

**PROPOSED TUMAS PROJECT AND  
ASSOCIATED INFRASTRUCTURE IN THE  
ERONGO REGION OF NAMIBIA**

**PROPOSED NEW POWERLINE**

**ENVIRONMENTAL MANAGEMENT PLAN**

**Prepared for: Reptile Uranium Namibia (Pty) Ltd**

**April 2023**



**Reptile Uranium Namibia (Pty) Ltd**

## DOCUMENT CONTROL

<b>Report Title</b>	EMP FOR THE PROPOSED TUMAS PROJECT AND ASSOCIATED INFRASTRUCTURE: PROPOSED NEW POWERLINE	
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<b>Project Number</b>	NSP2020RUN	
<b>Report Number</b>	5	
<b>Status</b>	<b>Final EMP for decision-making</b>	
<b>Issue Date</b>	April 2023	

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## TUMAS PROJECT: EMP FOR THE PROPOSED NEW POWERLINE

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## ACRONYMS AND ABBREVIATIONS

Below a list of acronyms and abbreviations used in this report.

<b>Acronyms / Abbreviations</b>	<b>Definition</b>
AMSL	Above Mean Sea Level
DEA	Directorate of Environmental Affairs
ECC	Environmental Clearance Certificate
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPL	Exclusive Prospecting Licence
LOM	Life of Mine
MAWLR	Ministry of Agriculture, Water and Land Reform
MEFT	Ministry of Environment, Forestry and Tourism
MME	Ministry of Mines and Energy
MMP	Management and Mitigation Plan
ML	Mining Licence
PFS	Pre-Feasibility Study
RMR	Reptile Mineral Resources and Exploration (Pty) Ltd
RUN	Reptile Uranium Namibia (Pty) Ltd

## 1 INTRODUCTION

### 1.1 BACKGROUND AND PROJECT OVERVIEW

Reptile Uranium Namibia (Pty) Ltd (RUN) plans to implement the proposed Tumas mining and processing Project. Based on the exploration results and the Pre-Feasibility Study (PFS) that was completed in 2021 for the Tumas Project, RUN plan to mine the uranium bearing ore through open-pit mining of the Tumas paleochannel and to process this material on site.

RUN submitted an application to apply to the Ministry of Mines and Energy (MME) to convert, in part, its Exclusive Prospecting Licences (EPLs) 3496 and 3497 to a Mining Licence (ML). RUN is a wholly owned subsidiary of Reptile Mineral Resources and Exploration (Pty) Ltd (RMR) who manages and conducts the exploration activities on RUN's tenements. RUN and RMR are both wholly owned subsidiaries of Deep Yellow Ltd. (Deep Yellow), an Australian listed company.

The Tumas Project area is located in the Namib Naukluft National Park (NNNP) in the Erongo Region, approximately 40 km east from Walvis Bay and can be reached via the C28 or the C14 roads (refer to Figure 1 for the regional locality map of the proposed Tumas project area).

RUN plans to develop the Tumas mining, processing and associated infrastructure on the proposed ML area; the construction of the proposed powerline; and the construction of the proposed water pipeline.

This Environmental Management Plan (EMP) covers the proposed construction of a 132 kV overhead transmission powerline (powerline project), to supply power to the Tumas mining and processing activities. The proposed powerline will be ~44 km long, following a route parallel to an existing 66 kV transmission line to the Langer Heinrich Mine. This line will commence at the Kuiseb substation, which is an existing 220/132 kV NamPower substation, and terminate at a 132/11 kV substation to be constructed at the Tumas Project site (refer to Figure 1 for the proposed route of the powerline).

This EMP documents a series of individual management plans which are designed to meet legal requirements and avoid or minimise the impacts associated with the construction and operation of the proposed new powerline.

The management plans have been compiled based on a review of the findings and recommendations of the EIA (Addendum) Report for the proposed powerline.

*NOTE: The specific requirements in this document must be read with the (overall) Tumas Project EMP, which documents the generic requirements and management and mitigation measures relevant to all Tumas Project Components (i.e. Tumas Mining / processing, water pipeline and powerline), which are not repeated in this (powerline specific) EMP.*



**FIGURE 1: REGIONAL LOCALITY OF THE TUMAS PROJECT AREA AND THE PROPOSED POWERLINE ROUTE**

## **1.2 AIM OF THE DOCUMENT**

The aim of the Environmental Management Plan (EMP) is to detail the actions required to effectively implement management and mitigation measures and design requirements. These actions are required to minimise negative impacts and enhance positive impacts associated with the proposed Powerline for the Tumas Project.

The EMP gives the environmental commitments, which will be implemented by RUN.

## **1.3 KEEPING THE EMP UP TO DATE**

It is the intention that this EMP should be seen as a “living document” which will be amended during the development stages of the powerline project (where relevant) and as new information is obtained (e.g.: environmental data, policies, authority guidelines, technologies) and the activities might change, or new ones be introduced.

RUN will conduct periodic reviews of the EMP should project circumstances change.

Should further listed activity(s) as defined in the Environmental Impact Assessment Regulations: Environmental Management Act (EMA), 2007 (Government Gazette No. 4878) be triggered (as a result of future modifications/changes to the Project), this EMP will be required to be updated through another EIA process as stipulate in the EMA and its Regulations.

## **1.4 DETAILS OF THE PERSONS WHO PREPARED THIS EMP**

Namisun (a Namibia-based, independent environmental consultancy firm) was appointed by RUN to undertake and manage the EIA process and environmental clearance applications for the Tumas Project. Namisun also compiled this EMP.

Namisun is an independent environmental consultancy firm in Namibia. Werner Petrick, the EIA Project Manager has ~twenty-three years of relevant experience in conducting/managing EIAs, compiling EMPs and implementing EMPs and Environmental Management Systems. Werner has a B. Eng (Civil) degree and a Master’s degree in environmental management. He is certified as lead environmental practitioner and reviewer under the Environmental Assessment Professionals Association of Namibia (EAPAN).

The EIA Team and relevant specialists relating to the proposed powerline are presented in section 1.4.1 of the EIA (Addendum) report for the powerline.

## 2 SCOPE OF THE EMP

The scope of the proposed powerline to the Tumas Project (i.e. proposed activities and infrastructure) to which this EMP relates is described in Section 1 of the EIA Addendum Report: Powerline (Namisun, 2022) and summarised in section 1.1 of this document.

The assessment of the potential environmental impacts of the proposed powerline is documented in section 7 of the above mentioned EIA Addendum Report.

The components of the EMP are described in the Table below.

**TABLE 1: CONTENT OF THE EMP**

EIA REGULATION REQUIREMENT	EMP REFERENCE
Details of the persons who prepared the EMP and the expertise of those persons to prepare an environmental management plan.	Section 1.4
Project overview	Section 1.1
Overall environmental objectives	Chapter 5
Information on any proposed management or mitigation measures to address the environmental impacts that have been identified in a report contemplated by these regulations, including environmental impacts or objectives in respect of – i. Planning and design ii. Construction activities iii. Operation or undertaking of the activity iv. Rehabilitation of the environment v. Closure, where relevant	Chapter 7
A description of the aspects of the activity that are covered by the EMP.	Section 4.1
An identification of the persons to be responsible for the implementation of the mitigation measures.	Section 6. Also see section 6.1 of the Tumas Project EMP
Where appropriate, time frames within which the measures contemplated in the EMP must be implemented.	Chapter 6 Also see section 7 of the Tumas Project EMP
Proposed mechanisms for monitoring compliance with the EMP and reporting on it.	Section 7



### 3 ENVIRONMENTAL LEGAL FRAMEWORK

#### 3.1 INTRODUCTION

Chapter 2 of the EIA Report for the proposed Tumas Project and Associated Infrastructure provides a detailed description of all Namibian legislation that is relevant to the proposed Tumas Project and the associated powerline.

A summary of the relevant permits required by RUN relating to the proposed powerline is provided below. Furthermore, reference is made to the Namib Naukluft National Park (NNNP) Rules as well as the Environmental Quality Objectives (EQOs) from the Strategic Environmental Assessment (SEA) ‘Uranium Rush’ (SAIEA, 2010).

#### 3.2 PERMITS AND PARK RULES

Table 2 lists all the applicable permits / authorisations required by RUN.

**TABLE 2: LIST OF PERMITS/APPROVALS REQUIRED BY RUN**

ASPECT	LEGISLATION	PERMITS / CERTIFICATES / AUTHORIZATIONS	REGULATOR
Project Implementation	Environmental Management, Act 7 of 2007.	Environmental Clearance Certificate (ECC)	Ministry of Environment, Forestry and Tourism (MEFT): Department of Environmental Affairs (DEA)
Vegetation	Forestry Act No 27 of 2004	Permit for the cutting, destruction or removal of vegetation that are classified under rare and or protected species. No living tree, bush, or shrub within 100 m from any river, stream, or water course may be removed without a permit.	Ministry of Environment, Forestry and Tourism (MEFT): Directorate of Forestry
Archaeological / Heritage / Cultural remains	National Heritage Act No 27 of 2004	Permit for removal, damaging, altering or excavation of archaeological / heritage site or cultural remains	National Heritage Council of Namibia
Labour	Labour Act, No 11 of 2007	Health and Safety of employees in the workplace	Ministry of Labour, Industrial Relations and Employment Creation

### 3.3 NNNP PARK RULES AND PARK ENTRY PERMIT

The NNNP rules need to be adhered to. The latest copy of the Park Rules will be obtained from the MEFT (Directorate Wildlife and National Parks) and followed prior to the commencement of construction activities.

All RUN employees, contractors and visitors to the powerline project area (i.e. proposed powerline to the Tumas Project) must have copies of a valid Park Entry Permit.

### 3.4 EQOs FROM THE SEA

The “SEA for the Central Namib Uranium Rush” sets out the likely cumulative impacts of mine-related developments in the NNNP, describes the ‘desired state’ that should be targeted by the various institutions and organizations involved and makes recommendations as to how this desired state can be achieved and maintained (SAIEA, 2010). The EQOs (and ‘aims’) from the SEA are presented in Table 3 below and are incorporated into the EMP, where relevant. Where applicable the EQOs will be implemented.

**TABLE 3: EQOS FROM THE SEA (2010)**

EQO	AIMS
<b>EQO 1: Socio-Economic Development</b>	Uranium mining improves Namibia and the Erongo Region’s sustainable socioeconomic development and outlook without undermining the growth potential of other sectors.
<b>EQO 2: Employment</b>	Promote local employment and employment equity.
<b>EQO 3: Infrastructure</b>	Key infrastructure is adequate and well maintained, thus enabling economic development, public convenience and safety.
<b>EQO 4: Water</b>	To ensure that the public have the same or better access to water in future as they have currently, and that the integrity of all aquifers remains consistent with the existing natural and operational conditions (baseline). This requires that both the quantity and quality of groundwater are not adversely affected by prospecting and mining activities.
<b>EQO 5: Air Quality</b>	Workers and the public do not suffer significant increased health risks as a result of exposure to dust emission from the uranium mines.
<b>EQO 6: Health</b>	Adequate health services are available to all. Workers and the public do not suffer significant increased health risks from uranium mining.
<b>EQO 7: Effect on Tourism</b>	<ul style="list-style-type: none"> <li>• The natural beauty of the desert and its sense of place are not compromised unduly by uranium mining; and to identify ways of avoiding conflicts between the tourism industry and prospecting/mining, so that both industries can coexist in the Central Namib.</li> <li>• Uranium mining does not prevent the public from visiting the usually accessible areas in the Central Namib for personal recreation and</li> </ul>

	<p>enjoyment; and to identify ways of avoiding conflicts between the need for public access and mining.</p>
<p><b>EQO 8: Ecological Integrity</b></p>	<p>The ecological integrity and diversity of fauna and flora of the Central Namib is not compromised by uranium mining. Integrity in this case means that ecological processes are maintained, key habitats are protected, rare and endangered and endemic species are not threatened. All efforts are taken to avoid impacts to the Namib and where this is not possible, disturbed areas are rehabilitated and restored to function after mining/development.</p>
<p><b>EQO 9: Education</b></p>	<p>In the Erongo Learning Region, people continue to have affordable and improved access to basic, secondary and tertiary education, which enables them to develop and improve skills and take advantage of economic opportunities.</p>
<p><b>EQO 10: Governance</b></p>	<p>Regulators and industry protect Namibia's reputation as a responsible uranium producer by means of ethical conduct and environmentally, socially and financially responsible practices.</p>
<p><b>EQO 11: Heritage</b></p>	<p>Uranium exploration and mining and related infrastructure developments will have the least possible negative impact on archaeological and paleontological heritage resources. Survey, assessment and mitigation will result in significant advances in knowledge of archaeological and paleontological heritage resources, so that their conservation status is improved and their use in research, education and tourism is placed on secure and sustainable footing.</p>
<p><b>EQO 12: Mine Closure and Future land-use</b></p>	<p>To maximize the sustainable contribution mines can make post closure to society and the region, and to minimize the social, economic and biophysical impacts of mine closure.</p>

## 4 ENVIRONMENTAL MANAGEMENT SYSTEM (ASPECTS AND IMPACTS)

RUN will introduce the development and implementation of an environmental management system (EMS) during the implementation of the proposed Tumas Project and associated activities and infrastructure. The use of the EMS will ensure that the environmental management requirements on the activities of the Project are not only properly planned for, but a robust mechanism for implementation is also ensured and, most importantly, that the environmental management function is always reviewed in line with continual improvement.

This EMP will be a component of the EMS and all the associated procedures, work instructions, etc. will be developed taking cognizance of the relevant commitments in this EMP.

As part of the EMS development, RUN and the relevant contractors will roll out the Management and Mitigation Plans (MMPs) in this EMP and develop detailed work instruction / procedures to ensure the objectives provided in this EMP are achieved and commitments are implemented. Responsibilities and target dates for implementing relevant commitments will therefore be included in revised EMPs and the work instructions / procedures and other relevant documents.

### 4.1 ENVIRONMENTAL ASPECTS AND IMPACTS

Understanding the biophysical and human environment in which the proposed project is located, is the first step to understanding the relevant impacts. Chapter 6 of the EIA Addendum Report for the proposed powerline describes the existing biophysical and social environment that could potentially be affected by the proposed powerline, using currently available information.

The next and possibly more important step is to identify the environmental aspects that give rise to the impacts. All these aspects have the potential to cause impacts on the environment (or third parties).. Successful management will be gauged by how well RUN avoids, minimises or mitigates all the impacts associated with each environmental aspect.

Potential environmental impacts were identified by Namisun in consultation with I&APs, regulatory authorities, specialist consultants and RUN during the Scoping phase of the EIA. The key potential impacts identified, are assessed in the EIA Addendum Report for the proposed powerline (see chapter 7).

Table 4 provides a summary of the key potential cumulative impacts associated with the proposed powerline project, as assessed in the above-mentioned EIA Addendum Report. Relevant management and mitigation measures, to address these potential impacts, as well as other general aspects, are presented in the MMPs in Chapter 7.

**TABLE 4: SUMMARY OF KEY POTENTIAL CUMULATIVE IMPACTS ASSOCIATED WITH THE PROPOSED TUMAS POWERLINE PROJECT**

Section	Potential impact	Significance of the impact	
		Unmitigated	Mitigated
<b>Biodiversity</b>	Potential loss or disturbance of biodiversity composition and habitat destruction	<b>M-H</b>	<b>L-M</b>
	Potential loss or disturbance of fauna (including avifauna) and flora	<b>H</b>	<b>L-M</b>
	Collision of birds with the overhead powerline and electrocution of birds	<b>H</b>	<b>L-M</b>
<b>Soils and land capability</b>	Loss of soil resources through physical disturbance and from pollution	<b>M-H</b>	<b>L</b>
<b>Archaeology</b>	Disturbance or destruction to archaeological sites and their landscape setting	<b>H</b>	<b>M</b>
<b>Visual impacts</b>	Visual impact (and sense of place) from sensitive views within the Namib Naukluft National Park.	<b>M</b>	<b>M</b>
<b>Surface water and ground water</b>	Pollution of surface water and groundwater.	<b>M</b>	<b>L</b>
<b>Air quality and noise</b>	Air pollution and noise pollution	<b>L</b>	<b>L</b>

## 5 OVERALL ENVIRONMENTAL OBJECTIVES FOR THE EMP

The following overall environmental objectives have been set for the activities associated with the proposed powerline, to be implemented by RUN:

- To comply with national legislation and standards for the protection of the environment.
- To limit potential impacts on biodiversity through the minimisation of the footprint of activities associated with the construction of the powerline and the conservation of residual habitat as far as possible.
- To keep key stakeholders informed about the project's activities, where relevant.
- To limit contamination of the environment through the containment, recycling or removal of contaminated water.
- To protect soils and water resources through the implementation of measures for spill prevention and clean-up.
- To ensure the legal and appropriate management and disposal of general and hazardous waste, through the implementation of a strategy for the minimisation, recycling (where possible), management, temporary storage and removal of waste.
- To protect heritage resources by thorough documentation and obtaining the necessary approvals if disturbance of heritage areas is required.
- To undertake rehabilitation after the completion of the various activities relating to the construction of the powerline.
- To support and encourage environmental awareness (and where relevant training) and responsibility amongst all employees and service providers.
- To prevent pollution and clean up if environmental incidents occur.
- To incorporate the relevant requirements stipulated in this EMP into the programme of activities, design and contracts.
- To develop, implement and manage monitoring systems to ensure good environmental performance and reporting.
- To ensure that all the employees and contractors adhere to the relevant management commitments.
- Ensure compliance to the EMP and other relevant conditions or approvals (ECC and other relevant permits and Park Rules).

## **6 GENERAL MANAGEMENT AND MITIGATION REQUIREMENTS – RELEVANT TO ALL TUMAS PROJECT COMPONENTS (I.E. TUMAS MINING / PROCESSING, WATER PIPELINE AND POWERLINE)**

The generic requirements for construction and operation, relevant to all Tumas Project components, including the proposed powerline, are documented in the Tumas Project EMP. These general management and mitigation requirements, which will not be repeated in this EMP, relate to the following:

- Parties responsible for the implementation of the EMP (section 6.2 of the Tumas Project EMP).
- Auditing Compliance of the EMP, which include internal audits and inspections as well as external environmental performance assessments (section 6.4 of the Tumas Project EMP).
- Reporting and submission of Information (section 6.5 of the Tumas Project EMP).
- Stakeholder Consultation / Communication (section 6.7 of the Tumas Project EMP).
- Environmental Training and Awareness (section 6.6 of the Tumas Project EMP).
- Emergency Preparedness and Response (section 6.3 of the Tumas Project EMP).
- General MMPs – relevant to all Project components:
  - Waste management MMP (section 6.9 of the Tumas Project EMP).
  - Handling, storage and disposal of hazardous substances, including hydrocarbon management and spills (sections 6.9 and 6.10 of the Tumas Project EMP).
  - Third party safety and security MMP (section 6.8 of the Tumas Project EMP).
  - Socio-economic MMP (section 7.10 of the Tumas Project EMP).

The specific requirements (section 7) in this document must therefore be implemented together with the above mentioned sections of the overall EMP for the Tumas Project.

If approved by MEFT, the ECC for the powerline might in future be transferred to NamPower. If this ECC transfer happens in future, the operations phase management requirements will then also be transferred to NamPower which would require an update of the EMP relating to the responsible parties.

## 7 MANAGEMENT AND MITIGATION PLANS SPECIFIC TO THE PROPOSED POWERLINE

The MMPs listed in the table below are specific to the proposed powerline for the Tumas Project. The MMPs follow in the subsequent sections.

**TABLE 5: VARIOUS MPS AND NUMBERS**

Number	Management and Mitigation Plan
7.1	Biodiversity MMP
7.2	Visual MMP
7.3	Archaeology MMP
7.4	Soil and Land Capability MMP
7.5	Surface Water and Groundwater MMP
7.6	Air Quality and Noise MMP



## 7.1 BIODIVERSITY MMP

### **Objectives**

The objective is to prevent, as far as is possible, the unacceptable loss of biodiversity (and topsoil) and related functionality.

### **Actions required**

#### Issue 1: Potential loss or disturbance of biodiversity composition and habitat destruction:

- Control the movement of all vehicles and plant machinery so that they remain on designated/demarcated routes. Only if absolutely necessary will new routes (temporary or permanent) be allowed. This should be planned in consultation with the Environmental Manager or equivalent. Temporary roads should be rehabilitated soon after their purpose has expired.
- In this regard, use the existing NamPower service road, within the existing 66 kV servitude as the road from where access points to the new poles will be made. Clear the minimum number of tracks.
- Use the new site access road to the mine as the service road for constructing the section of the powerline between the C28 Road and the proposed Tumas substation.
- Minimise disturbance in the sensitive lichen field areas. If areas with lichens are directly affected, implement special rehabilitation methods such as salvaging lichens and biotic crust and re-applying these on rehabilitated areas.
- Limit power line infrastructure, activities and related disturbance as far as possible.
- Monopoles should not be mounted in drainage lines or Tumas River, where possible.
- Enforce construction site speed limits.
- Dispose of waste materials in an appropriate manner;
- Minimise ground disturbance.
- Protect environmentally sensitive areas.
- Enhance dust control measures near the marble ridge area.
- Avoid marble ridge for position of infrastructure.
- Look for protected flora species in areas ear-marked for position of infrastructure:
  - Avoid clearing protected flora species.
  - If some cannot be avoided, transplant if possible and monitor survival.
    - The location and rescue of endemic and/or protected plants, and their transfer to a specified location shall be conducted by a suitably qualified Botanist/Ecologist.
    - Where possible direct transplantation of rescued plant material, into areas earmarked and prepared for revegetation. Transplantation shall only occur in areas of similar habitat and soil type from which rescued plant material originates.
- Recreate habitats that are favourable to unique species should these have been damaged and/or destroyed during the construction.

- During the detail design phase, confirm / identify the final powerline route – along the existing 66 kV corridor and avoid important habitats/areas/features.
- Topsoil management:
  - Strip, conserve and replace topsoil from areas to be disturbed during construction.
  - Compaction of the topsoil being replaced should be similar to that of the surrounding area in order to promote vegetation re-establishment.
  - Rehabilitate disturbed areas immediately after construction activities has been completed at the specific site (i.e. progressive rehabilitation) and re-instate the topsoil.

Issue 2: Potential loss or disturbance of fauna (including avifauna) and flora:

- See actions required under issue 1 above.
- Enforce site speed limits.
- Adhere to NNNP rules and regulations.
- Ensure all relevant rules and regulations are communicated to workers and visitors.
- Enforce no hunting and no collecting policies (e.g. egg and bird collection). The harming, maiming, hunting or poaching of wildlife in any form or manner shall be prohibited.
- The killing of perceived dangerous vertebrate fauna – e.g. snakes and carnivores – should be prohibited.
- Regularly inspect areas adjacent to operations for signs of litter, wood collection and hunting.
- Only allow construction personnel and registered visitors on site.
- Open holes could act as pitfall traps and should not be left open overnight and/or covered.
- Off road driving should be prohibited throughout the area.
- Remove and relocate slow moving species, especially reptiles (e.g. Namaqua chameleon).
- Avoid sensitive habitats i.e. lapped-faced vulture nest sites.
- Avoid felling habitat trees (especially trees with nests; known perching sites – e.g. large and/or dead trees).
- Rehabilitate all areas disturbed by the construction activities – i.e. laydown areas, etc.
- If protected plant species cannot be avoided, transplant into suitable habitat and monitor survival.
- Avoid disturbing birds, especially raptors, at breeding sites.
- No pesticides may be used for powerline maintenance.
- Implement a contractor code of conduct.

Issue 3: Collision of birds with the overhead powerline and electrocution of birds

- During the detail design phase, confirm / identify the final powerline route – along the existing 66 kV corridor.
- Where the proposed new transmission line deviates south-eastwards (i.e. along the proposed new service corridor from the C28 to the Tumas sub-station):
  - Install bird flight diverters (BFDs) (e.g. coils and/or flappers placed 50m apart);

- Tower design (132kV) - The grounded component on top of the 132 kV monopoles (i.e. phase-earth electrocution risk) should avoid mortalities; and
- Install BFDs at the following important habitats along the route between the Kuiseb substation and the service corridor to the Tumas Process Plant:
  - Drainage line at 7.9 – 8.1 km
  - Drainage line 23.3 and 27.2 km.
  - Section passing the existing lapped-faced vulture nest.
- Ensure that line span lengths are decreased where possible, especially where the line crosses deep drainage lines, in order to increase the visibility of the line.

### **Monitoring requirements**

- Monitor numbers of indicator species (e.g. Gray's Lark, Ruppell's Korhaan) before, during and after the power line construction activities.
- Prior to the construction of the proposed new 132 kV powerline the entire length of the existing 66 kV power line, as well as other similar 132 kV transmission line(s) in the area, will be monitored for any signs of bird strike, paying attention to night flying species such as flamingo, on a three month interval for a year. The results of this monitoring shall be used to inform the type of bird diversion mitigation that is required to be installed on the section of the new powerline between the Kuiseb sub-station and the C28. Install BFDs on the proposed new 132 kV line, along those specific sections similar to the existing BFDs along the 66 kV line.
- Following the commissioning of the new powerline a bird (mortality) monitoring programme will be implemented to monitor the effectiveness of the mitigation measures agreed above and the results will be used to inform the need for any improved bird diversion mitigation measures as a result of any significant bird mortality trends identified.
- Carry out dedicated monitoring patrols along the entire power line route on a regular basis during operations.
- Record bird mortalities on a standardised form.
- Monitor rehabilitation of disturbed areas during construction in accordance with the restoration plan to ensure long term success. Monitor the survival of transplanted plants.
- Commission research into the restoration of lichen fields (where disturbance was unavoidable) and monitor recovery.
- Possible use of fixed point photographic monitoring of strategic locations along the route before, during and after construction to record and assess habitat change.
- Initiate a bird/mammal mortality monitoring protocol associated with the powerline and substation.

## 7.2 VISUAL MMP

### **Objectives**

The objective is to prevent, as far as is possible, the change to the visual landscape as a result of the project for receptors in the area.

### **Actions required**

#### Issue: Impact relating to visual (sense of place)

- The minimum amount of existing vegetation and topsoil should be removed from construction areas.
- Dust suppression techniques should be in place during the construction phase when required.
- The proposed pylons should run immediately adjacent the existing power line.
- On-going management of rehabilitated areas until they are properly established.
- All site establishment components (as well as equipment) shall be positioned to limit visual intrusion on users of the area and the size of area disturbed.

### **Monitoring requirements**

- Carry out visual inspections of the above mentioned requirements. The inspections (and compliance audits) shall be carried out according to the requirements specified in section 6.4 of the Tumas Project EMP.

### 7.3 ARCHAEOLOGY MMP

#### **Objectives**

The objective of the measures is to prevent the unacceptable loss of archaeological sites and related historical information.

#### **Actions required**

##### Issue: Damage to archaeological sites and landscapes from the proposed power line project

- In the case of the six sites associated with the section of the powerline along the proposed service corridor re-route the alignment (where required) to prevent direct impacts.
- The proposed new power supply and powerline from Kuiseb to the C28 should be confined to the existing corridor as far as possible.
- Design and construct the powerline infrastructure to avoid the two archaeological sites along the section of the powerline between the Kuiseb substation and the service corridor (i.e. isolated artefact debris scatter and a section of the 19<sup>th</sup> century wagon track).
- Demarcate archaeological sites along the powerline route, avoid placing of monopole structures (and associated infrastructure and activities) at these sites.
- The project footprint should be kept as small as possible.
- All workers (temporary and permanent) to be educated about the importance of preserving archaeological sites.

#### **Chance Finds**

- If there are any chance finds of archaeological sites that have not been identified and described in the specialist report a chance find procedure shall be followed. The key component of which is to ensure that the site remains undisturbed until a specialist has assessed the site, assessed the potential damage, advised on the necessary management steps, and advised on the requirements for authority consultation and permitting.

## 7.4 SOIL AND LAND CAPABILITY MMP

### **Objectives**

The physical loss of soils and/or the loss of soil functionality are important issues because as an ecological driver, soil is the medium in which most vegetation grows and a significant range of vertebrates and invertebrates exist. The objectives of the management measures is to prevent pollution of soils and to prevent the loss of soils and related functionality through physical disturbance, erosion and compaction.

### **Actions required**

#### **Issue: Loss of soil resources through physical disturbance and from pollution**

- Pollution prevention through basic infrastructure design and through education and training of workers (permanent and temporary).
- The required steps to enable fast reaction to contain and remediate pollution incidents.
- Polluted soil and building rubble must be transported away from the site to an approved and appropriately classified waste disposal site.
- Specifications for post rehabilitation audit criteria (i.e. after the completion of the construction phase) to ascertain whether the remediation has been successful.
- Topsoil of large disturbed areas should be stockpiled and preserved as a seedbank.
- Limit the disturbance of soils to what is absolutely necessary both in terms of site clearing and in terms of project development and use of vehicles.
- Refer to section 7.1 for further measures relating to topsoil management.

### **Monitoring requirements**

- Monitor success of the rehabilitation of disturbed areas.
- Commission research into the restoration of lichen fields (where disturbance was unavoidable) and monitor recovery.

## 7.5 SURFACE WATER AND GROUNDWATER MMP

### **Objectives**

The objective of the management measures is to prevent pollution of surface water run-off and groundwater

### **Actions required**

Issue: Pollution of surface water and groundwater

- Refer to the waste management MMP (section 6.9 of the Tumas Project EMP).
- Refer to the MMPs relating to the handling, storage and disposal of hazardous substances, including hydrocarbon management and spills (sections 6.9 and 6.10 of the Tumas Project EMP).
- No littering.
- Ensure proper maintenance of all vehicles and equipment and conduct continuous maintenance and check-ups.
- Develop and implement an Emergency Preparedness and Responses Plan / Procedure for all operational related spillages.
- Washing equipment are not allowed on site.
- 'Best' practice measures should be applied to minimise the potential discharge of pollutants onto open soil especially near draining lines / Tumas River.

### **Monitoring requirements**

- Carry out visual inspections of the above mentioned requirements. The inspections (and compliance audits) shall be carried out according to the requirements specified in section 6.4 of the Tumas Project EMP.

## 7.6 AIR QUALITY AND NOISE MMP

### **Objectives**

The objectives of these measures are to prevent unacceptable air quality related pollution impacts and to limit excessive noise pollution.

### **Actions**

#### **Issue: Air pollution and noise pollution**

- Dust suppression techniques in place during the construction and operational phases when required.
- All registered complaints (regarding noise) will be documented, investigated and efforts made to address the area of concern where possible.
- Ensure that vehicles and equipment are well-maintained and fitted with the correct noise abatement measures.
- No amplified music allowed on site.
- The contractor shall not use sound amplification equipment on site unless in emergency situations.
- Limit construction times to daylight hours
- Enforce speed limits for vehicles on unpaved roads and minimise of haul distances. The speed limit for light vehicles is 30 km/h and for heavy vehicles 20 km/h.
- Ensure that material loads (that could cause dust) are properly covered during transportation.
- Minimise areas disturbed during construction at any one time and protection of exposed soil against wind erosion.
- Implement a reporting mechanism and action plan in case of excessive wind and dust conditions.

### **Monitoring requirements**

- Carry out visual inspections of the above mentioned requirements. Visual inspections of dust generating activities during the construction phase need to be implemented. The inspections (and compliance audits) shall be carried out according to the requirements specified in section 6.4 of the Tumas Project EMP.