



ORLIGHT SA (PTY) LTD
DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME
PROPOSED DEVELOPMENT OF THE LOERIESFONTEIN
TRANSMISSION LINES IN THE NORTHERN CAPE PROVINCE

SUBMITTED AS PART OF THE FINAL BASIC ASSESSMENT REPORT

APPLICANT:

ORLIGHT SA (PTY) LTD



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This document has been prepared by **Digby Wells Environmental**.

Report title: Orlight SA (Pty) Ltd – Draft Environmental Management Programme (EMP) for the Proposed 22 kV transmission line for the Orlight SA Solar Photovoltaic Power Plant, near Loeriesfontein in the Namakwa District Municipality, Northern Cape Province.

Project number: BSG1384

NAME	RESPONSIBILITY	SIGNATURE	DATE
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**INFORMATION REQUIREMENTS FOR AND ENVIRONMENTAL MANAGEMENT PLAN (EMP) IN TERMS OF
THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT 107 OF 1998)**

CONTENTS/SPECIFICATIONS	REFERENCE
<i>IN TERMS OF SECTION 33 OF NEMA, AN EMP MUST COMPLY WITH SECTION 24N OF NEMA...</i>	
(a) Details of – (i) the person who prepared the EMP; and (ii) the expertise of that person to prepare an EMP.	Section 1.3 – Details of the persons responsible for compiling the EMP
(b) Information on any proposed management or mitigation measures that will be taken to address the environmental impacts identified in a report contemplated by these Regulations, including environmental impacts or objectives in respect of: (i) planning and design; (ii) pre-construction and construction activities; (iii) operation or undertaking of the activity; (iv) rehabilitation of the environment; and (v) closure, where relevant.	Chapter 6 – Environmental Management Programme Section 6.1 – Planning and design phase Section 6.2 – Construction phase Section 6.3 – Operational phase Section 6.4 – Decommissioning phase
(c) A detailed description of the aspects of the activity that are covered by the draft EMP	Chapter 2 – Project activities
(d) An identification of the persons who will be responsible for the implementation of the measures contemplated in paragraph (b)	Chapter 4 – Responsibility of implementing the EMP Chapter 6 – Environmental Management Programme
(e) Proposed mechanisms for monitoring compliance with and performance assessment against the EMP and reporting thereon	Chapter 6 – Environmental Management Programme
(f) As far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development, including, where appropriate, concurrent or progressive rehabilitation measures	Chapter 6 – Environmental Management Programme Section 6.4 – Decommissioning phase
(g) A description of the manner in which it intends to— (i) modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) remedy the cause of pollution or degradation and migration of pollutants; (iii) comply with any prescribed environmental management standards or practices; (iv) comply with any applicable provisions of the Act regarding closure, where applicable; (v) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.	Table 3-1: Legislative and permitting requirements for the proposed project Chapter 6 – Environmental Management Programme
(h) Time periods within which the measures contemplated in the EMP must be implemented.	Chapter 6 – Environmental Management Programme
(i) The process for managing any environmental damage, pollution, pumping and	Chapter 6 – Environmental

CONTENTS/SPECIFICATIONS	REFERENCE
treatment of extraneous water or ecological degradation as a result of undertaking a listed activity.	Management Programme
(j) An environmental awareness plan describing the manner in which— (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment	Chapter 5 – Environmental Training and Awareness Plan
(k) Where appropriate, closure plans, including closure objectives.	Chapter 5 – Environmental Management Programme Section 5.4 – Decommissioning phase

Digby Wells Environmental (Digby Wells) was appointed as independent Environmental Assessment Practitioner (EAP) to conduct the Basic Assessment Report (BAR) process for the proposed Loeriesfontein Transmission Line and associated activities in accordance with the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

At the time of compiling the EIA for the proposed power plant near Aggeneys, the construction of the associated power line was not included in the application, as consultation with Eskom regarding their preferred connection point to the grid network was not yet undertaken and the optimal size of the proposed PV power plant was not yet determined. Subsequently, Digby Wells is also responsible for conducting the Basic Assessment (BA) required for the transmission lines associated with the proposed Aggeneys solar power plant. The national Department of Environmental Affairs (DEA) is the decision-making authority for the EIA being conducted for the proposed PV Power Plant (DEA Reference Number 12/12/20/2632) and also for this Basic Assessment (DEA Reference Number 14/12/16/3/3/1/536).

This draft Environmental Management Programme (EMP) is based on the outcomes of the BAR process that was undertaken for the proposed development of the Loeriesfontein Transmission Line.

Based on the nature and extent of the proposed project and the understanding of the significance of anticipated impacts that will be experienced, the EAP is of the opinion that the predicted impacts can be mitigated to an acceptable level. The management and mitigation measures that were recommended to mitigate impacts to the environmental, socio-economic and heritage environment to an acceptable level are described systematically in this EMP.

TABLE OF CONTENTS

1	INTRODUCTION	10
1.1	PROJECT OVERVIEW	10
1.2	PURPOSE OF THIS REPORT	10
1.3	DETAILS OF THE PERSONS RESPONSIBLE FOR COMPILING THE EMP	11
1.4	APPROACH TO ENVIRONMENTAL MANAGEMENT	11
1.5	REPORT STRUCTURE	11
2	PROJECT ACTIVITIES.....	13
3	LEGISLATIVE REQUIREMENTS.....	15
4	RESPONSIBILITY OF IMPLEMENTING THE EMP.....	22
4.1	ORGANISATIONAL COMMITMENT.....	22
4.2	MANAGEMENT AREAS AND RESPONSIBILITY	22
4.3	CONTRACTORS.....	22
4.4	ENVIRONMENTAL CONTROL OFFICERS.....	23
5	ENVIRONMENTAL TRAINING AND AWARENESS PLAN.....	24
5.1	RESPONSIBILITIES	24
5.2	TIMEFRAME	24
5.3	TRAINING REQUIREMENTS	24
5.4	PERFORMANCE MANAGEMENT	24
6	ENVIRONMENTAL MANAGEMENT PROGRAMME.....	25
6.1	PLANNING AND DESIGN PHASE	26
6.1.1	<i>Design considerations.....</i>	26
6.1.2	<i>Planning of site remediation and post-construction rehabilitation</i>	26
6.1.4	<i>Phase 2 Archaeological Impact Assessment.....</i> Error! Bookmark not defined.	
6.2	CONSTRUCTION PHASE	27
6.3	OPERATIONAL PHASE.....	45
6.4	DECOMMISSIONING PHASE	51
6.4.1	<i>Objectives.....</i>	51
6.4.2	<i>Approach to the decommissioning phase.....</i>	51
7	CONCLUSION.....	59

LIST OF TABLES

Table 1-1: Names and expertise of the report compilers	11
Table 2-1: Scale of physical disturbances associated with the proposed project	Error! Bookmark not defined.
Table 2-2: Project phases and associated activities	13
Table 3-1: Legislative and permitting requirements for the proposed project	16
Table 6-1: Structure of environmental management implementation plans	25
Table 6-2: Construction phase implementation plan – Soil and agricultural potential	28
Table 6-3: Construction phase implementation plan – Ecological components	30
Table 6-4: Construction phase implementation plan – Air quality	31
Table 6-5: Construction phase implementation plan – Noise	33
Table 6-6: Construction phase implementation plan – Waste	34
Table 6-7: Construction phase implementation plan – Visual Environment	36
Table 6-8: Construction phase implementation plan – Employment creation	38
Table 6-9: Construction phase implementation plan – Traffic	40
Table 6-10: Construction phase implementation plan – Heritage	42
Table 6-11: Operational phase implementation plan – Soils and ecology	46
Table 6-12: Decommissioning phase implementation plan – Soils and agricultural potential	53
Table 6-13: Decommissioning phase implementation plan – Ecological components	55
Table 6-14: Decommissioning phase implementation plan – Waste	56

ABBREVIATIONS

ABBREVIATION	DESCRIPTION
AIA	Archaeological Impact Assessment
BAR	Basic Assessment Report
BSGR	BSG Resources Limited
CARA	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)
CBA	Critical Biodiversity Area
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DEANC	Northern Cape Department of Environmental Affairs and Nature Conservation
Digby Wells	Digby Wells Environmental
DWA	Department of Water Affairs
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIA Regulations	GN Regulations 543 to 546 (18 June 2010)
EMP	Environmental Management Programme
ESTA	Extension of Security of Tenure Act (Act 62 of 1997)
ETAP	Environmental Training and Awareness Plan
FEPA	Freshwater Ecological Priority Area
GIS	Geographic Information System
LED	Local Economic Development
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NEMWA	National Environmental Management: Waste Act, 2008 (Act 59 of 2008)
NFA	National Forests Act, 1998 (Act 84 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
Orlight SA	Orlight SA (Pty) Ltd
PPP	Public Participation Process
PV	Photovoltaic
SAHRA	South African Heritage Resources Agency

SKEP	Succulent Karoo Ecosystem Programme
SMME	Small, Medium and Micro Enterprise
VIA	Visual Impact Assessment
WMA	Water Management Area
WULA	Water Use License Application

1 INTRODUCTION

In line with the growing need for electricity supply and cleaner energy production in South Africa, the Orlight SA (Pty) Ltd (Orlight SA) Solar Photovoltaic (PV) Project was initiated by its holding company, BSG Resources Limited (BSGR). BSGR is an international natural resources company that operates in the fields of mining, and energy. BSGR established a new company, Orlight SA, for the construction and operation of five new Solar PV Power Plants in the Western Cape and Northern Cape Provinces. One of these Solar Plants is proposed near Loeriesfontein in the Northern Cape. As part of this process associated transmission lines will be required to transport generated electricity to the nearest Eskom substation.

Digby Wells Environmental (Digby Wells) was appointed as independent Environmental Assessment Practitioner (EAP) to conduct the Basic Assessment Report (BAR) for the proposed Loeriesfontein Transmission Lines and associated activities in accordance with the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

1.1 Project overview

The proposed site for development of the Loeriesfontein transmission line is located in the vicinity of the town of Loeriesfontein in the Namakwa District Municipality of the Northern Cape Province (Plan 1a – BAR).

The transmission lines will make use of the following infrastructure:

- Support poles;
- Foundations for transmission line poles;
- Transmission line wires; and
- Service corridors to access transmission lines.

1.2 Purpose of this report

An Environmental Management Programme (EMP) is an environmental management tool that is implemented with the objective of mitigating the undue or reasonably avoidable adverse impacts associated with the development of a project and to enhance any potential positive impacts that could be realised due to the development of a project.

This draft EMP was based on the outcomes of the EIA process that was undertaken for the proposed development of the Loeriesfontein transmission line. Based on the nature and extent of the proposed project and the understanding of the significance of anticipated impacts that will be experienced, the EAP is of the opinion that the predicted impacts can be mitigated to an acceptable level. A number of potentially problematic issues have been avoided by the choice of the site on which to place the project and also the placement of infrastructure on the chosen site has minimised a number of the environmental impacts. The management and mitigation measures that were recommended to mitigate impacts to the environmental, socio-economic and heritage environment to an acceptable level are thus systematically addressed in the EMP.

The specific objectives of this report are to:

- Define environmental management objectives to achieve an acceptable environmental standard and long-term sustainability of the proposed project;
- Outline mitigation measures and environmental specifications that will be required to be implemented during the construction, operational and decommissioning phases of the proposed project to realise the environmental management objectives;

- Formulate plans to manage specific environmental features that are known to be significantly affected during project implementation as a precautionary measure;
- Propose mechanisms to monitor the implementation of the mitigation measures; and
- Formulate plans that can be implemented in response to unforeseen or emergency events during project implementation.

1.3 Details of the persons responsible for compiling the EMP

Digby Wells is a South African company with international expertise in delivering comprehensive environmental and social solutions for clients in diverse sectors including the energy, minerals and mining industries. The names and expertise of the project team responsible for compilation of this report are provided in Table 1-1.

Table 1-1: Names and expertise of the report compilers

ASPECT	SPECIALIST	QUALIFICATIONS AND COMPETENCY
Project manager	Mia Ackermann	2008: MSc Geography – UJ 2006: BSc (Honours) Geography and Environmental Management (<i>Cum Laude</i>) – UJ 2003 – 2005: BSc Geography and Environmental Management – UJ
Project administrator	Hendrik Kruger	2000 – 2005: BA Geography – UJ 2006 – 2007: BA Geography (Honours) – UJ

1.4 Approach to environmental management

The approach to this EMP has been based on two primary internationally recognised principles for environmental management:

- *Precautionary principle* – States that wherever there is doubt regarding the impacts that an activity may have on the environment, precautionary measures should be taken to prevent such impacts; and
- *Polluter pays principle* – The project applicant should be committed to preventing pollution and will make resources available to ensure that all reasonable safeguards are in place to do so. Full accountability and financial liability for any pollution that may occur lies with the project applicant.

This EMP should be made binding and enforceable on all the parties involved in the development of the proposed project, including the project applicant and contractors at the different operational management levels.

1.5 Report structure

The structure of this EMP and the respective objectives for each section is outlined as follows:

- Chapter 2 – Project activities provides an overview of the project activities that will be undertaken during the construction, operational and decommissioning phases of the project and that will result in environmental impacts. These activities will be managed in terms the various mitigation measures that have been included in this report;

- Chapter 3 – Legislative requirements is a summary of the legislative context in which the project will be implemented. Requirements and guidelines that must be adhered to during the undertaking of all activities and according to which the environmental and social performance of the project are described;
- Chapter 4 – Responsibility of implementation outlines the various levels of responsibility for implementing the supporting management plans, respective mitigation measures and this EMP;
- Chapter 5 – Environmental Training and Awareness Plan outlining the methodology that will be used to inform employees of any environmental impacts which may result from their work and the manner in which the impacts must be dealt with in order to avoid pollution to or the degradation of the environment;
- Chapter 6 – Environmental Management Programme includes the management objectives for each phase of the proposed project and a plan for the implementation of mitigation measures to mitigate negative impacts and enhance positive impacts associated with the proposed project; and
- Chapter 7 – Conclusion which includes a statement from the EAP regarding the level to which potential impacts can be mitigated by implementing the measures outlined in this report.

2 PROJECT ACTIVITIES

The proposed power transmission line will be comprised of the following infrastructure:

- *Support poles* – The transmission lines will be mounted on support towers to a maximum height of 30 m;
- *Foundations* – The tower foundations will have concrete foundations, depending on the terrain;
- *Transmission lines* – Electricity generated will be linked to the Eskom Loeriesfontein substation with overhead transmission lines.

The physical area that will be disturbed by the proposed project activities and components are summarised in Table 2-1 below. The route of the proposed project infrastructure and greater study area is illustrated in Plan 1a (BAR Report).

In order to establish and operate the infrastructure described above, numerous activities will be undertaken during the construction, operational and decommissioning phases of the proposed project. These activities were described in the Basic Assessment Report and formed the basis according to which potential impacts were identified and assessed. Table 2-2 provides a summary of these activities.

Table 2-1: Scale of physical disturbances associated with the proposed project

COMPONENT	PHYSICAL DISTURBANCE	
	OPTION A	OPTION B
Transmission lines (km)	11	11
Servitude width (m)	54	54

Table 2-2: Project phases and associated activities

ACTIVITY	DESCRIPTION
PHASE: CONSTRUCTION	
<i>The duration of the construction phase of the proposed transmission line is approximately 16 months.</i>	
<i>Employment opportunities and accommodation</i>	Construction workers will be sourced from local areas and therefore, minimal additional housing will be required. Accommodation of workers from outside the local area will be provided in the town of Aggeneys. No commercial activities such, as food stalls, will be allowed on the site and adjacent to the national road.
<i>Establishment of access and internal roads</i>	The site will be accessed from the existing Granaatboskolk/Zout Dwagga gravel road. Sight distances along the road are adequate to allow safe use of the access to the site.
<i>Site preparation</i>	Site preparation will consist of the clearance of vegetation at the footprint of each tower. Large boulders and rocks will be removed on the actual tower footprints. No protected tree species will be removed.
<i>Construction of transmission lines</i>	In the event that a 40 MW power plant is constructed, 2 x 22 kV transmission lines will be constructed from the facility substation along existing Eskom transmission lines to the Helios

ACTIVITY	DESCRIPTION
	<p>Substation. For a 70 MW power plant, 2 x 22 kV transmission lines will be required.</p> <p><i>*Management of the activities required for construction of the 22 kV transmission lines to the Helios substation is not included in this EMP, but will be addressed in the EMP that supports the Basic Assessment process that is being undertaken for the proposed transmission lines.</i></p>
<i>Water use</i>	Water will be used for domestic use and possibly for dust suppression during the construction phase.
<i>Construction waste management</i>	<p>All construction phase waste will be collected and stored in a temporary waste storage area, where it will be collected by a waste removal contractor for disposal at a licensed waste disposal facility. No on-site burying or burning of wastes will be allowed.</p> <p>The only chemical toxins on site will be the gas used in welding, the concrete, sulphur hexafluoride housed inside the switchgears and the diesel for the power generators used during the construction. These will be handled with care according to regulatory requirements. Wherever possible, waste materials shall be recycled.</p>
<i>Sewage management</i>	Temporary ablution facilities will be provided and a contractor employed to safely remove sewage from the site to a licensed disposal facility.
<i>Site remediation</i>	Upon completion of the construction phase, the site will be remediated by removing all temporary construction infrastructure, construction waste and construction materials. Vegetation will be re-established in areas where sufficient and suitable substrate remains.
<p>PHASE: OPERATION</p> <p><i>The typical lifecycle of a transmission lines will depend on the lifecycle of the proposed PV power plant.</i></p>	
<i>Employment opportunities and accommodation</i>	Constant and on-going maintenance will be required for the life of the transmission line
<p>PHASE: DECOMMISSIONING AND REHABILITATION</p> <p><i>Typical decommissioning and rehabilitation activities should take approximately 24 months.</i></p>	
<i>Removal of infrastructure</i>	Depending on the economic situation at the end-of-life of the transmission lines, the transmission lines will either be decommissioned or its operational phase extended past the planned life. Even if extended the facility will have to be decommissioned and closed.
<i>Site rehabilitation</i>	If and where applicable, sites will be rehabilitated. Rehabilitation is the process of returning the land in a given area to some degree of its former state, after some construction or operation activities may have resulted in its damage. This process will be minimal as the actual footprint is very limited to four foundations to each tower.

3 LEGISLATIVE REQUIREMENTS

The scope and content of this EMP has been informed by the following key legislation and guidelines:

- Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996);
- National Environmental Management Act, 1998 (Act No. 107 of 1998);
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004);
- Succulent Karoo Ecosystem Programme;
- Critical Biodiversity Areas;
- Freshwater Ecological Priority Area Programme;
- National Water Act, 1998 (Act No. 36 of 1998);
- Environment Conservation Act, 1989 (Act No. 73 of 1989);
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983);
- National Heritage Resources Act, 1999 (Act No. 25 of 1999);
- Land Use Planning Ordinance, Ordinance 15 of 1985; and
- Local Economic Development (LED) Strategy for the Namakwa District Municipality.

A summary of the legislative and permitting requirements that are applicable to this EMP is provided in Table 3-1.

Table 3-1: Legislative and permitting requirements for the proposed project

LEGISLATION	LEGAL REQUIREMENTS	COMPETENT AUTHORITY	PROJECT REQUIREMENTS
Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)	<p><u>Section 24</u></p> <p>This section of the Bill of Rights stipulates that everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that -</p> <ul style="list-style-type: none"> i. Prevent pollution and ecological degradation; ii. Promotes conservation; and iii. Secures ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. 	Parliament Constitutional Court	The constitutional rights from the basis of the environmental management objectives for the proposed project, namely <u>to protect ecologically sensitive areas and support sustainable development and the use of natural resources, whilst promoting justifiable socio-economic development in the town nearest to the project site.</u>
National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)	<p><u>Section 2</u></p> <p>This section defines the principles of integrated environmental management. According to these principles, developments must take the following factors into consideration:</p> <ul style="list-style-type: none"> • <i>Section 2(3)</i> – Development must be socially, environmentally and economically sustainable; • <i>Section 4(1)</i> – Sustainable development requires the consideration of all relevant factors including the following: <ul style="list-style-type: none"> ○ That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied; ○ That pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied; ○ That the disturbance of landscapes and sites that constitute 	Department of Environmental Affairs (DEA) Northern Cape Department of Environment Affairs and Nature Conservation (DEANC)	<p>The principles of integrated environmental management have been taken into consideration throughout the EIA process that was undertaken for the proposed project.</p> <p>This EMP contains an implementation plan that is aimed at achieving the objectives for sustainable development as specified in Section 4 of the Act.</p> <p>Specific objectives included in this EMP are:</p> <ul style="list-style-type: none"> • To minimise disturbance of ecosystems and loss of biological diversity in the study area; • To minimise the disturbance of sites and landscapes that are considered important in terms of their heritage value; • To minimise the generation of waste, promote recycling of wastes and ensure safe management and disposal of wastes;

LEGISLATION	LEGAL REQUIREMENTS	COMPETENT AUTHORITY	PROJECT REQUIREMENTS
	<p>the nation’s cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;</p> <ul style="list-style-type: none"> ○ That waste is avoided, or where it cannot be altogether avoided, minimised and reused or recycled where possible and otherwise disposed of in a responsible manner; ○ That the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource; ○ That the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised; ○ That a risk averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and ○ That negative impacts on the environment and on people’s environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied. 		<ul style="list-style-type: none"> • To prevent pollution and degradation of the environment; • To implement remediation measures in the event that pollution and degradation occur; • To prevent impacts on renewable resources, such as soil and water.
	<p><u>Section 24</u> In terms of this section, a list of activities that will require environmental authorisation prior to their commencement can be identified by the minister. These activities have been identified in GNR 543 to 546 (18 June 2010) promulgated in terms of the Act.</p>	DEA DEANC	A BAR process was required for the proposed project for activities listed in terms of GNR 543 to 544. The BAR Report forms part of this process and will be submitted to the DEA for review and consideration. The DEANC has been included as a commenting authority on the application.
	<p><u>Section 28(1)</u> This section of the Act stipulates a Duty of Care which requires the project applicant to ensure that reasonable measures are taken throughout the</p>	DEA	A plan for the implementation of mitigation measures is included in this EMP.

LEGISLATION	LEGAL REQUIREMENTS	COMPETENT AUTHORITY	PROJECT REQUIREMENTS
	project life cycle to ensure that any pollution or degradation of the environment associated with project implementation is avoided.		
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) Succulent Karoo Ecosystem Programme (SKEP) Critical Biodiversity Areas (CBA)	<p>The Act provides for the consolidation of biodiversity legislation through establishing national norms and standards for the management of biodiversity across all sectors and by different management authorities.</p> <p>Within the regional conservation context there are two conservation programmes which are underlain by NEMBA, namely the SKEP and the CBA. The aim of these programmes are to identify and conserve areas of high biodiversity and areas that are in support of these areas through defining conservation outcomes and working towards these.</p>	DEA	<p>A specialist fauna and flora assessment was undertaken during the BAR process as part of a characterisation of the ecological baseline of the study area and to manage potential impacts on biodiversity resources.</p> <p>SKEP and the CBA have been referred to as the basis for conservation planning for the project.</p>
	<p><u>Section 57</u></p> <p>This section of the Act states that person may not carry out a restricted activity (i.e. removal or destruction) of a specimen of a listed threatened or protected species without a permit issue by the relevant competent authority.</p> <p>A list of threatened and protected species was issued in GNR 151, 152 and 1187 promulgated in terms of the Act.</p>	DEA	<p>During the site layout design process, areas where threatened and protected species listed in terms of the Act occur were designated as no-go areas. <u>No destruction of protected species will be required and therefore, no permitting requirements apply.</u></p> <p><u>Should any threatened or protected plant species that were not identified to occur in the project development footprint be identified during the pre-construction wet-season survey, the necessary permits for the removal of the specimens will have to be obtained.</u></p>
	<p><u>Section 75</u></p> <p>This section of the Act controls activities relating to the control and eradication of invasive species. The requirements that must be adhered to are:</p> <ul style="list-style-type: none"> • <i>Section 75(1)</i> – The control and eradication of invasive or weed species must be undertaken by means of a method that are 	DEA	<p><u>An alien invasive control eradication programme will be implemented as part of this EMP. The control programme has been formulated based on the requirements listed in terms of Section 75 of the Act.</u></p>

LEGISLATION	LEGAL REQUIREMENTS	COMPETENT AUTHORITY	PROJECT REQUIREMENTS
	<p>appropriate for the species and the environment in which it occurs;</p> <ul style="list-style-type: none"> • <i>Section 75(2)</i> – Actions taken to control and eradicate listed invasive species must be executed with caution and in a manner that may cause least possible harm to biodiversity and the environment; and • <i>Section 75(3)</i> – Methods must be directed at the offspring, propagating material and re-growth of the invasive species. 		
<p>National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEMWA)</p>	<p><u>Chapter 5</u> This chapter of the Act provides for the licensing of waste management activities, as listed in GNR 718 of the Act. Waste management activities require a Waste Management License and undertaking of a BAR prior to its commencement.</p>	<p>DEA NCDEANC</p>	<p><u>No waste management activities will be triggered by the proposed project and therefore no permitting requirements have been identified.</u></p>
	<p><u>Chapter 4</u> This chapter of the Act defines the principles of waste management to avoid negative impacts on the environment. In terms of the Act, any person who stores waste must take the appropriate steps to ensure that:</p> <ul style="list-style-type: none"> • <i>Section 21(a)</i> – The containers in which waste is stored are intact or rendered unfit for safe storage of waste; • <i>Section 21(b)</i> – Adequate measures are taken to prevent accidental spillage or leaking; • <i>Section 21(c)</i> – Waste is not blown away by wind; • <i>Section 21(d)</i> – Nuisances such as odour, visual impacts and vectors do not arise; • <i>Section 21(e)</i> – Pollution of the environment and harm to health are prevented; and 	<p>DEA NCDEANC</p>	<p><u>The handling, storage and disposal of waste will have to be undertaken in accordance with a waste management plan that is based on the principles and requirements of this Act.</u></p>

LEGISLATION	LEGAL REQUIREMENTS	COMPETENT AUTHORITY	PROJECT REQUIREMENTS
	<ul style="list-style-type: none"> Section 22(2) – Waste that is reusable, recyclable or recoverable must be separated and stored apart from other general waste. 		
National Water Act, 1998 (Act No. 36 of 1998) (NWA) Freshwater Ecological Priority Area Programme	<p><u>Section 19</u></p> <p>In terms of this section of the Act, the project applicant must ensure that reasonable measures are taken to prevent and remedy any potential impacts of pollution to water resources.</p>	Department of Water Affairs (DWA)	Mitigation measures to prevent impacts to water resources have been included in this EMP.
	<p><u>Section 21</u></p> <p>Water uses listed in terms of this section of the Act requires a Water Use License Application (WULA) to be made, unless such water use falls into one of the categories listed in Section 22 of the Act or falls under a general authorisation.</p>	DWA	<u>A WULA for identified water uses, including the establishment of road crossings and trenches for underground electric cables over dry drainage lines will have to be submitted to the DWA prior to the commencement of this project.</u>
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA)	The Act provides for control and conservation of the utilisation of the natural agricultural resources of South Africa in order to promote the conservation of the soil, water sources and vegetation and the combating of weeds and invader plants; and for matters connected therewith. Category 1 plant in terms of the Act and needs to be eradicated using the control methods stipulated in Regulation 15D.	Department of Agriculture, Forestry and Fisheries (DAFF)	<u>The destruction of Category 1 plants that occur in the study area, as well as control of other alien invasive species is provided for in the alien invasive control programme, which is also guided by NEMBA.</u>
National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA)	<p><u>Section 38</u></p> <p>This section of the act state that Heritage Impact Assessments (HIAs) are required for certain types of development, including activities which result in changes to the character of a site exceeding 0.5 ha in extent.</p> <p>The relevant heritage authority must be notified of the development and will advise on the scope of the heritage assessments that need to be undertaken. Stand alone HIAs are not required where an EIA is undertaken and heritage considerations are integrated into the report.</p>	South African National Heritage Resources Agency (SAHRA)	<p>Heritage impacts have been considered during the BAR process and included a Phase 1 Archaeological Impact Assessment (AIA), Palaeontological Impact Statement and Visual Impact Assessment (VIA).</p> <p><u>A permit for the excavation and destruction of significant LSA archaeological sites will be required prior to the commencement of the construction phase to ensure that impacts to the heritage resources are minimised.</u></p>

LEGISLATION	LEGAL REQUIREMENTS	COMPETENT AUTHORITY	PROJECT REQUIREMENTS
Land Use Planning Ordinance, Ordinance 15 of 1985 Subdivision of Agricultural Land Act (Act No. 70 of 1970)	In terms of the provisions of these Acts, the property on which the proposed project is to be developed will require rezoning to land use for renewable energy generation.	Local Municipality	<u>A servitude will be registered for the proposed transmission line.</u>
National Forests Act, 1998 (Act 84 of 1998) (NFA)	<u>Section 5</u> In terms of this section of the Act, no person may cut, disturb, damage or destroy or remove any protected tree listed in terms of GNR 1042 of the Act without a licence granted by the minister.	DAFF	During the site layout design process, areas where threatened and protected species listed in terms of the Act occur were designated as no-go areas. <u>No destruction of protected species will be required and therefore, no permitting requirements apply.</u> <u>Should any threatened or protected plant species that were not identified to occur in the project development footprint be identified during the pre-construction wet-season survey, the necessary permits for the removal of the specimens will have to be obtained.</u>

4 RESPONSIBILITY OF IMPLEMENTING THE EMP

4.1 Organisational commitment

The success of an EMP is dependent upon the commitment of the organisation, at all levels, to environmental excellence (Environmental Protection Agency, 1995). Commitment to structured and effective EMPs will benefit both the organisations' business success and the community in which it operates. This commitment requires that the organisation provide the necessary resources for employee training, reference material and reporting and response procedures.

The manager of the company shall be held responsible and accountable for health and safety of personnel while on duty as well as the environmental impacts caused by project activities. The competence of the work force will be ensured through selection, training and awareness in health, safety and environmental matters. Continual evaluation measures must be implemented to ensure that performances with regard to social, health and well-being are improved and environmental management is effectively implemented throughout the lifespan of the proposed projects. Regular reviews of the company's performance are necessary during and after operations to ensure that procedures are appropriate and to ensure the desired environmental outcomes are being achieved.

4.2 Management areas and responsibility

The overall management responsibility for the implementation of the EMP will rest with the Environmental Manager of Orlight SA during construction, operation and closure. The Environmental Manager will be responsible for ensuring that all stakeholders understand and implement the plan. The Environmental Manager will also be responsible for ensuring that the plan remains effective and relevant through measurement and monitoring and adapting the plan where necessary to achieve its objectives. Although Orlight SA will ultimately be responsible for environmental management, it will also be the responsibility of all contractors to adhere to the plan. Specific requirements for environmental management relevant to their areas of operation should be detailed in their respective contracts. The management actions that will be the responsibility of the Environmental Manager include:

- Overview of EMP implementation;
- Ensure that environmental monitoring, recording and reporting are conducted;
- Adapting the EMP where required;
- Develop and implement environmental training and awareness plans, including protected species awareness; and
- Conduct internal Environmental Audits.

EMPs provide an essential tool for ensuring that the mitigation of negative impacts and enhancement of positive impacts is carried out effectively during the project life-cycle. The following tables therefore provides a summary of the potential mitigation measures that would be required for the potential impacts anticipated in the construction, operational and decommissioning phases for the transmission line project.

4.3 Contractors

The competence of the construction and operational workforce will be ensured through Orlight SA's tender process, as well as efficient selection, training, awareness and the effective implementation of applicable health and safety policies. The tendering requirements for potential contractors should be read in conjunction with the

EMP. Continual evaluation measures must be implemented to ensure that performances with regard to social, health and well-being are improved and environmental management is effectively implemented throughout the lifespan of the development. Regular reviews of the contractors' performance and Environmental Audits are necessary during and after the construction phase to ensure that procedures are appropriate and to ensure the desired environmental outcomes are being achieved.

4.4 Environmental Control Officers

Environmental Control Officers (ECO) will be employed for the proposed project. The ECO would be responsible for ensuring that all stakeholders understand and implement the EMP. The ECO will also be responsible for ensuring that the plan remains effective and relevant. Specific requirements for environmental management relative to their areas of construction and subsequent operation will be detailed in their respective contracts. The management actions that will be the responsibility of the ECO are summarised below:

- Overview of EMP implementation;
- Ensure that environmental monitoring, recording and reporting are conducted;
- Develop and implement environmental training and awareness plans; and
- Conduct internal Environmental Audits.

5 ENVIRONMENTAL TRAINING AND AWARENESS PLAN

The purpose of an Environmental Training and Awareness Plan (ETAP) is to outline the methodology that will be used to inform employees of any environmental impacts which may result from their work and the manner in which the impacts must be dealt with in order to avoid pollution to or the degradation of the environment.

5.1 Responsibilities

Local contractors will be used during the construction and operational phases, where possible. People receiving contracts as a result of this project will be responsible for training and skills transfer to local labour and will be expected to present training plans to management and the ECO. Management will be responsible for ensuring that the plans are adequate and for the monitoring of the effectiveness of the training.

5.2 Timeframe

All construction workers and their supervisors will undergo environmental awareness training prior to working at the proposed project site. Refresher courses will be held at suitable intervals. New contract staff and new employees on site will also be required to undergo training.

5.3 Training requirements

The ETAP will incorporate training on the following components:

- The social and environmental context within which the transmission line will be constructed;
- The risks associated with the activities which workers and supervisors will be responsible for and the associated mitigation measures;
- The relevant procedures and protocols to be followed; and
- The roles and responsibilities for implementing mitigation measures.

5.4 Performance management

The effectiveness of the environmental management training and awareness building interventions will be evaluated by:

- The performance as recorded by the environmental audits (conducted by the ECO) aimed at evaluating the environmental awareness of employees directly, and
- Analysing the root causes of environmental incidents, including non-conformance to legal requirements, to determine which incidents were caused by a lack of environmental awareness and training.

6 ENVIRONMENTAL MANAGEMENT PROGRAMME

The purpose of this section is to define the environmental objectives for each phase of the proposed project. The action plans that are required to achieve these objectives were compiled within the context of activities that could result in potential impacts to the biophysical, socio-economic and heritage environment.

These action plans are presented in tabular format to easily present the requirement for implementation of mitigation measures, as shown in Table 6-1.

Table 6-1: Structure of environmental management implementation plans

ENVIRONMENTAL ASPECT	
PHASE OF PROJECT	
Context	The context refers to the environmental, socio-economic and heritage conditions of the surrounding environment).
Objective	The management objective refers to the desired outcome of management measures for mitigating negative impacts and enhancing positive impacts related to project activities.
Risk sources	The risks sources refer to activities that will result in a potential impact.
Potential impacts	The potential impact refers to the changes or effects anticipated on the environment resulting from an environmental aspect, whether desirable or undesirable (i.e. positive or negative impact on the receiving environment).
Management and mitigation actions	The management actions refer to the practical actions aimed at achieving management objectives and targets.
Performance indicators	The performance indicator refers to probably key success factors according to which the implementation success of the management measures and objectives should be evaluated.
Monitoring and evaluation	Monitoring refers to the actions, tools or methods that should be implemented to evaluate whether management actions are being implementing and whether the desired objective is being achieved.

The tables and action plans were also compiled to assess the potential impacts associated with the construction phase (red), operational phase (yellow) and decommissioning or closure phase (green) of the project activities on the receiving environment.

CONSTRUCTION PHASE
OPERATIONAL PHASE
DECOMMISSIONING AND CLOSURE PHASE

It should be noted that, as detailed in the main BAR Report, the most significant impacts are anticipated during the construction phase.

6.1 Planning and design phase

The objectives of the planning and design phase for the proposed project are to:

- Ensure that the design of proposed project and associated infrastructure is undertaken in such a way that it does not directly impact on sensitive topographical, ecological, visual and socio-cultural areas;
- Ensure that a site remediation plan is prepared to ensure that impacts during the construction phase does not limit the success of site remediation efforts;
- Ensure that stakeholder concerns and recommendations have been integrated in the planning and design of the project, where appropriate; and
- Enable the continuation of some of the existing land uses throughout project development and operation.

6.1.1 Design considerations

The project design for the proposed project was finalised after suitable alternatives and necessary assessments were conducted. This was part of an integrated and dynamic process to ensure the most financially viable and environmentally sensitive designs were considered for the project.

The following sensitive and no-go areas were delineated:

- *Road reserve* – A 30 m buffer zone around the road has been included in the site layout;
- *Eskom transmission line servitudes* – The existing 66 kV line has a servitude width of 22 m. No construction will take place within these servitudes. The servitudes will, however, be used to access the areas where the transmission lines will be constructed;

The implementation plans for the construction, operational and decommissioning phases of the proposed project will make reference to the above mentioned no-go and sensitive areas that were delineated for the project area.

6.1.2 Planning of site remediation and post-construction rehabilitation

Site remediation and rehabilitation by definition means to replace that which was impacted by construction activities for the proposed project back to a sustainable and desirable condition. Thus the area of disturbance must be minimised to retain as much of the current land use capability as possible.

Important aspects to consider for rehabilitation are to minimise the area affected by the development, to minimise foreign material from entering the natural environment and to maximise the recovery and effective storage of material required for rehabilitation. Thus during construction of the relevant plants the following should be kept in mind:

- Construction activities must minimise their footprint of disturbance; and
- All infrastructure should be constructed with final closure in mind i.e. infrastructure should be designed with ease of deconstruction in mind.

Control and management of alien vegetation will contribute to the conservation of the natural vegetation. The alien species should therefore be removed from site and control measures must be implemented to ensure spreading of these species does not occur to other parts of the project area or the surrounding lands.

The areas not directly impacted upon by the project footprint but falling under the control of the project need to be managed for the duration of the time that the land is under project control.

6.2 Construction phase

The environmental objectives for the construction phase of the proposed project are to:

- Ensure that construction activities are undertaken in accordance with the specifications and outcomes of the planning and design phase;
- Implement an environmental training and awareness plan to familiarise all parties with the contents of the EMP;
- Establish clear communication channels between parties responsible for implementing the EMP;
- Establish a grievance mechanism whereby the public are able to voice issues and concerns regarding the construction activities;
- Ensure that construction activities are managed in such a way as to reduce the risk of potential environmental impacts occurring;
- Prevent impacts on the ephemeral river system and associated drainage lines in the study area;
- Minimise degradation or loss of the soil resource;
- Minimise the impact of the project on indigenous vegetation, Red Data and protected plant species and other sensitive ecological areas;
- Ensure that site remediation is undertaken where necessary and within the stipulated timeframes;
- Minimise impacts to sites of heritage significance outside the project development footprint and unidentified archaeological and palaeontological sites, should they be identified during the construction phase;
- Minimise negative impacts associated with the presence of construction workers and migrant job-seekers; and
- Enhance the potential socio-economic benefits associated with the construction of the proposed project.

The implementation plans for the construction phase of the proposed Loeriesfontein transmission lines are presented in the tables below.

Table 6-2: Construction phase implementation plan – Soil and agricultural potential

SOIL AND AGRICULTURAL POTENTIAL	
Context	The vast presence of the shale rock type gave rise to fragment infested shallow soils (<30 cm), with the exception of the watercourses/drainage lines where alluvial deposits were dominating. Anticipated vulnerabilities of the identified soils to anticipated impacts such as erosion induced by water when the soils are exposed, is considered to be moderate. This will be partly due to the little cohesion between particles on the one hand, while the mass of the coarser fragments will reduce the susceptibility, depending on the force subjected to.
CONSTRUCTION PHASE	
Objectives	<p>The environmental objectives for soils and agricultural potential are:</p> <ul style="list-style-type: none"> • To minimise loss of the soil resources to support existing land use and land capability; • To minimise soil erosion by wind and water; • To reduce the site’s susceptibility to erosion during flash floods; • To minimise compaction of soils during site preparation activities, including soil handling, stockpiling and vehicle use; and • To prevent soil contamination due to spillage of hydrocarbons or wastes.
Risk sources	<p>The following risk sources have been identified:</p> <ul style="list-style-type: none"> • The clearance of vegetation at the footprint of the tower structure and overhanging transmission lines; • Creation of compacted surfaces, including roads; • Storage of hydrocarbons and operation of equipment and vehicles; and • Generation and handling of domestic and industrial wastes.
Potential impacts	<p>The potential impacts on soils and agricultural potential include:</p> <ul style="list-style-type: none"> • The coarse graded soils that occur on the project site have little cohesion between particles and consequently, these soils are highly susceptible to water erosion, depending on the force applied at the time of impact; • The very fine material in-between the fragments will be subjected to wind erosion where exposed and stockpiled; • The fine-graded soils of southern part of the site will also be vulnerable to wind erosion when exposed after the removal of vegetation during site preparation and stockpiling for later use; • Soil compaction of well sorted fine-graded sand and silty soils; and

SOIL AND AGRICULTURAL POTENTIAL			
	<ul style="list-style-type: none"> The potential for contaminating the soil due to spillage of hydrocarbons from vehicles and machinery, or improper waste management. 		
Management and mitigation actions	Actions	Responsibility	Timeframe
	<ul style="list-style-type: none"> The majority of site preparation activities to be undertaken during the dry season; 	Orlight SA	Project planning
	<ul style="list-style-type: none"> Minimise soil removal and construction activities on windy days. Temporary cessation of construction activities could be required during very windy periods; 	Contractor	Construction
	<ul style="list-style-type: none"> Minimise the period of exposure of soil surfaces through planning; 	Contractor ECO	Project planning Construction
	<ul style="list-style-type: none"> Where feasible, activities that are usually undertaken by machinery (such as vegetation removal), should be replaced with manual labour; 	Contractor	Construction
	<ul style="list-style-type: none"> All waste products must be managed according to a waste management plan; 	Contractor	Construction
	<ul style="list-style-type: none"> All construction materials should be stored in bunded areas to ensure that material loss during surface flow events are prevented; 	Contractor	Pre-construction
	<ul style="list-style-type: none"> Vehicles should be serviced and checked for leaks on a daily basis to minimise spillage of hydrocarbon contaminants during the construction phase; 	Contractor	Construction
	<ul style="list-style-type: none"> Spillage should be managed through an emergency spill response plan. A hydrocarbon spill kit should be kept on site. 	Contractor	Construction
Performance indicators	The performance indicators are: <ul style="list-style-type: none"> No visible signs of erosion (i.e. bare patches, rills and gullies); No visible evidence of sediment transport during surface flow events; Construction vehicles are restricted to designated areas; Hydrocarbon storage areas are bunded; No visible evidence of hydrocarbon spills on site; and Waste management system is in place. 		

SOIL AND AGRICULTURAL POTENTIAL	
Monitoring and evaluation	<p>The following monitoring and evaluation actions are required:</p> <ul style="list-style-type: none"> • The ECO must evaluate, approve, supervise and monitor the construction activities undertaken by the contractor; • An independent ECO will be responsible for auditing implementation of the EMP on a bi-weekly basis; and • During surface water flows, monitoring is required to identify potential erosional problems.

Table 6-3: Construction phase implementation plan – Ecological components (Fauna and Flora)

ECOLOGICAL COMPONENTS	
Context	The vegetation community present in the drainage lines was designated as a no-go area, due to the ecological importance of the benefiting ephemeral river system. The protected plant species, <i>Hoodia gordonii</i> , was also observed in this area. For this purpose, the northern part of the study area was classified as sensitive and should be avoided.
CONSTRUCTION PHASE	
Objectives	<p>The environmental objectives for ecological components are:</p> <ul style="list-style-type: none"> • To prevent direct impacts on other areas that were delineated as highly sensitive and unsuitable for development; • To minimise the footprint of disturbance during the construction phase; • To preserve as many natural plant species that can be used during site remediation; and • To eradicate alien invasive and weed species from the project area.
Risk sources	<p>The following risk sources have been identified:</p> <ul style="list-style-type: none"> • The clearance of vegetation at the footprint of tower structures structure; • Creation of compacted surfaces, including roads; and • Access control and fencing of the site.
Potential impacts	<p>The potential impacts on ecological components include:</p> <ul style="list-style-type: none"> • During site preparation activities, some of the naturally occurring vegetation will be removed; • There is also a possibility that Red Data or protected plant species that have not been identified in areas within the project development footprint during dry-season surveys could be destroyed;

ECOLOGICAL COMPONENTS			
	<ul style="list-style-type: none"> • Decrease in effective photosynthesis as result of elevated ambient dust; • During site clearance, it is also likely that alien invasive and weed species will propagate on disturbed areas; and • Alien invasive species could out-compete indigenous vegetation, due to the fact that they are vigorous growers that are adaptable and able to invade a wide range of ecological niches. 		
Management and mitigation actions	Actions	Responsibility	Timeframe
	<ul style="list-style-type: none"> • No vegetation removal should be allowed outside the designated project development footprint; 	ECO Contractor	Construction
	<ul style="list-style-type: none"> • Clearing of vegetation should be supervised to ensure that no more than the minimum area of land that is needed is cleared; 	ECO	Construction
	<ul style="list-style-type: none"> • An alien invasive and weed control programme should be implemented. 	Contractor ECO	Construction
	<ul style="list-style-type: none"> • Veld management measures will have to be employed in areas outside the project development footprint, but within the fence boundary. This can be achieved by allowing gaps in fencing for fauna species to move between grazing areas during prescribed times of the year. 	Contractor ECO	Pre-construction
Performance indicators	The performance indicators are: <ul style="list-style-type: none"> • No destruction of vegetation outside designated areas; • No visible evidence of alien invasive species. 		
Monitoring and evaluation	The following monitoring and evaluation actions are required: <ul style="list-style-type: none"> • The ECO must evaluate, approve, supervise and monitor the construction activities undertaken by the contractor; • An independent ECO will be responsible for auditing implementation of the EMP on a quarterly basis; and • Daily inspections should be undertaken by the contractor to identify area where alien invasive species could establish. 		

Table 6-4: Construction phase implementation plan – Air quality

AIR QUALITY

AIR QUALITY			
Context	The Granaatboskolk/Zout Dwaggas gravel road will be used during the construction and operational phases of the project and will be the major source of dust during the construction phase.		
CONSTRUCTION PHASE			
Objectives	The environmental objective for air quality is to minimise creation of dust.		
Risk sources	The following risk sources have been identified: <ul style="list-style-type: none"> • The clearance of vegetation at the footprint of the tower structures • Vehicle movement on un-surfaced roads; and 		
Potential impacts	The potential impacts on air quality include: <ul style="list-style-type: none"> • The coarse graded soils that occur on the project site have little cohesion between particles and consequently, these soils are highly susceptible to water erosion, depending on the force applied at the time of impact. The very fine material in-between the fragments will be subjected to wind erosion where exposed and stockpiled; • The fine-graded soils of southern part of the site will also be vulnerable to wind erosion when exposed after the removal of vegetation during site preparation and stockpiling for later use; • Increased levels of ambient dust may cause respiratory ailments to the receiving environment; • Vehicles driving along un-surfaced roads at speeds which allow for the generation of dust; • Increase health and safety risks as result of increased dust and traffic; and • Decrease of plant productivity as result of dust on plants that limits photosynthesis. 		
Management and mitigation actions	Actions	Responsibility	Timeframe
	<ul style="list-style-type: none"> • Minimise soil removal and construction activities on windy days. Temporary cessation of construction activities could be required during very windy periods; • Minimise the period of exposure of bare surfaces through planning; • Where feasible, activities that are usually undertaken by machinery (such as vegetation removal), should be replaced with manual labour; 	Contractor Contractor ECO Contractor	Construction Project planning Construction Construction

AIR QUALITY			
	<ul style="list-style-type: none"> Dust suppression techniques such as applying water or non-toxic chemicals to minimise dust should be used, where feasible. 	Contractor ECO	Construction
Performance indicators	The performance indicators are: <ul style="list-style-type: none"> No visible signs of wind erosion; 		
Monitoring and evaluation	The following monitoring and evaluation actions are required: <ul style="list-style-type: none"> The ECO must evaluate, approve, supervise and monitor the construction activities undertaken by the contractor; An independent ECO will be responsible for auditing implementation of the EMP on a quarterly basis; and During surface water flows, monitoring is required to identify potential erosional problems. 		

Table 6-5: Construction phase implementation plan – Noise

NOISE	
Context	The town of Loeriesfontein is located approximately 40 km from the project site and there are no other receptors in close proximity. Ambient noise levels are very low, with occasional noise from traffic passing by on the gravel road.
CONSTRUCTION PHASE	
Objectives	The environmental objective for noise is to: <ul style="list-style-type: none"> Prevent generation of noise during certain times of the day (i.e. night time); and Limit the overall noise levels from construction activities.
Risk sources	The following risk sources have been identified: <ul style="list-style-type: none"> All construction activities; and Employment of workforce during the construction phase.
Potential impacts	The potential impacts on noise include: <ul style="list-style-type: none"> Increase in ambient noise levels due to noise emissions from vehicles and machinery used during construction activities; and Nuisance associated with noise during the transport of the workforce from the town of Aggeneys to the project site and the presence of the workforce

NOISE			
	<ul style="list-style-type: none"> in the area 		
Management and mitigation actions	Actions	Responsibility	Timeframe
	<ul style="list-style-type: none"> Limit all construction activities to day-light hours; 	Contractor	Construction
	<ul style="list-style-type: none"> The construction workforce should be made aware of the risk of nuisance noise due to their presence in the area and a Code of Conduct implemented to reduce general levels of noise; 	Contractor ECO	Construction
	<ul style="list-style-type: none"> Construction machinery and vehicles must be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installing exhaust mufflers; and Switch off equipment when not in use. 	Contractor Contractor	Construction Construction
Performance indicators	The performance indicators are: <ul style="list-style-type: none"> Evidence that noise assessments are being conducted with a noise meter ; The noise from the proposed operation should not measure above a level of 45dBA (daytime) and 35dBA (night time) for rural districts; Exhaust mufflers are installed on construction vehicles; 		
Monitoring and evaluation	The following monitoring and evaluation actions are required: <ul style="list-style-type: none"> The ECO must evaluate, approve, supervise and monitor the construction activities undertaken by the contractor; An independent ECO will be responsible for auditing implementation of the EMP on a quarterly basis; and Noise metre readings should be undertaken on a representative basis to determine whether noise levels are within the acceptable range. 		

Table 6-6: Construction phase implementation plan – Waste

WASTE	
Context	The construction of the transmission lines may generate solid, liquid and non-hazardous waste. The municipal waste management site may not have the capacity to accommodate waste generated by the project and therefore, a waste management contractor would have to be employed to remove waste to a registered landfill site.

WASTE			
CONSTRUCTION PHASE			
Objectives	The environmental objectives for waste management are to: <ul style="list-style-type: none"> • Minimise waste; • Contain movement of heavy vehicles to designated areas; • Avoid spillages and contamination; • Reuse, reduce and recycle, where possible; • Recover material such as glass, aluminium, as well as a variety of semiconductor materials. Recycling benefits the environment by reducing the volume of waste and helps to reduce the amount of energy required to provide raw materials and therefore the costs and environmental impacts of producing transmission lines. 		
Risk sources	The following risk sources have been identified: <ul style="list-style-type: none"> • Spillage during handling of waste or damaged containers; • Non utilisation of waste containers; • Waste being blown away from waste containers; • Waste vectors (i.e. rodents and cockroaches); • Littering by construction workers. 		
Potential impacts	The potential impacts from waste generation include: <ul style="list-style-type: none"> • Surface water contamination; • Soil contamination; • Ecological degradation; • Negative visual impacts; and • Nuisance, such as bad odours. 		
Management and mitigation actions	Actions	Responsibility	Timeframe
	<ul style="list-style-type: none"> • Ensure construction waste is effectively contained, stored and managed on site; 	Contractor	Construction

WASTE			
	<ul style="list-style-type: none"> • Ensure waste bins (e.g. for organic waste) is sufficient vermin proof and weatherproof; • Ensure all rubble and waste rock are disposed of at a registered disposal sites; • Implement the “reduce, reuse and recycle” approach for all waste. This means that different bins need to be put in place to separate i.e. plastic, paper, glass and cans, where feasible; • Ensure all solid and hazardous waste is disposed of at a registered disposal sites; and • The ablation contractor needs to ensure that no spillage occurs when the toilets are cleaned or emptied and that a licensed service provider removes the contents from site. 	Contractor	Construction
		Contractor	Construction
		Contractor	Construction
		Contractor	Construction
		Contractor	Construction
Performance indicators	<p>The performance indicators are:</p> <ul style="list-style-type: none"> • Evidence that waste is effectively contained, stored and managed on site; • No littering is visible on site or from the site; • Waste bins (e.g. for organic waste) has lids and is sufficient vermin proof and weatherproof; • Evidence that all solid waste, including rubble and waste rock, are removed and disposed of at a registered sites; • The “reduce, reuse and recycle” approach for all waste are being implemented by means of establishing separate bins for i.e. plastic, paper, glass and cans; and • There is no evidence of uncontrolled spillages or waste on site. 		
Monitoring and evaluation	<p>The following monitoring and evaluation actions are required:</p> <ul style="list-style-type: none"> • The ECO must evaluate, approve, supervise and monitor the construction activities undertaken by the contractor; and • An independent ECO will be responsible for auditing implementation of the EMP on a quarterly basis. 		

Table 6-7: Construction phase implementation plan – Visual Environment

VISUAL ENVIRONMENT	
Context	The Loeriesfontein study area is positioned on the farm Kleine Rooiberg, which was named after the landscape which displays outcropping areas that are reddish in colour and dominate the west and north of the study area. These unusual “rooiberge” definitely add to the aesthetic value of the study area. The

VISUAL ENVIRONMENT			
	landscape is dominated by vegetation that is comprised of low-lying shrubs and succulents and rocky areas. The study area is situated approximately 40 km outside of the town of Loeriesfontein and there are no residences in close proximity.		
CONSTRUCTION PHASE			
Objectives	The environmental objective for the visual environment are to: <ul style="list-style-type: none"> • Mitigate visual impacts to motorists on the road; • Manage complaints and grievances regarding visual impacts; and • Minimise dust impacts and visual pollution. 		
Risk sources	The following risk sources have been identified: <ul style="list-style-type: none"> • Increase in vehicular and other activity levels during the construction phase; • The clearance of vegetation at the footprint of the tower structures; and • Power line structures 		
Potential impacts	The potential impacts on the visual environment include: <ul style="list-style-type: none"> • The largest visual impact will be experience due to the removal of natural vegetation and installation of transmission lines and associated infrastructure, since a possible change in the intangible heritage and sense of place landscape will occur; • The construction activities themselves will lead to noise, dust and visual pollution due to the activities and transport requirements associated with labour, machinery and other materials. 		
Management and mitigation actions	Actions	Responsibility	Timeframe
	<ul style="list-style-type: none"> • Activities should be restricted to the project development footprint to reduce visual impacts to receptors; • Complaints and grievances related to visual impacts must be managed and addressed through a grievance mechanism; • No vegetation removal should be allowed outside the designated project development footprint; • Where possible, the removal and destruction of indigenous vegetation should be avoided (i.e. 	Orlight SA Orlight SA Contractor Contractor	Project planning Construction Construction Construction

VISUAL ENVIRONMENT			
	adhering to the designated internal road network); <ul style="list-style-type: none"> Minimise soil removal and construction activities on windy days. Temporary cessation of construction activities could be required during very windy periods; and Power lines are to be constructed in parallel to existing power lines to lessen the cumulative visual impact 	Contractor	Construction
Performance indicators	The performance indicators are: <ul style="list-style-type: none"> Construction activities are restricted to designated project development footprint areas; No visible signs of wind erosion and dust generation. 		
Monitoring and evaluation	The following monitoring and evaluation actions are required: <ul style="list-style-type: none"> The ECO must evaluate, approve, supervise and monitor the construction activities undertaken by the contractor; and An independent ECO will be responsible for auditing implementation of the EMP on a quarterly basis. 		

Table 6-8: Construction phase implementation plan – Employment creation

EMPLOYMENT CREATION	
Context	Some of these job opportunities will be for unskilled labourers, which will be sourced from the town of Loeriesfontein. The majority of residents in this town have low educational and skills levels, thus many are unemployed and well suited to unskilled labour. It is likely that there are existing entrepreneurs, local businesses and SMMEs in or around Loeriesfontein that render services that the proposed project will require. The social benefits associated with the proposed project will be enhanced if the proponent makes use of these businesses and SMMEs.
CONSTRUCTION PHASE	
Objectives	The environmental objective for employment creation are to: <ul style="list-style-type: none"> Employ as many labourers from the immediate and larger study area as possible; and Utilise local businesses and SMMEs as much as is feasible.
Risk sources	The following risk sources have been identified: <ul style="list-style-type: none"> Contractors making use of their own labour force, reducing the opportunity for locals to be temporarily gainfully employed;

EMPLOYMENT CREATION			
	<ul style="list-style-type: none"> • Sub-contracting large companies operating primarily outside the study area to provide support services such as catering; and • Sourcing labour (un-, semi- and skilled) from outside the larger study area if the required skills are available within that area. 		
Potential impacts	The potential impacts of employment creation include: <ul style="list-style-type: none"> • Socio-economic benefits associated with creating local employment and business opportunities; 		
Management and mitigation actions	Actions	Responsibility	Timeframe
	<ul style="list-style-type: none"> • Ensure that a minimum of 80% of the unskilled workers are sourced from Aggeneys (surrounding towns, if insufficient labourers are available in Aggeneys); 	Orlight SA Contractor	Pre-construction
	<ul style="list-style-type: none"> • Ensure that a minimum of 20% of the unskilled employment opportunities are awarded to women and previously disadvantaged individuals residing in the local and surrounding areas; 	Orlight SA Contractor	Pre-construction
	<ul style="list-style-type: none"> • In conjunction with the local municipality and other local organisations and companies, identify suitable individuals in the local and regional areas to fill the available job opportunities; 	Orlight SA Contractor	Pre-construction
	<ul style="list-style-type: none"> • Set-up a local labour and enterprise desk in Aggeneys to allow local labourers, entrepreneurs, SMMEs and companies to register their details and skills/ service to facilitate the employment and contracting of local labourers and entrepreneurs, SMMEs and companies; 	Orlight SA	Pre-construction Construction
	<ul style="list-style-type: none"> • Relevant information regarding employment opportunities (including job descriptions, skills required, and number of opportunities), as well as contracting of entrepreneurs, SMMEs and other local companies (including the type and scale of service required) will be made available at the local labour and enterprise desk; 	Orlight SA	Pre-construction Construction
	<ul style="list-style-type: none"> • Create conditions conducive to the involvement of local companies, SMMEs and entrepreneurs during the construction phase; 	Orlight SA	Pre-construction
	<ul style="list-style-type: none"> • Provide guidelines in tender documentation regarding the employment of locals and use of local enterprises; and 	Orlight SA	Pre-construction
<ul style="list-style-type: none"> • Skills training will be provided for the construction workforce and entrepreneurs, SMMEs and local 	Orlight SA	Pre-construction	

EMPLOYMENT CREATION			
	businesses as relevant and required.	Contractor	Construction
Performance indicators	The performance indicators are: <ul style="list-style-type: none"> • The majority of unskilled job opportunities are awarded to local individuals (at least 80% from Aggeneys or surrounding towns); • A fifth of unskilled job opportunities are filled by women and previously disadvantaged individuals; • The proponent/contractor has a list of candidates (including contact details, age, sex, skills level, educational levels and resident town) that may be able to fulfil unskilled job openings; • The proponent/contractor has a list of entrepreneurs, SMMEs and companies operating in the local area (including company name, services provided, number of employees and location) that could be used to provided services required during construction; • A labour and enterprise desk is operational and visible in Aggeneys; • Some services are provided by local entrepreneurs, SMMEs and businesses; • Tender documentation stipulates guidelines pertaining to the employment of locals, women and previously disadvantaged individuals, as well as the subcontracting of local entrepreneurs, SMMEs and businesses; and • The proponent/ contractor are able to provide records of training provided for local employees and entrepreneurs, SMMEs and businesses, including the nature of training, number of individuals/ entrepreneurs/ SMMEs/ businesses who received training, and the training provider. 		
Monitoring and evaluation	Monitoring on the performance according to all of the above performance indicators is required on a monthly basis by Orlight SA. Quarterly audits should be undertaken by an independent social and labour specialist.		

Table 6-9: Construction phase implementation plan – Traffic

TRAFFIC	
Context	The construction phase of the proposed project will necessarily increase the volume of traffic in the vicinity of the project site, as well as change the nature of the traffic (there will be an increased number of heavy motor vehicles). By imposing traffic and transportation rules, carefully planning access to the site, maintaining the access roads and ensuring that construction vehicles are roadworthy, the risk of traffic-related incidents involving construction traffic is reduced.
CONSTRUCTION PHASE	
Objectives	The environmental objective to minimise impacts on traffic are: <ul style="list-style-type: none"> • To minimise the impact of traffic associated with construction activities on the quality of roads, local traffic flow, local residents, land owners and

TRAFFIC			
	<p>roads. This limitation will be strictly enforced;</p> <ul style="list-style-type: none"> • Drivers' shifts will be limited to 8 hours per day to prevent driver fatigue; • Access from the national road to the gravel road leading to the site will be clearly marked and appropriate road signs will be used to warn public road users of the presence of heavy motor vehicles; • Any traffic delays that may be caused by construction traffic will be coordinated with the relevant local authorities prior to the delay occurring; • All drivers of construction vehicles will be in possession of the appropriate drivers' license for that vehicle; • Drivers of construction vehicles will not be allowed to transport any passengers; and • Any traffic-related accident (including accidents involving just the construction vehicle, or the construction vehicle and a member of the public and/ or livestock) will be reported to the contractor immediately. 	<p>Contractor</p> <p>Contractor</p> <p>Contractor</p> <p>Contractor</p> <p>Contractor</p> <p>Contractor</p>	<p>Construction</p> <p>Construction</p> <p>Pre-construction Construction</p> <p>Construction</p> <p>Construction</p> <p>Construction</p>
Performance indicators	<p>The performance indicators are:</p> <ul style="list-style-type: none"> • Affected parties (including surrounding land owners) are aware and satisfied with the contractor's traffic-related logistics; • The access road is in the same or better state than what it was at the outset of construction; • Dust generation from traffic on the access road(s) is of an acceptable level; • The construction vehicles are not involved in any traffic-related incidents; • Access to the site is clearly marked with appropriate road signs; and • The project-affected and surrounding communities do not lay any traffic-related complaints (such as reckless driving or speeding). 		
Monitoring and evaluation	<p>Monitoring on the performance according to all of the above performance indicators is required on a monthly basis by Orlight SA. Quarterly audits should be undertaken by an independent social and labour specialist.</p>		

Table 6-10: Construction phase implementation plan – Heritage

HERITAGE			
Context	The palaeontological landscape is described as bedrock comprising ancient basement rocks of the Bushmanland Terrance of the Namaqua Province. This geology is of negligible palaeontological interest. The stone artefact scatters which were recorded during the survey are considered to be of minor significance. They are probably not in original context and not associated with other archaeological material, such as bone, which could provide valuable information on prehistoric life ways. There do not appear to be “archaeological sites” with stone tools left in their original context.		
CONSTRUCTION PHASE			
Objectives	The environmental objectives for the heritage environment are to: <ul style="list-style-type: none"> To minimise impacts on the cultural landscape. 		
Risk sources	The following risk sources have been identified: <ul style="list-style-type: none"> The clearance of vegetation at the footprint of the tower structures; Removal of topsoil from the footprint; and The installation of transmission lines and all associated infrastructure. 		
Potential impacts	The potential impacts on heritage resources include: <ul style="list-style-type: none"> Although some archaeological material will be impacted, the impact is considered Low. Lack of site boundaries or associated organic remains reduces scientific value greatly; The largest visual impact will be experience due to the removal of natural vegetation and installation of transmission lines and associated infrastructure, since a possible change in the intangible heritage and sense of place landscape will occur. 		
Management and mitigation actions	Actions	Responsibility	Timeframe
	<ul style="list-style-type: none"> In the unlikely event that unmarked graves are present and found during the construction phase, work at that location must be halted, the feature should be cordoned off and the heritage authority (SAHRA) notified. They are likely to suggest mitigation in the form of exhumation. Recommendations for positioning of the solar PV panels and associated infrastructure were made during the site layout design process. Activities should therefore be restricted to the project development footprint to reduce visual impacts to receptors; Complaints and grievances related to visual impacts must be managed and addressed through a 	ECO Orlight SA Orlight SA	Construction Project planning Construction

HERITAGE			
	grievance mechanism; <ul style="list-style-type: none"> No vegetation removal should be allowed outside the designated project development footprint; Where possible, the removal and destruction of indigenous vegetation should be avoided. 	Contractor Contractor	Construction Construction
Performance indicators	The performance indicators are: <ul style="list-style-type: none"> Notify SAHRA and an archaeologist in the event that unmarked graves are identified during construction. 		
Monitoring and evaluation	None required.		

6.3 Operational phase

The objectives for the operational phase of the proposed project are to:

- Prevent impacts associated with the maintenance of the proposed power line; and Control and prevent the propagation of alien invasive species.

The implementation plans for the operational phase of the proposed Loeriesfontein Transmission line are presented in the tables below.

Table 6-11: Operational phase implementation plan – Soils and Ecology

SOILS AND AGRICULTURAL POTENTIAL			
Context	A few ephemeral river systems and associated drainage lines were identified for the project area. These systems are associated with the Volstruisesholte River catchment which is recognised by the FEPA as an upper management area in support of the downstream FEPAs (sub-catchment 5338). The catchment area is considered to be largely natural and as a result, any impacts to the systems may be severe.		
OPERATIONAL PHASE			
Objectives	The environmental objectives for soils and agricultural potential are: <ul style="list-style-type: none"> To reduce the site's susceptibility to erosion; and To minimise compaction of soils. 		
Risk sources	The following risk sources have been identified: <ul style="list-style-type: none"> Internal access roads. 		
Potential impacts	The potential impacts on surface water systems include: <ul style="list-style-type: none"> During rainfall events, compacted surfaces and areas below the solar PV panels will be susceptible to erosion due to the altered surface flow dynamics. The natural erosion process and sediment transport on-site and off-site will be aggravated. 		
Management and mitigation actions	Actions	Responsibility	Timeframe
	<ul style="list-style-type: none"> Traffic over project areas that have not been stripped of topsoil should be minimised. 	Contractor	Construction
Performance indicators	The performance indicators are: <ul style="list-style-type: none"> No visible signs of erosion (i.e. bare patches, rills and gullies); and No visible evidence of sediment transport during surface flow events. 		
Monitoring and evaluation	The following monitoring and evaluation actions are required: <ul style="list-style-type: none"> The operator of the transmission lines must undertake quarterly site inspections; An independent auditor will be responsible for auditing implementation of the EMP on an annual basis; and During and after surface water flows, the site must be expected to identify potential erosional problems. 		

Table 6-12: Operational phase implementation plan – Employment creation

EMPLOYMENT CREATION			
Context	<p>The operational phase of the proposed project won't require any job creation as only line maintenance will be involved.</p> <p>Additionally, the use of local entrepreneurs, SMMEs and businesses further enhance the socio-economic benefit associated with the proposed project. Possible opportunities for local service providers include security and cleaning services, maintenance of the construction camp and equipment, as well as the provision of chemical toilets for use on site. Both local employees and entrepreneurs, SMMEs and businesses will likely gain significantly from appropriate skills training and capacity building. The project also stands to benefit from such training and capacity building as it will enable the employees and local service providers to better perform their duties.</p>		
OPERATIONAL PHASE			
Objectives	<p>The environmental objectives for employment creation are to:</p> <ul style="list-style-type: none"> • Employ as many labourers from the immediate and larger study area as possible; • Utilise local entrepreneurs, businesses and SMMEs as much as is feasible; and • Provide the required training and capacity building to better enable the employees and service providers to perform their duties. 		
Risk sources	<p>The following risk sources have been identified:</p> <ul style="list-style-type: none"> • Locals not employed despite availability of skills; and • Local service providers not subcontracted despite availability of service. 		
Potential impacts	Socio-economic benefits associated with creating local employment and business opportunities, as well as training and capacity building.		
Management and mitigation actions	Actions	Responsibility	Timeframe
	<ul style="list-style-type: none"> • A skills development and capacity building plan will be developed in conjunction with the relevant employees and local service providers to ensure that the training opportunities are relevant and required by the target beneficiaries; • Ensure that a minimum of 20% of the unskilled employment opportunities are awarded to women and previously disadvantaged individuals residing in the local and surrounding areas; • Ensure that a minimum of 80% of the unskilled workers are sourced from Loeriesfontein (and 	Orlight SA Operator Operator Operator	Operation Post-construction Post-construction

EMPLOYMENT CREATION			
	<p>surrounding towns if insufficient labourers are available in Loeriesfontein); and</p> <ul style="list-style-type: none"> The proponent/ contractor will retain the list of local job-seeking individuals and service providers as compiled during the construction phase and will allow for period updates of the list. 	<p>Contractor Operator</p>	<p>Post-construction</p>
Performance indicators	<p>The performance indicators are:</p> <ul style="list-style-type: none"> The majority of unskilled job opportunities are awarded to local individuals (at least 80% of individuals are from Loeriesfontein or surrounding towns); A fifth of unskilled job opportunities are filled by women and previously disadvantaged individuals; The proponent/ contractor has a list of candidates (including contact details, age, sex, skills level, educational levels and resident town) that may be able to fulfil unskilled job openings; The proponent/ contractor has a list of entrepreneurs, SMMEs and companies operating in the local area (including company name, services provided, number of employees and location) that could be used to provide services required during the operational phase of the project. Some services are provided by local entrepreneurs, SMMEs and businesses; and The proponent/ contractor are able to provide records of training provided for local employees and entrepreneurs, SMMEs and businesses, including the nature of training, number of individuals/ entrepreneurs/ SMMEs/ businesses who received training, and the training provider. 		
Monitoring and evaluation	<p>Monitoring on the performance according to all of the above performance indicators is required on a quarterly basis by Orlight SA. Quarterly audits should be undertaken by an independent social and labour specialist.</p>		

Table 6- 13: Operational phase implementation plan – Local economic development

LOCAL ECONOMIC DEVELOPMENT	
Context	<p>In addition to the skills training and capacity building for the employees and service providers utilised by the proponent, the proponent has a social responsibility towards the communities in which it operates. Fulfilling this social responsibility will take place in conjunction with the Hantam Local Municipality and will be aligned with the municipality's Local Economic Development (LED) Strategy.</p>
OPERATIONAL PHASE	
Objectives	<p>The environmental objectives for LED are to:</p>

LOCAL ECONOMIC DEVELOPMENT			
	<ul style="list-style-type: none"> • Create and strengthen skills among the residents in Loeriesfontein and surrounding towns; and • Assist the municipality to fulfil their LED objectives. 		
Risk sources	The following risk sources have been identified: <ul style="list-style-type: none"> • No social responsibility from Orlight SA; • No contribution towards the local municipality’s LED initiatives; and • Insufficient training and capacity building among residents in Loeriesfontein and surrounding towns. 		
Potential impacts	The potential impacts on LED include: <ul style="list-style-type: none"> • Capacity building and skills training continuously undertaken during the operational phase of the project; and • Positively contributing to the local municipality’s LED initiatives. 		
Management and mitigation actions	Actions	Responsibility	Timeframe
	<ul style="list-style-type: none"> • Capacity building and skills training opportunities will be identified in conjunction with the local municipality and will be aligned with the municipality’s LED initiatives; • Once a year, local residents and entrepreneurs, SMMEs and businesses will be given an opportunity to express interest in receiving training by registering with the proponent; • Records will be kept of the training or capacity building provided, including the service provider, description of the training/ capacity building, date of training, names, ages and sex of beneficiaries or the name of SMME or local business; and • The usefulness of the training and capacity building will be determined by means of a survey to be completed by as many of the beneficiaries as possible to establish how it has contributed to their income-generating ability. This survey will be administered twice; once six months after the completion of training, and once one year after the completion of training. The results of the surveys will inform decisions regarding future training. 	Orlight SA Orlight SA Orlight SA Orlight SA	Operation Operation Operation Operation
Performance indicators	The performance indicators are: <ul style="list-style-type: none"> • LED initiatives identified by the municipality are supported; 		

LOCAL ECONOMIC DEVELOPMENT	
	<ul style="list-style-type: none">• The proponent is able to provide records of training provided; and• Local residents are aware of training and capacity building embarked on by the proponent.
Monitoring and evaluation	Monitoring on the performance according to all of the above performance indicators is required on a quarterly basis by Orlight SA. Quarterly audits should be undertaken by an independent social and labour specialist.

6.4 Decommissioning phase

The overall objective of the decommissioning phase is to leave the project area in a condition that minimises adverse impacts on the socio-economic and biophysical environment, with a legacy that contributes to sustainable development.

6.4.1 Objectives

The objectives of the decommissioning phase of the proposed project are to:

- Follow a process of decommissioning that is progressive and integrated into the short- and long-term project plans that will assess the closure impacts proactively at regular intervals throughout project life;
- Implement progressive rehabilitation measures, beginning during the construction phase;
- After the lease has expired and the project is in decommissioning phase, leave a safe and stable environment for both humans and animals and make their condition sustainable;
- Return rehabilitated land-use to a standard that can be useful to the post-project land user, such as grazing;
- Where applicable, prevent any further soil and surface water contamination by maintaining suitable storm water management systems;
- Comply with local regulatory requirements and international best practise;
- Maintain active partnerships with local communities; and
- Maintain and monitor all rehabilitated areas following re-vegetation, and if monitoring shows that the objectives have been met, apply for closure.

The implementation plan for the decommissioning phase of the proposed Loeriesfontein Solar PV Power Plant is presented in the tables below.

6.4.2 Approach to the decommissioning phase

It is recommended that planning of the decommissioning of the project and rehabilitation of the site take place at least two years prior to its decommissioning. Important factors that need to be taken into consideration are described below.

Identification of structures for post-closure use

All structures on site should be assessed in conjunction with the ultimate land users and authorities to determine which items could be used in future. Care should be taken when this assessment is undertaken to ensure that the infrastructure left behind will not become abandoned due to unsuccessful enterprises.

All infrastructure planned for removal and demolition will need to be assessed for their viable re-use or recycling opportunity. Structures destined for demolition or recycling need to be separated.

Removal of infrastructure

All infrastructure not destined for future use on the relevant property will be removed and/or demolished. Concrete to be demolished along with their associated concrete foundations. Inert demolished rubble must be removed from site and disposed of at a registered landfill site. All foundations must be removed to a depth of 1 m. Hard surfaced must be ripped to a depth of 1 m and vegetated.

Soil amelioration

The steps that should be taken during the amelioration of soils are as follows:

- The deposited soils must be ripped to ensure reduced compaction;
- An acceptable seed bed should be produced by surface tillage;
- Restore soil fertility;
- Incorporate the immobile fertilisers in to the plant rooting zone before ripping; and
- Apply maintenance dressing of fertilisers on an annual basis until the soil fertility cycle has been restored.

Establishment of vegetation

The objective is to restore the project site to a self-sustaining cycle i.e. to realise the re-establishment of the natural nutrient cycle with ecological succession initiated.

The objectives for the re-vegetation of reshaped and top-soiled land are to:

- Prevent erosion;
- Restore the land to the agreed land capability;
- Re-establish eco-system processes to ensure that a sustainable land use can be established without requiring fertilizer additions; and
- Restore the biodiversity of the area as far as possible.

Maintenance

Established vegetation requires regular maintenance. If the growth medium consists of low-fertility soils, then regular application of plant food will be required until the natural fertility cycle has been restored. Annual fertiliser application should continue for three to five years.

Monitoring

The purpose of monitoring is to ensure that the objectives of rehabilitation are met and that the rehabilitation process is followed. The physical aspects of rehabilitation should be carefully monitored during the progress of establishment of desired final ecosystems.

The following items should be monitored continuously:

- Depth of topsoil stripped and placed;
- Chemical, physical and biological status of replaced soil;
- Erosion status;
- Surface drainage systems and surface water quality;
- Vegetation basal cover;
- Vegetation species diversity; and
- Faunal re-colonisation.

Table 6-3: Decommissioning phase implementation plan – Soils and agricultural potential

SOILS AND AGRICULTURAL POTENTIAL			
Context	The project area is situated in the Olifants/Doring Water Management Area (WMA 17). The major rivers associated with this WMA are the Olifants, Doring, Krom, Sand and Sout Rivers. A few ephemeral river systems and associated drainage lines were identified for the project area. These systems are associated with the Volstruisnesholte River catchment which is recognised by the FEPA as an upper management area in support of the downstream FEPAs (sub-catchment 5338). The catchment area is considered to be largely natural and as a result, any impacts to the systems may be severe.to.		
DECOMMISSIONING PHASE			
Objectives	The environmental objectives for soils and agricultural potential are: <ul style="list-style-type: none"> • To minimise loss of the soil resources to support existing land use and land capability; • To minimise soil erosion by wind and water; • To reduce the site’s susceptibility to erosion; • To minimise compaction of soils during site preparation activities, including soil handling, stockpiling and vehicle use; and • To prevent soil contamination due to spillage of hydrocarbons or wastes. 		
Risk sources	The following risk sources have been identified: <ul style="list-style-type: none"> • Removal of infrastructure and ripping of compacted surfaces; • Generation of demolitions wastes; and • Machinery and vehicles used for decommissioning activities. 		
Potential impacts	The potential impacts on soils and agricultural potential include: <ul style="list-style-type: none"> • The removal of infrastructure will create bare surface which will be susceptible to erosion and could lead to increased sediment transport during surface flow events ; • The very fine material in-between the fragments will be subjected to wind erosion where exposed; and • The potential for contaminating the soil due to spillage of hydrocarbons from vehicles and machinery, or improper waste management. 		
Management and mitigation actions	Actions	Responsibility	Timeframe
	<ul style="list-style-type: none"> • The majority of decommissioning activities should be undertaken during the dry season; 	Orlight SA	Project planning

SOILS AND AGRICULTURAL POTENTIAL			
	<ul style="list-style-type: none"> Minimise activities on windy days. Temporary cessation of activities could be required during very windy periods; Minimise the period of exposure of soil surfaces through planning and immediate rehabilitation; Where feasible, activities that are usually undertaken by machinery (i.e. applying fertiliser and seeding), should be replaced with manual labour; Where topsoil is compacted, the soil surface can be loosened via tillage/ripping; Traffic over project areas that have not been stripped of topsoil should be minimised; All waste products must be managed according to a waste management plan; Vehicles should be serviced and checked for leaks on a daily basis to minimise spillage of hydrocarbon contaminants during the construction phase; Spillage should be managed through an emergency spill response plan. 	<p>Contractor</p> <p>Contractor ECO</p> <p>Contractor</p> <p>Contractor</p> <p>Contractor</p> <p>Contractor</p> <p>Contractor</p> <p>Contractor</p>	<p>Construction</p> <p>Project planning Construction</p> <p>Construction</p> <p>Construction</p> <p>Construction</p> <p>Construction</p> <p>Construction</p> <p>Construction</p>
Performance indicators	<p>The performance indicators are:</p> <ul style="list-style-type: none"> No visible signs of erosion (i.e. bare patches, rills and gullies); No visible evidence of damage to storm water management infrastructure; No visible evidence of sediment transport during surface flow events; Vehicles are restricted to designated areas; Topsoil in disturbed areas have been replaced and vegetation successfully restored; Hydrocarbon storage areas and vehicle hard parks are bunded; No visible evidence of hydrocarbon spills on site; and Waste management system is in place. 		
Monitoring and evaluation	<p>The following monitoring and evaluation actions are required:</p> <ul style="list-style-type: none"> The ECO must evaluate, approve, supervise and monitor the construction activities undertaken by the contractor; An independent ECO will be responsible for auditing implementation of the EMP on a quarterly basis; and 		

SOILS AND AGRICULTURAL POTENTIAL	
	<ul style="list-style-type: none"> • During surface water flows, monitoring is required to identify potential erosional problems.

Table 6-13: Decommissioning phase implementation plan – Ecological components

ECOLOGICAL COMPONENTS	
Context	<p>In relation to CBA, the study area falls outside any CBA (BGIS, 2010). In terms of the SKEP, the study area is not a geographic priority area, but has an irreplaceability value of 0.28. The irreplaceability value of a planning unit indicates how important that planning unit is for achieving conservation targets for the biodiversity features it contains. An irreplaceability value of 0.28 translates to flexibility in terms of which sites can be chosen to achieve the conservation target.</p> <p>The vegetation community present in the drainage lines was designated as a no-go area, due to the ecological importance of the benefiting ephemeral river system. The protected plant species, <i>Hoodia gordonii</i>, was also observed in this area. For this purpose, the northern part of the study area was classified as sensitive and should be avoided.</p>
DECOMMISSIONING PHASE	
Objectives	<p>The environmental objectives for ecological components are:</p> <ul style="list-style-type: none"> • To prevent direct impacts on other areas that were delineated as highly sensitive and unsuitable for development; • To minimise the footprint of disturbance during decommissioning; • To return as many as possible naturally occurring plant species to the site during rehabilitation; • To eradicate alien invasive and weed species from the project area; and • To achieve a sustainable land surface that can support ecological diversity and natural ecological succession during rehabilitation.
Risk sources	<p>The following risk sources have been identified:</p> <ul style="list-style-type: none"> • Movement of vehicles outside the designated site into natural areas; • Creation of compacted surfaces, including roads, the vehicle hard park area and construction lay-down yard; and • Soil erosion due to surface water flows from disturbed areas; • Alien invasive species.
Potential impacts	<p>The potential impacts on ecological components include:</p> <ul style="list-style-type: none"> • Upon exposure of bare surface after demolition of infrastructure, it is likely that alien invasive and weed species will propagate on disturbed areas;

ECOLOGICAL COMPONENTS			
	and <ul style="list-style-type: none"> Alien invasive species could out-compete indigenous vegetation, due to the fact that they are vigorous growers that are adaptable and able to invade a wide range of ecological niches. 		
Management and mitigation actions	Actions	Responsibility	Timeframe
	<ul style="list-style-type: none"> No vegetation removal should be allowed outside the designated demolition footprint; An alien invasive and weed control programme should be implemented. 	ECO Contractor Contractor ECO	Decommissioning Decommissioning
Performance indicators	The performance indicators are: <ul style="list-style-type: none"> Demarcation of drainage lines and buffer zones with visible danger tape or temporary fences; No destruction of vegetation outside designated areas; Evidence of vegetation being re-established in disturbed areas; No visible evidence of alien invasive species. 		
Monitoring and evaluation	The following monitoring and evaluation actions are required: <ul style="list-style-type: none"> The ECO must evaluate, approve, supervise and monitor the activities undertaken by the contractor; An independent ECO will be responsible for auditing implementation of the EMP on a quarterly basis; Daily inspections should be undertaken by the contractor to identify area where alien invasive species could establish; and A flora survey of the project development footprint should be undertaken upon completion of rehabilitation to determine the success of rehabilitation efforts. 		

Table 6-14: Decommissioning phase implementation plan – Waste

WASTE	
Context	The demolition of the transmission lines will generate solid, liquid and non-hazardous waste. The municipal waste management site may not have the capacity to accommodate waste generated by the project and therefore, a waste management contractor would have to be employed to remove waste to a registered

WASTE			
	landfill site. The fixed structure is 100% made of galvanized steel and therefore it could be said that the 100% of the structure is recyclable.		
DECOMMISSIONING PHASE			
Objectives	The environmental objectives for waste management are to: <ul style="list-style-type: none"> • Minimise waste generation; • Avoid spillages and contamination; • Reuse, reduce and recycle, where possible; • Recover material such as glass, aluminium, as well as a variety of semiconductor materials. Recycling benefits the environment by reducing the volume of waste and helps to reduce the amount of energy required to provide raw materials and therefore the costs and environmental impacts of producing PV modules. 		
Risk sources	The following risk sources have been identified: <ul style="list-style-type: none"> • Spillage during handling of waste or damage containers; • Waste vectors (i.e. rodents and cockroaches); • Littering by construction workers. 		
Potential impacts	The potential impacts from waste generation include: <ul style="list-style-type: none"> • Surface water contamination; • Soil contamination; • Ecological degradation; • Negative visual impacts; and • Nuisance, such as bad odours. 		
Management and mitigation actions	Actions	Responsibility	Timeframe
	<ul style="list-style-type: none"> • Ensure construction waste is effectively contained, stored and managed on site; • Ensure waste bins (e.g. for organic waste) is sufficient vermin proof and weatherproof; 	Contractor Contractor	Decommissioning Decommissioning

WASTE			
	<ul style="list-style-type: none"> Ensure all rubble and waste rock are disposed of at a registered disposal sites; Implement the “reduce, reuse and recycle” approach for all waste. This means that different bins need to be put in place to separate i.e. plastic, paper, glass and cans, where feasible; Ensure all solid and hazardous waste is disposed of at a registered disposal sites; and The ablution contractor needs to ensure that no spillage occurs when the toilets are cleaned or emptied and that a licensed service provider removes the contents from site. 	Contractor Contractor Contractor Contractor	Decommissioning Decommissioning Decommissioning Decommissioning
<i>Performance indicators</i>	The performance indicators are: <ul style="list-style-type: none"> Evidence that waste is effectively contained, stored and managed on site; No littering is visible on site; Waste bins (e.g. for organic waste) has lids and is sufficient vermin proof and weatherproof; Evidence that all solid waste, including rubble and waste rock, are removed and disposed of at a registered sites; The “reduce, reuse and recycle” approach for all waste are being implemented by means of establishing separate bins for i.e. plastic, paper, glass and cans; and There is no evidence of uncontrolled spillages or waste on site. 		
<i>Monitoring and evaluation</i>	The following monitoring and evaluation actions are required: <ul style="list-style-type: none"> The ECO must evaluate, approve, supervise and monitor the construction activities undertaken by the contractor; and An independent ECO will be responsible for auditing implementation of the EMP on a quarterly basis. 		

7 CONCLUSION

This draft EMP was based on the outcomes of the BAR process that was undertaken for the proposed development of the Loeriesfontein transmission lines.

Based on the nature and extent of the proposed project and the understanding of the significance of anticipated impacts that will be experienced, the EAP is of the opinion that the predicted impacts can be mitigated to an acceptable level. The management and mitigation measures that were recommended to mitigate impacts to the environmental, socio-economic and heritage environment to an acceptable level were systematically addressed in this EMP.

The EMP should be considered a dynamic document and will require updating and the inclusion of additional environmental specifications as and when required.