and quantify any alien species.
» A comprehensive stormwater management plan should be compiled for the substation footprints prior to construction.
» Applications for all other relevant and required permits required to be obtained by Just Palm Tree Power must be submitted to the relevant regulating authorities. This includes permits for the transporting of all components (abnormal loads) to site, disturbance to heritage sites, disturbance of protected vegetation (if applicable), and disturbance to any riparian vegetation or wetlands.
» Just Palm Tree Power should consider the establishment of a Monitoring Forum (MF) in order to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should be established before the construction phase commences, and should include key stakeholders, including representatives from local communities, local Kamiesberg councillors, farmers and the contractor(s). The MF should also be briefed on the potential risks to the local community associated with construction workers.
» A preconstruction survey for bats should be undertaken to determine whether bat species of concern occur on site or not and whether roosting habitats or known important maternity roosts occur within close proximity to the site. If this preconstruction survey finds that the presence of bats or roosting habitats of concern occur, then a monitoring programme should be implemented to document the effect of wind turbines on bat species of concern.

Is an EMPr attached?	YES	NO
	✓	

The EMPr must be attached as Appendix F.

SECTION F: APPENDIXES

Appendix A: Site plan

Appendix B: Photo records

Appendix C: Facility illustrations

Appendix D: Specialist reports

- *Appendix D1:* Heritage Study
- *Appendix D2:* Palaeontological study
- *Appendix D3:* Flora study
- *Appendix D4:* Terrestrial Fauna and bat study
- *Appendix D5:* Noise study
- *Appendix D6:* Visual study
- *Appendix D7:* Avifauna study
- *Appendix D8:* Geology, soils and agricultural potential study
- *Appendix D9:* Social study

Appendix E: Record of public involvement process

- *Appendix E1: Proof of advert placement and site notices*
- *Appendix E2: Background Information Document (BID) and Reply form*
- *Appendix E3: Stakeholder Correspondence*
- *Appendix E4: I&AP database*
- *Appendix E5: Minutes of meetings*
- *Appendix E6: Comments and Response Report*

Appendix F: Draft Environmental Management Programme

Appendix G: Other information

- *Appendix G1: cvs of Project Team*
- *Appendix G2: Authority Consultation*