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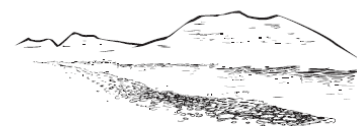
ECC-94-214-REP-04-D

## ENVIRONMENTAL SCOPING REPORT PLUS ASSESSMENT

EXPLORATION ACTIVITIES ON EPL 6155 FOR PRECIOUS STONES.

//KARAS REGION

PREPARED FOR



**GRIEP**  
DIAMONDS

P.O. BOX 35 KEETMANSHOOP NAMIBIA

AUGUST 2019

## TITLE AND APPROVAL PAGE

<b>Project Name:</b>	Exploration Activities on EPL 6155 for Precious Stones //Karas Region
<b>Project Number</b>	ECC-94-214-REP-04-D
<b>Client Name:</b>	Gariep Diamonds
<b>Ministry Reference:</b>	NA
<b>Status of Report:</b>	Final for Submission
<b>Date of issue:</b>	August 2019
<b>Review Period</b>	NA

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## EXECUTIVE SUMMARY

Gariep Diamonds (refer to herein as the proponent) propose to undertake exploration activities on Exclusive Prospecting Licence (EPL) 6155 for precious stones in the //Karas Region. The proposed project triggers listed activities in terms of the Environmental Management Act 7 of 2007, therefore, an environmental clearance certificate is required. As part of the environmental clearance certificate application, an environmental impact assessment has been undertaken to satisfy the requirements of the Environmental Management Act, 2007. This environmental scoping report and environmental management plan (EMP) shall be submitted as part of the application for the environmental clearance.

Additionally, the Namibia's National policy on Prospecting and Mining in Protected Areas of 2018, has been passed to promote sustainable development by guiding prospecting and mining in the country's protected areas whilst ensuring sustainable exploration and mining, conserving biodiversity and maintaining healthy ecosystems. Although it is recognised that EPL 6155 is located within a National Park, the EPL predates the implementation and development of the National Policy on Prospecting and Mining in Protected Areas. Therefore, measures shall be taken by the proponent to avoid irreparable damage to the environment.

The proposed project will include various types of exploration methods within EPL 6155, which may include mechanical digging of trenches and pits to bedrock. Small equipment such as Tractor-Loader-Backhoe (TLB), a small tipper, one pan with conveyor, jig and generator will be used to recover samples and separate gravel. Water for the exploration activities will be abstracted from the Orange River. If exploration is successful, and a mineral resource can be defined, with commercially viable mineral concentrations, exploration operations can potentially transcend into mining operations that would be assessed at a detailed level.

EPL 6155 is located in the /Ai-/Ais-Richtersveld Transfrontier Park (ARTFP) and is classified as Zone 2, *Areas of Medium Sensitivity*. Some areas of the /Ai-/Ais-Richtersveld Transfrontier Park are excluded from prospecting and mining activities. These areas include but not limited to the Fish River Mouth, existing Ai-/Ais and Hobas tourist camp, and many other areas closed to the Canyon. This is to avoid irreparable damage that may affect rare and endemic species and the current and future prospects of tourism.

This environmental impact assessment (EIA) has been undertaken in terms of the requirements of the Environmental Management Act 7 of 2007 and the Environmental Impact Assessment Regulation, 2007 (No. 30 of 2011) gazetted under the Environmental Management Act, 2007 (referred to herein as the EIA Regulations). The EIA was undertaken using a methodology developed by Environmental Compliance Consultancy, which is based on the International Finance Corporation (IFC) standard for environment and social impact assessments. Through the scoping process, a review of the site and surrounding environment was completed by undertaking desktop reviews and site verification.

The impacts of exploration activities with respect to airborne dust are expected to be limited to vehicular movements. There will be some release of exhaust fumes from machinery that will impact the immediate vicinity but will be of short duration. Additionally, there will be associated machinery noise, which could be a disturbance to neighbours although unlikely due to the location of the EPL, neighbours are limited to other mining and exploration activities, this will be of short duration.

This assessment has assessed, potential, likely and identified impacts, through the process it was determined that the likely effects were not deemed significant due to the magnitude of change from the baseline environment, the short duration of potential impacts and the reversibility of effects. On this basis, it is the opinion of ECC that an environmental clearance certificate could be issued, on conditions that the management and mitigation measures specified in the EMP are implemented and adhered to.

**TABLE OF CONTENTS**

<b>1</b>	<b>INTRODUCTION .....</b>	<b>8</b>
1.1	PURPOSE OF THE REPORT .....	8
1.2	BACKGROUND TO THE PROPOSED PROJECT.....	8
1.3	THE PROPONENT OF THE PROPOSED PROJECT.....	10
1.4	ENVIRONMENTAL CONSULTANCY .....	10
1.5	ENVIRONMENTAL REQUIREMENTS .....	10
1.6	REPORT STRUCTURE .....	11
<b>2</b>	<b>REGULATORY FRAMEWORK .....</b>	<b>12</b>
2.1	NATIONAL REGULATORY REGIME.....	12
2.2	MINERALS POLICY .....	15
2.3	NATIONAL POLICY ON THE PROSPECTING AND MINING IN PROTECTED AREAS .....	15
2.4	PERMITS AND LICENCES.....	16
2.4.1	Exclusive prospecting licence .....	16
<b>3</b>	<b>METHODOLOGY APPROACH TO THE EIA .....</b>	<b>17</b>
3.1	PURPOSE OF THE ENVIRONMENTAL IMPACT ASSESSMENT .....	17
3.2	THE ASSESSMENT PROCESS.....	17
3.3	METHODOLOGY FOR THE IMPACT ASSESSMENTS.....	19
3.3.1	Screening of the proposed project.....	19
3.3.2	Scoping of the environmental assessment.....	19
3.3.3	Baseline studies .....	19
3.3.4	Impact predication and evaluation.....	19
3.4	EIA DETERMINATION OF SIGNIFICANCE.....	19
3.5	EIA CONSULTATION.....	23
3.5.1	Newspaper advertisements.....	23
3.5.2	Site notices .....	23
3.5.3	Non-technical summary .....	23
3.5.4	Consultation feedback.....	23
<b>4</b>	<b>PROJECT DESCRIPTION.....</b>	<b>24</b>
4.1	NEED FOR THE PROPOSED PROJECT.....	24
4.2	ALTERNATIVES CONSIDERED.....	24
4.2.1	No-go alternative.....	24

4.3	PROPOSED EXPLORATION ACTIVITIES.....	25
4.3.1	Exploration schedule .....	25
4.3.2	Workers and accommodation .....	25
4.3.3	Resource use and waste management.....	27
4.3.4	Site Rehabilitation .....	27
<b>5</b>	<b>ENVIRONMENT AND SOCIAL BASELINE .....</b>	<b>28</b>
5.1	INTRODUCTION .....	28
5.2	SITE AND SURROUNDING ENVIRONMENT .....	28
5.2.1	/Ai-/ais-richtersveld transfrontier park .....	28
5.3	CLIMATE.....	30
5.4	FLORA AND FAUNA.....	31
5.5	HERITAGE .....	31
5.6	SOILS AND GEOLOGY.....	31
5.7	HYDROLOGY.....	33
5.8	LAND USE AND INFRASTRUCTURE .....	33
5.8.1	Protected areas excluded from prospecting and mining .....	34
5.9	SOCIO-ECONOMIC.....	35
5.9.1	Governance.....	35
5.9.2	Demographic profile.....	35
5.9.3	HIV/aids in Namibia .....	35
5.9.4	Employment .....	35
5.9.5	Economic activities .....	35
5.9.6	Noise impacts .....	36
5.9.7	Air quality.....	36
<b>6</b>	<b>ENVIRONMENTAL ASSESSMENT FINDINGS AND MITIGATION.....</b>	<b>37</b>
6.1	SCOPING ASSESSMENT FINDINGS.....	37
6.2	LIMITATIONS, UNCERTAINTIES AND ASSUMPTION .....	38
<b>7</b>	<b>ENVIRONMENTAL MANAGEMENT PLAN .....</b>	<b>46</b>
<b>8</b>	<b>CONCLUSION .....</b>	<b>47</b>
	<b>REFERENCES.....</b>	<b>48</b>
	<b>APPENDIX A_ ENVIRONMENTAL MANAGEMENT PLAN.....</b>	<b>49</b>
	<b>APPENDIX B - NON-TECHNICAL SUMMARY .....</b>	<b>50</b>

<b>APPENDIX C - EVIDENCE OF PUBLIC CONSULTATION AND REGISTERED POSTS.....</b>	<b>57</b>
<b>APPENDIX D - SITE NOTICE AND ADVERTS.....</b>	<b>58</b>
<b>APPENDIX E -ECC CVS .....</b>	<b>61</b>
<b>APPENDIX F - LIST OF PLANT SPECIES ON EPL 6155 .....</b>	<b>66</b>

**TABLES**

TABLE 1 - PROPONENT DETAILS .....	10
TABLE 2 – ENVIRONMENTAL SCOPING REPORT SECTIONS .....	11
TABLE 3 - LEGAL COMPLIANCE .....	12
TABLE 4 – PERMIT AND LICENCES REQUIRED FOR EPL 6155 .....	16
TABLE 5 - SENSITIVITY AND VALUE OF RECEPTOR.....	20
TABLE 6 - NATURE OF IMPACT .....	20
TABLE 7- MAGNITUDE OF CHANGE .....	21
TABLE 8 – LEVEL OF CERTAINTY.....	21
TABLE 9 - GUIDE TO SIGNIFICANCE RATINGS .....	22
TABLE 10– SIGNIFICANCE DESCRIPTION.....	22
TABLE 11 - SUMMARY OF LIMITATION, UNCERTAINTIES AND ASSUMPTION OF THE EIA PROCESS .....	38
TABLE 12 – SCOPING ASSESSMENT FINDINGS .....	39

**FIGURES**

FIGURE 1 - LOCALITY MAP OF EPL 6155 .....	9
FIGURE 2 – EIA PROCESS.....	18
FIGURE 3 – PROPOSED ACCOMMODATION FACILITIES .....	26
FIGURE 7 - LANDSCAPE OF THE PROPOSED SITE.....	29
FIGURE 8 - OLD VEHICLE TRACK .....	29
FIGURE 9 - RIVERINE AROUND THE EPL 6155.....	29
FIGURE 4 - PREVALENT WIND DIRECTION IN SURROUNDING AREA OF THE EPL 6155.....	30
FIGURE 5 – ILLUSTRATION OF THE GEOLOGY ON EPL 6155 .....	32
FIGURE 6 - WATER RESOURCES INFRASTRUCTURE ON EPL 6155 .....	33
FIGURE 10 - MANAGEMENT AREAS FOR THE /AI-/AIS/RICHTERSVELD TRANSFRONTIER PARK .....	34
FIGURE 11 - SENSITIVE RECEPTORS TO NOISE AND AIR QUALITY .....	36

## DEFINITIONS AND ABBREVIATIONS

ARTFP	/Ai-/Ais-Richtersveld Transfrontier Park
DEA	Directorate of Environmental Affairs
DWNP	The Directorate of Wildlife and National Parks
ECC	Environmental Compliance Consultancy
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPL	Exclusive Prospecting Licence
ESIA	Environmental and Social Impact Assessment
GDP	Gross Domestic Product
I&AP	Interested and affected parties
IFC	International Finance Cooperation
MET	Ministry of Environment and Tourism
MME	Ministry of Mines and Energy
MPMRAC	Minerals (Prospecting and Mining Rights) Committee
NamWater	Namibia Water Corporation
NDP5	National Development Plan 5
TFCA	Transfrontier Conservation Area
TLB	Tractor-Loader-Backhoe

# 1 INTRODUCTION

## 1.1 PURPOSE OF THE REPORT

The purpose of this report is to present the findings of the environmental impact assessment (EIA) for the proposed project. This EIA has been undertaken in terms of the requirements of the Environmental Management Act 7 of 2007 and the Environmental Impact Assessment Regulation, 2007 (No. 30 of 2011) gazetted under the Environmental Management Act, 2007 (referred to herein as the EIA Regulations). This Scoping Report and appendices will be submitted to the Ministry of Mines and Energy (MME) and the Directorate of Environmental Affairs (DEA) at the Ministry of Environment and Tourism (MET) for review as part of the application for an environmental clearance certificate.

This report has been prepared by Environmental Compliance Consultancy (ECC). ECC's terms of reference for the assessment is strictly to address potential effects, whether positive or negative and their relative significance, explore alternatives for technical recommendations and identify appropriate mitigation measures.

This report provides information to authorities, the public and stakeholders to aid in the decision-making process for the proposed project. The objectives are to:

- Provide a description of the proposed activity and the site on which the activity is to be undertaken, and the location of the activity on the site
- Provide a description of the environment that may be affected by the activity
- Identify the laws and guidelines that have been considered in the assessment and preparation of this report
- Provide details of the public consultation process
- Describe the need and desirability of the activity
- Provide a high-level environmental and social impact assessment on feasible alternatives that were considered, and
- Report the assessment findings, identifying the significance of effects.

An Environmental Management Plan (EMP) (Appendix A) has been developed to mitigate and manage potential impacts identified during the environmental assessment process. An EMP provides the management framework for planning and implementation of exploration activities. It provides operational standards and operating arrangements to ensure that the potential impacts of exploration activities are mitigated, prevented and minimised as far as reasonably practicable, furthermore the EMP ensures that statutory requirements and legal obligations are fulfilled.

## 1.2 BACKGROUND TO THE PROPOSED PROJECT

Gariep Diamonds propose to undertake mineral exploration activities on Exclusive Prospecting Licence (EPL) 6155 for Precious Stones in //Karas Region (referred to as the proposed project from herein). EPL 6155 is located in the /Ai-/Ais-Richtersveld Transfrontier Park (ARTFP) and stretches across the Orange River, into South African boundaries. The Namibia Water Corporation (NamWater) plant is located within the EPL site. The EPL boundaries are approximately 16.27 km south-east of Rosh as illustrated in FIGURE 1.



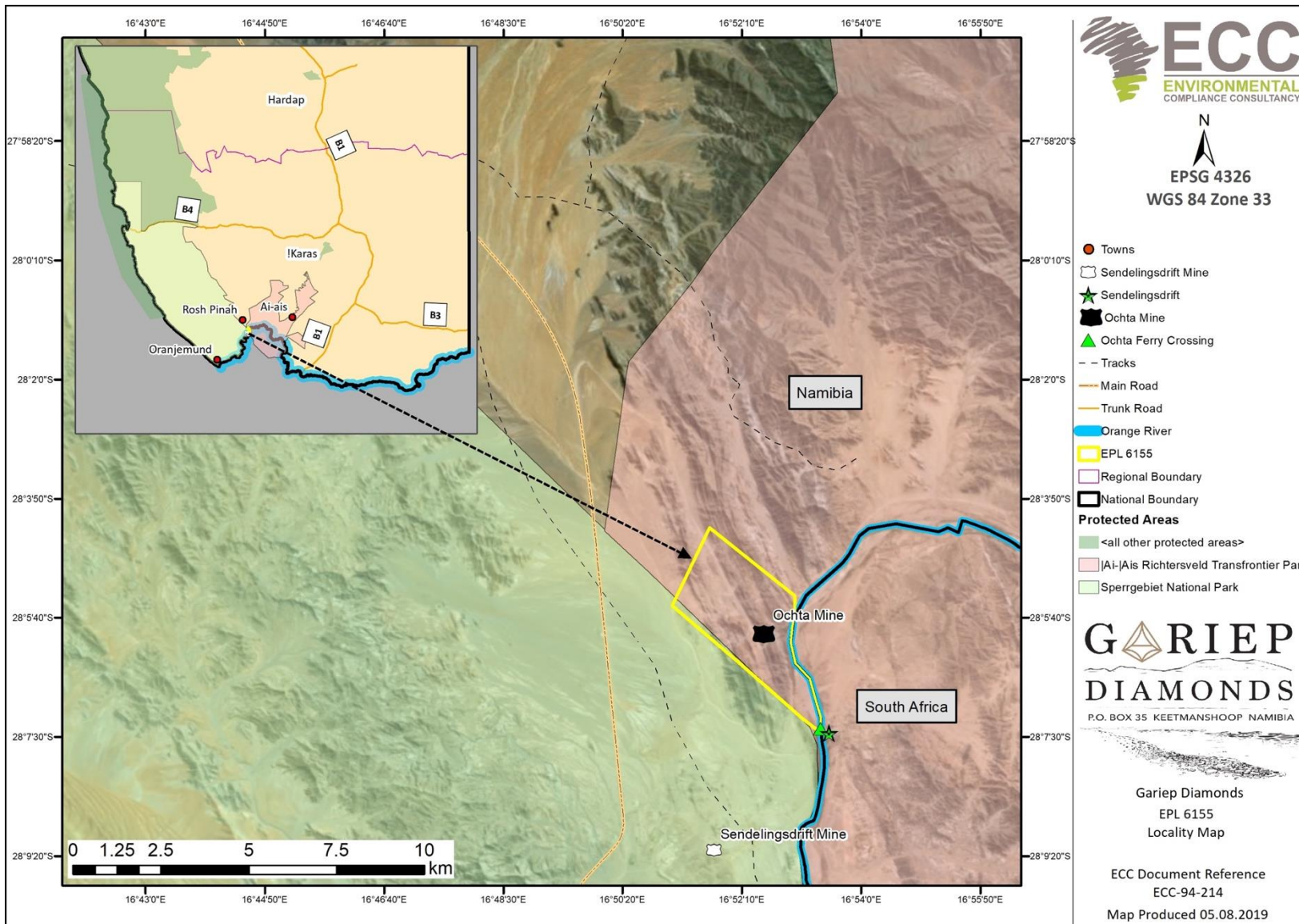


FIGURE 1 - LOCALITY MAP OF EPL 6155

### 1.3 ENVIRONMENTAL REQUIREMENTS

The Environmental Management Act, 2007 stipulates that an Environmental Clearance Certificate is required to undertake listed activities in terms of the Act and its regulations. As such an environmental impact assessment (EIA) of the proposed project is required, and subsequent assessment report (this document) submitted as part of the Environmental Clearance Certificate application. Listed activities triggered by the proposed project in terms of the Environmental Management Act, 2007 and its supporting regulations are as follows.

#### MINING AND QUARRYING ACTIVITIES

(3.1) The construction of facilities for any process or activities which requires a licence, right or other form of authorisation, and the renewal of a licence, right or other form of authorisation, in terms of the Minerals (Prospecting and Mining) Act, 1992

- ✓ The proposed project requires a licence for extraction of precious stones

(3.2) Other forms of mining or extraction of any natural resources whether regulated by law or not

- ✓ Minerals (soil and sand), precious stones will be sampled from within the EPL 6155

(3.3) Resource extraction, manipulation, conservation and related activities

- ✓ The proposed project will extract precious stones

#### WATER RESOURCE DEVELOPMENT

(8.1) The abstraction of ground or surface water for industrial or commercial purposes

- ✓ Surface water will be abstracted from the Orange River

(8.3) Any water abstraction from a river that forms an international boundary

- ✓ Water for the exploration activities will be abstracted from The Orange River

### 1.4 THE PROPONENT OF THE PROPOSED PROJECT

TABLE 1 - PROPONENT DETAILS

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### 1.5 ENVIRONMENTAL CONSULTANCY

Environmental Compliance Consultancy, a Namibian consultancy registration number 2013/11401, has prepared this document on behalf of the proponent. ECC operates exclusively in the environmental, social, health and safety fields for clients across Southern Africa in the public and private sector.

ECC is independent of the proponent and has no vested or financial interest in the proposed project, except for fair remuneration for professional services rendered. All compliance and regulatory requirements regarding this EIA report should be forwarded by email or posted to the following address:

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## 1.6 REPORT STRUCTURE

This environmental scoping study and impact assessment report is structured as per the contents set out in TABLE 2.

**TABLE 2 – ENVIRONMENTAL SCOPING REPORT SECTIONS**

SECTION	TITLE	CONTENT
-	Executive Summary	Executive summary of the EIA
-	Acronyms	A list of acronyms used during the report
1	Introduction	This section introduces the EIA and provides background information on the proposed project, proponent and purpose of the report
2	Regulatory Framework	This chapter describes the international and Namibian environmental regulatory framework applicable to the project and how it has been considered in the assessment and the Scoping Report and EMP.
3	Methodology and approach to EIA	This chapter involves methods of identifying, predicting, evaluating and mitigating the potential effects of a proposed project on the natural and human environment.
4	Project Description	Presents a description of the proposed project and how the proposed project will be operated
5	Environment and social baseline	Presents information on the surrounding environment that may be affected by the project.
6	Environmental Impact Assessment and Mitigation	This chapter presents the predicted potential environmental and social effects arising from the proposed project, and the mitigation and management strategies to be applied to avoid or reduce the effects.
7	Conclusions	Concludes the findings of the EIA
8	References	A list of reference used for this report
-	Appendices A-F	<ul style="list-style-type: none"> <li>- Appendix A: Environmental Management Plan</li> <li>- Appendix B: Non-Technical Summary</li> <li>- Appendix C: Evidence of Public Consultation</li> <li>- Appendix D: Site notice, Newspaper adverts</li> <li>- Appendix E: ECC CV's</li> <li>- Appendix F: List of Plant Species</li> </ul>

## 2 REGULATORY FRAMEWORK

### 2.1 NATIONAL REGULATORY REGIME

This chapter outlines the regulatory and policy framework applicable to the proposed project. TABLE 3 provides a list of applicable legislation and the relevance to the project.

TABLE 3 - LEGAL COMPLIANCE

NATIONAL REGULATORY REGIME	SUMMARY	APPLICABILITY TO THE PROJECT
<b>Minerals (Prospecting and Mining) Act No 33 of 1992</b>	<p>Provides for the reconnaissance, prospecting and mining for, and disposal of, and the exercise of control, minerals in Namibia.</p> <p>Section 50 (i) requires <i>“an environmental impact assessment indicating the extent of any pollution of the environment before any prospecting operations or mining operations are being carried out and an estimate of any pollution, if any, likely to be caused by such prospecting operations or mining operations”</i></p> <p>Section 50 sets out that in addition to any term and condition contained in a mineral agreement and any term and condition contained in any mineral licence, it shall be a term and condition of any mineral licence that the holder of such mineral licence shall:</p> <p>Exercise any right granted to him or her in terms of the provisions of this Act reasonably and in such manner that the rights and interests of the owner of any land to which such licence relates are not adversely affected, except to the extent to which such owner is compensated.</p> <p>Section 52 sets out that the holder of a mineral licence shall not exercise any rights conferred upon such holder by this Act or under any terms and conditions of such mineral licence</p> <p>(a) In, on or under any private land until such time as such holder-</p> <p>(i) Has entered into an agreement in writing with the owner of such land containing terms and conditions relating to the payment of compensation, or the owner of such land has in writing waked any right to such compensation and has submitted a copy of such agreement or waiver to the Commissioner.</p>	<p>The proposed activity is prospecting for minerals; hence it requires an EIA to be carried out as it triggers listed activities in terms of the Environmental Management Act and its regulations. This report presents the findings of the EIA.</p> <p>Works shall not commence until all conditions in the Act are met, which includes agreement with the landowners and conditions of compensation have been agreed.</p> <p>The project shall be compliant with section 76 of the Minerals Act. With regards to records, maps, plans and financial statements, and information, reports and returns submitted.</p>
<b>Environmental Management Act, 2007 (Act No. 7 of 2007) and its regulations, including the</b>	<p>The Act aims to promote sustainable management of the environment and the use of natural resources by establishing principles for decision-making on matters affecting the environment.</p> <p>It sets the principles of environmental management as well as the functions and powers of the Minister. The</p>	<p>This environmental scoping report and the EMP documents present the findings of the environmental assessment undertaken for the proposed project, which will form part of the environmental clearance</p>

NATIONAL REGULATORY REGIME	SUMMARY	APPLICABILITY TO THE PROJECT
<p><b>Environmental Impact Assessment Regulation, 2007 (No. 30 of 2011)</b></p>	<p>Act requires certain activities to obtain an environmental clearance certificate prior to project development. The Act states an EIA may be undertaken and submitted as part of the environmental clearance certificate application.</p> <p>The MET is responsible for the protection and management of Namibia’s natural environment. The Department of Environmental Affairs under the MET is responsible for the administration of the environmental clearance certificate process.</p>	<p>application. The assessment and report have been undertaken in line with the requirements in terms of the Act and its regulations.</p>
<p><b>Water Act, 1956</b></p>	<p>This Act provides for “the control, conservation and use of water for domestic, agricultural, urban and industrial purposes; to make provision for the control, in certain respects... and for the control of certain activities on or in water in certain areas”.</p> <p>The Ministry of Agriculture Water and Forestry Department of Water Affairs is responsible for the administration of the Water Act.</p> <p>The Minister may issue a Permit in terms of the regulations 5 and 9 of the government notice R1278 of 23 July 1971 as promulgated under section 30 (2) of the Water Act no. 54 of 1956, as amended. To abstract water from a controlled water source, a WA 002 should be filled and submitted to the MAWF</p>	<p>The Act stipulates obligations to prevent pollution of water. The EMP sets out measures to avoid polluting the water environment.</p> <p>Regulation 5: "Upon receipt of an application in terms of regulation 4(1) the Minister may issue a permit authorising the applicant to sink, enlarge, deepen, alter, open up or clean any borehole, well or spring mentioned in the application or to abstract therefrom and use a specific quantity of water for the purposes and subject to the conditions specified in the permit: Provided that, if the director is of the opinion that artesian water is or will be found in a borehole or well, the Minister shall not consider an application unless it is recommended by the Board."</p> <p>Regulation 9: The Minister may, when issuing a permit under regulation 5, impose such conditions, whether generally or in respect of different periods in any year, as he may deem necessary for an equitable distribution of water in the public interest or for the conservation of water supplies or for the protection of water sources, including conditions in respect of -</p> <p>Measures to minimise potential groundwater and surface water pollution are contained in the EMP.</p>

NATIONAL REGULATORY REGIME	SUMMARY	APPLICABILITY TO THE PROJECT
<b>The Nature Conservation Ordinance No. 4 of 1975</b>	One of the major biodiversity related laws in Namibia is the legislation governing the conservation of wildlife, and protected areas.	<p>The following sections are applicable to the proposed project and measures to ensure compliance are included in this environmental scoping report plus the EMP.</p> <ul style="list-style-type: none"> <li>- Section 18 of the Nature Conservation Ordinance, restricts of the rights to enter game parks and nature reserves and prohibition of certain acts therein, and</li> <li>- Section 72 of the Nature Conservation Ordinance, restricts picking and transport of protected species.</li> </ul>
<b>National Heritage Act, No. 27 of 2004.</b>	<p>The Act provides provision of the protection and conservation of places and objects with heritage significance.</p> <p>Section 55 compels exploration companies to report any archaeological findings to the National Heritage Council after which a heritage permit needs to be issued</p>	There is potential for heritage objects to be found on the site, therefore the stipulations in the Act have been taken into consideration and are incorporated into the EMP. Section 55 compels exploration companies to report any archaeological findings to the National Heritage Council after which a permit needs to be issued before the find can be disturbed.
<b>Soil Conservation Act No.76 of 1969</b>	Makes provision for the prevention and control of soil erosion and the protection, improvement and the conservation, improvement and manner of use of the soil and vegetation.	Taken into consideration during the design of the works to be undertaken within EPL 6155 site. Measures in the EMP set out methods to avoid soil erosion.
<b>Convention on Biological Diversity (1992)</b>	<p>The Convention on Biological Diversity (1992) has the objectives:</p> <p>The conservation of biological diversity</p> <p>The sustainable use of biological resources, and</p> <p>The fair and equitable sharing of benefits arising from the use of genetic resources.</p>	The vision of the proposed project is to integrate the development into the natural environment and conserve and enhance the sites flora and fauna. The biological diversity on the site and surrounding area shall be conserved as part of the proposed development.
<b>Vision 2030</b>	Vision 2030 sets out the county's development programmes and strategies to achieve its national objectives. It sets out eight themes to realise the country's long-term vision.	The proposed project shall meet the objectives of Vision 2030 and shall contribute to the overall development of the country while building capacity in the local communities.

NATIONAL REGULATORY REGIME	SUMMARY	APPLICABILITY TO THE PROJECT
	Vision 2030 states that the overall goal of the vision is to improve the quality of life of the Namibian people to a level in line with the developed world.	
<b>Fifth National Development Plan (NDP5)</b>	<p>The NDP5 is the fifth in the series of seven five-year national development plans that outline the objectives and aspiration of Namibia’s long-term vision as expressed in Vision 2030. The NDP5 is structure on five pillars: economic progression, social transformation, environmental sustainability and good governance. Under the social transformation pillar is the goal of improved education.</p> <p>A desired outcome of NDP5 is to have a diversified and competitive tourism sector with increased number of tourists from 1.4 million in 2015 to 1.8 million.</p>	The proposed project supports meeting the objectives of the NDP5 through creating employment opportunities, however the project is in a protected area and precaution must be taken to safeguard environment sustainability and its culture.

## 2.2 MINERALS POLICY

The Minerals Policy was adopted in 2002 and sets guiding principles and direction for the development of the Namibian mining sector while communicating the values of the Namibian people. It sets out to achieve several objectives in line with the sustainable development of Namibia’s natural resources. The policy strives to create an enabling environment for local and foreign investments in the mining sector and seeks to maximise the benefits for the Namibian people from the mining sector while encouraging local participation, amongst others.

The objectives of the Minerals Policy are in line with the objectives of the Fifth National Development Plan (NDP5) that include reduction of poverty, employment creation and economic empowerment in Namibia. The proposed project conforms to the policy and has been considered through the EIA process and the production of this report.

## 2.3 NATIONAL POLICY ON THE PROSPECTING AND MINING IN PROTECTED AREAS

Namibia’s National policy on Prospecting and Mining in Protected Areas of 2018, has been passed to promote sustainable development by guiding prospecting and mining in the country’s protected areas whilst ensuring sustainable exploration and mining, conserving biodiversity and maintaining healthy ecosystems.

The policy provides a framework for integrating relevant biodiversity information into decision making process for exploration and mining options and how best to avoid, minimise or remediate biodiversity impacts caused by mining, and in so doing support sustainable development.

Although it is recognised that EPL 6155 is located within a National Park, the EPL predates the implementation and development of the National Policy on Prospecting and Mining in Protected Areas. Therefore, measures shall be taken by the proponent to avoid irreparable damage to the environment.

EPL 6155 (assessed in this report) falls within the ARTFP. It is therefore imperative that the potential impacts within the national park be thoroughly assessed and are reviewed and compared with the ‘no mining and prospecting zones’ in the aforementioned policy. Some areas of the park are excluded from prospecting and mining activities. These areas include the Fish River Mouth, existing Ai-/Ais and Hobas tourist camp and areas in proximity to the Canyon to avoid irreparable damage that may affect rare and endemic species and the current and prospects of tourism.

During the exploration activities, the proponent is required to ensure potential environmental impacts are minimised and managed using the best practice approaches available, which includes adhering to the conditions set out in the policy.

## 2.4 PERMITS AND LICENCES

**TABLE 4 – PERMIT AND LICENCES REQUIRED FOR EPL 6155**

PERMIT AND LICENCES	MINISTRY	VALIDITY/DURATION
PARK ENTRY PERMIT	Ministry of Environment and Tourism-Windhoek	3 Months
CAMPING IN THE APRK	Ministry of Environment and Tourism-Windhoek	3 Months
WATER ABSTRACTION PERMITS	Ministry of agriculture, Water and Forestry	Permit dependent
EXCLUSIVE PROSPECTING LICENCE	Ministry of Mines and Energy- Windhoek	3 Years
NOTICE OF INTENTION TO DRILL (IF APPLICABLE)	Ministry of Mines and Energy	To be submitted prior to drilling

### 2.4.1 EXCLUSIVE PROSPECTING LICENCE

EPL 6155 was granted on the 23<sup>rd</sup> May 2018 and expires on the 22<sup>nd</sup> of March 2021. In terms of the Minerals (Prospecting and Mining) Act, 1992, an EPL may be renewed, however it may only be extended twice for two-year periods if demonstrable progress is shown. Renewals beyond seven years requires special approvals from the Minister (Ministry of Mines and Energy, 2018). Such renewals are subject to a reduction in the size of the EPL. When a company applies for renewal of an EPL, this application must be lodged 90 days prior to the expiry date of the EPL or, with good reason, no later than the expiry date (Ministry of Environment and Tourism, Ministry of Mines and Energy, 2018).

A renewal application for EPL 6155 has been submitted with MME on the 22<sup>nd</sup> of March 2019. The MME shall review the renewal application and make any comments and/or recommendations for consideration by the Minerals (Prospecting and Mining Rights) Committee (MPMRC). Amendments and revisions may be required for the EIA and EMP. Due consideration must be given when renewing the licence to ascertain whether there is justification to renew the licence. Once an EPL expires and a new EPL is issued, even if it is to the previous holder, the full screening process must be followed with a full EIA process before operations may commence (Ministry of Environment and Tourism, Ministry of Mines and Energy, 2018).



### 3 METHODOLOGY APPROACH TO THE EIA

#### 3.1 PURPOSE OF THE ENVIRONMENTAL IMPACT ASSESSMENT

The EIA process in Namibia is governed and controlled by the Environmental Management Act, 2007 and the EIA Regulations 30 of 2012, which is administered by the office of the environmental commissioner through the DEA of the MET.

An EIA is the process of identifying, predicting, evaluating and mitigating the potential effects of a proposed project on the natural and human environment. The aim of the EIA process and subsequent report are to apply the principles of environmental management to proposed activities; reduce the negative and increasing the positive effects arising from a proposed project; provide an opportunity for the public to consider the environmental impacts of a proposed project through meaningful consultation; and to provide a vehicle to present the findings of the assessment process to competent authorities for decision making.

#### 3.2 THE ASSESSMENT PROCESS

The EIA methodology applied to this EIA has been developed using the International Finance Cooperation (IFC) standards and models, in particular Performance Standard 1, 'Assessment and management of environmental and social risks and impacts' (International Finance Corporation, 2017) (International Finance Corporation, 2012); Namibian draft procedures and guidance for EIA and EMP (Republic of Namibia, 2008); international and national best practice; and over 25 years of combined EIA experience. The process followed the basic assessment is illustrated in Figure 6 and detailed further in the following sections.

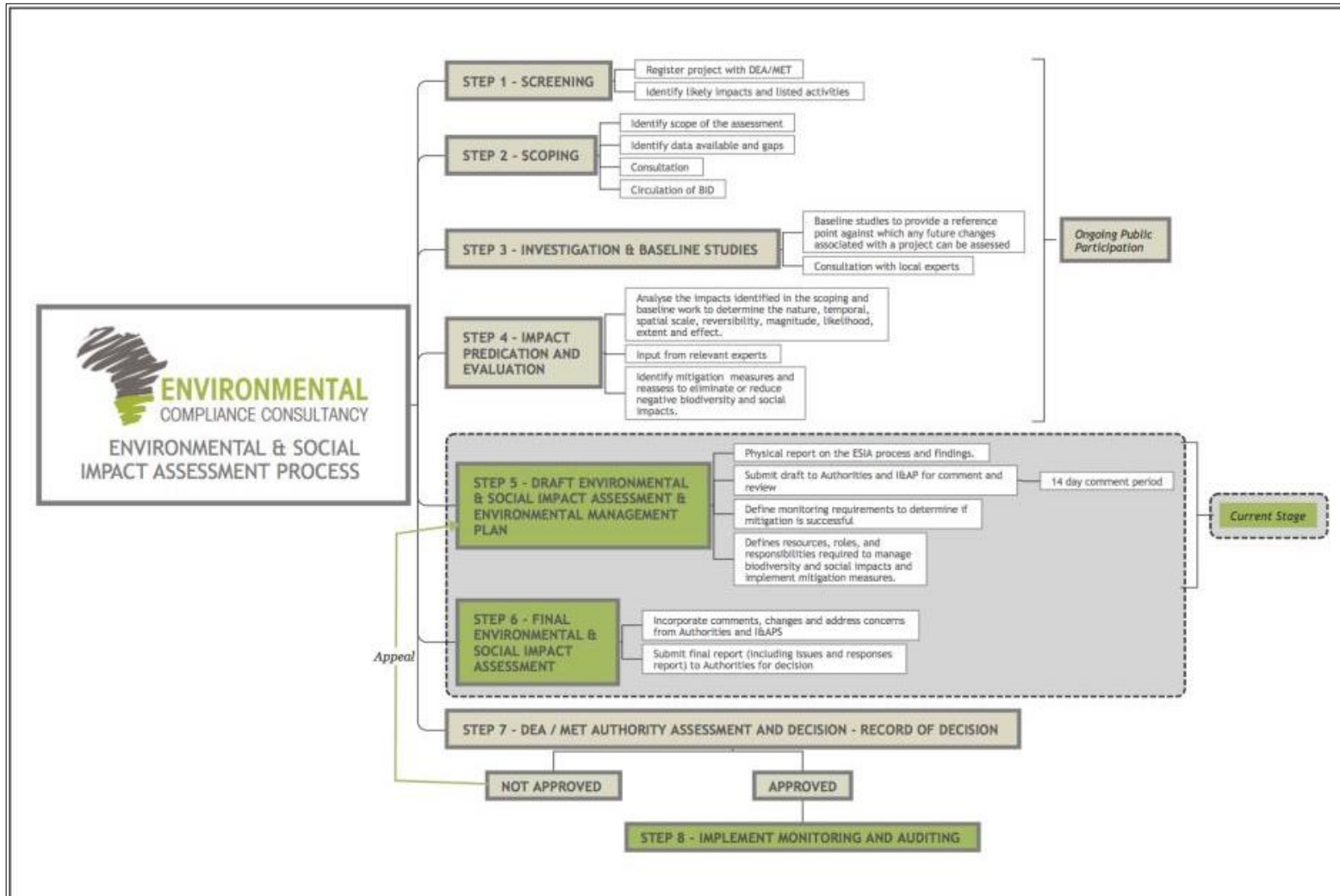


FIGURE 2 – EIA PROCESS

### 3.3 METHODOLOGY FOR THE IMPACT ASSESSMENTS

ECCs methodology for environmental impact assessments is adopted and based on models for environmental and social impact assessments set out by the International Finance Corporation (IFC) principal 1 'Assessment and management of environmental and social risks and impacts. Furthermore, this impact assessment was undertaken for Gareip Diamonds in accordance with Namibian legal requirements.

This impact assessment is a formal process in which the effects of certain types of development on the biophysical, social and economic environments are identified, assessed and reported, so that the effects can be taken into account when considering whether to grant development consent or to provide financial support.

Desktop studies on the national database are undertaken as part of the scoping stage to get information of the current status of the receiving environment. This provides a baseline where changes that occur as a result of the proposed project can be measured. This is verified through site data from the proponent.

The environmental and social topics that may be affected by the proposed project are described in this section. The baseline focuses on receptors which could be affected by the proposed project.

#### 3.3.1 SCREENING OF THE PROPOSED PROJECT

The first stages of the EIA process are to register the project with the Competent Authority and undertake a screening exercise. The screening exercise determines whether the proposed project is considered as a Listed Activity in terms of the Environmental Management Act, 2007 and associated Regulations, and if significant impacts may arise. During this process, the location, scale and duration of project activities are considered against the receiving environment to determine the approach to the EIA.

#### 3.3.2 SCOPING OF THE ENVIRONMENTAL ASSESSMENT

The purpose of the scoping stage in the EIA process is to identify the scope of assessment, undertake a high-level assessment to identify potential impacts, and confirm if further investigation is required to assign the severity of potential significant effects and allocate appropriate mitigation.

This report presents the findings of the scoping phase and high-level assessment and confirms that no further investigation is required. This conclusion is presented in Section 6

#### 3.3.3 BASELINE STUDIES

Baseline studies are undertaken as part of the scoping stage which involves collecting all pertinent information from the current status of the receiving environment. This provides a baseline against which changes that occur as a result of the proposed project can be measured.

For the proposed project, baseline information was obtained through a desk-top study, focussing on environmental receptors that could be affected by the proposed project and verified through site data. The baseline studies are presented in Section 5.

#### 3.3.4 IMPACT PREDICATION AND EVALUATION

Impact prediction and evaluation involves predicting the possible changes to the environment as a result of the development/project. The recognized methodology was applied to determine the magnitude of impact and whether or not the impact was considered significant and thus warrant further investigation. The findings of the assessment are presented in Section 6.

### 3.4 EIA DETERMINATION OF SIGNIFICANCE

The significance of an impact was determined by taking into consideration the combination of the sensitivity and importance/value of environmental and social receptors that may be affected by the proposed project, the nature and characteristics of the impact, and the magnitude of potential change. The magnitude of change (the impact) is the

identifiable changes to the existing environment which may be direct or indirect; temporary/short term, long-term or permanent; and either beneficial or adverse. These are described as follows and thresholds are provided in TABLE 5, 6 and 7.

- The **sensitivity and value of a receptor** are determined by identifying how sensitive and vulnerable a receptor is to change, and the importance of the receptor (internationally, nationally, regionally and locally).
- The **nature and characteristics of the impact** are determined through consideration of the frequency, duration, reversibility and probability and the impact occurring.
- The **magnitude of change** measures the scale or extent of the change from the baseline condition, irrespective of the value. The magnitude of change may alter over time, therefore temporal variation is considered (short-term, medium-term; long-term, reversible, irreversible or permanent).

**TABLE 5 - SENSITIVITY AND VALUE OF RECEPTOR**

SENSITIVITY AND VALUE	DESCRIPTION
High	Of value, importance or rarity on an international and national scale, and with very limited potential for substitution; and/or very sensitive to change or has little capacity to accommodate a change.
Medium	Of value, importance or rarity on a regional scale, and with limited potential for substitution; and/or moderate sensitivity to change, or moderate capacity to accommodate a change.
Low	Of value, importance or rarity on a local scale; and/or not particularly sensitive to change or has considerable capacity to accommodate a change.

**TABLE 6 - NATURE OF IMPACT**

NATURE	DESCRIPTION
Positive	An impact that is considered to represent an improvement on the baseline or introduces a positive change.
Negative	An impact that is considered to represent an adverse change from the baseline or introduces a new undesirable factor.
Direct	Impacts causing an impact through direct interaction between a planned project activity and the receiving environment/receptors.
Indirect	Impacts that result from other activities that are encouraged to happen as a result / consequence of the Project. Associated with the project and may occur at a later time or wider area
<b>Extent / Geographic Scale</b>	
On-site	Impacts that are limited to the boundaries of the proposed project site
Local	Impacts that occur in the local area of influence, including around the proposed site and within the wider community
Regional	Impacts that affect a receptor that is regionally important by virtue of scale, designation, quality or rarity.
National	Impacts that affect a receptor that is nationally important by virtue of scale, designation, quality or rarity.
International	Impacts that affect a receptor that is internationally important by virtue of scale, designation, quality or rarity.
<b>Duration</b>	
Short-term	Impacts that are likely to last for the duration of the activity causing the impact and are recoverable
Medium-term	Impacts that are likely to continue after the activity causing the impact and are recoverable
Long-term	Impacts that are likely to last far beyond the end of the activity causing the damage but are recoverable over time
<b>Reversibility</b>	
Permanent /Irreversible	Impacts which are not reversible and are permanent

Temporary / Reversible	Impacts are reversible and recoverable in the future
<b>Likelihood</b>	
Certain	The impact is likely to occur
Likely	The impact is likely to occur under most circumstances
Unlikely	The impact is unlikely to occur

**TABLE 7- MAGNITUDE OF CHANGE**

MAGNITUDE OF CHANGE	DESCRIPTION
<b>Major</b>	Loss of resource, and quality and integrity of resource; severe damage to key characteristics, features or elements; or Large-scale or major improvement of resources quality; extensive restoration or enhancement; major improvement of attribute quality.
<b>Moderate</b>	Loss of resource, but not adversely affecting its integrity; partial loss of/damage to key characteristics, features or elements; or Benefit to, or addition of, key characteristics, features or elements; improvements of attribute quality.
<b>Minor</b>	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (or maybe more) key characteristic, feature or element; or Minor benefit to, or addition of, one (or maybe more) key characteristic, feature or element; some beneficial effect on attribute quality or a reduced risk of a negative effect occurring.
<b>Negligible</b>	Very minor loss or detrimental alteration to one (or maybe more) characteristic, feature or element; or Very minor benefit to, or positive addition of, one (or maybe more) characteristic, feature or element.

A level of certainty has also been applied to the assessment to demonstrate how certain the assessment to demonstrate how certain the assessment conclusions are and where there is potential for misinterpretation or a requirement to identify further mitigation measures, thereby adopting a precautionary approach. Where there is a low degree of certainty, monitoring and management measures can be implemented to determine if the impacts are worse than predicted and support the identification of additional mitigation measures through the lifetime of the proposed project. TABLE 7 provides the levels of certainty applied to the assessment, as well as a description.

**TABLE 8 – LEVEL OF CERTAINTY**

LEVEL OF CERTAINTY	DESCRIPTION
High	<ul style="list-style-type: none"> <li>- Likely changes are well understood</li> <li>- Design/information/data used to determine impacts is very comprehensive</li> <li>- Interactions are well understood and documented</li> <li>- Predictions are modelled, and maps based on interpretations are supported by a large volume of data, and</li> <li>- Design/information/data has very comprehensive spatial coverage or resolution.</li> </ul>
Medium	<ul style="list-style-type: none"> <li>- Likely changes are understood</li> <li>- Design/information/data used to determine impacts include a moderate level of detail</li> <li>- Interactions are understood with some documented evidence</li> <li>- Predictions are modelled but not yet validated and/or calibrated, and</li> <li>- Mapped outputs are supported by a moderate spatial coverage or resolution.</li> </ul>
Low	<ul style="list-style-type: none"> <li>- Interactions are currently poorly understood and not documented.</li> <li>- Predictions are not modelled, and the assessment is based on expert interpretation using little or no quantitative data.</li> <li>- Design is not fully developed, or information has poor spatial coverage or resolution.</li> </ul>

The significance of impacts has been derived using professional judgment and applying the identified thresholds for receptor sensitivity and magnitude of change (as discussed above) and guided by the matrix presented in TABLE 9. The matrix is applicable for impacts that are either positive or negative. The distinction and description of significance and whether the impact is positive, or negative is provided in TABLE 4.

**TABLE 9 - GUIDE TO SIGNIFICANCE RATINGS**

		<b>Magnitude of Change</b>				
		Negligible	Minor	Moderate	Major	
	High	Minor (3)	Moderate (6)	Major (9)	Major (12)	<b>Sensitivity</b>
	Medium	Low (2)	Minor (4)	Moderate (6)	Major (8)	
	Low	Low (1)	Low (2)	Minor (3)	Moderate (4)	

Significance is not defined in the Namibian EIA Regulations, however the Draft Procedure and Guidance for EIA and EMP states that the significance of a predicted impact depends upon its context and intensity. Accordingly, definitions for each level of significance have been provided in TABLE 10. These definitions were used to check the conclusions of the assessment of receptor sensitivity, nature of impact and magnitude of impact was appropriate.

**TABLE 10– SIGNIFICANCE DESCRIPTION**

<b>SIGNIFICANCE OF IMPACT</b>	<b>DESCRIPTION</b>
<b>Major (negative)</b>	Impacts are considered to be key factors in the decision-making process that may have an impact of major significance, or large magnitude impacts occur to highly valued/sensitive resource/receptors. Impacts are expected to be permanent and non-reversible on a national scale and/or have international significance or result in a legislative non-compliance.
<b>Moderate (negative)</b>	Impacts are considered within acceptable limits and standards. Impacts are long-term, but reversible and/or have regional significance. These are generally (but not exclusively) associated with sites and features of national importance and resources/features that are unique and which, if lost, cannot be replaced or relocated.
<b>Minor (negative)</b>	Impacts are considered to be important factors but are unlikely to be key decision-making factors. The impact will be experienced, but the impact magnitude is sufficiently small (with and without mitigation) and well within accepted standards, and/or the receptor is of low sensitivity/value. Impacts are considered to be short-term, reversible and/or localized in extent.
<b>Low (negative)</b>	Impacts are considered to be local factors that are unlikely to be critical to decision-making.
<b>Low – Major (Beneficial)</b>	Impacts are considered to be beneficial to the environment and society:

The colour green has been applied to highlight positive impacts over negative impacts shown in shades of yellow, orange and red. The description for each level of significance presented in TABLE 10 was also followed when determining the level of significance for a beneficial impact.

The level of significance of impacts has been derived using professional judgment and applying the identified thresholds for receptor sensitivity and magnitude of change, as well as the definition for significance. In most instances, moderate and major adverse impacts are considered as significant, and however, there may be some instances where impacts are lower than this but are still considered to be significant. The following thresholds were therefore used to double check the assessment of significance had been applied appropriately; a significant impact would meet at least one of the following criteria:

- It exceeds widely recognized levels of acceptable change
- It threatens or enhances the viability or integrity of a receptor or receptor group of concern, and
- It is likely to be material to the ultimate decision about whether or not the environmental clearance certificate is granted.

### 3.5 EIA CONSULTATION

Public participation and consultation is a requirement stipulated in section 21 of the Environmental Management Act, 2007 and its regulations for a project that requires an environmental clearance certificate. Consultation is a compulsory and critical component in the EIA process in achieving transparent decision-making and can provide many benefits.

A key aim of consultation is to inform stakeholders and interested and affected parties (I&AP) about the proposed project. The methods undertaken for the proposed project are detailed as follows, which are in line with the requirements of the EIA Regulations.

#### 3.5.1 NEWSPAPER ADVERTISEMENTS

Notices regarding the proposed project and its activities were circulated in two newspapers namely the 'Informante' and 'The Namibian' on the 04<sup>th</sup> and 11<sup>th</sup> of July 2019, as illustrated in Appendix D. The purpose of this was to commence the consultation process and enable I&APs to register interest with the project.

#### 3.5.2 SITE NOTICES

A site notice ensures neighbouring properties and stakeholders are made aware of the proposed project. The notice was set up at the proposed site location as illustrated in Appendix D.

#### 3.5.3 NON-TECHNICAL SUMMARY

The Non-Technical Summary (NTS) presents a high-level description of the proposed project; sets out the EIA process and when and how consultation is undertaken; and contact details for further enquiries and is made available to all registered I&APs. The NTS can be found in Appendix C.

#### 3.5.4 CONSULTATION FEEDBACK

No issues or concerns were raised by the I&APs during consultation period.

## 4 PROJECT DESCRIPTION

### 4.1 NEED FOR THE PROPOSED PROJECT

Namibia is fortunate to host a wide range of mineral deposits, a number of which are considered to be world class, such as diamond and uranium. In addition, other mineral resources such as gold, base metals, industrial minerals, a wide variety of precious and semi-precious stones and several types of dimension stones are extracted in Namibia.

Mining significantly contributes between 10% and 13% to the country's Gross Domestic Product (GDP). For this reason, exploration activities are encouraged in Namibia and the vision of the Minerals Policy being to *"further attract investment and enable the private sector to take the lead in exploration, mining, mineral beneficiation and marketing"* supports the development. In the event that exploration activities are successful, and a resource can be defined in commercially viable concentrations, exploration operations can potentially transcend into mining operations, which can result in socio-economic development (Ministry of Environment and Tourism, Ministry of Mines and Energy, 2018).

### 4.2 ALTERNATIVES CONSIDERED

In terms of the Environmental Management Act, 2007 and its regulations, alternatives considered should be analysed and presented in the scoping assessment and EIA report. This requirement ensures that during the design evolution and decision-making process, potential environmental impacts, costs, and technical feasibility have been considered, which leads to the best option(s) being identified.

Exploration activities will entail various types of exploration methods within EPL 6155, which may include mechanical digging of trenches and pits to bedrock. Small equipment such as Tractor-Loader-Backhoe (TLB), a small tipper, one pan with conveyor, jig and generator will be used to recover samples and separate gravel. Other methods to use shall be determined based on the exploration programme which is further designed once more information and data is obtained. At this stage, the exploration activities are yet to be finalised and therefore a range of options remain. Once the exploration programme is further defined, the most suitable options and methods shall be identified to ensure the impacts on the environment and society are minimised.

The environmental assessment has taken a worst-case scenario into consideration (as per best practice guidance – see TABLE 12), which includes a review of all likely exploration activities, thus no other technological alternatives are available for consideration at this stage. Once the exploration programme is further defined, the best available option for methods shall be identified to ensure the impacts on the environment and society are minimised.

#### 4.2.1 NO-GO ALTERNATIVE

Should exploration activities on EPL 6155 not proceed, the anticipated environmental impacts from exploration activities would not occur, however, the social and economic benefits associated with project would also not be realised. There would not be an opportunity to refine Namibian resources in the project area, a missed opportunity for geological mapping and data collection that benefits the Namibian economy.



## 4.3 PROPOSED EXPLORATION ACTIVITIES

The proponent intends to undertake prospecting using techniques that will include mechanical digging of trenches and pits to bedrock, and gravel separation. The duration of exploration activities is anticipated to be over the course of a 3-year period (or for the duration of the mineral licence) and the periods of each exploration programme will vary and will be refined as geological information becomes available.

### 4.3.1 EXPLORATION SCHEDULE

Exploration activities are intended to commence once the environmental clearance has been granted. The presence of mineralisation shall be determined during the first period of tenure. If mineralisation is identified, further exploration methods shall be applied; if not identified, EPL 6155 shall be rehabilitated and returned to government.

The National Policy on Prospecting and Mining in Protected Areas stipulates that companies involved in prospecting and mining in protected areas take responsibility for carrying out appropriate rehabilitation and restoration, during and upon closure of their activities. Therefore, the proponent shall ensure funds are available to restore/ rehabilitate the EPL site once exploration activities are completed. The proponent has also committed to restoring any historic exploration disturbance on the site if identified.

### 4.3.2 WORKERS AND ACCOMMODATION

The project will employ approximately ten (10) workers for the exploration phase. The workers will be hired from Noordoewer, a settlement in the //Karas Region. During the assessment process, two accommodation sites were identified as illustrated in

FIGURE 3; option 1 (NamWater's old campsite) and option 2 (a site within the EPL). The proponent will consider option 2 for accommodation purposes. Worker will be accommodated in an exploration camp located on site as per the options set out above.

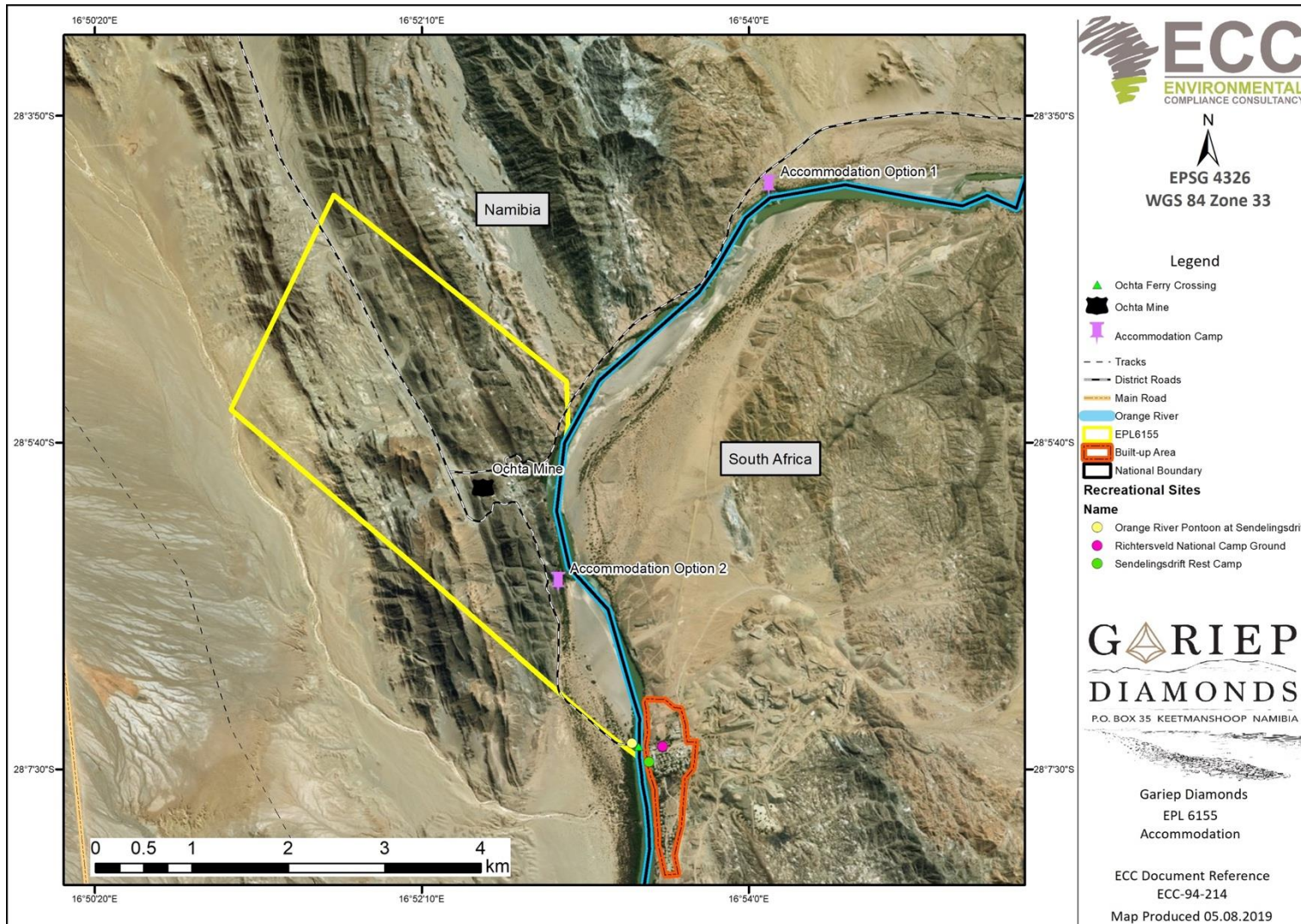


FIGURE 3 – PROPOSED ACCOMMODATION FACILITIES

#### 4.3.3 RESOURCE USE AND WASTE MANAGEMENT

Water will be required for various uses including human consumption and exploration activities. Water for the exploration activities will be abstracted from the Orange River. No mineral sampling or waste will be generated apart from the alluvial gravel with no chemical additions.

Portable chemical toilet facilities will be hired for onsite use and any sewerage generated will be managed by the supplier of the toilet or the contactor.

General waste will be disposed of at the appropriate site located in Rosh Pinah. The banning of plastics bags in game parks or nature reserve as per the Government notice No.85, published in the Government Gazette No. 6285 in April 2017 shall be adhered to, at all times.

The banning of plastics bags in national parks or nature reserve as per the Government notice No.85, published in the Government Gazette No. 6285 in April 2017 should be adhered to unless:

- Designated to be used for the disposal of waste;
- Designated for agricultural purposes;
- Used for sampling or analysis;
- That constitutes or form an integral part of, the packaging in which goods are sealed prior to the sale in the local market or for export; or
- That it is a transparent resealable bag

The Government notice No.85, published in the Government Gazette No. 6285 in April 2017 shall be adhered to, at all times.

#### 4.3.4 SITE REHABILITATION

The National Policy on the Prospecting and Mining in Protected Areas stipulates that companies involved in prospecting and mining in protected areas take responsibility for carrying out appropriate rehabilitation and restoration, during and upon closure of their activities. Therefore, the proponent shall ensure funds are available to restore/ rehabilitate the EPL once exploration activities are completed.

Once exploration activities are completed the areas shall be rehabilitated to a condition as close to the original state as far as possible. Rehabilitation methods shall be determined during the exploration programme and shall be agreed with the MET.

Before and after photographs will be used to monitor rehabilitation success.

## 5 ENVIRONMENT AND SOCIAL BASELINE

### 5.1 INTRODUCTION

This section provides an overview of the existing biophysical environment through the analysis of the baseline data regarding the existing natural and socio-economic environment. Desktop studies on the national database are undertaken as part of the scoping stage to get information of the current status of the receiving environment. This provides a baseline where changes that occur as a result of the proposed project can be measured. Site verification and site data is also collected as part of this assessment. This section also incorporates consultation and public participation of the proposed project.

### 5.2 SITE AND SURROUNDING ENVIRONMENT

The environmental and social topics that may be affected by the proposed project are described in this section. The baseline focuses on receptors which could be affected by the proposed project.

#### 5.2.1 /AI-/AIS-RICHTERSVELD TRANSFRONTIER PARK

The /Ai-/Ais-Richtersveld Transfrontier Park (ARTFP) is Namibia's first cross-border park that conserves a large part of the Nama Karoo and Succulent Karoo Biomes. The park protects a vast area that encompasses one of the richest botanical hot spots in the world. It was established by the governments of Namibia and South Africa and provides for joint management of the /Ai-/Ais Hot Springs Park (Namibia) and Richtersveld National Park (South Africa).

The park covers an area of 6 045 km<sup>2</sup> and portrays some of the most spectacular arid and desert mountain scenery in Southern Africa, including an area of approximately 4 420 km<sup>2</sup> of Namibia's-|Ais Hot Springs Game Park and the 1625 km<sup>2</sup> |Ai-|Ais/Richtersveld National Park in South Africa. This conservation area features the world's second largest canyon - the Fish River Canyon, which meanders for 161 km between the steep enormous cliffs that divide the Nama plateau. In some places the canyon floor is more than 550 m below the plateau, exposing rock of nearly 2 600 million years old (South African Nationalb Parks , 2019; Ministry of Environment and Tourism, 2019).

On 16 October 2007, the Sendelingsdrift border post on the Orange River was opened as a joint port of entry with police and immigration services on both sides of the river. A pontoon allows tourists to move between the two countries – across the Orange River, through the parks.

Since 2007, the Joint Management Board has been investigating the feasibility of expanding the ARTP into a larger Transfrontier Conservation Area (TFCA) that will include other areas of land. If the TFCA were to be expanded, it would incorporate the Sperrgebiet National Park, areas of private and communal land and the //Gamaseb and Gawachab conservancies (Ministry of Environment and Tourism, 2019).

Mining is the prime challenge to biodiversity in the park, with some areas along the river under Exclusive Prospecting Licences (EPLs). The other challenges the park faces include alien species, and illegal fishing, park entry and livestock grazing.

**Below are figures of the surroundings of the proposed project site:**



FIGURE 4 - LANDSCAPE OF THE PROPOSED SITE



FIGURE 5 - OLD VEHICLE TRACK

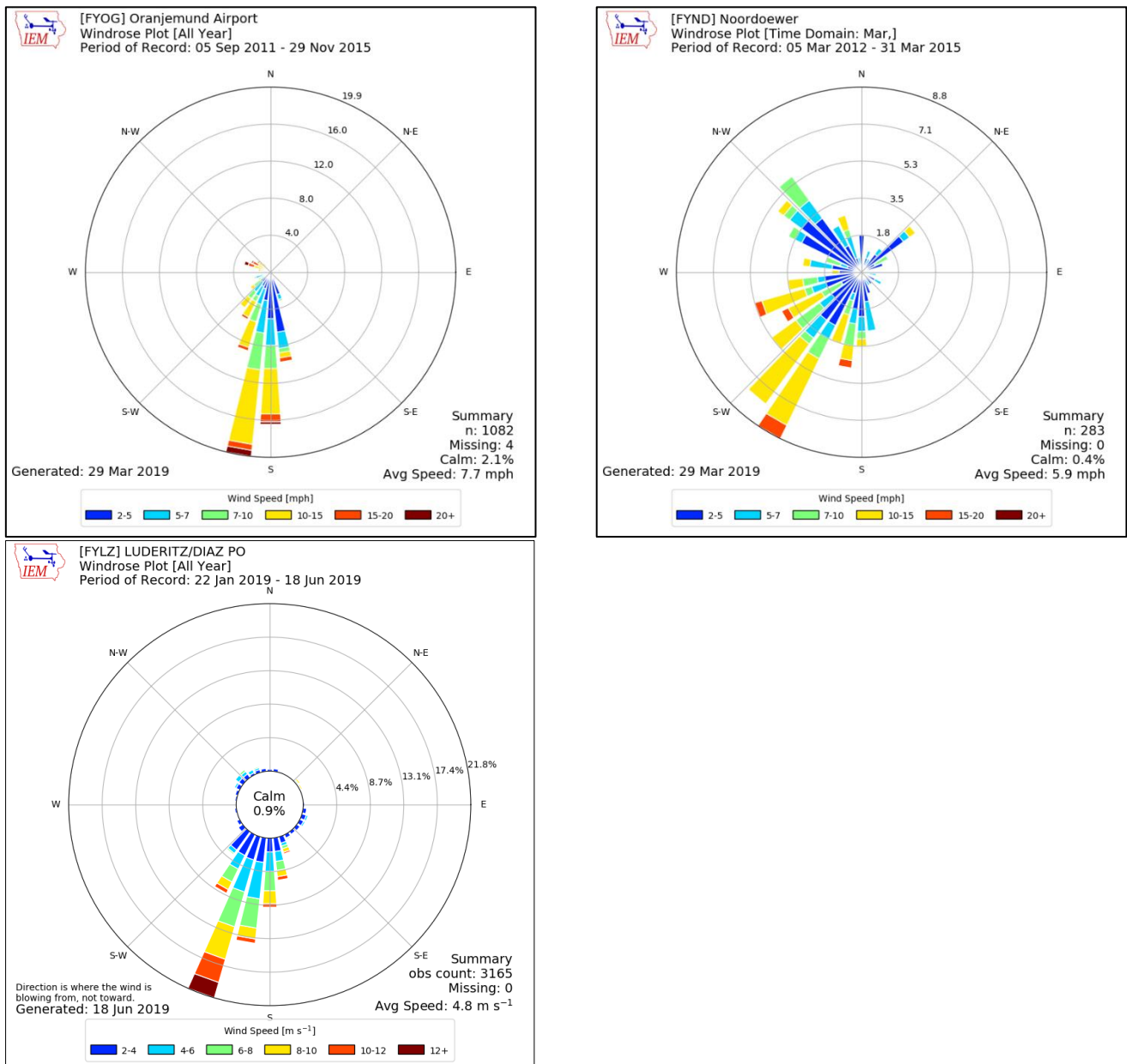


FIGURE 6 - RIVERINE AROUND THE EPL 6155

### 5.3 CLIMATE

Two major climatic regions meet within the Transfrontier Park, the warm temperate winter rainfall area, (characteristic of the Succulent Karoo biome) and a non-seasonal rainfall region to the east, (like the Nama-Karoo biome). The rainfall in the winter rainfall area (May - September) varies from 15 mm per annum in the valleys to 300 mm on the mountain tops. During winter the temperature can drop to below 0°C, while in summer it can ascend to 52°C, hence the appropriate name, |Ai-|Ais, meaning “hot, very hot” (South African National Parks , 2019).

A wind rose from monthly averages for the area are available, graphically represent the prevailing wind direction, and refer to FIGURE 4. The prevailing winds are from the southeast and southwest in terms of both frequency and strength. The average wind speed in Lüderitz is 4.8 meters per second ( $m s^{-1}$ ) (Iowa State University of Science and Technology, 2019).



Retrieved from (Iowa State University of Science and Technology, 2019)

FIGURE 7 - PREVALENT WIND DIRECTION IN SURROUNDING AREA OF THE EPL 6155

## 5.4 FLORA AND FAUNA

The area is well known for its rugged landscapes, including Namibia's Fish River Canyon, the Orange River, and unique plant life such as desert/dwarf shrub transition, succulent steppe, dwarf shrub savannah, //karas dwarf shrubland, riverine woodland, the quiver tree (*Aloe dichotoma*), maiden's quiver tree (*Aloe ramosissima*), the rare giant quiver tree, (*Aloe pillansii*), the halfmens (*Pachypodium namaquanum*) and the endangered riparian bush of the Orange River. Refer to Appendix F - for a complete list of plant species from the National Herbarium of Namibia. The ARTFP is the furthest developed of the three transboundary conservation initiatives in which Namibia is involved. The Directorate of Wildlife and National Parks (DWNP) leads the MET's efforts in this bilateral initiative (Ministry of Environment and Tourism, 2019; Ministry of Environment and Tourism, Ministry of Mines and Energy, 2018).

There are 100 endemic succulents and over 1,600 other plant species, rare animals, spectacular scenery and thermal springs. At the Gariiep Centre of Plant Endemism, with the transfrontier park at its core, at least 2 700 species of plants, 560 of which are endemic or near endemic, can be found. A soft but regular rainfall is mainly responsible for this abundance of plant life. Many of the endemic plants are limited to small areas, mostly on mountains where the rainfall is higher and habitat diversity is greatest. A list of plant species from the National Herbarium of Namibia is included in Appendix F.

The animal species found in the area are adapted to withstand the harsh, arid climate. Other species are concentrated in the denser vegetation bordering the Orange River, including 56 species of mammals and 202 bird species (Ministry of Environment and Tourism, 2019). Furthermore, a large variety of lizards (35 species) and snakes (16 species) are found in various microhabitats.

## 5.5 HERITAGE

There are several significant archaeological sites situated in the regional area. The earliest evidence of human habitation within the |Ai-|Ais/Richtersveld National Park was discovered in a shelter at Die Toon near Tatasberg. This site has been dated back to 2200 BC. Bones uncovered at Kokerboomkloof reveal that at least some of the animal species currently present in the region, such as springbok, zebra and klipspringer, were also present over 4 000 years ago.

The |Ai-|Ais/Richtersveld, is one of the last regions, where the traditional lifestyle of the Nama people (nomadic pastoralism) has been preserved. Namibia's oldest rock paintings are found at the Apollo 11 caves, are located 42.75 km, northeast of EPL 6155 (coordinates: 17°6'0" E; 27°45'0" S) whereas rock engravings crafted by ancestors of the Khoi people who lived in the area 2 000 years ago, are scattered throughout the park.

A review of the National Heritage Council database was conducted, and no known heritage sites were identified on EPL 6155 site. Prior to any works commencing the proponent will conduct a field assessment to identify any heritage site, painting or potential area of significance. In cases where heritage sites are discovered the chance find procedure will be used.

## 5.6 SOILS AND GEOLOGY

The |Ai-|Ais/Richtersveld Transfrontier Park is a renowned geological area, featuring many distinct periods of geological history over 2 000 million years. The area is characterised by complex, intensely folded, fractured and actively uplifted landmasses are now heavily eroded. The Orange River mouth is a Ramsar site, and the 350-million-year-old erosion-rich-lower Orange River gorge flourishes with history.



A large extend of Namibia’s area consists of soils that are unsuited for crop growth and occurring in areas where rainfall is too low for rain-fed cultivation. The EPL stretches over an area that is predominately made up of the Gariep complex and rock, as shown in FIGURE 5. Lithic leptosols soils, which are very thin, and shallow are formed in actively eroding landscape; they depth is limited by continuous hard rock of highly calcareous layer within 30cm of the surface and have low water holding capacity, as a result vegetation in this environment is often prone to drought. This soil type are the shallowest soils to be found in Namibia (Mendelshon, Jarvis, Roberts, & Robertson, 2002). Lithic leptosols soils are the dominant soils on EPL 6155.

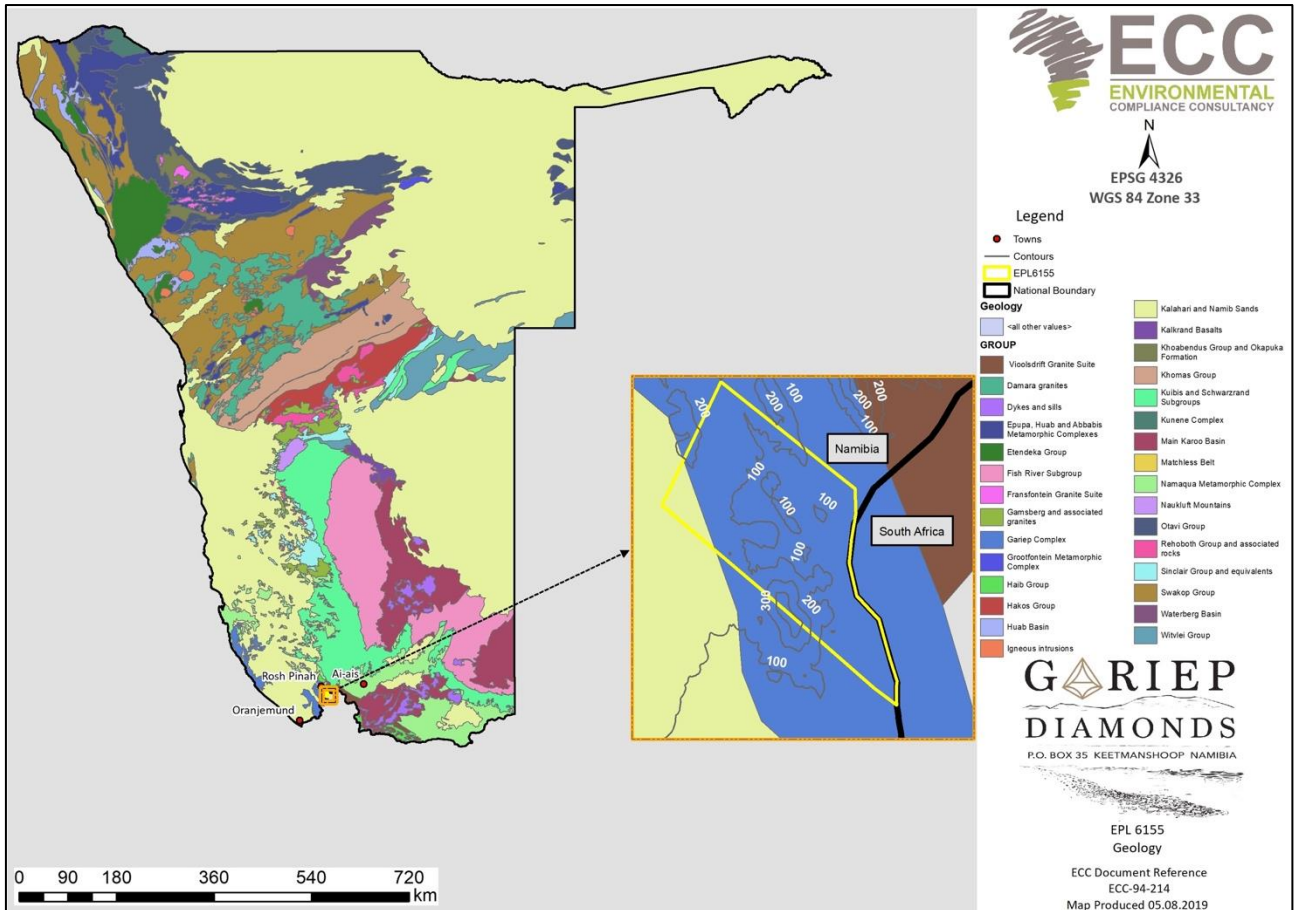


FIGURE 8 – ILLUSTRATION OF THE GEOLOGY ON EPL 6155

## 5.7 HYDROLOGY

In Namibia water and land resources management is carried out at basin level. There are 11 water basins in the country, of which the EPL is located within the Orange Fish River Basin, in southern Namibia. The major source of water supply in the basin mostly comes from perennial surface water (Orange River), ephemeral surface water (Fish River) and a smaller portion from groundwater sources. The proponent will source water for its exploration activities, from Orange River, for its activities refer to FIGURE 9.

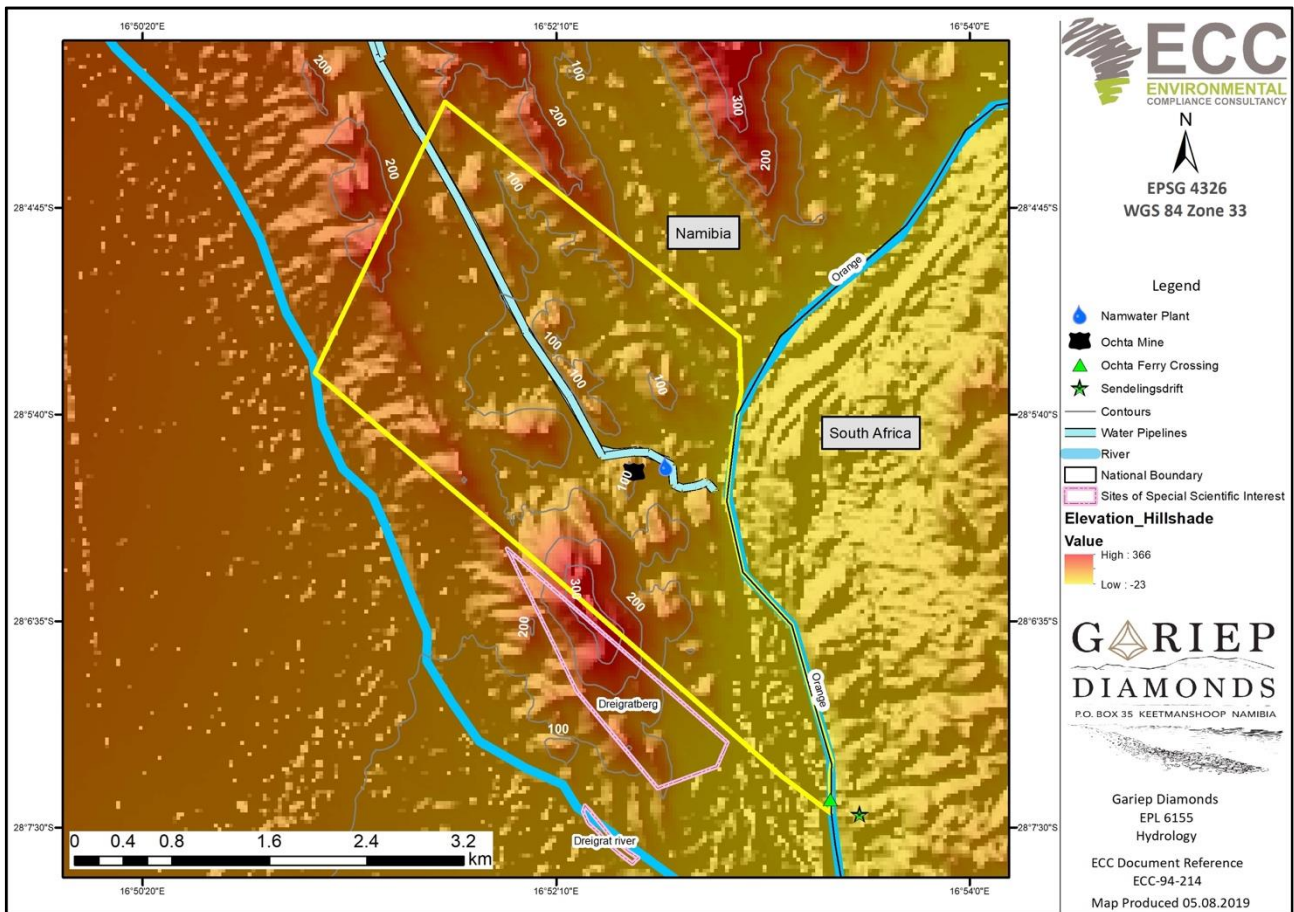


FIGURE 9 - WATER RESOURCES INFRASTRUCTURE ON EPL 6155

## 5.8 LAND USE AND INFRASTRUCTURE

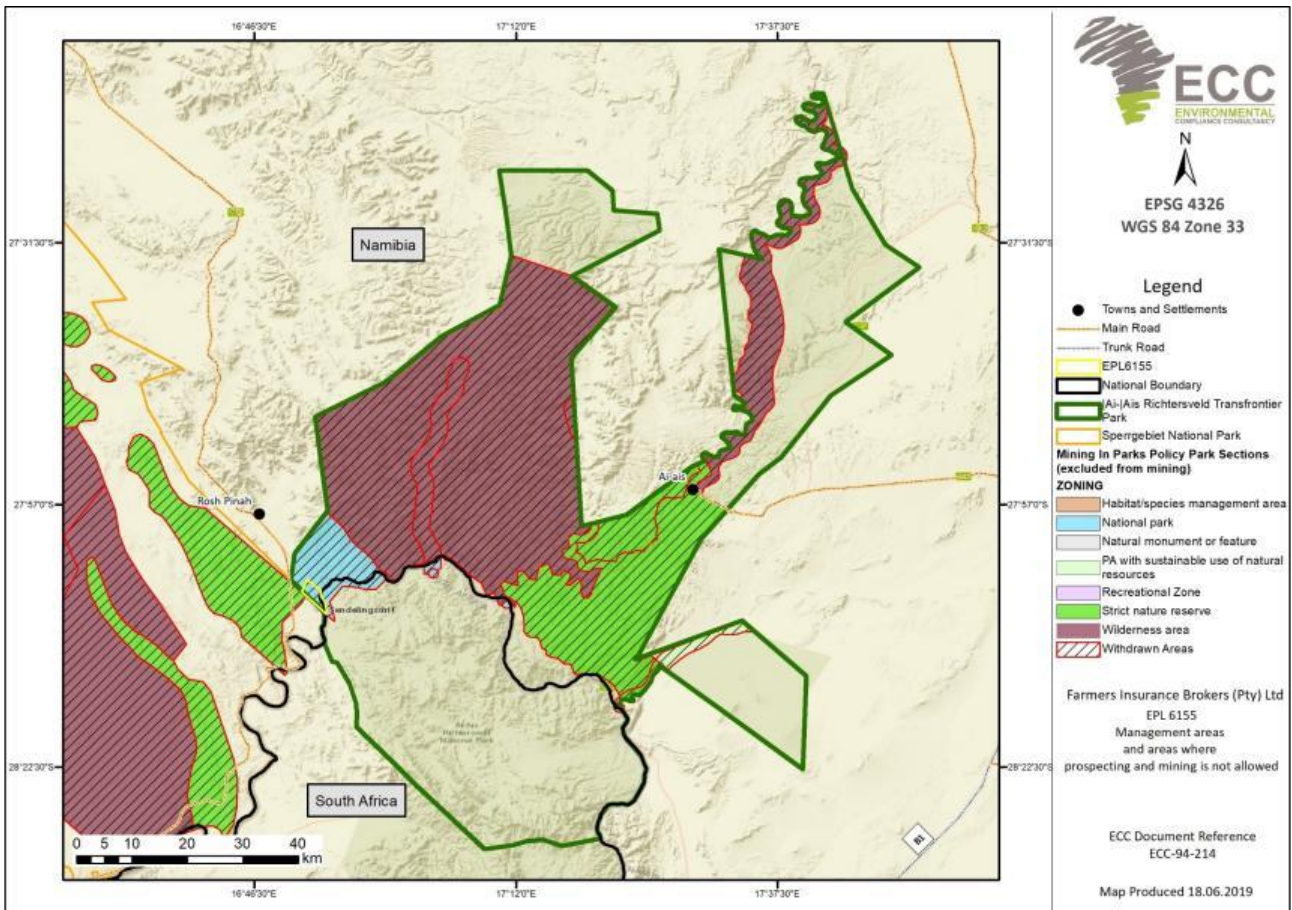
Due to low rainfall, the regions carrying capacity of rangeland is very low. Moreover, the biodiversity is threatened by habitat transformation and subsequent species loss due to unsustainable land use (i.e. mining, overgrazing, and ploughing) exacerbated by projected climate change. The dominant land-use in this area is semi-nomadic farming with goats, sheep and cattle.

EPL 6155 is in the /Ai-/Ais/Richtersveld Transfrontier Park, which is used primarily for tourism. Due to the park richness of the succulent Karoo biome; the Fish River Canyon; /Ai-/Ais and Hobas Tourist Camp, it is a well-known tourist destination that boast the famous hiking trails in southern Africa. The mouths of the Konkiep, Boom and Naub Rivers have a potential for tourism and ecological importance as they feature rare and endemic species and provide drainage.

There are tourism facilities (information centre, rest camp, ferry crossing) on the EPL site, within the South African boundary. Therefore, to sustain the aesthetic value and preservation of the park, rehabilitation of activities is imperative for any future tourism development.

### 5.8.1 PROTECTED AREAS EXCLUDED FROM PROSPECTING AND MINING

As stated previously, EPL 6155 is located in the /Ai-/Ais/Richtersveld Transfrontier Park. To support the protection of Namibia’s national parks whilst developing the mining sector in line with the Fifth National Development Plan (NDP5), the Namibian Government has developed an integrated, flexible and comprehensive policy to deal with mining and prospecting in protected areas (refer to section 2). The policy sets out where mining and exploration related impacts are legally prohibited and where biodiversity areas may present high risks for mining projects. FIGURE 10 illustrates these areas for the /Ai-/Ais/Richtersveld Transfrontier Park.



**FIGURE 10 - MANAGEMENT AREAS FOR THE /AI-/AIS/RICHTERSVELD TRANSFRONTIER PARK**

EPL 6155 is located in the /Ai-/Ais-Richtersveld Transfrontier Park (ARTFP) area and is classified as Zone 2, *Areas of Medium Sensitivity*. Some areas of the park are excluded from prospecting and mining activities to avoid irreparable damage that might affect the rare and endemic species and current and future prospects of tourism. EPL 6155, predates the implementation and development of the National Policy on Prospecting and Mining in Protected Areas. Hence, the proponent is required to ensure potential environmental impacts are minimised and managed through the use of best practice approaches available and compliance to the EMP.

## 5.9 SOCIO-ECONOMIC ENVIRONMENT

### 5.9.1 GOVERNANCE

Namibia was established in 1990 and is led by a democratically elected and stable government. The country ranked top fifth out of 54 African countries in the Ibrahim Index of African Governance in 2015 for the indicators including the quality of governance and the government's ability to support human development, sustainable economic opportunity, rule of law and human rights (National Planning Commission, 2017).

As a result of sound governance and stable macroeconomic management, Namibia has experienced rapid socioeconomic development. Namibia has achieved the level of 'medium human development' and ranks 125th on the Human Development Index out of 188 countries (National Planning Commission, 2017).

### 5.9.2 DEMOGRAPHIC PROFILE

Namibia is one of the least densely populated countries in the world, with a population of 2.3 million people. Life expectancy is 65 years and expected years of schooling is 11.7 (National Planning Commission, 2017). Namibia's population is expected to increase from an estimated 2.11 million in 2011 to 3.44 million by 2041 (63%) (Namibia Population Census, 2011).

### 5.9.3 HIV/AIDS IN NAMIBIA

HIV/AIDS in Namibia is a critical public health issue and is one of the leading causes of death. Namibia has a generalised HIV epidemic, meaning that there is a high HIV prevalence among the whole population. The epidemic is now starting to stabilise, after a rapid increase from the time that the first case of HIV was reported in 1986 through until a peak in 2002. HIV prevalence in Namibia is not yet measured through a population-based survey, instead, HIV prevalence among pregnant women attending Ante Natal Clinics is used. In 2010, 18.8% of pregnant women were HIV positive, a reduction from the high of 22% in 2002. However, HIV prevalence is unevenly distributed throughout the country, therefore this figure is not a national representation. The overall trend illustrates that HIV prevalence is stabilising rather than increasing (UNICEF, 2011).

### 5.9.4 EMPLOYMENT

Unemployment rates in Namibia particularly, among the youth are exceedingly high. According to the Namibia Labour Survey (2018), the unemployment rate of the country was 33.4% in 2018, with the //Karas Region accounting for 32.2% of unemployment rate.

The labour force participation rate is the proportion of the economically active people in a given population group, which is calculated as the number of economically active people divided by the total population in the same population group. The labour force participation for the country was 71.2% (Namibia Population Census, 2011).

### 5.9.5 ECONOMIC ACTIVITIES

The Namibian economy has grown on average by 4.6% per year between 2012 and 2016, however, slowed down in 2016 to 0.2% due to a reduction in productivity in the farming industry. The growth rate over the years has not reduced unemployment; in 2016 nearly 18% of the population lived in poverty. A lack of industrialisation and infrastructure has contributed to Namibia's economic imbalance. The 5th Namibian NDP (National Planning Commission (2017) states that, by modernising and industrialising of the major sectors of agriculture, fisheries, manufacturing, mining and tourism, and by providing trading opportunities so that workers can upgrade their skills. Namibia will create jobs in a diverse range of industries which will improve the economy.

The mining and quarrying sector is the largest income which contributed an overall 11.3 percent to GDP and 64.2 percent to gross primary industry contribution to GDP, this is then followed by the tourism, fishing and manufacturing (Namibia Population Census, 2011)

### 5.9.6 NOISE IMPACTS

There sensitive receptors within proximity to the site are tourists. Activities on the EPL 6155 have the potential to generate nuisance noise that can impact the quality of life for neighbouring residents and tourism activities with the park however this potential impact Are minimal due to the nature of the exploration methods employed refer to FIGURE 11.

### 5.9.7 AIR QUALITY

During the exploration phase, dust will be created by mechanical digging of trenches and pits to bedrock. However, the impacts on the environment during exploration activities are expected to be minimal. Similarly, impact to sensitive receptors surrounding the proposed project area mentioned above may occur, refer to FIGURE 11.

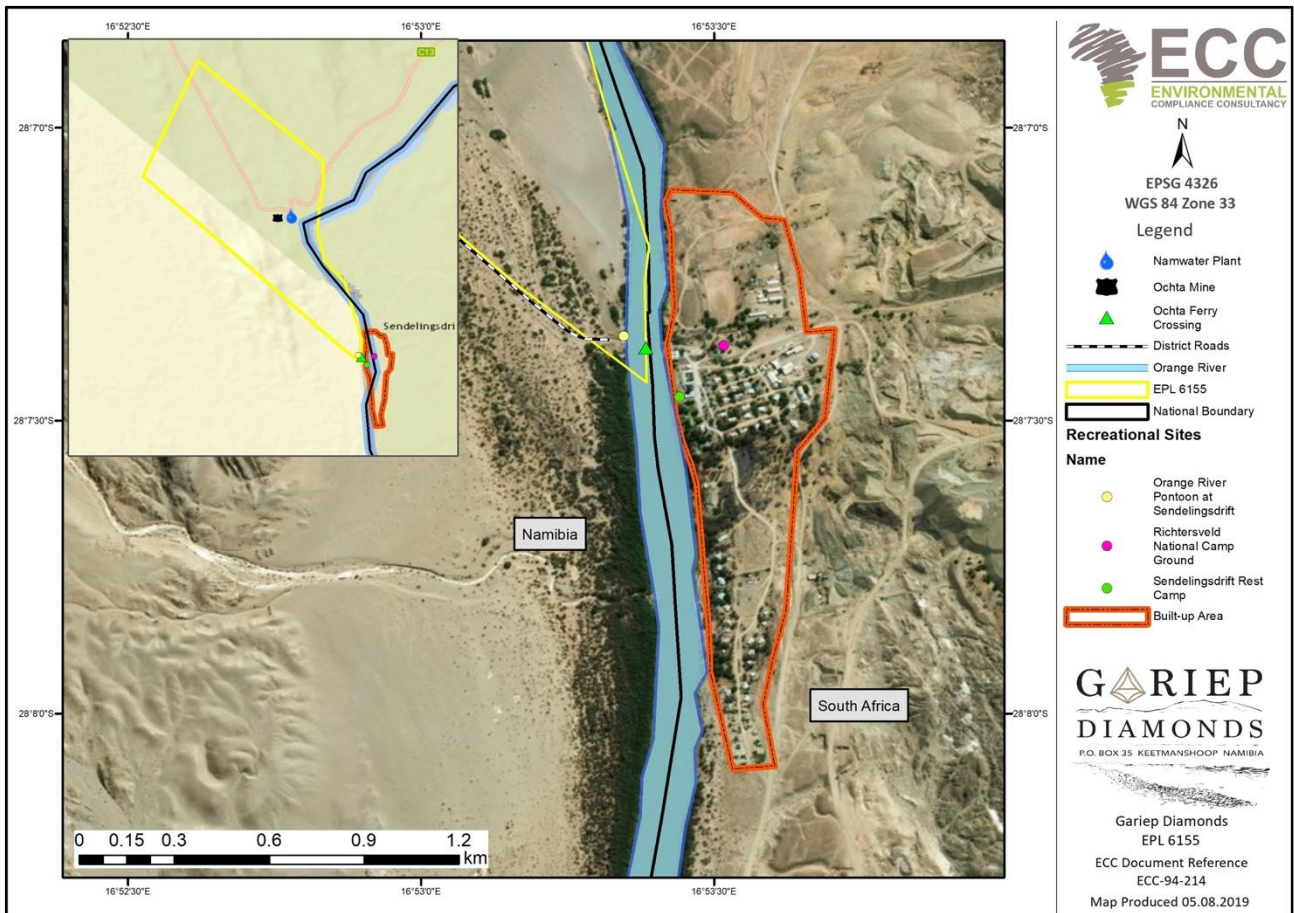


FIGURE 11 - SENSITIVE RECEPTORS TO NOISE AND AIR QUALITY

## 6 ENVIRONMENTAL ASSESSMENT FINDINGS AND MITIGATION

### 6.1 SCOPING ASSESSMENT FINDINGS

When undertaking the scoping exercise, the design of the proposed project and best practice measures were considered to ensure the likely significant effects and any required additional mitigation were identified. The following topics were considered during the assessment:

- Surface water and ground water
- Soils and geology
- Landscape (visual impacts, change in landscape, sense of place)
- Socioeconomics (employment, local businesses, community, demographics, tourism and land use)
- Noise
- Ecology (fauna & flora)
- Human environment (infrastructural services, traffic and transport)
- Air quality (including dust), and
- Cultural heritage and palaeontology resources.

The source-pathway-receptor model was used to evaluate the potential impacts of the proposed project and determine if further assessment is required. These include:

- **Source of potential impact** - where does the impact come from, e.g. the activity, ground excavation, which emits dust;
- **The potential pathway** – how can the pollution / impact travel through the environment e.g. wind direction and speed; and
- **The receptor and effect** – what can be affected and how e.g. water body, sedimentation, water quality affected.

TABLE 12 sets out the findings of the assessment. Activities that could be the source of an impact have been listed, followed by receptors that could be affected. The pathway between the source and the receptor has been identified where both are present. Where an activity and/or receptor has not been identified, an impact is unlikely, thus no further assessment or justification is provided. Where the activity, receptor and pathway have been identified, a justification has been provided documenting if further assessment is required or not required.

Due to the nature and localised scale of the exploration activities, and the environmental context of the site, the potential environmental and social effects are limited and unlikely to be significant. The only area where uncertainty remained during the scoping phase was the potential effects on human receptors from the increase in noise levels, namely residents in farm houses. Further consideration of the potential effects on humans was therefore undertaken and results are presented in the next section

## 6.2 LIMITATIONS, UNCERTAINTIES AND ASSUMPTION

A number of limitations and uncertainties were acknowledged during the EIA process. In line with EIA best practice, assumptions have been made based on realistic worst-case scenarios, thereby ensuring that the worst-case potential environmental impacts are identified and assessed.

The following assumptions and uncertainties identified during the assessment process include:

**TABLE 11 - SUMMARY OF LIMITATION, UNCERTAINTIES AND ASSUMPTION OF THE EIA PROCESS**

LIMITATION / UNCERTAINTY	ASSUMPTION
The program of exploration works is not confirmed	It is assumed that exploration work shall commence as soon as approval is attained and involve mineral sampling. Pitting and trenching are unlikely.
Number of employees and area they will come from	It is assumed that most of the workers will come from Noordoewer, //Karas Region.
Water resource use	Water will be abstracted from the Orange River, yet the volume is undefined.
Access route and creation of new tracks	No new tracks or access roads shall be created, public roads to be used to access the EPL

TABLE 12 – SCOPING ASSESSMENT FINDINGS

RECEPTOR	DESCRIPTION OF ACTIVITY	DESCRIPTION OF POTENTIAL IMPACT/S	EFFECT/DESCRIPTION OF MAGNITUDE	VALUE OF SENSITIVITY	MAGNITUDE OF CHANGE	SIGNIFICANCE OF IMPACT	IMPACT MANAGEMENT/CONTROL MEASURES	RESIDUAL IMPACT AFTER MITIGATION
Groundwater	Trenching and pitting can contaminate groundwater through potential spillages of fluid, fuel lubrication etc.	- Groundwater pollution through the spillages of material and may lead to soil contamination	Direct Local Medium-Term Temporary/reversible Likely	Medium	Moderate	Moderate (6)	- Ensure spill kits are always in place and readily available - Consider alternative sites when the water table is too high	Low (2)
Soil	Fuel handling, storage and lubrication of equipment.  Trenching and the use of equipment can cause reduction in soil quality	- Spillage may lead to soil contamination - Trenching and pitting can cause reduction in soil quality - Soil erosion can be caused through vegetation clearance	Direct On-site Short-term Temporary/reversible Likely	Medium	Moderate	Moderate (6)	<b>Safe delivery and handling:</b> - All employees should be trained on how to respond in an event of an incidents and toolbox talks - Good housekeeping across the site shall be maintained - Ensure spill kits are always in place and readily available across the site - Any major spill is reported to the project manager and Ministry of Mines and Energy - Equipment to be well maintained and serviced regularly - The use of hydrocarbons under 200 litres can be used for mobile refuelling or servicing  <b>Storage:</b> All tanks to be stored on a non-porous floor and bunded area	Low (2)



RECEPTOR	DESCRIPTION OF ACTIVITY	DESCRIPTION OF POTENTIAL IMPACT/S	EFFECT/DESCRIPTION OF MAGNITUDE	VALUE OF SENSITIVITY	MAGNITUDE OF CHANGE	SIGNIFICANCE OF IMPACT	IMPACT MANAGEMENT/CONTROL MEASURES	RESIDUAL IMPACT AFTER MITIGATION
							<ul style="list-style-type: none"> <li>- Bund need to be capable of storing at least 110% of the volume of the tank</li> <li>- All containers should to be suitable for use and not damaged</li> <li>- Tanks should always be locked</li> </ul> <p><b>Refuelling:</b></p> <ul style="list-style-type: none"> <li>- Drip tray to be used during refuelling of vehicles and must be on an impermeable flat surface where possible</li> <li>- A funnel or similar should be available and used to avoid spillage during decanting</li> <li>- Equipment must be in good condition to ensure that the oil spills do not contaminate the site</li> </ul>	
<b>Community</b>	Exploration activities can result in loss of potential tourism due to poor visual amenity	Loss of tourism	Indirect On-site Short-term Reversible Likely	Medium	Moderate	<b>Moderate (6)</b>	<ul style="list-style-type: none"> <li>- A suitable exclusion radius should be observed for areas with high tourism value Excluded areas and plant species should remain unaffected</li> <li>- Ensure operations are not visually displeasing for tourist and are out of tourist views from main roads.</li> </ul>	<b>Low (2)</b>

RECEPTOR	DESCRIPTION OF ACTIVITY	DESCRIPTION OF POTENTIAL IMPACT/S	EFFECT/DESCRIPTION OF MAGNITUDE	VALUE OF SENSITIVITY	MAGNITUDE OF CHANGE	SIGNIFICANCE OF IMPACT	IMPACT MANAGEMENT/CONTROL MEASURES	RESIDUAL IMPACT AFTER MITIGATION
<b>Community</b>	Dust creation due to trenching and pitting activities  Dust creation due to vehicular activities	<ul style="list-style-type: none"> <li>- Impacts of public health and visibility</li> <li>- Impact on fauna and flora</li> </ul>	Direct Local Temporary Reversible Likely	Low	Minor	Minor (3)	<ul style="list-style-type: none"> <li>- Avoid off-road driving</li> <li>- Apply dust suppression methods- water sprinkling</li> <li>- Communication with landowners/neighbours</li> <li>- Digging of trenches and pits method will be selected depending on proximity to sensitive receptor.</li> </ul>	Low (2)
<b>Neighbours /Landowners / Tourists</b>	Visual impact exploration equipment on and laydown area on site	<ul style="list-style-type: none"> <li>- Eyesore due to poor housekeeping</li> <li>- Chang in landscape</li> <li>- Obscuring views</li> </ul>	Direct Local Short-term Reversible Certain	Low	Minor	Minor (3)	<ul style="list-style-type: none"> <li>- Make provision for visual barriers at exploration site, and</li> <li>- Maintain good housekeeping on site</li> </ul>	Minor (3)
<b>Terrestrial Ecology and biodiversity</b>	Exploration activities in sensitive environments including; <ul style="list-style-type: none"> <li>- Vegetation clearing</li> <li>- Hauling equipment</li> <li>- Vehicle movements</li> </ul>	<ul style="list-style-type: none"> <li>- Possible injury or death of animals</li> <li>- Poaching</li> <li>- Habitat fragmentation from clearing, pitting and trenching</li> <li>- Habitat loss from excessive</li> </ul>	Direct Local Short-term Temporary/reversible Certain	Medium	Low	Minor (2)	<ul style="list-style-type: none"> <li>- Use existing tracks where possible</li> <li>- Identify rare, endangered, threatened and protected species and harvest, protect and store them for replantation as part of rehabilitation. Demarcate them and avoid cutting them down.</li> </ul>	Low (2)

RECEPTOR	DESCRIPTION OF ACTIVITY	DESCRIPTION OF POTENTIAL IMPACT/S	EFFECT/DESCRIPTION OF MAGNITUDE	VALUE OF SENSITIVITY	MAGNITUDE OF CHANGE	SIGNIFICANCE OF IMPACT	IMPACT MANAGEMENT/CONTROL MEASURES	RESIDUAL IMPACT AFTER MITIGATION
		clearing					<ul style="list-style-type: none"> <li>- All workers on-site are to be notified avoid any excluded areas or species</li> <li>- Progressive rehabilitation during the exploration phase should applied</li> <li>- Natural drainage patterns should be restored</li> <li>- Relocation of protected plant species if disturbance cannot be avoided.</li> </ul>	
<b>Topography and landscape</b>	Creation of new tracks and roads	<ul style="list-style-type: none"> <li>- Environmental disturbance</li> <li>- Loss of flora and fauna</li> <li>- Disturbance of migratory animals in the area</li> </ul>	Direct Local Short-term Reversible Likely	Medium	Moderate	Moderate (6)	<ul style="list-style-type: none"> <li>- Make use of existing tracks if available</li> <li>- When developing a new track off an existing roadway ensure the junction is discreet but is also safe</li> <li>- Monitor the condition of the track before, during, and after use.</li> <li>- Do not needlessly remove vegetation from either side of the roadway.</li> </ul>	Low (2)
<b>Heritage</b>	<ul style="list-style-type: none"> <li>- Trenching and pitting can destroy heritage remains</li> <li>- Direct and indirect</li> </ul>	Impact on viewshed/landscape surrounding heritage features	Direct On site Long-term Irreversible Unlikely	High	Major	Major (9)	<p>If discovery of unearthed archaeological remains to be uncovered, the following measures (chance find procedure) shall be applied:</p> <ul style="list-style-type: none"> <li>- Works to cease, area to be demarcated with appropriate</li> </ul>	Minor (4)

RECEPTOR	DESCRIPTION OF ACTIVITY	DESCRIPTION OF POTENTIAL IMPACT/S	EFFECT/DESCRIPTION OF MAGNITUDE	VALUE OF SENSITIVITY	MAGNITUDE OF CHANGE	SIGNIFICANCE OF IMPACT	IMPACT MANAGEMENT/CONTROL MEASURES	RESIDUAL IMPACT AFTER MITIGATION
	impacts to cultural resources						<p>tape by the site supervisor, and the Site Manger to be informed</p> <ul style="list-style-type: none"> <li>- Site manager to visit the site and determine whether work can proceed without damage to findings, mark exclusions boundary</li> <li>- If work cannot proceed without damage to findings, site manager is to inform the environmental manager who will get in touch with an archaeologist for advice</li> <li>- Archaeological specialist is to evaluate the significance of the remains and identify appropriate action, for example, record and remove; relocate or leave in situ (depending on the nature and value of the remains)</li> <li>- Inform the police if the remains are human, and</li> <li>- Obtain appropriate clearance or approval from the competent authority, if required, and recover and remove the remains to the National Museum or National Forensic Laboratory as appropriate.</li> </ul>	

RECEPTOR	DESCRIPTION OF ACTIVITY	DESCRIPTION OF POTENTIAL IMPACT/S	EFFECT/DESCRIPTION OF MAGNITUDE	VALUE OF SENSITIVITY	MAGNITUDE OF CHANGE	SIGNIFICANCE OF IMPACT	IMPACT MANAGEMENT/CONTROL MEASURES	RESIDUAL IMPACT AFTER MITIGATION
<b>Social Economic</b>	Job creation due to exploration activities	<ul style="list-style-type: none"> <li>- Employment creation and skills development</li> <li>- Opportunities during the exploration phase (Approx. 10-20 jobs)</li> </ul>	Direct Regional Long-term Reversible Certain	Medium	Minor	Minor (4)	<ul style="list-style-type: none"> <li>- Maximise local employment and local business opportunities to promote and improve the local economy</li> <li>- Enhance the use of local labour and local skills as far as reasonably possible. Where the required skills do not occur locally, and where appropriate and applicable, ensure that relevant local individuals are trained, and</li> <li>- Ensure that goods and services are sourced from the local and regional economy as far as reasonably possible</li> </ul>	Low beneficial
<b>Community Environment</b>	Generation of waste due to exploration activities	<ul style="list-style-type: none"> <li>- Nuisances (odours and visual), and</li> <li>- Litter (nuisance and ecological risk)</li> </ul>	Direct On-site Short-term Reversible Likely	Moderate	Low	Minor (3)	<ul style="list-style-type: none"> <li>- Training and toolbox talk to workers shall be provided</li> <li>- Ensure good housekeeping across site</li> <li>- Implement the waste management hierarchy across the site: avoid, reuse, and recycle</li> <li>- Waste shall be collected and shall be removed on a regular basis to avoid bad odours</li> <li>- It is unlikely that hazardous material and wastes will be produced, however in the event that they do, they shall be</li> </ul>	Low (2)

RECEPTOR	DESCRIPTION OF ACTIVITY	DESCRIPTION OF POTENTIAL IMPACT/S	EFFECT/DESCRIPTION OF MAGNITUDE	VALUE OF SENSITIVITY	MAGNITUDE OF CHANGE	SIGNIFICANCE OF IMPACT	IMPACT MANAGEMENT/CONTROL MEASURES	RESIDUAL IMPACT AFTER MITIGATION
							<p>managed in a safe and responsible manner so as to prevent contamination of soils, pollution of water and/or harm to people or animals as a result of the use of these materials, and</p> <ul style="list-style-type: none"> <li>– Hazardous and non-hazardous waste shall always be stored separately.</li> </ul>	

## 7 ENVIRONMENTAL MANAGEMENT PLAN

The EMP for the proposed project is presented in Appendix A. It provides management options to ensure the impacts of the proposed project are minimised. An EMP is a tool used to take pro-active action by addressing potential problems before they occur. This should limit the corrective measures needed, although additional mitigation measures might be included if necessary.

The management measures should be adhered to during all stages of the exploration activities. All persons involved and partaking in the proposed activities should be made aware of the measures outlined in the EMP to ensure activities are conducted in an environmentally sound manner.

The objectives of the EMP are:

- To include all components of the development and operations of the project
- To prescribe the best practicable control methods to lessen the environmental impacts associated with the project
- Compliance to the park management plan
- Compliance to the National Policy on Prospecting and mining in prospecting in Protected Areas
- To ensure rehabilitation and restoration will take place, and
- To ensure that appropriate environmental training is provided to responsible operational personnel.

## 8 CONCLUSION

The environmental assessment that was undertaken for the proposed project followed ECC's EIA methodology to identify if there is potential for significant effects to occur as a result of the proposed project. Through the scoping process, all social and environmental receptors were scoped as requiring further assessment as it was unlikely that there would be significant effects. Various best practice and mitigation measures have been identified to avoid and reduce effects as far as reasonably practicable, as well as to ensure the environment is protected.

Namibia's National policy on Prospecting and Mining in Protected Areas, has been passed to promote sustainable development by guiding prospecting and mining in the country's protected areas whilst ensuring sustainable exploration and mining and conserving biodiversity and maintaining healthy ecosystems.

It is recognised that EPL 6155 is located within a national Park and within an area of medium sensitivity, the assessment incorporated these factors and concluded that the assessment is considered to be comprehensive and sufficient to identify impacts, and it is concluded that measures shall be taken to avoid irreparable damage to the environment by:

- Setting aside for sensitive and low non-intrusive exploration activities
- Ensuring no or minimal mechanized access in the park, and
- Ensuring no permanent structures shall be constructed.

On this basis, it is of the opinion of ECC that an environmental clearance certificate could be issued, on conditions that the management and mitigation measures specified in the EMP are implemented and adhered to.



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## APPENDIX A\_ ENVIRONMENTAL MANAGEMENT PLAN

## APPENDIX B - NON-TECHNICAL SUMMARY



ECC-94-214-NTS-05-C

## NON-TECHNICAL SUMMARY

### EXPLORATION ACTIVITIES ON EPL 6155 FOR PRECIOUS STONES, //KARAS REGION

PREPARED FOR



JULY 2019

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PO BOX 91193 Windhoek Namibia  
Environmental Compliance Consultancy CC  
CC/2013/11404

# NON-TECHNICAL SUMMARY

## PROPOSED EXPLORATION ACTIVITIES ON EPL 6155 FOR PRECIOUS STONES

### 1 PURPOSE OF THIS DOCUMENT

The purpose of this Non-Technical Summary (NTS) is to provide Interested and Affected Parties (I&APs) a background to the proposed project and to invite I&APs to register as part of the Environmental Impact Assessment (EIA) process. The project involves exploration activities on EPL 6155 for precious stones. Through registering, all I&APs will be kept informed throughout the EIA process, and a platform for participation will be provided to submit comments/recommendations pertaining to the project.

This NTS includes the following information on:

- The proposed project and location
- The necessity of the project, benefits or adverse impacts anticipated
- The alternatives to the project have been considered and assessed
- How the EIA process works
- The public participation process and how to become involved, and
- Next steps and the way forward.

### 2 DESCRIPTION OF PROPOSED PROJECT

#### 2.1 BRIEF INTRODUCTION

Environmental Compliance Consultancy (ECC) has been engaged by the proponent (Gariiep Diamonds) to undertake an Environmental Impact Assessment (EIA) and an Environmental Management Plan (EMP) in terms of the Environmental Management Act, 2007 and its Regulations. An environmental clearance application will be submitted to the relevant competent authorities: The Ministry of Mines and Energy (MME) and Ministry of Environment and Tourism (MET).

#### 2.2 LOCATION

The project is located in the //Karas Region. The site is located approximately 16.27km south-east of Rosh Pinah with the C13 route cross cutting from the north

throughout the EPL. Refer to the location map provided in FIGURE 1.

#### 2.3 WHAT IS PROPOSED

Gariiep Diamonds undertakes mineral exploration in Namibia and propose to undertake exploration activities on EPL 6155 for precious stones in the //Karas Region.

#### 2.4 OPERATION PHASE

The following are envisaged during the proposed project:

- Potential creation of access tracks, where existing tracks cannot be utilised
- Limited vegetation clearing for the creation of tracks, and
- Exploration methods may include mechanical digging of trenches and pits to bedrock. Small equipment such as (Tractor-Loader-Backhoe (TLB), a small tipper, one pan with conveyer, jig and generator) will be used to recover samples and then to separate gravel.

#### 2.5 WHY IS THE PROJECT NEEDED

Gariiep Diamonds intends to pursue exploration opportunities with the aim of identifying new mining prospects. Namibia is rich in natural resources and the mining industry is one of the largest contributors to GDP in Namibia. Exploration could lead to mining activities which would contribute to the national and local economy.

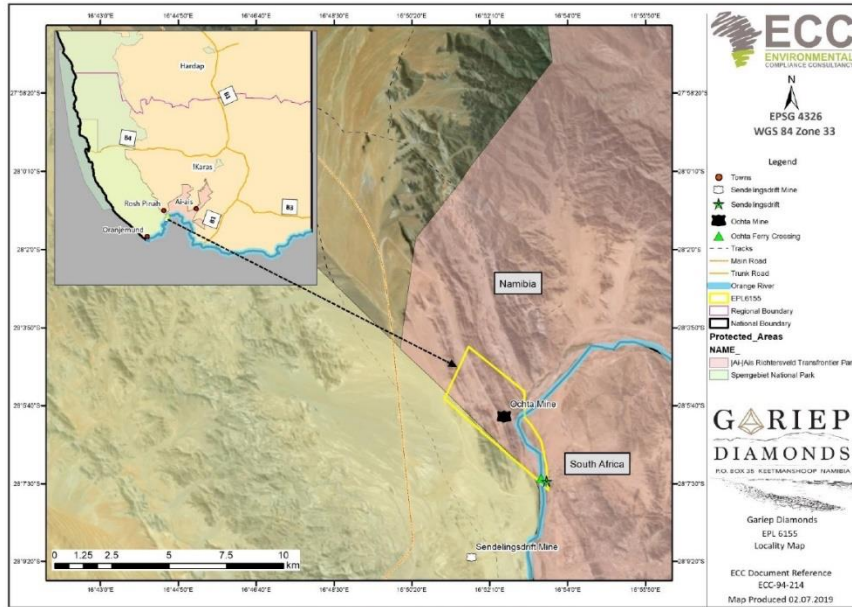


FIGURE 1 – LOCATION MAP OF THE PROPOSED PROJECT



NON-TECHNICAL SUMMARY  
GARIEP DIAMONDS

2.6 POTENTIAL IMPACTS OF THE PROJECT

2.6.1 SOCIO-ECONOMIC

The potential social impacts are anticipated to be of low significance, and those that may transpire shall be confined within the EPL site, these potential impacts may include the following:

- Potential to unearth, damage or destroy undiscovered heritage remains
- Some jobs will be created as a result of the project, and
- There will be economic benefits due to increased investment and investor confidence in the Namibian minerals sector.

2.6.2 THE ENVIRONMENT

The potential environmental impacts are anticipated to be of minor significance, and those that may occur shall be contained within the EPL site, these potential impacts may include the following:

- Some potential ground disturbance and vegetation loss due to possible tracks creation
- Use of natural resources, including surface water
- Minor risk of loss of contaminant of hydrocarbon, chemical fluids from exploration activities potentially leading to localised ground contamination.

3 CONSIDERATION OF ALTERNATIVES

Best practice environmental assessment methodology calls for consideration and assessment of alternatives to a proposed project.

In a project such as this one, it is difficult to identify alternatives to satisfy the need of the proposed project; the activities shall be specific to the EPL 6155 which was granted by the MME on the 23<sup>rd</sup> March 2018.

During the assessment, alternatives will take the form of a consideration of optimisation and efficiency to reduce potential effects e.g. different types of technology or operations, route access and exploration methods.

4 THE ENVIRONMENTAL ASSESSMENT PROCESS

This EIA, conducted by ECC, is undertaken in terms of the Environmental Management Act, 2007 and its regulations.

The process followed in this EIA is set out in the flowchart in

FIGURE 2 below.

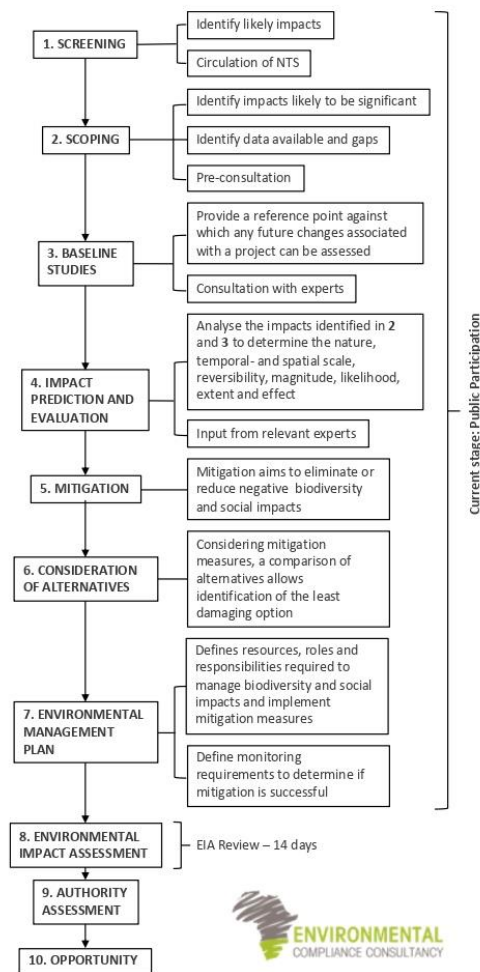


FIGURE 2 - FLOWCHART OF THE ENVIRONMENTAL ASSESSMENT PROCESS



#### 4.1 SCREENING

A review of the proposed project screening findings against the listed activities was conducted; the findings of which are summarised below.

##### **MINING AND QUARRYING ACTIVITIES**

(3.1) The construction of facilities for any process or activities which requires a licence, right or other form of authorisation, and the renewal of a licence, right or other form of authorisation, in terms of the Minerals (Prospecting and Mining Act), 1992

- The proposed project requires a licence for extraction of precious stones

(3.2) Other forms of mining or extraction of any natural resources whether regulated by law or not

- Minerals (soil and sand), precious stones will be sourced out within the project's footprint/locally as far as possible

(3.3) Resource extraction, manipulation, conservation and related activities

- The proposed project extract will precious stones

##### **WATER RESOURCE DEVELOPMENT**

(8.1) The abstraction of ground or surface water for industrial or commercial purposes

- Surface water will be abstracted from the Orange River

(8.3) Any water abstraction from a river that forms an international boundary

- Water for the project will be abstracted from the Orange River

The potential environmental and social effects are anticipated to be of minor significance, and those that may occur shall be contained on the EPL 6155 site.

#### 4.2 SCOPING

Due to the nature of the proposed project, and the implementation of industry best practice mitigation measures during the mineral exploration phase of the project, the effects on the environment and society are expected to be minimal and localised.

#### 4.3 BASELINE STUDIES

For the proposed project, baseline information was obtained through a desk-based study focusing on the environmental receptors that could be affected by the proposed project. ECC will also engage with

stakeholders, I&APs and the proponent to seek input into the assessment as required.

#### 4.4 IMPACT ASSESSMENT

The EIA will be conducted in terms of the Environmental Management Act, 2007 and its regulations. ECCs methodology for impact assessments was developed using IFC standards in particular Performance Standard 1 'Assessment and management of environmental and social risks and impacts' (International Finance Corporation, 2017), (International Finance Corporation, 2012) and Namibian Draft Procedures and Guidance for EIA and EMP (Republic of Namibia, 2008) including international and national best practice with over 25 years of combined EIA experience.

#### 4.5 ENVIRONMENTAL MANAGEMENT PLAN

An EMP shall be developed for the proposed project setting out auditable management actions for Gariep Diamonds to ensure careful and sustainable management measures are implemented for their activities in respect of the surrounding environment and community.

#### 4.6 PUBLIC PARTICIPATION AND ADVERTISING

Public participation is an important part of the EIA process; it allows the public and other stakeholders to raise concerns or provide valuable local environmental knowledge that can benefit the assessment, in addition it can aid the design process. This project is currently at the scoping phase and public participation phase.

At this phase ECC will perform the following:

- Identify key stakeholders, authorities, municipalities, environmental groups and interested or affected members of the public, hereafter referred to as I&APs
- Distribute the NTS for the proposed project (this document)
- Advertise the environmental application in two national newspapers
- Place notices on-site, at or near the boundary of the EPL 6155 site
- If required host a public meeting to encourage stakeholder participation and engagement, and provide details of issues identified by the





NON-TECHNICAL SUMMARY  
GARIEP DIAMONDS

environmental practitioner, stakeholders and I&APs

- Record all comments of I&APs and present such comments, as well as responses provided to ECC, in the comments and responses report, which will be included in the scoping report that shall be submitted with the application, and
- Circulate I&AP comments to the project team for consideration of project design.

Comments must be submitted in writing and can be emailed using the details in the contact us section below.

CONTACT US

We welcome any enquiries regarding this document and its content. Please contact:

**Environmental Compliance Consultancy (ECC)**

[info@eccenvironmental.com](mailto:info@eccenvironmental.com)

Tel: +264 81 669 7608

[www.eccenvironmental.com](http://www.eccenvironmental.com)

At ECC we make sure all information is easily accessible to the public.

Follow us online to be kept up to date:



## APPENDIX C - EVIDENCE OF PUBLIC CONSULTATION AND REGISTERED POSTS

APPENDIX D - SITE NOTICE AND ADVERTS

28 Thursday 4 July 2019

## VACANCIES

The Namibia Statistics Agency (NSA) was established in terms of the Statistics Act No. 9 of 2011. The Agency is mandated, amongst others, to constitute the central statistical authority of the State and to collect, produce, analyse and disseminate official statistics in Namibia.

**Nature of Employment: Temporary**

**Positions: Team Supervisors  
Mappers/Enumerators  
IT Field Technicians  
IT System Specialist: Database Administrator**

**ONLINE APPLICATIONS ONLY**  
Interested candidates are requested to apply online via the NSA website. Please use the following link to access the NSA's E-recruitment system: <https://nsa.org.na/jsp/vacancies/>

*"As per the Affirmative Action (Employment) Act, Act 29 of 1996, Namibian Citizens from previously disadvantaged groups will enjoy preferential treatment"*

Only short listed candidates will be contacted.

Closing date for applications: Friday, 12th July 2019

Namibia Statistics Agency (NSA), PO-Box, 44 Post Street Mall, Windhoek, Namibia, PO Box 2103, Windhoek, Namibia  
Tel: 061-432 2200, Fax: 061-43 0223  
[www.nsa.org.na](http://www.nsa.org.na)

THE NAMIBIAN

### USAKOS TOWN COUNCIL

67 Usakos Namibia, T. 064-64 00025, F. 064-64 00021, E. [town@usakos.com.na](mailto:town@usakos.com.na) / [town@usakos.com.na](mailto:town@usakos.com.na)

**Request for Proposal, Leasing and Management of the Usakos Community Garden**

The Usakos Town Council hereby welcomes interested and reputable Namibian companies, individuals and institutions to submit a proposal for leasing and management of Erf. 253 Usakos, 45, 51st Street in use (commonly known as the Usakos Community Gardens) for a period of ten (10) years.

The proposal should be submitted in a closed envelope (no couriers, email, postcard, faxed or telegraphic applications will be accepted). The sealed envelope should clearly be marked "REQUEST FOR PROPOSAL - LEASING AND MANAGEMENT OF USAKOS COMMUNITY GARDEN" and must be deposited into the bid box on or before Thursday 26th July 2019 by 10:30 a.m. located at 179 C/O. Kaiser Wilhelm & Goethe Streets. Late proposals will NOT be accepted.

Potential bidders are encouraged to participate in the scheduled site visit on Monday July 15th and must RSVP prior to Friday, July 12th. Finally, any request for clarification should be forwarded in writing to the Office of the Chief Executive Officer, latest 7 days prior to the deadline set for submission of proposals. A detailed Terms of Reference is available upon request, also from the Office of the Chief Executive Officer.

Capacity to deliver to the scope and experience of the bidders shall be considered as paramount requirements. Usakos Town Council may call for a round of presentations and may wish to interview prospective companies, individuals and institutions prior to awarding the Order.

It is estimated that the minimum duration of the lease and management agreement for the garden facility shall be for a period 10 years. You should base your financial proposal on these figures, giving an indication of monthly and/or yearly figures considered necessary by you to undertake the assignment.

Should you be contacted for negotiations, you must be prepared to furnish the detailed cost breakdown and other clarifications to the proposal submitted by you, so we may be required to adjust the reasonable terms of your price proposals.

Please note that the cost of preparing a proposal and of negotiating a contract including visits to Usakos, if any, is not reimbursable.

All offers shall be submitted in the English language.

**For all your advertising needs, call**

Windhoek: 061 - 279600  
Oshakati: 065 - 220246  
Swakopmund: 064 - 463751

or  
E-mail: [sales@namibian.com.na](mailto:sales@namibian.com.na)

**nida** NAMIBIA INDUSTRIAL DEVELOPMENT AGENCY

**MAYANA COMMUNITY IRRIGATION AND CLIMATE RESILIENCE SCHEME**

### GENERAL PROCUREMENT NOTICE

- The Namibia Industrial Development Agency (NIDA) has been awarded financing (hereinafter called "funds") through the Ministry of Infrastructure, Works and Development (MIND) from the United Kingdom Department for International Development (DFID) through the Climate Resilient Infrastructure Development Facility (CRIDF) (hereinafter called "the financial sponsor") toward the cost of the project named above. CRIDF is an official SADC programme working to deliver sustainable small scale infrastructure across 12 SADC countries with a demand-driven programme focusing on water services, water resource management and water for livelihoods, fostering sustainable development of the region's water resources and addressing the water, food and energy needs. NIDA wishes to apply a portion of the funds to eligible payments under the contract for which bidding documents will be issued.
- Within the premises of the CRIDF procurement guidelines, NIDA hereby invites sealed bids from suitably qualified contractors or suppliers for the design, supply, delivery and installation of a solar powered water pumping system at Mvumba in the Erongo Region. The Mayana Community Irrigation and Climate Resilience Scheme is located approximately 20km east of Karas and 100 km south of the Orange River. The project includes the following main components:
  - Up to 200ha solar farm
  - Submersible pumps and associated controls for installation to take in solar pump station
 The work under this contract will be performed as the role of Nominated Subcontractor to the civil works Main Contractor who will be performing the preparation and associated irrigation related tasks.
- The invitation is open to national contractors and suppliers who are registered with the relevant Namibian authorities.
- Interested bidders may purchase bidding documents from 12:00pm on **Thursday 11 July 2019** upon registration and payment of R2 000 at time of collection from the following location:
 

Upon site and request and perfection from:  
Namibia Industrial Development Agency  
NIDA Building  
11 Goethe Street  
Windhoek, Namibia  
E-mail: [procurement@nida.com.na](mailto:procurement@nida.com.na) / [procurement@nida.com.na](mailto:procurement@nida.com.na)
- All bids must be sealed and marked "Procurement No. CRIDF/2019/02-2/7046, Mayana Community Irrigation - Solar Powered Water Pumping System", bearing the closing date and time of the tender and bearing the identification of the tenderer, together with a bid security in the form of a bank guarantee to the value of R4 000 000, or secured via an electronic bank transfer (SET) of the same value, must be deposited in the Tender Box marked TDND03 800, located in the NIDA Building on or before noon local time on **Monday 12 August 2019**.

All bids shall be sent to:  
**ENVIRONMENTAL COMPLIANCE CONSULTANCY**  
Namibia Industrial Development Agency  
NIDA Building  
11 Goethe Street  
Windhoek, Namibia

**Final Address:**  
Namibia Industrial Development Agency  
NIDA Building  
11 Goethe Street  
Windhoek, Namibia

Bidding, in the presence of bidders who choose to attend, will be at the address above on **12 August 2019 at 12:00pm**.

For further clarifications regarding the bid process and obtaining documents, bidders may contact the Financial Sponsor using the details below:

CRIDF  
Smeets' Floor, Block G, Hatfield Gardens  
333 Gower Street  
Hatfield  
Pretoria, South Africa

tel: +27 11 342 9819  
email: [procurement@nida.com.na](mailto:procurement@nida.com.na) and [town@usakos.com.na](mailto:town@usakos.com.na)

**ECC**

### NOTICE OF ENVIRONMENTAL ASSESSMENT & PUBLIC PARTICIPATION PROCESS

EXPLORATION ACTIVITIES ON THE 8535  
(ERONGO REGION, NAMIBIA)

Environmental Compliance Consultancy (ECC) hereby gives notice to the public that an application for an Environmental Clearance Certificate (ECC) has been filed in terms of the Environmental Management Act, 2007 and will be made upon the following:

**Applicant:** Gariep Diamonds  
**Environmental Assessment Practitioner (EAP):** Environmental Compliance Consultancy  
**Location:** Erongo Region, Namibia

**Project:** Exploration activities on Erf. 8535 for Precious Stones, Erongo Region, Namibia.

**Proposed Activity:** The proposed proposal to carry out low impact, non-intrusive exploratory activities for Precious Stones on Erf. 6055 located in the Erongo Region. The EAP is located in the JHU Wildlife and Game Ranch (WGR) (AR17). Exploration activities may include mechanical digging of trenches and pits to bedrock. Water for the exploration activities will be abstracted from The Orange River.

**Application for Environmental Clearance Certificate:** in terms of the Environmental Management Act, 2007 (No. 7 of 2007), ECC on behalf of Gariep Diamonds is required to apply for environmental clearance to the competent authority and the Ministry of Environment and Tourism for the above-mentioned project.

**Purpose of the Review and Comment Period:** The purpose of the review and comment period is to present the proposed project and to afford (EAP) an opportunity to comment on the project to ensure that all issues and concerns are captured and considered in the assessment.

**Review Period:** The review and comment period is effective from **07 July 2019 - 21 July 2019**.

**How you can participate:** ECC is undertaking the required environmental assessment and public participation process in terms of the Act. Interested and affected parties (I&APs) and stakeholders are required to register for the project at: <https://www.environmental.com.na/8535>

Environmental Compliance Consultancy  
Postal address: Namibia: 127001/127001  
Mentemba No. 10, Bechtelsdorp (at 5th) / Mvumba  
PO Box 2103, Windhoek  
Tel: 061 43 000 000  
E-mail: [info@environmental.com.na](mailto:info@environmental.com.na)  
Namibia: [info@environmental.com.na](mailto:info@environmental.com.na) / [town@usakos.com.na](mailto:town@usakos.com.na)  
Erongo: 064 463 751 / 064 463 751

**NOTICE OF ENVIRONMENTAL ASSESSMENT & PUBLIC PARTICIPATION PROCESS**  
**EXPLORATION ACTIVITIES ON EPL 6055**  
**//KARAS REGION, NAMIBIA**

Environmental Compliance Consultancy CC (ECC) hereby gives notice to the public that an application for an Environmental Clearance Certificate in terms of the Environmental Management Act, 2007 will be made as per the following:

**Applicant:** Gariep Diamonds  
**Environmental Assessment Practitioner (EAP):** Environmental Compliance Consultancy  
**Location:** //Karas Region, Namibia

**Project:** Exploration activities on EPL 6055 for Precious Stones, //Karas Region, Namibia.

**Proposed Activity:** The proponent proposes to carry out low impact, non-intrusive exploration activities for Precious Stones on EPL 6055 located in the //Karas Region. The EPL is located in the //An-Ab-Abi Hermsdorp Farm (AB799). Exploration methods may include mechanical digging of trenches and pits to bedrock. Water for the exploration activities will be abstracted from the Orange River.

**Application for Environmental Clearance Certificate:** In terms of the Environmental Management Act, 2007 (No. 7 of 2007), ECC on behalf of Gariep Diamonds is required to apply for environmental clearance to the Competent Authority and the Ministry of Environment and Tourism for the above-mentioned project.

**Purpose of the Review and Comment Period:** The purpose of the review and comment period is to present the proposed project and to afford IRAPs an opportunity to comment on the project to ensure that all issues and concerns are captured and considered in the assessment.

**Review Period:** The review and comment period is effective from 4<sup>th</sup> July 2019 – 29<sup>th</sup> July 2019.

**How you can participate:** ECC is undertaking the required environmental assessment and public participation process in terms of the Act. Interested and affected parties (IRAPs) and Stakeholders are required to register for the project at: <http://www.environmental.com.na>

**Environmental Compliance Consultancy**  
 Registration Number: 022201810000  
 Members: Mr. B. Roodhooft and Mrs. J. Moseley  
 PO Box 91300, Uice, Windhoek  
 Tel: +264 61 464 7000  
 E-mail: [info@environmental.com.na](mailto:info@environmental.com.na)  
 Website: [www.environmental.com.na](http://www.environmental.com.na)  
 Project #: 022-04-214-457-01-4

**OUR NEW BRANCH NOW OPEN AT WERNHIL MALL**

Get help with your insurance and financial needs at our new branch at the New Wernhil Mall in the heart of Windhoek. Our new branch is open weekdays Monday - Friday from 09H00 to 17H30 and Saturdays 09H00 to 12H00

Contact the branch on 061 289 3015 for more information.

DO GREAT THINGS EVERY DAY

# Gobabis Toyota WINTER SPECIAL

 <b>ANDRE BOTHA</b> Automark Manager 0611278901 <a href="mailto:andrebottoyota@gmail.com">andrebottoyota@gmail.com</a>	 <b>IVAN DELIE</b> Sales Executive Used 06 12956090 <a href="mailto:ivan@toyota@gobabis.com">ivan@toyota@gobabis.com</a>	 <b>Willem Pretorius</b> Sales Executive Used 0613707494 <a href="mailto:willemtoyota@gobabis.com">willemtoyota@gobabis.com</a>	 <b>ETIENNE JANJARIÉ</b> Sales Executive New 06 18294284 <a href="mailto:etjanu@gmail.com">etjanu@gmail.com</a>	 <b>SIDONIO ALFAUTE</b> Sales Executive New 0611200114 <a href="mailto:gstoyota1@gmail.com">gstoyota1@gmail.com</a>	 <b>HANNES ENGELBRECHT</b> Sales Manager New 0611227340 <a href="mailto:hannese@toyota.na">hannese@toyota.na</a>	 <b>STEFAN BOTES</b> Sales Executive 0611222213 <a href="mailto:botesstefan@gmail.com">botesstefan@gmail.com</a>
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 2017 QUANTUM BUS 2.0D GL 140 65 000KM BULL BAR, TOW BAR <b>N\$450 000</b>	 2017 HILUX DC 2.4 GDE RD, BFX MT, 20 000KM BULL BAR, TOW BAR, RUBBERIZED <b>N\$375 000</b>	 2019 TOYOTA COROLLA 1.6 PRESTIGE 39000KM <b>N\$290 000</b>	 2017 FORTUNER 2.8 RB AT 61000KM TOW BAR, NUDDO BAR, RUNNING BOARDS <b>N\$460 000</b>	 2016 TOYOTA COROLLA 1.6 Gled 67 000KM <b>N\$172 000</b>	 2018 TOYOTA HILUX DC 2.8 GDE 24 000KM PB PAPER AT BULL BAR, RUNNING BOARDS, RAILS, RUBBERIZED, TOW BAR <b>N\$380 000</b>	 2015 TOYOTA HILUX DC 2.8 GDE 4X4 DABAR 154 000KM NUDDO BAR, RUNNING BOARDS, RUBBERIZED, RAILS <b>N\$385 000</b>	 2016 TOYOTA HILUX 2.8 4X4DC MT 101 000KM CANOPY, TOW BAR, RUNNING BOARDS, RUBBERIZED <b>N\$430 000</b>
 2015 TOYOTA HILUX 3.0 4M LUS DAB DGC AT 118 000KM NUDDO BAR, RUNNING BOARDS, TOW BAR, RUBBERIZED <b>N\$395 000</b>	 2018 TOYOTA C-HR 1.7 1.2 PLUS 14 000KM <b>N\$285 000</b>	 2015 CHEVROLET UTILITY 1.4 BASE AC 57000KM <b>N\$190 000</b>	 2014 TOYOTA ETIOS 1.5 XD HD 60 040KM <b>N\$105 000</b>	 2019 TOYOTA HILUX 2.8 GDE 4X2 EXT AT DEMO 90KM <b>N\$435 000</b>	 2019 TOYOTA HILUX 2.8 GDE 4X2 EXT CAB DEMO 8KM <b>N\$420 000</b>	 2016 TOYOTA HILUX 2.4 GDE AC 4X2 9C 121 000KM RUBBERIZED, TOW BAR <b>N\$215 000</b>	 <b>Automark Certified</b> Used Vehicles Tel: 062 - 562 081 Fax: 062 - 562 803

Please contact us for a 3 months payment holiday period and for RV.

**SITE NOTICE**



APPENDIX E -ECC CVS



**ENVIRONMENTAL**  
COMPLIANCE CONSULTANCY

# Stephan Bezuidenhout

ENVIRONMENTAL ASSESSMENT  
PRACTITIONER

---

*Hello! :)*



**ABOUT ME**

**Name**  
Jacobus Stephan Bezuidenhout  
- But you can call me Stephan -

**Born**  
11 April 1989

**Phone**  
+264 81 262 7872

**Email**  
stephan@eccenvironmental.com

**Website**  
www.eccenvironmental.com

*Contact me!*

**How to reach me!**

kid.bezuidenhout 

+264812627872

Stephan   
Bezuidenhout



**Education & Qualifications**

University of Pretoria  
South Africa  
2012 *Postgraduate Degree in Environmental Management & Analysis*

University of Stellenbosch  
South Africa  
2008 *Bachelors in Applied Science*

**Additional Qualifications:**

- Snake Bite and Snake Handling
- Level 1 & 2 First Aid
- Industrial Environmental Compliance

**Publications:**

*N.S., et al., Some ecological side-effects of chemical and physical bush clearing in a southern African rangeland ecosystem, Southern African Journal of Botany (2015), <http://dx.doi.org/10.1016/j.sajb.2015.07.012>*

*The FSC National Forest Stewardship Standard of Namibia (Draft V 4). Co-authored by S Bezuidenhout, P Cunningham, A Ashby, F Detering, W Enslin & D Honsbein*



**Experience & Work History**

**Managing Director**

**Current:**

- Since 2012, Stephan has been working as an environmental assessment practitioner. Stephan has a strong ecological background and has gained more than seven years experience in the environmental industry. As a lead practitioner, Stephan has successfully driven environmental impact assessments and compliance assessments within Southern Africa. His hands on and practical experience and knowledge of international standards, such as IFC and World Bank standards allows Stephan to advise his clients and teams constructively and effectively.

**ENVIRONMENTAL CONSULTANT & PRACTITIONER**

Stephan manages a dynamic team of environmental practitioners and graduates at Environmental Compliance Consultancy. The firms' core objective is to improve the national standard of environmental compliance by developing local capacity. To date Stephan and his team have successfully completed over 30 projects for various industries, including mining, energy, infrastructure, conservation and tourism.



**ENVIRONMENTAL**  
COMPLIANCE CONSULTANCY

## Stephan Bezuidenhout

Managing Director

+264 81 262 7872

### References

*Feel free to ask the boss :)*

**SALOME BEESLAAR**

Environmental Practitioner  
Pr.Sci.Nat: 400385/14

**ESCA COETZEE**

Environmental Scientist  
Sasol Technology

**PHIL BARKER**

Pipeline Construction Superintendent  
Worley Parsons

*Or ask those who have worked for me?*

**Michael Moreland**

Environmental Scientist  
CSP Solar Energy Projects

### Professional Associations

- South African Institute of Ecologists and Environmental Scientists (SAIE&ES)
- Environmental Assessment Practitioners Association of Namibia (EAPAN#172).
- Member of FSC Environmental Chamber
- Executive Committee Member of Namibian Chamber of Environment

### Fun Facts:

- Keen fisherman
- Passionate Hunter & Conservationist
- 21ft vessel certified skipper
- Summated Kilimanjaro
- Have survived scorpion stings and snakebites!
- Did I mention I love camping?
- **Words I live by:**

'Do what makes you happy  
the rest will follow'

### Experience & Work History

Over the past two years he has mentored over eight interns (of which most still work closely with him) building their careers in environmental management, conservation and rangeland management.

Examples of projects successfully completed include:

- **Abengoa Solar SA Paulputs CSP (Pty) Ltd. 150 MW CSP Tower** Environmental Assessment Practitioner during EIA Process  
Northern Cape Province, South Africa
- **Abengoa Solar SA, Xina Solar One (200 MW) CSP Trough** Environmental Control Officer during construction phase. Northern Cape Province, South Africa
- **Abengoa Solar SA, Khi Solar One (50 MW) CSP Tower.** Environmental Control Officer during commissioning and rehabilitation phases. Northern Cape Province, South Africa for Abengoa Solar
- **Isondlo Project Support (IPS) (Pty) Ltd.** Soil Remediation and commissioning report of NGALA Camp. Gauteng, South Africa
- **Berekisanang Empowerment Farm.** Annual external Water Use Licence audit and 70 hectare agricultural development. Northern Cape, South Africa.

#### Environmental Coordinator

ROMPCO PIPELINE – Worley Parsons  
Mozambique and South Africa

Stephan was employed by the Procurement, Management and Construction (PMC) consultant, Worley Parsons to manage the environmental aspects of the proposed linear development. Stephan managed a team of 12 positions for the duration of the project ensuring compliance of National and best practice such as IFC standards.



# Jessica Mooney

## Environment & Safety Specialist

Hello! :)



### ABOUT ME

**Name**

Jessica Mooney

**Born**

24 October 1984

**Phone**

+264 81 653 1214

**Email**

Jessica@eccenvironmental.com

**Website**

www.eccenvironmental.com

*Contact me!*

### How to reach me!

+264 81 653 1214 

Jessica.mooney7 

+264 81 653 1214 

Jessica Mooney 



### Education & Qualifications

Federation University  
Australia  
2003-2006

Bachelor of Applied Science -Environmental Management

Additional  
Qualifications

Management Systems Leadership  
ICAM - Incident Cause Analysis Method  
Certificate II in Metalliferous Mining core safety and risk management  
Certificate III in Mine Emergency Response & Rescue  
Level 3 – HLTFA402B Apply Advanced first Aid  
Emergency Rope Rescue  
Level 2 - 21593VIC First Aid level 2  
Bonded Asbestos Removal >10m2  
Leading and Managing People –  
Brisbane North Institute of TAFE



Current

### Experience & Work History

#### Environment and Safety Specialist

Environmental Compliance Consultancy  
Providing professional consulting services to clients in Namibia with particular focus on approvals, ECCs, reporting and compliance.

- ECC Approvals
- Mine Closure Plans
- Rehabilitation
- Pipeline projects
- Cultural Change programmes
- IMS (ISO14001 and 18001)

#### Group HSE Manager

Weatherly Mining Namibia

An exciting role covering the breadth of two operational underground mines (Otjihase and Matchless) and the construction of a new open pit mine (Tschudi) working for Weatherly Mining in Namibia, Africa.

- Managed company's SHEQ portfolio
- Full scale construction of new greenfield mine into operational copper mine
- Reduced LTIFR by 90% from 23.1 to 2.4 in 22 months!
- Implemented integrated management system
- Approvals, ECC renewals and EMPs
- Established the first mining environmental forums in Namibia
- Implemented SAFE COPPER cultural change programme





# Jessica Mooney

## Environment & Safety Specialist

### References

*Feel free to ask the boss :)*

**MR CRAIG THOMAS**  
Managing Director  
Weatherly Mining

**MR COLIN BULLEN**  
Managing Director  
Imerys (client)

Group Manager Lihir Gold

**MR NICK CURREY**  
Director at Sustainable Mining Strategies

*Or ask those who have worked for me?*

**Ms Asteria Salmon**  
Worked as Control Room Operator  
WMN

**Mr. Hermanus Lamprecht**  
Paramedic Safety Officer

### Professional Associations

- Chamber of Mines Namibia
- Women on Boards
- The Chamber of Minerals and Energy of Western Australia Industry Member – Mining, Minerals and Resources

### Fun Facts:

- I can deadlift 135kg
- To keep fit I Olympic weight lift
- I run ultra Marathons & the longest run yet the fish river Canyon 65km
- I am one of 6 children - do you think that means 4 of us suffer middle child syndrome?

### Words I live by:

‘The journey will bring you happiest, not the destination’



### Experience & Work History

#### Environmental Consultant

Ensolve Pty Ltd - Australia  
In February 2013 an opportunity came about to launch my own business, Blue Wren Environmental Services.

During this time I have worked alongside Ensolve Pty Ltd to deliver several environmental projects including:

- A mine closure project taking an operating mine site into the rehabilitation and closure phase. This project involved the full development of a mine closure plan, facilitation of the government approvals, stakeholder engagement and technical environmental studies to inform the mine closure plan
- Sustainability reporting in accordance with the Global Reporting Initiative
- Rehabilitation of historic exploration sites and obtaining associated government approvals for relinquishment of bonds.

#### Site Environmental Manager

Panoramic Resources – Australia

- Brought the site into full compliance with the Environmental Licence within 1 year.
- Managed projects relating to the expansions of the current mine tailings dams including obtaining approvals under the Mining Act 1978 and Environmental Protection Act 1986.
- Managed the environmental and community aspects of three operations; Savannah Nickel Mine, Copernicus Nickel Mine (currently in care and maintenance) and the operations at Wyndham Port
- Responsible for the environment, sustainability and social reporting portfolio
- Developed productive working relationships with local government environmental agencies and non-government agencies, which assisted with the approvals process.
- Developed strategies for the recruitment and retention of local Indigenous personnel

#### Environmental Systems Coordinator

Lihir Gold Limited – Australia

Working on site to provide technical environmental and community advice to ensure all regulatory and licence obligations were met or exceeded

- Regulatory Approvals (State and Federal Government)
- Environment and social aspects of the international cyanide management code
- Operational budgeting and bond management for mine closure
- Compliance with the legislative framework
- Community engagement



# Johanna Ithindi

## ENVIRONMENTAL GRADUATE

Hello! :)



### ABOUT ME

#### Name

Johanna Ithindi

#### Born

08 November 1990

#### Email

johanna@eccenvironmental.com

#### Website

www.eccenvironmental.com

*Contact me!*

### How to reach me!

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### References

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### Words I live by:

*'You only fail when you stop trying'*



### Education & Qualifications

Namibia University of  
Science and Technology,  
Namibia  
2016

*Master Degree in Integrated Water Resources  
Management*

Namibian University of  
Science and Technology,  
Namibia  
2014

*Bachelor Degree in Environmental Health Sciences*



### Experience & Work History

#### Current

#### Environmental Graduate

Environmental Compliance Consultancy

- Draft and develop the best practice mining guide for the Namibian mining sector
- Environmental Assessment activities
- Participate in environmental requirements of projects, including licences, monitoring and reporting

#### Research Intern

Namibia University of Science and Technology

- Collection and management of research data
- Data analysis and report writing
- Organize workshops for stakeholders

#### Research Assistant

Namibia University of Science and Technology

- Coordinate project activities for the Environmental Engineering Master Programme
- Assisting staff in the department with research activities
- Compiling and documentation of program material.

#### Laboratory Technologist

Polytechnic of Namibia

- Coordinate student trips and excursions, tutor and

**APPENDIX F - LIST OF PLANT SPECIES ON EPL 6155**

<i>SPECIES</i>	<i>PLANTDESC</i>	<i>MAJOR AREA</i>	<i>MINOR AREA</i>
<i>Acanthopsis disperma</i> Nees	Leaves rosette-like, prostrate. Inflorescences up to 8 cm tall. Flowers bright blue.	Karas	Lüderitz District
<i>Adromischus alstonii</i> (Schönland & Baker f.) C.A.Sm.	Stems tuberous, 50 cm tall with elongate, spoon shaped, 4 cm long, 2 cm broad leaves. Gray-brown-green. Inflorescence 13-15 cm long.	Karas	Lüderitz District
<i>Adromischus filicaulis</i> (Eckl. & Zeyh.) C.A.Sm. subsp. <i>filicaulis</i>	With upright 12-30 cm tall stems with clavate-spathulate, 3 cm long leaves.	Karas	Lüderitz District
<i>Albuca etesiogaripensis</i> U.Müll.-Doblies	Small herb with white flowers.	Karas	Lüderitz District
<i>Albuca leucantha</i> U.Müll.-Doblies	Tepals green, inner tepals with a white tip.	Karas	
<i>Albuca setosa</i> Jacq.	Bulb round with a thin outer tunics. Inflorescence up to 0.30 m long. Tepals yellow with green keel. Leaves rigid, channelled, up to 1 cm wide.	Karas	
<i>Aloe gariensis</i> Pillans	The rosettes are stemless. The inflorescence is 80 cm high. The flowers are a green-yellow.	Karas	Lüderitz District
<i>Aloe pearsonii</i> Schönland		Karas	Lüderitz District
<i>Aloidendron dichotomum</i> (Masson) Klopper & Gideon F.Sm.	Perennial tree. Inflorescence broken off, probably by baboons, but appear to be laterally carried. Leaves with whitish marginal teeth. Dry leaf 40 cm long found nearby. Trunk slender, branching at about 2.5 m. Fruits and seed are capsules, not ripe.	Karas	Lüderitz District
<i>Alternanthera nodiflora</i> R.Br.	Herb low. Rootstock enlarged. Much open short herb stand.	Karas	Lüderitz District
<i>Amaranthus thunbergii</i> Moq.	Prostrate annual herb. Leaves below with white venation.	Karas	Lüderitz District
<i>Amellus nanus</i> DC.	Annual herb. Round plant with conspicuous yellow anthers.	Karas	Lüderitz District

<i>SPECIES</i>	<i>PLANTDESC</i>	<i>MAJOR AREA</i>	<i>MINOR AREA</i>
<i>Amphibolia obscura</i> H.E.K.Hartmann	Perennial succulent shrub, 0.3-0.5 m high, plant erect. Leaves succulent, club-shaped to trigonous, 1.6 x 0.7cm, free at base, opposite. Inflorescence dichasia. No flowers. Fruit with 6 loculars, not closing once open, valves winged, funnel-shaped, not disintegrating into cage-like structure & different shape.	Karas	Lüderitz District
<i>Amphibolia rupis-arcuatae</i> (Dinter) H.E.K.Hartmann	Shrub 0.3 m high. Flowers capsule 5-locular. Leaves succulent, triangular, sheathing, leaves base joined.	Karas	Lüderitz District
<i>Anacampseros retusa</i> Poelln. subsp. <i>retusa</i> var. <i>retusa</i>	From enlarged rhizome. Leaves dense, broad support, cobweb felty.	Karas	Lüderitz District
<i>Aridaria noctiflora</i> (L.) Schwantes subsp. <i>noctiflora</i>	Succulent 0.4 m high. Capsule, 4-locular. Succulent cylindrical leaves. 25 x 7mm big, opposite and joined at pinkish stem. Flowers white.	Karas	Lüderitz District
<i>Aristida parvula</i> (Nees) De Winter	Grass.	Karas	Lüderitz District
<i>Astridia alba</i> (L.Bolus) L.Bolus	Woody succulents with large boat-shaped pointed leaves, up to 5.5 cm long with velvety-papillate dull green surfaces. Flowers white, large, showy with attenuate white staminodes outside of stamens. Anthers and pollen deep yellow. Flower up to 6 cm diameter. Capsule 6-locular with very raised valve edges. Flower almost sessile, subtended by two fleshy keeled bracts. Keels on bracts pink, rest of bract light green. Calyx lobes 6, 2 larger and fleshier, 4 more slender with long terminal tooth and membranous margin.	Karas	Lüderitz District
<i>Astridia citrina</i> (L.Bolus) L.Bolus	Shrub 30-40 cm high, upright shrub with 4-5 cm long, grey, 1.5 cm thick leaves with sharp edge on tip. Flowers in few-flowered cymes, up to 5 cm in diameter. Stamens combined into spherical shape. Petals pale yellow, thread-like. Capsule covers raised.	Karas	Lüderitz District
<i>Astridia dulcis</i> L.Bolus	Succulent. Flower pale pink; quite showy. Leaves curved, almost terete, slightly velvety, brightish green. Flowers terminal, almost sessile, subtended by two keeled fleshy bracts. Calyx lobes 6, 2 large and fleshy opposite sides to bracts, 4 more slender with terminal tooth and broad membranous margin.	Northern Cape	
<i>Astridia velutina</i> Dinter	A 0.30 m high perennial shrub. Slightly rough/velvety trigonous leaves, fused at base.	Karas	Lüderitz District

<i>SPECIES</i>	<i>PLANTDESC</i>	<i>MAJOR AREA</i>	<i>MINOR AREA</i>
<i>Atriplex suberecta</i> I. Verd.	Annual, spreading - ascending herb. Leaves green above, with scales below.	Karas	Lüderitz District
<i>Augea capensis</i> Thunb.	[Largest of small population] Shrub bushy, 470 mm tall x 900-1100 mm diameter. Stem lower stele white, hard woody, pith green, bark young smooth green, later yellow, flaky. Leaves: subsessile, succulent, elongate obovoid, uneven, up to 49mm long and pedicels and calyx shrivelling, persistent. Fruit up to 6 per node, elongate barrel-shaped.	Karas	Lüderitz District
<i>Babiana falcata</i> G.J.Lewis	Monocot. Flowers white with blue nerves.	Karas	Lüderitz District
<i>Barleria rigida</i> Nees	Spherical small shrub 0.30 m high. Flowers pale, blue-violet, 2 stamens. Leaves wavy, with white spines. Bracts with pinnatifid spines. Sepals spiny.	Karas	Lüderitz District
<i>Berkheya spinosissima</i> (Thunb.) Willd. subsp. <i>namaensis</i> Roessler var. <i>namaensis</i>	Erect herb, with clasping cobweb leaves, up to 40 cm high in mountain gorge on slope.	Karas	Lüderitz District
<i>Blepharis furcata</i> (L.f.) Pers.	Spreading dwarf shrub. Flowers white, large.	Karas	Karasburg District
<i>Boscia albitrunca</i> (Burch.) Gilg & Gilg-Ben.	Tree 4 m high. Bark white. Leaves opposite, grey-green, smooth, glaucous, ovate, apex truncate, coriaceous. Flowers in axillary racemes; sepals 4, green, recurved; stamens numerous, filaments curled, cream; pistil on exerted gynophore.	Karas	Lüderitz District
<i>Brownanthus arenosus</i> (Schinz) Ihlenf. & Bittrich	The roots included are short and have to absorb moisture constantly to stay alive.	Karas	Lüderitz District
<i>Brownanthus marlothii</i> (Pax) Schwantes		Karas	Lüderitz District
<i>Brownanthus nucifer</i> (Ihlenf. & Bittrich) S.M.Pierce & Gerbaulet	Dwarf shrub up to 30 cm high with succulent branches. Flowers in many flowered dichasia, white. Fruit a very woody capsule 3 or 4 locular. Together with <i>Rushianthemum</i> and <i>Sphalmanthus tetragonus</i> .	Karas	Lüderitz District
<i>Brownanthus pseudoschlichtianus</i> S.M.Pierce & Gerbaulet	Forming lawns, up to 40 cm high. On woody branches 1 - 3 cm long, up to 1.5 cm thick internodes. With white covering. Leaves papillose, cylindrical, 1 cm long and about 4 mm in diameter.	Karas	Lüderitz District

<i>SPECIES</i>	<i>PLANTDESC</i>	<i>MAJOR AREA</i>	<i>MINOR AREA</i>
<i>Brownanthus pubescens</i> (N.E.Br. ex C.A.Maass) Bullock	Cushion-like, up to 15 cm high and 60 cm in diameter. Flowers white.	Karas	Lüderitz District
<i>Calicorema capitata</i> (Moq.) Hook.f.	Shrub, rigid about 0.5 m high. Flowers with outside white, inside pink.	Karas	Lüderitz District
<i>Calobota halenbergensis</i> (Merxm. & Schreib.) Boatwr. & B.-E. van Wyk	Perennial shrub, 2.5 m high. Bright green appearance. Flowers bright yellow.	Karas	Lüderitz District
<i>Cenchrus ciliaris</i> L.	Grass. Inflorescences reddish purple.	Karas	Lüderitz District
<i>Cephalophyllum ebracteatum</i> (Pax ex Schltr. & Diels) Dinter & Schwantes	Shrub 10 cm high. Flowers big, yellow.	Karas	Lüderitz District
<i>Cephalophyllum herrei</i> L.Bolus	Branched tuft. Leaves trigonous-terete, punctate, slender and tapering. Flower yellow. Sepals 5, 3 larger, 2 smaller with membranous margins. Capsule shallow-bowlshaped, 10-locular with quite broad valve wings, divergent keels and large white round closing bodies (like Cheiridopsis).	Karas	Lüderitz District
<i>Ceraria fruticulosa</i> H.Pearson & Stephens	Shrubs up to 1.2 m high. Leaves succulent.	Karas	Lüderitz District
<i>Ceraria namaquensis</i> (Sond.) H.Pearson & Stephens	Shrub 0.50m high. Bright white-shiny bark. Leaves clavate, cylindrical, 0.6 cm long with black leaf scars on branches.	Karas	Lüderitz District
<i>Chascanum garipense</i> E.Mey.	Slender herb about 0.3 m high. Flowers white.	Karas	Lüderitz District
<i>Chenopodium album</i> L.	Annual, erect herb, laxly branched, up to 50 cm high.	Karas	Lüderitz District
<i>Chenopodium ambrosioides</i> L.	Annual herb up to 45 cm high, aromatic.	Karas	Lüderitz District
<i>Chenopodium pumilio</i> R.Br.	Spreading, creeping in sand.	Karas	Lüderitz District
<i>Chlorophytum viscosum</i> Kunth	With sticky vellozia-like leaves. Flowers white with brown midrib, with a strong sweet scent.	Karas	Lüderitz District

SPECIES	PLANTDESC	MAJOR AREA	MINOR AREA
<i>Chrysocoma puberula</i> Merxm.	Perennial. Flowers pale yellow.	Karas	Lüderitz District
<i>Citrullus lanatus</i> (Thunb.) Matsum. & Nakai	Procumbent with long branches. Ovary smooth. Flowers pale yellow.	Karas	Lüderitz District
<i>Cladoraphis spinosa</i> (L.f.) S.M.Phillips	Grass.	Karas	Lüderitz District
<i>Cleome foliosa</i> Hook.f. var. <i>lutea</i> (Sond.) Codd & Kers	Annual erect herb, up to 45 cm high. Flowers pale yellow, filament lilac. Leaves hard and sticky.	Karas	Lüderitz District
<i>Cleome suffruticosa</i> Schinz	Annual herb, up to 40 cm high. Flowers golden yellow, filaments violet.	Karas	Lüderitz District
<i>Commiphora capensis</i> (Sond.) Engl.		Karas	Lüderitz District
<i>Conophytum quaesitum</i> (N.E.Br.) N.E.Br. subsp. <i>densipunctum</i> (L.Bolus) S.A.Hammer		Karas	Lüderitz District
<i>Conophytum</i> sp.	Leaves green. No flowers or fruits seen.	Karas	
<i>Conophytum taylorianum</i> (Dinter & Schwantes) N.E.Br. subsp. <i>ernianum</i> (Loesch & Tischer) de Boer ex S	Cushion, Aretia - type. Flowers purple.	Karas	Lüderitz District
<i>Cotula anthemoides</i> L.	Annual herb, up to 25 cm high and 25 cm in diameter. Heads big, yellow.	Karas	Lüderitz District
<i>Crassothonna opima</i> (Merxm.) B.Nord.	Leaves round, very juicy. Heads with lemon yellow ray florets. Involucral bracts with pale margin.	Karas	Lüderitz District
<i>Crassula brevifolia</i> Harv. subsp. <i>brevifolia</i>		Karas	Lüderitz District
<i>Crassula elegans</i> Schönland & Baker f. subsp. <i>elegans</i>	Lawn-like, erect, in four rows. Leaves wide, triangular, flat on top, bulging, keeled, with windows velvety 1.5 - 2 cm high. Inflorescence 2 cm high. Hairy. Petals whitish. Flowers sparse.	Karas	Lüderitz District
<i>Crassula fusca</i> Herre	Cushion-forming shrublet, 25 cm high, with succulent leaves and stems. Leaves dull pink, apex tapering to point. Flowers appear pinkish, but still in bud. Very attractive.	Karas	Lüderitz District

SPECIES	PLANTDESC	MAJOR AREA	MINOR AREA
<i>Crassula garibina</i> Marloth & Schönland subsp. <i>garibina</i>	Perennial. Flower white, calyx red-brown. Leaves up to 30 mm long, pointed, appear papillate and velutinous. Stems and bark internodes visible, about 5 mm long.	Karas	Lüderitz District
<i>Crassula macowaniana</i> Schönland & Baker f.		Karas	Lüderitz District
<i>Crassula muscosa</i> L. var. <i>muscosa</i>	Perennial or annual shrub, 20 cm high. Leaves densely packed, reduced to triangular scales. Flowers minute, sessile, scattered along stem, yellow.	Karas	Lüderitz District
<i>Crassula rupestris</i> Thunb. subsp. <i>commutata</i> (Friedrich) Toelken	Very woody, half spherical shrubs with orange-yellow to deep red leaves. Up to 50 cm diameter and up to 25 cm high. Leaves L-rowed, triangular, weakly keeled.	Karas	Lüderitz District
<i>Crassula sericea</i> Schönland var. <i>sericea</i>		Karas	Lüderitz District
<i>Crassula sericea</i> Schönland var. <i>velutina</i> (Friedrich) Toelken	Succulent, 3 cm high. Leaves densely packed, in opposite pairs, decussate, dorsiventrally flattened, oblanceolate to obovate, grey with a red margin, covered with hair-like trichomes. Stems not visible. Flowers in terminal clusters, small, white to cream coloured, with a pink dot at the base, sepals and peduncle covered with hair-like trichomes, petals 1 - 2 mm long, tips drawn out into a beak-like point, no dorsal appendage.	Karas	Lüderitz District
<i>Crassula sladenii</i> Schönland	Succulent up to 80 cm high. Leaves decussate, with reddish dots. Flowers in terminal pseudo - umbells. Flowers white, wilting to rust-red.	Karas	Lüderitz District
<i>Crotalaria meyeriana</i> Steud.	Silver-grey herb, up to 40 cm high. Base woody. Flowers golden-yellow.	Karas	Lüderitz District
<i>Cucumis africanus</i> L.f.	Creeping on sand. Flowers large, yellow. Fruits very prickly, yellow and green striped when ripe.	Karas	Lüderitz District
<i>Cucumis rigidus</i> E.Mey. ex Sond.		Karas	Lüderitz District
<i>Cullen obtusifolia</i> (DC.) C.H.Stirt.	Upright, basally woody herb, grey-green, up to 70 cm high. Flowers small, clustered, violet.	Karas	Lüderitz District
<i>Cyanella ramosissima</i> (Engl. & K.Krause) Engl. & K.Krause		Karas	Lüderitz District



<b>SPECIES</b>	<b>PLANTDESC</b>	<b>MAJOR AREA</b>	<b>MINOR AREA</b>
<i>Cynodon dactylon (L.) Pers.</i>	Very soft leaved.	Karas	Lüderitz District
<i>Cyperus marginatus Thunb.</i>	Up to 1 m high tufts.	Karas	Lüderitz District
<i>Datura metel L.</i>	Shrublet about 1 m high. Flowers white. Fruit globose, spiny, green.	Karas	Lüderitz District
<i>Deverra denudata (Viv.) Pfisterer &amp; Podlech subsp. aphylla (Cham. &amp; Schltl.) Pfisterer &amp; Podlech</i>	Shrub 2 m high.	Karas	Lüderitz District
<i>Diandrochloa namaquensis (Nees) De Winter</i>	Erect, small grass, 30 cm high. Spikes shading red (seperately).	Karas	Lüderitz District
<i>Dimorphotheca pluvialis (L.) Moench</i>	Herb, up to 20 cm high. Ray florets white at top, blue-red striped at bottom.	Karas	Lüderitz District
<i>Diospyros lycioides Desf. subsp. guerkei (Kuntze) De Winter</i>	Shrubs or trees up to 4 m tall. Flowers pale yellow.	Karas	Lüderitz District
<i>Diospyros lycioides Desf. subsp. lycioides</i>	Woody. Flowers yellow.	Karas	Lüderitz District
<i>Dipcadi brevifolium (Thunb.) Fourc.</i>	Tiny geophyte growing, in clusters from beneath rock. Leaves threadlike, a bit curly. Roots fleshy, numerous. Neck with membranous sheath. Flowers and fruit absent.	Karas	Lüderitz District
<i>Dipcadi spirale Baker</i>	Small geophyte, 5 cm high. Bulb small, subglobose, fleshy, white. Leaves many, linear, grooved, spirally twisted at the apex.	Karas	Lüderitz District
<i>Dracophilus dealbatus (N.E.Br.) Walgate</i>		Karas	Lüderitz District
<i>Drosanthemum albens L.Bolus</i>	Prostrate. Flowers up to 2.5 cm in diameter, pure white.	Karas	Lüderitz District
<i>Drosanthemum curtophyllum L.Bolus</i>	Low-growing perennial herb, 15 cm high, with woody stems and succulent yellow to orange-green leaves that have very fine epidermal bladder cells giving them a silky look and feel. Flowers white (staminodes and stamens), anthers cream, about 25 mm in diameter. Capsule 5-locular, mature and immature.	Karas	Lüderitz District

<i>SPECIES</i>	<i>PLANTDESC</i>	<i>MAJOR AREA</i>	<i>MINOR AREA</i>
<i>Drosanthemum sp.</i>	Perennial herb with wiry stems. Leaves globular, covered with bladder cells. Flowers absent, fruit mature.	Karas	
<i>Dyerophytum africanum</i> (Lam.) Kuntze	Shrub.	Karas	Lüderitz District
<i>Eberlanzia clausa</i> (Dinter) Schwantes	Smaller leaves with apical tooth, main shoot clear, side shoots arising further up and giving a tree-like appearance.	Karas	Lüderitz District
<i>Eberlanzia ebracteata</i> (L.Bolus) H.E.K.Hartmann	Small leaves, flowers violet, petals in 5 groups, diameter < 10 mm, material in alcohol.	Northern Cape	
<i>Eberlanzia schneideriana</i> (A.Berger) H.E.K. Hartmann		Karas	Lüderitz District
<i>Eberlanzia sedoides</i> (Dinter & A.Berger) Schwantes		Karas	Lüderitz District
<i>Ectadium latifolium</i> (Schinz) N.E.Br.	Shrub 2 m high. Multi-branched, long flexible branches.	Karas	Lüderitz District
<i>Ectadium virgatum</i> E.Mey.	Shrub ca. 2 m high. Flowers greenish yellow. Fruit green.	Karas	Lüderitz District
<i>Ehrharta delicatula</i> (Nees) Stapf	Small annual grass.	Karas	Lüderitz District
<i>Emex australis</i> Steinh.	Spreading - procumbent, juicy herb of 50 cm high and 120 cm diameter.	Karas	Lüderitz District
<i>Enneapogon desvauxii</i> P.Beauv.	Tufted annual grass.	Karas	Lüderitz District
<i>Enneapogon scaber</i> Lehm.	Annual grass, up to 20 cm high, broad-leaved.	Karas	Lüderitz District
<i>Eragrostis brizantha</i> Nees	Annual, erect grass. Spikelets dark violet.	Karas	Lüderitz District
<i>Eragrostis sp.</i>	Grass.	Karas	Lüderitz District
<i>Eriocephalus ambiguus</i> (DC.) M.A.N.Müll.	Perennial shrub, 0.4 m high. Leaves clustered on short shoots. Branch tips spinescent.	Karas	Lüderitz District
<i>Eriocephalus scariosus</i> DC.	Aromatic dwarf shrub, pale bark. Ray florets white.	Karas	Lüderitz District

<i>SPECIES</i>	<i>PLANTDESC</i>	<i>MAJOR AREA</i>	<i>MINOR AREA</i>
<i>Eriospermum namaquanum</i> <i>Marloth ex P.L.Perry</i>	Geophyte, 8 cm high. Flowers white, with green and pink median stripe on outside of tepal, tip of tepal hooked inward. Leaf (on non-flowering plant) lanceolate-acute. Tuber irregular-shaped, knobby, flesh white to cream, relatively large for size of plant, about 10 cm long, 4 cm wide and high.	Karas	Lüderitz District
<i>Eriospermum sp.</i>	Geophyte. Tuber fairly large, fleshy, dome-shaped, flattened off at the bottom, with a long, fibrous neck. Leaves single, cordate, dark green, glabrous.	Karas	Lüderitz District
<i>Euclea pseudebenus E.Mey.</i> <i>ex A.DC.</i>	Tree ca. 4 m high. Fruits ripening from green through red to black.	Karas	Lüderitz District
<i>Euphorbia cibdela N.E.Br.</i>	Sparse shrubs, old growth woody. Nodes distinct, swollen. Branches opposite. Angle between lateral branches 90 degrees. Flowers very small with 5 yellow-green entire glands.	Karas	Lüderitz District
<i>Euphorbia gariepina Boiss.</i> <i>subsp. gariepina</i>	Rocky slopes.	Karas	Lüderitz District
<i>Euphorbia guerichiana Pax</i>	Loosely branched shrubs, up to 2 m high, mostly much branched. Stem with papery, dark grey bark.	Karas	Lüderitz District
<i>Euphorbia gummifera Boiss.</i>	Rounded shrubs on slopes of terraces. Flowers with five, fat, red-brown glands.	Karas	Lüderitz District
<i>Euphorbia hamata (Haw.)</i> <i>Sweet</i>		Karas	Lüderitz District
<i>Euphorbia mauritanica L.</i> <i>var. corallothamnus (Dinter)</i> <i>A.C.White, R.A.Dyer &amp; B.Sloane</i>	Gariiep form. Silver veins - no leaves, few flowers and red capsules.	Karas	Lüderitz District
<i>Euphorbia mauritanica L.</i> <i>var. mauritanica</i>	Resembling Sarcostemma. Silvery-white. Bracts sessile, yellow. Glands round, moulded. Capsule washed with red, 1 cm thick.	Karas	Lüderitz District
<i>Euphorbia phylloclada Boiss.</i>	Prostrate.	Karas	Lüderitz District
<i>Euphorbia rhombifolia Boiss.</i>	Shrub up to 50 cm high.	Karas	Lüderitz District
<i>Euphorbia spinea N.E.Br.</i>		Karas	Lüderitz District

<i>SPECIES</i>	<i>PLANTDESC</i>	<i>MAJOR AREA</i>	<i>MINOR AREA</i>
<i>Euryops namaquensis</i> Schltr.	Upright shrubs, up to 50 cm high, white bark. Achenes hairy, light purple.	Karas	Lüderitz District
<i>Felicia namaquana</i> (Harv.) Merxm.	Annual, long hairy, not glandular/sticky. Rayflorets blue.	Karas	Lüderitz District
<i>Ficus cordata</i> Thunb. subsp. <i>cordata</i>	Tall tree, 5 m high. Branch tips with brown velutinous indumentum. Leaves alternate, narrowly cordiform, glabrous, coriaceous, venation prominent, especially adaxially. Figs small, 1 cm in diameter, globose, axillary, sessile, green with pale flecks, ostiole pink.	Karas	Lüderitz District
<i>Forsskaolea hereroensis</i> Schinz	Perennial scabrid herbs, 45 cm high. Leaves discolorous, felty below. Flowers mature. Attractive.	Karas	Lüderitz District
<i>Foveolina dichotoma</i> (DC.) Källersjö	Small annual herb with distinct red-brown rigid flower stalks.	Karas	Lüderitz District
<i>Frankenia pulverulenta</i> L.	Flat, prostrate herb. Annual. Flowers pink.	Karas	Lüderitz District
<i>Gaillonia crocyllis</i> (Sond.) Thulin	Stiffly branched shrub, up to 1.5 m high. Flowers white.	Karas	Lüderitz District
<i>Galenia dregeana</i> Fenzl ex Sond.	Perennial shrub, 35 cm high. Leaves papillate, almost circular, fleshy.	Karas	Lüderitz District
<i>Galenia papulosa</i> (Eckl. & Zeyh.) Sond.	Shrublet 40 cm high, 1 m in diameter. Flowers minute, yellow. Leaves eggs-shaped, slightly succulent, but highly papillose.	Karas	Lüderitz District
<i>Galenia papulosa</i> (Eckl. & Zeyh.) Sond. var. <i>microphylla</i> Adamson	Spreading, prostrate herb with ascending shoots up to 9 cm in diameter. Flowers small, greenish-yellow.	Karas	Lüderitz District
<i>Galenia pruinosa</i> Sond.	Half shrub, up to 0.40 m high, 50 - 60 cm in diameter. Bark white. Semi-succulent. Leaves grey-green. Flowers small, yellow.	Karas	Lüderitz District
<i>Galenia</i> sp.		Karas	Lüderitz District
<i>Gazania lichtensteinii</i> Less.	Annual herb 2-3 cm high. Heads pale yellow. Rayflorets with black-violet throat mark.	Karas	Lüderitz District
<i>Gethyllis namaquensis</i> (Schönland) Oberm.		Karas	Lüderitz District

<i>SPECIES</i>	<i>PLANTDESC</i>	<i>MAJOR AREA</i>	<i>MINOR AREA</i>
<i>Gisekia africana</i> (Lour.) Kuntze var. <i>africana</i>	Prostrate.	Karas	Lüderitz District
<i>Gisekia pharnacioides</i> L. var. <i>pharnacioides</i>		Karas	Lüderitz District
<i>Glinus lotoides</i> L. var. <i>lotoides</i>	Grey-green, procumbant.	Karas	Lüderitz District
<i>Gnaphalium confine</i> Harv.	Herb, somewhat spreading prostrate, grey-green, ascending shoots. Capitula white.	Karas	Lüderitz District
<i>Gnaphalium polycaulon</i> Pers.	Herb, grey-green, annual, clustered, erect. Capitula white, straw-coloured when ripe.	Karas	Lüderitz District
<i>Gomphocarpus fruticosus</i> (L.) W.T.Aiton subsp. <i>fruticosus</i>	Shrub about 2 m high. Flowers greenish yellow. Flowers yellow.	Karas	Lüderitz District
<i>Gomphostigma virgatum</i> (L.f.) Baill.	Reed-likeshrub up to 0.2 m high. Flowers small, white mostly only at the end of the branches with leaves, other 3/4 of branches glabrous.	Karas	Lüderitz District
<i>Gorteria corymbosa</i> DC.	Erect, somewhat spreading annual herb, up to 0.45 m high. Ray florets yellow.	Karas	Lüderitz District
<i>Grielum humifusum</i> Thunb. var. <i>parviflorum</i> Harv.		Karas	Lüderitz District
<i>Grielum sinuatum</i> Licht. ex Burch.	Perennial herb 20 cm high with yellow flowers that looks like Tribilus.	Karas	Lüderitz District
<i>Gymnosporia linearis</i> (L.f.) loes. sub		Cape Province	
<i>Hartmanthus halii</i> (L.Bolus) S.A.Hammer	Succulent 20 cm high. Flowers white.	Karas	Lüderitz District
<i>Hartmanthus pergamentaceus</i> (L.Bolus) S.A.Hammer	Grey-white, succulent cushions with ascending flowering shoots. Flowers bright pink, 2.5 cm in diameter.	Karas	Lüderitz District
<i>Hebenstretia namaquensis</i> Roessler	Upright, cushion-forming, with reflexed leaves, otherwise like <i>Hebenstretia integrifolia</i> .	Karas	Lüderitz District
<i>Hebenstretia parviflora</i> E.Mey.	Annual herb, up to 25 cm high. Flowers white with orange throat.	Karas	Lüderitz District

<i>SPECIES</i>	<i>PLANTDESC</i>	<i>MAJOR AREA</i>	<i>MINOR AREA</i>
<i>Helichrysum alsinoides DC.</i>	Annual, silver-white herb. Capitulae small, yellow.	Karas	Lüderitz District
<i>Helichrysum gariepinum DC.</i>	Prostrate with ascending, flowering shoots, up to 50 cm in diameter, capitula clustered, white.	Karas	Lüderitz District
<i>Helichrysum herniarioides DC.</i>	Plant, erect or spreading and prostrate. Leaves becoming glabrous, slightly sticky. Shoots spar-like and rigid.	Karas	Lüderitz District
<i>Helichrysum leontonyx DC.</i>	Annual, fairly small herb, capitulum small, yellow.	Karas	Lüderitz District
<i>Helichrysum micropoides DC.</i>	Annual, erect herb, capitula small, yellow-brown.	Karas	Lüderitz District
<i>Helichrysum obtusum (S.Moore) Moeser</i>		Karas	Lüderitz District
<i>Helichrysum oxybelium DC.</i>	Dwarf shrub, up to 25 cm high with old capitulae.	Karas	Lüderitz District
<i>Heliophila deserticola Schltr. var. deserticola</i>	Annual, upright herb, up to 40 cm high. Leaves succulent, almost cylindrical. Flowers very small, blue.	Karas	Lüderitz District
<i>Heliophila eximia Marais</i>	Small, floppy shrub with decumbent branches. Flowers white.	Karas	Lüderitz District
<i>Heliophila trifurca Burch. ex DC.</i>	Annual herb, 25 cm tall, 30 cm in diameter. Flowers blue-violet.	Karas	Lüderitz District
<i>Heliotropium ovalifolium Forssk.</i>	Somewhat spreading, ascending, grey-green herb. Flowers white.	Karas	Lüderitz District
<i>Heliotropium tubulosum E.Mey. ex DC.</i>	Whitish grey herb. Flowers white.	Karas	Lüderitz District
<i>Hermannia gariepina Eckl. &amp; Zeyh.</i>	Perennial shrub, 0.4 m high. Leaves softly hairy, grey. Flowers pink-red, pendulous.	Karas	Lüderitz District
<i>Hermannia macra Schltr.</i>	Annual here or always upright, up to 45 cm high, densely branched. Flowers yellow, small droopy. In upper parts few leaves.	Karas	Lüderitz District
<i>Hermannia paucifolia Turcz.</i>	Perennial shrub, 1 m high. Leaves along stem. Flower yellow, pendulous.	Karas	Lüderitz District

<i>SPECIES</i>	<i>PLANTDESC</i>	<i>MAJOR AREA</i>	<i>MINOR AREA</i>
<i>Hermannia stricta</i> (E.Mey. ex Turcz.) Harv.		Karas	Lüderitz District
<i>Hermbsstaedtia glauca</i> (J.C.Wendl.) Rchb. ex Steud.	Shrub. Stem 20 cm thick at base. Calyx grey, androecium pink.	Karas	Lüderitz District
<i>Hoodia alstonii</i> (N.E.Br.) Plowes	Erect prickly succulent with small bright yellow flowers.	Karas	Lüderitz District
<i>Hoodia gordonii</i> (Masson) Sweet ex Decne.		Karas	Lüderitz District
<i>Hypertelis salsoloides</i> (Burch.) Adamson var. <i>salsoloides</i>	Perennial dwarf shrub. Up to 35 cm high. Leaves cylindrical, fleshy blue-green. Peduncle 10 cm long. Base leaves pink.	Karas	Lüderitz District
<i>Hypertelis spergulacea</i> E.Mey. ex Fenzl	Perennial with densely woody base. Flowers pink with brown keel.	Karas	Lüderitz District
<i>Ifloga glomerata</i> (Harv.) Schltr.	Almost covered with fine sand.	Karas	Lüderitz District
<i>Ifloga molluginoides</i> (DC.) Hilliard	Plant spreading, prostrate with ascending terminal shoots.	Karas	Lüderitz District
<i>Indigastrum argyraeum</i> (Eckl. & Zeyh.) Schrire	Silver-grey, spreading, prostrate herb. Leaves 1-3-foliolate, mostly bifoliolate. Flowers in short, about 1 cm long racemes. Flowers small, deep red with darker base.	Karas	Lüderitz District
<i>Indigastrum argyroides</i> (E.Mey.) Schrire	Annual, prostrate, silver-grey herb. Up to 30 cm in diameter. Flowers pinkish-red.	Karas	Lüderitz District
<i>Indigofera adenocarpa</i> E.Mey.	Silver-white, erect shrub, up to 50 cm high. Flowers red.	Karas	Lüderitz District
<i>Indigofera auricomia</i> E.Mey.	Slightly woody perennial.	South Africa	
<i>Indigofera nudicaulis</i> E.Mey.		Karas	Lüderitz District
<i>Indigofera pungens</i> E.Mey.	Rounded shrublet.	Cape Province	
<i>Jamesbrittenia adpressa</i> (Dinter) Hilliard	Herb, lying upon the ground, up to 60 cm in diameter. Flowers luminous yellow.	Karas	Lüderitz District

<i>SPECIES</i>	<i>PLANTDESC</i>	<i>MAJOR AREA</i>	<i>MINOR AREA</i>
<i>Jamesbrittenia canescens</i> (Benth.) Hilliard var. <i>canescens</i>	Annual, upright herb, up to 55 cm high, grey-green. Flowers with long yellow tubes. Corolla-dark to lighter maroon in colour.	Karas	Lüderitz District
<i>Jamesbrittenia fruticosa</i> (Benth.) Hilliard	Flowers white .	Karas	Lüderitz District
<i>Jamesbrittenia glutinosa</i> (Benth.) Hilliard	Annual herb up to 50 cm high. Flowers pink, throat orange.	Karas	Lüderitz District
<i>Jamesbrittenia maxii</i> (Hiern) Hilliard	Erect perennial herb, 0.4 m high. Leaves lanceolate, opposite. Flowers tubular, dirty white flushed dull purple, mature. No fruit seen.	Karas	
<i>Jamesbrittenia sp.</i>	Multi-branched, perennial shrub 0.5 m high. Aromatic. No flowers present.	Karas	Lüderitz District
<i>Jatropha orangeana</i> Dinter ex P.G.Mey.		Karas	Lüderitz District
<i>Juncus rigidus</i> Desf.	Sedge 1 m high.	Karas	Lüderitz District
<i>Juttadinteria albata</i> (L.Bolus) L.Bolus		Karas	Lüderitz District
<i>Kohautia caespitosa</i> Schnizl. subsp. <i>brachyloba</i> (Sond.) D.Mantell	Upright, annual herb, up to 40 cm high. Flowers large, greenish-yellow outside, matt yellow on inside.	Karas	Lüderitz District
<i>Kohautia ramosissima</i> Bremek.	Perennial shrublet about 0.5 m high. Flowers white.	Karas	Lüderitz District
<i>Lampranthus uniflorus</i> (L.Bolus) L.Bolus		Karas	Lüderitz District
<i>Lapeirousia dolomitica</i> Dinter subsp. <i>dolomitica</i>	Flowers pale violets with dark violets venation and yellow throat.	Karas	Lüderitz District
<i>Lapeirousia littoralis</i> Baker subsp. <i>littoralis</i>	Perennial geophyte, 0.15m high. Flowers pale lilac, tube longer than lobes, bent near mouth. One long, linear arching leaf, others short, spinescent.	Karas	Karasburg District
<i>Larryleachia marlothii</i> (N.E.Br.) Plowes	Six stems. Stems up to 4 c in diameter. Flowers yellow, very densely wine-red dotted. Coronas yellow. Outer corona bifurcate.	Karas	Lüderitz District



SPECIES	PLANTDESC	MAJOR AREA	MINOR AREA
<i>Lavrania marlothii</i> (N.E.Br.) <i>Bruyns, p.p.</i>	Succulent, 10 cm high. Stems succulent, terete in cross section, elongated, grey, with many small fields, branched at base. Leaves absent. Flowers clustered towards stem apex, small, star-shaped, yellowish inside with fine maroon spots, corona with horn-like projections, maroon.	Karas	Lüderitz District
<i>Leipoldtia weingangiana</i> (Dinter) Dinter & Schwantes subsp. <i>grandifolia</i> (L.Bolus) H.E.K.Hartmann & Ru	Erect herb, with succulent leaves, 0.3 m high. Flowers bright pink. Flowers and fruits mature.	Karas	
<i>Leipoldtia weingangiana</i> (Dinter) Dinter & Schwantes subsp. <i>weingangiana</i>		Karas	Lüderitz District
<i>Lepidium desertorum</i> Eckl. & Zeyh.	Annual, herbaceous. Flowers white/cream.	Karas	Lüderitz District
<i>Lessertia benguellensis</i> Baker f.	Annual, upright herb of up to 30 cm high. Flowers light red-violet venation and keel tips.	Karas	Lüderitz District
<i>Lessertia brachypus</i> Harv.	Shrub, 0.40 m high. Pods ovate, uniform green.	Karas	Lüderitz District
<i>Lessertia candida</i> E.Mey.	Annual shrub, 0.4 m high. Flowers cream, standard with purple venation, keel and wings mostly purple. Pods flat, oval, not speckled.	Karas	Lüderitz District
<i>Lessertia falciformis</i> DC.	Shrubs, annual, to 25 cm high. Flowers deep pink. Pods papery, contorted.	Karas	Lüderitz District
<i>Lessertia incana</i> Schinz	Shrub up to 50 cm high, silver-grey. Flowers have yellowish base toning shading violet.	Karas	Lüderitz District
<i>Lessertia macrostachya</i> DC. var. <i>macrostachya</i>	Annual herb up to 60 cm high. Violet flowers. Pods flat with violet spots.	Karas	Lüderitz District
<i>Limeum aethiopicum</i> Burm.f. subsp. <i>namaense</i> Friedrich var. <i>namaense</i>	Perennial dwarf shrub, up to 25 cm high. Flowers green/white.	Karas	Lüderitz District
<i>Limeum aethiopicum</i> Burm.f. var. <i>glabrum</i> Moq.		Karas	Lüderitz District

<b>SPECIES</b>	<b>PLANTDESC</b>	<b>MAJOR AREA</b>	<b>MINOR AREA</b>
<i>Limeum viscosum</i> (J.Gay) <i>Fenzl subsp. nummulifolium</i> (H.Walter) Friedrich	Plant is very sticky.	Karas	Lüderitz District
<i>Limeum viscosum</i> (J.Gay) <i>Fenzl subsp. nummulifolium</i> (H.Walter) Friedrich [2]	Annual, prostrate herb. Leaves oval-elliptical. Flowers white. Slightly viscid.	Karas	Lüderitz District
<i>Litogyne gariepina</i> (DC.) Anderb.	Bushy forb, approximately 60 cm high x 1.5 m across. Flowers mauve.	Karas	Lüderitz District
<i>Lophiocarpus polystachyus</i> Turcz.	Stem upright.	Karas	Lüderitz District
<i>Lotononis falcata</i> (E.Mey.) Benth.	Spreading herb with yellow flowers.	Karas	Lüderitz District
<i>Lotononis strigillosa</i> (Merxm. & A.Schreib.) A.Schreib.	Annual prostrate herb, 0.01 m high. Flowers yellow, keel with orange-brown tip. Calyx tube narrow, funnel-shaped, lobes wide, campanulate. Pods slightly falcate. Leaves alternate.	Karas	Lüderitz District
<i>Lycium bosciifolium</i> Schinz	Shrub about 2 m high. Flowers blue.	Karas	Lüderitz District
<i>Lycium horridum</i> Thunb.	Perennial shrub, 1 m high. Branches spreading. Leaves clavate, succulent. Flowers dark purple, lobes with lighter margins. Anthers just reaching mouth of tube.	Karas	Lüderitz District
<i>Lycium sp.</i>	Very spiny, small shrub, up to 20 cm high and up to 60 cm in diameter. Flowers 4-merous, pale violet.	Karas	Lüderitz District
<i>Lycium tetrandrum</i> Thunb.	Bush that looks like Skilpadbessiebos. Very, very thorny with light orange berries. Leaves small and narrow. Only 1 bush seen.	Karas	Lüderitz District
<i>Lycopersicon pimpinellifolium</i> (L.) Mill.	Spreading, procumbent herb. Flowers yellow. Fruits pea-size turning from green to white to orange.	Karas	Lüderitz District
<i>Lyperia tristis</i> (L.f.) Benth.		Karas	Lüderitz District
<i>Maerua gilgii</i> Schinz	Shrub, more or less spherical, many stemmed, dense, 2.50 m high and diameter.	Karas	Lüderitz District
<i>Manulea gariepina</i> Benth.	Annual, erect herb. Flowers yellow-green, delicate with very long tips.	Karas	Lüderitz District

<i>SPECIES</i>	<i>PLANTDESC</i>	<i>MAJOR AREA</i>	<i>MINOR AREA</i>
<i>Mesembryanthemum annuum L.Bolus</i>		Karas	Lüderitz District
<i>Mesembryanthemum guerichianum Pax</i>	Annual, forming large succulent cushions, up to 1 m in diameter and 25 cm high. Flowers white.	Karas	Lüderitz District
<i>Mesembryanthemum hypertrophicum Dinter</i>	Flowers red.	Karas	Lüderitz District
<i>Mesembryanthemum pellitum Friedrich</i>	Shrub up to 1 m high, 1.5 m in diameter. Entire plant covered with very conspicuous papillose hair. Flowers white, up to 5 cm in diameter.	Karas	Lüderitz District
<i>Mesogramma apiifolium DC.</i>	Annual herb, slightly spreading-ascending, up to 60 cm high and in diameter. Capitula bright yellow.	Karas	Lüderitz District
<i>Momordica balsamina L.</i>	On ground. Up to 1.5 m in diameter. Male flowers pale yellow.	Karas	Lüderitz District
<i>Monechma crassiusculum P.G.Mey.</i>	Shrub 0.60 m high. Bark grey, sparsely upright branched, many shoots mostly at the tips of branches. Leaves grey-green, somewhat fleshy, clustered at the tips of short shoots.	Karas	Lüderitz District
<i>Monechma mollissimum (Nees) P.G.Mey.</i>	Spherical shrub, 0.50 m high and 50 cm in diameter. Branches and leaves densely hairy. Flowers with light purple-red inferior lobe.	Karas	Lüderitz District
<i>Montinia caryophyllacea Thunb.</i>	Female. Shrub up to 1.50 m high. Narrow leaved.	Karas	Lüderitz District
<i>Nemesia viscosa E.Mey. ex Benth.</i>	Flush 10 - 15 cm high, orange-yellow flowers.	Karas	Lüderitz District
<i>Nemesia williamsonii K.E. Steiner</i>		Karas	Lüderitz District
<i>Nesaea luederitzii Koehne var. luederitzii</i>	Herb up to 0.25 m high. Base woody. Flowers bright red-violet.	Karas	Lüderitz District
<i>Nicotiana glauca Graham</i>	Upright shrub or small tree.	Karas	Lüderitz District
<i>Nicotiana longiflora Cav.</i>	Prostrate leaf rosette. Stalks up to 1 m high. Flowers greenish with a shade of red.	Karas	Lüderitz District
<i>Nidorella resedifolia DC. subsp. resedifolia</i>	Flowers yellow.	Karas	Lüderitz District

<i>SPECIES</i>	<i>PLANTDESC</i>	<i>MAJOR AREA</i>	<i>MINOR AREA</i>
<i>Nolletia gariepina</i> (DC.) Mattf.	Perennial shrub, 20 cm high. Leaves glandular, hairy, soft. Flower head pendulous, eligulate. Stems shiny, purple.	Karas	Lüderitz District
<i>Oenothera indecora</i> Cambess. subsp. bonariensis W.Dietr.	Erect, annual herb. Flowers orange coloured.	Karas	Lüderitz District
<i>Oncosiphon grandiflorum</i> (Thunb.) Källersjö	Annual herb, 0.3 m high. Flower heads hemispherical, florets tubular, yellow.	Karas	Lüderitz District
<i>Oncosiphon suffruticosum</i> (L.) Källersjö	Multi-stemmed herb, 45 cm high. Leaves bipinnate with linear lobes. Capitulae bright yellow, lacking ray florets, 4-6 mm in diameter, in terminal groups of 3 to 5.	Karas	Lüderitz District
<i>Ophioglossum polyphyllum</i> A.Braun	Fern. Roots fibrous, thin, yellow. Leaves elliptic, one per plant, with a long white petiole. Flower a yellow spade, enclosed by the leaf.	Karas	Lüderitz District
<i>Ornithogalum glandulosum</i> Oberm.	Flowers green-with central green stripe, petals strongly recurved. Leaves long and narrow folded. Height is 0.15 m.	Karas	
<i>Ornithogalum puberulum</i> Oberm. subsp. puberulum	Corymb. Flower pure white. Leaves hairy.	Karas	Lüderitz District
<i>Ornithogalum sp.</i>		Karas	Lüderitz District
<i>Ornithogalum suaveolens</i> Jacq.		Karas	Lüderitz District
<i>Osteospermum armatum</i> Norl.	Up to 55 cm high shrub, grey bark, strongly aromatic. Capitula 2 cm in diameter, golden yellow.	Karas	Lüderitz District
<i>Osteospermum sp.</i>	Composite - yellow annual.	Karas	Lüderitz District
<i>Othonna arbuscula</i> (Thunb.) Sch.Bip.	Tall, branched plants with smooth grey bark.	Karas	Lüderitz District
<i>Othonna lasiocarpa</i> (DC.) Sch.Bip.	Sparse shrub, 30 cm high. Stems waxy orange-brown. Leaves blue-green, obovate.	Karas	Lüderitz District
<i>Oxalis beneprotecta</i> Dinter ex R. Kunth	Up to 40 cm high plant. Flower pink, petals and sepals with red margin.	Karas	Lüderitz District
<i>Oxalis sp.</i>	Up to 7 cm high cushion plant. Flower white, being only a bit higher than the leaf rosette.	Karas	Lüderitz District

<b>SPECIES</b>	<b>PLANTDESC</b>	<b>MAJOR AREA</b>	<b>MINOR AREA</b>
<i>Ozoroa concolor</i> (C.Presl ex Sond.) De Winter		Karas	Lüderitz District
<i>Pachypodium namaquanum</i> (Wyley ex Harv.) Welw.	Erect usually unbranched, spiny, succulent 0.60-1.5 m high. Flowers deep brownish red. Apex always pointing north.	Karas	Lüderitz District
<i>Papaver aculeatum</i> Thunb.	Rosette, up to 30 cm in diameter.	Karas	Lüderitz District
<i>Pegolettia oxyodonta</i> DC.	Erect herb, very woody at base. Flowers pale yellow.	Karas	Lüderitz District
<i>Pelargonium carnosum</i> (L.) L'Hér.	Stems up to 30 cm tall and 5-6 cm in diameter, ridged, green. Leaves large, densely hairy.	Karas	Lüderitz District
<i>Pelargonium grandicalcaratum</i> R.Knuth	More or less spherical shrub, 30 cm high and up to 40 cm in diameter. Branches barely succulent with pale brown bark. Leaves very small. Flowers up to 3.5 cm long. Spur 6 mm long. Tube dark red. Lobes yellow with red stripes.	Karas	Lüderitz District
<i>Pelargonium klinghardtense</i> R.Knuth	Thick stems, up to 5 cm in diameter, yellow-green, smooth. Flowers white.	Karas	Lüderitz District
<i>Pelargonium redactum</i> Vorster	Pelargonium. Annual, with flowers and fruits.	Karas	Lüderitz District
<i>Peliostomum leucorrhizum</i> E.Mey. ex Benth.	Perennial herb, 30 cm high. Stems basally white, longitudinally fissured, young stems slightly grooved. Leaves alternate, obovate, at most 1 cm long, with very fine indumentum. Flowers solitary, axillary; petals purple, with deep purple striations in tube; stamens 4, purple fringed.	Karas	Lüderitz District
<i>Peliostomum viscosum</i> E.Mey. ex Benth.	Annual, spreading, somewhat stiff, sticky herb. Flowers bright blue-violet with dark throat. Occasional with pink-purple flowers.	Karas	Lüderitz District
<i>Phyllobolus melanospermus</i> (Dinter & Schwantes) Gerbaulet	Perennial shrub, 0.20 m high. Stem spreading, coppery, smooth. Leaves terete, blister cells not obvious. Flowers very pale pink or white.	Karas	Lüderitz District
<i>Phyllobolus oculatus</i> (N.E.Br.) Gerbaulet	Longish papillose. Annual. Herb, loosely branched, prostrate ascending. Leaves terete. Leaves salmon.	Karas	Lüderitz District
<i>Polygala leptophylla</i> Burch. var. <i>leptophylla</i>	Leafless shrublet about 1 m high. Stems blue-green. Flowers pink.	Karas	Lüderitz District

<i>SPECIES</i>	<i>PLANTDESC</i>	<i>MAJOR AREA</i>	<i>MINOR AREA</i>
<i>Polypogon monspeliensis</i> (L.) Desf.	Annual, bushy, grass, culms ascending. Panicles white.	Karas	Lüderitz District
<i>Prenia tetragona</i> (Thunb.) Gerbaulet	Succulent with white flowers. Leaves green and succulent with some reddish growth at tips.	Karas	Lüderitz District
<i>Psammophora modesta</i> (Dinter & A.Berger) Dinter & Schwantes	Low perennial succulent. Stems flexible, with joints. Leaves boat-shaped, coated with sand. Flowers bright pink. Capsules 6-locular. Attractive.	Karas	Lüderitz District
<i>Psammophora saxicola</i> H.E.K.Hartmann	Perennial, 30 cm high. Flower single in leaf axils, sepals 4, 2 larger, 2 smaller. Leaves paired, fleshy, briefly fused at the base, pointed, some sand sticking to them, mostly to younger leaves, curved upwards. Fruits and seed: capsules 8-locular, with broad valve wings, lacking closing bodies, expanding keels first quite parallel then diverge distally, covering membranes small.	Karas	Lüderitz District
<i>Pseudognaphalium luteoalbum</i> (L.) Hilliard & B.L.Burt	Silver-grey, annual herb. Capitula silver to straw coloured.	Karas	Lüderitz District
<i>Psilocaulon coriarium</i> (Burch. ex N.E.Br.) N.E.Br.	Much branched shrub 1.5 m high and wide. Leaves up to 1 cm long, light green. Flowers inconspicuous on short side-branches. Flowers white, 0.8 cm in diameter.	Karas	Lüderitz District
<i>Pteronia anisata</i> Dinter ex Merxm.	Shrub, 1 m high. Branches spreading. Leaves clustered, succulent, terete-flattened, somewhat folded along midrib. Pappus red-brown.	Karas	Lüderitz District
<i>Pteronia ciliata</i> Thunb.	Dwarf shrub.	Karas	Lüderitz District
<i>Pulicaria scabra</i> (Thunb.) Druce	Upright annual herb up to 65 cm high, capitulum yellow.	Karas	Lüderitz District
<i>Quaqua incarnata</i> (L.f.) Bruyns subsp. <i>hottentotorum</i> (N.E.Br.) Bruyns		Karas	Lüderitz District
<i>Quaqua mammillaris</i> (L.) Bruyns		Karas	Lüderitz District
<i>Rhus pendulina</i> Jacq.	Shrub/tree up to 6 m high.	Karas	Lüderitz District

<i>SPECIES</i>	<i>PLANTDESC</i>	<i>MAJOR AREA</i>	<i>MINOR AREA</i>
<i>Rhus populifolia</i> E.Mey. ex Sond.		Karas	Lüderitz District
<i>Ricinus communis</i> L. var. <i>communis</i>	Shrub 4 m high.	Karas	Lüderitz District
<i>Rumex crispus</i> L.	Annual herb, up to 1.20 m high. Leaves undulate. Basal leaves up to almost 50 cm long. Valves with entire margins, one with thickened ridge.	Karas	Karasburg District
<i>Ruschia abbreviata</i> L.Bolus	Flowers yellow-whitish.	Karas	Lüderitz District
<i>Ruschia</i> sp.	Succulent shrub 30 cm high with fine purple flowers.	Karas	Lüderitz District
<i>Ruschianthemum gigas</i> (Dinter) Friedrich	Succulent half-shrub, 40 cm high. Leaves opposite, succulent, glabrous, adaxially flattened, green with red tip. Flowers terminal, in compound umbell, past.	Karas	Lüderitz District
<i>Salix mucronata</i> Thunb. subsp. <i>capensis</i> (Thunb.) Immelman	Trees up to 9 m high. Canopy deep green. Twigs hanging.	Karas	Lüderitz District
<i>Salsola zeyheri</i> (Moq.) Bunge	Shrub 50 cm high and in diameter.	Karas	Lüderitz District
<i>Salvia garipensis</i> E.Mey. ex Benth.	Approximately 30 cm high shrublet with white flowers.	Karas	Lüderitz District
<i>Sarcocaulon crassicaule</i> Rehm	Bark green. Sines 3-4 cm long. Flowers lemon-yellow to pale yellow. Sepals hairy. Leaves sericeous, clavate, tapering into petiole.	Karas	Lüderitz District
<i>Sarcocaulon flavescens</i> Rehm	Spreading dwarf shrub, 25 cm high. Stems sparsely branched, slender, grey, spiny, branches long. Leaves obovate, silky pubescent, apex deeply notched, margins scalloped. Flowers single, pale yellow, open late afternoon. Only one plant had flowers on.	Karas	Lüderitz District
<i>Sarcocaulon inerme</i> Rehm		Karas	Lüderitz District
<i>Sarcocaulon multifidum</i> E.Mey. ex R.Knuth	Thin stem, swollen roots. Quartz slopes above river.	Karas	Lüderitz District

<i>SPECIES</i>	<i>PLANTDESC</i>	<i>MAJOR AREA</i>	<i>MINOR AREA</i>
<i>Sarcocaulon patersonii</i> (DC.) G.Don	Spreading to erect, spiny shrublet with yellow bark. Flowers deep pinkish purple, rather small.	Karas	Lüderitz District
<i>Sarcocaulon peniculinum</i> Moffett		Karas	Lüderitz District
<i>Schotia afra</i> (L.) Thunb. var. <i>angustifolia</i> (E.Mey.) Harv.	Shrub 4-5m high. Flowers are said to be red.	Karas	
<i>Schwantesia herrei</i> L.Bolus	Grey-green, up to 6 cm high cushions. Flowers yellow.	Karas	Lüderitz District
<i>Schwantesia herrei</i> L.Bolus var. <i>herrei</i>	Succulent with yellow flowers.	Karas	Lüderitz District
<i>Schwantesia loeschiana</i> Tischer	Tufted succulent. Perennial. Leaves distinctly keeled, blue-green, hard, asymmetric, with 2 off-set keels and a few indistinct scalloped-teeth. Capsules 5-locular, shallow, valve wings broad, keels touch all the way from the base to the top, closing bodies lacking, vestitular covering membranes present. Locules have a tuft of funicular hairs. Seeds blackish. Flowers 30mm diameter, petals yellow fading to white at the base, calyx lobes 5, 2 with terminal teeth that are very keeled, 3 with membraneous margins and subterminal teeth. Pedicel flattened, with an extra ridge on one side. Sepals and pedicels glaucous. Style 5-branched, pale yellow, briefly fused at base, nectary continuous, narrow, yellow and crenulate, nectar straw coloured. Filaments slightly pubescent near the base, yellow fading to white at base, anthers and pollen deep yellow.	Karas	Lüderitz District
<i>Scirpoides dioecus</i> (Kunth) Browning	Up to 1 m high tufts.	Karas	Lüderitz District
<i>Senecio arenarius</i> Thunb.	Annual herb, slightly succulent, sticky. Ray florets mostly 8.	Karas	Lüderitz District
<i>Senecio consanguineus</i> DC.	Annual, upright herb, up to 65 cm high, capitulum up to 2 cm in diameter, ray florets bright yellow.	Karas	Lüderitz District
<i>Senecio giessii</i> Merxm.	Annual tender herb. Rayflorets yellow.	Karas	Lüderitz District
<i>Septulina glauca</i> (Thunb.) Tiegh.	Semi-parasite, grey-green. Flowers outside and inside bright deep-pink. In dense clusters up to 1 m diameter on <i>Tamarix austroafricana</i> .	Karas	Lüderitz District



<i>SPECIES</i>	<i>PLANTDESC</i>	<i>MAJOR AREA</i>	<i>MINOR AREA</i>
<i>Septulina ovalis (E.Mey. ex Harv.) Tiegh.</i>	Parasite on Tamarix, forming dense, heavy tufts, yellow-green. Branches light rusty red-brown. Young branches densely felty pubescent. Flowers red beneath yellow-green pubescence, tips yellow. Tube 1/3 dehiscent.	Karas	Lüderitz District
<i>Sericocoma pungens Fenzl</i>	Small, squarrose spherical, 25 centimetre diametre. Older bark of older twigs pale grey, young twigs densely white felty. Leaves green blabrous. Flowers terminal, small fascicles, up to 10 flowers.	Karas	Lüderitz District
<i>Sesamum capense Burm.f.</i>	Flowers purple.	Karas	Lüderitz District
<i>Sesbania pachycarpa DC. subsp. dinterana J.B.Gillett</i>	Plants upright, up to 60 cm high. Flowers yellow, with dark dots.	Karas	Lüderitz District
<i>Sesuvium sesuvioides (Fenzl) Verdc. var. angustifolium (Schinz) Gonç.</i>	Shrublet 30 cm high, up to 2 m in diameter. Flowers dark pink, starshaped, 2 to 2,2 cm in diameter.	Karas	Lüderitz District
<i>Setaria pumila (Poir.) Roem. &amp; Schult.</i>	Grass. Small, dense tufts.	Karas	Lüderitz District
<i>Sisyndite spartea E.Mey. ex Sond.</i>		Karas	Lüderitz District
<i>Solanum nigrum L.</i>	Annual, somewhat spreading, erect herb, up to 50 cm high. Flowers white. Anthers yellow.	Karas	Lüderitz District
<i>Stachys rugosa Aiton</i>	Flowers yellow.	Karas	Lüderitz District
<i>Stapelia hirsuta L. var. gariensis (Pillans) Bruyns</i>	Flowering in cult, 2 December 1988. Large plant found at foot of mountains some 4 km north of road.	Karas	Lüderitz District
<i>Stapelia sp.</i>		Karas	Lüderitz District
<i>Stipagrostis anomala De Winter</i>	Tufted perennial; roots strong.	Karas	Lüderitz District
<i>Stipagrostis ciliata (Desf.) De Winter var. capensis (Trin. &amp; Rupr.) De Winter</i>	Perennial grass. Inflorescence very loose and open.	Karas	Lüderitz District

<b>SPECIES</b>	<b>PLANTDESC</b>	<b>MAJOR AREA</b>	<b>MINOR AREA</b>
<i>Stipagrostis obtusa</i> (Delile) Nees	Perennial tufts at foot of slope, older parts branched. Inflorescence up to 20 cm long, purple-red coloured. Nodes purple-red.	Karas	Lüderitz District
<i>Stipagrostis subacaulis</i> (Nees) De Winter	Grass.	Karas	Lüderitz District
<i>Stoeberia beetzii</i> (Dinter) Dinter & Schwantes var. <i>arborescens</i> Friedrich		Karas	Lüderitz District
<i>Stoeberia carpii</i> Friedrich	Shrub, 1.5 m high. Leaves large, trigonous, pointed, paired, fused at base. Inflorescences on elongated peduncles. Capsules with long, funnel-shaped base.	Karas	Lüderitz District
<i>Stoeberia gigas</i> (Dinter) Dinter & Schwantes	Upright, rounded shrubs, up to 1 m high, dense. Flowers 5-radiate, white with pale pink tips.	Karas	Lüderitz District
<i>Suessenguthiella scleranthoides</i> (Sond.) Friedrich	Spread out, procumbent. Flowers small, whitish.	Karas	Lüderitz District
<i>Tapinanthus oleifolius</i> (J.C.Wendl.) Danser	Parasite on <i>Euclea pseudebenus</i> . Leaves somewhat fleshy, glabrous. Flowers bright red, with spherical, inflated base and yellow-green tips. Tubes with white dots. Fruit ovate, about 1.5 cm long, bright red. Sparsely warty - dotted.	Karas	Lüderitz District
<i>Tephrosia dregeana</i> E.Mey. var. <i>dregeana</i>	Annual herb, 50 cm high. Leaves imparipinnately compound, pinnae narrowly ovate to lanceolate, up to 7 cm long, abaxially with dense white adpressed indumentum, slightly folded along mid-rib. Flowers in lax axillary racemes, small, 1 cm long; petals bright mauve with abaxially adpressed indumentum; sepals 5, fused, indumentum as on petal. Fruit pods flattened, slightly falcate, with dense white adpressed indumentum; after dehiscion valves twisted; seed reniform, brown, pitted.	Karas	Lüderitz District
<i>Trachyandra bulbinifolia</i> (Dinter) Oberm.	Roots somewhat juicy, yellow. Leaves many, tips somewhat spiralling. Perianth segments brownish white with brown central stripe.	Karas	Lüderitz District
<i>Trachyandra muricata</i> (L.f.) Kunth	Thick, yellow roots, leaves broad. uoted in: Prodrromus einer Flora von Sdwestafrika 147:72 (1970).	Karas	Lüderitz District

<b>SPECIES</b>	<b>PLANTDESC</b>	<b>MAJOR AREA</b>	<b>MINOR AREA</b>
<i>Trianthema parvifolia</i> E.Mey. ex Sond. var. <i>parvifolia</i>	Prostrate herb. Stems basally woody with grey-white bark, young stems canaliculate, red, smooth. Leaves opposite, succulent, minutely papillose, ovoid. Flowers small, inconspicuous, in axillary clusters, tepals pink, persistent; stamens 5, anthers bright orange.	Karas	Lüderitz District
<i>Trichodesma africanum</i> (L.) Lehm.		Karas	Lüderitz District
<i>Trigonella hamosa</i> L.	Erect herb. Flowers yellow, smelling like honey.	Karas	Lüderitz District
<i>Tripteris polycephala</i> DC.	Erect, up to 60 cm high, semi-succulent, grey-green. Ray florets relatively short.	Karas	Lüderitz District
<i>Tripteris</i> sp.	Annual, smelly. Flowers bright yellow.	Karas	Lüderitz District
<i>Triraphis pumilio</i> R.Br.	Up to 5 cm high grasses, with seemingly dense spikelets.	Karas	Lüderitz District
<i>Tromotriche pedunculata</i> (Masson) Bruyns subsp. <i>longipes</i> (C.A.Lückh.) Bruyns	Stems knobby, 4-angled, with violet tinge, up to 2 cm thick. Flowers with conspicuous violet-red cilia bundles in lower third of corolla lobes. Corona double, outer one small, pale, 2-lobed; inner one dark brown, consisting of two lip-like, domed lobes. Corpusculum brownish. Pedicles up to 12 cm long. Calyx acute. Inflorescence stem very short. Corolla lobe olive brown. Shoots 2,5 cm in diameter.	Karas	Lüderitz District
<i>Tylecodon hallii</i> (Toelken) Toelken	Small succulent shrublet about 0.30 m high. Flowers yellow green, leaves cylindrical, yellow green.	Karas	Lüderitz District
<i>Ursinia anthemoides</i> (L.) Poir. subsp. <i>versicolor</i> (DC.) Prassler	Flowers yellow, turning blood red when wilting then heads hanging down.	Karas	Lüderitz District
<i>Vahlia capensis</i> (L.f.) Thunb. subsp. <i>capensis</i>	Annual herb, upright, up to 45 cm high. Flowers bright yellow.	Karas	Lüderitz District
<i>Verbesina encelioides</i> (Cav.) Benth. & Hook.f. ex A.Gray var. <i>encelioides</i>		Karas	Lüderitz District
<i>Veronica anagallis-aquatica</i> L.	Leaves soft, densely hairy. Flowers light blue.	Karas	Lüderitz District

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<i>Viscum rotundifolium</i> L.f.		Karas	Lüderitz District
<i>Wahlenbergia androsacea</i> A.DC.	Upright half rosette. Flowers pale blue, small.	Karas	Karasburg District
<i>Wahlenbergia annularis</i> A.DC.	Flowers light blue.	Karas	Karasburg District
<i>Wahlenbergia campanuloides</i> (Delile) Vatke	Spreading herb. Flowers tiny, whitish-blue.	Karas	Karasburg District
<i>Wahlenbergia erophiloides</i> Markgr.	Flowers blueish-pink.	Karas	Lüderitz District
<i>Wahlenbergia patula</i> A.DC.	Annual herb, 25 cm high. Leaves ovate, dentate, alternate, glabrous, thin in texture. Flowers in densely branched axillary panicles, petals 5, lilac-purple, fused, campanulate, sepals narrowly lanceolate.	Karas	Karasburg District
<i>Wahlenbergia subumbellata</i> Markgr.	Delicate, small, prostrate herb, central shoots upright, 20 cm in diameter. Flowers very small, pale blueish.	Karas	Lüderitz District
<i>Whiteheadia etesionamibensis</i> U.Müll.-Doblies & D.Müll.-Doblies		Karas	Lüderitz District
<i>Zygophyllum cordifolium</i> L.f.		Karas	Lüderitz District
<i>Zygophyllum cylindrifolium</i> Schinz		Karas	Lüderitz District
<i>Zygophyllum decumbens</i> Delile var. <i>decumbens</i>	Half-shrub, 40 cm high. Stems distinctly articulated. Leaves: with 2 pinnae, petiole cylindrical, pinnae broadly ovate, flattened, smooth, succulent. Flowers solitary, axillary; sepals 5, slightly succulent; petals white, reduced; stamens well exerted.	Karas	Lüderitz District
<i>Zygophyllum longicapsulare</i> Schinz	Spreading dwarf shrub, nearly lying on the ground, with clear internodes, older ones light brown, younger white. Leaves round, approximately 0.8 cm in diameter and 1 mm thick. Flowers white. Fruit with a 1 mm broad wing edge. Twigs consist of approximately 3 cm thick and 5 cm long stems.	Karas	Lüderitz District

<i>SPECIES</i>	<i>PLANTDESC</i>	<i>MAJOR AREA</i>	<i>MINOR AREA</i>
<i>Zygophyllum longistipulatum</i> Schinz		Karas	Lüderitz District
<i>Zygophyllum microcarpum</i> Licht. ex Cham. & Schldl.	Rather sprawling shrublets, 0.6 m high, with brittle grey branches. Flowers white.	Karas	Lüderitz District
<i>Zygophyllum patenticaule</i> Van Zyl	Dwarfshrub, up to 25 cm high and 45 cm in diameter. Bark dark grey. Flower white. Terminal shoots becoming somewhat spinescent.	Karas	Lüderitz District
<i>Zygophyllum prismatocarpum</i> E.Mey. ex Sond.	Shrub, with very many, small, white flowers. Semi-succulent round leaves. Stem - grey and woody.	Karas	Lüderitz District
<i>Zygophyllum schreiberanum</i> L.	Upright half shrub with 3-lobed leaves, up to 60 cm high. Leaves not articulate from the centre tip to the petiole. Tips spreading. Fruit dry, not winged, barren.	Karas	Lüderitz District
<i>Zygophyllum segmentatum</i> Van Zyl	Dwarf shrub, 20 cm high, 40 cm in diameter.	Karas	Lüderitz District
<i>Zygophyllum</i> sp.	Low shrublet.	Karas	Lüderitz District