PROPOSED NOJOLI WIND FARM SUBSTATION AND POWER LINE GRID CONNECTION, EASTERN CAPE PROVINCE

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

Submitted as part of the Final Basic Assessment Report

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PROJECT DETAILS

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DEFINITIONS AND TERMINOLOGY

Alien species: A species that is not indigenous to the area or out of its natural distribution range.

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.

Assessment: The process of collecting, organising, analysing, interpreting and communicating information which is relevant.

Biological diversity: The variables among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes they belong to.

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

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.

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.

Ecosystem: A dynamic system of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

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 plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its on-going maintenance after implementation.

Environmental assessment practitioner: An individual responsible for the planning, management and coordinating of environmental management plan or any other appropriate environmental instruments introduced by legislation.

Habitat: The place in which a species or ecological community occurs naturally.

Hazardous waste: Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment (Van der Linde and Feris, 2010;pg 185).

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.

Natural properties of an ecosystem (*sensu* Convention on Wetlands): Defined in Handbook 1 as the "…physical, biological or chemical components, such as soil, water, plants, animals and nutrients, and the interactions between them". (Ramsar Convention Secretariat. 2004. Ramsar handbooks for the wise use of wetlands. 2nd Edition. Handbook 1. Ramsar Convention Secretariat, Gland, Switzerland.) (see http://www.ramsar.org/).

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

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

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

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

Waste: Any substance, whether or not that substance can be reduced re-used, recycled and recovered; that is surplus, unwanted, rejected, discarded, abandoned or disposed of which the generator has no further use for the purposes of production. Any product which must be treated and disposed of, that is identified as waste by the minister of Environmental affairs (by notice in the Gazette) and includes waste generated by the mining, medical or other sectors, but: A by-product is not considered waste, and portion of waste, once re-used, recycled and recovered, ceases to be waste (Van der Linde and Feris, 2010; pg 186).

TABLE OF CONTENTS

Appendices:

Appendix A: Grievance Mechanism for Public Complaints and Issues
Appendix B: Guidelines for Integrated Management of Construction Waste
Appendix C: Norms and Standards for Storage of Waste

PROJECT DETAILS *CHAPTER 1*

Nojoli Wind Farm (Pty) Ltd is proposing the establishment of a new substation and power line to connect the authorised Nojoli Wind Farm (previously Cookhouse South Wind Farm) to the existing Eskom Poseidon Substation. The proposed facility will be established with a development corridor located within the Nojoli Wind Farm located approximately 15 km north-east of the town Cookhouse within the Blue Crane Route Local Municipality, Eastern Cape Province.

The following farms are being investigated for the siting of the substation and power line:

» Farm Bavians 151
» Portion 2 of the Farm Bavians 151
» Farm Hillbrow148
» Portion 2 of the Farm Klipfontein 150
» Remainder of the farm Van Wyks Kraal 73

Based on a pre-feasibility analysis undertaken by Nojoli Wind Farm (Pty) Ltd, two technically feasible sites have been identified as alternative locations for the new substation:

» **Alternative 1:** Substation is located south of Poisedon Substation. The proposed power line between the new substation and Poseidon Substation is approximately 4.5km in length and runs parallel to existing power lines.
» **Alternative 2:** Substation is located south-west of Poseidon Substation. The proposed power line between the new substation and Poseidon Substation is approximately 3km in length, and the proposed power line is approximately 3 km from the Poisedon substation and will run parallel to existing power lines for a portion of its length.

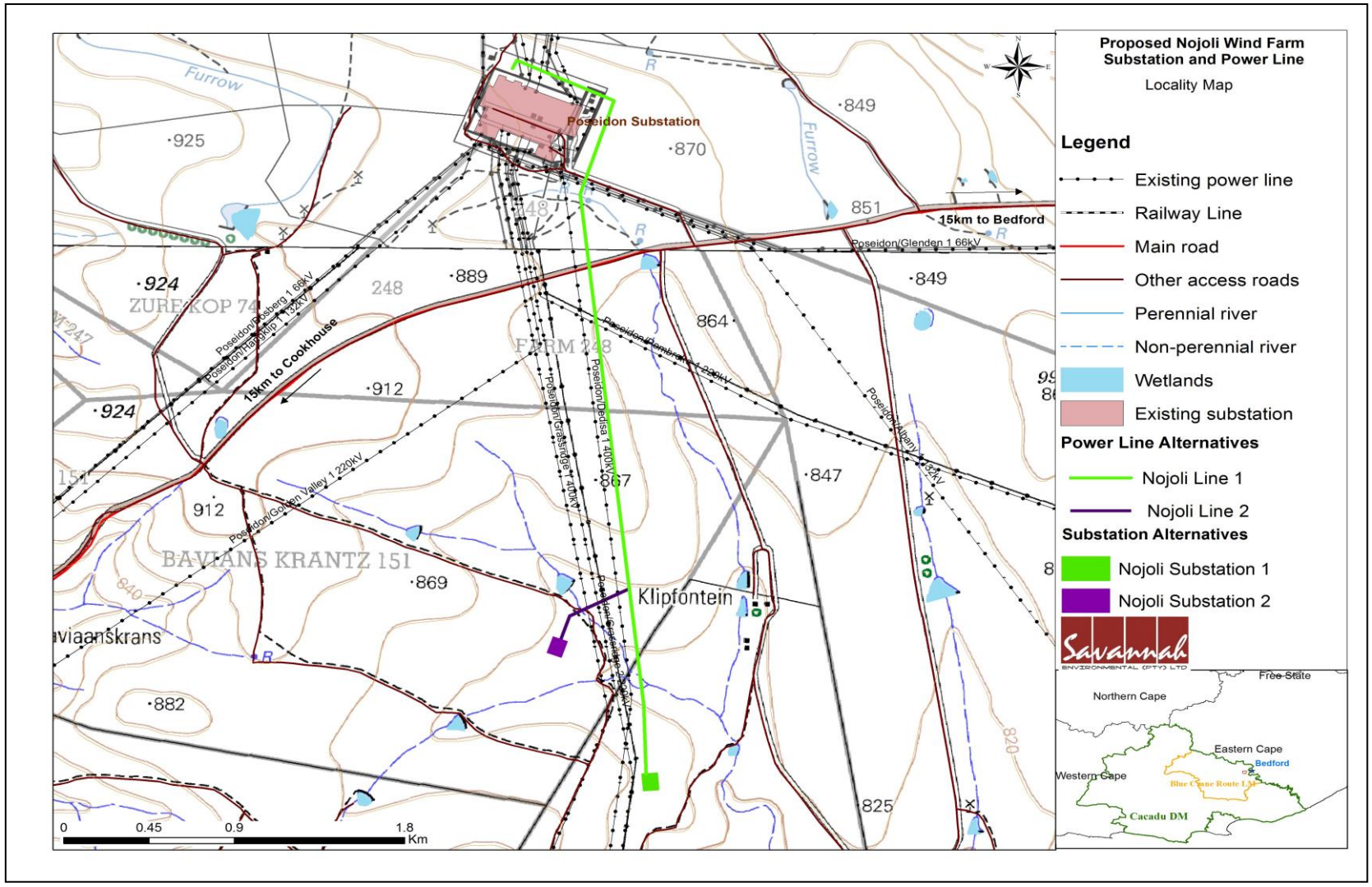

Figure 1.1: Locality map showing the two proposed substations and power routes for the Nojoli Wind Farm

1.1. Potential impacts

Through the assessment of impacts associated with the proposed Nojoli substation and power line, both potentially positive and negative impacts have been identified. The most significant environmental impacts associated with the proposed project include:

» **Ecology:** The total disturbed footprint of the proposed substation will be less than 5 hectares. The power line will be 3 – 4.5km in length, depending on the alternative selected. The development of the substation and power line will result in vegetation loss and disturbances to fauna. The impact on ecology is expected to be of **low significance** due to the limited footprint of the development. It is expected that many of the impacts can be further reduced with effective management of the substation and power line site as well as the utilization of rehabilitation / re-vegetation of the site, after construction and decommissioning. For the plant species of special concern, it is recommended that these species are identified within the development footprint and rescued before construction commences.

» **Avifauna:** The proposed substation and power line will possibly affect populations of regionally or nationally threatened (and impact susceptible) birds (mainly large terrestrial species and raptors) likely to occur within or close to the proposed alignment, and the line may have a detrimental impact on these birds, particularly in terms of collision and electrocution mortality risk, unless commitment is made to mitigating these effects. Therefore if no mitigation is followed the impacts on birds as a result of the 132kv power line may have a **High to moderate** significance but if precautionary ensures are taken it will be **low to moderate.** Careful and responsible implementation of the required mitigation measures should reduce impacts to sustainable levels.

» **Heritage:** In general the proposed substation sites and power line corridors appear to be of low cultural and archaeological significance and therefore an impact of **low significance** is expected. Although it would appear unlikely that any significant in situ heritage sites/material will be exposed during the construction phase of these developments, sites/materials may be covered by soil and vegetation.

» **Visual**: It is not expected that the proposed infrastructure will significantly alter the outcome of the potential visual impacts associated with the Nojoli Wind Farm and existing power lines. The potential visual impacts associated with the proposed substation and power line should not alter/influence the outcome of the project decision-making. Visual impacts of the substation and power line will be of a **low significance**.

» **Social:** the proposed substation and power line will have a positive impact through the creation of employment and transfer of skills to the local people.

» **Cumulative impacts:** the cumulative impacts on ecology, heritage, avifauna and social will be high considering the existing infrastructure and the proposed infrastructure (i.e. wind turbines, substation and power lines) in the area. This is however offset by the benefits that will result from the construction of the substation and the line.

A sensitivity map has been prepared from the findings of the Basic Assessment studies undertaken (refer to **Figure 1.2**). The study area is considered to have a low to moderate sensitivity based on the extent of the area to be used for both substation and power line. Some areas of high sensitivity have been identified due to the occurrence of sensitive vegetation. Placement of infrastructure within these areas should be avoided as far as possible.

The two substation site alternatives and power line are similar from an environmental perspective (in terms of impacts on ecology, heritage, avifauna and visual). Alternative 1 is parallel to the existing power lines, Alternative 2 is located adjacent to existing power lines and crosses a non-perennial drainage line after exiting the substation which may result in impacts on this drainage line. Alternative 2 is therefore considered to be more environmental sensitive than Alternative 1. On the basis of the conclusions from the Basic Assessment, Substation Site Alternative 1 and associated power line is nominated as the preferred location for the substation, although both alternatives are considered to be completely acceptable. This alternative is also the technically preferred alternative as it would reduce the need to cross existing power lines with the new power line. Preference of the options is purely driven by the line routing and not the substation positions. The substation positions are considered equal from a technical and environmental perspective.

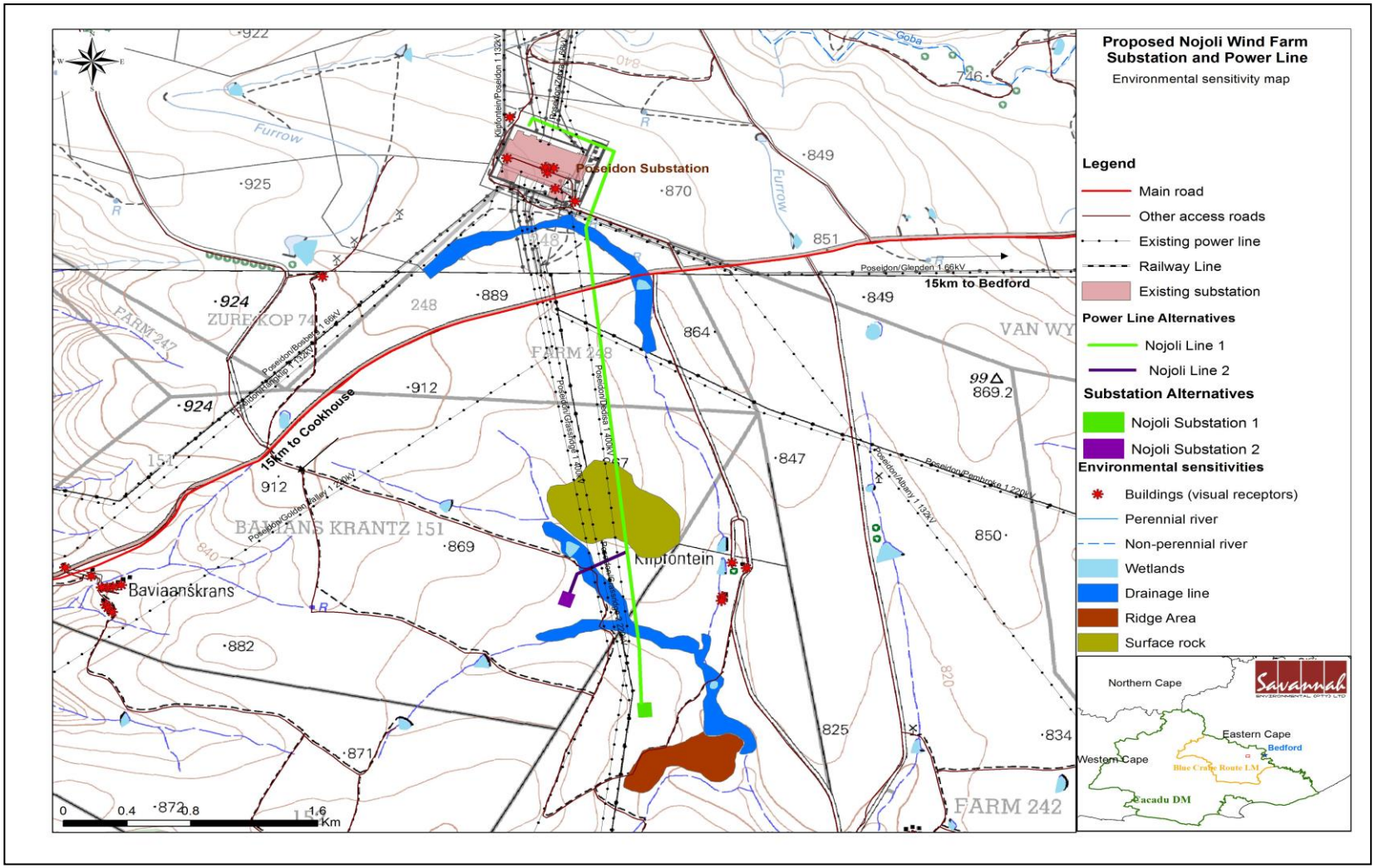

Figure 1.2: Environmental Sensitivity map for the proposed Nojoli Substation and Power line integration

1.2. Activities and Components associated with the Construction of Substation and Power Line

The table below illustrates activities undertaken during the construction, operation and decommissioning phases of the proposed substation and power line

Activities Associated with the Construction Phase:

Activity	Description
Pre-construction surveys	Prior to initiating construction, a number of detailed surveys will be required including, but not limited to: » *Geotechnical survey* – the geology and topography of the study area will be confirmed. The geotechnical study will look at flood potential, foundation conditions, potential for excavations, and the availability of natural construction materials. This study will serve to inform the type of foundations required to be built and the extent of earthworks and compaction required in the establishment of any internal access roads. » *Site survey* – this will be required to finalise the design layout of the substation. The finalisation will need to be confirmed in line with the Environmental Authorisation issued for the substation and power line
Establishment of access roads	» The site can be accessed via an existing gravel road (~7km) off the N10 that bisects the site in a westerly direction. Existing roads on the farm portion will be used and upgraded where necessary. » Access track construction (if required) would normally comprise of compacted rock-fill with a layer of higher quality surfacing stone on top. The strength and durability properties of the rock strata at the proposed site are not known at this stage; this will need to be assessed via a geotechnical study to be conducted by the project proponent. » The final layout of the access roads will be determined following the identification of site related sensitivities.
Undertake site preparation	» Site preparation activities will include clearance of vegetation at the proposed substation and power line site. These activities will require the stripping of topsoil which will need to be stockpiled, backfilled and/or spread on site.
Transport of components and equipment to site	» The components for the proposed substation will be transported to site, in sections, by road. Some of the components for the substation may be defined as abnormal loads in terms of the Road Traffic Act (Act No. 29 of 1989)[1] by virtue of the dimensional limitations (i.e. length and weight). The typical civil engineering construction equipment will need to be brought to the site (e.g. excavators, trucks, graders, and compaction equipment etc.) as well as components required for the establishment of the substation. » In some instances, the dimensional requirements of the loads to be transported during the construction phase (e.g. the transformer of the substation) may require alterations to the existing road infrastructure (e.g. widening on corners), and protection of road-related structures (i.e. bridges, culverts, etc.) because of abnormal loading.
Establishment of Laydown Areas on Site	» Laydown and storage areas will be required for the typical construction equipment which will be required on site, and within the development footprint.
Undertake site	» Once construction is complete and all construction equipment is removed, the site must be rehabilitated where

[1] A permit will be required for the transportation of any abnormal loads on public roads.

Activity	Description
rehabilitation	practical and reasonable. On full commissioning of the substation, any access points to the site that are not required during the operational phase must be closed and prepared for rehabilitation.

Operation and Maintenance Phase:

The operational phase of the substation and power line are expected to extend over a period of approximately 40 years with plant maintenance, depending on the energy requirements of the country. It is anticipated that during this time security, maintenance, supervision and monitoring teams will be required on site. Maintenance activities will include keeping the substation operational and maintenance of access roads. The proposed substation will be operated by Eskom and will require routine maintenance work throughout this period. The site will be accessed using the access roads established during the construction phase.

Activity	Description
Site operation and maintenance	» Security, maintenance, and control room staff will be required on site. » The access to the site and the internal access roads will be maintained during the operational phase.

Decommissioning Phase

The substation and power line are expected to have a lifespan of more than 40 years (with maintenance) and the infrastructure would only be decommissioned once it has reached the end of its economic life. If economically feasible/desirable the decommissioning activities would comprise the disassembly and replacement of the individual components with more appropriate technology/ infrastructure available at that time. However, if not deemed so, then the substation would be completely decommissioned which would include the following decommissioning activities.

Activity	Description
Site preparation	Site preparation activities will include confirming the integrity of the access to the site to accommodate the required equipment (e.g. lay down areas and decommissioning camp) and the mobilisation of decommissioning equipment.
Disassemble existing components	The components would be disassembled, and reused and recycled (where possible), or disposed of in accordance with regulatory requirements.

PURPOSE AND OBJECTIVES OF THE EMP CHAPTER 2

An Environmental Management Programme (EMP) is defined as "an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts associated with the planning, construction, operation and decommissioning of a project are avoided or mitigated, and that the positive benefits of the projects are enhanced."[2] The objective of this EMP is to provide consistent information and guidance for implementing the management and monitoring measures established in the permitting process and help achieve environmental policy goals. The purpose of an EMP is to ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation. An effective EMP is concerned with both the immediate outcome as well as the long-term impacts of the project.

The EMP provides specific environmental guidance for the construction and operation phases of a project, and is intended to manage and mitigate construction and operation activities so that unnecessary or preventable environmental impacts do not result. These impacts range from those incurred during start up (i.e. site clearing and site establishment), during the construction activities themselves (i.e. erosion, noise, dust, and visual impacts), during site rehabilitation (i.e. soil stabilisation, re-vegetation), during operation and during decommissioning (i.e. similar to construction phase activities).

This EMP has been compiled in accordance with Section 33 of the EIA Regulations and will be further developed in terms of specific requirements listed in any authorisations or permit issued for the proposed project. The EMP has been developed as a set of environmental specifications (i.e. principles of environmental management), which are appropriately contextualised to provide clear guidance in terms of the on-site implementation of these specifications (i.e. on-site contextualisation is provided through the inclusion of various monitoring and implementation tools).

This EMP has the following objectives:

» Outline mitigation measures and environmental specifications which are required to be implemented for the planning, construction and rehabilitation, operation, and decommissioning phases of the project in order to manage and

[2] Provincial Government Western Cape, Department of Environmental Affairs and Development Planning: *Guideline for Environmental Management Plans*. 2005

minimise the extent of potential environmental impacts associated with the power line.
» Ensure that all the phases of the project do not result in undue or reasonably avoidable adverse environmental impacts, and ensure that any potential environmental benefits are enhanced.
» Identify entities responsible for the implementation of the measures and outline functions and responsibilities.
» Propose mechanisms and frequency for monitoring compliance, and preventing long-term or permanent environmental degradation.
» Facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that was not considered in the BA process.

The management and mitigation measures identified within the Basic Assessment (BA) process are systematically addressed in this EMP, and ensure the minimisation of adverse environmental impacts to an acceptable level.

Nojoli Wind Farm (Pty) Ltd must ensure that the implementation of the project complies with the requirements of all environmental authorisations, permits, and obligations emanating from relevant environmental legislation. This obligation is partly met through the development and the implementation of this EMP and through its integration into the contract documentation. Since this EMP is part of the BA process, it is important that this document be read in conjunction with the Basic Assessment Report compiled for this project. This will contextualise the EMP and enable a thorough understanding of its role and purpose in the integrated environmental management process. Should there be a conflict of interpretation between this EMP and the environmental authorisation, the stipulations in the environmental authorisation shall prevail over that of the EMP, unless otherwise agreed by the authorities in writing. Similarly, any provisions in legislation overrule any provisions or interpretations within this EMP.

This EMP shall be binding on all the parties involved in the construction and operational phases of the project, and shall be enforceable at all levels of contract and operational management within the project.

STRUCTURE OF THIS EMP *CHAPTER 3*

The first two chapters provide background to the EMP and the proposed project, while the chapters which follow consider the following:

» Key legislation applicable to the development;
» Planning and design activities;
» Construction activities;
» Operation activities; and
» Decommissioning activities.

These chapters set out the procedures necessary for the construction of the proposed substation and power line to minimise environmental impacts and achieve environmental compliance. For each of the phases of implementation, an over-arching environmental **goal** is stated. In order to meet this goal, a number of **objectives** are listed. The EMP has been structured in table format in order to show the links between the goals for each phase and their associated objectives, activities/risk sources, mitigation actions, monitoring requirements and performance indicators. A specific EMP table has been established for each environmental objective. The information provided within the EMP table for each objective is outlined below.

a). OBJECTIVE: Description of the objective, which is necessary to meet the overall goals; which take into account the findings of the BA specialist studies

Project Component/s	» List of project components affecting the objective.
Potential Impact	» Description of potential environmental impact if objective is not met.
Activity/Risk Source	» Description of activities which could affect achieving objective.
Mitigation: Target/Objective	» Description of the target and/or desired outcomes of mitigation.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
List specific action(s) required to meet the mitigation target/objective described above.	Who is responsible for the measures?	Periods for implementation.

Performance Indicator	Description of key indicator(s) that track progress/indicate the effectiveness of the EMP.
Monitoring	Mechanisms for monitoring compliance; the key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods, and reporting.

The objectives and EMP tables are required to be reviewed and possibly modified whenever changes, such as the following, occur:

» Planned activities change;
» Modification to or addition to environmental objectives and targets;
» Relevant legal or other requirements are changed or introduced; or
» Significant progress has been made on achieving an objective or target such that it should be re-examined to determine if it is still relevant, should be modified, etc.

3.1. Project Team

This draft EMP was compiled by and had input from:

	Name	**Company**
EMP Compilers:	Lusani Rathanya Karen Jodas	Savannah Environmental
Specialist input:	Johannes Binneman (Heritage Report)	Eastern Cape Heritage Consultants cc
Specialist input from existing reports:	Marianne Strohbach (Ecology Specialist Report)	Savannah Environmental

KEY LEGISLATION APPLICABLE TO THE DEVELOPMENT CHAPTER 4

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

- National Environmental Management Act (Act No 107 of 1998).
- EIA Regulations, published under Chapter 5 of the NEMA (GNR R545, GNR 546 in Government Gazette 33306 of 18 June 2010).
- Guidelines published in terms of the NEMA EIA Regulations, in particular:
  - Companion to the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations of 2010 (Draft Guideline; DEA, 2010).
  - Public Participation in the EIA Process (DEA, 2010).
  - Integrated Environmental Management Information Series (published by DEA)
- International guidelines, including the Equator Principles.

Several other Acts, standards, or guidelines have also informed the project process and the scope of issues addressed and assessed in the BA Report. A review of legislative requirements applicable to the proposed project is provided in Table 4.1.

Table 4.1: Relevant legislative and permitting requirements applicable to the proposed power line

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 must be considered, investigated, assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation.	» National Department of Environmental Affairs » Eastern Cape DEDEAT	» The Final BA Report is to be submitted to the DEA for review and decision making. » The EC DEDEAT will act as the commenting authority.

Legislation	*Applicable Requirements*	*Relevant Authority*	*Compliance requirements*
	» In terms of GNR 543 of 18 June 2010, a Basic Assessment 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 BA process. » 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 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	» 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. » A permit would be required for the protected plant species found on site to be disturbed or destroyed by the proposed development.

Legislation	*Applicable Requirements*	*Relevant Authority*	*Compliance requirements*
	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 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		

Legislation	*Applicable Requirements*	*Relevant Authority*	*Compliance requirements*
	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 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.		

Legislation	*Applicable Requirements*	*Relevant Authority*	*Compliance requirements*
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 922, 29 November 2013), 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; (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 Department of Water and Environmental Affairs » Eastern Cape DEDEAT	» As no waste disposal site is to be associated with the proposed project, no permit is required in this regard. » 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. » The volumes of waste to be generated and stored on the site during construction and operation of the power line will not require a waste license (provided these remain below the prescribed thresholds).
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	» National Department of Environmental Affairs » Eastern Cape DEDEAT	» While no permitting or licensing requirements arise from this legislation, this Act will find application during the construction phase of the project.

Legislation	*Applicable Requirements*	*Relevant Authority*	*Compliance requirements*
	(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 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 » Eastern Cape Department of Water Affairs	» A general permitting or licensing is a requirements from this legislation for river and wetland crossings. However, if the wetlands and rivers can be avoided or spanned by the proposed power line no licence will be needed.
Environment Conservation Act (Act No. 73 of 1989)	» National Noise Control Regulations (GN R154 dated 10 January 1992)	» National Department of Environmental Affairs » Local Authorities	» There is no requirement for a noise permit in terms of the legislation. » Any noisy activities carried out during the construction phase that could present an intrusion impact to the local community should be limited to 6:00am to 6:00pm Monday – Saturday (excluding public holidays). » Should these specific activities need to be undertaken outside of these times,

Legislation	*Applicable Requirements*	*Relevant Authority*	*Compliance requirements*
			the surrounding communities will need to be notified and appropriate approval will be obtained from the DEA and the Local Municipality.
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	» There is a borrow pit on site that has been authorised.
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 lines), bridges exceeding 50 m, or any development or other activity which will change the character of a	» South African Heritage Resources Agency	» A permit may be required should heritage sites be unearthed on site during the construction phase.

Legislation	*Applicable Requirements*	*Relevant Authority*	*Compliance requirements*
	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.		
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". » GN 1042 provides a list of protected tree species.	» Department of Agriculture, Forestry and Fisheries	» A permit would need to be obtained for any protected trees that are affected, although none are likely to occur on site.
National Veld and Forest Fire Act (Act 101 of 1998)	» Provides requirements for veldfire prevention through firebreaks and	» Department of Agriculture, Forestry and Fisheries	» While no permitting or licensing requirements arise from this legislation,

Legislation	*Applicable Requirements*	*Relevant Authority*	*Compliance requirements*
	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.		this act will find application during the operational phase of the project in terms of fire prevention and management.
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	» 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
	substances or products in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products. » Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared 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.		
Provincial Legislation			
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.	» Eastern Cape DEDEAT	» Permitting or licensing requirements may arise from this legislation for the proposed activities to be undertaken for the proposed project.

MANAGEMENT PROGRAMME: PLANNING AND DESIGN CHAPTER 5

Overall Goal: undertake the planning and design phase in a way that:

» Ensures that the design responds to the identified environmental constraints and opportunities.
» Ensures that adequate regard has been taken of any landowner and community concerns and that these are appropriately addressed through design and planning (where appropriate).
» Ensures that the best environmental options are selected for the linear components, including the access roads and power line alignments.
» Enables the construction activities to be undertaken without significant disruption to other land uses and activities in the area.

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

5.1 Objectives

a). OBJECTIVE: Ensure the design responds to identified environmental constraints and opportunities

The study area is part of the Bedford Dry Grasslands as described by Mucina and Rutherford (2006), with riverine vegetation on the banks of small ephemeral water washes that drain into the Great Fish River. Bedford Dry Grassland is considered to be Least Threatened, with 1% conserved of a target of 23% and 3% transformed. This vegetation type is found on the gently undulating plains south of the Winterberg Mountains from Somerset East in the west to Fort Beaufort in the east. It is an open, dry grassland interspersed with *Acacia karroo* woodland, especially along drainage lines. The grassland is relatively short and contains a dwarf shrubby component of karroid origin. This is the most widespread vegetation type within the study area and occurs on all the farm portions under assessment.

Bedford Dry Grassland occurs on undulating plains and the structure is generally open, dry grassland interspersed with pockets of *Acacia karroo* woodlands. The grassland is relatively short and can be dominated by grasses such as *Digitaria argyrograpta, Themeda triandra*, *Eragrostis* species, and *Cynodon* species. It can also contain a variable amount of dwarf karroid shrubs, of which *Nenax microphylla* and *Asparagus striatus* are relatively common (Mucina & Rutherford

2006). Although only 1% of this vegetation type is currently conserved in private reserves, only 3 % has been transformed and overall the vegetation type is considered as least threatened (Strohbach, 2012).

Project Component/s	» Substation » Power line » Access roads
Potential Impact	» Soil erosion » Impacts on ecology & birds » Impact on heritage sites
Activities/Risk Sources	» Positioning of all the facilities components
Mitigation: Target/Objective	» The design responds to the identified environmental constraints and opportunities

Mitigation: Action/Control	Responsibility	Timeframe
Undertake pre-construction walk-through footprint investigations for protected flora and burrowing terrestrial vertebrates. The final footprint investigation (walkthrough) is aimed to fully inform the developer, responsible conservation authority (that will issue the relevant permits and authorisations), contractors and ECO about: » Protected and red data species that will be affected by the development * indicating the red-data and protection status of each species observed (what red-data classification, which legislation) » Location of protected plant species within the footprint area – either individually mapped or approximate areas of occurrence (alternatively, for linear structures, between which structures or other markers) » Identification of the affected species by providing a representative photo record that enables ECOs and contractors to identify such plants » How many specimens per species will be affected – relatively accurate estimate to the nearest 50, more accurate if less than 50 » Which species can be successfully relocated, which and how many will have to be destroyed » Location and nature of any nesting sites or active burrows of vertebrate species (birds, amphibians,	Developer, carried out by Specialist	Design review phase

Mitigation: Action/Control	Responsibility	Timeframe
reptiles and mammals), mapped by GPS, that will have to be inspected and cleared/relocated prior to construction by the contractor or duly appointed person(s) » Location and nature of any alien invasive species that will have to be cleared by the contractor » Location and nature of any other significant environmental concerns, e.g. extreme gully erosion, that will need to be addressed by the contractor to prevent any unnecessary (further) degradation of the development footprint		
The above pre-construction footprint investigations must be used to draft the following: » A comprehensive search and rescue program for plants and possible burrowing animals » A comprehensive alien invasive species eradication and management plan * Basic requirements of these EMPs are listed under the Construction and operational Phase EMP	Developer, carried out by Specialist	Design review phase
Obtain permits for protected plant removal and relocation (if applicable) prior to commencement of any activity related to this development. As a minimum, permits will be required to remove all or some of the following species: * *Euphorbia meloformis* * *Euphorbia gatbergensis* * *Euphorbia globosa* * *Euphorbia striata* * *Trichodiadema species* * *Bergeranthus species* * *Pelargonium sidoides* * *Moraea elliotii* * *Tritonia laxifolia* * *Aloe longistyla* * *Aloe ciliaris* * *Mestoklema species* * *Haemanthus species* * *Anacampseros arachnoides* * *Chasmatophyllum musculinum*	Developer, or contractor responsible for vegetation clearing	Pre-commencement
Use design-level mitigation measures recommended in respect of habitat and ecosystem intactness and prevention of species loss as detailed within the BA Report	Developer	Prior to submission of final construction

Mitigation: Action/Control	Responsibility	Timeframe
» This includes positioning components of the development as close as possible together and in close proximity to other existing or planned developments in the area » Strictly adhere to existing tracks/roads where ever possible to gain access to the site » Sites for storing, mixing, and handling topsoil stockpiles (if necessary) or any introduced materials, including all machinery or processing implements, must be placed in an ecologically least sensitive area and at least 500 m from any type of wetland. Such sites must be clearly indicated in site plans and the drafting of relevant detailed method statements and/or management plans requested from the relevant contractor or environmental firm.		layout plan
Access roads and machinery turning points must be planned to minimise the impacted area, avoid the initiation of accelerated soil erosion and prevent unnecessary compaction and disturbance of topsoils, prevent obstruction or alteration of natural water flow	Developer	Design phase
Compile a comprehensive storm water management and erosion control plan for the footprint area as part of the final design of the project » Basic requirements of these plans are listed under the Construction and Operational Phase EMP	Developer and relevant specialist	Design phase
» Depending on the final layout and taking all potential impacts, fire risks and maintenance requirements into consideration, it has to be decided upon and made clear: * Permissible vegetation: maximum height, desirable density and composition * Maintenance of this vegetation – mowing, small livestock grazing, etc. Note: due to the close proximity of rivers to the site, there should be no application of herbicides * Permissible terrestrial fauna that could be allowed to migrate/return to the area below/between the pylons – including species that must be excluded due to potential damage to the development	Developer, in consultation with relevant specialist	Design phase
Compile a comprehensive vegetation rehabilitation management plan	Developer and relevant specialist	Design phase

Mitigation: Action/Control	Responsibility	Timeframe
Depending on the type of pylons selected for the development, a response and management plan must be drafted and available to deal with accidental breakages. This plan must include as a minimum: » How and where broken components and any potential harmful substances can be disposed of – it must also be indicated if any material can be recycled, and where materials must then be taken for recycling * The above will have to be incorporated into the waste management plan to be developed for the site	Developer and relevant waste management specialist	Design phase

Performance Indicator	» Grid connection and road alignments meet environmental objectives. » Ecosystem fragmentation is kept to a minimum » Ecosystem functionality is retained and any degradation prevented
Monitoring	» Ensure that the design implemented meets the objectives and mitigation measures in the BA Report through review of the design by the Project Manager, and the ECO prior to the commencement of activity.

MANAGEMENT PROGRAMME: CONSTRUCTION CHAPTER 6

Overall Goal: Undertake the construction phase in a way that:

» Ensures that construction activities are properly managed in respect of environmental aspects and impacts.
» Enables construction activities to be undertaken without significant disruption to other land uses and activities in the area, in particular concerning noise impacts, farming practices, traffic and road use, and effects on local residents.
» Minimises the impact on the indigenous natural vegetation, and habitats of ecological value.
» Minimises impacts on fauna (including birds) in the study area.
» Minimises the impact on heritage sites should they be uncovered.
» Establishes an environmental baseline during construction activities on the site, where possible.

6.1 Institutional Arrangements: Roles and Responsibilities for the Construction Phase

As the proponent, Nojoli Wind Farm (Pty) Ltd must ensure that the project complies with the requirements of all environmental authorisations and permits, and obligations emanating from other relevant environmental legislation. This obligation is partly met through the development of the EMP, and the implementation of the EMP through its integration into the contract documentation. Nojoli Wind Farm (Pty) Ltd will retain various key roles and responsibilities during the construction phase.

a). OBJECTIVE: Establish clear reporting, communication, and responsibilities in relation to overall implementation of the EMP

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Project Manager; Site Manager; Safety, Health and Environment Representative; Environmental Control Officer (ECO) and Contractor for the construction phase of this project are as detailed below.

Project Manager will:

» Ensure all specifications and legal constraints specifically with regards to the environment are highlighted to the Contractor(s) so that they are aware of these.
» Ensure that Nojoli and its Contractor(s) are made aware of all stipulations within the EMP.
» Ensure that the EMP is correctly implemented throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes.
» Be fully conversant with the BA for the project, the EMP, the conditions of the Environmental Authorisation (once issued), and all relevant environmental legislation.

Site Manager (Nojoli's on-site Representative) will:

» Be fully knowledgeable with the contents of the BA and risk management.
» Be fully knowledgeable with the contents and conditions of the Environmental Authorisation (once issued).
» Be fully knowledgeable with the contents of the EMP.
» Be fully knowledgeable with the contents of all relevant environmental legislation, and ensure compliance with these.
» Have overall responsibility of the EMP and its implementation.
» Conduct audits to ensure compliance to the EMP.
» Ensure there is communication with the Project Manager, the ECO, and relevant discipline engineers on matters concerning the environment.
» Ensure that no actions are taken which will harm or may indirectly cause harm to the environment, and take steps to prevent pollution on the site.
» Confine activities to the demarcated construction site.

Environmental Control Officer (ECO) (independent of Nojoli as well as Eskom, but could be the same resource as that used for the larger Nojoli Wind Farm) will be responsible for monitoring, reviewing, and verifying compliance by the Contractor with the environmental specification and accordingly will:

» Be fully knowledgeable with the contents within the BA.
» Be fully knowledgeable with the contents within the conditions of the Environmental Authorisation (once issued).
» Be fully knowledgeable with the contents within the EMP.
» Be fully knowledgeable with the contents within all relevant environmental legislation, and ensure compliance with them.

» Ensure that the contents of this document are communicated to the Contractor site staff and that the Site Manager and Contractor are constantly made aware of the contents through discussion.
» Ensure that the compliance of the EMP is monitored through regular and comprehensive inspection of the site and surrounding areas.
» Ensure that if the EMP conditions or specifications are not followed then appropriate measures are undertaken to address this.
» Monitoring and verification must be implemented to ensure that environmental impacts are kept to a minimum, as far as possible.
» Ensure that the Site Manager has input into the review and acceptance of construction methods and method statements.
» Ensure that activities on site comply with all relevant environmental legislation.
» Ensure that a removal is ordered of any person(s) and/or equipment responsible for any contravention of the specifications of the EMP.
» Ensure that the compilation of progress reports for submission to the Project Manager, with input from the Site Manager, takes place on a regular basis, including a final post-construction audit.
» Ensure that there is communication with the Site Manager regarding the monitoring of the site.
» Ensure that any non-compliance or remedial measures that need to be applied are reported.
» Independently report to DEA in terms of compliance with the specifications of the EMP and conditions of the Environmental Authorisation (once issued).

Contractors and Service Providers: It is important that contractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMP. The contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts. The contractor's obligations in this regard include the following:

» Employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment.
» A copy of the EMP must be easily accessible to all on-site staff members.
» Employees must be familiar with the requirements of this EMP and the environmental specifications as they apply to the construction of the power line.
» Prior to commencing any site works, all employees and sub-contractors must have attended an environmental awareness training course which must

provide staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
» Staff will be informed of environmental issues as deemed necessary by the ECO.

All contractors (including sub-contractors and staff) and service providers are ultimately responsible for:

» Ensuring adherence to the environmental management specifications.
» Ensuring that Method Statements are submitted to the Site Manager (and ECO) for approval before any work is undertaken.
» Any lack of adherence to the above will be considered as non-compliance to the specifications of the EMP.
» Ensuring that any instructions issued by the Site Manager on the advice of the ECO are adhered to.
» Ensuring that a report is tabled at each site meeting, which will document all incidents that have occurred during the period before the site meeting.
» Ensuring that a register is kept in the site office, which lists all transgressions issued by the ECO.
» Ensuring that a register of all public complaints is maintained.
» Ensuring that all employees, including those of sub-contractors receive training before the commencement of construction in order that they can constructively contribute towards the successful implementation of the EMP (i.e. ensure their staff are appropriately trained as to the environmental obligations).

Roles and responsibilities should be confirmed and updated throughout the construction phase in order to ensure effective environmental management and communication between parties.

6.2 Objectives

In order to meet the overall goal for construction, the following objectives, actions, and monitoring requirements have been identified.

b). OBJECTIVE: Minimise impacts related to inappropriate site establishment

Project	» Substation

Component/s	» Power line » Access road
Potential Impact	» Hazards to landowners and public. » Damage to indigenous natural vegetation, due largely to ignorance of where such areas are located. » Loss of threatened plant species
Activities/Risk Sources	» Excavations. » Movement of construction vehicles in the area and on-site.
Mitigation: Target/Objective	» To secure the site against unauthorised entry. » To protect members of the public/landowners/residents. » No loss of or damage to sensitive vegetation in areas outside the immediate development footprint.

Mitigation: Action/Control	Responsibility	Timeframe
Secure site, working areas and excavations in an appropriate manner, as agreed with the ECO.	Contractor	Site establishment, and duration of construction
Where necessary control access, fence, and secure area.	Contractor	Site establishment, and duration of construction
Fence and secure contractor's equipment camp.	Contractor	Site establishment
Where the public could be exposed to danger by any of the works or site activities, the contractor must, as appropriate, provide suitable flagmen, barriers and/or warning signs in English, Afrikaans and any other relevant local languages, all to the approval of the Site Manager.	Contractor	Site establishment and duration of construction
All unattended open excavations shall be adequately demarcated and/or fenced. Adequate protective measures must be implemented to prevent unauthorised access to the working area and the internal access/haul routes.	Contractor	Site establishment and duration of construction
Establish appropriately bunded areas for storage of hazardous materials (i.e. fuel to be required during construction).	Contractor	Site establishment
All development footprints should be appropriately fenced off and clearly demarcated.	Contractor	Site establishment, and duration of construction
Establish the necessary ablution facilities with chemical toilets and provide adequate sanitation facilities and ablutions for construction workers (1	Contractor	Site establishment, and duration

Mitigation: Action/Control	Responsibility	Timeframe
toilet per every 15 workers) at appropriate locations on site. Provide sanitary bins for female workers.		of construction
Ablution or sanitation facilities should not be located within 100 m from a 1:100 year flood line including drainage lines.	Contractor	Site establishment, and duration of construction
Supply adequate (closable, tamper proof) waste collection bins at site where construction is being undertaken. Separate bins should be provided for general and hazardous waste. As far as possible, provision should be made for separation of waste for recycling.	Contractor	Site establishment, and duration of construction

Performance Indicator	» Site is secure and there is no unauthorised entry. » No members of the public/ landowners injured. » Appropriate and adequate waste management and sanitation facilities provided at construction site.
Monitoring	» An incident reporting system will be used to record non-conformances to the EMP. » ECO to monitor all construction areas on a continuous basis until all construction is completed. Non-conformances will be immediately reported to the site manager.

c). OBJECTIVE: Appropriate management of the construction site and construction workers

Project Component/s	» Substation » Power line » Access road
Potential Impact	» Damage to indigenous natural vegetation and sensitive areas. » Damage to and/or loss of topsoil (i.e. pollution, compaction etc.). » Impacts on the surrounding environment due to inadequate sanitation and waste removal facilities. » Pollution/contamination of the environment.
Activities/Risk Sources	» Vegetation clearing and levelling of equipment storage area/s. » Access to and from the equipment storage area/s. » Ablution facilities. » Contractors not aware of the requirements of the EMP, leading to unnecessary impacts on the surrounding environment.
Mitigation: Target/Objective	» Limit equipment storage within demarcated designated areas. » Ensure adequate sanitation facilities and waste management practices.

	» Ensure appropriate management of actions by on-site personnel in order to minimise impacts to the surrounding environment.

Mitigation: Action/Control	Responsibility	Timeframe
As far as possible, minimise vegetation clearing and levelling for equipment storage areas.	Contractor	Site establishment, and during construction
Rehabilitate all disturbed areas at the construction equipment camp as soon as construction is complete within an area.	Contractor	Duration of Contract
Ensure waste removal facilities are maintained and emptied on a regular basis.	Contractor	Site establishment, and duration of construction
The terms of this EMP and the Environmental Authorisation (once issued) must be included in all tender documentation and Contractors contracts	Nojoli	Tender process
Ensure that all personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm. This can be achieved through the provision of appropriate environmental awareness training to all personnel. Records of all training undertaken must be kept.	Contractor	Duration of construction
Contractors must use chemical toilets/ablution facilities situated at designated areas of the site; no ablution activities will be permitted outside the designated areas. These facilities must be regularly serviced by appropriate contractors. A minimum of one toilet shall be provided per 15 persons at each working area such as the Contractor's camp	Contractor and sub-contractor/s	Duration of contract
Cooking and eating of meals must take place in a designated area. No firewood or kindling may be gathered from the site or surrounds.	Contractor and sub-contractor/s	Duration of contract
All litter must be deposited in a clearly marked, closed, animal-proof disposal bin in the construction area. Particular attention needs to be paid to food waste.	Contractor and sub-contractor/s	Duration of contract
No one other than the ECO or personnel authorised by the ECO may disturb flora or fauna outside of the demarcated construction area/s.	Contractor and sub-contractor/s	Duration of contract
Fire fighting equipment and training must be provided	Contractor and	Duration of

Mitigation: Action/Control	Responsibility	Timeframe
before the construction phase commences.	sub-contractor/s	contract
Draft Code of conduct for construction workers.	Contractor and sub-contractor/s	Pre-construction
Contractors must ensure that all workers are informed at the outset of the construction phase of the conditions contained in the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.	Contractor and sub-contractor/s	Construction
On completion of the construction phase, all construction workers must leave the site within one week of their contract ending.	Contractor and sub-contractor/s	Construction

Performance Indicator	» The construction equipment camps have avoided sensitive areas, as approved by the ECO. » Ablution and waste removal facilities are in a good working order and do not pollute the environment due to mismanagement. » All areas are rehabilitated promptly after construction in an area is complete. » Excess vegetation clearing and levelling is not reported by the ECO. » No complaints regarding contractor behaviour or habits. » Appropriate training of all staff is undertaken prior to them commencing work on the construction site. » Code of Conduct drafted before commencement of construction phase.
Monitoring	» Regular audits of the construction camps and areas of construction on site by the ECO. » Proof of disposal of sewage at an appropriate wastewater treatment works. » An incident reporting system should be used to record non-conformances to the EMP. » Observation and supervision of Contractor practices throughout construction phase by the ECO. » Complaints will be investigated and, if appropriate, acted upon. » An incident reporting system will be used to record non-conformances to the EMP.

d). OBJECTIVE: Maximise local employment and business opportunities associated with the construction phase

Although limited, employment opportunities could be created during the construction phase, specifically for semi-skilled and unskilled workers, use should be made of local labour as far as possible.

Project Component/s	» Substation » Power line » Access roads
Potential Impact	» The opportunities and benefits associated with the creation of local employment and business.
Activities/Risk Sources	» Contractors who make use of their own labour for unskilled tasks, thereby reducing the employment and business opportunities for locals. » The inflow of various specialists from outside the study area and even abroad. » Sourcing of individuals with skills similar to the local labour pool outside the municipal area.
Mitigation: Target/Objective	» Employment of a maximum number of low-skilled to semi-skilled workers for the project from the local area where possible.

Mitigation: Action/Control	Responsibility	Timeframe
Construction workers should be recruited, as far as possible, from the local area in and around the Cookhouse Community area (construction workers should be able to provide proof of having lived in the area for five years or longer).	Contractor	Duration of construction
Tender documentation should contain guidelines for the involvement of labour, entrepreneurs, businesses, and SMMEs from the local sector.	Contractor	Pre-construction
Develop a database of local BEE service providers and ensure that they are informed of tenders and job opportunities.	Contractor	Pre-construction and construction

Performance Indicator	» The involvement of local labour and previously disadvantaged individuals is promoted. » Labour, entrepreneurs, businesses, and SMMEs from the local sector are awarded jobs, where possible, based on requirements in the tender documentation.

Monitoring	» Developer and or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.

e). OBJECTIVE: Minimise impacts related to traffic management and transportation of equipment and materials to site

The construction phase of the project will be the most significant in terms of generating traffic impacts; resulting from the transport of equipment and materials and construction crews to the site and the return of the vehicles after delivery of materials.

Project Component/s	» Substation » Power line » Access roads
Potential Impact	» Impact of heavy construction vehicles on road surfaces, and possible increased risk in accidents involving people and animals. » Traffic congestion, particularly on narrow roads or on road passes where overtaking is not permitted. » Deterioration of road pavement conditions (both surfaced and gravel road) due to abnormal loads.
Activities/Risk Sources	» Construction vehicle movement. » Speeding on local roads. » Degradation of local road conditions. » Site preparation and earthworks. » Foundations or plant equipment installation. » Transportation of ready-mix cement from off-site batching plant to the site. » Mobile construction equipment movement on-site. » Substation and Power line construction activities.
Mitigation: Target/Objective	» Minimise impact of traffic on local traffic volume, existing infrastructure, property owners, animals, and road users. » To ensure all vehicles are roadworthy and all materials/equipment are transported appropriately and within any imposed permit/licence conditions.

Mitigation: Action/Control	Responsibility	Timeframe
Appropriate dust suppression techniques must be implemented to minimise dust from gravel roads. These could include the use of water or other appropriate dust suppressants, as determined by the	Nojoli and ECO	Construction

Mitigation: Action/Control	Responsibility	Timeframe
local site conditions.		
Construction vehicles and those transporting materials and goods should be inspected by the contractor or a sub-contractor to ensure that these are in good working order and not overloaded.	Contractor	Construction
Strict vehicle safety standards should be implemented and monitored.	Contractor and ECO	Construction
All relevant permits for abnormal loads must be applied for from the relevant authority.	Contractor (or appointed transportation contractor)	Pre-construction
A designated access to the proposed site must be created to ensure safe entry and exit.	Contractor	Pre-construction
No deviation from approved transportation routes must be allowed, unless roads are closed for whatever reason outside the control of the contractor.	Contractor	Duration of contract
Appropriate road management strategies must be implemented on external and internal roads with all employees and contractors required to abide by standard road and safety procedures.	Contractor (or appointed transportation contractor)	Pre-construction
Any traffic delays resulting from the presence of construction traffic must be co-ordinated with the appropriate authorities.	Contractor	Duration of contract
The movement of all vehicles within the site must be on designated roadways.	Contractor	Duration of contract
Signage must be established at appropriate points warning of turning traffic and the construction site (all signage to be in accordance with prescribed standards).	Contractor	Duration of contract
Appropriate maintenance of all vehicles of the contractor must be ensured.	Contractor	Duration of contract
An appropriate speed limit should be implemented for vehicles travelling on site in order to minimise dust generation and ensure safety of personnel and the environment.	Contractor	Duration of contract
All vehicles of the contractor travelling on public roads must adhere to the specified speed limits and all drivers must be in possession of an appropriate valid driver's license.	Contractor	Duration of contract

Performance Indicator	» Vehicles keeping to the speed limits. » Vehicles are in good working order and safety standards are implemented. » Local residents and road users are aware of vehicle movements

	and schedules. » No construction traffic related accidents are experienced. » Local road conditions and road surfaces are up to standard. » Complaints of residents are not received (e.g. concerning the speeding of heavy vehicles).
Monitoring	» Developer and or appointed ECO must monitor indicators listed above to ensure that they have been implemented.

f). OBJECTIVE: To avoid and or minimise the potential impact of the activities during the construction on the safety of local communities and the potential loss of stock and damage to farm infrastructure

An inflow of workers could, as a worst case scenario and irrespective of the size of the workforce, pose some security risks. Criminals could also use the opportunity due to "outsiders" being in the area to undertake their criminal activities.

Project Component/s	» Substation » Power line » Access roads
Potential Impact	» Impact on safety of farmers and communities (increased crime etc.) and potential loss of livestock due to stock theft by construction workers and also damage to farm infrastructure, such as gates and fences. » Impact on irrigated fields
Activities/Risk Sources	» The presence of construction workers on the site can pose a potential safety risk to local farmers and communities and may result in stock thefts. The activities of construction workers may also result in damage to farm infrastructure.
Mitigation: Target/Objective	» To avoid and or minimise the potential impact on local communities and their livelihoods.

Mitigation: Action/Control	Responsibility	Timeframe
The housing of construction workers on the site should be limited to security personnel.	Contractor	Construction
Ensure that all farm gates are locked and secure at all times.	Nojoli and Contractor	Construction and Operation
Inform all landowners of activity on their land at least 2 days in advance of planned activities.	Nojoli	All phases of the project
The construction site should be fenced and access to the area controlled.	Nojoli and Contractor	All phases of project
Procedures and measures to prevent, and in worst	Nojoli, Local	Pre-

Mitigation: Action/Control	Responsibility	Timeframe
cases, attend to fires should be developed in consultation with the surrounding property owners and the local municipality	Municipality, and local communities	construction and when required
Contact details of emergency services should be prominently displayed on site.	Nojoli and Contractor	Construction
Appropriate fire-fighting equipment must be present on site and members of the workforce should be appropriately trained in using this equipment in the fighting of veld fires	Nojoli and Contractor	Construction

Performance Indicator	» No criminal activities and theft of livestock are reported. » No fires or on-site accidents occur.
Monitoring	» Nojoli and appointed ECO must monitor indicators listed above to ensure that they have been implemented.

g). OBJECTIVE: Management of dust and air emissions

During the construction phase, limited gaseous or particulate emissions are anticipated from exhaust emissions from construction vehicles and equipment on-site, as well as vehicle entrained dust from the movement of vehicles on the main and internal access roads.

Project Component/s	» Substation » Power line » Access roads
Potential Impact	» Dust and particulates from vehicle movement to and on-site, foundation excavation, road construction activities, road maintenance activities, temporary stockpiles, and vegetation clearing affecting the surrounding residents and visibility. » Release of minor amounts of air pollutants (for example NO_2, CO and SO_2) from vehicles and construction equipment
Activities/Risk Sources	» Clearing of vegetation and topsoil. » Excavation, grading, scraping, levelling, digging, drilling. » Transport of materials, equipment, and components on internal access roads. » Re-entrainment of deposited dust by vehicle movements. » Wind erosion from topsoil and spoil stockpiles and unsealed roads and surfaces. » Fuel burning vehicle and construction engines.
Mitigation: Target/Objective	» To ensure emissions from all vehicles and construction engines are minimised, where possible, for the duration of the construction phase

	» To minimise nuisance to the community from dust emissions and to comply with workplace health and safety requirements for the duration of the construction phase

Mitigation: Action/Control	Responsibility	Timeframe
Roads must be maintained in a manner that will ensure that nuisance from dust emissions from road or vehicle sources are not visibly excessive.	Contractor	Site establishment and construction
Ensure that any damage to roads because of construction activities is repaired before completion of the construction phase.	Contractor	Site establishment and construction
Appropriate dust suppressant must be applied on all exposed areas and stockpiles as required to minimise/control airborne dust. These could include the use of water or other appropriate dust suppressants, as determined by the local site conditions.	Contractor	Duration of contract
Haul vehicles moving outside the construction site carrying material that can be wind-blown must be covered with tarpaulins if required by the wind conditions.	Contractor	Duration of contract
An appropriate speed limit should be implemented for vehicles travelling on site in order to minimise dust generation and ensure safety of personnel and the environment.	Contractor	Duration of contract
Dust-generating activities or earthworks may need to be rescheduled or the frequency of application of dust control/suppressant increased during periods of high winds if excessive visible dust is blowing toward nearby residences outside the site.	Contractor	Duration of contract
Strictly control vibration pollution from compaction plant or excavation plant.	Contractor	Duration of contract
Disturbed areas must be re-vegetated as soon as practicable once construction in an area is completed.	Contractor	Completion of construction
Vehicles and equipment must be maintained in a road-worthy condition at all times.	Contractor	Duration of contract

Performance Indicator	» No complaints from affected residents or community regarding dust or vehicle emissions. » Dust suppression measures implemented for all heavy vehicles that require such measures during the construction phase commences. » Drivers made aware of the potential safety issues and

	enforcement of strict speed limits when they are employed. » All heavy vehicles equipped with speed monitors before they are used in the construction phase in accordance with South African vehicle legislation. » Road worthy certificates in place for all heavy vehicles at outset of construction phase and up-dated on a monthly basis.
Monitoring	» Monitoring must be undertaken to ensure emissions are not exceeding the prescribed levels via the following methods: » Immediate reporting by personnel of any potential or actual issues with nuisance dust or emissions to the Site Manager. » A complaints register must be maintained, in which any complaints from residents/the community will be logged, and thereafter complaints will be investigated and, where appropriate, acted upon. » An incident reporting system must be used to record non-conformances to the EMP.

h). OBJECTIVE: Minimisation of development footprint and disturbance to topsoil

In order to minimise impacts on flora, fauna, and ecological processes, the development footprint should be limited.

Project Component/s	» Substation » Power line. » Access roads
Potential Impact	» Impacts on natural vegetation. » Impacts on soil. » Loss of topsoil.
Activity/Risk Source	» Site preparation and earthworks. » Excavation of foundations. » Construction of site access road. » Site preparation (e.g. compaction). » Power line construction activities. » Stockpiling of topsoil, subsoil and spoil material.
Mitigation: Target/Objective	» To retain natural vegetation, where possible. » To minimise footprints of disturbance of vegetation/habitats. » Remove and store all topsoil on areas that are to be excavated; and use this topsoil in subsequent rehabilitation of disturbed areas. » Minimise spoil material.

Mitigation: Action/Control	Responsibility	Timeframe
Areas to be cleared must be clearly marked on-site to eliminate the potential for unnecessary clearing.	Contractor in consultation with Specialist	Pre-construction
The extent of clearing and disturbance to the native vegetation must be kept to a minimum so that impact on flora and fauna and their habitats is restricted.	Contractor	Site establishment & duration of contract
Construction activities must be restricted to demarcated areas so that impact on flora and fauna is restricted.	Contractor	Site establishment & duration of contract
Any fill material required must be sourced from a commercial off-site suitable/permitted source, quarry or borrow pit. Where possible, material from foundation excavations must be used as fill on-site.	Contractor	Duration of contract
Excavated topsoil must be stockpiled in designated areas separate from base material at a maximum height and covered until replaced during rehabilitation.	Contractor	Site establishment & duration of contract
Topsoil must not be stripped or stockpiled when it is raining or when the soil is wet as compaction will occur.	Contractor	Site establishment Maintenance: for duration of contract
As far as possible, the maximum topsoil stockpile height must not exceed 2 m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen.	Contractor	Duration of contract

Performance Indicator	» Minimal disturbance outside of designated work areas. » Minimise clearing of existing vegetation. » Topsoil appropriately stored.
Monitoring	» Observation of vegetation clearing and soil management activities by ECO throughout construction phase. » Supervision of all clearing and earthworks. » An incident reporting system will be used to record non-conformances to the EMP.

i). OBJECTIVE: Limit impacts on vegetation communities and species of special concern to limit the loss of biodiversity

The study area is part of the Bedford Dry Grasslands as described by Mucina and Rutherford (2006), with riverine vegetation on the banks of small ephemeral water washes that drain into the Great Fish River. Bedford Dry Grassland is considered to be Least Threatened, with 1% conserved of a target of 23% and 3% transformed. This vegetation type is found on the gently undulating plains south of the Winterberg Mountains from Somerset East in the west to Fort Beaufort in the east. It is an open, dry grassland interspersed with Acacia karroo woodland, especially along drainage lines. The grassland is relatively short and contains a dwarf shrubby component of karroid origin. This is the most widespread vegetation type within the study area and occurs on all the farm portions under assessment .

Bedford Dry Grassland occurs on undulating plains and the structure is generally open, dry grassland interspersed with pockets of *Acacia karroo* woodlands. The grassland is relatively short and can be dominated by grasses such as *Digitaria argyrograpta, Themeda triandra*, *Eragrostis* species, and *Cynodon* species. It can also contain a variable amount of dwarf karroid shrubs, of which *Nenax microphylla* and *Asparagus striatus* are relatively common (Mucina & Rutherford 2006). Although only 1% of this vegetation type is currently conserved in private reserves, only 3 % has been transformed and overall the vegetation type is considered as least threatened (Strohbach, 2012).

Project Component/s	» Substation » Power line » Access roads
Potential Impact	» Permanent loss of vegetation communities and alteration of habitat. » Loss of populations of Species of special concern (SSC); loss of suitable habitat for SSC
Activity/Risk Source	» Construction, environmental management
Mitigation: Target/Objective	» Reduce the impact on the vegetation communities and individual species in the area

Mitigation: Action/Control	Responsibility	Timeframe
Areas to be cleared must be clearly marked in the field to eliminate unnecessary clearing.	Contractor	Construction
Limit unnecessary impacts on surrounding natural	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
vegetation, e.g. driving around in the veld, use access roads only.		
Keep removal of vegetation and species of concern and trampling to a minimum.	Construction team, management, EO.	Construction and operation
Ensure that construction and operation activities are kept within the demarcated areas.	Construction team, management, EO.	Construction and operation
Where possible, align access routes and along existing roads and tracks.	Construction team, management, EO.	Construction and operation
SSC in any area to be cleared should be identified and rescued by a qualified horticulturalist. These species can be re-located to a nursery and used for rehabilitation where appropriate.	Construction team, EO	Construction and operation
Some species of special concern will not transplant. These individuals should, as far as possible, be avoided.	Construction team, EO	Construction and operation
Permits must be obtained to remove species of special concern.	Construction team, EO	Construction and operation
Rehabilitate disturbed areas immediately after they are no longer being constructed on	Construction team, EO	Construction and operation
It is recommended that as much as possible of the high sensitivity areas be set aside as conservation areas and be managed as such by the land owners and the developers.	Construction team, EO	Construction and operation
New roads should be sited in disturbed areas or the edges of disturbed areas wherever possible.	Construction team, EO	Construction and operation
Where possible, the positioning of infrastructure should be shifted to avoid populations of species of special concern.	Construction team, EO	Construction and operation

Performance Indicator	» Minimal loss of vegetation to species of special concern.
Monitoring	» On-going monitoring of the area by an environmental control officer » On-going monitoring of area by environmental manager during operation

j). OBJECTIVE: Protection of vegetation

There are no areas of *very* high local sensitivity on site. However, areas of high local ecological sensitivity have been identified. Placement of infrastructure in these areas should be avoided as far as possible. The development footprints will not impact on any botanical "no go" habitats or areas. Permits will be required where Red Data or protected flora which will be disturbed or relocated.

Project component/s	» Substation » Power line » Access roads
Potential Impact	» Clearing of natural vegetation » Construction activities » Traffic to and from site
Activity/risk source	» Site preparation and earthworks » Construction-related traffic » Foundations or plant equipment installation » Mobile construction equipment » Substation and Power line construction activities » Dumping or damage by construction equipment outside of demarcated construction areas.
Mitigation: Target/Objective	» To retain natural vegetation in the high and moderate sensitive areas on the site » To minimise footprints of disturbance of vegetation/habitats on-site

Mitigation: Action/control	Responsibility	Timeframe
Areas to be cleared will be clearly marked in the field to eliminate unnecessary clearing.	Contractor in consultation with Specialist	Pre-construction
The extent of clearing and disturbance to the native vegetation will be kept to a minimum so that the impact on flora is restricted.	Contractor	Site establishment & duration of contract
A site rehabilitation programme must be implemented.	Contractor in consultation with Specialist	Duration of contract

Performance Indicator	» No disturbance outside of designated work areas » Minimised clearing of existing/natural vegetation » Limited impacts on areas of identified and demarcated sensitive habitats/vegetation

Monitoring	» Observation of vegetation clearing activities by ECO throughout construction phase » Supervision of all clearing and earthworks » An incident reporting system will be used to record non-conformances to the EMP.

k). OBJECTIVE: Limit the damage to wetlands and watercourses

There are no areas of *very* high local sensitivity on site, however there are areas of high local ecological sensitivity. The development footprints will not impact on any botanical "no go" habitats or areas. Permits will be required where Red Data flora is to be disturbed or relocated. These can be obtained from the CapeNature Head Office (Cape Town) or any regional office.

Project component/s	Construction of: » Substation » Power line » Access roads
Potential Impact	» Damage to the watercourse (such as erosion, siltation, dumping of waste within the wetland) that will impact on ecosystem functioning.
Activity/risk source	» Construction, environmental management
Mitigation: Target/Objective	Target: No damage to the drainage line, wetlands and watercourses within the project area.

Mitigation: Action/control	Responsibility	Timeframe
Where possible, substation and power line structures should be placed outside of the wetland 50 m buffer area. Where this is not possible, infrastructure and access roads should be: » Aligned with existing roads » Should go around wetlands where possible » Should cross watercourses perpendicularly to reduce the footprint » Infrastructure should not be placed within drainage lines » Disturbed areas should be rehabilitated immediately » Stormwater and runoff should be controlled » Adequate bridges and culvert structures	Construction team, management, environmental officer.	Construction

Mitigation: Action/control	Responsibility	Timeframe
should be provided at the crossings		
Where wetlands or drainage lines can't be avoided, a permit or General Authorisation from the Department of Water Affairs will need to be obtained.	Developer	Design and construction

Performance Indicator	» No disturbance outside of designated work areas » Minimised clearing of existing/natural vegetation » Limited impacts on areas of identified and demarcated sensitive habitats/vegetation
Monitoring	» An Environmental control officer should monitor the habitat loss before and after construction » The wetlands should be monitored for the presence and development of erosion features downstream of any construction on site.

l). OBJECTIVE: Minimise the establishment and spread of alien invasive plants

On-going alien plant monitoring and removal should be undertaken on all areas of natural vegetation on an annual basis.

Project Component/s	» Substation » Power line » Access roads
Potential Impact	» Invasion of natural vegetation surrounding the site by declared weeds or invasive alien species.
Activities/Risk Sources	» Construction, environmental management.
Mitigation: Target/Objective	» There is a target of no alien plants within project control area during the construction and operation phases.

Mitigation: Action/Control	Responsibility	Timeframe
Avoid creating conditions in which alien plants may become established: » Keep disturbance of indigenous vegetation to a minimum. » Rehabilitate disturbed areas as quickly as possible. » Do not import soil from areas with alien plants.	Contractor	Construction and operation
Establish an on-going monitoring programme to detect and quantify any alien species that may become	Contractor	Construction and

Mitigation: Action/Control	Responsibility	Timeframe
established and identify the problem species (as per Conservation of Agricultural Resources Act and Biodiversity Act).		operation
Immediately control any alien plants that become established using registered control methods.	Contractor	Construction and operation

Performance Indicator	» For each alien species: number of plants and aerial cover of plants within project area and immediate surroundings.
Monitoring	» On-going monitoring of area by ECO during construction. » Annual audit of project area and immediate surroundings by qualified botanist. » If any alien invasive species are detected then the distribution of these should be mapped (GPS co-ordinates of plants or concentrations of plants), number of individuals (whole site or per unit area), age and/or size classes of plants and aerial cover of plants. » The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the project area. » The environmental manager should be responsible for driving this process. » Reporting frequency depends on legal compliance framework.

m). OBJECTIVE: Minimise soil degradation and erosion

The soil on site may be impacted in terms of:

» Soil degradation including erosion (by wind and water) and subsequent deposition elsewhere (i.e. into the drainage lines)
» Uncontrolled run-off relating to construction activity (excessive wetting, uncontrolled discharge, etc.) will also lead to accelerated erosion and possible sedimentation of the drainage lines.
» Degradation of the natural soil profile due to excavation, stockpiling, compaction, pollution and other construction activities will affect soil forming processes and associated ecosystems. Degradation of parent rock is considered low as there are no deep excavations envisaged.

Project Component/s	» Substation » Power line. » Access roads.

Potential Impact	» Soil and rock degradation. » Soil erosion. » Increased deposition of soil into drainage systems. » Increased run-off over the site.
Activities/Risk Sources	» Removal of vegetation, excavation, stockpiling, compaction, and pollution of soil. » Rainfall - water erosion of disturbed areas. » Wind erosion of disturbed areas. » Concentrated discharge of water from construction activity.
Mitigation: Target/Objective	» Minimise extent of disturbance areas. » Minimise activity within disturbance areas. » Minimise soil degradation (mixing, wetting, compaction, etc). » Minimise soil erosion. » Minimise deposition of soil into drainage lines. » Minimise instability of embankments/excavations.

Mitigation: Action/Control	Responsibility	Timeframe
Identify disturbance areas and restrict construction activity to these areas.	Contractor	Before and during construction
Rehabilitate disturbance areas as soon as practicable when construction in an area is complete.	Contractor	During and after construction
Access roads to be carefully planned and constructed to minimise the impacted area and prevent unnecessary excavation, placement, and compaction of soil.	Engineer, ECO, and Contractor	Design and construction
Where access roads cross natural drainage lines, culverts must be designed to allow free flow and regular maintenance must be carried out.	Engineer, ECO, and, Contractor	Design, before and during construction
Dust control on construction site (i.e. wetting of denuded areas).	Contractor	Construction
It may be necessary to use geotextiles and/or wind nets to limit wind erosion of exposed areas, where wind erosion could present difficulties and result in the loss of valuable topsoil.	Contractor	Site establishment & duration of contract
Minimise removal of vegetation which adds stability to soil.	ECO/Contractor	Construction
Soil conservation: Stockpile topsoil for re-use in rehabilitation phase, protect stockpile from erosion	Contractor	Before and during construction
Erosion control measures (i.e. run-off attenuation on slopes (sand bags, logs), silt fences, storm water catch-pits, shade nets, or temporary mulching over denuded area as required).	Contractor, and ECO	Erection: Before construction Maintenance:

Mitigation: Action/Control	Responsibility	Timeframe
		Duration of contract
Control depth of excavations and stability of cut faces/sidewalls.	Engineer, ECO, and, Contractor	Before construction and Maintenance Duration of contract

Performance Indicator	» No activity outside demarcated disturbance areas. » Acceptable level of activity within disturbance areas, as determined by the ECO. » Acceptable level of soil erosion around site, as determined by the ECO. » Acceptable level of increased siltation in drainage lines, as determined by the ECO. » Acceptable state of excavations, as determined by the ECO. » No activity in restricted areas.
Monitoring	» Monthly inspections of the site by the ECO. » Monthly inspections of sediment control devices. » Monthly inspections of surroundings, including drainage lines. » Immediate reporting of ineffective sediment control systems. » An incident reporting system will record non-conformances.

n). OBJECTIVE: Protection of heritage resources

The main cause of impacts to archaeological sites is physical disturbance of the material itself and its context. The heritage and scientific potential of an archaeological site is highly dependent on its geological and spatial context. Excavations for foundations may archaeological sites, as will road construction activities.

The heritage study conducted for the proposed substation and power line has revealed that there are no known buildings/features or graves older than 60 years in the study area. In general the study area is of low cultural sensitivity and it would appear unlikely that any archaeological remains of significance will be found *in situ* or exposed during the development.

Project Component/s	» substation » Power line. » Access roads.

Potential Impact	» Heritage objects/ artefacts/ Unidentified Sites/ Burial and Grave Sites (found on site are inappropriately managed or destroyed
Activity/Risk Source	» Site preparation and earthworks » Foundations or plant equipment installation » Mobile construction equipment movement on site » Power line and access roads construction activities.
Mitigation: Target/Objective	» To ensure that any heritage objects found on site are treated appropriately and in accordance with the relevant legislation.

Mitigation: Action/control	Responsibility	Timeframe
Areas required to be cleared during construction must be clearly marked in the field to avoid unnecessary disturbance of adjacent areas.	Contractor in consultation with Specialist	Pre-construction
Project employees and any contract staff will maintain, at all times, a high level of awareness of the possibility of discovering heritage sites. Familiarise all staff and contractors with procedures for dealing with heritage objects/sites.	Nojoli/ Contractor	Duration of contract
If a heritage object is found i.e. grave/ burial site, or archaeological site, work in that area will be stopped immediately, and appropriate specialists brought in to assess to site, notify the administering authority of the item/site, and undertake due/required processes.	Nojoli, and Contractor in consultation with Specialist	Duration of contract
Apply for sampling permits from SAHRA for work on any archaeological sites identified as needing intervention.	Nojoli in consultation with Specialist	Pre-construction
Placement of pylons should avoid potential sites of high archaeological sensitivity such as pans, rocky ridges and river beds.	Nojoli in consultation with Specialist	Pre-construction

Performance Indicator	» Zero disturbance outside of designated work areas. » All heritage items located are dealt with as per the legislative guidelines.
Monitoring	» Observation of excavation activities by ECO throughout construction phase. » Supervision of all clearing and earthworks. » Due care taken during earthworks and disturbance of land by all staff and any heritage objects found reported. » Appropriate permits obtained from SAHRA prior to the disturbance or destruction of heritage sites. » An incident reporting system will be used to record non-conformances to the EMP.

o). OBJECTIVE: Minimisation of visual impacts associated with construction

During the construction phase heavy vehicles, components, equipment and construction crews will frequent the area and may cause, at the very least, a cumulative visual nuisance to landowners and residents in the area as well as road users. The placement of lay-down areas and temporary construction camps should be carefully considered in order to not negatively influence the future perception of the project. Secondary visual impacts associated with the construction phase, such as the sight of construction vehicles, dust and construction litter must be managed to reduce visual impacts. The use of dust-suppression techniques on the access roads (where required), timely removal of rubble and litter, and the erection of temporary screening will assist in doing this.

Project Component/s	» Substation » Power line » Laydown areas
Potential Impact	» Visual impact of general construction activities » Potential scarring of the landscape due to vegetation clearing.
Activity/Risk Source	» The viewing of the above mentioned by observers on or near the site.
Mitigation: Target/Objective	» Minimal visual intrusion by construction activities and construction accommodation and intact vegetation cover outside of immediate works areas.

Mitigation: Action/Control	Responsibility	Timeframe
Reduce the construction period through careful planning and productive implementation of resources.	Nojoli or contractor	Planning
Plan the placement of lay-down areas in order to minimise vegetation clearing.	Nojoli or contractor	Planning
Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.	Nojoli or contractor	Construction
Ensure that good house-keeping practises are maintained, ensuring that rubble, litter, and disused construction materials are managed and removed regularly.	Nojoli or contractor	Construction
Reduce and control construction dust using approved dust suppression techniques.	Contractor	Construction
As far as possible, restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.	Contractor	Construction
Rehabilitate all disturbed areas, construction areas,	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
roads, and servitudes to acceptable visual standards.		

Performance Indicator	» Vegetation cover on and near the site is intact with no evidence of degradation or erosion. » Construction site is kept in a neat and tidy state.
Monitoring	» Monitoring of vegetation clearing during construction. » Monitoring of rehabilitated areas post construction.

p). OBJECTIVE: Protection of avifauna from collision and electrocution

During the operation, the threat of collision with the power line is the biggest potential threat to avifauna, particularly sensitive, collision prone species that may occur in the study area. The threat of electrocution while perching on the power line and associated infrastructure serves as a threat to certain sensitive species, depending on the power line structures implemented.

Project Component/s	» substation » Power line.
Potential Impact	» Collision and Electrocution events with the overhead power line.
Activities/Risk Sources	» Operation of the power line without appropriate mitigation measures.
Mitigation: Target/Objective	» Maintain a low number of collision, and electrocution events.

Mitigation: Action/Control	Responsibility	Timeframe
Ensure bird-friendly tower designs are implemented to minimise the risk of electrocutions	Contractor	Construction
Identify the exact power line spans requiring marking to reduce the potential for collision.	Nojoli and ornithologist	Construction
Fit bird flappers to new lines in identified sensitive Areas	Contractor	Construction
Insulate live components at support structures.	Contractor	Construction
Line to avoid areas with high bird densities or areas which attract birds.	Nojoli	Pre-Construction

Performance Indicator	» Minimal collision or electrocution events.
Monitoring	» Observation of electrocution or collision events with the power

	line. » Monitor power line servitude for mortalities.

q). OBJECTIVE: Appropriate handling and management of waste

The main wastes expected will include general construction waste, hazardous waste (i.e. fuel), and liquid waste (including grey water and sewage).

In order to manage the wastes effectively, guidelines for the assessment, classification, and management of wastes, along with industry principles for minimising construction wastes must be implemented.

Project Component/s	» Substation » Power line » Access roads.
Potential Impact	» Inefficient use of resources resulting in excessive waste generation. » Litter or contamination of the site or water through poor waste management practices.
Activity/Risk Source	» Packaging. » Other construction wastes. » Hydrocarbon use and storage. » Spoil material from excavation, earthworks, and site preparation.
Mitigation: Target/Objective	» To comply with waste management legislation. » To minimise production of waste. » To ensure appropriate waste storage and disposal. » To avoid environmental harm from waste disposal. » A waste manifests should be developed for the ablutions showing proof of disposal of sewage at appropriate water treatment works.

Mitigation: Action/Control	Responsibility	Timeframe
Construction method and materials should be carefully considered in view of waste reduction, re-use, and recycling opportunities.	Contractor	Duration of contract
Construction contractors must provide specific detailed waste management plans to deal with all waste streams.	Contractor	Duration of contract
Specific areas must be designated on-site for the temporary management of various waste streams, i.e.	Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
general refuse, construction waste (wood and metal scrap), and contaminated waste as required. Location of such areas must seek to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage, and vermin control.		
Where practically possible, construction and general wastes on-site must be reused or recycled. Bins and skips must be available on-site for collection, separation, and storage of waste streams (such as wood, metals, general refuse etc.).	Contractor	Duration of contract
Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.	Contractor	Duration of contract
Uncontaminated waste will be removed at least weekly for disposal; other wastes will be removed for recycling/ disposal at an appropriate frequency.	Contractor	Duration of contract
Disposal of waste will be in accordance with relevant legislative requirements, including the use of licensed contractors.	Contractor	Duration of contract
Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area.	Contractor	Duration of contract
Waste must be kept to a minimum and must be transported by approved waste transporters to sites designated for their disposal.	Contractor	Duration of contract
Spilled cement will be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site.	Contractor	Duration of contract
Documentation (waste manifest) must be maintained detailing the quantity, nature, and fate of any regulated waste. Waste disposal records must be available for review at any time.	Contractor	Duration of contract
Regularly serviced chemical toilets facilities must be used to ensure appropriate control of sewage. Waste from these toilets should be disposed of at a licensed wastewater treatment works.	Contractor	Duration of contract
Upon the completion of construction, the area must be cleared of potentially polluting materials.	Contractor	Completion of construction
Dispose of all solid waste collected at an appropriately registered waste disposal site. Waste disposal shall be in accordance with all relevant legislation and under no circumstances may waste be burnt on site.	Contractor	Duration of construction
Where a registered waste site is not available close to	Contractor	Duration of

Mitigation: Action/Control	Responsibility	Timeframe
the construction site, provide a method statement with regard to waste management.		construction
Proof of appropriate disposal of all waste must be obtained from the waste contractors and kept on file.	Contractor	Duration of construction

Performance Indicator	» No complaints received regarding waste on site or indiscriminate dumping. » Internal site audits ensuring that waste segregation, recycling and reuse is occurring appropriately. » Provision of all appropriate waste manifests for all waste streams.
Monitoring	» Observation and supervision of waste management practices throughout construction phase. » Waste collection will be monitored on a regular basis. » Waste documentation completed. » A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon. » An incident reporting system will be used to record non-conformances to the EMP.

r). OBJECTIVE: Appropriate handling and storage of chemicals, hazardous substances

The construction phase will involve the storage and handling of a variety of chemicals including adhesives, abrasives, oils and lubricants, paints and solvents.

Project Component/s	» Substation » Power line » Access roads
Potential Impact	» Release of contaminated water from contact with spilled chemicals. » Generation of contaminated wastes from used chemical containers.
Activity/Risk Source	» Vehicles associated with site preparation and earthworks. » Construction activities of area and linear infrastructure. » Hydrocarbon use and storage.
Mitigation: Target/Objective	» To ensure that the storage and handling of chemicals and hydrocarbons on-site does not cause pollution to the environment or harm to persons.

	» To ensure that the storage and maintenance of machinery on-site does not cause pollution of the environment or harm to persons.

Mitigation: Action/Control	Responsibility	Timeframe
Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants.	Contractor	Duration of contract
Corrective action must be undertaken immediately if a potential/actual leak or spill of a polluting substance identified. This includes stopping the contaminant from further escaping, cleaning up the affected environment as much as practically possible and implementing preventive measures.	Contractor	Duration of contract
In the event of a major spill or leak of contaminants, the relevant administering authority must be immediately notified as per the notification of emergencies/incidents.	Contractor	Duration of contract
Spilled cement must be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site.	Contractor	Duration of contract
Any contaminated/polluted soil removed from the site must be disposed of at a licensed hazardous waste disposal facility.	Contractor	Duration of contract
Routine servicing and maintenance of vehicles must not to take place on-site (except for emergencies). If repairs of vehicles must take place, an appropriate drip tray must be used to contain any fuel or oils.	Contractor	Duration of contract
All stored fuels to be maintained within a bund and on a sealed surface.	Contractor	Duration of contract
Fuel storage areas must be inspected regularly to ensure bund stability, integrity, and function.	Contractor	Duration of contract
Construction machinery must be stored in an appropriately sealed area.	Contractor	Duration of contract
The storage of flammable and combustible liquids such as oils will be in designated areas which are appropriately bunded, and stored in compliance with Material Safety Data Sheets (MSDS) files.	Contractor	Duration of contract
Any storage and disposal permits/approvals which may be required must be obtained, and the conditions attached to such permits and approvals will be compiled with.	Contractor	Duration of contract
Transport of all hazardous substances must be in accordance with the relevant legislation and regulations	Contractor	Duration of contract
The sediment control and water quality structures used on-site must be monitored and maintained in an	Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
operational state at all times.		
Upon the completion of construction, the area must be cleared of potentially polluting materials.	Contractor	Completion of construction

Performance Indicator	» No chemical spills outside of designated storage areas. » No unattended water or soil contamination by spills. » No complaints received regarding waste on site or indiscriminate dumping.
Monitoring	» Observation and supervision of chemical storage and handling practices and vehicle maintenance throughout construction phase. » A complaints register must be maintained, in which any complaints from the community will be logged. » An incident reporting system will be used to record non-conformances to the EMP.

s). OBJECTIVE: Noise control

Traffic movement to and from the site, particularly of heavy-duty vehicles during construction, could potentially result in a noise impact.

Project component/s	» Substation » Power line » Access roads
Potential Impact	» Nuisance noise from construction affecting the surrounding community
Activity/risk source	» Site preparation and earthworks » Construction-related transport » Foundations or plant equipment installation » Power line construction activities
Mitigation: Target/Objective	» To minimise noise to any surrounding residences from the construction activities » To comply with Noise Control Regulations and SANS Guidelines » To ensure noise levels are acceptable at residences in close proximity to construction activities

Mitigation: Action/control	Responsibility	Timeframe
On-site construction activities will be limited to 6:00am to 6:00pm Monday – Saturday (excluding public	Contractor	Duration of contract

Mitigation: Action/control	Responsibility	Timeframe
holidays) (in terms of the Environment Conservation Act). Should construction activities need to be undertaken outside of these times, the surrounding communities will be notified and appropriate approval will be obtained from DEAT and/or the Local Authority.		
Construction noise will be managed according to the Noise Control Regulations and SANS 10103.	Contractor	Duration of contract
All construction equipment, including vehicles, will be properly and appropriately maintained in order to minimise noise generation.	Contractor	Duration of contract

Performance Indicator	» No complaints received concerning noise
Monitoring	» A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon. » An incident reporting system will be used to record non-conformances to the EMP.

6.3 Detailing Method Statements

s). OBJECTIVE: Ensure all construction activities are undertaken with the appropriate level of environmental awareness to minimise environmental risk

The environmental specifications are required to be underpinned by a series of Method Statements, within which the Contractors and Service Providers are required to outline how any identified environmental risks will practically be mitigated and managed for the duration of the contract, and how specifications within this EMP will be met. That is, the Contractor will be required to describe how specified requirements will be achieved through the submission of written Method Statements to the Site Manager and ECO.

A Method Statement is defined as "a written submission by the Contractor in response to the environmental specification or a request by the Site Manager, setting out the plant, materials, labour and method the Contractor proposes using to conduct an activity, in such detail that the Site Manager is able to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications". The Method Statement must cover applicable details with regard to:

- Construction procedures;
- Materials and equipment to be used;
- Getting the equipment to and from site;
- How the equipment/material will be moved while on-site;
- How and where material will be stored;
- The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- Timing and location of activities;
- Compliance/non-compliance with the Specifications; and
- Any other information deemed necessary by the Site Manager.

Specific method statements required may include:

- Site establishment (which explains all activities from induction training to offloading, construction sequence for site establishment and the different amenities and to be established etc. Including a site camp plan indicating all of these).
- Preparation of the site (i.e. Clearing vegetation, compacting soils and removing existing infrastructure and waste).
- Soil management/stockpiling and erosion control.
- Excavations and backfilling procedure.
- Stipulate norms and standards for water supply and usage (i.e.: comply strictly to licence and legislation requirements and restrictions)
- Stipulate the storm water management procedures recommended in the storm water management method statement.
- Ablution facilities (placement, maintenance, management and servicing)
- Solid Waste Management:
  - Description of the waste storage facilities (on site and accumulative).
  - Placement of waste stored (on site and accumulative).
  - Management and collection of waste process.
  - Recycle, re-use and removal process and procedure.
- Liquid waste management:
  - The design, establish, maintain and operate suitable pollution control facilities necessary to prevent discharge of water containing polluting matter or visible suspended materials into rivers, streams or existing drainage systems.
  - Should grey water (i.e. water from basins, showers, baths, kitchen sinks etc.) need to be disposed of, link into an existing facilities where possible. Where no facilities are available, grey water runoff must be controlled to ensure there is no seepage into wetlands or natural watercourses.
- Dust and noise pollution
  - Describe necessary measures to ensure that noise from construction activities is maintained within lawfully acceptable levels (construction

activities generating output levels of 85 dB(A) near human settlement, are to be confined to working hours (08h00 - 17h00) Mondays to Fridays).

- Procedure to control dust at all times on the site, access roads, borrow pits and spoil sites (dust control shall be sufficient so as not to have significant impacts in terms of the biophysical and social environments). These impacts include visual pollution, decreased safety due to reduced visibility, negative effects on human health and the ecology due to dust particle accumulation.

» Hazardous substance storage (Ensure compliance with all national, regional and local legislation with regard to the storage of oils, fuels, lubricants, solvents, wood treatments, bitumen, cement, pesticides and any other harmful and hazardous substances and materials. South African National Standards apply).
  - Lists of all potentially hazardous substances to be used.
  - Appropriate handling, storage and disposal procedures.
  - Prevention protocol of accidental contamination of soil at storage and handling areas.
  - All storage areas, (ie: for harmful substances appropriately bunded with a suitable collection point for accidental spills must be implemented and drip trays underneath dispensing mechanisms including leaking engines/machinery).
» Fire prevention and management measures on site.
» Fauna and flora protection process on and off site (ie removal to reintroduction or replanting, if necessary).
  - Rehabilitation and re-vegetation process.
» Incident and accident reporting protocol.
» General administration
» Designate access road and the protocol on while roads are in use.
» Requirements on gate control protocols.

The Contractor may not commence the activity covered by the Method Statement until it has been approved by the Site Manager, except in the case of emergency activities and then only with the consent of the Site Manager. Approval of the Method Statement will not absolve the Contractor from their obligations or responsibilities in terms of their contract.

Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved. The ECO should monitor the construction activities to ensure that these are undertaken in accordance with the approved Method Statement.

6.4 Awareness and Competence: Construction Phase

t). OBJECTIVE: To ensure all construction personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm

To achieve effective environmental management, it is important that Contractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMP. The Contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts.

The Contractors obligations in this regard include the following:

» Employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment.
» Ensuring that a copy of the EMP is readily available on-site, and that all site staff are aware of the location and have access to the document.
» Employees will be familiar with the requirements of the EMP and the environmental specifications as they apply to the construction of the power line.
» Ensuring that, prior to commencing any site works, all employees and sub-contractors have attended an Environmental Awareness Training course.
» The course should be sufficient to provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
» Awareness of any other environmental matters, which are deemed necessary by the ECO.
» Ensuring that employee information posters, outlining the environmental "do's" and "don'ts" (as per the environmental awareness training course) are erected at prominent locations throughout the site.
» Ensure that construction workers have received basic training in environmental management, including the storage and handling of hazardous substances, minimisation of disturbance to sensitive areas, management of waste, and prevention of water pollution.
» Records must be kept of those that have completed the relevant training.
» Training should be done either in a written or verbal format but must be appropriate for the receiving audience.
» Refresher sessions must be held to ensure the contractor staff are aware of their environmental obligations as practically possible, detailed below.

6.4.1 Environmental Awareness Training

Environmental Awareness Training must take the form of an on-site talk and demonstration by the ECO before the commencement of site establishment and construction on site. The education/awareness programme should be aimed at all levels of management and construction workers within the contractor team. A record of attendance of this training must be maintained by the ECO on site.

6.4.2 Induction Training

Environmental induction training must be presented to all persons who are to work on the site – be it for short or long durations; Contractor's or Engineer's staff; administrative or site staff; sub-contractors or visitors to site.

This induction training should include discussing the developer's environmental policy and values, the function of the EMP and Contract Specifications and the importance and reasons for compliance to these. The induction training must highlight overall do's and don'ts on site and clarify the repercussions of not complying with these. The non-conformance reporting system must be explained during the induction as well. Opportunity for questions and clarifications must form part of this training. A record of attendance of this training must be maintained by the SHE Officer on site.

6.4.3 Toolbox Talks

Toolbox talks should be held on a scheduled and regular basis (at least twice a month) where foremen, environmental and safety representatives of different components of the Works and sub-consultants hold talks relating to environmental practices and safety awareness on site. These talks should also include discussions on possible common incidents occurring on site and the prevention of reoccurrence thereof. Records of attendance and the awareness talk subject must be kept on file.

6.5 Monitoring Programme: Construction Phase

u). OBJECTIVE: To monitor the performance of the control strategies employed against environmental objectives and standards

A monitoring programme must be in place not only to ensure conformance with the EMP, but also to monitor any environmental issues and impacts which have

not been accounted for in the EMP that are, or could result in significant environmental impacts for which corrective action is required. The period and frequency of monitoring will be stipulated by the Environmental Authorisation (once issued). The Project Manager will ensure that the monitoring is conducted and reported.

The aim of the monitoring and auditing process would be to monitor the implementation of the specified environmental specifications, in order to:

» Monitor and audit compliance with the prescriptive and procedural terms of the environmental specifications.
» Ensure adequate and appropriate interventions to address non-compliance.
» Ensure adequate and appropriate interventions to address environmental degradation.
» Provide a mechanism for the lodging and resolution of public complaints.
» Ensure appropriate and adequate record keeping related to environmental compliance.

An independent Environmental Control Officer (ECO) must be appointed, and must have the appropriate experience and qualifications to undertake the necessary tasks. The ECO will ensure compliance with the environmental authorisation (once issued), EMP, relevant permits and licences and the environmental legislation during construction, and will conduct monitoring activities on a regular basis. The ECO will report any non-compliance or where corrective action is necessary to the Site Manager, DEA and/or any other monitoring body stipulated by the regulating authorities.

The ECO shall remain on site on a full-time basis as long as construction activities dictate. Thereafter provided compliance is maintained, monthly or bi-weekly site compliance inspections would be sufficient, reducing as construction proceeds. However, in the absence of the ECO there should be a designated environmental officer present to deal with any environmental issues that may arise such as fuel or oil spills.

6.5.1. Non-Conformance Reports

All supervisory staff including Foremen, Resident Engineers, and the ECO must be provided the means to be able to submit non-conformance reports to the Site Manager. Non-conformance reports will describe, in detail, the cause, nature and effects of any environmental non-conformance by the Contractor. Records of penalties imposed may be required by the relevant authority within 48 (forty eight) hours.

The non-conformance report will be updated on completion of the corrective measures indicated on the finding sheet. The report must indicate that the remediation measures have been implemented timeously and that the non-conformance can be closed-out to the satisfaction of the Site Manager and ECO.

6.5.2. Monitoring Reports

A monitoring report will be compiled by the ECO on a monthly basis and must be submitted to DEA for their records. This report should include details of the activities undertaken in the reporting period, any non-conformances or incidents recorded, corrective action required, and details of those non-conformances or incidents which have been closed out.

6.5.3. Final Audit Report

A final environmental audit report must be compiled by an independent auditor and be submitted to DEA upon completion of the construction and rehabilitation activities (within 30 days of completion of the construction phase (i.e.: within 30 days of site handover)) and within 30 days of completion of rehabilitation activities. This report must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions and the requirements of the EMP.

MANAGEMENT PROGRAMME: REHABILITATION CHAPTER 7

Overall Goal: Undertake the rehabilitation measures in a way that:

» Ensures rehabilitation of disturbed areas following the execution of the works, such that residual environmental impacts are remediated or curtailed.

7.1. Objectives

In order to meet this goal, the following objective, actions and monitoring requirements are relevant:

a). OBJECTIVE: Ensure appropriate rehabilitation of disturbed areas such that residual environmental impacts are remediated or curtailed

Areas requiring rehabilitation will include all areas disturbed during the construction phase and that are not required for regular operation and maintenance operations. Rehabilitation should be undertaken in an area as soon as possible after the completion of construction activities within that area.

Project Component/s	» Substation » Power line. » Access roads.
Potential Impact	» Environmental integrity of site undermined resulting in reduced visual aesthetics, erosion and increased runoff, and the requirement for on-going management intervention.
Activity/Risk Source	» Temporary construction areas. » Temporary access roads/tracks. » Power line servitudes. » Other disturbed areas/footprints.
Mitigation: Target/Objective	» Ensure and encourage site rehabilitation of disturbed areas. » Ensure that the site is appropriately rehabilitated following the execution of the works, such that residual environmental impacts (including erosion) are remediated or curtailed.

Mitigation: Action/Control	Responsibility	Timeframe
All temporary facilities, equipment, and waste materials must be removed from site.	Contractor	Following execution of the works
All temporary fencing and danger tape must be	Contractor	Following

Mitigation: Action/Control	Responsibility	Timeframe
removed once the construction phase has been completed.		completion of construction activities in an area
The area that previously housed the construction equipment camp is to be checked for spills of substances such as oil, paint, etc. and these should be cleaned up.	Contractor	Following completion of construction activities in an area
All hardened surfaces within the construction equipment camp area should be ripped, all imported materials removed, and the area shall be top soiled and re-vegetated.	Contractor	Following completion of construction activities in an area
Temporary roads must be closed and access across these blocked.	Contractor	Following completion of construction activities in an area
Necessary drainage works and anti-erosion measures must be installed, where required, to minimise loss of topsoil and control erosion.	Contractor	Following completion of construction activities in an area
A rehabilitation plan should be drawn up that specifies the rehabilitation process and should be approved by the ECO.	Contractor, Nojoli and ECO	Pre-construction
Where disturbed areas are not To be used during the construction of the proposed power line, these areas must be rehabilitated/re-vegetated with appropriate natural vegetation and/or local seed mix. Re-use of native/) indigenous plant species removed from disturbance areas in the rehabilitation phase to be determined by a botanist, as applicable.	Contractor in consultation with rehabilitation specialist	Following completion of construction activities in an area
Re-vegetated Areas may have 4o be protected from wind erosion and maintained until an acceptable plant cover has been achie6ed.	Nojoli in consultation with rehabilitation specialist	Post-rehabilitation
Erosion control measures should be used in sensitive areas such as areas with steep slopes .	Nojoli consultation with ECO and rehabilitation specialis4 (if	Post-rehabilitation

Mitigation: Action/Control	Responsibility	Timeframe
	required)	
On□going plant monitoring and removal must be undertaken on all areas of natural Vegeta4ion on an annual basis	Nojoli	Post-rehabilitation

Performance Indicator	» All portions of site, including construction equipment camp and working areas, cleared of equipment and temporary facilities. » Topsoil replaced on all areas and stabilised where practicable or required After construction and temporally utilised areas. » Disturbed areas rehabilitated and acceptable plant cover achieved on rehabilitated sites. » Complete site free of erosion alien invasive plants.
Monitoring	» On-going inspection of rehabilitated areas in order to determine effectiveness of rehabilitation measures implemented. » On-going alien plant monitoring and removal should be undertaken on an annual basis.

MANAGEMENT PROGRAMME: OPERATION CHAPTER 8

Overall Goal: To ensure that the operation of the proposed facility does not have unforeseen impacts on the environment and to ensure that all impacts are monitored and the necessary corrective action taken in all cases. In order to address this goal, it is necessary to operate the facility in a way that:

» Ensures that operation activities are properly managed in respect of environmental aspects and impacts.
» Enables the proposed facility operation activities to be undertaken without significant disruption to other land uses in the area, in particular with regard to farming practices, traffic and road use, and effects on local residents.
» Minimises impacts on fauna using the site.

An environmental manager must ensure the implementation of the operational EMP.

8.1. Objectives

In Order to meet this goal, The following objectives have been identified, together With necessary actions and monitoring requirements.

a). OBJECTIVE: Protection of Indigenous natural vegetation, fauna and maintenance of rehabilitation

Indirect impacts on vegetation And fauna during operation could result from main4enance acti6ities and the movement of people and vehicles /n site and in the surrounding area. In order to ensure the long-term environmental integrity of the site following construction, maintenance of the areas rehabilitated post-construction must be undertaken until these areas have successfully re-established.

Project component/s	» Service road utilised during regular maintenance. » Areas disturbed during the construction phase and subsequently rehabilitation completion.
Potential Impact	» Disturbance to or loss of vegetation and/or habitat.
Activity/Risk Source	» Movement of employee vehicles within and around site.
Mitigation: Target/Objective	» Maintain minimised footprints of disturbance of vegetation/habitats on-site.

	» Ensure and encourage plant 2egrowth in non-operational areas of post-cons4ruction rehabilitation.

Mitigation: Action/Control	Responsibility	Timeframe
Vehicle movements must be restricted to designated roadways.	Contractor	Operation
No disturbance of vegetation outside of the project site must occur.	Contractor	Operation
Existing roads must Be maintained to ensure limited erosion and impact on areas adjacent to roadways.	Contractor	Operation
An on-going alien plant monitoring and eradication programme must be implemented, where necessary.	Contractor	Operation

Performance Indicator	» No further disturbance to vegetation or terrestrial faunal habitats. » Continued improvement of rehabilitation efforts. » No disturbance of vegetation outside of project site.
Monitoring	» Regular inspection to monitor plant regrowth/performance of rehabilitation efforts and weed infestation compared to natural/undisturbed areas

b). OBJECTIVE: Protection of avifauna from coLlision and electrocution

During the operation, the threat of collision with the power line is the biggest potential threat to avifauna, particularly sensitive, collision prone species that may occur in the study area. The threat of electrocution while perching on the power line and associated infrastructure serves as a threat to certain sensitive species, depending on the power line structures implemented.

Project Component/s	» Power line.
Potential Impact	» Collision and Electrocution events with the overhead power line.
ActivitiEs/Risk Sources	» Operation of the power line without appropriate mitigation measures.
MitiGAtion: Target/Objective	» Maintain a low number of collision, and electrocution events.

MitigaTion: Action/Control	Responsibility	TImeframe
Ensure bird-friendly tower designs are implemented to minimise the risk of electrocutions	Contractor	Construction
Identify the exact power line spans requiring marking to reduce the potential for collision.	Nojoli and ornithologist	Construction
Fit bird flappers to new lines in identified sensitive Areas	Contractor	Construction
Insulate live components at support structures.	Contractor	Construction
Line to avoid areas with high bird densities or areas which attract birds.	Nojoli	Pre-Construction

Performance InDi#ator	» Minimal collision, or electrocution events.
Monitoring	» Observation of electrocution or collision events with the power line. » Monitor power line servitude for mortalities.

c). OBJECTIVE: Minimise soil degradation and erosion

The soil on site may be impacted in terms of:

» Soil degr!dation including erosion (by wind and water) and subsequent deposition elsewhere is of a concern across the entire site which is underlain by fine grained soil which can be mobilised when disturbed, even on relatively low slope gradients (accelerated erosion).
» Uncontrolled run-off relating to construction activity (excessive wetting, uncontrolled discharge, etc.) will also lead to accelerated erosion and possible sedimentation of drainage systems.
» Degradation of the natural soil profile due to pollution.

Project Component/s	» Substation » Power line. » Access roads.
Potential Impact	» Soil degradation. » Soil erosion. » Increased deposition of soil into drainage systems. » Increased run-off over the site.
Activities/Risk Sources	» Poor rehabilitation of cleared areas. » Rainfall - water erosion of disturbed areas. » Wind erosion of disturbed areas.

	» Concentrated discharge of water from construction activity.
Mitigation: Target/Objective	» Ensure rehabilitation of disturbed areas is maintained. » Minimise soil degradation (i.e. wetting). » Minimise soil erosion and deposition of soil into drainage lines. » Ensure continued stability of embankments/excavations.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Rehabilitate disturbance areas should the previous attempt be unsuccessful.	Contractor	Operation
Maintain erosion control measures implemented during the construction phase (i.e. run-off attenuation on slopes (sand bags, logs), silt fences, storm water catch-pits, and shade nets).	Contractor	Operation

Performance Indicator	» Acceptable level of soil erosion around site, as determined by the site manager. » Acceptable level of increased siltation in drainage lines, as determined by the site manager.
Monitoring	» Inspections of site on a bi-annual basis. » Water management plan

MANAGEMENT PROGRAMME: DECOMMISSIONING CHAPTER 9

It is most likely that decommissioning activities of the infrastructure would comprise the disassembly and replacement of the substation and power line infrastructure with more appropriate technology/infrastructure available at that time.

The section on Rehabilitation (chapter 7) is also relevant to the decommissioning of sections of the proposed distribution line and must be adhered to.

The relevant mitigation measures contained under the construction section should be applied during decommissioning and therefore is not repeated in this section. It must be noted that decommissioning activities will need to be undertaken in accordance with the legislation applicable at that time, which may require this section of the EMP to be revisited and amended.

9.1. Site Preparation

Site preparation activities will include confirming the integrity of the access to the site to accommodate required equipment, preparation of the site (e.g. lay down areas, construction platform) and the mobilisation of construction equipment.

9.2 Disassemble and Replace Infrastructure

Disassembled components will be reused, recycled, or disposed of in accordance with regulatory requirements.

The EMP is a dynamic document, which must be updated to include any additional specifications as and when required. It is considered critical that this draft EMP be updated to include site-specific information and specifications following the final walk-through survey by specialists of the power line, and development site. This will ensure that the construction and operation activities are planned and implemented considering sensitive environmental features.

APPENDIX A:
GRIEVANCE MECHANISM FOR PUBLIC COMPLAINTS AND ISSUES

GRIEVANCE MECHANISM / PROCESS

AIM

The aim of the grievance mechanism is to ensure that grievances / concerns raised by local landowners and or communities are addressed in a manner that is:

» Fair and equitable;
» Open and transparent;
» Accountable and efficient.

1 It should be noted that the grievance mechanism does not replace the right of an individual, community, group or organization to take legal action should they so wish. However, the aim should be to address grievances in a manner that does not require a potentially costly and time consuming legal process.

Proposed generic grievance process

» Local landowners, communities and authorities will be informed in writing by the proponent (the renewable energy company) of the grievance mechanism and the process by which grievances can be brought to the attention of the proponent.
» A company representative will be appointed as the contact person for grievances to be addressed to. The name and contact details of the contact person will be provided to local landowners, communities and authorities.
» Project related grievances relating to the construction, operational and or decommissioning phase must be addressed in writing to the contact person. The contact person should assist local landowners and or communities who may lack resources to submit/prepare written grievances.
» The grievance will be registered with the contact person who, within 2 working days of receipt of the grievance, will contact the Complainant to discuss the grievance and agree on suitable date and venue for a meeting. Unless otherwise agreed, the meeting will be held within 2 weeks of receipt of the grievance.
» The contact person will draft a letter to be sent to the Complainant acknowledging receipt of the grievance, the name and contact details of Complainant, the nature of the grievance, the date that the grievance was raised, and the date and venue for the meeting.
» Prior to the meeting being held the contact person will contact the Complainant to discuss and agree on who should attend the meeting. The people who will be required to attend the meeting will depend on the nature of the grievance. While the Complainant and or proponent are entitled to invite their legal representatives to attend the meeting/s, it should be made clear that to all the parties involved in the process that the grievance

mechanism process is not a legal process. It is therefore recommended that the involvement of legal representatives be limited.

» The meeting will be chaired by the company representative appointed to address grievances. The proponent will provide a person to take minutes of and record the meeting/s. The costs associated with hiring venues will be covered by the proponent. The proponent will also cover travel costs incurred by the Complainant, specifically in the case of local, resource poor communities.

» Draft copies of the minutes will be made available to the Complainant and the proponent within 4 working days of the meeting being held. Unless otherwise agreed, comments on the Draft Minutes must be forwarded to the company representative appointed to manage the grievance mechanism within 4 working days of receipt of the draft minutes.

» In the event of the grievance being resolved to the satisfaction of all the parties concerned, the outcome will recorded and signed off by the relevant parties. The record should provide details of the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.

» In the event of a dispute between the Complainant and the proponent regarding the grievance, the option of appointing an independent mediator to assist with resolving the issue should be discussed. The record of the meeting/s will note that a dispute has arisen and that the grievance has not been resolved to the satisfaction of all the parties concerned;

» In the event that the parties agree to appoint a mediator, the proponent will be required to identify three (3) mediators and forward the names and CVs to the Complainant within 2 weeks of the dispute being declared. The Complainant, in consultation with the proponent, will identify the preferred mediator and agree on a date for the next meeting. The cost of the mediator will be borne by the proponent. The proponent will provide a person to take minutes of and record the meeting/s.

» In the event of the grievance, with the assistance of the mediator, being resolved to the satisfaction of all the parties concerned, the outcome will recorded and signed off by the relevant parties, including the mediator. The record should provide details on the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.

» In the event of the dispute not being resolved, the mediator will prepare a draft report that summaries the nature of the grievance and the dispute. The report should include a recommendation by the mediator on the proposed way forward with regard to the addressing the grievance.

» The draft report will be made available to the Complainant and the proponent for comment before being finalised and signed by all parties. Unless otherwise agreed, comments on the draft report must be forwarded to the company representative appointed to manage the grievance mechanism within 4 working days.

The way forward will be informed by the recommendations of the mediator and the nature of the grievance. As indicated above, the grievance mechanism does not replace the right of an individual, community, group or organization to take legal action should they so wish. In the event of the grievance not being resolved to the satisfaction of Complainant and or the proponent, either party may be of the opinion that legal action may be the most appropriate option.

APPENDIX B:
GUIDELINES FOR INTEGRATED MANAGEMENT OF CONSTRUCTION WASTE

APPENDIX C:
NORMS AND STANDARDS FOR STORAGE OF WASTE

GOVERNMENT NOTICE

DEPARTMENT OF ENVIRONMENTAL AFFAIRS

No. 926 **29 November 2013**

NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT, 2008 (ACT NO. 59 OF 2008)

NATIONAL NORMS AND STANDARDS FOR THE STORAGE OF WASTE

I, Bomo Edith Edna Molewa, Minister of Water and Environmental Affairs, in terms of section 7(1)(c) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), hereby set the national norms and standards for the storage of waste in the Schedule hereto for implementation.

BOMO EDITH EDNA MOLEWA

MINISTER OF WATER AND ENVIRONMENTAL AFFAIRS

SCHEDULE

NATIONAL NORMS AND STANDARDS FOR THE STORAGE OF WASTE

TABLE OF CONTENTS

CHAPTER 1

INTERPRETATION, PURPOSE AND APPLICATION

1. Definitions

In this Schedule, unless the context indicates otherwise, any word or expression that is defined in the National Environmental Management: Waste Act,2008 (Act No.59 of 2008) has the same meaning, and—

"Applicable legislation" includes, but is not limited to—

(a) the National Environmental Management Act, 1998 (Act No. 107 of 1998);
(b) the National Environmental Management: Waste Act, 2008 (Act No.59 of 2008);

"Best environmental practice" means to perform or exercise a particular activity or activities in the most suitable, appropriate, advantageous or best advised manner in order to achieve the highest standards while performing or exercising such activity or activities;

"Colour coding" means the use of colour on a container or bag or the label attached to such, that serves to identify the category of waste that it contains;

"Constitution" means the Constitution of the Republic of South Africa, 1996

"General waste storage facility" means a storage facility that has a capacity to store in excess of 100m^3 of general waste continuously;

"Ground water" means water that occupies pores in the soil and cavities and spaces found in the rocks which are situated in the saturated zone of the profile by rising from a deep magmatic source or by the infiltration of rainfall;

"Handling" means the functions associated with the movement of waste, including storage, treatment and ultimate disposal, by the use of manual systems and automated systems;

"Hazard" means the intrinsic potential property or the ability of any agent, equipment, material or process to cause harm;

"Hazardous waste storage facility" means a storage facility that has a capacity to store in excess of 80m^3 of hazardous waste continuously;

"Impermeable surface" means a physical barrier or a membrane that prevents leaching of waste;

"Monitoring" means continuous or non-continuous measurement of a concentration or other parameters for purpose of assessment or control of environmental quality or exposure and the interpretation of such measurements;

"Tank" means a container designed for the accumulation of waste.

LIST OF ACRONYMS

CBO: Community Based Organization

DEA: Department of Environmental Affairs

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

NEM: WA: National Environmental Management: Waste Act, 2008(Act No.59 of 2008)

NGOs: Non Governmental Organizations

SEMAs: Specific Environmental Management Acts

2. Purpose

(1) The purpose of these norms and standards is to—

(a) provide auniform national approach relating to the management of waste storage facilities;

(b) ensure best practice in the management of waste storage facilities; and

(c) provide minimum standards for the design and operation of new and existing waste storage facilities.

3. Legislative Framework

(1) The Constitution provides the foundation for environmental regulation and policy. Section 24 of the Constitution makes provision for environmental protection for the benefit of present and future generation and the right to an environment that is not harmful to health and well-being. This can only be achieved through a reasonable legislative framework and other measures that prevent pollution and ecological degradation, promote conservation, and secure ecologically sustainable development and the sustainable use of natural resources. The responsibility of ensuring a safe and healthy environment rests upon the State,reference can be made to the provisions of section 7(2) of the Constitution that reads "*The State must respect, protect and fulfill the bill of rights*". The DEA fulfill these rights through the application of the NEMA and the SEMAs among other tools.

(2) The NEMA introduced a number of guiding principles into the South African environmental legislation, including the life-cycle approach to waste management, producer responsibility, the precautionary principle and the polluter pays principle. NEMA also places a duty of care on any person who causes significant pollution or degradation to the environment, requiring them to institute measures to prevent pollution from occurring, or to minimise and rectify the pollution or degradation where it cannot reasonably be avoided. The development of the norms and standards is the foundation of the regulatory system established in terms section 7(1)(c) of the NEM: WA.

4. Application

(1) These norms and standards apply to any person who stores general or hazardous waste in a waste storage facility.

(2) These facilities are required to comply with thenorms and standards without a need to conduct a basic assessment and obtain a waste management licence as required by the Government Notice No. 718 of 3 July 2009.

(3) The norms and standards do not apply to the storage of general or hazardous waste in surface impoundments or lagoons.

CHAPTER 2

REQUIREMENTS FOR WASTE STORAGE FACILITIES

Part 1

Registration, Location and Construction

5. Registration

(1) A new waste storage facility must be registered with the competent authoritywithin 90 (ninety) days prior to the construction taking place.

(2) The applicant must provide at least the following information to be registered:

(a) Demarcation of the area where the storage facility will be located;

(b) Name of the waste storage facility;

(c) Name of the owner of the waste storage facility;

(d) Types of waste to be stored at the facility;

(e) Size of the storage facility;

(f) Sources of waste to be stored at the facility;

(g) Time frames for the storage of waste; and

(h) Geographical co-ordinates of the waste storage facility.

6. Location

(1) In locating the waste storage facility consideration must be given to the public health and environmental protection. The location of the waste storage facility must also take into consideration the requirements in respect of existing servitudes.

(2) A new hazardous waste storage facility must be located within an industrial demarcated zone. A storage facility that is not located within the industrial demarcated zone must have a buffer zone of at least 100m unless there is a prescribed buffer zone by the relevant municipality.

(3) A general waste storage facility may be located within a residential area and must be located such that the facility is easily accessible by the public.

(4) A waste storage facility must be located in such a manner that it can provide optimum handling and transportation of waste material.

(5) The location of the hazardous waste storage facility must also take into consideration the hazards including the flammability and toxicity of the waste stored and applicable codes and standards.

(6) A waste storage facility must be located in areas accessible by emergency response personnel and equipments.

7. Construction and Design

(1) Construction and development of the waste storage facility must be carried out under the supervision of a registered professional engineer and must be in accordance with the approved civil engineering designs. The plan must only be amended and approved by a registered professional engineer.

(2) The liquid waste storage area must have firm, impermeable, chemical resistant floors and a roof. Liquid waste containers that are not stored under a roofed area must be coated to prevent direct sunlight and rain water from getting in contact with the waste.

(3) A hazardous waste storage facility must have impermeable and chemical resistant floors.

(4) Aliquid waste storage facility must be surrounded by an interception trench with a sump for intercepting and recovering potential spills and must be lined incompliance with the requirements set out in paragraph 7(2) of these standards.

(5) A waste storage facility must be constructed to maintain on a continuous basis a drainage and containment system capable of collecting and storing all runoff water arising from the storage facility in the event of a flood. The system must under the said rainfall event, maintain a freeboard of half a meter.

(6) A liquid waste storage area must have a secondary containment system (e.g. bund, drip tray) of a capacitywhich can contain at least 110% of the maximum contents of the waste storage facility. Where more than one container or tank is stored, the bund must be capable of storing at least 110% of the largest tank or 25% of the total storage capacity, whichever is greater (in the case of drums the tray or bund size must be at least 25% of total storage capacity).

Part 2

Management of Waste Storage Facilities

8. Access Control and Notices

(1) A waste storage facility must have effective access control to prevent unauthorised entry. Weatherproof, durable and legible signs in at least 3 (three) official languages applicable in the area must be displayed at each entrance to the facility. The signs must indicate the risks involved in entering the site, hours of operation, the name, address, telephone number and the person responsible for the operation of the facility as a minimum.

(2) Access to a hazardous waste storage facility must be limited to employees who have been trained with respect to the operation of the hazardous waste storage facility and emergency response procedures and any other person authorised by the owner of the hazardous waste storage facility.

9. Operation

(1) Awaste storage facility must be free from odour or emissions at levels likely to cause annoyance.

(2) Waste must be sorted at source into various categories (recyclables and non-recyclables) and a documented procedure must be implemented to prevent any mixing of hazardous and general waste integrated waste management plan and/or Industry Waste Management Plan, if any.

(4) A waste storage facility must be operated within its design capacity and the waste storage container must not be overfilled.

(5) Liquid waste must be stored in leak resistant containers which must be inspected weekly for early detection of leaks.

10. General Requirements of Waste Storage Containers

(1) A liquid waste container must be of sufficient strength and structural integrity to ensure that it is unlikely to burst or leak in its ordinary use.

(2) Waste that is spilled or blown by wind during opening, handling or storage must be contained.

(3) Hazardous waste must be stored in covered containers and only open when waste is added or emptied.

(4) Below-ground pipes connected to the container must be protected from physical damage (e.g. excessive surface loading, ground movement or disturbance). If mechanical joints have to be used, they must be readily accessible for inspection.

(5) A hazardous waste storage container, associated piping and equipment must be of sufficient structural strength to withstand normal handling and installed on stable foundation.

(6) The foundation of a hazardous waste storage container must be protected from, or resistant to all forms of internal and external wear, vibration, corrosion, fire, heat, vacuum and pressure which might cause the storage tank foundation to fail.

(7) A leak monitoring device must be installed on an underground liquid waste storage container and piping to and from the container in order to keep operating personnel informed.

(8) If a container is lined or internally coated, the coating must be compatible with the substance stored. Furthermore the coating specification must adhere to existing engineering practices and the applicable standards or requirements.

(9) The waste storage tank must be a closed system and pressure resistant.

(10) In a case where a tank or vent pipe is not visible during the filling process an automatic overfill prevention device must be fitted onto the tank.

11. Minimum Requirements for above ground waste storage facilities

(1) A hazardous waste container resting on the ground mustbe underlain by barriers, which will not deteriorate with permeability rate of the waste stored.

(2) Bottoms of the container in contact with soil and are subject to corrosion must be protected from external corrosion by either ensuring that the container is made of corrosion resistant materials or the container have a cathodic protection system.

(3) A waste storage tankmust not have mechanical joints, except ifit can be accessed for inspection.

(4) The screw fitting or other fixed coupling fitted to the tank must be maintained in good condition and must only be used when filling the tank.

12. Minimum Requirements for underground waste storage containers

(1) Underground waste storage container must have double walled and synthetic liners and underground vaults must be installed.

(2) A steel underground tank and piping in contact with soil must be protected from corrosion using corrosion resistant materials or cathodic protection.

(3) Container components that are placed underground and backfilled must be provided with a backfill material that is a non-corrosive, porous, homogeneous substance and that is installed so that the backfill is placed completely around the tank and compacted to ensure that the tank and piping are fully and uniformly supported.

(4) If external coating is used to protect the tank from external corrosion, the coating must be fiberglass, reinforced, plastic, epoxy, or any other suitable dielectric material.

Chapter 3

General Provisions

13. Training

(1) Training must be provided continuously to all employees working with waste and to all contract workers that might be exposed to the waste.

(2) The training programme must amongst others include the following:

(a) Precautionary measures that need to be taken;

(b) Procedures that the employees must apply to their particular type of work;

(c) Procedures for dealing with spillages and accidents;

(d) Appropriate use of protective clothing; and

(e) The risks of the hazardous substances to their health which they are likely to be exposed to.

(3) A sufficient number of employees must receive training to cover for leave periods, absences due to illness, public holidays or any other reason.

(4) An attendance register must be kept and signed by each employee at each training session and made available to the relevant authorities when required.

(5) Only trained persons must be allowed to handle hazardous waste.

14. Emergency Preparedness Plan

(1) Waste can be hazardous or dangerous to the environment if not handled properly or if stored inappropriately. To minimise environmental impacts, a waste storage facility must have an emergency preparedness plan including the following:

(a) Hazard identification;

(b) Prevention measures;

(c) Emergency planning;

(d) Emergency response;

(e) Remedial actions.

(2) Immediate action must be taken to contain spillage and prevent it from entering storm water drains or environment.

15. Monitoring and Inspection

(1) Containers, tanks, valves and piping containing hazardous waste must be inspected for leaks, structural integrity and any sign of deterioration (e.g. corrosion or wearing of protective coatings) on a weekly basis.

(2) A registered engineer must inspect tanks containing hazardous waste at least once per annum to check tank integrity, corrosion, piping, valves, bunding, and impermeability of the bund wall and bund floor.

(3) The secondary containment system must be examined at least weekly or after each significant precipitation event to ensure that the containment is free of debris, rainwater and other materials that would compromise the capacity and integrity of the system.

(4) Ventilation systems, sump pumps, emergency alarms, impressed current corrosion protection systems, level alarms and other mechanical systems must be inspected on a weekly basis to ensure proper functioning based on manufacturer recommendations, regulatory requirements or best practice.

(5) Inspection must include the review of the adequacy and accessibility of spill response equipment.

(6) If environmental pollution is suspected or is occurring from the waste storage facility, an investigation must be initiated into the cause of the problem or suspected problem and remedial action taken.

16. Auditing

Internal Audits

(1) Internal audits must be conducted bi-annually and on each audit occasion an official report must be compiled by the relevant auditor to report the findings of the audits, which must be made available to the external auditor.

External Audits

(2) An independent external auditor must be appointed to audit the waste storage facility biennially and the auditor must compile an audit report documenting the findings of the audit, which must be submitted to the relevant authority.

(3) The external audit report must-

(a) specifically state whether conditions of these standards are adhered to;

(b) include an interpretation of all available data and test results regarding the operation of the storage facility and all its impacts on the environment;

(c) specify target dates for the implementation of the recommendations to achieve compliance;

(d) contain recommendations regarding non-compliance or potential non-compliance and must specify target dates for the implementation of the recommendations and whether corrective action taken for the previous audit non conformities was adequate; and

(e) show monitoring results graphically and conduct trend analysis.

17. Relevant Authority Audits and Inspections

(1) The relevant authority responsible for waste management reserves the right to audit and/or inspect the waste storage facility without prior notification at any time.

(2) Any records or documentation pertaining management of the waste storage facility must be available to the relevant authorities upon request, as well as any other information which may be required.

18. Reporting

(1) An emergency incident must be reported in accordance with section 30 of NEMA.

(2) An action plan which includes a detailed time schedule, and resource allocation to address any incident must be signed off by the senior management of the organisation.

(3) Complaints register and incident report must be made available to the external auditor and relevantauthority.

(4) Each external audit report must be submitted to the relevant authority within 30 days from the date on which the external auditor finalized the audit.

19. Records

(1) Each waste storage facility must be able to provide documentation verifying the following:

(a) number of waste storage containers or tanks within the facility;

(b) date of collection; and

(c) authorized collector or collectors and proposed final point of treatment, recycling or disposal.

(2) Any deviations from the approved integrated or industry waste management plan must be recorded.

(3) Records must be kept for a minimum of 5 (five) years and must also be available for inspection by the relevant authority.

20. Minimum Requirements during the Decommissioning Phase

(1) A waste storage facility to be discontinued, the site must be rehabilitated to the satisfaction of the relevant authority.

(2) A rehabilitation plan for the site, including the indication of end use of the area must be developed and submitted to the DEA for approval not more than 1 (one) year prior to the intended closure of the facility.

(3) The rehabilitation plan must indicate the following:

(a) measures for rehabilitating contaminated areas within the facility; and

(b) manner in which the waste resulted from decommissioning activities will be managed.

(4) The site must be rehabilitated according to such a plan.

(5) The owner of the facility, including the subsequent owner of the facility will remain responsible for any adverse impacts on the environment, even after operations have

ceased.

CHAPTER 4

MISCELLANEOUS

21. Transitional provisions

A personwho lawfully operated a waste storage facility for the storage of general and hazardous waste prior to and on the date of coming into operation of these standards may continue with the activity for the duration as stipulated in the permit or licence and after the expiry of the permit or licence comply with these standards.