APP-003304

IRRIGATION AND RELATED ACTIVITIES OF KOMSBERG, //KARAS REGION, NAMIBIA

ENVIRONMENTAL ASSESSMENT
SCOPING REPORT

Assessed by:

Assessed for:

Socotra Islands Investments (Pty) Ltd

November 2021

Project:	**IRRIGATION AND RELATED ACTIVITIES OF KOMSBERG, //KARAS REGION, NAMIBIA, ENVIRONMENTAL ASSESSMENT SCOPING REPORT**	
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Report Approval	Pierre Botha Managing Director	Quzette Bosman Environmental Assessment Practitioner

Client Declaration

I , Martin Johan Lourens (Public Officer/Financial Manager) acting as the below company's representative, hereby confirm that the project description contained in this report is a true reflection of the information provided to Geo Pollution Technologies. All material information in our possession that reasonably has or may have the potential of influencing any decision or the objectivity of this assessment is fairly represented in this report.

Signed at Farm Komsberg, Ariamsvlei on the 2 day of December 2021.

Socotra Islands Investments (Pty) Ltd

2016/0830
Business Registration Number

EXECUTIVE SUMMARY

Socotra Islands Investments (Pty) Ltd trading as **Komsberg,** operate irrigation systems for various high value crops, including table grapes and blueberries, as part of their agricultural development along the Orange River in the //Karas Region. Expansion around the existing crop fields are proposed to be developed over the next ten years. As primary operations by the Proponent were recently established, and draws water from an international river, an environmental clearance certificate as per the Environmental Management Act, Act No. 7 of 2007, is required. An environmental assessment, in relation to the biophysical and social features of the site, was conducted. Subsequently, an environmental management plan was drafted for the related operational area.

Geo Pollution Technologies (Pty) Ltd was appointed to conduct this assessment and to compile the environmental management plan. This scoping report presents the findings of the environmental assessment and was used as the primary reference for the compilation of the environmental management plan.

During the environmental assessment, sensitive features of the biophysical and social environment were identified and mapped. These include habitat areas along the Orange River. Consideration was awarded to the complex social structure of the informal settlement, as well the ecosystem services provided to the community and farming operators. Such considerations have been framed by the various National Development Plans, as well as the regional development goals, which all have the table grape industry as an important development driver. Comments and concerns from Interested and Affected Parties have served to augment the environmental assessment by not only providing comments during the public consultation process, but also by providing data regarding some social challenges in the area.

The project was announced to the public as per press and site notices, while adjacent land owners were provided with documentation informing them about the application for environmental clearance certificates. The proof of the public participation process to date is attached as an appendix to this report. Various governmental agencies as well as international organisations have been included in the stakeholder distribution list. Several oral comments and concerns were recorded, most of which are in support of the project. The main concerns are the following:

- Security (theft) concerns;
- Workers housing; and
- Development of the area.

As per the findings of the environmental assessment, the area is faced with various environmental challenges which include extreme climatic conditions and fundamental community challenges such as potable water and sanitation. In addition, the project area borders the Orange River, from which the project sources its water. Definite concerns were raised regarding the water use from the river, as well as the quality of the water in relation to cumulative water uses up- and downstream.

The majority of the significant impacts relate to the biophysical spheres of the environment, specifically related to the soil and water and in a cumulative sense. However, in terms of economic contribution, the table grape sector in Namibia is underpinned by various development plans and goals, while contributing significantly to the export market of Namibia. Investments made to accommodate the project have already significantly contributed to especially the regional and national economy, with investment expenditure exceeding two billion Namibian Dollars. Operations are therefore in line with the regional and national development goals.

It is the opinion of Geo Pollution Technologies that the project will contribute to sustainable development of the region, if the company is compliant with the mitigation measures which are proposed in this report and related environmental management plan. It is noted that Komsberg already conduct their operations as per international best practise requirements, linked to the international markets of developed countries. Therefore, it is proposed that the environmental clearance certificate be issued on condition of compliance to the environmental management plan.

Table A. Summary of Impacts Prior to Mitigation

Impact Category	Impact Type	Construction	Operations
	Positive Rating Scale: Maximum Value	5	5
	Negative Rating Scale: Maximum Value	-5	-5
EO	Revenue Generation in the Professional Sector	3	2
EO	National Development Goals: Water, Agriculture and Land Use Planning	0	4
SC/EO	Scientific Knowledge	3	3
SC	Ideals and Aspirations for the Future	2	2
EO	Contribution to the National Economy	4	4
SC/EO	Economic Resilience and Employment	3	3
EO	Change of Land Use	2	2
SC	Training and Skills Development	2	1
EO	Agricultural Produce and Economic Diversification	3	3
SC	Demographic Profile and Community Health	-1	-3
SC	Health and Safety of the Workforce	-2	-2
PC	Fire	-3	-3
PC	Waste Production	-2	-2
SC	Road Maintenance and Traffic	-2	-2
PC	Soil Contamination and Soil Structure Disturbance	-2	-3
PC	Groundwater Contamination	-2	-2
BE/EO	Water Abstraction		-4
PC/BE	Orange River Water Quality		-3
BE	Change in Ecosystem and Biodiversity (Riverine)	-2	-2
PC	Dust	-2	-1
PC	Noise	-2	-1
SC	Visual Impact	-1	-1
BE	Greenhouse Gas Emissions	-2	-2
SC	Loss of Palaeontological and Archaeological Resources	-3	-3

Table of Contents

1 BACKGROUND & INTRODUCTION 1

2 SCOPE 2

3 ASSUMPTIONS AND LIMITATIONS 3

4 METHODOLOGY 3

4.1 Desk-top Review 3
4.2 Site Visit 3
4.3 Public Consultation 4

5 PROJECT DEVELOPMENT AND RELATED ACTIVITIES 4

5.1 Cultivating Citrus 4
5.2 Cultivating Table Grapes 5
5.3 Cultivating Blueberries 7
5.4 Cultivating Dates 7
5.5 Planning Phase 8
5.6 Development Phase 9
5.7 Operational Phase 10
5.7.1 Crop Production 11
5.7.2 Irrigation 14
5.7.3 Ancillary Activities 15
5.7.4 Employment 17
5.7.5 Property Access and Road Alignment 18
5.8 Decommissioning Phase 19

6 ALTERNATIVES 19

6.1 Location Alternatives 19
6.2 Project Planning and Design Alternatives 20
6.2.1 Agricultural Produce 20
6.2.2 Irrigation Methods 20
6.3 No Go Alternative 22

7 ADMINISTRATIVE, LEGAL AND POLICY REQUIREMENTS 23

8 ENVIRONMENTAL CHARACTERISTICS 28

8.1 Locality and Surrounding Land Use 28
8.2 Climate 29
8.3 Topography, Drainage and Soils 30
8.4 Hydrogeology 33
8.5 The Orange River and Water Supply 35
8.5.1 Irrigation Water Supply 37
8.6 Fauna and Flora 38
8.7 Local Economy 41
8.8 Demographic and Cultural Characteristics 42
8.9 Archaeological, Palaeontological and Heritage Considerations 45

9 PUBLIC CONSULTATION 47

9.1 Press notice 47
9.2 Site Notice 47
9.3 Notification Letters 47
9.4 Meetings 48
9.5 Building an IAP Database 48
9.6 Comments Received 48

10 ASSESSMENT OF IMPACTS 48

11 RISK ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN 50

11.1 Revenue Generation in the Professional Sector 52
11.2 National Development Goals: Water, Agriculture and Land Use Planning 53

11.3 Scientific Knowledge 54
11.4 Ideals and Aspirations for the Future 55
11.5 Contribution to the National Economy (Revenue & Investment Confidence) 56
11.6 Economic Resilience and Employment 57
11.7 Change of Land Use 58
11.8 Training and Skills Development 59
11.9 Agricultural Produce 60
11.10 Demographic Profile and Community Health 61
11.11 Health and Safety of the Workforce 63
11.12 Fire 65
11.13 Waste Production 66
11.14 Road Maintenance and Traffic 67
11.15 Soil Contamination and Soil Structure Disturbance (Degradation and Erosion) 68
11.16 Groundwater Contamination 70
11.17 Water Abstraction 72
11.18 Orange River Water Quality 73
11.19 Change in Ecosystem and Biodiversity (Riverine) 75
11.20 Dust Generation 77
11.21 Noise 78
11.22 Visual 79
11.23 Greenhouse Gas Emissions 80
11.24 Loss of Paleontological and Archaeological Resources 81
11.25 Impact Summary 82
11.26 Decommissioning Phase 82

12 CONCLUSION 83

13 REFERENCES 84

List of Appendices

Appendix A. Communication - Roads Authority 86
Appendix B. Water Permits 89
Appendix C. Proof of Public and Authority Consultation 102
Appendix D. Archaeological Assessment of Orange River Tributaries At Komsberg, Karas Region, Namibia 117
Appendix E. Curriculum Vitae 126

List of Figures

Figure 1-1. Location of the Komsberg agriculture developments 1
Figure 5-1. Basic trellis structure of a vineyard (http:// www.grapegrowingguide.com) 6
Figure 5-2. Simplified presentation of vines before and after pruning (http://www.clemson.edu, 2017) 7
Figure 5-3. Existing cultivated areas and proposed cultivated areas 10
Figure 5-4. Operational areas and key project infrastructure and ancillary components 11
Figure 5-5. Current and previous road alignment of D232 19
Figure 7-1. Draft //Karas Land Use Plan (Koch, *et al*, 2011) 27
Figure 8-1. Protected and conservations areas close to the site 28
Figure 8-2. Topography, drainage and agro-ecological zones 31
Figure 8-3. Major drainage lines present on site 32
Figure 8-4. Berm structures and cut-off trenches around existing operations on the farm Stolzenfelds No. 74 33
Figure 8-5. Geology of the project area 34
Figure 8-6 Groundwater data points 35
Figure 8-7. Habitat integrity as adapted from ARTP JMB, 2008 37

FIGURE 8-8. INFORMAL SETTLEMENT AREA IN RELATION TO EXISTING OPERATIONS ON THE FARM STOLZENFELDS NO. 74 44
FIGURE 8-9. ARCHAEOLOGICAL RESOURCES WHICH HAVE BEEN DESTROYED BY PREVIOUS OPERATIONS PRIOR TO THE OPERATIONS OF THE PROPONENT 46
FIGURE 8-10. ARCHAEOLOGICAL RESOURCES IN RELATION TO PROPOSED OPERATIONS 47

List of Tables

TABLE 5-1. EXISTING WATER ALLOCATION 9
TABLE 5-2. GENERAL ADDITIONAL PROJECT COMPONENTS AND AMENITIES 15
TABLE 6-1. ECONOMIC ALTERNATIVE COMPARISON FOR IRRIGATED CROP PRODUCTION (WRP CONSULTING ENGINEERS ET AL., SEPTEMBER 2014) 20
TABLE 6-2. IRRIGATION SYSTEM EFFICIENCY (IWRM PLAN JOINT VENTURE NAMIBIA, 2010) ... 21
TABLE 6-3. ALTERNATIVE COMPARISON TABLE: IRRIGATION METHOD (BASED ON THE WATER DEMAND STRATEGY DEVELOPED FOR NAMIBIA) (IWRM PLAN JOINT VENTURE NAMIBIA, 2010) 22
TABLE 7-1. NAMIBIAN LAW APPLICABLE TO THE DEVELOPMENT 24
TABLE 7-2. RELEVANT MULTILATERAL ENVIRONMENTAL AGREEMENTS 26
TABLE 7-3. STANDARDS OR CODES OF PRACTISE 26
TABLE 8-1. SUMMARY OF CLIMATE DATA (ATLAS OF NAMIBIA PROJECT, 2002) 29
TABLE 8-2. RAINFALL STATISTICS (WWW.METEOBLUE.COM, 2021) 29
TABLE 8-3. WATER USE IN THE LOWER ORANGE RIVER, DOWNSTREAM OF VANDERKLOOF DAM (TANNER ET AL, UNDATED). 38
TABLE 8-4. TREE ATLAS OF NAMIBIA RECORDS FOR QDS 2819BC, 2819BD AND 2819DA (CURTIS & MANNHEIMER, 2005) 39
TABLE 8-5. GENERAL FLORA DATA (MENDELSOHN, 2002) 40
TABLE 8-6. GENERAL FAUNA DATA (MENDELSOHN, 2002) 41
TABLE 8-7. DEMOGRAPHIC CHARACTERISTICS OF THE KARASBURG EAST CONSTITUENCY, THE //KARAS REGION AND NATIONALLY (NAMIBIA STATISTICS AGENCY, 2011) 42
TABLE 8-8. MAIN INDUSTRY OF EMPLOYED POPULATION AGED 15 YEARS AND ABOVE FOR THE KARASBURG EAST CONSTITUENCY AND //KARAS REGION 43
TABLE 10-1. ASSESSMENT CRITERIA 48
TABLE 10-2. ENVIRONMENTAL CLASSIFICATION OF IMPACTS ACCORDING TO THE RAPID IMPACT ASSESSMENT METHOD OF PASTAKIA 1998 49
TABLE 10-3. CRITERIA FOR IMPACT EVALUATION (DIRECTORATE OF ENVIRONMENTAL AFFAIRS, 2008) 49
TABLE 11-1. SUMMARY OF OPERATIONAL IMPACTS PRIOR TO MITIGATION 82

List of Photos

PHOTO 5-1. SCHEMATIC ILLUSTRATION OF THE SQUARE PLANTING SYSTEM 4
PHOTO 5-2. TYPICAL SHADE NETTING STRUCTURE (ADAPTED FROM WWW.SHRIJIGREEN.COM 4
PHOTO 5-3. CITRUS ORCHARD UNDER SHADE NETTING 5
PHOTO 5-4. NEWLY PLANTED, WHITE-WASHED CITRUS TREES 5
PHOTO 5-5. OLD VINEYARD WITH FLAT TRELLIS STRUCTURE 6
PHOTO 5-6. RAISED TRELLIS STRUCTURE UNDER SHADE NETTING 6
PHOTO 5-7. TOPSOIL STORAGE 9
PHOTO 5-8. REMOVED BEDROCK MATERIAL 9
PHOTO 5-9. PREPARED FIELDS 10
PHOTO 5-10. BEDROCK USED IN BERM 10
PHOTO 5-11. BLUEBERRY TRIAL SECTION 1 12
PHOTO 5-12. BLUEBERRY TRIAL SECTION 2 12
PHOTO 5-13. CITRUS TREES IN POWERLINE SERVITUDE 12
PHOTO 5-14. CITRUS TREES UNDER SHADE NETTING 12
PHOTO 5-15. IRRIGATION LINE BETWEEN CITRUS TREES 12

PHOTO 5-16. IRRIGATION SYSTEM ALONG TREE LINE 12
PHOTO 5-17. PREVIOUSLY ESTABLISHED VINEYARD 13
PHOTO 5-18. BOTTOM SPRAYING IRRIGATION IN ESTABLISHED VINEYARD 13
PHOTO 5-19. EMPLOYEES DISTRIBUTE GROUNDCOVER MATERIAL 13
PHOTO 5-20. GROUNDCOVER IN NEWLY ESTABLISHED VINEYARDS 13
PHOTO 5-21. CHEMICAL STORE 14
PHOTO 5-22. WATER FILLING POINT AND WASH BAY 14
PHOTO 5-23. ABSTRACTION PUMPS AND PUMP HOUSE IN THE ORANGE RIVER 14
PHOTO 5-24. STORAGE DAM 2 14
PHOTO 5-25. ABSTRACTION PUMPS AND PUMP HOUSE IN THE ORANGE RIVER 15
PHOTO 5-26. STORAGE DAM 1 15
PHOTO 5-27. NAMPOWER TRANSFORMER 16
PHOTO 5-28. WATER TREATMENT PLANT 16
PHOTO 5-29. POTABLE WATER RESERVOIR 16
PHOTO 5-30. FUEL STORAGE 16
PHOTO 5-31. IN FIELD ABLUTION FACILITY 17
PHOTO 5-32. FRENCH DRAIN 17
PHOTO 5-33. PACKING AND MATERIAL STORAGE 17
PHOTO 5-34. FENCED-OFF LANDFILL SITE 17
PHOTO 5-35. TRACTOR AND TRAILORT STORAGE 17
PHOTO 5-36. MATERIAL STORAGE 17
PHOTO 5-37. OVERALL VIEW OF EMPLOYEE ACCOMMODATION 18
PHOTO 5-38. ELECTRICITY LINES TO SEASONAL EMPLOYEE ACCOMMODATIONS 18
PHOTO 5-39. WATER TREATMENT FACILITY FOR EMPLOYEES' ACCOMMODATION 18
PHOTO 5-40. PERMANENT EMPLOYEE HOUSES 18
PHOTO 6-1. DATE PALM WITH BOTTOM SPRAYING IRRIGATION 22
PHOTO 6-2. TOP-SPRAYING IRRIGATION 22
PHOTO 8-1. ELEVATED VIEW OF RIDGES WITHIN THE OPERATIONAL AREA 31
PHOTO 8-2. BERM ADJACENT TO CULTIVATED AREA 31
PHOTO 8-3. CUT-OFF TRENCH AROUND OPERATIONAL AREA 31
PHOTO 8-4. GENERAL VIEW OF INFORMAL SETTLEMENT 44
PHOTO 8-5. ACCESS ROAD TO INFORMAL SETTLEMENT 44
PHOTO 8-6. DAY-CARE CENTRE (CRÈCHE) 45
PHOTO 8-7. EMPLOYEE REST AREA 45
PHOTO 8-8. QRS 14/38 PREVIOUSLY SUSPECTED BURIAL SITE 46
PHOTO 8-9. QRS 14/39 PREVIOUSLY DOCUMENTED HUT FEATURE SITE 46

List of Abbreviations

AIDS	Acquired Immune Deficiency Syndrome
DEA	Department of Environmental Affairs
°C	Degrees Celsius
EA	Environmental Assessment
ECC	Environmental Clearance Certificate
EIA	Environmental Impact Assessment
EMA	Environmental Management Act, 2007 (Act no. 7 of 2007)
EMP	Environmental Management Plan
EMS	Environmental Management System
GPT	Geo Pollution Technologies (Pty) Ltd
HIV	Human Immunodeficiency Virus
Ha	Hectares
HMV	Heavy Motor Vehicle
IAP	Interested and Affected Party
IUCN	International Union for Conservation of Nature
IWRM	Integrated Water Resource Management
kV	Kilovolt
Km	Kilometre
MAWLR	Ministry of Agriculture, Water and Land Reform
m	Meter
m^3	Cubic meter
m/s	Meter per second
mbs	Meters below surface
MEFT	Ministry of Environment, Forestry and Tourism
mm/a	Millimetres per annum
MSDS	Material Safety Data Sheet
NDP	National Development Plan
NGO	Non-Government Organisation
ORASECOM	Orange-Senqu River Commission
PPE	Personal Protective Equipment
PV	Photovoltaic
R/ha	South African Rand/hectare
SEA	Strategic Environmental Assessment
WHO	World Health Organization
VIP	Ventilated Improved Pit Latrine

Glossary of Terms

Alternatives - A possible course of action, in place of another, that would meet the same purpose and need but which would avoid or minimize negative impacts or enhance project benefits. These can include alternative locations/sites, routes, layouts, processes, designs, schedules and/or inputs. The "no-go" alternative constitutes the 'without project' option and provides a benchmark against which to evaluate changes; development should result in net benefit to society and should avoid undesirable negative impacts.

Assessment - The process of collecting, organising, analysing, interpreting and communicating information relevant to decision making.

Biodiversity - The variability among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part.

Competent Authority - means a body or person empowered under the Local Authorities Act or Environmental Management Act to enforce the rule of law.

Cumulative Impacts - in relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Dripline - The area directly located under the outer circumference of the tree branches. When the tree canopy gets wet, any excess is shed to the ground along this dripline. This is also known as a tree's critical root zone.

Environment - As defined in the Environmental Assessment Policy and Environmental Management Act - "land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, palaeontological or social values".

Environmental Assessment (EA) – Namibian terminology for a process of assessing the effects on the environment through either a scoping assessment or a combination of a scoping- and detailed assessment.

Environmental Management Plan (EMP) - A working document on environmental and socio-economic mitigation measures, which must be implemented by several responsible parties during all the phases of the proposed project.

Environmental Management System (EMS) - An Environment Management System, or EMS, is a comprehensive approach to managing environmental issues, integrating environment-oriented thinking into every aspect of business management. An EMS ensures environmental considerations are a priority, along with other concerns such as costs, product quality, investments, and strategic planning. An EMS generally makes a positive impact on a company's bottom line. It increases efficiency and focuses on customer needs and marketplace conditions, improving both the company's financial and environmental performance. By using an EMS to convert environmental problems into commercial opportunities, companies usually become more competitive.

Evaluation – means the process of ascertaining the relative importance or significance of information, the light of people's values, preference and judgements in order to make a decision.

Hazard - Anything that has the potential to cause damage to life, property and/or the environment. The hazard of a particular material or installation is constant; that is, it would present the same hazard wherever it was present.

Interested and Affected Party (IAP) - any person, group of persons or organisation interested in, or affected by an activity; and any organ of state that may have jurisdiction over any aspect of the activity.

Mitigate - The implementation of practical measures to reduce adverse impacts.

Proponent (Applicant) - Any person who has submitted or intends to submit an application for an authorisation, as legislated by the Environmental Management Act no. 7 of 2007, to undertake an activity or activities identified as a listed activity or listed activities; or in any other notice published by the Minister or Ministry of Environment & Tourism.

Public - Citizens who have diverse cultural, educational, political and socio-economic characteristics. The public is not a homogeneous and unified group of people with a set of agreed common interests and aims. There is no single public. There are a number of publics, some of whom may emerge at any time during the process depending on their particular concerns and the issues involved.

River Morphology – Description of the shapes of river channels and how they change in shape and direction over time. The morphology of a river channel is a function of a number of processes and environmental conditions, including the composition and erodibility of the bed and banks (e.g., sand, clay, bedrock); erosion comes from the power and consistency of the current, and can affect the formation of the river's path.

Scoping Process - process of identifying: issues that will be relevant for consideration of the application; the potential environmental impacts of the proposed activity; and alternatives to the proposed activity that are feasible and reasonable.

Significant Effect/Impact - means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment

Skirting - also known as skirt pruning, removes branches that are growing too low on the tree. This is done for several reasons, most of which focus on reducing fruit loss or tree loss to environmental and biological factors like ants, rats and rotting diseases.

Stakeholder Engagement - The process of engagement between stakeholders (the proponent, authorities and IAPs) during the planning, assessment, implementation and/or management of proposals or activities. The level of stakeholder engagement varies depending on the nature of the proposal or activity as well as the level of commitment by stakeholders to the process. Stakeholder engagement can therefore be described by a spectrum or continuum of increasing levels of engagement in the decision-making process. The term is considered to be more appropriate than the term “public participation”.

Stakeholders - A sub-group of the public whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. The term therefore includes the proponent, authorities (both the lead authority and other authorities) and all interested and affected parties (IAPs). The principle that environmental consultants and stakeholder engagement practitioners should be independent and unbiased excludes these groups from being considered stakeholders.

1 BACKGROUND & INTRODUCTION

Geo Pollution Technologies (Pty) Ltd was appointed by Socotra Islands Investments (Pty) Ltd trading as Komsberg (the Proponent), to undertake an environmental assessment for their irrigation based agricultural activities on farms Stolzenfelds No. 74 and Komsberg No. 156 (Remainder and Portion 1) along the Orange River in the //Karas Region (Figure 1-1). The main commercial activities of the Proponent comprise the cultivation of table grapes, citrus and blueberries. The Proponent has cleared 610 ha, of which 276 ha is under irrigation and the remainder to be developed. Possible additional areas for cultivation were identified and amounts to 670 ha. The Proponent has a water permit for the irrigation of the combined areas. In compliance with best agricultural practices, the fields are cultivated and covered by shade netting prior to planting. A portion of the operations is left uncovered. Water for irrigation is sourced from the Orange River and applied by means of micro sprinkler and drip irrigation systems. The main operational activities include:

- land preparation,
- construction of support infrastructure,
- planting,
- water abstraction and irrigation,
- fertilizer application and pest control and
- harvesting, processing and transporting activities specific to each crop.

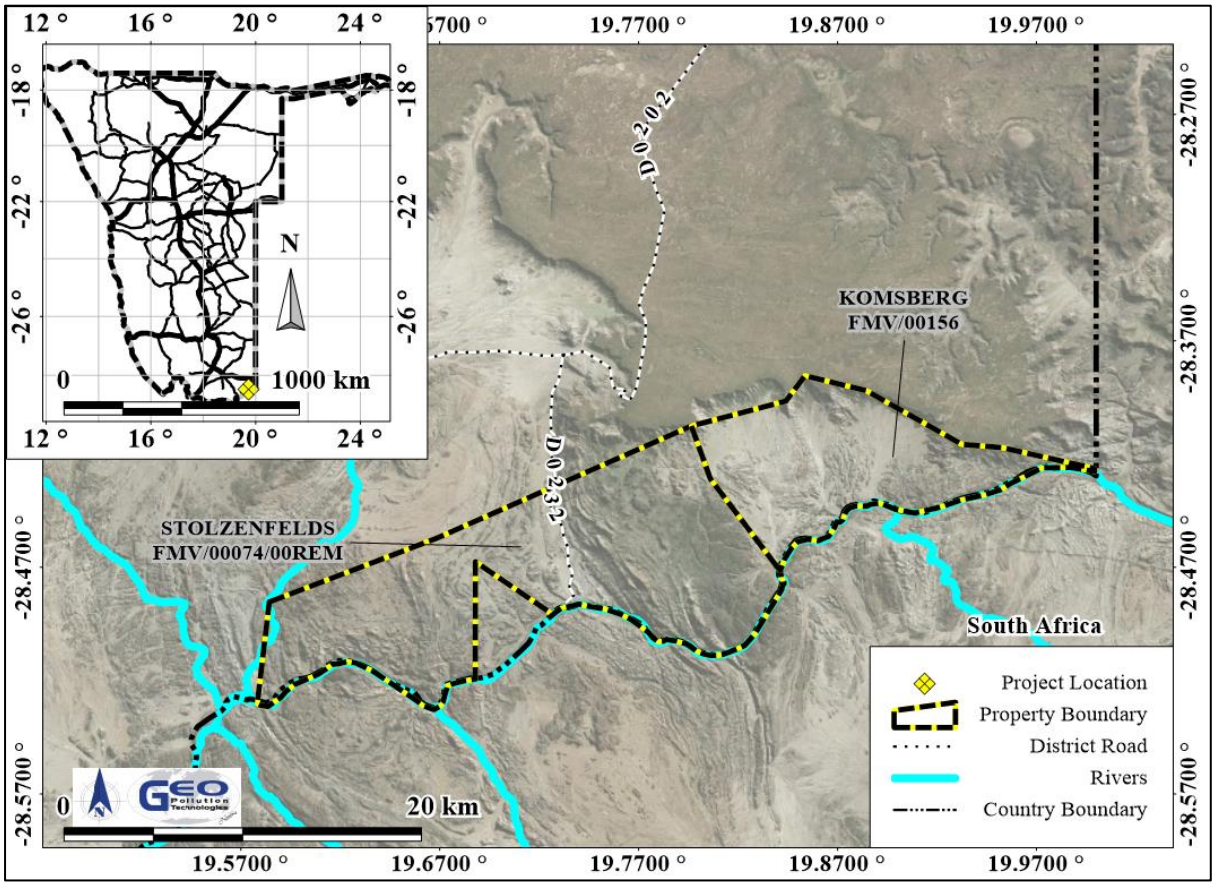


Figure 1-1. Location of the Komsberg agriculture developments

A detailed project description is provided in section 4. The potential impacts of the project on the environment, resulting from various operational, maintenance and construction, and possible decommissioning activities, were determined through the risk assessment as presented in this report. The environment being defined in the Environmental Management Act as "land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, paleontological or social values". The

environmental assessment was conducted to apply for an environmental clearance certificate in compliance with Namibia's Environmental Management Act (Act No 7 of 2007) (EMA).

Project Justification – the lower Orange River has seen agricultural development since the turn of the previous century with an accelerated growth over the past 30 years, particularly the table grape sector. The unique climate, being very hot with little to no rain, proved to be an exceptional environment for table grape production. The first vineyards along the Namibian side of the Orange River were planted by the owner of the greater farm Aussenkjer 147, in Aussenkehr. Thereafter, various portions along the Orange River were independently developed to form the very strong table grape sector of Namibia. Numerous European and international retail franchises have secured supplies from Namibia. The environmental features along the Orange River provide a unique opportunity for table grape producers to cultivate, harvest and sell their table grapes a month before a surge in global supply. Thereby, the table grape producers are securing a more profitable product.

Vineyard development requires investment costs of approximately N$500,000 per hectare. The proposed expansion areas will therefore see a substantial investment into the //Karas Region and Namibia. By developing additional vineyards, the Proponent can potentially more than quadruple their overall combined exports.

Benefits of the agricultural activities conducted by the Proponent include:

- Food production and enhanced food security for local and potential international markets.
- Employment and supporting of livelihoods of both unskilled and skilled labourers.
- Generation of income that contributes to the national treasury.
- Support for economic resilience in the area through diversified business activities and opportunities.
- International investors' confidence,
- Growth in the export markets,
- Growth in the agricultural sector.

2 SCOPE

The purpose of this environmental assessment is to consider the impacts that the agricultural project has on the environment. Once determined, possible enhancement measures will be listed for those positive impacts while preventative and mitigation measures will be provided for negative impacts. As per the findings of this scoping report, an EMP was compiled and will be submitted with the scoping report to the Directorate of Environmental Affairs (DEA) of the Ministry of Environment, Forestry and Tourism (MEFT). These documents were compiled in accordance with the requirements of the EMA and its regulations as to afford the DEA an objective view of expected impacts on the environment. Below follows a summarised list of the requirements of a scoping report and draft EMP

- List of project benefits, need and desirability (Section 1.1)
- Project scoping (Section 2)
- List of assumptions and limitations to the project (Section 3)
- Description of the methodology (Section 4)
- Description of project and components (Section 5)
- Description of project alternatives (Section 6)
- List and link of pertinent legislation (Section 7)
- Description of environment and highlight of sensitive features (Section 8)
- Public consultation process (Section 9)
    - Proof of press and site notices,
    - Notification record, consultation,
    - Interested and Affected Party (IAP) / stakeholder list,
    - List of issues and concerns as per IAPs,
    - Provide IAPs with an opportunity to comment on SR,
    - Incorporate comments into final SR and draft EMP.
- Major identified impacts (Section 10)
- Assessment and management of impacts (Section 10 and 11)

3 ASSUMPTIONS AND LIMITATIONS

Assumptions and limitations which are pertinent to this environmental assessment include the following:

Assumptions

- Existing operations largely determine current operational and managerial actions.
- Table grape-, blueberry- and citrus production are foreseen as a long term investment by the proponent.
- Cumulative impact assessment, specifically associated with the Orange River, will require an overall assessment, including considerations of all operations which may impact the Orange River along the Namibian and South African borders. Authorising bodies should conduct an update resource estimation based on actual use and backflow of water on both sides of the river. Such a larger assessment fall outside of the scope of this assessment and cumulative impacts are considered within the region of project location.
- Data presented by the Proponent is true and correct for the time-period of this assessment.
- Data regarding the water use of the Lower Orange River was provided by the Ministry of Agriculture Water and Land Reform (MAWLR) in 2021. It is assumed that this is the most up to date information.

Limitation

- No correspondence from the Orange-Senqu River Commission (ORASECOM) member, as per the Ministry of Agriculture, Water and Forestry (MAWLR), was received.
- No correspondence from the Orange-Senqu River Commission (ORASECOM) member in Pretoria was received.
- Input from non-governmental associations and international water forums regarding water use of the lower reaches of the Orange River has not been forthcoming and is therefore considered as a data limitation (with regards to cumulative considerations).
- A limiting factor to the environmental assessment is the inability of any party to exactly determine the amount of drainage water which flows back into the Orange River (due to the nature of operations).

4 METHODOLOGY

The environmental assessment process considers information from various sources which was used to compile a description of the environment and the project. Initially, project activities and components were obtained from the Proponent. These have changed to a certain degree as the project continued to develop. Information regarding the environment was mainly derived though desk top review of relevant related documentation, site visits and consultation with neighbours and governmental organisations.

An outline of the work conducted during this environmental assessment follows below.

4.1 DESK-TOP REVIEW

Information regarding the biophysical environment was sourced from the Atlas of Namibia and augmented by various planning documents. These include, but are not limited to the following:

- ORASECOM: Orange-Senqu Basin Integrated Water Resources Management Plan – 2014 and related specialist reports,
- Strategic Environmental Assessment (SEA) for the coastal areas of the //Karas and Hardap Regions and
- Previous environmental assessments conducted for Aussenkehr within the last six years. These include assessments conducted for energy providers and table grape producers.

4.2 SITE VISIT

For purposes of this environmental assessment, a two day site visit and consultation period was conducted during May 2021. Existing activities on and around the site were noted, all of which are described in Section 5 of this report.

4.3 PUBLIC CONSULTATION

The project team endeavoured to consult with surrounding land owners, as well as regional and local governing institutions. Notification of the project, and information sharing with an array of parties through the consultation process, as described in Section 9 of this report, augmented information about the community and its economic activities. The consultation provided insightful perspectives regarding potential impacts and benefits of this project. Relevant data regarding water use and electricity was obtained from government and parastatal agencies. Once all the information was gathered, a risk assessment was conducted as per the weighted impact assessment methodology described in Section 10 of this report.

5 PROJECT DEVELOPMENT AND RELATED ACTIVITIES

To understand the project description, it is important to understand the citrus and table grape sector, since the greatest part of operations comprise these. The production and retail of both citrus and table grapes are an integral process, which is not only reliant on extensive planning, but also on the concise execution of daily activities associated with cultivation. Administration of pesticides and herbicides, pruning, irrigation and drainage require hands-on management, as one mistake may jeopardize an entire harvest. In addition, pests and plagues vary annually as well as seasonally, requiring managers to consider the various industry norms and standards in the latest and most effective pest management regime. Soil management, continual maintenance of irrigation systems, support structures and an extensive labour force, render the project complex. Over and above the hands-on management, the Proponent is subject to various annual, international audits and investigations requiring documented proof of all activities. Such audits hold the Proponent to the highest environmental, technical, health and safety standards for the industry. Should the Proponent fail an audit, they will not be allowed to send their produce to the related international markets. Thereby incurring substantial losses in revenue generation. All such audit results are available on request from the Proponent.

5.1 CULTIVATING CITRUS

When a citrus orchard is planned, a square or rectangular planting system are most practical and most often adopted, where the topography of the land is suitable. Depending on the variant of citrus planted, spacing between the trees may differ. The square planting system is mostly adopted for orchards under irrigation, as is used by the Proponent. Commercial cultivation has seen a development of shielding structures around the orchards. Traditionally protected from wind and other climatic conditions by a tall and dense tree line forming a windbreak; entire orchards can now be cultivated under shade netting. Hence, when such a shielding structure is part of an orchard, it is typically erected prior to the planting of the seedlings. Citrus trees are planted as per the planting system indicated in Photo 5-1 within a shaded net house as per Photo 5-3.

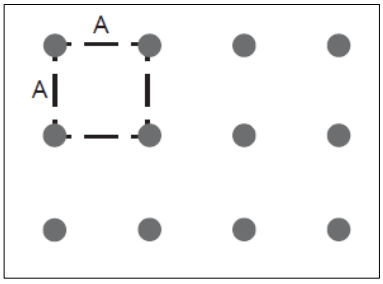


Photo 5-1. Schematic illustration of the square planting system

Photo 5-2. Typical shade netting structure (Adapted from www.shrijigreen.com

Along with the erection of the shade netting, any irrigation system, if so required, is also installed. Thereafter, the internationally sourced young trees, are usually planted in prepared holes with due consideration to soil structure and nutrient levels. Initially, irrigation is typically required twice a week, until the trees are well established, thereafter only weekly. Irrigation requirements

may however vary depending on climatic and soil conditions. Water demand increases as the trees mature. The root system of a citrus tree may penetrate up to 2 m into the soil and well beyond the dripline of the tree. Pest and nutrient management are performed throughout the life of the commercially productive tree. Although pruning is not usually conducted, trees are skirted soon after crops are harvested. Yong tree stems are treated against sun damage through white washing. Maturity is reached between four and five years, depending on the tree variant, climatic and soil conditions. However, some fruits will be produced during the growing phase of the tree. Maturing of citrus fruits takes between 6 to 8 months.

During the harvesting season, fruits are typically picked by labourers and transported to the local storage chambers for packing and distribution. Some parts of the world have mechanised the harvesting of fruit, thereby reducing seasonal labour requirements. Mechanical harvesting may be achieved through a variety of machines available within the industry.

Photo 5-3. Citrus orchard under shade netting

Photo 5-4. Newly planted, white-washed citrus trees

5.2 CULTIVATING TABLE GRAPES

The type of table grape cultivar considered for cultivation is largely based on consumer demand and cultivar performance. Young vines of the preferred cultivars are sourced from various suppliers, mostly beyond Namibian borders. The planting of new vines is not restricted to the proposed areas for expansion, but also apply to agricultural areas from which older vines will be removed. Removal of established vineyards may be required for a variety of reasons, yet mostly relate to the performance of the cultivar in the harsh climatic conditions.

Once the vines arrive from the suppliers, they are directly planted into prepared fields. Preparation of fields comprise the construction of a support structure, known as trellising for each vine. The trellis structure is a large grid set-up which accommodates an irrigation network. Irrigation networks vary between over-hanging or bottom-spraying for each vine. Traditionally, bottom spraying irrigation networks were installed. These are systematically replaced by top spraying irrigation systems when vineyards are replaced.

The trellis set-up comprise overhanging wires, anchored at each end, onto which each vine will be able to grow. The anchors consist of cement blocks onto which stay wires are connected to stabilise and anchor the trellis structure. Some alternative anchors include the use of galvanised steel plates. The end posts are much larger wooden poles. The vines coil around the tensioned wire which is strong enough to support the individual plant when bearing fruit. Figure 5-1 presents a simplified diagram of the trellis structure. Similar to the citrus orchards, whole vineyards may be cultivated under shade netting.

Photo 5-5. Old vineyard with flat trellis structure

Photo 5-6. Raised trellis structure under shade netting

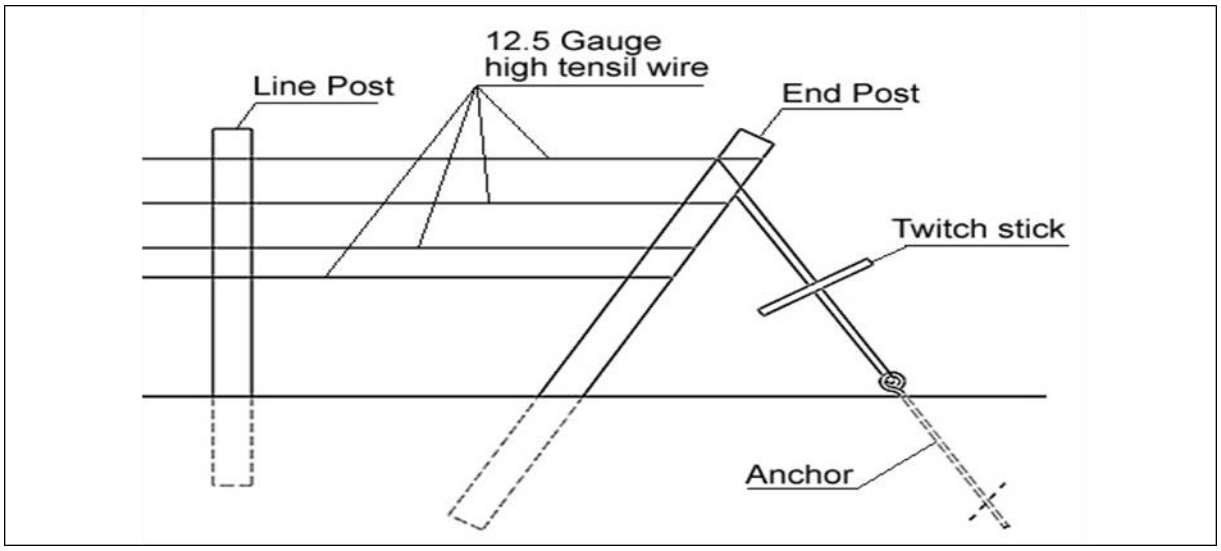


Figure 5-1. Basic trellis structure of a vineyard (http:// www.grapegrowingguide.com)

After the vines have established, they are cultivated to maturity over a period of about four years. During this time, grapes are produced, however a full harvest may typically only be expected during the fourth year. During cultivation, irrigation water requirements for developing vines, are less than that of mature vineyards.

Traditionally, during harvesting, grapes are cut from the vine by labourers and transported into cool storage areas where it is packed for transportation and retail purposes. However, recently the industry has seen a change to in-field packing which reduces handling of the grapes. The vines, now void of any fruit, are pruned at some point after the harvesting season. During pruning the cane part of the vine is stripped of all branches as depicted in Figure 5-2. After pruning, the vine enters a resting period, usually during the winter months of June and July.

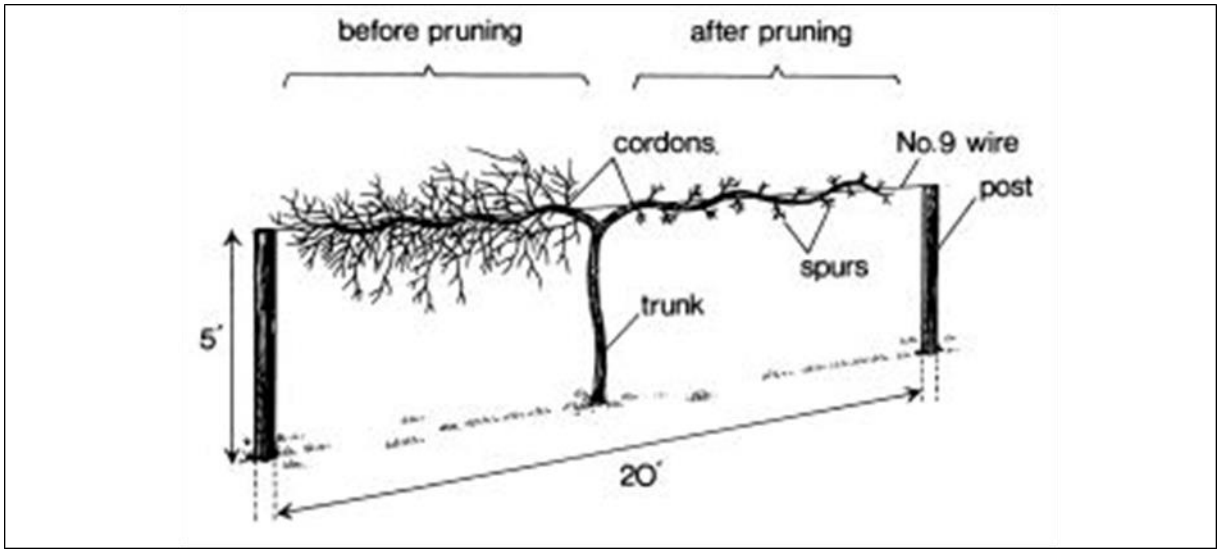


Figure 5-2. Simplified presentation of vines before and after pruning (http://www.clemson.edu, 2017)

5.3 CULTIVATING BLUEBERRIES

Commercial blueberry production requires significant planning and trialling of variants within the chosen area of cultivation. Most cultivated blueberries are not grown from seed. Instead, they are grown from cuttings. This may be due to the seeds producing genetically different offspring. The bushes have a shallow, fibrous root system that requires special growing conditions to optimize plant health and to produce an optimal harvest. Therefore, the Proponent has already engaged in some trials in determining not only the most suited variety, but also cultivation and planting alternatives. Blueberries have a similar growth cycle to that of table grapes, with maturity only achieved between the fourth and sixth year of growth, while they may produce competitive harvests for more than 20 years.

Generally, up to 50% of the plant may be pruned once planted and fruit can be harvested within the first 16 months after planting. A mature harvest can be expected from the fifth to sixth years onwards. Pollination is conducted through the use of bees to ensure a commercially viable harvest.

Water requirements for the plants vary depending on climatic conditions and the growing stage of the plant. A rough estimation would suggest that blueberries require approximately 25 mm of water per week. Mulch material, similarly used in the table grape sector, may be employed to limit evaporation losses. However, specific soil pH requirements may limit the type of material used as mulch in Namibia. When irrigated, drip irrigation is preferred to avoid wetting of the leaves, flowers and fruit. Conversely, within the Namibian climate, overhead irrigation may be employed as such systems will serve to cool the plant down. Final and specific cultivation methods for the proposed blueberry production of the Proponent, will be developed based on cultivar performance. Harvesting of the berries are conducted in a similar fashion to that of table grapes and citrus, being handpicked.

5.4 CULTIVATING DATES

The Proponent is considering planting date palm trees for the cultivation of dates. Date palm trees differ in growth stages from that of citrus, table grapes and blueberries due to the fact that they only start producing fruit in the fifth or sixth year of cultivation, with commercially viable production reached between seven and ten years. Significant investment is required to maintain operations until profits may be realised. However, conventional commercial date palm plantations have a much longer fruit-bearing lifespan, with commercially viable harvests being conducted for up to 60 years.

Dates are commercially grown from off-shoots or culture plants and rarely from seeds (tissue material can be bought and plants are made in the on-site nursery). When establishing a new date plantation, considerable planning in terms future access to the trees and fruits should be conducted, before planting of the young trees. Of critical importance is soil depth to accommodate proper root development. Date palm trees become top-heavy and should have significant room for root anchorage. When soil characteristics do not allow for proper drainage, or has the potential to clog when considering the lifetime operations, the installation of a drainage system should be considered. Similarly, the initial and future irrigation methods and related infrastructure, should be kept in mind. A considerable variety of possibilities are available for such irrigation and drainage methods. Any employed methods will be determined by the biophysical attributes of the climate and soil.

Planting of trees is usually conducted in an 1 m^3 hole, each located either 10 m by 10 m apart, 9 m by 9 m apart or, as practiced in Namibia during various trials, 8 m by 10 m apart. In Namibia such planting is usually conducted in autumn which gives the young plant a longer time to establish itself before the extreme heat of summer. Similar to grapes, mulching around the roots are encouraged once the trees have been planted. In addition to the mulch protective layer, it is recommended that young trees be protected from the extreme heat during their first summer. Once established, the date palm has a different fertilisation and pesticide program for different growth stages. Young trees up to three years receive about a third of the fertilisation a tree older than six years would require. Fertilisers may be applied through the irrigation systems such as micro of drip irrigation. These systems are best suited for the date palm trees which absorb most of their water requirements within the first 100 cm of the soil.

Since only female date palm trees bear fruit, commercial farmers practise artificial pollination to ensure a viable harvest. Pollination can either be conducted manually or mechanically. Similarly, harvesting of the fruit can be done by hand or machine. The Proponent is considering manual labour for both processes. Date harvesting is conducted during January to March every year.

All activities associated with the project (cultivation of various produce) have been divided into four phases namely planning-, development-, operational- and decommissioning phases. An outline of expected activities for each phase is detailed below. The project is divided into two overlapping and integrated operations: *Existing Operations* and *Planned Operations*.

5.5 PLANNING PHASE

The planning phase entails not only overall operational planning, but also amenities and permit acquisition. It includes the setting up of various agreements between contractors, suppliers, state departments and adjacent land owners. Some of the agreements which may be considered as examples are provided below:

- Land ownership,
- Subdivision and rezoning of properties,
- NamPower servitude agreement,
- Roads authority approval,
- Obtaining petroleum product consumer installation certificate,
- Water rights and permits,
- Setting labour contracts (including tender documentation for contractors), and
- Obtaining an ECC (as per this process) as well as any other permits as required.

Within the wider planning framework, many of the negotiations as listed above, are cumulative in nature and essential for all the operators along the Orange River.

Generally, planned expansion of vineyards, orchards and new produce such as blueberries, will tie in with existing operations and therefore the planning phase incorporates existing operations.

Ensuring water permits is an ongoing planning initiative. Water permits dictate the amount of water which may be abstracted from the Orange River for irrigation use. Each property has allocated water permits. Table 5-1 presents the total land portion size in relation to water

allocations or applications. Copies of the existing water permits are attached in Appendix B. Renewal and or application of any new water permits are subject to obtaining an environmental clearance certificate.

Table 5-1. Existing water allocation

Farming Unit	Total planned irrigation < 5 years (Ha)	Existing water allocation as per existing permit m^3
Stolzenfelds No. 74	150	8,000,000
Komsberg No. 156 Ptn 1	736	6,000,000
Komsberg No. 156	392	7,000,000
Combined Total	**1,278**	**21,000,000**

5.6 DEVELOPMENT PHASE

The development phase (also traditionally known as the construction phase for infrastructure related projects) focusses on the establishment and development of the blueberry and vineyard blocks as well as citrus orchards. This phase broadly range from land preparation and support infrastructure right through to planting of produce. Management of crops is the onset of the operational phase. Typical development phase activities will entail land preparation and earth works as well as fencing and netting the expansion area. The development phase will entail the following:

- A temporary construction camp during establishment of new infrastructure, buildings, etc.,
- Upgrading and development of access- and crop roads,
- Site office and storage facilities (pack houses),
- Ablution facilities and associated septic tanks,
- Land preparation for cultivation (blasting of rock, clearing, soil analysis and modification, subsoiling, tillage, drainage infrastructure establishment, cover crops and wind breaks) and
- Infrastructure establishment (water pipelines, irrigation systems, drainage, electrical power supply, etc.)

Ground breaking is typically conducted with a bulldozer while bedrock is loosened with blasting. Rock is removed and stored next to fields being prepared. Topsoil is used in field preparation. Once bedrock is exposed, blasting is conducted to loosen the bedrock which is then excavated and stockpiled and/or used in berm structures around existing operational areas. Ripping is conducted up to 1.8 m deep.

The remaining area to be prepared totals approximately 680 ha, mainly on farm Komsberg No. 156. All existing vineyards and orchards have been prepared in this manner on the farm Stolzenfelds No. 74. Existing and proposed areas of operation are indicated in Figure 5-3.

Photo 5-7. Topsoil storage

Photo 5-8. Removed bedrock material

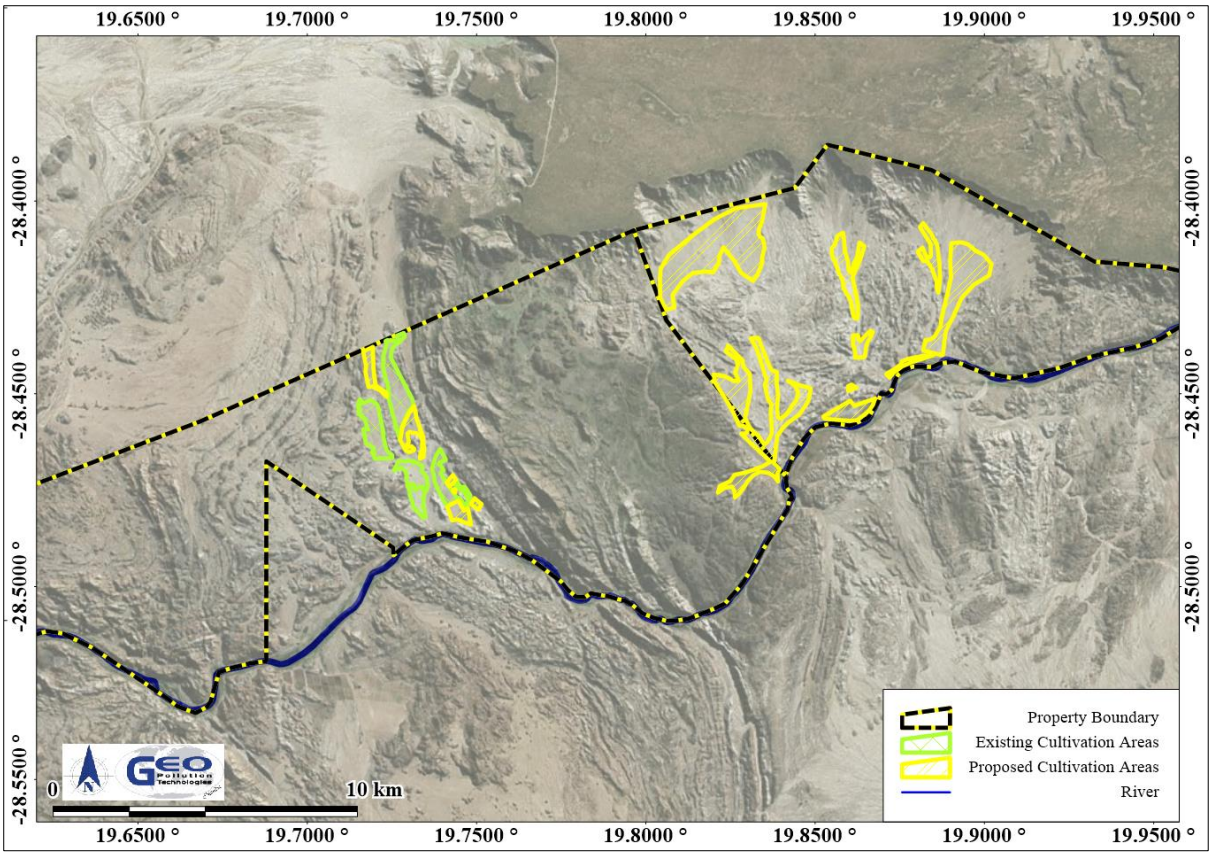


Figure 5-3. Existing cultivated areas and proposed cultivated areas

Irrigation (bulk underground pipelines), trellis and drainage establishment are mainly performed by manual labour. Some of the seasonal workforce, typically employed during the harvesting season, is to be used during such activities. Proposed expansion areas, as well as longstanding areas (which are being replanted), will fall into the development phase of activities.

Photo 5-9. Prepared fields

Photo 5-10. Bedrock used in berm

5.7 OPERATIONAL PHASE

The operational phase refers to the actual cultivation and harvesting of the grapes, citrus, dates and blueberries. It includes all activities required in terms of vineyard and orchard management, maintenance of support infrastructure, operational equipment and labour management. To support cultivation, various ancillary activities are undertaken. Primary cultivation and harvesting will broadly entail the following:

- Planting of chosen crop,
- Fertilisation,
- Weed and pest control,
- Nutrient and soil management,
- Irrigation,

- Drainage water management,
- Vineyard and orchard maintenance (e.g. pruning, green berry preparation) and
- Harvesting, storage and packing of produce.

Operational areas and related key ancillary components located on the farm Stolzenfelds No. 74 are depicted in Figure 5-4

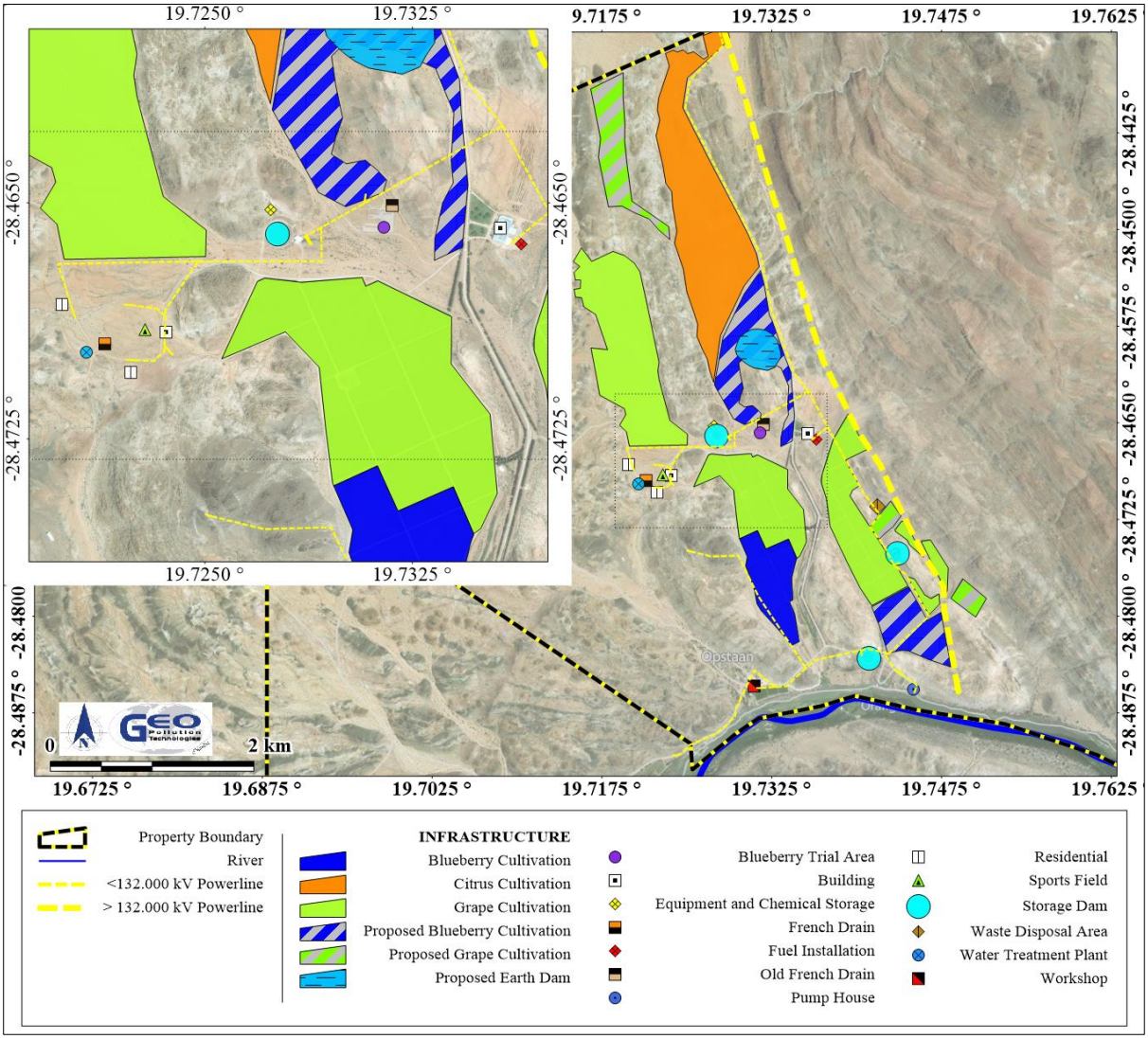


Figure 5-4. Operational areas and key project infrastructure and ancillary components

5.7.1 Crop Production

A combined area of approximately 276 ha is used for irrigation based crop cultivation. Currently the production of table grapes and citrus fruits are the main produce of the farm with table grapes comprising 180 ha and citrus 96 ha. However, the production of blueberries is being conducted on a trial basis with a number of variants currently considered. The different variants are cultivated in various ways to determine which is the most suited for the area. Once the most suited method of cultivation is determined, an expansion of the blueberry plantation to 100 ha is expected. All blueberry cultivation is and will be conducted under shade netting. Blueberry harvesting is conducted manually by mostly a seasonal workforce during the months of April to September/October. Once picked, the blue berries are packed in a cold storage area where it is also kept until transportation to various markets.

Photo 5-11. Blueberry trial section 1

Photo 5-12. Blueberry trial section 2

Citrus trees are also cultivated under shade netting, with only those trees within the NamPower servitude not being covered. In this instance, the shade netting structure will pose a safety risk. Discussion about the management of the servitude and powerline are ongoing with NamPower. Irrigation methods and quantities are different for trees being cultivated in netted areas than those in the open. Block specific irrigation systems enable strict management of water provision. All trees are irrigated through gyro emitters (sprinkler system) which are connected to risers off the distribution tube (Photo 5-16). The tubes and risers are initially laid along the planted rows of trees. As the trees mature, the sprinkler systems are gradually adjusted and moved to an intermittent location between planted rows (Photo 5-15). The above ground irrigation systems tie up with the bulk water supply lines which were laid during the orchard establishment. All trees currently on the property were planted within the last three years and comprise approximately 96 ha, all of which are irrigated. An additional 30 ha of citrus is planned. Harvesting times coincide partly with those of the blueberries during the months of April to August.

Photo 5-13. Citrus trees in powerline servitude

Photo 5-14. Citrus trees under shade netting

Photo 5-15. Irrigation line between citrus trees

Photo 5-16. Irrigation system along tree line

When the Proponent acquired the property, some vineyards had already been established by the previous owners. Most of these vineyards located in the open, have been taken over and managed according to the established irrigation and trellis infrastructure. However, cultivars which are not performing will be replaced with more suited cultivars. During the replacement of such vineyards, improved trellis and irrigation structures may be established, similar to those adopted for more recent vineyards. More recently planted vineyards were established

under shade netting. Apart from pruning required during the resting months, ongoing management of the vineyards not only include water provision, pest management and fertilisation, but also root protection and soil management. An example sees provision of a groundcover (hay) within the vineyard (Photo 19 and 20). Older vineyards have established with living groundcover. These vineyards have established bottom spraying irrigation systems while the newer vineyards were established with top-spraying irrigation systems.

Photo 5-17. Previously established vineyard

Photo 5-18. Bottom spraying irrigation in established vineyard

Photo 5-19. Employees distribute groundcover material

Photo 5-20. Groundcover in newly established vineyards

Irrigation systems allow for the addition of nutrients to the water prior to it being irrigated onto crops. Nutrients which may block or cause disturbances in the irrigation systems is administered manually. However, herbicide and pesticides are administered to all vineyards, orchards and fields by means of external spraying techniques which is mostly administered using manual labour (hand-held pumping). Herbicides, pesticides and nutrients may be carted with a combination of tractor-trailer systems. Such transportation provides easy and mobile access for distributors. Fertilizers and pesticides are applied as required and according to the specifications for application. For irrigated fields, fertilisers are mixed with water in large mixing tanks. Once the desired mixing ratio is achieved, the fertilisers are fed into the respective irrigation systems for administration onto the crops. The Proponent utilises low-soluble-nutrient fertilizers which may be readily absorbed by crops and requires less water. Pesticides are administered as per the specified application procedures for the corresponding pest by means of tractor spraying. To ensure correct and safe application of pesticides, a pesticide plan is implemented and regularly updated. All pesticides are stored in a dedicated chemical store.

Photo 5-21. Chemical store

Photo 5-22. Water filling point and wash bay

5.7.2 Irrigation

Irrigation with water from the Orange River is one of the main listed activities as per the focus of the environmental assessment. Therefore, more detail regarding existing and planned irrigation and water management is provided.

The Proponent pumps water directly from the Orange River by means of centrifugal pumps. All water pumped from the Orange River passes through filtration systems. All quantities abstracted are measured with flow meters or volumes calculated through pump operating hours. The water is pumped to two holding dams from where it is distributed into irrigation systems, water points or water treatments plants. Two irrigation systems are employed. Conventional irrigation systems are manually operated. The amount of irrigation water released, is based on data gathered from soil moisture profiles. The second irrigation system used is fully automated. It links to electronic weather data and an evaporation index. The automated system sends commands providing information on when and how much water should be released through the irrigation system. Determining soil moisture is conducted through probes fitted within the soil. To manually determine soil moisture levels, weekly soil inspections are conducted and water levels documented.

Both manual and automated irrigation systems may be either bottom spraying or hanging systems. A comparison between drip irrigation and spraying irrigation systems is detailed in the alternatives Section 6.

A substantial quantity of the irrigated water is required to be drained from the soil around the root systems of the vines as well as citrus trees. Drainage is required to ensure integrity of the soil structure and to prevent rotting of the root system. Clay particles that swell, or soil that silts up, may cause the fluid infiltration and drainage rate to reduce. Root systems penetrate soil up to a level of between 0.8 m and 1.5 m, while drainage water is known to settle between 1.2 m and 4 m. The prepared fields incorporated enough rock material to accommodate the drainage of water while over irrigation is avoided at all cost. To facilitate drainage, an underground network of collection channels/ pipes was constructed underneath existing operations (where drainage was problematic). The water in the drainage system is monitored and analysed annually.

Photo 5-23. Abstraction pumps and pump house in the Orange River

Photo 5-24. Storage dam 2

Photo 5-25. Abstraction pumps and pump house in the Orange River

Photo 5-26. Storage Dam 1

5.7.3 Ancillary Activities

Ancillary activities required to support the main activity include the following:

- Maintenance of infrastructure (roads, buildings, dams, power lines, sewerage systems, pack-houses, residential units, workshops, etc.) and equipment (irrigation systems, pumps, earth moving equipment and machines, etc.) and
- Management of environmental risks (fire, contamination, degradation).

A variety of amenities linked to the project are listed in Table 5-2. These include components such as general infrastructure, power- and water supply, as well as sanitation, workshops, etc. The D232 district road leads onto the property and provides access to the neighbouring farm and informal settlement area. A 400 kV NamPower powerline is also located across the property. The servitude of this powerline is managed by the Proponent as per agreement with NamPower.

A 23 m^3 aboveground steel storage tank, stores the diesel used by the Proponent during general farming operations. The single tank is housed in a proper bund with required and serviced firefighting equipment present. Diesel is received from tanker trucks and stored in the storage tank. Fuel is dispensed to the various operational machinery via the dispenser on the pump island, by authorised employees, as required. A 2 m^3 mobile fuel bowser is employed to transfer diesel to operational areas further removed from the main tank. Handling of such diesel will be conducted over drip trays and in accordance with Namibian legislation and South African National Standards (SANS) related to fuel handling and storage. Employees are provided with in-house training for refuelling and operations. Regular tank dips (on the main tank) and reconciliation of fuel volumes are performed. The main storage tank adheres to all Namibian legislation and to relevant SANS related to fuel handling and storage, ensuring safety and environmental protection. The refuelling surface comprise concrete spill control slabs with catchment pits to collect any spills. Safety systems include emergency shutoff systems, channelling of storm water in order to prevent its contamination with hydrocarbons, and firefighting equipment. The scale of operations and the frequency of fuel delivery to the area necessitates the use of one additional tank of the same capacity, especially for future operations. For the additional tank, all National and SANS regulations will be employed. The proposed combined fuel storage capacity will be 46 m^3.

Table 5-2. General additional project components and amenities

Project Component	Current Provision	Future Provision
Electricity Provision	Estimated 7,500 kVA mainly sourced from NamPower.	Estimated additional requirement of approximately 6,000 kVA mainly sourced from NamPower.
Water Provision	Surface water abstraction: as per existing water rights.	Additional abstraction for proposed expansion area as per renewal of water permits.

Project Component	Current Provision	Future Provision
Water Treatment	Three water treatments plants across the property to serve all domestic water requirements.	Additional or the upgrading of water treatments plants may be considered for future expansion.
Water Storage	Three storage dams with a combined capacity of 60,000 m^3.	Two additional storage dams (volume to be determined).
Irrigation System	All vineyards, orchards and fields have irrigation systems.	Irrigation systems will be extended for any new operations.
Pack Houses / Cool Stores & General Storage	One existing pack house / cool storage complex.	Additional pack houses / cool storage complexes planned.
Sanitation	Current VIP and French drain systems catering for existing staff compliment.	VIP systems planned for additional operational areas.
Landfill	One landfill site which is fenced.	No additional sites planed.
Fuel Storage	One diesel tank with a capacity of 23 m^3 located in a bund wall	One additional 23 m^3 diesel tank.
Workshops & Maintenance Yards	One workshop and maintenance yard.	Additional workshop and maintenance yard planned.
Chemical Storage Area	One chemical storage unit.	Additional chemical storage unit planned.
Office Complex	One office complex.	No additional office complexes required.

Photo 5-27. NamPower transformer

Photo 5-28. Water treatment plant

Photo 5-29. Potable water reservoir

Photo 5-30. Fuel storage

Photo 5-31. In field ablution facility

Photo 5-32. French drain

Photo 5-33. Packing and material storage

Photo 5-34. Fenced-off landfill site

Photo 5-35. Tractor and trailort storage

Photo 5-36. Material storage

5.7.4 Employment

The Proponent is a relative large scale employer with operations requiring 160 permanent employees and over 800 seasonal employees. All permanent and seasonal employees are provided with brick houses, running warm water and electricity. Company benefits further include the facilitation of health care through ongoing liaison with local clinics and transport to retail centres such as Keetmanshoop.

Should proposed operations realise (the portion of operations not yet fully developed) an additional 2,300 employment opportunities will be provided. As such, planning for additional worker accommodation has already been initiated. Planned operations will further see a prolonged harvesting season since blueberries may require harvesting teams for longer (from April /May to September/October. Therefore the seasonal workforce may be employed for longer periods of time.

Photo 5-37. Overall view of employee accommodation

Photo 5-38. Electricity lines to seasonal employee accommodations

Photo 5-39. Water treatment facility for employees' accommodation

Photo 5-40. Permanent employee houses

5.7.5 Property Access and Road Alignment

The Proponent is in discussion with the Roads Authority regarding the D232 road. Some minor road alignment changes were done to allow for current operations and the property entrance. The current and previous road alignment are indicated in Figure 5-5. The road is currently maintained by the Roads Authority with some assistance provided by the Proponent. An application was made by the Proponent to register the road as a farm road. This application was reviewed by the Roads Authority. The Proponent has received an informal notification that the application was successful, however they are still waiting for the formal communication related to the matter. Such a classification will afford the client the opportunity to better maintain the road.

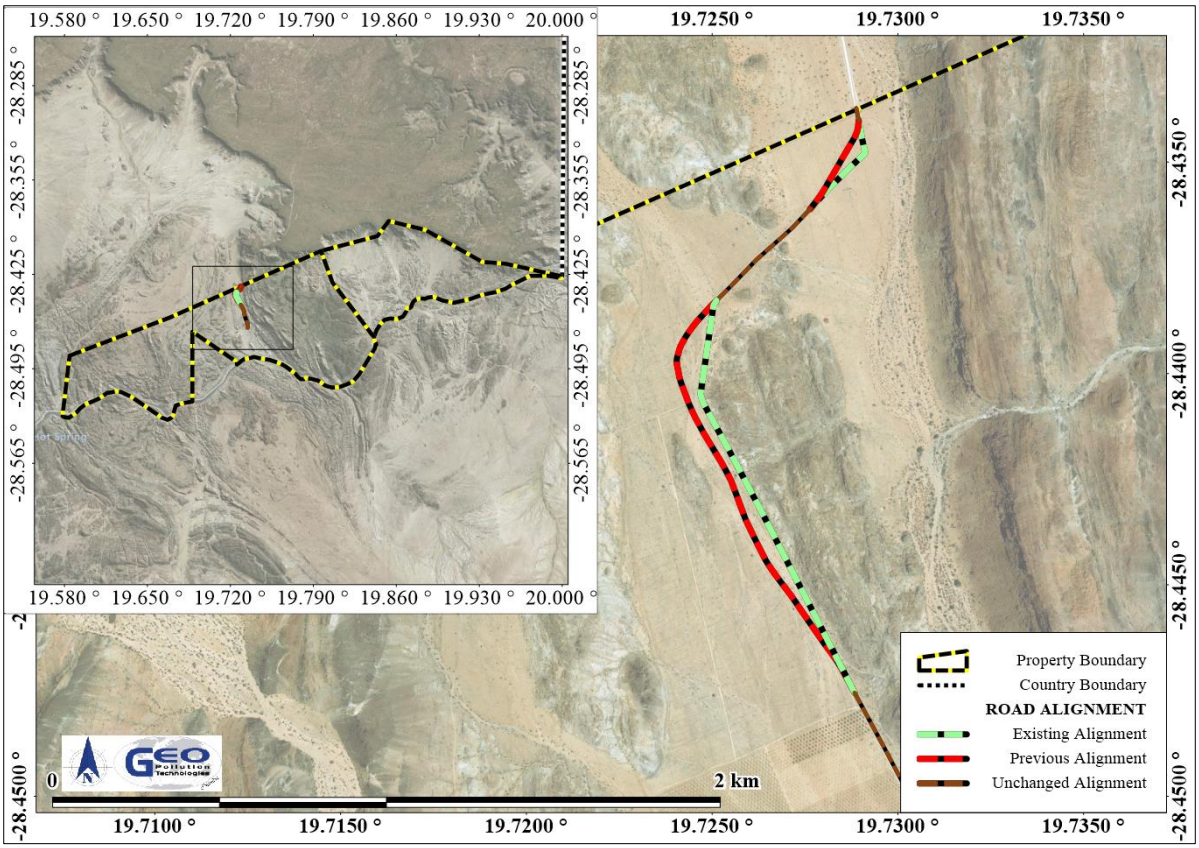


Figure 5-5. Current and previous road alignment of D232

5.8 DECOMMISSIONING PHASE

Should the Proponent decide to terminate their involvement in the area, or abandon a ANY cultivated area or any part of operations, a decommissioning phase may be initiated. All supporting infrastructure, such as water and irrigation pipelines, electricity supply lines, access and cultivated area roads etc., will have to be removed and or rehabilitated to a state either useable for an alternative agricultural project, or as close as possible to its original state. Rehabilitation should further be conducted for any component of the project, which may, during the life of the project, become redundant or be decommissioned. An example would be any residential units or workshop area no longer of any use. In addition, sufficient preparation should be allowed for, for provisioning for social aspects and labour law requirements. Alternatively, should the Proponent sell any part of their agricultural project, all pollution, closure and rehabilitation liabilities should be stipulated and made part of the take-over agreement.

6 ALTERNATIVES

Various alternatives related to the project are considered and each of these alternatives are discussed. The alternatives can roughly be grouped into three main groups namely:

- Location alternatives;
- Project planning and design alternatives;
- No go alternative.

6.1 LOCATION ALTERNATIVES

Various developments along the Orange River have been established in those areas where the topographical features allow. Limited areas along the Orange River in Namibia exist in relation to available services. The majority of these are already being utilised. Expansion areas are largely located adjacent to existing operations. Due to the proximity of the farm to the Orange River (i.e. water supply), an essential requirement for the project, no alternative location away from the river is possible.

6.2 PROJECT PLANNING AND DESIGN ALTERNATIVES

Although operations are ongoing, various alternatives are continually considered to optimise operations and increase productivity. Alternatives, related to the main activity of water abstraction from the Orange River, are however not feasible. There are no viable groundwater resources to consider and no alternative surface water resource is available. Therefore, there are no alternative water sources for the existing irrigation operations. However, there are a number of alternatives with regards to the application of the water used. These relate to crop irrigation methods and dust suppression. In addition to these alternatives, the Proponent has also considered alternative crops and worker transportation.

6.2.1 Agricultural Produce

The table grape industry proved to be one of the most viable options with regards to water use for high value crops in Namibia. An assessment conducted in 2004: "Development of Reconciliation Strategies for Large Bulk Water Systems: Orange River – Irrigation Demands and Water Conservation / Water Demand Management", considered the contribution of a variety of crops to the economic sector (inclusive of labour contributions). The study specifically considered irrigation practices along the Orange River. As per Table 6-1, it is clear that growing table grapes along the Orange River provides the leading economic contribution (inclusive of secondary spinoffs such as labour) (measured in South African Rand / hectare).

Table 6-1. Economic alternative comparison for irrigated crop production (WRP Consulting Engineers et al., September 2014)

Crop	Goss Income (R/ha)	Interest on Working Capital (R/ha)	Variable Cost (R/ha)	Fixed Cost (R/ha)	Net Farm Income (R/ha)
Maize	26,000	797	20,784	3,613	4,206
Apples	247,500	4,069	130,413	7,424	42,931
Wheat	17,640	319	13,060	2,622	4,578
Dry beans	17,400	318	12,983	2,613	3,261
Lucerne	24,000	1,569	20,588	4,636	4,641
Potatoes	129,690	2,315	91,696	3,432	32,517
Cabbage	58,725	2,133	1,128	3,594	11,870
Table Grapes	294,373	4,875	170,701	8,861	86,405
White Grapes	50,018	2,757	26,945	8,507	11,808
Raisins (Dried Grapes)	86,215	3,475	42,736	7,956	32,048

Similarly the emerging blueberry and citrus industry in Namibia provide opportunities of high value crop cultivation. The citrus industry is still in its infancy shoes. However, the Proponent will have a significant segment of market share.

In addition to the economic viability, additional considerations pertaining to crop performance include the soil, climate and water requirements of the crop. Therefore, ongoing trials are being performed by the Proponent to consider most suited crop cultivation.

6.2.2 Irrigation Methods

When considering alternative irrigations systems, the most viable irrigation option is not only based on the irrigation system's design efficiency, but should include environmental constrains and operating costs. Some systems are simply not viable due to climatic and topographical features as well as cost implications. For example, flood basin irrigation is not viable on steeper gradients. Similarly, crops cultivated further away and on higher elevations from the water source are more expensive to produce due to water pumping costs. The

considered irrigation system should therefore take into account the local topographical and climatic conditions.

The type of produce to be cultivated will also play a determining factor. It will not be feasible to install highly efficient yet expensive irrigation systems (such as drip irrigation) for crops with lower economic yields. The high value of table grapes, blueberries and citrus can however accommodate such systems. In turn, such produce will not produce such high yields when cultivated under less efficient systems. Table 6-2 depicts different types of irrigation systems as per the South African Irrigation Institute's suggested efficiencies (IWRM Plan Joint Venture Namibia, 2010). The estimated average costs are based on 35 ha units. Although flood and sprinkler systems are not viable irrigation methods, these have been included for comparison with regards to capital cost and design efficiency.

Table 6-2. Irrigation system efficiency (IWRM Plan Joint Venture Namibia, 2010)

Irrigation System	Design Efficiency	Capital Costs (R / ha)
Flood: Furrow	65%	13,000
Flood: Border	60%	17,600
Flood: Basin	75%	18,800
Sprinkler: Dragline	75%	24,800
Sprinkler: Quick-coupling	75%	22,500
Sprinkler: Permanent	85%	34,500
Sprinkler: Travelling boom	80%	23,200
Sprinkler: Centre pivot	85%	43,300
Sprinkler: Linear	85%	69,400
Sprinkler: Micro sprinkler	85%	36,300
Micro: Spray	90%	53,200
Micro: Drip	95%	46,300

For the Proponent's project, climatic, topographical and soil conditions necessitate an irrigation system which will pump water from the lower lying Orange River to higher elevations, while irrigation itself is required to be of a high efficiency (due to evaporation and soil salinization). A highly effective irrigation system will minimise wastage of water through evaporation and/or runoff. Normal drip irrigation systems will not be able to provide enough water within the pumping time available. When temperatures soar in summer months, additional water is required to be irrigated onto crops. Drip irrigation systems are not designed to accommodate such requirements and acquiring additional systems will be too costly. Micro spray irrigation is therefore preferred to micro drip irrigation. Traditionally bottom spraying micro-spray irrigation systems were used for table grape cultivation. Recently, the Proponent has endeavoured to systematically replace these systems with over hanging micro-spray irrigation systems. The change is aimed at reducing systems damage due to worker incidents (stepping and trampling bottom-spraying irrigation systems). For blueberry production, the top spraying systems may be considered, however, a combination system of the two irrigation systems could be employed. Bottom spraying irrigation further allows for the easy cultivation of cover-crop production between vineyards and orchards when considered. Citrus and date production prefer bottom spraying irrigation. Table 6-3 is a comparison table detailing the advantages and disadvantages of micro spray systems vs micro drip systems.

Table 6-3. Alternative comparison table: irrigation method (Based on the water demand strategy developed for Namibia) (IWRM Plan Joint Venture Namibia, 2010)

Description	Advantages	Disadvantages	Preferred alternative
Micro: Spray (Top & Bottom)	Provide enough water during soaring temperatures Reduced risk to worker damage (top spraying systems) Supply of enough water within the operating constraints of pumping time (reduced irrigation hours)	Design efficiency 90% Water system losses (evaporation, weeds and runoff) Most expensive capital cost Higher consumption rate as water outside of targeted zone	A combination of top and bottom micro spraying is currently used. There is a systematic conversion of the bottom spraying system to the top spraying system. All future operations are to employ top micro spraying systems.
Micro: Drip	Design efficiency 95% Less capital costs Higher-targeted zone watering Watered zone is shadowed by the plant itself, evaporation is minimal and the consumption is lowered Unwanted plant growth is prevented. Foliage remains dry, thus reducing the risk of disease	Labour intensive clogging clearing Dripper clogging replacement cost Salinization of soils Longer irrigation hours required	

Photo 6-1. Date palm with bottom spraying irrigation

Photo 6-2. Top-Spraying irrigation

6.3 NO GO ALTERNATIVE

Table grape production in Namibia, was initiated in the 1980's and have been in operation for more than 30 years. High-value crop production has proliferated along the lower Orange River. The project falls within relatively new areas of development, having been acquired within the last four years. Should the project not receive the environmental clearance certificate, there would be a significant loss in capital investment since the current foreign investment into the project exceeds a billion Namibian dollars. There will further be a loss in investor's confidence in Namibia as existing operations were identified by the Namibian Government to fall within an area for growth, investment and development, specifically in the table grape sector. Of significant importance is that thousands of workers will lose their stable income and jobs. Finally, revenue generated for Namibia will be reduced. The biophysical attributes of the area allow for limited alternative uses. Not continuing with the project may see the land utilised for significantly less profitable operations.

7 ADMINISTRATIVE, LEGAL AND POLICY REQUIREMENTS

To protect the environment and achieve sustainable development, all projects, plans and programmes deemed to have adverse impacts on the environment require an ECC. Namibian legislation lists specific activities which are required to apply for an ECC. The current and proposed agricultural operations fall within the ambit of these activities, as per Section 3 of Government Gazette No 4878. Listed activities which require an ECC application (Government Regulation No 29 of 2012) related to this project include the following:

Section 2: Waste Management, Treatment, Handling and Disposal Activities

- 2.1 The construction of facilities for waste sites, treatment of waste and disposal of waste. Various sanitation systems are located among the vineyards for labourers. These are mainly French drain and VIP systems. The Proponent further also manages a landfill site for general waste.

Section 7: Agriculture and Aquaculture Activities

- 7.5 Pest control: The Proponent will use conventional pest control products as approved by the Namibian government for some of the produce. These may include herbicides and pesticides.

Section 8 of Government Notice No. 29 of 2012: Water Resource Developments

- 8.1. The abstraction of ground or surface water for industrial or commercial purposes: Water is abstracted from the Orange River for current and proposed commercial operations.
- 8.3. Any abstraction from a river that forms an international boundary. Water is abstracted from the Orange River, which forms an international boundary with South Africa.
- 8.6 Construction of industrial and domestic wastewater treatment plants and related pipeline systems: The Proponent has installed wastewater treatment facilities (French drain systems) on the properties to manage mainly black and grey water.
- 8.7 Irrigation schemes for agriculture excluding domestic irrigation: No *irrigation scheme* was developed, however, *irrigation systems* are used on the farm. Irrigation on the farms does not contribute to or is part of any irrigation scheme as proclaimed by the Namibian Government.

Section 9 of Government Notice No. 29 of 2012: Hazardous Substance Treatment, Handling and Storage

- 9.1 The manufacturing, storage, handling or processing of a hazardous substance defined in the Hazardous Substances Ordinance, 1974. The project has a fuel installation for *storing* diesel in an aboveground tank which has a capacity of 23 m^3. An additional storage tank is proposed for expansion operations. The additional tank will have a capacity of 23 m^3.
- 9.2 Any process or activity which requires a permit, licence or other form of authorisation, or the modification of or changes to existing facilities for any process or activity which requires an amendment of an existing permit, licence or authorisation or which requires a new permit, licence or authorisation in terms of a law governing the generation or release of emissions, pollution, effluent or waste: One small landfill site has been established within the property boundaries. This site will be licenced once and if the Regional or local council adopts Waste Management Regulations. This site is currently managed according to industry best practise for export produce products.
- 9.4. The storage and handling of a dangerous goods, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 cubic meters at any one location. The project has a consumer installation for storing diesel in an aboveground tank which has a capacity of 23 m^3. An additional storage tank is proposed for expansion operations. The additional tank will have a capacity of 23 m^3.

Section 10: Infrastructure

- 10.2. The route determination of road and design of associated physical infrastructure where it is a public road The D2332 road enters the property to provide public access to the adjacent property. The alignment of the road was slightly changed to enhance its resilience to flooding instances. All changes to the road were discussed with the Roads Authority with whom continuous discussions are kept.

The legislation and standards provided in Table 7-1 to Table 7-3 speak into the environmental assessment process in Namibia, and are relevant to this assessment.

Table 7-1. Namibian law applicable to the development

Law	Key Aspects
The Namibian Constitution	♦ Promote the welfare of people ♦ Incorporates a high level of environmental protection ♦ Incorporates international agreements as part of Namibian law
Environmental Management Act Act No. 7 of 2007, Government Notice No. 232 of 2007	♦ Defines the environment ♦ Promotes sustainable management of the environment and the use of natural resources ♦ Provides a process of assessment and control of activities with possible significant effects on the environment
Environmental Management Act Regulations Government Notice No. 28-30 of 2012	♦ Commencement of the Environmental Management Act ♦ List activities that requires an environmental clearance certificate ♦ Provide Environmental Impact Assessment Regulations
Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act Act No. 36 of 1947; Government Notice No. 1239 of 1947	♦ Governs the registration, importation, sale and use of fertilizers, farm feeds, agricultural remedies and stock remedies ♦ Various amendments and regulations
Seed and Seed Varieties Act 23 of 2018 Act No. 23 of 2018, Government Notice No. 368 of 2018	♦ Provides for restrictions on the importation of seed ♦ Not in force yet
The Water Act Act No. 54 of 1956	♦ Remains in force until the new Water Resources Management Act comes into force ♦ Defines the interests of the state in protecting water resources ♦ Controls water abstraction and the disposal of effluent ♦ Numerous amendments
Water Resources Management Act Act No. 11 of 2013	♦ Provides for management, protection, development, use and conservation of water resources ♦ Prevention of water pollution and assignment of liability ♦ Not in force yet
Forest Act (Act 12 of 2001, Government Notice No. 248 of 2001)	♦ Makes provision for the protection of the environment and the control and management of forest fires ♦ Provides for the licencing and permit conditions for the removal of woody and other vegetation as well as the disturbance and removal of soil from forested areas
Forest Regulations: Forest Act, 2001 Government Notice No. 170 of 2015	♦ Declares protected trees or plants ♦ Issuing of permits to remove protected tree and plant species.
Soil Conservation Act Act No. 76 of 1969	♦ Law relating to the combating and prevention of soil erosion, the conservation, improvement and manner of use of the soil and vegetation and the protection of the water sources in Namibia
Agricultural Pests Act No 3 of 1973	♦ To provide for the registration of nurseries and the control and destruction of plants, insects and plant diseases at nurseries
Inland Fisheries Resource Act No 1 of 2003	♦ To Act to provide for the conservation and protection of aquatic ecosystems and the sustainable development of inland fisheries resources; to provide for the control and regulation of inland fishing; and to provide for related matters
Mountain Catchment Areas Act No 63 of 1970	♦ To provide for the conservation, use, management and control of land situated in mountain catchment areas, and to provide for matters incidental thereto

Law	Key Aspects
Biosafety Act Act No. 7 of 2006	♦ Regulate activities involving the research, development, production, marketing, transport, application and other uses of genetically modified organisms and specified products derived from genetically modified organisms ♦ Prohibits planting of genetically modified organisms without registration
Petroleum Products and Energy Act Act No. 13 of 1990, Government Notice No. 45 of 1990	♦ Regulates petroleum industry ♦ Makes provision for impact assessment ♦ Petroleum Products Regulations (Government Notice No. 155 of 2000) ♦ Prescribes South African National Standards (SANS) or equivalents for construction, operation and decommissioning of petroleum facilities (refer to Government Notice No. 21 of 2002)
Local Authorities Act Act No. 23 of 1992, Government Notice No. 116 of 1992	♦ Defines the powers, duties and functions of local authority councils
Public Health Act Act No. 36 of 1919	♦ Provides for the protection of health of all people
Public and Environmental Health Act Act No. 1 of 2015, Government Notice No. 86 of 2015	♦ Provides a framework for a structured more uniform public and environmental health system, and for incidental matters ♦ Deals with Integrated Waste Management including waste collection disposal and recycling, waste generation and storage, and sanitation
Labour Act Act No 11 of 2007, Government Notice No. 236 of 2007	♦ Provides for Labour Law and the protection and safety of employees ♦ Labour Act, 1992: Regulations relating to the health and safety of employees at work (Government Notice No. 156 of 1997)
National Heritage Act No. 27 of 2004, Government Notice No. 287 of 2004	♦ Provides for the protection of heritage, archaeological and palaeontological resources
Atmospheric Pollution Prevention Ordinance Ordinance No. 11 of 1976	♦ Governs the control of noxious or offensive gases ♦ Prohibits scheduled process without a registration certificate in a controlled area ♦ Requires best practical means for preventing or reducing the escape into the atmosphere of noxious or offensive gases produced by the scheduled process
Hazardous Substances Ordinance Ordinance No. 14 of 1974	♦ Applies to the manufacture, sale, use, disposal and dumping of hazardous substances as well as their import and export ♦ Aims to prevent hazardous substances from causing injury, ill-health or the death of human beings
Pollution Control and Waste Management Bill (draft document)	♦ Not in force yet ♦ Provides for prevention and control of pollution and waste ♦ Provides for procedures to be followed for licence applications

Table 7-2. Relevant multilateral environmental agreements

Agreement	Key Aspects
Stockholm Declaration on the Human Environment, Stockholm 1972.	♦ Recognizes the need for a common outlook and common principles to inspire and guide the people of the world in the preservation and enhancement of the human environment
United Nations Framework Convention on Climate Change (UNFCCC)	♦ The Convention recognises that developing countries should be accorded appropriate assistance to enable them to fulfil the terms of the Convention
Convention on Biological Diversity, Rio de Janeiro, 1992	♦ Under article 14 of The Convention, EIAs must be conducted for projects that may negatively affect biological diversity
International Treaty on Plant Genetic Resources for Food and Agriculture, 2001	♦ Promote conservation, exploration, collection, characterization, evaluation and documentation of plant genetic resources for food and agriculture ♦ Promote the sustainable use of plant genetic resources for food and agriculture

Table 7-3. Standards or codes of practise

Standard or Code	Key Aspects
South African National Standards (SANS)	♦ The Petroleum Products and Energy Act prescribes SANS standards for the construction, operations and demolition of petroleum facilities. ♦ SANS 10131 (2004) is aimed at above-ground storage tanks for petroleum products. o Provide requirements for spill control infrastructure

Considering local and regional planning initiatives are paramount in achieving optimal and integrated sustainable development in Namibia. As such, the Strategic Environmental Assessment for the //Karas Integrated Regional Development Planning (Koch *et al*, 2011) was considered as part of the desk top study. Therein, the proposed land use for the //Karas Region's development is indicated. As depicted in Figure 7-1, the proposed land use for Komsberg includes irrigated fields. This confirms that the agricultural project is in line with the proposed regional development goals.

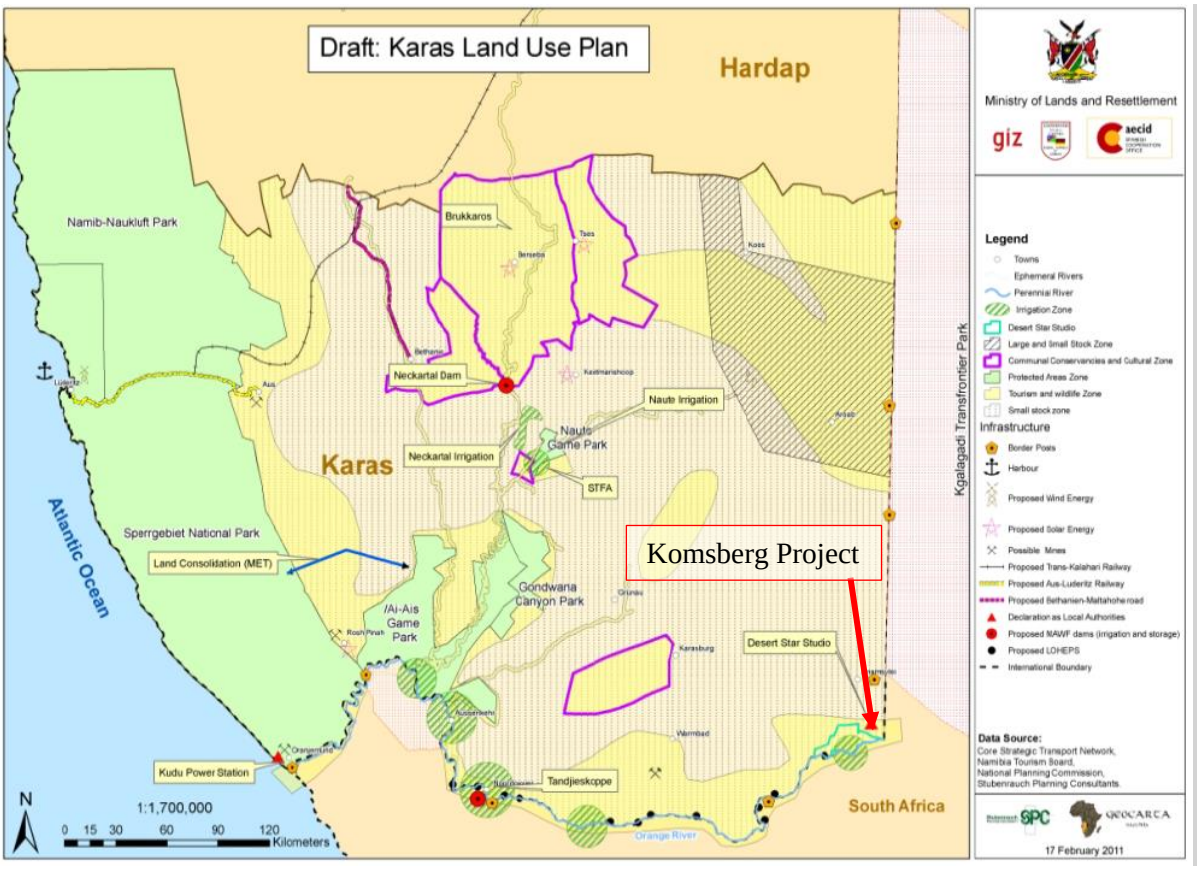


Figure 7-1. Draft //Karas Land Use Plan (Koch, *et al*, 2011)

In addition to the Regional Land Use Planning, the environmental assessment considered the goals set out as per Namibia's Vision 2030 and the various related National Development Plans (NDP's). In particular, an aspects highlighted as being paramount to the project is water from the Orange River, used for commercial purposes. Therefore, during the environmental impacts assessment, the goals of Vision 2030, which have specifically been adopted for the water sector, were kept in mind. These goals are summarised as follows:

Vision 2030 -Freshwater and Associated Resources: Water allocated and used efficiently

- Irrigation of only high value and strategic crops on suitable soils,
- Clean, unpolluted water,
- Productive and healthy natural wetlands with rich biodiversity, and
- Optimal and strategic economic development options.

The development targets stated in the NDP3 (and which is being built on during the NDP4 & 5), in the Key Result Area: *Productive utilization of natural resources and environmental sustainability, Sub sector 4* (water), include:

- Increasing the contribution of water to GDP,
- Increasing the average value added per cubic meter (m^3) of water used,
- Increasing the irrigation water supply, and

Increasing availability of water, national water supply and potable water supply for people and livestock.

8 ENVIRONMENTAL CHARACTERISTICS

This section lists the most pertinent environmental characteristics of the study area and provides a statement on the potential environmental impacts on each.

8.1 LOCALITY AND SURROUNDING LAND USE

Komsberg is located in the Karasburg-East constituency of the //Karas Region in Namibia. It is located on the banks of the Orange River which forms an international border with South Africa. The area is accessed by District Road D232 from Ariamsvlei (a gravel road). All aspects of operations including worker housing and agricultural activities, are located on privately owned land. The Augrabies Falls National Park (in South Africa) is located on the opposite bank of the Orange River, across a portion of the farm which is not cultivated and upstream of the main activities. The main focus of the Park is to conserve the unique landscape, features, cultural heritage and the biodiversity characteristic of the Gariep centre of endemism, as part of the regional landscape. Protected areas in close proximity to the site are indicated in Figure 8-1. The project is surrounded by a combination of commercial and subsistence farming practises.

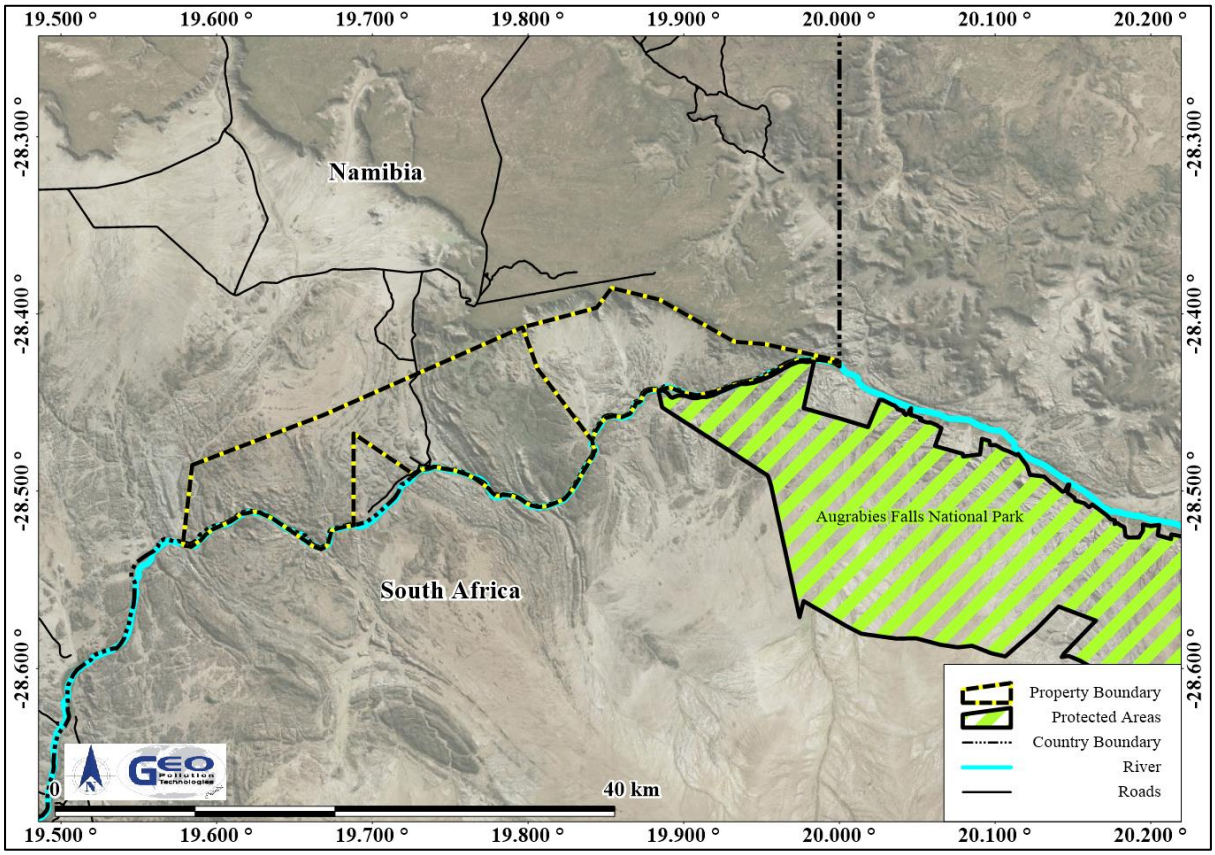


Figure 8-1. Protected and conservations areas close to the site

Implications and Impacts

The project was and will be developed, mainly in the central and flatter valleys and plains. These areas are not foreseen to have a direct impact on the protected areas close to the site. The agricultural development has contributed to development initiatives such as infrastructure development into this remote area of the //Karas Region. All development planning should be provided to the //Karas Regional Council for inclusion in the updated reporting of land use in the region. Information sharing will impact planning and development initiatives of the region in relation to protected areas.

8.2 CLIMATE

The project area is renowned for its extremely hot and dry summers and up to 12 hours daylight in the summer. On average, the area receives typically more than 10 hours of daily sunlight per annum. Although the average maximum temperature is approximately 30 ºC, extreme heat conditions occur in the summer months with some days peaking above 42 ºC. Temperatures of over 45 ºC have been recorded informally. The average rainfall varies from approximately 100 to 150 mm/a. Evaporation for the project area is approximately 3,500 mm/a. For this location the evaporation losses are more than 20 times the average annual rainfall.

Localised wind patterns are mostly influence by uneven heating of the surrounding earth surface, the Orange River and topography. The major wind direction is southwesterly winds. A few windy days are experienced throughout the year. Localised whirl winds, also known as dust devils, occur frequently in the area. The Proponent has a weather station, however, due to Covid-19 travel restrictions, the systems could not be serviced or updated as required and no long term data could be provided by the station. It is foreseen that the weather station will be operational by 2022. Climatic data for the project is summarised in Table 8-1 while rainfall data for the last 39 years is presented in Table 8-2. Note that the data as presented in Table 8-2 is based on remote sensing data.

Table 8-1. Summary of Climate Data (Atlas of Namibia Project, 2002)

Average annual rainfall (mm/a)	100 - 150
Variation in annual rainfall (%)	60 - 70
Average annual evaporation (mm/a)	3,400 – 3,600
Water deficit (mm/a)	2,301 - 2,500
Solar radiation kWh Per m^2	5.4 – 5.6
Sunshine per day (hours/day)	10 - 11
Wind speed	Light to moderate breeze throughout the year
Localised wind direction	South-westerly

Table 8-2. Rainfall statistics (www.meteoblue.com, 2021)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Minimum (mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum (mm)	19.2	36.0	43.7	33.3	22.1	6.2	11.8	17.6	21.8	11.7	22.7	24.5
Average (mm)	7.9	14.0	18.0	10.2	5.6	1.1	1.7	2.9	4.5	5.7	7.5	7.2
Variability (%)	56.0	72.0	59.0	70.0	116.0	154.0	178.0	151.0	105.0	56.0	70.0	89.0
Daily maximum (mm)	12.0	21.8	23.4	20.3	17.1	4.1	8.4	17.6	9.4	8.6	13.0	9.6
Average rain days	2	3	3	2	1	1	0	1	1	2	2	2
Season July - June average: 86 mm				Season coefficient of variation: 27 %								
Data range	1981-Jul-01	to	2020-Jun-30							Lat: -28.4756°S Long: 19.7386°E		

Several models were run in an attempt to predict the effects possible climate change will have on Namibia. As such it has been predicted that soil moisture levels will decline further as temperatures rise. According to studies compiled during the development of the //Karas Regional Structure Plan, it was determined that a drop of 10% in rainfall may be expected for the southern parts of the //Karas Region (including the project area) over the next 35 years and a further decrease in rainfall of up to 20% in another 30 years (by 2080). This translates to an average rainfall of less than 110 mm/a. In addition, the higher evaporation losses may have detrimental effects on the Orange River. Climate change effects in the upper reaches of the Orange River may cause reduced runoff in lower lying areas which may, even though the system is regulated, cause reductions in available water for all users including the Proponent. The situation may be remediated for lower Orange River water users by the proposed construction of a dam in the lower reaches of the Orange River at Noordoewer. The Proponent has installed automated irrigation systems to reduce water wastage. All vineyards, orchards and plantations are planned to be irrigated by such systems. In addition, the majority of existing and all new planned operations will be under shade netting to reduce evaporation losses.

The warm climate has relatively low occurrences of frost with an average of only 5 to 10 days of frost per year, while the project is located in an area which receives the highest amount of sunlight hours per day (more than 10 hours a day). Solar radiation for the area has however been mapped as being one of the lowest in Namibia (Atlas of Namibia Project, 2002).

A study for the South African table grape industry was conducted regarding the greenhouse gas emissions typically produced by the industry. The findings of this report stipulate that electricity used (during water abstraction, storage and irrigation) is the greatest greenhouse gas contributor for the sector, followed by cold storage energy use (Blignaut, 2014).

Implications and Impacts

Very high summer temperatures may result in heatstroke of workers and influence produce development. Hot, dry winds increases the risk of crop damage while dust devils may contaminate and litter vineyards with dirt from the informal settlement area. Covered cultivation by means of shade netting significantly reduces such climatic risks. The high evaporation rates may necessitate covering of storage dams to minimise water losses as well as vehicle / equipment storage areas to reduce sun damage. The high amount of sunlight hours, coupled with the low occurrence of frost, are favourable conditions for crop cultivation. High potential evaporation and related evaporative losses within the Orange River, result in an increase in concentrations of nutrients and chemicals along the lower Orange River.

Climate change contributors are largely related to the mechanised systems used as part of operations. However, ground breaking activities would have contributed to greenhouse gas emissions and should be taken into account during any carbon crediting initiatives. Effects of climate change to consider during the proposed operations over the next 30 years include:

- 10% increase in water use for irrigation (consideration towards the Orange River allocation be awarded over and above expected growth),
- Leaching of nutrients, pesticides and fertilisers from irrigated land may increase the cumulative water pollution of the Orange River system. However, since the Orange River's flow is regulated, such impact may greatly be reduced when ecological water requirements are met through sufficient release of water if and when available.
- Improved efficiencies of grid electricity usage. Consider conducting, an energy/water usage audit of the pumping system to also highlight areas of concern relating to high electricity use.

8.3 TOPOGRAPHY, DRAINAGE AND SOILS

Located in an open valley system, the majority of operations are surrounded by terrain described as dissected rolling hills with prominent dolerite sills, typical to the Gomkab Basin. The current operational area, located mainly on farm Stolzenfelds, is located around smaller ridges of between 550 m and 700 m above sea level, with the valley floor gently sloping south from about 600 m to 430 m above sea level. The highest point on the property is located directly east of existing operations, along the northern portions of the farm Stolzenfelds, with an elevation of just over 1,000 m. Continuing east along the northern border of the farm Komsberg, with a similar elevation indicating the edge of a plateau which stretches north of the project area. Figure 8-2 depicts the topography and drainage.

Most of the project area falls within the CPL12 agro-ecological zone (AEZ) with only the eastern corner being in the CPL4-9 AEZ. CPL12 is the Orange River Valley while CPL4-9 represents strongly dissected plains. Both are regarded as suitable for sheep grazing only, but due to the presence of the Orange River, irrigation of crops allows for productive agricultural projects.

Localised drainage is well developed. All runoff is towards the Orange River and mainly through the various drainage lines as indicated Figure 8-3. A number of berms and cut-off trenched have been established by the Proponent to guide drainage around the operations.

Flash floods are known to occur in the area and according to local knowledge has a frequency of every four to five years. These floods can cause considerable damage to operations close to or in

the drainage lines. Numerous high ridges increase velocity of flowing water. Dominant soils over the entire project area are eutric Leptosols which are describes as shallow soils with a fair to good nutrient status.

Photo 8-1. Elevated view of ridges within the operational area

Photo 42. Ridges within the operational area

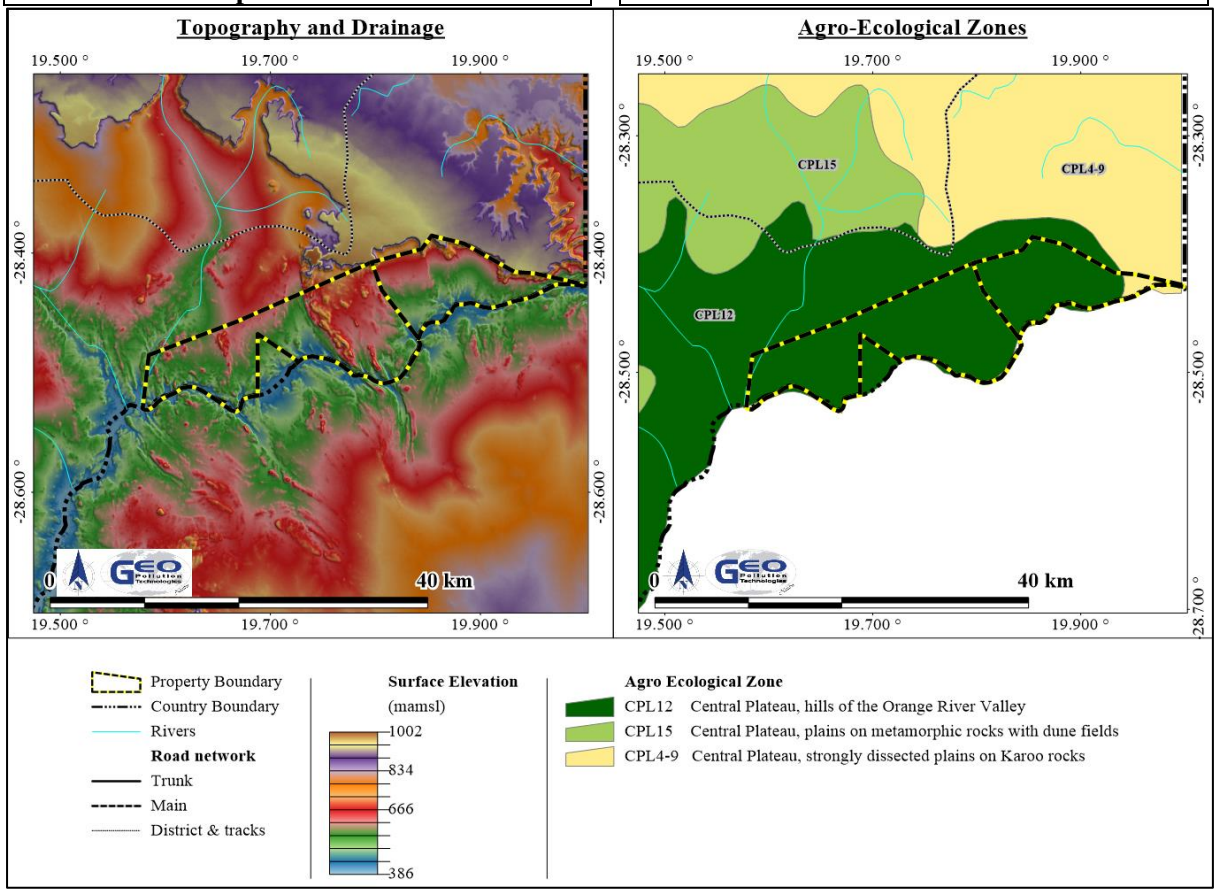


Figure 8-2. Topography, drainage and agro-ecological zones

Photo 8-2. Berm adjacent to cultivated area

Photo 8-3. Cut-off trench around operational area

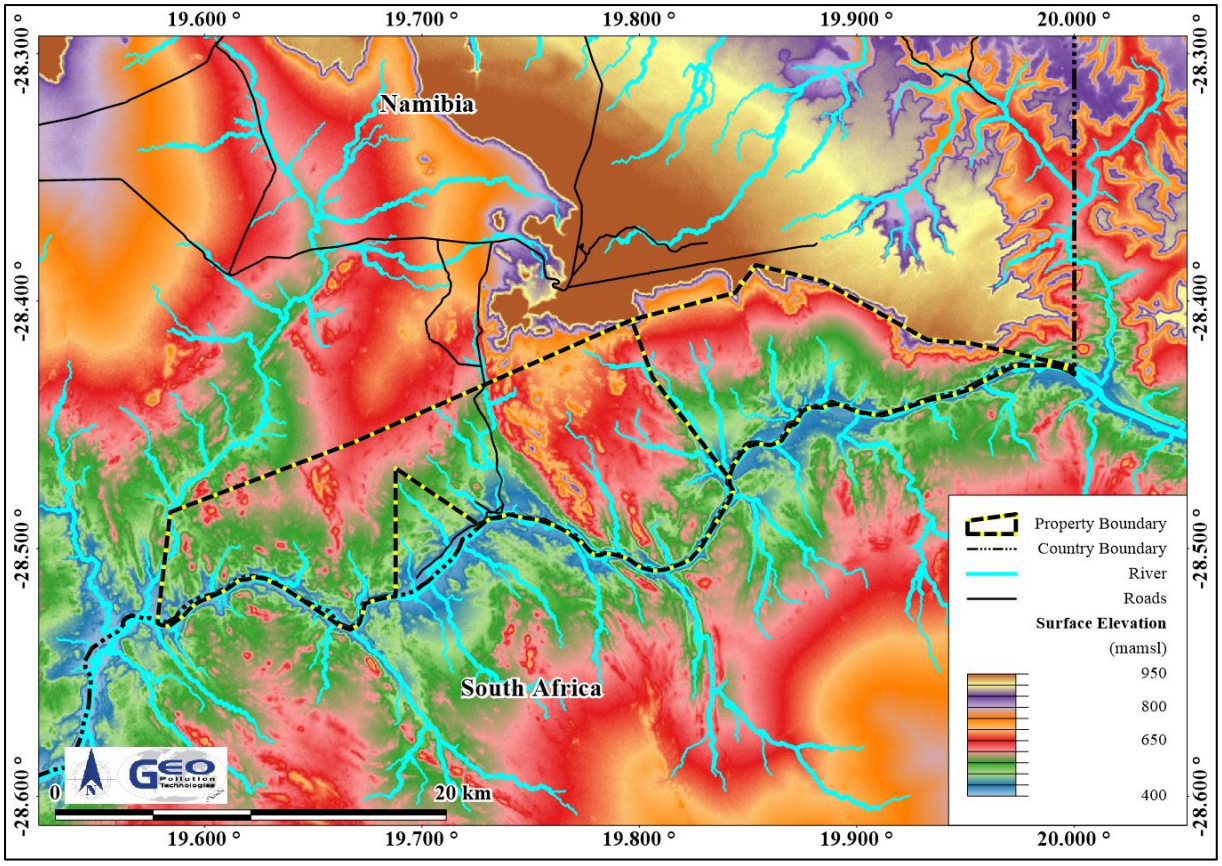


Figure 8-3. Major drainage lines present on site

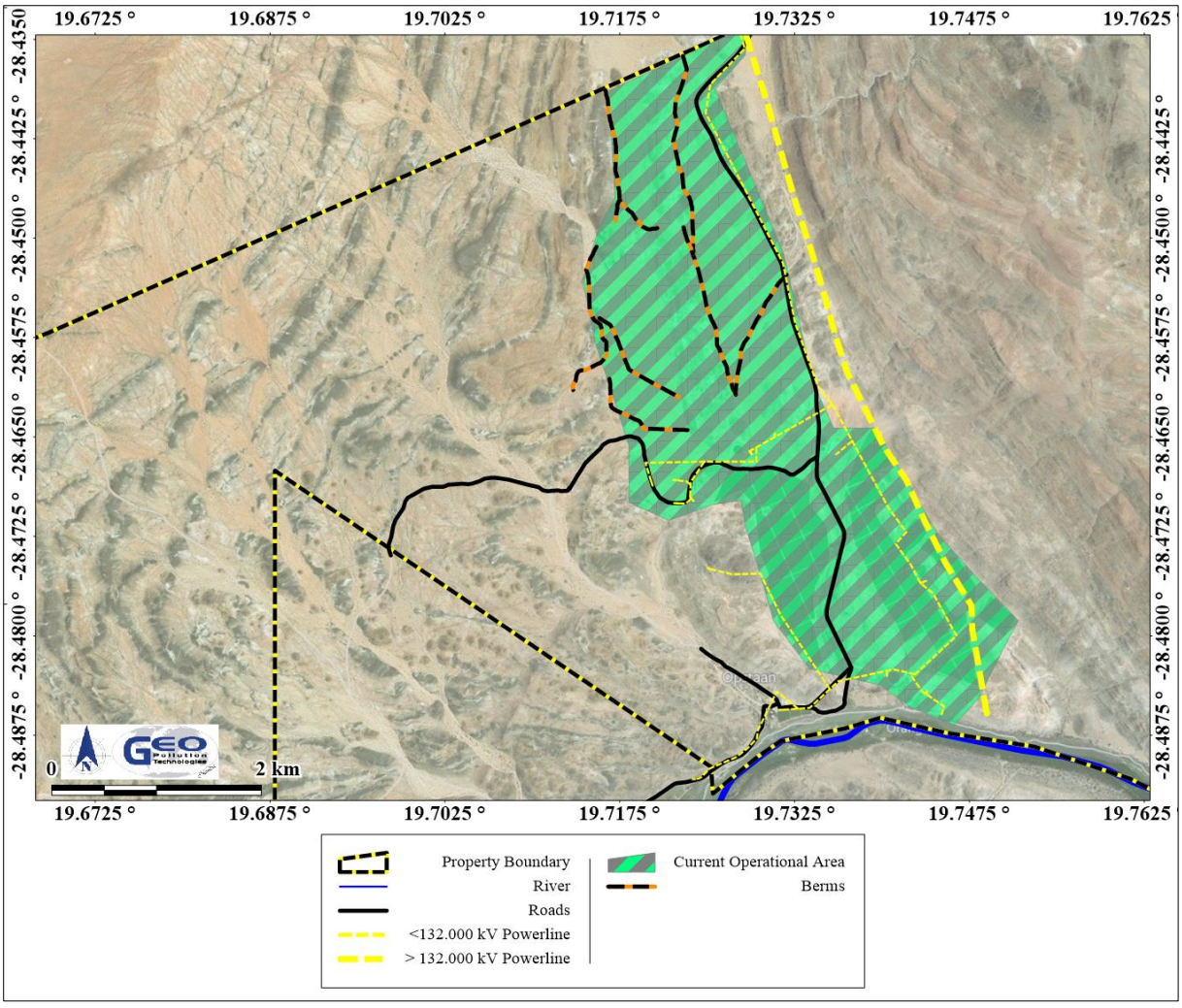


Figure 8-4. Berm structures and cut-off trenches around existing operations on the farm Stolzenfelds No. 74

Implications and Impacts

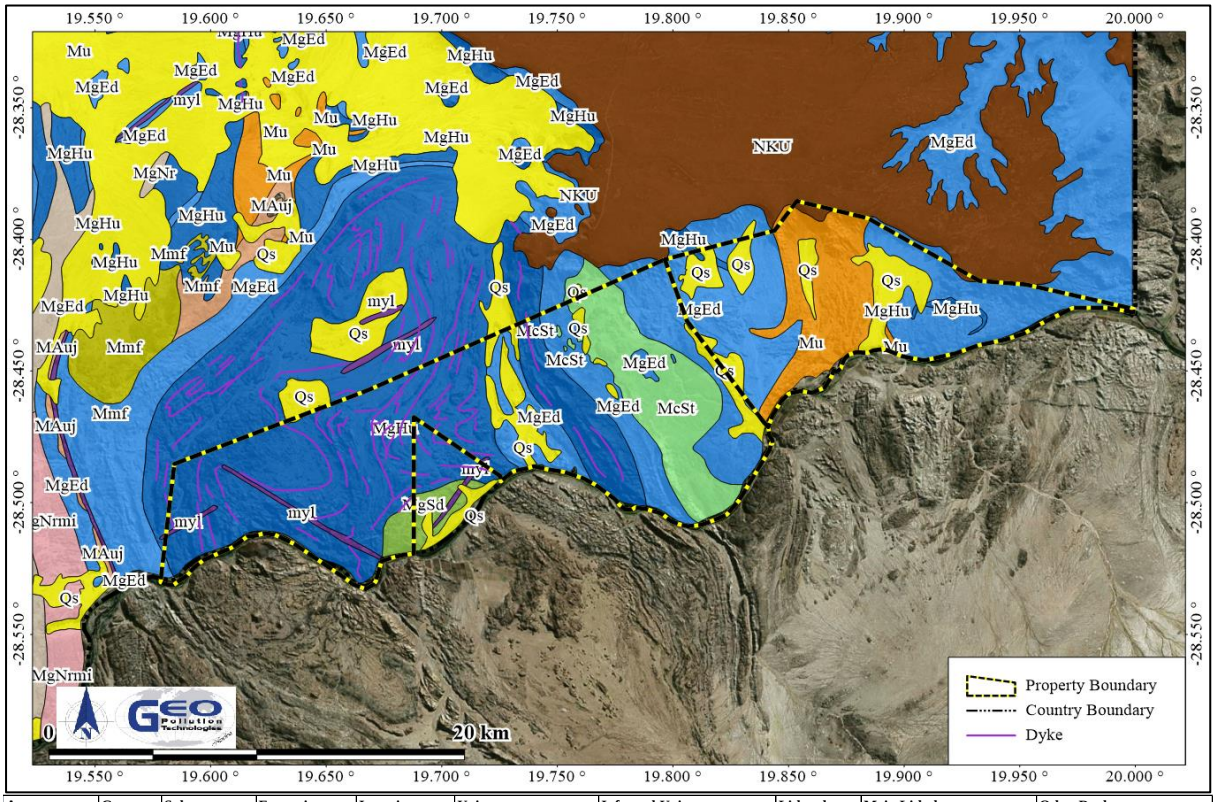
Topographical features limit some development. Slope angles of ridges are mainly rocky and very steep, thus not suitable for crop cultivation and related irrigation establishment. The proposed most eastern developments are located on relatively flat terrain within mostly valleys. Flash floods present risks to the community and operations. All personnel should be educated in terms of flash floods and related safety measures. The cut-off berms will prevent vineyard and orchard damage through high velocity run-off during flash-flood events.

8.4 HYDROGEOLOGY

The dominant soil group in the area is eutric leptosols, which refer to a thin soil cover (<10 cm) over hard rock. Some surficial coverage (Qs) of Quartenary age is present in parts of the project area. This is specifically notable along some of the tributaries of the Orange River see Figure 8-5. North of the eastern portion of the project area is a plateau consisting of sandstone, limestone, conglomerate and shale formations of Namibian age, belonging to the Kuibis Subgroup, which is part of the Nama Group. This formed a regional cover, which was eroded away on the project area to expose the much older Namaquan age formations underneath. The formations of Namaquan age are part of the Namaqua Metamorphic Complex. These formations include foliated leucogranite from the Houmsrivier (MgHu) intrusive suite, granite from the Eendoorn (MgEd) intrusive suite, partly foliated charnockite from the Stolzenfels (McSt) intrusive suite and migmatitic gneiss from the Umeis succession (Mu). Various mylonite bands and mafic/ultramafic dykes are present, mainly on the western portions of the farm Komsberg.

This area does not fall within a water control area and the drilling and utilization of groundwater is thus not specifically controlled by Government. Water is utilized in the area, specifically on the neighbouring farms not having access to water from the Orange River, see Figure 8-6. It should be noted that this is based on data contained in the Department of Water Affairs (DWA) database and that more boreholes might be present. Based on data contained in the Department of Water Affairs (DWA) database, it seems as if the groundwater is mainly of a poor quality, mostly due to the presence of high total dissolved solids, fluoride and or sulphate concentrations.

The groundwater flow direction, as inferred from historic water level data, suggests a flow direction similar to that of surface flow. Flow along preferred flow paths might be in different directions, but the larger scale flow is still expected to be related to the topography.



Age	Group	Subgroup	Formation	Intrusive	Unit	Informal Unit	Lithcode	Main Lithology	Other Rock
Quaternary					Quaternary	Quaternary sediments	Qs	surficial deposits	
Namibian to Cambrian	Nama	Schwarzrand			Nama Gp/ Schwarzrand Subgp		NSR	shale/sandstone (red/green)	limestone
Namibian	Nama	Kuibis			Nama Gp/ Kuibis Subgp		NKU	sandstone	limestone, conglomerate, shale
Namaquan				Naros	Namaqua MC		MgNr	hornblende-biotite granite (foliated;porphyritic)	
Namaquan				Naros	Namaqua MC	Naros migmatite	MgNrmi	granite (migmatitic)	
Namaquan				Stolzenfels	Namaqua MC		McSt	charnockite (partly foliated)	
Namaquan		Gruenau	Arus		Namaqua MC	Jerusalem subunit	MAuj	cordierite-sillimanite gneiss	
Namaquan			.	Eendoorn	Namaqua MC		MgEd	granite	charnockitic granite, mafic/granitic xenoliths
Namaquan					Namaqua MC	Grass River augengneiss	MgEdag	augengneiss	
Namaquan				Houmsrivier	Namaqua MC		MgHu	leucogranite (foliated)	calc-silicate xenoliths, biotite-cordierite-sillimanite gneiss xenoliths
Namaquan				Schuitdrift	Namaqua MC		MgSd	augengneiss	calc-silicate xenoliths;biotite-cordierite-sillimanite gneiss xenoliths
Namaquan					Namaqua MC	Hoogoor gneiss	Mhg	quartz-feldspar gneiss (leucocratic)	
Namaquan					Namaqua MC	Umeis succession	Mu	gneiss (migmatitic)	amphibolite, mafic schist, calc-silicate rock, gneissic granite
Kheisian to Namaquan					Kheisian to Namaquan intrusives	Mokolian mafic rock	Mmf	mafic/ultramafic rocks (partly foliated)	
unknown					diverse	mylonite of unknown age	myl	mylonite	

Figure 8-5. Geology of the project area

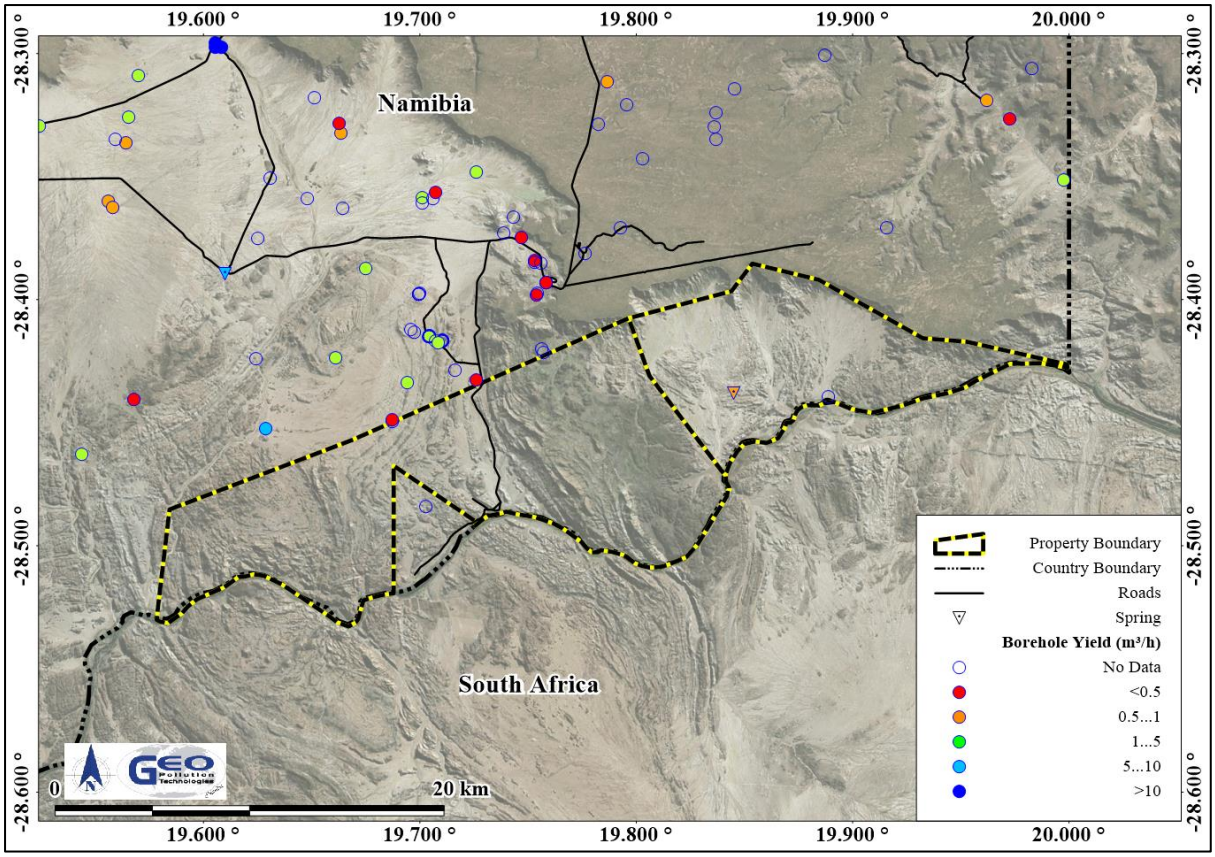


Figure 8-6 Groundwater data points

Implications and Impacts

An average of 1,800 mm of water per year is irrigated across vineyard, orchards and plantations. The date palm plantation will cause an increase in this level to 3,500 mm. This may result in salt being leached from the soils. Additional water infiltration may result in a perched water table and cause saturated conditions to downstream areas. Continual irrigation over long periods of time may result in the accumulation of gypsum and calcification which will prohibit water infiltration and degrade the soil due to salt build-up. The Proponent should therefore consider such condition for the sensitive blueberry crops as well as drainage infrastructure which may be required for the rest of the planned and existing operations.

Although groundwater is not utilised in the area, it must still be protected against pollution. Polluted groundwater may transport pollutants to the nearby Orange River.

The presence of gypsum in the soil may impact on concrete structures and can caused increased corrosion. Higher clay content in certain soils closer to the Orange River banks may result in the soil densifying with the administration of water. Clay will swell and drainage will become hampered. Therefore adequate drainage systems should be implemented, especially in the area closer to the Orange River which has a greater amount of water flowing through it. Effective management of the drainage channels (preventing of silting up) should be conducted.

The possibility of diamond deposits along sections of the Orange River exist. Should diamond mining be considered by any party, the conflicting land use should be resolved between the Ministry of Mines and Energy, the Ministry of Agriculture Water and Land Reform as well as the parties involved.

8.5 THE ORANGE RIVER AND WATER SUPPLY

The Orange River became highly regulated by the more than 20 major dams, such as the Gariep and Vanderkloof Dams (located in South Africa), and numerous weirs within its catchment (Belcher, 2012). In Addition, the Orange River has seen a rise in the number of pollutant

contributors, the majority of which are located around the middle stretches of the river. Some of the developments, on both the South African and Namibian side, are irrigation-related developments with drainage water (similar to that at Komsberg) flowing into the river. Compounded by poor water quality inflows from mainly the South African tributaries, the river ecology has been impacted and changed from its original state. This change has seen an increase in alien species (especially along the riparian zone) and a proliferation of indigenous plant species in areas downstream of drainage water release points.

A habitat integrity study done on the lower Orange River in 2008 (ARTP JMB, 2008) suggested that sections of the river was still in pristine condition with portions along the project farms being classified as high impact (Figure 8-7). This study evaluated the habitat from a river tourism perspective and agricultural activities were seen as a degradation of the habitat. What is of interest is that the sections along and downstream of the planned and current operations were already considered as degraded in 2008.

All water supplied to operations is pumped from the Orange River. The section of river alongside the project area has a mixed riparian river landscape with the majority of the area described as perennial pool and a lesser portion being braided. However, the dynamic river systems often changes with time due to an array of factors.

Domestic purpose water (for office and general consumption), is fed from either storage dams supplying the irrigation schemes or directly from the Orange River. All such water is purified through the use of water treatments plants. All employees are provided with treated and potable water.

There is currently no NamWater points which supply water to any part of operations or the informal settle area around Opstaan. The Proponent has erected some taps around their workshop as well as at the community hall and crèche which was also built by the Proponent. Members of the informal settlement make use of these as well as from taps erected in the informal area upon the request of the community. Limited water treatment is provided for the workshop water and related taps. No other local or regional government initiatives have been established to provide water to any part of the community since the settlement is on a private farm.

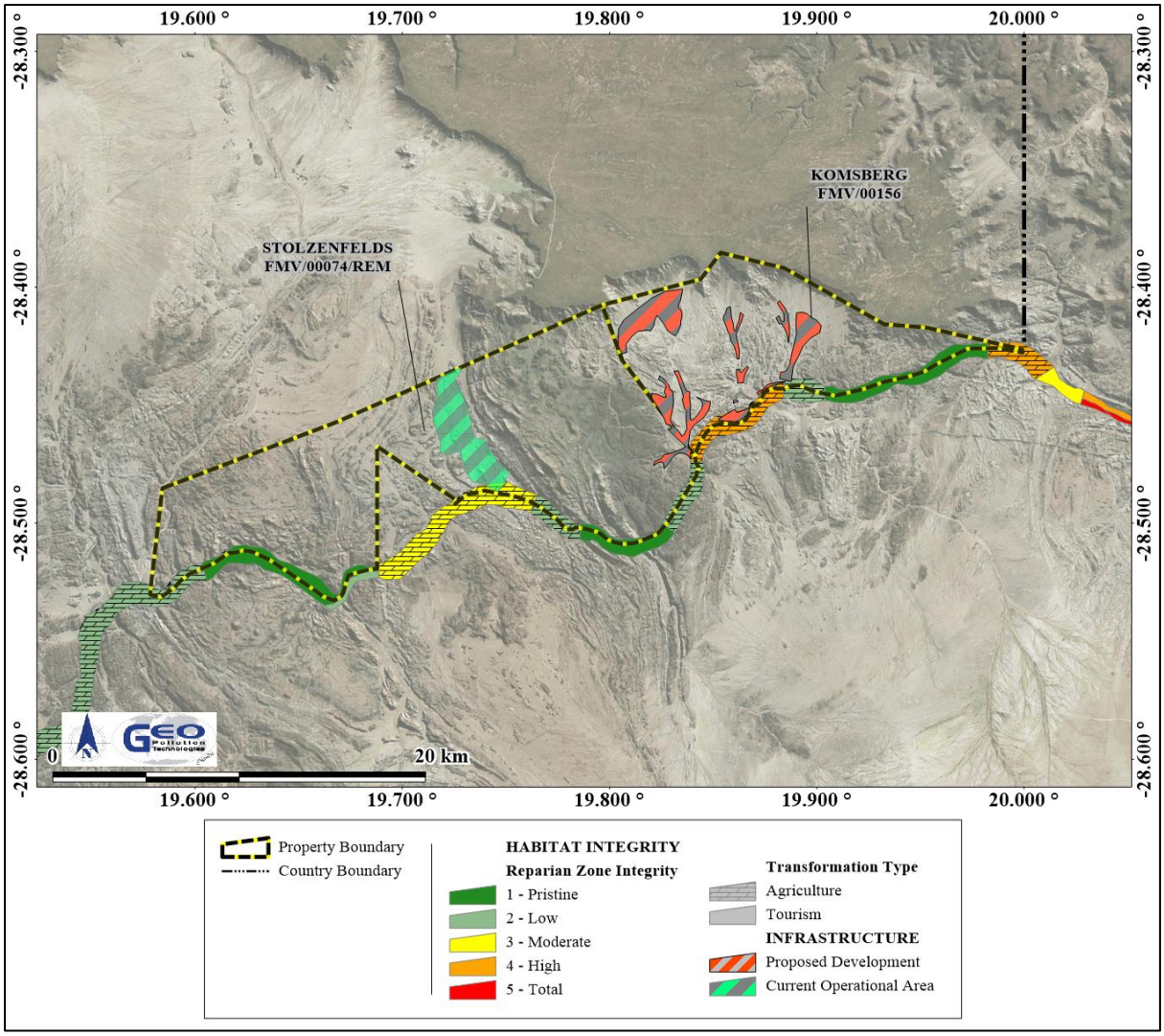


Figure 8-7. Habitat integrity as adapted from ARTP JMB, 2008

8.5.1 Irrigation Water Supply

All water used for irrigation purposes is sourced from the Orange River. Data for the combined allocation of water (volume) for all Namibian agricultural operators along the Orange River was obtained from the MAWLR and amounts to approximately 129 million m^3/a. This number is much lower than the predicted 196 million m^3/a as per Tanner et al, Undated (Table 8-3). However, not all of the allocated water is abstracted and there is no account for the volume of water which flows back into the Orange River as drainage water. According to information provided by the Namibian Department of Water Affairs (Tanner, Undated), the projected increase, at that time, in water user demands for the Orange River system, could result in the availability of water decreasing in the medium to long term. The construction of a dam upstream of Noordoewer is however expected to contribute positively to water sustainability in the lower Orange. Since the Orange River is a regulated system, the geo-political relations related to available water to Namibia, is of utmost importance. Water allocated to Namibia must be released by upstream users.

Various studies conducted in terms of water demand from the Orange River were considered during the compilation of this report. Interesting to note is that South Africa has placed a cap on the growth of demand from 2015 onward based on the resource limit within the Orange River System. The allocated water volumes for Namibia exceed this limit, however the actual water deficit is not known.

Table 8-3. Water use in the Lower Orange River, downstream of Vanderkloof Dam (Tanner et al, Undated).

Category	Expected water demand (Mm^3/a)				
	2002	**2005**	**2010**	**2015**	**2020**
RSA					
Irrigation: Lower Orange	62	82	102	122	122
Urban, Industrial & Mining: Lower Orange	15	17	23	24	22
Total RSA	**77**	**99**	**125**	**146**	**144**
Namibia					
Irrigation- Lower Orange	41	60	103	150	197
Urban- Lower Orange	9	16	31	47	47
Total- Namibia	**50**	**76**	**134**	**197**	**244**

The Proponent has their own water permits which have been factored into the allocated water volume (via water abstraction permits) for Namibia. The provisions in the Proponent's water permit allows for existing and proposed operations. It was calculated that the proponent will, when their water allocation is fully realised, use approximately 16 % of the total water allocated from the Orange River in Namibia. It is important to note that although the Proponent takes a certain amount of water from the Orange River, there is an undetermined amount which flows back into the Orange River as drainage water. Water is therefore not only sourced from the Orange River, but also impacted by backflow from the agricultural activities. The nature of the impacts is strongly cumulative with several irrigation projects located upstream and downstream on the Namibian and South African sides of the river.

The Orange River provides various essential ecosystem services without which the project will not be able to continue

Implications and Impacts

Industry related water permits allocated to Komsberg as per the MAWLR amount to approximately 21 million m^3/a. Presently not all of the allocation is used, although it was awarded. Once the projects is fully developed, it is expected that this amount will be utilised to a greater extend. Consideration should further be given towards climatic conditions (such as climate change) which may result in a 10 % increase in water requirements over the next 30-50 years. The project will contribute to the cumulative use of water from the Orange River. Should all water be abstracted per allocated water rights, abstraction may be more than what was traditionally released into the Orange River System (for the users of the Lower Orange River System). New thresholds for the upstream release of water in to the Orange River may be required.

Unsanitary conditions in the informal settlement area, coupled with drainage water, contribute to the cumulative degradation of the water course.

8.6 FAUNA AND FLORA

The farm falls within the Nama Karoo Biome in an area with a Karas dwarf shrubland vegetation type and sparse shrubland structure. Plant species diversity is low to medium with between 100 and 150 species occurring in the area. As a result of the perennial Orange River, species diversity is higher than just north of the project area where diversity is between 50 and 100 plant species.

The Atlas of Namibia Project (2002) classifies the farms' "average green vegetation biomass production" as mainly very low to low interspersed with small pockets of medium production. The main vegetation cover consist of grass (3.7 %) and dwarf shrubs (3.6 %) (Atlas of Namibia Project, 2002). Trees of between 2 and 5 m in height makes up less than 1 % of the ground cover, however, taller trees are densely established along the Orange River banks. The project area spans four quarter degree squares (QDS) namely 2819BC, 2819BD and 2819DA, with a very small portion of about 190 ha falling within 2819DB. The Tree Atlas of Namibia lists nine species that

are protected by forestry legislation occurring in QDS 2819BC, 2819BD and 2819DA (Curtis & Mannheimer, 2005) (Table 8-4). Furthermore, three species are listed in CITES Appendix II and one is considered as an aggressive invader.

Table 8-4. Tree Atlas of Namibia records for QDS 2819BC, 2819BD and 2819DA (Curtis & Mannheimer, 2005)

Name	Common Name	Abundance	Conservation Concerns
Acacia erioloba	Camel-thorn	Uncommon to Rare	Protected by forestry legislation
Acacia karroo	Sweet-thorn	Uncommon to Rare	
Acacia mellifera subsp *detinens*	Blue-thorn Acacia	Occasional	Aggressive invader, especially in central and northern Namibia
Aloe dichotoma	Quiver Tree	Uncommon to Rare	Protected by the Nature Conservation Ordinance as a CITES Appendix II species. Protected by forestry legislation
Boscia albitrunca	Shepherd's Tree	Uncommon to Rare	Protected by forestry legislation
Boscia foetida subsp *foetida*	Smelly Shepherd's-bush	Uncommon to Rare	
Cadaba aphylla	Leafless Wormbush	Uncommon to Rare	
Commiphora gracilifrondosa	Karee Corkwood	Uncommon to Rare	Endemic species to the Orange River with restricted distribution. Protected by forestry legislation
Commiphora namaensis	Nama Corkwood	Uncommon to Rare	Near-endemic to Namibia. Protected by forestry legislation
Commiphora pyracanthoides	Fire Thorn Corkwood; Small Common Corkwood	Uncommon to Rare	
Euclea pseudebenus	Wild Ebony	Uncommon to Rare	Protected by forestry legislation
Euphorbia gregaria	Karas Euphorbia	Common to Abundant	Endemic to southern Namibia and Richtersveld. CITES Appendix II
Euphorbia virosa	Candelabra Euphorbia	Uncommon to Rare	CITES Appendix II
Maerua gilgii	River Bush-cherry	Uncommon to Rare	Very restricted along Orange River
Nicotiana glauca	Wild Tobacco	Uncommon to Rare	Alien. Not a major threat in Namibia, but should be monitored
Pappea capensis	Jacket-plum	Uncommon to Rare	Protected by forestry legislation
Parkinsonia africana	Green-hair Tree	Uncommon to Rare	
Prosopis spp	Prospis	Uncommon to Rare	Alien
Rhigozum trichotomum	Three-thorn Rhigozum	Common to Abundant	
Searsia pendulina	White Karee	Uncommon to Rare	
Searsia populifolia	Poplar-leaved Karee	Uncommon to Rare	

Name	Common Name	Abundance	Conservation Concerns
Tamarix usneoides	Wild Tamarisk	Occasional	Protected by forestry legislation
Ziziphus mucronata	Buffalo-thorn	Common to Abundant	Protected by forestry legislation

Although the habitat is further classified as being suitable for quiver trees, current operations retained such trees as part of the project layout. Contrastingly different to the valley and ridges, the riparian zone associated with the Orange River, is a dense cover of a mixture of alien and indigenous species. A summary of general flora data for the area is presented in Table 8 5.

Table 8-5. General flora data (Mendelsohn, 2002)

Vegetation type	Karas dwarf shrubland
Vegetation structure type	Sparse shrubland
Number of plant species	100 -150
Percentage tree cover	0.1-1
Percentage dwarf shrub cover	3,6
Dwarf shrub height (m)	0.5
Grass height (m)	0.5

The riparian habitat of the Orange River, along the stretches of the existing and proposed operations, are considered to be transformed or impacted due to irrigation practises and subsequent alien species introduction (ARTP JMB, 2008) (Figure 8-7). Although there are no existing operations on Komsberg No. 156, cultivation and related irrigation activities on the South African side of the Orange River moderately affects the Orange River along this section. The riparian integrity becomes less degraded downstream of these operations until the section of river along the existing operations on the Farm Stolzenfelds No. 74. Here the river is again affected by existing operations as well as extensive operations on the South African side. This section of the river is affected to a lesser degree (indicated in yellow) on Figure 8-7. The Orange River is considered to have a less affected and pristine integrity along the rest of the project area on the Farm Stolzenfelds No. 74.

The higher flora diversity along the river supports higher species diversity of birds than the surrounding areas. A Ramsar site approximately 580 km downstream of operations, at the Orange River Mouth, host a particularly sensitive birdlife habitat.

Animal biodiversity inventories in Namibia are mostly focussed on vertebrates with stronger focus on mammals, reptiles and birds. Furthermore, inventories of animals are often associated with specific areas of interest or frequently travelled roads. Limited information is available for the project area. Among selected higher animal taxa, about 16 species are expected to be endemic to the area.

The lower Orange River does not have a high aquatic species diversity with only two protected fish species of the 16 known to occur in the lower parts of the river. The near-threatened *Leobarbus kimberleyensis (*largemouth yellowfish) and vulnerable *Oreochromis mossambicus* (Mozambique tilapia) are expected to occur in the vicinity of the project area. A summary of the fauna data is presented in Table 8-6.

No ecosystem health surveys were conducted by the Namibian Government on the Orange River and hence no data could be obtained from governmental agencies. However, consideration was given to an existing study regarding the river system and aquatic fauna of the Orange River. This study conducted by Belcher in July 2012, classified the state of the river based on the South African Scoring System: rapid bio-assessment for rivers guidelines as used in South Africa (Belcher, July 2012). This assessment, which collected macroinvertebrate samples, found an abundance of *atyidae* (freshwater shrimps*), caenidae* and *baetidae* (mayflies); *corixidae* (water boatmen); *naucoridae* (creeping water bugs), *dytiscidae* (predacious diving beetles); *simulidae* (blackflies); and *chironomidae* (midges).

Table 8-6. General fauna data (Mendelsohn, 2002)

Mammal Diversity	61 - 75 Species
Rodent Diversity	20 - 23 Species
Bird Diversity	51 - 80 Species
Reptile Diversity	41 - 50 Species
Snake Diversity	15 - 19 Species
Lizard Diversity	28 - 31 Species
Scorpion Diversity	6 - 9 Species

Implications and Impacts

Development of the various agricultural components have and will result in habitat degradation. Along the Orange River, this is a cumulative impact. It is a possible irreversible activity which may have a long term effect on the soil. Herbicides, pesticides and nutrients in the soil and water will further impact not only the localised aquatic ecosystems of the Orange River, but also cumulatively affect the downstream water quality and related ecosystems and habitats. Possible pollution and changes of habitats (cumulative impacts), may now create a suitable habitat for species not traditionally know in the area – these include fauna and flora species.

Wildlife present risks to current operations. While certain insects are considered pests (such ants, locusts, mealybugs and nematodes), the use of pesticides may not be as effective and have detrimental effects on other insects as well. In addition, mammals such as baboons consume harvest fruits while being destructive to trellis structures and irrigation systems.

8.7 LOCAL ECONOMY

The //Karas Region's economy is a diverse representation of various sectors and industries within the region. These include (but are not limited to) fishing, mining, tourism and agriculture; all of which have shown potential to be developed. The Karasburg East constituency have much less economic diversity and the agricultural sector, specifically the irrigation schemes at Beenbreek and Komsberg, are large contributors, if not the largest in the constituency. Not only does it create jobs, but it has also been one of the main driving forces of infrastructure development and related capital expenditure which are on-going in planning.

One of the economic enablers for the Proponent is the affordable price of water which is vital to operations. In evaluating water use in primary economic activities such as agriculture, it is useful to consider the entire value-chain, i.e. the upstream and downstream activities (Van der Merwe, 2004). Intensive irrigated production schemes are strong economic drivers, as witnessed by the influx of workers at Komsberg. This can potentially make a significant contribution to the development of the //Karas Region and Namibia as a whole.

Water quality will have an effect on the productivity of operations, therefore the economic benefits of ensuring that the water quality of the Orange River remains at its best, is an essential component of the agricultural process. If water treatment is required, then the cost of production will increase, resulting in a decrease in revenue and feasibility. The same can be said for the quality of the soil, as lowered quality soil will be less economically productive.

Water and soil are paramount for the continued functioning of the agricultural project and therefore provide a vital ecosystem service to the Proponents. However the river also supports additional ecosystem services. These services which may have an economic spinoff include the following:

- Fresh water for domestic use (by community and downstream users),
- Reeds growing within the river used as building material (informal settlement),
- Recreational, tourism and cultural uses (Namibia and South Africa), and
- Erosion control (international shared resource).

Implications and Impacts

Continuation of operations will contribute to existing economy as well as to sustaining existing livelihoods. Proposed expansion will provide employment opportunities (permanent and seasonal) in the region and to possible workers all over Namibia who flock to the area for possible employment. The project and proposed expansion will contribute to the local and national agricultural sector and specifically in terms of the planned growth in the irrigation sector as envisioned by the local government. The growing citrus, blueberry and table grape sectors in the area, may further promote tourism for the region. Namibia as a whole is promoted as more produce carrying the Namibian name, is sent to Europe and international countries. Increased numbers of quality controllers from such countries who visit the production unit as well as the region. All of aforementioned activities contribute to the local, regional and national economy. Possible costs to consider by the Proponent, should the ecosystem be degraded, include the following:

- Cost of additional water purification before and after use,
- Soil remediation, and
- Replacement of natural nutrients of soil

8.8 DEMOGRAPHIC AND CULTURAL CHARACTERISTICS

Statistics for the demographic profile of the specific area have proven to be lacking in reliable and recent data. Various stakeholders to the project as well as inhabitants of the area have estimated the number of people residing in the valley, as part of the informal settlement, to be up to 1,000 during the harvesting season (October to January).

In the absence of any government records, statistics for an area similar in operations, Aussenkehr, was considered. For that area, which has a commercial centre, it is estimated that for every employed worker in the area, there are six persons who are not economically active. The Komsberg informal settlement is much smaller and less developed with no services or commercial centres. It is estimated that for every seasonal employees, there are fewer dependants living with them within the informal settlement.

Table 8-7. Demographic characteristics of the Karasburg East Constituency, the //Karas Region and Nationally (Namibia Statistics Agency, 2011)

	Karasburg East Constituency	//Karas Region	Namibia
Population (Males)	4,706	39,407	1,021,912
Population (Females)	4,497	38,014	1,091,165
Population (Total)	9,203	77,421	2,113,077
Population density (people/km^2)			2.6
Unemployment (15+ years)	39,7%*	32.2%*	37%
Literacy (15+ years)	96.8%	96.6%	89%

*Unemployment rate based on the economically active population component

The Karasburg East Constituency relies on the agricultural sector in terms of employment, with the sector being the second largest contributor to the employment sector (Table 8-8). The economy of the area is built largely on commercial irrigation farming supplemented with game and stock farming. Unemployment is at 39 % which is significantly higher than the overall //Karas Region. The farming unit as a whole provides for a variety of employment opportunities. Although generally harvesting is considered to use unskilled labour, experience sharing is required to conduct certain tasks. Similarly, skills and training are required to maintain and operate the irrigation systems. The farming unit as a whole provide 160 permanent and 820 seasonal job opportunities of which a portion receives training. Such employment figures are not reflected in the government data which was collected prior to the Proponent's operations. In

addition to the existing employment opportunities, approximately another 2,000 jobs will be created when the full potential of currently envisioned operations are developed.

Table 8-8. Main industry of employed population aged 15 years and above for the Karasburg East Constituency and //Karas Region

Main Industry	//Karas Region	Karasburg East Constituency
Total	26,979	2,509
Armed force	587	75
Legislators senior officials and managers	1,018	55
Professionals	1,432	112
Technician and associate professionals	1,413	157
Clerk	1,570	172
Service workers	3,507	437
Skilled agricultural and fishery workers	5,408	329
Craft and related trades workers	3,332	278
Plant and machine operators and assemblers	1,780	64
Elementary occupations	6,925	830

During this environmental assessment, key issues related to the development and planning surfaced. Although no official documentation are included, it was established that a certain portion of the property is being occupied and accessed via the existing district road. The informal settlement is growing around the area known as Opstaan, next to the workshop area of the Proponent. The settlement comprise mostly of persons not being employed by the Proponent, however, a small number of seasonal employees also reside in this area. Being an informal settlement, there are no services such as water supply and effective waste removal or any sanitation facilities. Although the Proponent has a NamPower connection to its workshop, the informal settlement has no access to electrical power provided by NamPower. Dwellings are of a temporary nature, mostly constructed from reeds and or corrugated iron. During the public participation process for this project, it was noted that various neighbours are concerned about the informal settlement around Opstaan. Almost all neighbours feel that the informal settlement is connected to the increased crimes such as theft, stock theft and poaching, being experienced by the community. The location of the informal settlement is depicted in Figure 8-8. Ongoing negotiations with the local and regional authorities are being conducted to find a solution to the situation since the settlement is also located in a drainage line which poses significant risks during flash flood events.

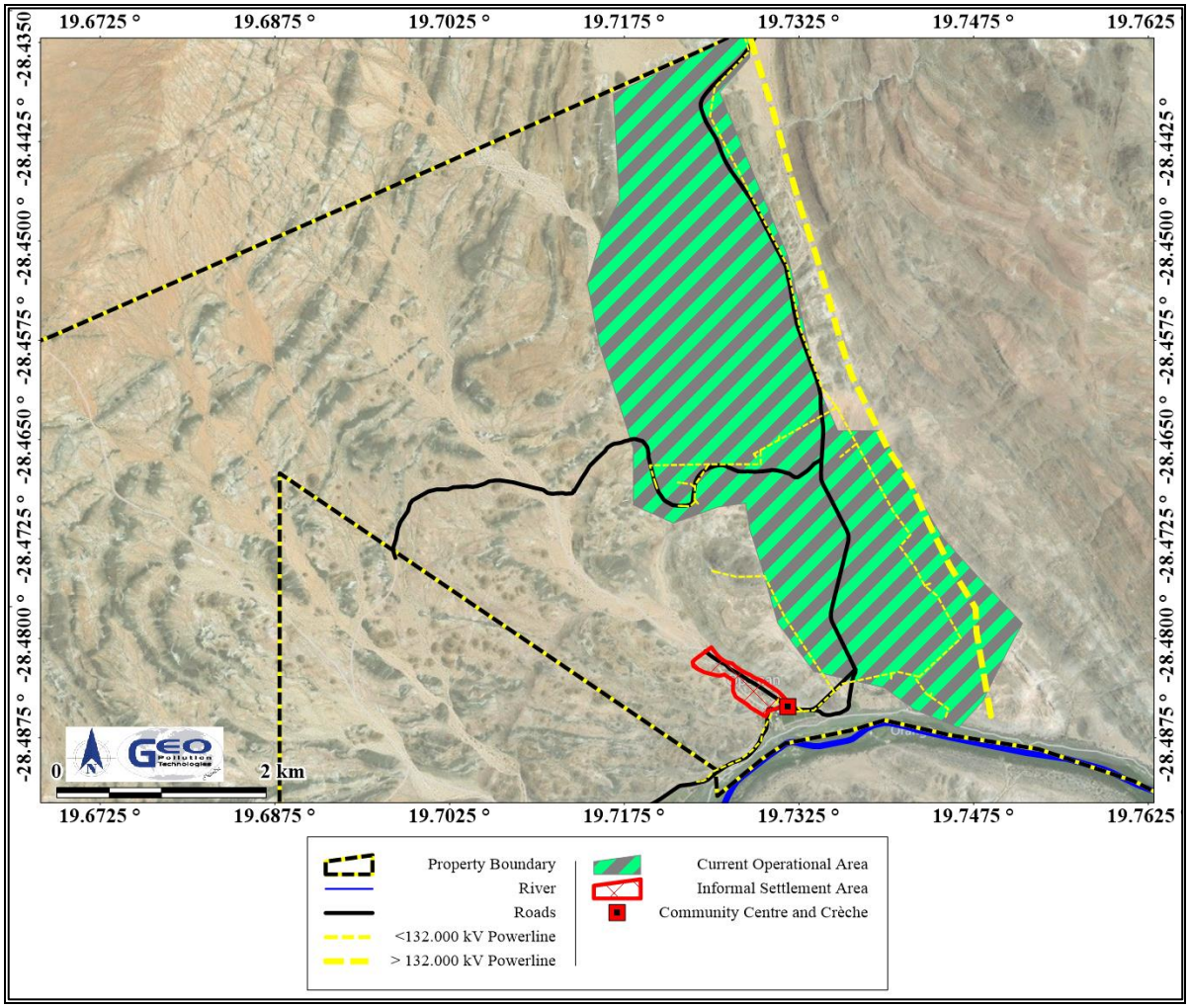


Figure 8-8. Informal settlement area in relation to existing operations on the farm Stolzenfelds No. 74

Photo 8-4. General view of informal settlement

Photo 8-5. Access road to informal settlement

The majority of employees are provided with housing with electricity, clean drinking water and sanitation. The Proponent is further helping employees by the following means:

- Provision of wood cuttings to employees during pruning season;
- Old trellis structure provided to employees,
- Contributions to worker education in terms of funding towards private and public school,
- Provision of a school and day-care centre (Crèche),
- Support in growing of vegetable gardens,
- Transportation of children during long weekends and holidays from and to school located further away, and
- Monthly transportation for shopping in Keetmanshoop provided.

All workers have access to shaded and cool resting areas during lunch and tea breaks, if they so desire. This area is located in front of the packhouse and offices and depicted in Photo 8-7. The Proponent further regularly laisse with governing authorities to ensure clinic services for all of the employees. Emergency services are facilitated if and when required between the Proponent and the related governmental agency. No persons are buried on the farm.

Photo 8-6. Day-care centre (Crèche)

Photo 8-7. Employee rest area

Implications and Impacts

Expansion of the current operations will increase employment in the area. Skills development and training would also be a benefit to employees. The development may have an influence on further stimulating economic growth of the area, which may result in more job opportunities. Additional people would however also put additional pressure on existing limited infrastructure, services and natural resources in the area. If full expansion is reached, community related impacts will increase.

8.9 ARCHAEOLOGICAL, PALAEONTOLOGICAL AND HERITAGE CONSIDERATIONS

Specialist filed investigations related to archaeological and palaeontological resources of the area were conducted prior to the involvement of the Proponent. Such investigations were associated with an existing powerline and a development which was proposed for the farms, some years prior to the Proponent taking over the property. The *initial* proposed development never realised and later the property was bought by the Proponent to expand on the existing agricultural activities.

The specialists who conducted the initial archaeological assessment were contacted again during this environmental assessment to provide information regarding the site. The following was concluded by Kinahan (2021):

"*From the available field data which consists of seventeen archaeological sites in the vicinity of the Komsberg project, a total of five sites are considered to have high Sensitivity levels. These are QRS 14/38 and 39, and QRS 128/ 6, 7 and 10. There are altogether four suspected burials and one confirmed burial among these sites. All of the sites should be treated with caution, and the burials, suspected as well as confirmed, should be treated as no-go areas. This means that they should be fenced, signposted and excluded from all areas to be cultivated or disturbed by development. It is possible that in the course of development further sites including human remains not visible at the surface may be encountered. For this reason and to ensure compliance with the provisions of the National Heritage Act (27 of 2004) it is recommended that the project EMP should adopt the Archaeological Chance Finds Procedure.*"

Identified resources were mapped in relation to existing and proposed operations as depicted in Figure 8-9 and Figure 8-10. The entire report, Kinahan (2021) and related Chance Finds Procedures, are attached in the Environmental Assessment (Appendix D). It should be noted that some of the resources which were documented during the previous surveys have been impacted on by the previous property owners. Resources 14/40, 14/39 and 14/38 were not present when the Proponent took over operations. Arial photographs taken over the property where the

resources should be, are indicated in Photo 8-8 and Photo 8-9. All resources which remain will be attended to as per the specialist recommendations.

No cultural sites are associated with the project neither are there any churches, mosques or other religious buildings or places of worship close to existing and proposed operations.

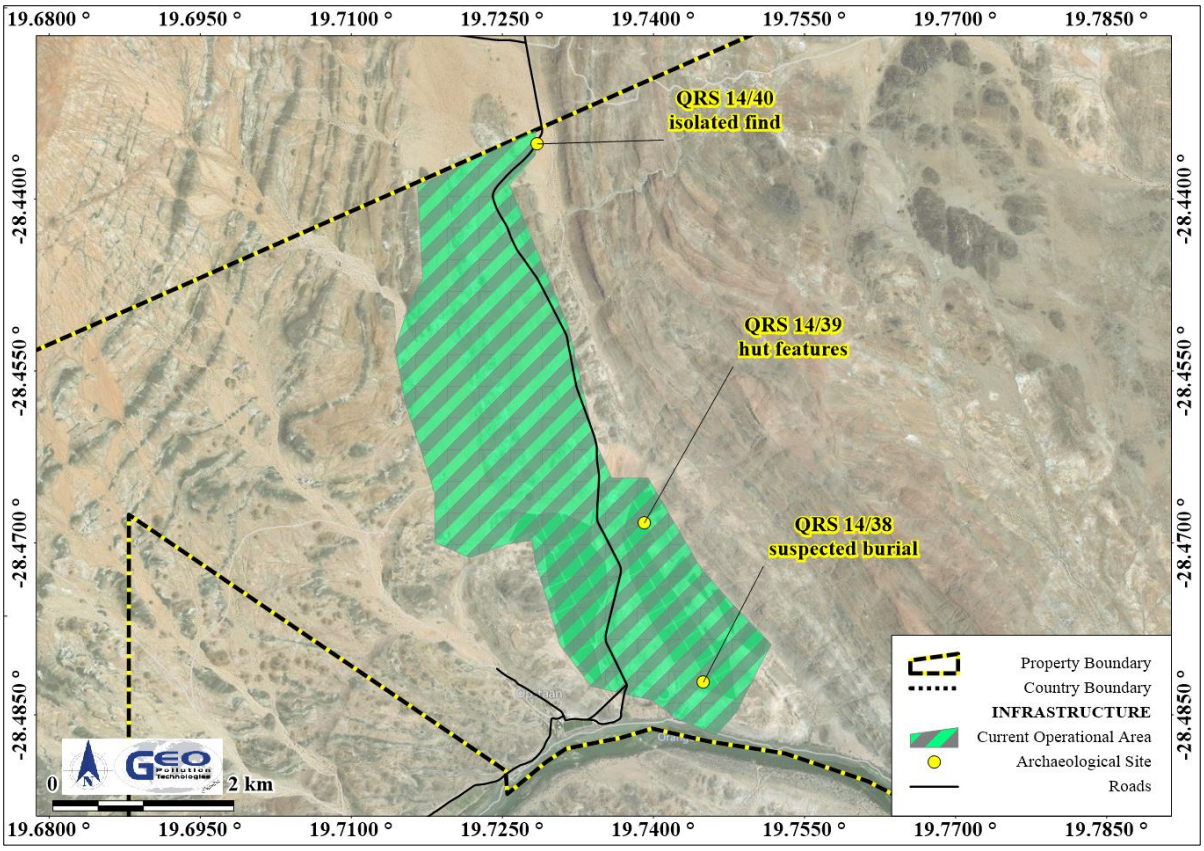


Figure 8-9. Archaeological resources which have been destroyed by previous operations prior to the operations of the Proponent

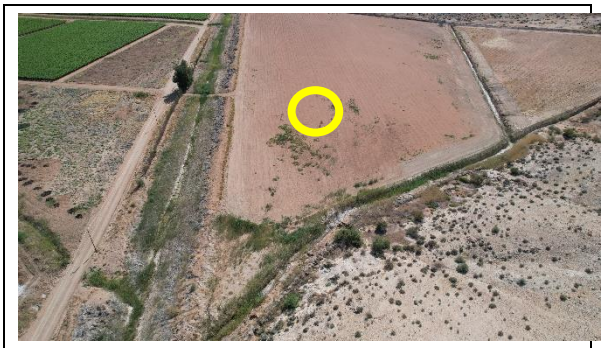


Photo 8-8. QRS 14/38 previously suspected burial site

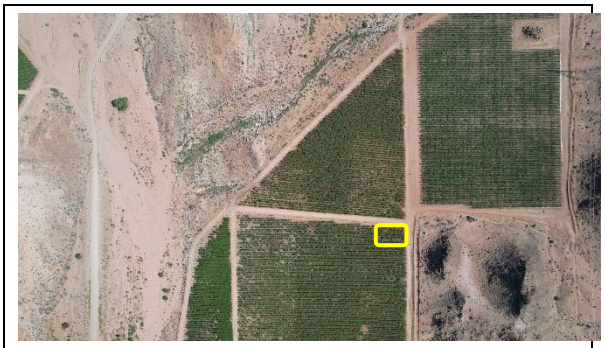


Photo 8-9. QRS 14/39 previously documented hut feature site

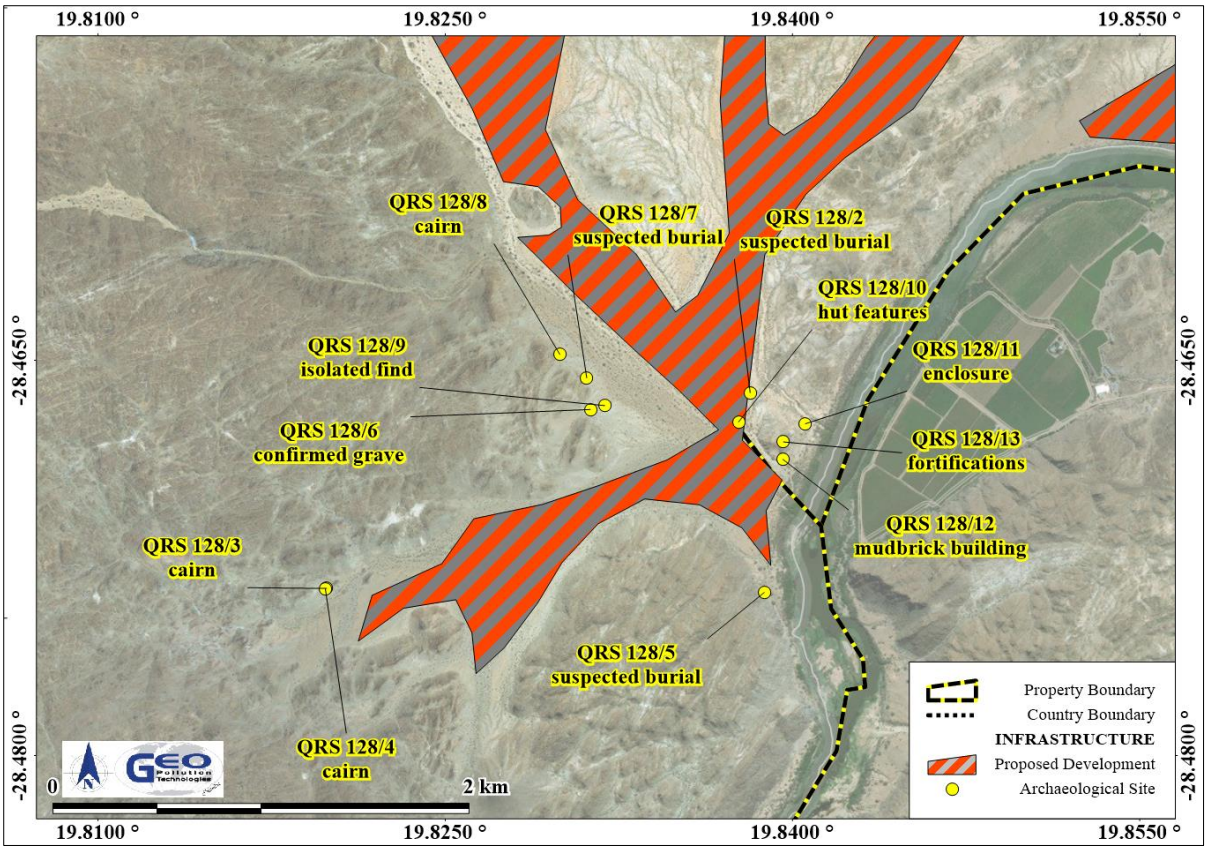


Figure 8-10. Archaeological resources in relation to proposed operations

Implications and Impacts

The area may harbour archaeological and palaeontological resources. Any archaeological or paleontological finds will contribute positively to the National resources of Namibia through the preservation and documentation of the resources.

9 PUBLIC CONSULTATION

Consultation with the public forms an integral component of an environmental assessment. It enables Interested and Affected Parties (IAPs) e.g. neighbouring landowners, local authorities, civic associations and communities, to comment on the potential environmental impacts associated with the operations. IAPs are provided with the opportunity to also identify additional issues which they feel should be addressed in the scoping assessment. Public consultation was initiated and facilitated through notification letters, site and press notices and stakeholder meetings.

9.1 PRESS NOTICE

Press notices were placed in two national newspapers for two consecutive weeks. Notices appeared in The Namibian Sun and Republikein on 11 May and 18 May 2021.

9.2 SITE NOTICE

Site notices for this particular application were erected on site on 12 May 2021 at the entrance gate to the property and were still present at the time of the compilation of this report. Proof of site notices are attached in Appendix C.

9.3 NOTIFICATION LETTERS

Neighbours and key IAPs, including NGO's and governmental agencies such as the regional and local government, Roads Authority, NamPower, Ariamsvlei Farmers Association, Grape Growers Association, etc., received notifications informing them about the proposed development and inviting them to provide their comments and concerns. As the project is on the

border with South Africa, ORASECOM was also informed. A list of the parties to which the notification letter was sent is attached in Appendix C.

9.4 MEETINGS

Although public meetings are not a requirement of the EMA, various informal stakeholder meetings were held. During these meetings the project components were discussed and IAPs provided with an opportunity to ask clarification questions and provide concerns for assessment. Discussions held at the IAP properties were of an informal format in order to adhere to Covid-19 National Regulations. Such information sharing discussions were mostly held with neighbours and were conducted during the week of the 12th of May 2021.

9.5 BUILDING AN IAP DATABASE

During the initiation phase of the public consultation process, IAPs were made aware of their rights to provide input into the assessment process through registering for the project and providing comments and concerns. This invitation appeared on all the notices as mentioned above. Combining the registered parties with those already identified for similar projects in the area cumulated in the stakeholder list for the project. All parties on this list received and will continually receive information about the ECC application as well as an opportunity to comment on this report. The main issues or concerns are detailed below.

9.6 COMMENTS RECEIVED

Various oral comments and concerns were recorded, most of which are in support of the project. The main comments are the following:

- Concerns regarding criminal activities perceived to be linked to the informal settlement;
- Support towards the project development and related employment opportunities;
- Concerns related to access to the informal settlement and operations as a whole.

Various members of the community expressed their enthusiasm regarding the possibility of growth and improvement of livelihoods in the area, which will be stimulated by the proposed expansion.

10 ASSESSMENT OF IMPACTS

The purpose of this section is to assess the most pertinent environmental impacts and to provide possible mitigation measures that are expected from the planning- development- and operational activities associated with the agricultural project. These identified impacts will be assessed and evaluated in different phases of the project. Preventative and mitigation measures are also proposed for different impacts. The Rapid Impact Assessment Method (Pastakia, 1998) was used during the assessment. Ranking formulas are calculated as follow:

A = A1 x A2

B = B1 + B2 + B3

Environmental Classification (ES) = A x B

The Environmental Classifications of impacts are provided in Table 10-1 to Table 10-3.

Table 10-1. Assessment criteria

Criteria	Score
Importance of condition (A1) – assessed against the spatial boundaries of human interest it will affect	
Importance to national/international interest	4
Important to regional/national interest	3
Important to areas immediately outside the local condition	2
Important only to the local condition	1
No importance	0

Magnitude of change/effect (A2) – measure of scale in terms of benefit / detriment of an impact or condition	
Major positive benefit	3
Significant improvement in status quo	2
Improvement in status quo	1
No change in status quo	0
Negative change in status quo	-1
Significant negative detriment or change	-2
Major detriment or change	-3
Permanence (B1) – defines whether the condition is permanent or temporary	
No change/Not applicable	1
Temporary	2
Permanent	3
Reversibility (B2) – defines whether the condition can be changed and is a measure of the control over the condition	
No change/Not applicable	1
Reversible	2
Irreversible	3
Cumulative (B3) – reflects whether the effect will be a single direct impact or will include cumulative impacts over time, or synergistic effect with other conditions. It is a means of judging the sustainability of the condition – not to be confused with the permanence criterion.	
Light or No Cumulative Character/Not applicable	1
Moderate Cumulative Character	2
Strong Cumulative Character	3

Table 10-2. Environmental classification of impacts according to the Rapid Impact Assessment Method of Pastakia 1998

Environmental Classification (ES)	Class Value	Description of Class
72 to 108	5	Extremely positive impact
36 to 71	4	Significantly positive impact
19 to 35	3	Moderately positive impact
10 to 18	2	Limited positive impact
1 to 9	1	Minor positive impact
0	-0	No alteration
-1 to -9	-1	Minor negative impact
-10 to -18	-2	Limited negative impact
-19 to -35	-3	Moderately negative impact
-36 to -71	-4	Significantly negative impact
-72 to -108	-5	Extremely Negative Impact

Table 10-3. Criteria for Impact Evaluation (Directorate of Environmental Affairs, 2008)

Risk Event	Description of the risk that may lead to an impact.
Probability	Refers to the probability that a specific impact will happen following a risk event. **Improbable** (low likelihood) **Probable** (distinct possibility) **Highly probable** (most likely) **Definite** (impact will occur regardless of prevention measures)
Confidence Level	The degree of confidence in the predictions, based on the availability of information and specialist knowledge. **Low** (based on the availability of specialist knowledge and other information)

	Medium (based on the availability of specialist knowledge and other information) **High** (based on the availability of specialist knowledge and other information)
Significance of Impact (no Mitigation)	**None** (A concern or potential impact that, upon evaluation, is found to have no significant impact at all.) **Low** (Any magnitude, impacts will be localised and temporary. Accordingly the impact is not expected to require amendment to the project design.) **Medium** (Impacts of moderate magnitude locally to regionally in the short term. Accordingly the impact is expected to require modification of the project design or alternative mitigation.) **High** (Impacts of high magnitude locally and in the long term and/or regionally and beyond. Accordingly the impact could have a 'no go' implication for the project unless mitigation or re-design is practically achievable.)
Mitigation	Description of possible mitigation measures
Significance of Impact (with Mitigation)	**None** (A concern or potential impact that, upon evaluation, is found to have no significant impact at all.) **Low** (Any magnitude, impacts will be localised and temporary. Accordingly the impact is not expected to require amendment to the project design.) **Medium** (Impacts of moderate magnitude locally to regionally in the short term. Accordingly the impact is expected to require modification of the project design or alternative mitigation.) **High** (Impacts of high magnitude locally and in the long term and/or regionally and beyond. Accordingly the impact could have a 'no go' implication for the project unless mitigation or re-design is practically achievable.)

11 RISK ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN

The EMP provides management options to ensure impacts of the agricultural and related activities on the farm are minimised. An EMP is a tool used to take pro-active action by addressing potential problems before they occur. This should limit corrective measures needed, although additional mitigation measures might be included if necessary. The environmental management measures are provided in the tables and descriptions below. These management measures should be adhered to during the execution of various activities on the farm. This section of the report is also presented as a stand-alone document for easy reference. All personnel taking part in the operations of the farms should be made aware of the contents of this section, so as to plan the operations accordingly and in an environmentally sound manner.

The objectives of the EMP are:

- to include all components related to operational and possible construction activities of the farm;
- to prescribe the best practicable control methods to lessen the environmental impacts associated with the farm;
- to monitor and audit the performance of operational personnel in applying such controls; and
- to ensure that appropriate environmental training is provided to responsible operational personnel.

The Proponent may implement an Environmental Management System (EMS) for their operations. An EMS is an internationally recognized and certified management system that will ensure ongoing incorporation of environmental constraints. At the heart of an EMS is the concept of continual improvement of environmental performance with resulting increases in operational efficiency, financial savings and reduction in environmental, health and safety risks. An effective EMS would need to include the following elements:

- A stated environmental policy which sets the desired level of environmental performance;
- An environmental legal register;
- An institutional structure which sets out the responsibility, authority, lines of communication and resources needed to implement the EMS;
- Identification of environmental, safety and health training needs;

- An environmental program(s) stipulating environmental objectives and targets to be met, and work instructions and controls to be applied in order to achieve compliance with the environmental policy; and
- Periodic (internal and external) audits and reviews of environmental performance and the effectiveness of the EMS.
- The Environmental Management Plan.

Various potential and definite impacts will emanate from the operations, planning-, development-, operational- and decommissioning phases. The majority of these impacts can be mitigated or prevented. The impacts, risk rating of impacts, as well as prevention and mitigation measures are listed in this section. The following tables evaluate the identified impacts, both positive and negative on the environment. This includes the social, economic and biophysical environment affected by the agricultural activities. Any one of the activities associated with the project may result in various impacts on a variety of environmental features. In addition some activities may not have a significant impact on a particular feature, but the cumulative nature of the impact may deem it to have a greater significance.

The planning phase encompasses proposed expansion areas as well as existing operations. Obtaining various permits and the renewal thereof is an ongoing requirement. By developing and expanding the project, a large amount of investment capital is spent on hiring and remuneration of the professionals (consulting and service sectors). Project planning is in line with national initiatives regarding agriculture development. During the environmental assessment consultation with surrounding land owners and possible affected parties is conducted. Information about the possible expansion of operations and proposed new operations are provided to consulted parties. This has impacted the future aspiration of various residents, surrounding land owners and employees.

During the planning phase, it is the responsibility of Proponent to ensure they are and remain compliant with all legal requirements. The Proponent must also ensure that all required management measures are in place prior to, and during all phases, to ensure potential impacts and risks are minimised. The following general actions are recommended for the planning phase and should continue during all other phases of the project.

- Ensure that all the necessary permits from the various ministries, local authorities and any other bodies that governs the operations, maintenance/construction and decommissioning activities remain valid. This includes the consumer fuel installation certificate, water permits, etc.
- Ensure all appointed contractors and employees enter into an agreement, which includes the EMP. Ensure that contractors, sub-contractors, employees and all personnel present on the farm understand the applicable sections of the EMP.
- Make provisions to have a Health, Safety and Environmental (HSE) Coordinator to implement the EMP, oversee occupational health and safety as well as general environmental related compliance.
- Have a system in place to deal with complaints, keeping record thereof and allowing for a grievance mechanism.

Have the following emergency plans, equipment and personnel on site, where reasonable, to deal with all potential emergencies:

  - EMP, risk management plan, emergency response plan and HSE manuals;
  - Adequate protection and indemnity insurance cover for incidents;
  - Procedures, equipment and materials required for emergencies (e.g. firefighting, first aid, etc.).

- Establish and maintain a fund for future ecological restoration, specifically for instances of environmental damage caused during operations including pollution remediation where required. Should project activities cease completely, and future land-use will not involve agriculture, the funds should be utilised to remove all redundant infrastructure and waste.
- Establish and/or maintain a reporting system to report on aspects of operations, maintenance/construction, and decommissioning as outlined in the EMP. Keep monitoring reports on file for bi-annual submission to MEFT in support of environmental clearance certificate renewal applications. This is a requirement by MEFT.

Assessment of all impacts are summarised in the tables below.

11.1 REVENUE GENERATION IN THE PROFESSIONAL SECTOR

Consulting and professional services are engaged with for assistance in applications for new permits and renewal for existing permits. During the application processes, information is generated which informs and facilitates planning of the Proponent as well as affected parties and governmental agencies. The professional service sector is further engaged with in terms of administrative processes. Such services mainly relate to the planning and operational services.

Project Activity/Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Planning	Employment and contribution to local and national economy	3	2	3	1	1	30	3	Definite
Daily Operations	Employment contribution to local and national economy	2	1	3	3	1	14	2	Definite
Indirect Impacts	Increased economic resilience in the professional sector	3	1	3	3	3	27	3	Definite

Desired Outcome: Contribution to national treasury and increased economic resilience in the local professional sector.

Actions

Enhancement:

- Contract local Namibians where possible.
- Deviations from this practice must be justified.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Service providers' contracts or agreement or records be kept.

11.2 NATIONAL DEVELOPMENT GOALS: WATER, AGRICULTURE AND LAND USE PLANNING

The agricultural project pins down key development goals and challenges which were identified as part of the Namibian development goals. It may be considered as an agricultural / irrigation project which aims at generating income from foreign sectors by providing the most value per resource (water, soil & labour). In addition, the project is located in line with the regional planning initiatives which identified the location as an area for irrigation development. The project is unique in being one of only a handful of table grape growing projects in Namibia. The project is considered a long term project.

Developing of the agricultural sector was identified as one of the core plans within the 3rd and 4th National Development Plans for Namibia. The focus on agricultural development has further been carried forward in the 5th plan which was released during the final quarter of 2017. The agricultural project therefore is considered to be a positive contributor to achieving national development goals.

Project Activity/Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Planning	Project implementation in line with the NDP4 & 5 and regional land use planning.	4	1	2	1	1	14	2	Definite
Daily Operations	Expansion of the agricultural sector in the //Karas Region Project implementation in line with the NDP4 & 5 and regional land use planning.	3	2	2	2	2	36	4	Definite
Indirect Impacts	Contribution of achieving the goals set out in Vision 2030 for Namibia	3	1	3	3	3	27	3	Definite

Desired Outcome: Continued contribution to the development of the //Karas Region as well as implementation of project activities in line with NDP 4 & 5 and Vision 2030.

Actions

Enhancement:

- Liaison with regional and national governmental agencies through appropriate financial and social responsibility reporting.
- Infrastructure maintenance and development such as, road and powerline servitude, water- and sanitation system developments (provision to employees) and node development. Where possible, public and private partnership regarding projects should be considered.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- All project contributions towards regional development, inclusive of communications held with relevant authorities, to be kept on file.

11.3 SCIENTIFIC KNOWLEDGE

During the environmental assessment, the social, economic and biophysical information of the area was either updated or augmented by new information. During the assessment new biophysical attributes were discovered. Additional specialist opinions were obtained and added to the scientific knowledgebase of the area. Similarly information related to water use, fuel and the access road has been updated and shared with the relevant authorities. The scientific contribution is of national and international importance.

Project Activity/Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Planning	Updating existing scientific knowledge and contributing new scientific knowledge	4	2	3	3	3	72	5	Definite
Development / Construction	Updating existing scientific knowledge and contributing new scientific knowledge	3	1	3	3	3	27	3	Definite
Indirect Impacts	Increased knowledge about the lower Orange River	3	1	3	3	3	27	3	Probable

Desired Outcome: Sharing of all scientific knowledge or finds with relevant NGO's, authorities and scientific fraternity.

Actions

Enhancement:

- Monitoring of environmental features of concern such as riverine vegetation to be conducted and information included in monitoring reports.
- Any heritage, archaeological or paleontological finds to follow chance find procedures which includes the notification of the National Heritage Council.
- Water and soil quality records to be kept on file.
- Weather data records to be kept on file.
- Liaison with regional and national governmental and international agencies regarding matters such as water quality and quantity concerns.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Keeping of all scientific records and finds

11.4 IDEALS AND ASPIRATIONS FOR THE FUTURE

During the environmental assessment, pubic consultation was conducted with neighbours and interested and or affected parties. Information shared with the parties did not result in a change in aspirations for the future. Concerns were raised related to the increased population of the informal settlement and corresponding increased criminal activities on surrounding properties. However, local community members and job seekers remain hopeful that the project will provide additional employment opportunities. The agricultural project is considered to have an overall positive impact on ideals and aspirations of the local community at large.

Project Activity/Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Planning /Construction /Operation	Information sharing about proposed expansion and related possible environmental constraints	2	1	2	2	1	10	2	Definite
Indirect Impacts	Knowledge of economic and development activities in the area	2	1	3	3	1	14	2	Definite

Desired Outcome: Continued sharing of activity plans with IAPs and governing agencies. Maintaining an open door policy with neighbours and employees.

Actions

Enhancement:

- Information sharing about the proposed expansion should be made available to governmental agencies, interested and affected parties. The Proponent and affected parties should use the information generated during the environmental assessment to realistically plan for future growth and optimisation of irrigation systems with related operations. Open communication regarding future development and employment opportunities to employees, through employees' management structures.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Records kept of all information shared with authorities, neighbours and employees

11.5 CONTRIBUTION TO THE NATIONAL ECONOMY (REVENUE & INVESTMENT CONFIDENCE)

During the operational phase, table grapes will be exported to world markets generating revenue for Namibia. The successful implementation of the project and related return on investment for shareholders, will boost investors' confidence in Namibia. The successful implementation of the project will contribute to Namibia's sustainable development of Vision 2030 and the related development goals of the //Karas Land Use Plan (Koch et al., 2011). The project will contribute to stimulate growth in the region and stimulate localised expenditure.

Project Activity/Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Development / Construction	Contribution to national, regional and local economies and agricultural sector. Contribution to sustainable development and investors' confidence	3	3	2	2	3	42	4	Probable
Daily Operations	Contribution to national, regional and local economies. Contribution to sustainable development and investors' confidence	3	3	2	2	3	42	4	Definite
Indirect Impacts	Contribution to national, regional and local economies. Contribution to sustainable development and investors' confidence	3	1	3	3	3	27	3	Definite

Desired Outcome: Contribution to national treasury and increased economic resilience in the local sector.

Actions

Enhancement:

- Maximise contribution to the Namibian economy by contribution to industry development and using Namibian suppliers. Adhere to all Namibian Labour Act requirements.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Service providers' contracts or agreement or records be kept

11.6 ECONOMIC RESILIENCE AND EMPLOYMENT

Establishment of additional agricultural areas will require additional skilled and unskilled labour. People considered for employment will be sourced from the local population while skilled labour may be sourced from other regions. The project has a combined labour force of approximately 1,000 people. This number is expected to increase double fold with the realisation of proposed expansion. Successful implementation of the project is hinged on continued employment of labourers. Continued employment of individuals increases their economic stability which in turn increases their economic resilience.

Project Activity/Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Development / Construction	Permanent and seasonal workforce requirements will increase during the development / construction phase of additional irrigated agricultural areas	2	2	2	2	2	24	3	Definite
Daily Operations	Continued permanent employment (direct & indirect) & increased employment of temporary employees (during harvesting season).	2	2	2	2	2	24	3	Definite
Indirect Impacts	Increased economic resilience of employees	2	1	2	2	2	12	2	Definite

Desired Outcome: Continued remuneration of temporary and permanent employees as per the Labour Act. Continued contributions to social security.

Actions

Enhancement:

- Predominately Namibian workforce to be employed, ideally from the region and informal settlement itself.
- Investigation and possible collaboration with banking sector or social security in providing voluntary financial literacy.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Financial records of contributions to social security and employees' salaries.

11.7 CHANGE OF LAND USE

Changes will be initiated in the way revenue is generated and contributed to the local, regional and national economy. The change in the use of the land will change the revenue produced and paid to the national treasury. A major change of revenue has already been established since the Proponent acquired the properties and initiated operations. Additional revenue will be generated though employment, purchasing of goods and use of services.

Project Activity/Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Development / Construction	Cultivation of previously unused land.	3	2	2	2	2	18	2	Definite
Daily Operations	Continued cultivation operations	2	1	2	2	1	10	2	Definite
Indirect Impacts	Growth in local and regional Gross Domestic Product (GDP)	4	2	2	2	2	48	3	Definite

Desired Outcome: Continued revenue generating activities though the successful implementation and management of the project.

Actions

Enhancement:

- The Proponent is encouraged to develop an anti-corruption policy which could be made public.
- Implementation of measure to ensure the successful management of the project.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Service providers contracts or agreement or records be kept

11.8 TRAINING AND SKILLS DEVELOPMENT

During the development phase, training will be provided to a portion of the workforce to be able to install and maintain the extensive irrigation system and related operations. Skills will further be transferred to those unskilled workforce in the construction of the trellis structures, shade houses and general vineyard, orchard and infrastructure maintenance.

During normal operations, employees will enhance their working expertise while some individuals may be identified for promotion and additional skills development and training.

Project Activity/Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Development / construction	Training to be provided for the irrigation and some additional operational systems and skills development through exposure to new technologies and industry foreign to Namibia.	1	2	3	3	2	16	2	Definite
Daily Operations	Employee's skills and expertise to be increased during continued employment and training provided.	1	1	3	3	1	7	1	Probable

Desired Outcome: To see an increase in skills of local Namibians, as well as development and technological advancements in the agricultural industry.

Actions

Enhancement:

- Predominately Namibian workforce to be employed, ideally from the region and within the area itself.
- Ensure that all training is certified or managerial referenced and proof provided to the employees.
- Skills development and improvement programs to be made available as identified during performance assessments. Ensure that all training is certified or managerial references provided (proof provided to the employees) inclusive of training attendance, completion and implementation. Employees to be informed about parameters and requirements for references upon employment.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Service providers contracts or agreement or records be kept

11.9 AGRICULTURAL PRODUCE

The project is in line with the objectives of Namibia's NDP5 and related implementation plans and strategies. It contributes to the economy of, and food security in, Namibia. It employs mechanised and conservation agriculture technologies. Locally produced crops decrease the amount of crops that needs importing and increases food security in Namibia. Production of crops for export to international markets strengthens the Namibian economy.

Project Activity/Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Development / Daily Operations	Contribution to economy, contribution to food security in Namibia	3	1	3	3	2	24	3	Definite
Indirect Impacts	Reduced import needs, increase in trade balance, spread of knowledge and skills, increased crop productivity	3	1	3	3	3	27	3	Definite

Desired Outcome: Maximum contribution to the food security and economy of Namibia. Provide a positive contribution to the trade balance of Namibia by reducing the amount of imported produce and increasing exported products.

Actions:

Enhancement:

- Train employees on sustainable and basic farming practices to enable the spread of knowledge and skills.
- Diversification and continuous improvement to maximise sustainability of the farm.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Records kept of goods produced and exported.

11.10 DEMOGRAPHIC PROFILE AND COMMUNITY HEALTH

The proposed expansion will require additional labour during both the harvesting and growing season. Change in the demographic profile of the local community will result in an influx of job seekers over time and densification of the informal settlement. Community structures may change with an increase in population while the economic profile will be adjusted as the employment structure of the area is changed. Community health may be exposed to factors such as communicable disease like HIV/AIDS and alcoholism/drug abuse. An increase in people in the area may potentially increase the risk of criminal and socially deviant behaviour such as stealing of agricultural produce, poaching of game, and the illegal harvesting of fish. More people in the area will exert additional pressure on governmental services, particularly essential services such as health care. Currently mobile clinic units visit operations on a monthly basis. Medical assistance, emergency services and the policing of the community are strained especially during harvesting season. The impact is compounded by the fact that the informal settlement is established on private property, hence no governmental services are expected to be provided.

Project Activity/Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Development / construction	Social ills possibly associated with staff and jobseekers.	2	-1	1	1	2	-8	-1	Probable
Daily Operations	Social ills possibly associated with staff and jobseekers. Increased number of people compounding existing service delivery challenges. Degradation of environmental features (dust & water quality)	2	-2	2	2	2	-20	-3	Probable
Indirect Impacts	The spread of disease	2	-1	2	2	2	-12	-2	Improbable

Desired Outcome: To prevent the occurrence of social ills and prevent the spread of diseases such as HIV/AIDS.

Actions:

Prevention:

- Employ only local people from the area, deviations from this practice should be justified appropriately.
- Adhere to all local authority by-laws relating to environmental health which includes, but is not limited to, sanitation requirements.
- Appointment of reputable contractors where applicable.
- Adhere to all local authority by-laws relating to environmental health, which includes, but is not limited to, sanitation requirements for employees.
- Provide educational, awareness information for employees on various topics of social behaviour and HIV/AIDs.
- Disciplinary steps, within the legal parameters of Namibia, to be taken for socially deviant behaviour at the employee-housing compound or during working hours should be clearly stipulated in employment contracts.

Mitigation:

- Take disciplinary action against employees not adhering to contractual agreements with regard to socially deviant behaviour (e.g. alcohol or drug abuse during working hours).

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Summary report based on educational programmes and training conducted.
- Employee contracts on file.

11.11 HEALTH AND SAFETY OF THE WORKFORCE

Every activity associated with the development phase is reliant on human labour and labourers are thus exposed to health and safety risks. Some activities, especially associated with the operation of machines and heavy motor vehicles and or hazardous chemicals, poses the main risks to employees. In addition to these expected risks, severe climatic characteristics of the area (e.g. extreme heat) may contribute to conditions such as sunstroke, fatigue, dehydration and related symptoms. Risks to human health and safety have been identified as a priority concern by the Proponent who has endeavoured to reduce the risk of incidents by implementing improved operating systems (such as worker transportation) and warnings (for dangerous substances). It is therefore foreseen that the improved operating procedures (in terms of health and safety) will be carried forward to the proposed new expansion areas and implemented during the development phase of these areas.

Project Activity/Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Development / construction	Development phase activities which poses risks to human health and safety physical injuries, exposure to chemicals and criminal activities	1	-2	3	3	1	-14	-2	Probable
Daily Operations	The risk of accidents or injuries during use of heavy machinery, use (handling) of hazardous (chemical) materials as well as the non-use of PPE and risk to environmental incidents physical injuries, exposure to chemicals and criminal activities	1	-2	2	2	1	-10	-2	Probable

Desired Outcome: To prevent injury, health impacts and theft.

Actions

Prevention:

- Implement and maintain an integrated health and safety management system, to act as a monitoring and mitigating tool.
- Comply with all health and safety standards as specified in the Labour Act and related legislation.
- Clearly label dangerous and restricted areas as well as dangerous equipment and products.
- Lock away or store all equipment and goods on site in a manner suitable to discourage criminal activities (e.g. theft).
- Provide all employees with required and adequate personal protective equipment (PPE) where required.
- Ensure that all personnel receive adequate training on the operational procedures of equipment and machinery and the handling of hazardous substances.
- Train selected personnel in first aid and ensure first aid kits are available on site.
- The contact details of all emergency services must be readily available.
- Implement a maintenance register for all equipment whose malfunction can lead to injury or exposure to hazardous substances.
- Apply and adhere to all industry specific health and safety procedures and regulations applicable to the handling of food produce for markets.

Mitigation

- Treat all minor work related injuries immediately and obtain professional medical treatment if required.
- Assess any safety problems and implement corrective action to prevent future occurrences.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Record any incidents with the actions taken to prevent future occurrences.
- Record all training which was conducted and when safety equipment and structures were inspected and maintained

11.12 FIRE

Fires may be ignited in a number of ways. Lightning can be a natural ignition source for veld fires, which in turn can spread and damage infrastructure and crops or pose health impacts. Failing electrical infrastructure and fires outside of designated areas may increase the risk of the occurrence of uncontrolled fires which may spread into the nearby fields and surrounding farms. Similarly machinery can ignite dry vegetation if sufficient heat (e.g. exhaust pipes) or sparks are produced. Chemicals and fuels stored and used for general activities may be flammable. Improper waste burning or discarding of cigarette buds further increases fire risks.

Project Activity/Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Development / construction	Fire risk	2	-2	2	2	1	-20	-3	Improbable
Daily Operations	Fire risk	2	-2	2	2	1	-20	-3	Improbable

Desired Outcome: To prevent property damage, veld fires, possible injury and impacts caused by uncontrolled fires.

Actions:

Prevention:

- Prepare a holistic fire protection and prevention plan. This plan must include evacuation plans and signage, an emergency response plan and a firefighting plan.
- Personnel training (safe operational procedures, firefighting, fire prevention and responsible housekeeping practices).
- Ensure all flammable chemicals are stored according to material safety data sheet (MSDS) and SANS instructions and all spills or leaks are cleaned up immediately.
- Maintain regular site, mechanical and electrical inspections and maintenance.
- Maintain firefighting equipment and promote good housekeeping.
- Allow fires used for purposes such as cooking (by staff) in designated areas only.

Mitigation:

- Implement the fire protection and firefighting plan in the event of a fire.
- Quick response time by trained staff will limit the spread and impact of fire.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Maintain a register of all relevant incidents. Include measures taken to ensure that such incidents do not repeat themselves.
- Record when fire drills were conducted and when firefighting equipment were tested and training given.

11.13 WASTE PRODUCTION

Various waste streams result from the operational and possible construction and maintenance activities. Waste may include hazardous waste associated with hydrocarbon products, pesticides and chemicals, as well as soil and water contaminated with such products. Construction/maintenance waste may include building rubble and discarded material and equipment. Domestic waste will be generated by the residents and employees on the farm. Waste presents a contamination risk and when not removed regularly may become a health and/or fire hazard and attract wild animals and scavengers. Sewage is a form of liquid biological waste that needs disposal.

Project Activity/Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Development / construction	Excessive waste production, littering, illegal dumping, contaminated materials	1	-2	2	2	2	-12	-2	Definite
Daily Operations	Excessive waste production, littering, contaminated materials	1	-2	2	2	2	-12	-2	Definite

Desired Outcome: To reduce the amount of waste produced and prevent pollution and littering.

Actions

Prevention:

- Implement waste reduction measures. All waste that can be re-used/recycled must be kept separate.
- Ensure adequate temporary storage facilities for disposed waste are available.
- Prevent windblown waste from entering the environment.
- Prevent scavenging (human and non-human) of waste at the storage facilities.
- Train employees on the importance of proper waste handling and disposal in the professional and domestic setting.

Mitigation:

- Alternative waste disposal methods should be investigated for hazardous waste or waste that present specific pollution risks. This include transporting such wastes to recyclers in larger settlements when empty trucks travel there to collect goods.
- Discarded waste should be disposed of and burned regularly to reduce health and pollution risks.
- Empty chemical containers that may present a contamination/health risk must be treated as hazardous waste. Workers should not be allowed to collect such containers for purposes of storing water or food. This can be achieved by puncturing or crushing such containers prior to disposal.
- Ensure all ablution facilities are connected to properly constructed effluent treatment systems to prevent groundwater contamination.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Maintain a register of disposal of hazardous waste. This should include type of waste, volume as well as disposal method/facility.
- Record any complaints received regarding waste with notes on actions taken.

11.14 ROAD MAINTENANCE AND TRAFFIC

Additional traffic will be generated during the operational phase which will contribute to the cumulative collision- and road degradation risks of the D232 from Ariamsvlei (a gravel road road), especially during the harvesting season. It is however not considered to be a significant impact. Traffic management and road degradation should be considered cumulatively for all operations within the area and a combined initiative (from all operators together with the Roads Authority) should be considered to address possible issues such as road degradation.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Development / construction	Delivery of equipment and building supplies. Increased traffic, road wear and tear and accidents risk	2	-1	2	2	1	-10	-2	Probable
Daily Operations	Increased collision risk at access road entrances to various vineyards. Road degradation.	2	-1	2	2	1	-10	-2	Probable

Desired Outcome: Minimum impact on traffic and no transport or traffic related incidents.

Actions

Prevention:

- Erect clear signage regarding access and exit points at the farm as well as speed limits on the gravel roads along the access road.
- Collective road maintenance initiatives to be embarked upon.
- All vehicles to be fitted and maintained with adequate signalling devices adequate to increase awareness over and above standard features. All operators / drivers to adhere to all the requirements of relevant traffic regulations.

Mitigation:

- If any traffic impacts are expected, possibly as a result of delivery of equipment or construction material, traffic management should be performed to prevent these.
- The placement of signs to warn and direct traffic will mitigate traffic impacts.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Any complaints received regarding traffic issues should be recorded together with action taken to prevent impacts from repeating itself.
- A bi-annual report should be compiled of all incidents reported, complaints received, and action taken.

11.15 SOIL CONTAMINATION AND SOIL STRUCTURE DISTURBANCE (DEGRADATION AND EROSION)

Site clearing of large areas will result in the loss of terrestrial habitat in the area. Although large portions of land identified for expansion are very sparsely vegetated and in many instances considered as bare ground, the topsoil structures of these areas present a unique habitat which will be disturbed and lost once ground breaking activities are initiated. The impact significance is weighted by the cumulative nature of the impact considering the existing and planned surrounding land use. This impact mainly relates to the development phase.

During site excavation, clearance and especially ground breaking, the structure of the topsoil has been and will be disturbed and altered mechanically. Possible fuel and oil spills pose a risk of chemical contamination which may contribute to the soil degradation. Additional activities contributing to a change in the soil structure or composition may result from the additional toilet / sewerage facilities which will be established around new vineyards and orchards.

The long term operational phase will see a high volume of water being irrigated on to the cultivated area, a portion thereof penetrating the soil (not evaporating or being absorbed by the plants). Poor drainage may result in soil saturation and chemical alteration of the soil. Evaporation of salt and nutrient rich irrigation water may cause salt accumulation on and near the surface of the soil profile. Capillary action during saturated conditions may cause the upward migration of water and dissolved salts in the soil profile. Salts present in the soil will then be dissolved and will migrate to the soil surface. Soil water evaporation can then cause further build-up of salts. Such increased levels of salt in the soil can be harmful to planted crops and soil flushing through the application of high water volumes are then often conducted to leach the salts from the soil. Installation of proper soil drainage mechanisms with the aim of preventing saturated conditions can prevent such situations. A further method that can be applied is improved irrigation methods (e.g. drip irrigation or micro irrigation) that supply only sufficient water to the plants to cater for their needs and for evaporation losses. It is expected that drainage water will collect in the cut-off trenches around operations. The cut-off trenches have been designed to follow natural drainage patters.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Development / construction	Contamination from hazardous material spillages and hydrocarbon leakages. Physical change in soil structure.	2	-1	2	2	1	-10	-2	Definite
Daily Operations	Contamination from hazardous material spillages and hydrocarbon leakages or sewage, over application of fertilizer and pesticides, soil leaching and Change in chemical composition of soil as a result of irrigation	2	-2	2	2	2	-24	-3	Definite

Desired Outcome: To prevent the contamination of water and soil.

Actions

Prevention:

- Avoid construction or development phase activities in river courses, hilly areas and riverine vegetation.
- Limit clearing of land to areas that will be irrigated.

- Plan roads to minimize impact beyond irrigable land.
- Prevent off-road driving or movement of earthmoving equipment outside of areas designated for clearing.
- No dumping of rocks and removed soil in environmentally sensitive areas. Where possible it can be used to fill erosion ditches, if any are present.
- Soil should be sampled and analysed annually to ensure the correct amounts of fertilizer is applied and soil and groundwater quality is maintained. Inputs on soil quality and fertilisation requirements can be provided by a soil specialist.

Mitigation:

- Any fuel spillage of more than 200 litre must be reported to the Ministry of Mines and Energy.
- Spill clean-up means must be readily available on site as per the relevant MSDS and spills must be cleaned up immediately.
- The spill containment (drip trays / bunding) of the chemical store must be cleaned if any products are present and this waste must be disposed of at a suitably classified hazardous waste disposal facility.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Records of soil assessments kept on file.
- Registers be kept by the farmers on the type, quantities and frequency of application of fertiliser, pesticides and any other chemicals utilised in crop production.
- A bi-annual report should be compiled on all information and of all spills or leakages reported. The report should contain the following information: date and duration of spill, product spilled, volume of spill, remedial action taken.

11.16 GROUNDWATER CONTAMINATION

Operation of heavy motor vehicles, machines, establishment of trellis structure, shade netting and handling of hazardous chemicals and fuels have the potential to pollute soil and groundwater through spills and leaks. No excessive use of herbicides and pesticides are proposed during the development phase and therefore it is not foreseen that groundwater will be impacted by such chemicals during the development phase.

During the operational phase, as drainage water (potentially laden with herbicides, pesticides and nutrients) moves through the soil, it may dissolve additional nutrients and salts which may lead to a build-up of those nutrients and salts in the groundwater. In addition to the drainage water, chemical and hydrocarbon spills from fuels, herbicides and pesticides may penetrate the soil and contaminate the groundwater. The relative high number of VIP toilets can contribute further to groundwater pollution. Groundwater can form a pathway for pollutants to the Orange River.

Project Activity/Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2)Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Development / construction	Hazardous material, spillages, hydrocarbon leakages from vehicles and machinery.	2	-1	2	2	1	-10	-2	Improbable
Daily Operations	Application of fertilizer, pesticides, herbicides, etc. Sewerage system malfunction.	2	-1	2	2	1	-10	-2	Improbable

Desired Outcome: To prevent the contamination of groundwater.

Actions

Prevention:

- Appoint reputable contractors.
- Vehicles may only be serviced on a suitable spill control structures.
- Regular inspections and maintenance of all vehicles to ensure no leaks are present.
- All hazardous chemicals should be stored in a sufficiently bunded area.
- Follow prescribed dosage of fertilizers and pesticides to avoid over application.
- Maintain sewerage systems and conduct regular monitoring.
- All hazardous waste must be removed from the site and disposed of timeously at a recognised hazardous waste disposal facility, including any polluted soil or water.
- Use of drip and / or micro-irrigation systems to replace older irrigation systems.

Mitigation:

- Appoint a suitably qualified hydrogeologist once impact on groundwater is identified to map the extent and nature of the impact and to implement suitable remedial action.
- Re-use of drainage water where possible (for example dust suppression).
- Immediately clean any spills that occur and dispose of contaminated material according to the relevant MSDS information.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Maintain Material Safety Data Sheets for hazardous chemicals.
- Groundwater should be sampled and analysed to test for nitrate concentrations from the fertilizer and for traces of chemicals used in pesticides and herbicides.
- Registers be kept by the Proponent on the type, quantities and frequency of application of fertiliser, pesticides and any other chemicals utilised in crop production.

- A register of all incidents must be maintained on a daily basis. This should include measures taken to ensure that such incidents do not repeat themselves.
- All spills or leaks must be reported on and cleaned up immediately.

11.17 WATER ABSTRACTION

Although water abstraction volumes will remain within the allocated water rights, the continued abstraction will contribute to the overall water demand from the Orange River. The impact on its own is not considered to be significant, however in light of possible climate change considerations and demand increase of the combined water users on the Lower Orange River System, considerations should be given to future use and water security for downstream water users. The impact has a strong cumulative nature. It should however be noted that the Orange River System is a regulated system, in other words water flow within the river is regulated by the release of water dammed upstream in the river as determined by related parties. Therefore, international communication between South African and Namibia related to water requirements is of utmost importance. The Proponent, as well as all downstream water users must report their water use (abstraction) to provide MWALR with updated water requirements.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Daily Operations	Continued abstraction of water from the Orange River and possible increased abstraction to compensate for climate change (higher evaporation rates and decreased rainfall).	3	-2	2	2	2	-36	-4	Definite
Indirect Cumulative Impact	Additional pressure on the Lower Orange Water System.	2	-2	2	2	2	-24	-3	Probable

Desired Outcome: Sustainable and optimal usage of the water resource.

Actions

Prevention:

- Adhere to water abstraction permit regulations.
- Adhere to recommended abstraction volumes to ensure over abstraction does not take place.
- To prevent unnecessary water loss all pipeline and water storage infrastructure must be inspected and maintained regularly, and over irrigation should be avoided.
- Pressure and flow sensors can be installed that will shutoff water pumps if a leak is detected

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Continued monitoring (flow metres) of water use and water quality as per water monitoring regime.
- Reporting of poor water quality to ORASECOM and the MAWLR.
- Baseline values should be reviewed every three years based on all historic water level data.
- Bi-annual summary report based on all information.

11.18 ORANGE RIVER WATER QUALITY

Impacts on the water quality of the Orange River may stem from a variety of sources related to the project. Some of which may be direct and some of which can be considered to be in-direct. The latter may for example relate to the increase of vegetation in the river which may be due to increased nutrient levels of the drainage water backflow.

Direct impacts related to the water quality in the Orange River can be a result from possible pollution by chemicals and hydrocarbons and pesticides, herbicides and nutrients in irrigation water which drains to the Orange River. The leaching of soils may further directly contribute to change in the water quality. The effects of the possible water quality changes are strongly cumulative in nature as the operations are part of several other irrigation, industrial and mining activities that can impact on the Orange River. Similar agricultural activities are conducted up- and downstream of the site, e.g. in Aussenkehr, Noordoewer and in South Africa.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Daily Operations / Cumulative	Change (degradation) in Orange River Water Quality	2	-2	2	2	2	-24	-3	Definite

Desired Outcome: To prevent degradation of the Orange River Water Quality.

Actions

Prevention:

- Soil flushing should be avoided to prevent Orange River water pollution.
- Registers to be kept by the Proponent showing the type, quantities and frequency of application of fertiliser, pesticides and any other chemicals utilised in crop production. Over application of such substances should be avoided.
- All ablution facilities to be operated and maintained according to specification and industry best practise. Education regarding the use of such facilities to be provided.
- Awareness to be raised regarding environmental degradation due to misuse of implemented systems. Staff to receive training on waste handling and the principles of reduce, reuse and recycle.
- Chemical and fuel handling and storage according to relevant MSDS. Chemicals to be stored in a way that runoff water would not wash such chemicals into the river. No chemical / fuel storage within the 1:100 year flood line of the Orange River.
- A pesticide plan should be compiled by a specialist and reviewed annually. This plan should be strictly followed, deviations should be approved by the specialist.
- MSDS instructions should be strictly followed for the use and application of chemicals.
- Formulation of best salinity management practices and the application thereof on field and farm level.

Mitigation:

- Any fuel spillage of more than 200 litre must be reported to the Ministry of Mines and Energy.
- Spill clean-up means must be readily available on site as per the relevant MSDS and spills must be cleaned up immediately.
- The spill containment (drip trays / bunding) of the chemical store must be cleaned if any products are present and this waste must be disposed of at a suitably classified hazardous waste disposal facility.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Monitoring of intake water quality and drainage water quality (at various locations along the Orange River).
- Water quality results kept on file
- Registers be kept by the Proponent on the type, quantities and frequency of application of fertilisers, pesticides and any other chemicals utilised in crop production.
- A bi-annual report should be compiled on all information and of all spills or leakages reported. The report should contain the following information: date and duration of spill, product spilled, volume of spill, remedial action taken.

11.19 CHANGE IN ECOSYSTEM AND BIODIVERSITY (RIVERINE)

The change in the water quality and quantity may result in a change of the related ecosystems. Contribution of toxins and nutrients may alter and promote growth of various organisms. Primary and invader species are prone to proliferate in degraded ecosystems. The nature of the impact is strongly cumulative not only due to the upstream users, but also the other local table grape growers and agricultural activities on the South African side. Changes in the vegetation growth (as part of the ecosystem) is clearly visible along the Orange River. The banks and drainage water diffuse areas, have more trees, reeds and rivers grasses established, as opposed to the natural and more sparsely populated growth along uncultivated areas.

Poaching and illegal collection of plant and animal materials may occur. Irresponsible pesticide use, for example as method of vermin control, may impact on scavengers such as vultures and in the long run on top predators through biomagnification in higher trophic levels.

Project Activity/Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Development / construction	Change in biodiversity associated with the river due to contribution of toxins and nutrients.	2	-1	3	2	2	-14	-2	Probable
Daily Operations	Change in biodiversity associated with the river due to contribution of toxins and nutrients.	2	-1	2	2	2	-12	-2	Probable

Desired Outcome: To avoid pollution of, and impacts on, the ecological environment.

Actions.

Prevention

- Prevent toxins and nutrients from entering the Orange River and groundwater.
- Strictly adhere to pesticide application instructions and use pesticides only for the purposes for which it is registered and marketed. Importantly, pesticides should not be used to kill vermin unless specifically registered for that purpose, and even then alternative, environmentally friendly methods should be investigated and used.
- Prevent pesticides from ending up in the hands of potential poachers.
- Educate all contracted and permanent employees on the value of biodiversity and strict conditions prohibiting harvesting and poaching of fauna and flora must be part of employment contracts. Include prohibitions or regulations on the collection of firewood.

Mitigation:

- Take disciplinary action against any employees failing to comply with contractual conditions related to poaching and the environment.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Documentation of all chemicals, herbicide, pesticides and nutrients administrated and or used as part of any other operational activity.
- Incidents record kept of all chemical and hydrocarbon spills inclusive of remediation measures taken
- Report any extraordinary animal sightings to the Ministry of Environment, Forestry and Tourism.
- Photographic documentation of the riverbank and vegetation growth of various points as identified for the integrated monitoring plan.

- Monitoring to be conducted on the water quality, upstream and downstream of the drainage water seepage points. Monitoring also to be conducted on the quality of the drainage water (within cut-off trenches).
- Report on all extraordinary animal or plant sightings or instances of poaching.
- Keep frequent records of abstracted water volumes to identify any trends or consistent reduction in water levels.

11.20 DUST GENERATION

Dust and noise as one of the results of the development phase may be generated by a range of activities such as site clearance, transportation of goods and labour, general construction activities and especially tillage or ground breaking. Dust may lead to reduced visibility, respiratory difficulty, and providing a habitat for some pests associated with dusty environments (by settling on surrounding vegetation). The Proponent is continually employing diverse dust abatement measures to reduce the impact and are actively engaged in mitigation of the dust effect. Even with considered mitigation measures the residual impact of dust generation will remain cumulative in nature. Effects are considered to be periodic and of very short term.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2)Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Development / construction	Excessive dust generated from the construction and transportation activities	2	-1	2	2	1	-10	-2	Definite
Daily Operations	Excessive dust generated from the operational activities	1	-1	2	2	2	-6	-1	Definite

Desired Outcome: To minimise the dust generated and prevent nuisance and health impacts.

Actions

Prevention:

- Warning signs to be provided on roads which may have reduced visibility.
- Monitoring of dust accumulation on surrounding vineyards, orchards and plantations.
- Personnel issued with dust masks and regular dust suppression if required.
- Heavy vehicles to maintain low speeds on gravel roads.
- Cultivation and tillage of soils should be prevented on windy days if practically possible.
- A complaints register should be kept for any dust related issues and mitigation steps taken to address complaints where necessary.
- All chemical applications should be according to regulations and material safety data sheet instructions.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Any complaints received regarding dust should be recorded with notes on action taken.
- All information and reporting to be included in a bi-annual report.

11.21 NOISE

Noise will be generated due to the operation of machinery and vehicles accessing the site. Construction and maintenance activities may increase the amount of noise generating activities which may lead to hearing loss in workers. It is however not expected that surrounding farms will be impacted by noise generated from the operations and construction activities of the project.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Development / construction	Excessive noise generated from construction activities – nuisance and hearing loss	1	-2	2	2	1	-10	-2	Probable
Daily Operations	Noise generated from the operational activities – nuisance and hearing loss	1	-1	2	2	1	-5	-1	Improbable

Desired Outcome: To prevent any nuisance and hearing loss due to noise generated.

Actions

Prevention:

- Follow World Health Organization (WHO) guidelines on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment for various differentiated tasks.
- All machinery must be regularly serviced to ensure minimal noise production.

Mitigation:

- Hearing protectors as standard PPE for workers in situations with elevated noise levels.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- WHO Guidelines.
- Maintain a complaints register.
- Bi-annual reports on complaints and actions taken to address complaints and prevent future occurrences.

11.22 VISUAL

Project expansion will be conducted in parts which have already been transformed into an agricultural area through the cultivation of table grapes for over 10 years. Irrigation areas along this section of the Orange River are demarcated on old topographic maps, indicating that the area has long since been recognised as an agricultural area. Expansion areas will therefore add to the existing landscape character which has become one of the main attributes of the area. The operations are uniquely located and serves as a point of interest to tourists and patrons to the area.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Development / construction	Increased areas of cultivated land surrounding existing vineyards.	1	-1	2	2	2	-6	-1	Probable
Daily Operations	Aesthetic appearance and integrity of the site	1	-1	2	2	2	-6	-1	Probable

Desired Outcome: To minimise aesthetic impacts associated with the farm.

Actions

Prevention:

- Regular waste disposal, good housekeeping and routine maintenance on infrastructure will ensure that the longevity of structures are maximised and a low visual impact is maintained.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- A bi-annual report should be compiled of all complaints received and actions taken.

11.23 GREENHOUSE GAS EMISSIONS

The majority of activities related to the development phase are labour intensive with carbon fuel burning machines mostly associated with ground breaking and transport vehicles. No additional electricity will be required for the irrigation systems (as these will still be established). However, existing operations are reliant on NamPower electricity provision which is partly based on fossil fuel combustion. During the development phase no significant amounts of fertilisers will be administered. It is therefore foreseen that development related activities will not contribute significantly to additional greenhouse gasses. It is estimated that the development phase be of relatively short duration.

Although numerous fuel combusting machines are used during the operational phase; the agricultural project inheritably also absorbs greenhouse gasses. The majority of activities related to the operational phase are labour intensive with carbon fuel burning machines mostly associated with operational vehicles such as tractors and transport vehicles. Additional electricity will be required for the irrigation systems for operational activities. This demand will increase during the harvesting season when cooling units are used to temporarily store produce. Existing operations are reliant on NamPower electricity provision which is partly based on fossil fuel combustion. During the operational phase, fertilisers will be administered. Such fertilizers are known to be converted to greenhouse gasses by microorganisms while production of fertilizers is fossil fuel intensive.

Considering industry carbon crediting, table grapes especially has a better rating than other fruits. The overall contribution of the project to Namibia's carbon crediting is expected to be very, very low.

Project Activity/Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Development / construction	Clearing of land using fossil fuel driven machines. Ground breaking and tillage.	2	-1	3	2	2	-14	-2	Probable
Daily Operations	Operational activities reliant on fossil fuel driven machines and electricity. Application of fertilisers.	2	-1	2	2	2	-12	-2	Probable

Desired Outcome: To reduce the carbon footprint.

Actions.

Prevention:

- Catalytic converters installed on all machines. All engines should be maintained in good working condition. No unnecessary idling of vehicles or tillage of soil to be conducted.
- Employ improved efficiencies of grid electricity usage and increase complementary utilization of renewable energy sources for irrigation pumping requirements.
- Consider reducing nitrogen fertiliser usage through more precise application.
- Consider using a carbon calculator to determine the carbon footprint.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Internal records kept if carbon crediting is conducted.

11.24 LOSS OF PALEONTOLOGICAL AND ARCHAEOLOGICAL RESOURCES

Archaeological resources were identified within the farm boundaries. Some of the resources which were documented historically were no longer present when the Proponent took over operations in 2017. Remaining resources, mainly on the Farm Komsberg, were documented and the Proponent has been guided by the specialist assessment in order to demarcate these areas. Apart from two sites all sites are located outside of proposed development areas.

Site clearance and excavation activities could result in the destruction of other undocumented paleontological or archaeological resources. However, should any resources be discovered, chance find procedures as detailed by the specialist should be followed.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Development / construction	The discovery /destruction of archaeologically, paleontological or culturally important sites.	3	-1	3	3	1	-21	-3	Improbable
Daily Operations	The discovery /destruction of archaeologically, paleontological or culturally important sites.	3	-1	3	3	1	-21	-3	Improbable

Desired Outcome: To prevent the damage to, or destruction of, any archaeological, paleontological or culturally important (heritage) resources.

Actions

Prevention:

- All recommendation of the specialist investigation should be adhered to.
- If such a site or any other archaeologically important artefact is found during any phase, any work that may damage / impact the site must be halted and the relevant authorities must be informed. Firstly, the Namibian Police must be informed. Secondly, the National Monuments Council dealing with heritage should be informed. Construction work may only continue at that location once permission has been granted.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Record measures taken to protect archaeological, paleontological or culturally important (heritage) resources
- Record of any discoveries and proof of notifications to authorities on file.
- All information and reporting to be included in a bi-annual report.

11.25 IMPACT SUMMARY

Operational phase activities are all cumulative in nature as the agricultural project is located amongst similar projects in Aussenkehr. Operational activities are reliant on water abstracted from the Orange River while at the same time drainage water will flow back into the river. The most significant biophysical impacts therefore relate to the Orange River and soils. The project will however generate revenue and provide employment for a large number of employees thereby contributing significantly to the economy and related development set for the industry and //Karas Region.

Table 11-1. Summary of Operational Impacts Prior to Mitigation

Impact Category	Impact Type	Construction	Operations
	Positive Rating Scale: Maximum Value	5	5
	Negative Rating Scale: Maximum Value	-5	-5
EO	Revenue Generation in the Professional Sector	3	2
EO	National Development Goals: Water, Agriculture and Land Use Planning	0	4
SC/EO	Scientific Knowledge	3	3
SC	Ideals and Aspirations for the Future	2	2
EO	Contribution to the National Economy	4	4
SC/EO	Economic Resilience and Employment	3	3
EO	Change of Land Use	2	2
SC	Training and Skills Development	2	1
EO	Agricultural Produce and Economic Diversification	3	3
SC	Demographic Profile and Community Health	-1	-3
SC	Health and Safety of the Workforce	-2	-2
PC	Fire	-3	-3
PC	Waste Production	-2	-2
SC	Road Maintenance and Traffic	-2	-2
PC	Soil Contamination and Soil Structure Disturbance	-2	-3
PC	Groundwater Contamination	-2	-2
BE/EO	Water Abstraction		-4
PC/BE	Orange River Water Quality		-3
BE	Change in Ecosystem and Biodiversity (Riverine)	-2	-2
PC	Dust	-2	-1
PC	Noise	-2	-1
SC	Visual Impact	-1	-1
BE	Greenhouse Gas Emissions	-2	-2
SC	Loss of Palaeontological and Archaeological Resources	-3	-3

BE = Biological/Ecological EO = Economical/Operational PC = Physical/Chemical SC = Sociological/Cultural

11.26 DECOMMISSIONING PHASE

The existing operations, as managed by the Proponent and the proposed expansion areas, are not foreseen to be decommissioned within five years from the date of the compilation of this report. It is also not foreseen that any of the operations will then be decommissioned during the validity of the Environmental Clearance Certificate. However, should in any event, the Proponent be required to sell or cease operations, rehabilitation of the area may be required. Decommissioning will entail the complete removal of all infrastructure including buildings, offices and vineyard trellis structures and irrigation systems. All dams and the drainage structure should also be removed, unless thy will be of use for post closure activities. It is therefore proposed that the Proponent consider obtaining insurance to cover possible rehabilitation costs which may be associated with the agricultural project. As per recommended guidelines, a closure cost assessment may be conducted and provided as part of the Environmental Management Parameters. Impacts will then be similar to that of the development / construction phase, with a large and diverse waste component.

12 CONCLUSION

The agricultural operations of the Proponent plays a positive role in the //Karas Region due to provision of commodities as well as the contribution to sustaining livelihoods of employees. The use of the land for the high value crops has a beneficial role in generating income in the region and providing employment.

Project related impacts must be prevented or mitigated by implementing strict monitoring and control. All permits and approvals must be obtained from relevant ministries or authorities for the agricultural operations. Pollution prevention measures should be adequate to prevent incidents that may potentially damage soil, groundwater and surface water. Health, safety and security regulations should be adhered to in accordance with the regulations pertaining to relevant laws and standards. The areas being used are on private land and no need for additional fencing is required. Of main importance is to maintain the Orange River water quality. It is therefore recommended that the Proponent, together with the rest of the Namibian table grape growers, date farmers and all miscellaneous irrigation related water users of the Orange River, embark on an Orange River monitoring initiative. The parameters of such monitoring programme (which should focus on the river quality and related ecosystems) should be determined by a specialist and in conjunction with ORASECOM. The aim thereof would be to monitor any change the combined actions will have on the Orange River system.

The EMP should be used as an on-site reference document during all phases of the agricultural operations. Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken.

It is finally suggested that should an ECC be granted, it be applicable to the agricultural operations on the areas as indicated in Figure 1-1. Any additional areas which may be considered for operations should be demarcated and presented as a separate environmental assessment.

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Appendix A. Communication - Roads Authority

ROADS AUTHORITY
Private Bag 12030
Ausspannplatz
Windhoek
NAMIBIA

SAFE ROADS TO PROSPERITY

Our Ref.:14/6/1/232, 280

Your Ref.:

Enquiries: P Rittmann
Telephone: +264 61 284 7063
Fax: +264 61 284 7151
E-mail: rittmannp@ra.org.na

The Manager
Komsberg Farming
P.O Box 64
Ariamsvlei

Sir/Madam

APPLICATION THAT A PORTION OF DISTRICT ROAD 232 BE RE-CLASSIFIED TO A FARM ROAD (NUMER 280): DISTRICT OF KARASBURG.

1. In terms of Section 16(4) of the Roads Ordinance, 1972 (Ordinance 17 of 1972), a copy of a Government Notice in respect of the above is attached for your attention.

2. The relevant notice is to be published in the Government Gazette dated 31 July 2019 as well as local newspapers of respective dates.

3. Should you have any objection to the above-mentioned application, you are hereby requested to lodge your complaint in writing stating clearly and specifically the grounds on which your objections are based. Your objections must be addressed to: The Liaison Officer of the Roads Boards, Private Bag 12030, Ausspannplatz, within a period of thirty days from the date of publication of this notice.

Liaison Officer: Roads Boards.

1
Ontvang
15/7/2019

GOVERNMENT NOTICE

MINISTRY OF WORKS AND TRANSPORT

NO. 2019

APPLICATION THAT A PORTION OF DISTRICT ROAD 232 BE RECLASSIFIED TO A FARM ROAD (NUMBER 280): DISTRICT OF KARASBURG

In terms of section 16(1)(a)(v) of the Roads Ordinance, 1972 (Ordinance 17 of 1972), it is hereby made known that application has been made to the Chairperson of the Roads Board of Karas East that the classification of a portion of district road 232 described in the Schedule and shown on sketch-map P2388 by the symbols A-B, be changed to a farm road (number 280).

A copy of this notice and the said sketch-map on which the road to which the application refers and other proclaimed, minor and private roads in the area are shown, shall for the full period of 30 days mentioned below, lie open to inspection at the offices of the Roads Authority, Windhoek, and the Chief Engineering Technician of the Roads Authority, Karasburg, during normal office hours.

Every person having any objection to the above-mentioned application is hereby commanded to lodge his or her objection in writing, with the grounds upon which it is based clearly and specifically therein stated, with the Liaison Officer: Roads Boards, Private Bag 12030, Ausspannplatz, within a period of 30 days from the date of publication of this notice.

SCHEDULE

From a point (A on sketch-map P2388) at the junction with district road 232 on the common boundary of the farms Noghoop 1 and Stolzenfelds 74 generally southwards across the last-mentioned farm to a point (B on sketch-map P2388) at the homestead on the last-mentioned farm.

15/7/2019

Appendix B. Water Permits

REPUBLIC OF NAMIBIA

MINISTRY OF AGRICULTURE, WATER AND FORESTRY

Telephone: (061) 2087111
Fax: (061) 2087697
Enquiries: J J Galant
Reference: PV 74

Department of Water Affairs and Forestry
Private Bag 13193
Windhoek
9000

The General Manager
Socotra Island Investments (Pty) Ltd
P.O. Box 64
ARIAMSVLEI

Dear Sir

APPLICATION FOR THE RENEWAL OF PERMIT NO. 10531 FOR THE ABSTRACTION OF WATER FOR IRRIGATION PURPOSES FROM THE ORANGE RIVER ON THE FARM STOLZENFELS NO. 74, KARASBURG DISTRICT

1. The above-mentioned application has been approved. Attached please find permit number 10 531 which authorizes the abstraction of water for irrigation purposes and substitutes permit number 10531 dated 16 December 2015.

2. Kindly take note that the irrigation permit implies no exemption from compliance with environmental legislation. Your returns of water abstracted shall be based on actual water meter readings.

3. You are kindly requested to comply with all the permit conditions, especially to conditions number 2, 6, 7 and 10.

Yours sincerely

Percy W Misika
PERMANENT SECRETARY

All official correspondence must be addressed to the Permanent Secretary

REPUBLIC OF NAMIBIA

MINISTRY OF AGRICULTURE, WATER AND FORESTRY

Telephone: +264 61 208 7111
Fax: +264 61 208 7227
Enquiries: J J Galant
Reference: PV 74

Department of Water Affairs and Forestry
Private Bag 13193
WINDHOEK
Namibia

PERMIT NUMBER: 10531

DATE: 24 April 2018

PERMIT ISSUED IN TERMS OF SECTION 7 (aA) OF THE WATER ACT, 1956 (ACT 54 OF 1956), AS AMENDED AND AS APPLICABLE TO A PUBLIC STREAM.

NAME OF PERMIT HOLDER	:	General Manager, Socotra Island Investments (Pty) Ltd
ADDRESS	:	P O Box 64, ARIAMSVLEI
REGISTERED PROPERTY	:	Stolzenfels No. 74
DISTRICT	:	Karasburg
RIVER/AREA WHERE WATER MAY BE ABSTRACTION	:	Orange River
PURPOSE FOR WHICH WATER MAY BE USE	:	Irrigation purposes
VALIDITY PERIOD	:	5 (Five) years
MAXIMUM ABSTRACTION PER YEAR	:	8 000 000 m^3 per year

This permit authorizes the abstraction and use of water for domestic use and irrigation purposes from the Orange River, subject to the following conditions:

1. The validity period of the permit shall be from 24 April 2018 to 23 April 2023, but the permit will be renewed subject to the performance of the permit holder to utilize the allocated water as planned and to keep to the permit conditions.

2. No unutilized existing water rights in terms of the permit may be transferred from the permit holder to a new permit applicant.

All official correspondence must be addressed to the Permanent Secretary

3. An application for the extension of the validity period of the permit shall be in the possession of the Permanent Secretary at least six months before the expiry date of the permit.

4. This permit is incident to the property. If the present owner sells the property, the permit shall be handed to the new owner.

5. No embankment or structure which could dam up or impede the normal flow of the water in the Orange River may be constructed around the abstraction installation.

6. The permit holder shall pass all water abstracted through a water meter and shall bear all costs for the supply, installation and maintenance of this meter. The permit holder shall consult the Permanent Secretary about the specifications of the water meter and must inform the Permanent Secretary after the water meter had been commissioned so that an inspection can be conducted to confirm that the installation is to the satisfaction of the Permanent Secretary.

7. The permit holder shall keep a record of the quantity of water abstracted per day and the total quantity of water abstracted on a monthly basis. This information must be submitted at quarterly intervals on or before the 10th day of the following quarter to "The Control Officer: Abstraction Control", at the address mentioned above. The permit holder shall also state the number of hectares irrigated in the month concerned. If no water was abstracted during a quarter, a form with a nil return must be submitted.

8. The permit holder shall take the necessary measures to use the water allocated for abstraction in the most efficient and beneficial way. All water installations such as reservoirs, pipes, taps, troughs and reticulation systems must be leak proof to prevent any loss or wastage of water.

9. All costs to pump water from the river will be at the expense of the permit holder.

10. The permit holder shall pay a tariff of N$7-27/ha/annum in respect of the first 30 (thirty) hectares of land under irrigation as well as a fixed tariff of N$37-34/ha/annum for each additional hectare irrigated. The Permanent Secretary shall supply the permit holder with an annual statement of account based on the abstraction figures supplied by the permit holder. If no abstraction figures are submitted by the permit holder, the Permanent Secretary shall supply an account for the maximum quantity of water allocated in terms of this permit. Payment for the water may be made at the office of the Veterinary Services of the Ministry of Agriculture, Water and Forestry at Karasburg under the revenue code number 312022777 for the sale of water. A copy of the receipt must then be submitted to the office in Windhoek with your next quarterly return.

11. The permit holder is not allowed to discharge waste water or any other harmful substances into the river or to re-use the said substances in such a manner or perform any act which could pollute the water, including subterranean water, in such a way as to render it less fit for:

    (a) The purposes for which it is or could ordinarily be used by other persons; or

    (b) The propagation of fish or other aquatic life; or for

    (c) Recreation or other legitimate purposes.

12. The Permanent Secretary, or his authorized representative, in consultation with the Honourable Minister, shall have the right to:

    (a) Amend, replace or withdraw any condition of this permit or

    (b) Withdraw this permit in its entirety, after reasonable notice to the permit holder, and

    (b) Inspect the irrigation scheme at all reasonable times to determine whether the permit conditions are adhered to.

13. The Permanent Secretary cannot guarantee the quality of the water available for abstraction and cannot accept any liability for damage or loss suffered by the permit holder should the flow in the river wane or run dry or if the period of validity of the permit cannot be extended or renewed for any reason which is beyond the control of the Permanent Secretary.

14. When water restrictions are introduced due to drought conditions or other limitations on the availability of water, the permit holder shall comply with the instructions of the Permanent Secretary.

15. Should the permit holder not comply with any of the permit conditions:

    (a) The permit holder may be held liable for any costs which the Permanent Secretary may incur as a result thereof, and

    (b) The permit holder shall be guilty of an offence and shall, on conviction, be liable to the penalties prescribed in Section 170 of the Water Act, 1956 (Act 54 of 1956).

Percy W Misika
PERMANENT SECRETARY

REPUBLIC OF NAMIBIA

MINISTRY OF AGRICULTURE, WATER AND FORESTRY

Telephone: (061) 2087111
Fax: (061) 2087697
Enquiries: J J Galant
Reference: PV 156

Department of Water Affairs and Forestry
Private Bag 13193
Windhoek
9000

The General Manager
Socotra Island Investments (Pty) Ltd
P.O. Box 64
ARIAMSVLEI

Dear Sir

APPLICATION FOR THE RENEWAL OF PERMIT NO. 10532 FOR THE ABSTRACTION OF WATER FOR IRRIGATION PURPOSES FROM THE ORANGE RIVER ON THE FARM KOMSBERG NO. 156, KARASBURG DISTRICT

1. The above-mentioned application has been approved. Attached please find permit number 10 532 which authorizes the abstraction of water for irrigation purposes and substitutes permit number 10532 dated 16 December 2015.

2. Kindly take note that the irrigation permit implies no exemption from compliance with environmental legislation. Your returns of water abstracted shall be based on actual water meter readings.

3. You are kindly requested to comply with all the permit conditions, especially to conditions number 2, 6, 7 and 10.

Yours sincerely

Percy W Misika
PERMANENT SECRETARY

All official correspondence must be addressed to the Permanent Secretary

REPUBLIC OF NAMIBIA

MINISTRY OF AGRICULTURE, WATER AND FORESTRY

Telephone: +264 61 208 7111
Fax: +264 61 208 7227
Enquiries: J J Galant
Reference: PV 156

Department of Water Affairs and Forestry
Private Bag 13193
WINDHOEK
Namibia

PERMIT NUMBER: 10532

DATE: 24 April 2018

PERMIT ISSUED IN TERMS OF SECTION 7 (aA) OF THE WATER ACT, 1956 (ACT 54 OF 1956), AS AMENDED AND AS APPLICABLE TO A PUBLIC STREAM.

NAME OF PERMIT HOLDER	:	General Manager, Socotra Island Investments (Pty) Ltd
ADDRES	:	P O Box 64, ARIAMSVLEI
REGISTERED PROPERTY	:	Komsberg No. 156
DISTRICT	:	Karasburg
RIVER/AREA WHERE WATER MAY BE ABSTRACTION	:	Orange River
PURPOSE OF WATER USE	:	Irrigation purposes
VALIDITY PERIOD	:	5 (Five) years
MAXIMUM ABSTRACTION	:	7 000 000 m^3 per year

This permit authorizes the abstraction and use of water for domestic use and irrigation purposes from the Orange River, subject to the following conditions:

1. The validity period of the permit shall be from 24 April 2018 to 23 April 2023, but the permit will be renewed subject to the performance of the permit holder to utilize the allocated water as planned and to keep to the permit conditions.

2. No unutilized existing water rights in terms of the permit may be transferred from the permit holder to a new permit applicant.

All official correspondence must be addressed to the Permanent Secretary

3. An application for the extension of the validity period of the permit shall be in the possession of the Permanent Secretary at least six months before the expiry date of the permit.

4. This permit is incident to the property. If the present owner sells the property, the permit shall be handed to the new owner.

5. No embankment or structure which could dam up or impede the normal flow of the water in the Orange River may be constructed around the abstraction installation.

6. The permit holder shall pass all water abstracted through a water meter and shall bear all costs for the supply, installation and maintenance of this meter. The permit holder shall consult the Permanent Secretary about the specifications of the water meter and must inform the Permanent Secretary after the water meter had been commissioned so that an inspection can be conducted to confirm that the installation is to the satisfaction of the Permanent Secretary.

7. The permit holder shall keep a record of the quantity of water abstracted per day and the total quantity of water abstracted on a monthly basis. This information must be submitted at quarterly intervals on or before the 10th day of the following quarter to "The Control Officer: Abstraction Control", at the address mentioned above. The permit holder shall also state the number of hectares irrigated in the month concerned. If no water was abstracted during a quarter, a form with a nil return must be submitted.

8. The permit holder shall take the necessary measures to use the water allocated for abstraction in the most efficient and beneficial way. All water installations such as reservoirs, pipes, taps, troughs and reticulation systems must be leak proof to prevent any loss or wastage of water.

9. All costs to pump water from the river will be at the expense of the permit holder.

10. The permit holder shall pay a tariff of N$7-27/ha/annum in respect of the first 30 (thirty) hectares of land under irrigation as well as a fixed tariff of N$37-34/ha/annum for each additional hectare irrigated. The Permanent Secretary shall supply the permit holder with an annual statement of account based on the abstraction figures supplied by the permit holder. If no abstraction figures are submitted by the permit holder, the Permanent Secretary shall supply an account for the maximum quantity of water allocated in terms of this permit. Payment for the water may be made at the office of the Veterinary Services of the Ministry of Agriculture, Water and Forestry at Karasburg under the revenue code number 312022777 for the sale of water. A copy of the receipt must then be submitted to the office in Windhoek with your next quarterly return.

11. The permit holder is not allowed to discharge waste water or any other harmful substance into the river or to re-use the said substances in such a manner or perform any act which could pollute the water, including subterranean water, in such a way as to render it less fit for:

    (a) The purposes for which it is or could ordinarily be used by other persons; or

    (b) The propagation of fish or other aquatic life; or for

12. The Permanent Secretary, or his authorized representative, in consultation with the Honourable Minister, shall have the right to:

    (a) Amend, replace or withdraw any condition of this permit or

    (b) Withdraw this permit in its entirety, after reasonable notice to the permit holder, and

    (b) Inspect the irrigation scheme at all reasonable times to determine whether the permit conditions are adhered to.

13. The Permanent Secretary cannot guarantee the quality of the water available for abstraction and cannot accept any liability for damage or loss suffered by the permit holder should the flow in the river wane or run dry or if the period of validity of the permit cannot be extended or renewed for any reason which is beyond the control of the Permanent Secretary.

14. When water restrictions are introduced due to drought conditions or other limitations on the availability of water, the permit holder shall comply with the instructions of the Permanent Secretary.

15. Should the permit holder not comply with any of the permit conditions:

    (a) The permit holder may be held liable for any costs which the Permanent Secretary may incur as a result thereof, and

    (b) The permit holder shall be guilty of an offence and shall, on conviction, be liable to the penalties prescribed in Section 170 of the Water Act, 1956 (Act 54 of 1956).

Percy W Misika
PERMANENT SECRETARY

REPUBLIC OF NAMIBIA

MINISTRY OF AGRICULTURE, WATER AND FORESTRY

Telephone: (061) 2087111
Fax: (061) 2087697
Enquiries: J J Galant
Reference: PV 156/1

Department of Water Affairs and Forestry
Private Bag 13193
Windhoek
9000

The General Manager
Socotra Island Investments (Pty) Ltd
P.O. Box 64
ARIAMSVLEI

Dear Sir

APPLICATION FOR THE RENEWAL OF PERMIT NO. 10534 FOR THE ABSTRACTION OF WATER FOR IRRIGATION PURPOSES FROM THE ORANGE RIVER ON PORTION 1 OF THE FARM KOMSBERG NO. 156, KARASBURG DISTRICT

1. The above-mentioned application has been approved. Attached please find permit number 10 534 which authorizes the abstraction of water for irrigation purposes and substitutes permit number 10534 dated 16 December 2015.

2. Kindly take note that the irrigation permit implies no exemption from compliance with environmental legislation. Your returns of water abstracted shall be based on actual water meter readings.

3. You are kindly requested to comply with all the permit conditions, especially to conditions number 2, 6, 7 and 10.

Yours sincerely

Percy W Misika
PERMANENT SECRETARY

All official correspondence must be addressed to the Permanent Secretary

REPUBLIC OF NAMIBIA

MINISTRY OF AGRICULTURE, WATER AND FORESTRY

Telephone: +264 61 208 7111
Fax: +264 61 208 7227
Enquiries: J J Galant
Reference: PV 156/1

Department of Water Affairs and Forestry
Private Bag 13193
WINDHOEK
Namibia

PERMIT NUMBER: 10534

DATE: 24 April 2018

PERMIT ISSUED IN TERMS OF SECTION 7 (aA) OF THE WATER ACT, 1956 (ACT 54 OF 1956), AS AMENDED AND AS APPLICABLE TO A PUBLIC STREAM.

NAME OF PERMIT HOLDER	:	General Manager, Socotra Island Investments (Pty) Ltd
ADDRESS	:	P O Box 64, ARIAMSVLEI
REGISTERED PROPERTY	:	Portion 1 Komsberg No. 156
DISTRICT	:	Karasburg
RIVER/AREA WHERE WATER MAY BE ABSTRACTION	:	Orange River
PURPOSE FOR WHICH WATER MAY BE USE	:	Irrigation purposes
VALIDITY PERIOD	:	5 (Five) years
MAXIMUM ABSTRACTION PER YEAR	:	6 000 000 m^3 per year

This permit authorizes the abstraction and use of water for domestic use and irrigation purposes from the Orange River, subject to the following conditions:

1. The validity period of the permit shall be from 24 April 2018 to 23 April 2023, but the permit will be renewed subject to the performance of the permit holder to utilize the allocated water as planned and to keep to the permit conditions.

2. No unutilized existing water rights in terms of the permit may be transferred from the permit holder to a new permit applicant.

All official correspondence must be addressed to the Permanent Secretary

3. An application for the extension of the validity period of the permit shall be in the possession of the Permanent Secretary at least six months before the expiry date of the permit.

4. This permit is incident to the property. If the present owner sells the property, the permit shall be handed to the new owner.

5. No embankment or structure which could dam up or impede the normal flow of the water in the Orange River may be constructed around the abstraction installation.

6. The permit holder shall pass all water abstracted through a water meter and shall bear all costs for the supply, installation and maintenance of this meter. The permit holder shall consult the Permanent Secretary about the specifications of the water meter and must inform the Permanent Secretary after the water meter had been commissioned so that an inspection can be conducted to confirm that the installation is to the satisfaction of the Permanent Secretary.

7. The permit holder shall keep a record of the quantity of water abstracted per day and the total quantity of water abstracted on a monthly basis. This information must be submitted at quarterly intervals on or before the 10th day of the following quarter to "The Control Officer: Abstraction Control", at the address mentioned above. The permit holder shall also state the number of hectares irrigated in the month concerned. If no water was abstracted during a quarter, a form with a nil return must be submitted.

8. The permit holder shall take the necessary measures to use the water allocated for abstraction in the most efficient and beneficial way. All water installations such as reservoirs, pipes, taps, troughs and reticulation systems must be leak proof to prevent any loss or wastage of water.

9. All costs to pump water from the river will be at the expense of the permit holder.

10. The permit holder shall pay a tariff of N$7-27/ha/annum in respect of the first 30 (thirty) hectares of land under irrigation as well as a fixed tariff of N$37-34/ha/annum for each additional hectare irrigated. The Permanent Secretary shall supply the permit holder with an annual statement of account based on the abstraction figures supplied by the permit holder. If no abstraction figures are submitted by the permit holder, the Permanent Secretary shall supply an account for the maximum quantity of water allocated in terms of this permit. Payment for the water may be made at the office of the Veterinary Services of the Ministry of Agriculture, Water and Forestry at Karasburg under the revenue code number 312022777 for the sale of water. A copy of the receipt must then be submitted to the office in Windhoek with your next quarterly return.

11. The permit holder is not allowed to discharge waste water or any other harmful substances into the river or to re-use the said substances in such a manner or perform any act which could pollute the water, including subterranean water, in such a way as to render it less fit for:

    (a) The purposes for which it is or could ordinarily be used by other persons; or

    (b) The propagation of fish or other aquatic life; or for

    (c) Recreation or other legitimate purposes.

12. The Permanent Secretary, or his authorized representative, in consultation with the Honourable Minister, shall have the right to:

    (a) Amend, replace or withdraw any condition of this permit or

    (b) Withdraw this permit in its entirety, after reasonable notice to the permit holder, and

    (b) Inspect the irrigation scheme at all reasonable times to determine whether the permit conditions are adhered to.

13. The Permanent Secretary cannot guarantee the quality of the water available for abstraction and cannot accept any liability for damage or loss suffered by the permit holder should the flow in the river wane or run dry or if the period of validity of the permit cannot be extended or renewed for any reason which is beyond the control of the Permanent Secretary.

14. When water restrictions are introduced due to drought conditions or other limitations on the availability of water, the permit holder shall comply with the instructions of the Permanent Secretary.

15. Should the permit holder not comply with any of the permit conditions:

    (a) The permit holder may be held liable for any costs which the Permanent Secretary may incur as a result thereof, and

    (b) The permit holder shall be guilty of an offence and shall, on conviction, be liable to the penalties prescribed in Section 170 of the Water Act, 1956 (Act 54 of 1956).

Percy W Misika
PERMANENT SECRETARY

Appendix C. Proof of Public and Authority Consultation

Site Notice

Interested and Affected Parties

Name	Surname	Organisation
Anton	Zondach	Neighbour Farm Koms
Nico	Jansen	Neighbour Noghoop FMV/00113/00001
Nic	Erasmus	Neighbour Jerusalem FMV/00073/00002 &/ 0000A
Ali	Albwardy	Neighbour Klipfontein FMV/00075/00001
Jurgens	de Preez	Neighbour Platrand FMV/00154/00REM
Johannes	Smit	Neighbour Ysterplaat FMV/00154/00003
Jorus	de Preez	Neighbour Tierkloof FMV/00154/00002
Jannie	Boonzaair	Neighbour Jericho FMV/00113/00REM
Heinrich	Boühne	Desert Fruit
Pieter	Dippenaar	Border FMV/00155/00REM
		Border FMV/00155/00001
Kevin	Liddle	Silverlands Vineyards
John	Kinahan	QRS / Quaternary Research Services
Coleen	Manheimer	Private Consulting
Maria	Amakali	Director: Water Resource Management MAWLR
Aune	Amwaama	IWRM - Basin Management Committee MAWLR
Wayne	Handley	//Karas Parks- Acting Chief Warden for //Karas Parks
Pauline	Mufeti	Head: Hydrology MAWLR
Lucia	Basson	//Karas Regional Council: Governor
Mr	Ucham	//Karas Regional Council: Acting CRC
		//Karas Region – Governor's Office
Dillon	Maasdorp	NamPower
Johan	Blaauw	Roads Authority: Regional Engineer Maintenance
Calvyn	Beukes	Ariamsvlei Settlement Office: //Karas Regional Council
Anseline	Beukes	Ariamsvlei Settlement Office: //Karas Regional Council
Lenka	Thamae	ORASECOM
Johannes	Smit	Ariamsvlei Farmers Association.
Nico	V D Merwe	Table Grape Growers Association

Sun

REEN LIGHT: Dr Esperance Luvindao f Onanjokwe State Hospital.
IOTO: TWITTER

IUD CAMPAIGN IN OSHIKOTO TO DECREASE TEEN PREGNANCY

TUNOHOLE MUNGOBA
ONGWEDIVA

The Onandjokwe State Hospital's family medicine department, led by Dr Esperance Luvindao, has received the green light to commence with a free IUD insertion campaign for girls and women in the Oshikoto Region.

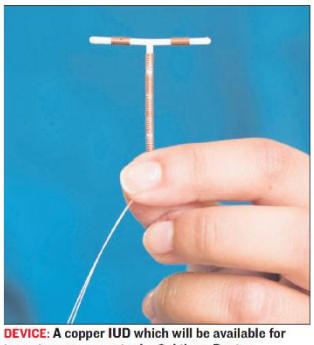
The procedure will also be available at the Onyanya, Onayena and Okankolo clinics.

The campaign will begin this Friday, 14 May, at Onandjokwe and on 4 June at the three clinics. The insertions will then continue every Friday to provide all women and girls a chance to receive an IUD.

The aim of the campaign is to not only provide a facility for women and girls to receive the IUD (intrauterine device), but to also receive information on different contraceptive options and to educate young women and girls on sexual reproductive health.

Low contraceptive use

"The initiative was started on the baseline knowledge of how the usage of contraceptives is very low amongst our community and that is not only here in Oshikoto, but other parts of Namibia as well.



DEVICE: A copper IUD which will be available for insertion at no cost in the Oshikoto Region.
PHOTO: BEDSIDE.ORG

"That is why the aim of this campaign is not only for the insertion of these IUDs, but to provide information and educate young women and girls," said Luvindao.

"We have many cases of women walking into the hospital and they usually only request condoms and some are at least knowledgeable enough to ask about the injection. That is pretty much it," she said.

The department received training from gynaecologist Dr Pala Pala in April and based on the training, the department decided to opt for inserting copper IUDs instead of hormonal ones.

"This is because the copper IUDs do not come with any hormonal side-effects such as weight gain and acne. In addition, many women are usually discouraged by these side effects," Luvindao said.

The campaign aims to target a decrease of 50% in teenage pregnancies in Oshikoto by 2022.

"We do have plans on having this campaign in other parts of the region as we are fully aware that sexual health and reproduction education is needed everywhere.

"Once this is a successful, we will definitely target other regions," she said.

A MULTI-ETHNIC COMMUNITY

German-speaking Namibians want to be heard

A forum launched last month will seek to promote peaceful integration for the benefit of the country.

TAFF REPORTER
/INDHOEK

German-speaking Namibians recently launched a platform called the Forum of German-peaking Namibians (FDN) which ims to give a voice to the multi-eth-ic community.

Through the forum, launched last nonth, the members will seek to romote peaceful integration.

"The aim is thus to become an integral part of the Namibian society for the benefit of the country and its inhabitants. By means of meetings, communication, exchange and dialogue, the forum will pursue reciprocal understanding and promote national integration and peaceful living together in harmony in [the] Namibian society," explained the forum's chairman, Harald Hecht, in a media release issued yesterday.

Hecht said the management committee of the forum is grateful for the clear mandate that was received.

"Its first meeting was held on Sunday, 25 April, allocating duties and determining the next and most important steps to be taken," he said.

"These are, inter alia, to motivate younger members to join the forum, the extension of the forum to other parts of Namibia as well as the regular and steady exchange of information and contact with our membership base."

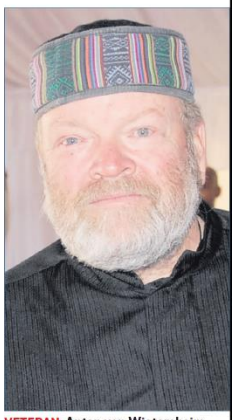
Making a difference

According to Hecht, the forum will engage in matters of national importance in the areas of politics, the economy, legal matters, culture, education and generally matters affecting society as a whole.

"In this spirit and based on the expectation that an improvement of economic activity is imminent, the committee appeals to the Namibian business community to join the 'Create a job and make a difference' campaign, thereby accelerating the expected upturn in our economy," he said.

Other members of the management committee include former parliamentarian Anton von Wietersheim and his wife Monika, Raimar von Hase, Benita Herma, Carola von Blattnitz and former Rally for Democracy and Progress (RDP) youth leader Monica Nambelela.

CHANGE: Monica Nambelela.



VETERAN: Anton von Wietersheim.
PHOTOS: FILE/NAMPA

Strengthening sustainable community fisheries

ELLANIE SMIT
WINDHOEK

A community project to strengthen sustainable fisheries in the Kavango–Zambezi Transfrontier Conservation Area (KAZA TFCA) was launched last week in Rundu.

In the KAZA TFCA, fishing makes an important contribution to almost 20% of its estimated two million people.

The project was launched under the auspices of the KAZA Secretariat and the Namibia Nature Foundation (NNF), and is a grant under the Ecofish programme, promoted and funded by the European Union (EU) and implemented through the EU delegation to Mauritius and Seychelles with the support of eight implementing partners, including SADC.

The overall objective of the Ecofish programme is to enhance the contribution of sustainable fisheries to the blue economy of eastern Africa, southern African and the Indian Ocean (EA-SA-IO).

According to the NNF, the inland and marine coastal fisheries resources of the EA-SA-IO region represent a natural wealth of about N$855.7 billion (€50 billion).

Ecofish strives to ensure the sustainable management of these assets by putting in place policies to handle them effectively, by protecting them and by promoting good fishing practices, the NNF said.

Vehicle of transformation

Senior technical advisor of the project, Britta Hackenberg said inland fisheries are probably the most underestimated resource.

"Healthy fish diversity is a source of livelihood for rural poor, but can also be a vehicle of transformation".

The project aims to strengthen sustainable fisheries management through ecosystem-based adaptation enhancing the socio-ecological resilience of communities by continuing to work with local communities in establishing fisheries reserves.

Currently, there are 10 fisheries reserves gazetted in Namibia's Zambezi Region, co-managed and legally recognised by the government, and which all show encouraging recovery trends.

To enable state agencies, non-governmental organisations (NGOs) and community-based organisations to establish such fish protection areas, standardised tools and guidelines will be developed to be applied in the wider landscape.

The NNF said local communities are increasingly and rightly being recognised as critical for conservation and this community-centric, ecosystem-based adaptation approach has the potential to generate wider values in several key areas.

Ultimately, this project and the wider programme aims to restore the fisheries to an extent that local people who live near and are custodians of important rivers and their biodiversity can reasonably expect to go to the river and catch some fish to eat, to trade and to enjoy.

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WEER

BINNELAND: Gedeeltelik bewolk en warm tot baie warm.

KUS: Gedeeltelik bewolk en matig tot warm.

GETYE BY WALVISBAAI: H: 07:13 L: **13:18 H:** 20:04

VOORUITSIGTE

WINDHOEK	09°	25°
RUNDU	12°	28°
OSHAKATI	14°	28°
GOBABIS	08°	27°
MARIENTAL	10°	28°
KEETMANSHOOP	09°	27°
WALVISBAAI	11°	26°
LUANDA	21°	30°
JOHANNESBURG	05°	21°
KAAPSTAD	08°	20°

Sodomiewet se dae dalk getel

VAN BL. 1

Die regering het beide ere opgemerk dat, ioewel hulle weier om odomie te dekriminali-eer, LGBTQ-mense nie eviktimiseer of vervolg vord nie.

Die LRDC-adjunkvoor-itter, mnr. Etuna Josua, iet gister die sodomiewet verouderd" genoem.

Hy het gesê die 34 wette vat in die twee verslae ge-dentifiseer is, "is nie in ioreenstemming met lie tye nie, en is nie meer elevant of versoenbaar met ons grondwetlike be-deling nie."

GELYKE REGTE

In reaksie op vrae oor die regstryd om die wettiging van selfdegeslag-huwe-like, wat vandeesweek voor 'n volbank regters in die hoërhof begin, het Dausab gesê die tyd is reg "vir ons om in 'n rigting te beweeg wat inklusief is teenoor alle Namibiërs".

Sy het verder daarop gewys dat die hof se besluit om 'n volbank van drie regters aan te stel, as bewys dien dat die howe die saak ernstig opneem.

"Dit is vir ons in Namibië amper 'n mylpaal as land in terme van die rigting waarin ons menseregte-paradigma en samelewing beweeg".

Sy het gesê geen Nami-biër moet voel of hulle nie deel is van die Namibiese Huis nie, en aangevoer die huidige regering bespreek die kwessie ernstig.

"Homofobie, transfobie en enige fobiese neigings word nie deur die staat goedgekeur nie.

"Maar ons moet mense toelaat om hul eie sienings te hê. Wat ons nie moet toelaat nie is aktiewe of passiewe diskriminasie teen enige dele van ons samelewing. Ek dink nie dit is wat ons van plan is om te doen nie."

Oor die verskeie sake wat verband hou met LGBTQ-kwessies soos gesins-, huweliks- en veiligheidsregte, het die minister gesê dié sake is tans 'n "belangrike baan in ons menseregteparadigma. En ek dink ons howe het 'n groot verpligting om die LGBTQ-gemeenskap te verseker dat hulle gehoor en gesien word.

"Natuurlik het ons geen beheer oor die proses nie, ons moet toelaat dat dit sy gang gaan."

Die minister het ook ge-reageer op kritiek teen 'n wetsontwerp op huishou-delike geweld wat onlangs ter tafel gelê is, wat paar-tjies in selfdegeslag-verhoudings uitdruklik uitsluit van die veiligheid wat die wetsontwerp bied.

Sy sê sy het nog nie ge-reageer op die kommer wat in die kabinet uitge-spreek is nie om "die LG-BQ-gemeenskap en ander lede van ons samelewing wat belangstel" toe te laat om insette in die wets-ontwerp te lewer.

- republikein@republikein.com.na

Die minister van justisie, me. Yvonne Dausab, en die adjunkvoorsitter van die LRDC, mnr. Etuna Josua, tydens die oorhandiging. FOTO JANA-MARI SMITH

Psemas: 'Pensioenarisse nie geskrap'

VAN BL. 1

Hy het gerugte ontken dat pensioenarisse van die fonds geskrap gaan word.

"Daar blyk onduidelik-heid te wees onder pen-sioenarisse, met inligting wat sirkuleer dat hulle van die fonds geskrap sal word. Dié inligting is glad nie waar nie," het hy gesê.

Shidhudhu het verdui-delik die enigste pensioe-narisse wat versoek is om GIPF-state vir die minis-terie te bring, is dié wat hul ledegeld kontant betaal.

Volgens hom is tydens die verifiëringsproses wat in 2018 uitgevoer is, vasgestel dat sommige pensioenarisse maande-liks kontant of elektro-nies vir hul lidmaatskap betaal. Dit is volgens Shidhudhu 'n oortreding van die staatsdienspersо-neelreël.

"Dié lede is vervolgens verlede jaar versoek om briewe van aftrede en GIPF-state in te dien," het hy verduidelik.

FASE-BENADERING

Daar is vasgestel die meeste van dié mense is afgetrede regeringsamp-tenare wie se status on-wettig op die stelsel na pensioenaris verander is, voormalige afgetrede regeringspersoneel is wat gekies het om die hele pensioenvoordeel te onttrek en sodoende die Psemas-voordeel verbeur het of buite die grense van Namibië en Suid-Afrika woon.

"Dié segment het niks te doen met die herregistra-sieproses wat tans onder-weg is nie."

Volgens hom volg die proses 'n fase-benadering wat beteken net sekere regeringskantore en -agentskappe word tydens 'n sekere tydperk genader, terwyl die res in 'n latere stadium gekon-tak sal word.

Shidhudhu het 'n beroep op Psemas-begunstigdes gedoen om nie die minis-terie in dié verband te nader nie, maar eerder te wag vir kommunikasie van hul kantore vir mens-like hulpbronne.

- henriette@republikein.com.na

440 000 NAMIBIANS IN FOOD AID CRISIS

Food insecurity at five-year high

At least 441 000 people in Namibia were expected to be in crisis or worse in October 2020 to March 2021 due to the impact of Covid-19 pandemic-related income losses on food access.

ELLANIE SMIT
WINDHOEK

This is according to the recently-released 2021 Global Report on Food Crises - recently released by an international alliance of the United Nations (UN), the European Union (EU), governmental and non-governmental agencies.

According to the report, there is an increase of around 20 million people from the previous year in need of humanitarian food aid.

Conflict and climate shocks have been the key drivers of acute food insecurity on the continent, especially in central and southern Africa. But in 2020, the adverse economic effects of Covid-19 restrictions contributed to a sharp rise in the number of people in acute food crisis or worse. Market disruptions due to measures to contain the pandemic also contributed to the food crisis. At the same time, agricultural production had declined due to a rainfall deficit in early 2020.

WORRYING FIGURES: Hunger levels were at a five-year, with further increases expected this year. PHOTO: FILE

The number of food insecure people in the world's poorest nations, the report notes, shot to a five-year high in 2020, with millions facing starvation.

The majority of the 155 million affected are spread across 55 countries around the world, among them more than 15.8 million children under five suffering from wasting.

According to the report, in 2016, a total of 94.2 million people faced food insecurity.

It said while many people around the world have been pushed to the edge by the economic collapse imposed by the Covid-19 pandemic, many more, particularly in Africa, were driven into food crises by pre-existing fragilities including conflict, poverty and weather extremities.

Fragile Africa

Africa is still the continent most affected by food crises, accounting for 63% of the global total number of people in crisis or worse, up from 54% in 2019.

The report warned that millions could slip into full scale famine while more are expected to join the millions who are acutely food insecure should humanitarian intervention fail to reach them.

In Africa, more than 13 million people require humanitarian food aid

The report added that with the pandemic still not under control many households will face reduced incomes associated with limited labour opportunities and delays in payment of government employee salaries.

"If there is no improvement, the economic consequences may become more severe as the year progresses."

In net food-importing countries weakening currencies will continue to push up food prices and further curtail purchasing power. High levels of government debt stress could impinge on longer-term development policies that could potentially undermine economic recoveries stalling improvements in food security and equality, the report said.

Hai //Om traditional authority under siege

ESTER KAMATI
OUTJO

Members of the Hai //Om community staged a peaceful demonstration at Outjo yesterday where they demanded the removal of the traditional authority, especially Chief David Khamuxab, who has been recognised as chief since July 2004.

Protesters from five regions marched to the constituency councillor's office displaying posters stating '17 years of corruption, nepotism' and 'Shut down the Hai //Om office'. In the petition read by group spokesperson Leon Aib, Khamuxab was accused of not being transparent and not having followed due process in his nomination and election. It was further stated that the traditional authority is constituted of only the chief's relatives.

The petition further claimed that the chief "does not promote peace and welfare among the community."

Nepotism claims

Chief Khamuxab denied appointing his relatives as traditional authority members. "It is not true," he said, stating that he is not related to everyone on the traditional authority and that those leading the demonstration are also part of his family.

The traditional authority stated that they are dealing with traditional affairs and not politics.

"Their movement is totally political," they said about the demonstration, which they claimed was bringing disunity among the people.

They explained that the procedures for constituting a traditional authority are different from political procedures.

The traditional authority stressed that they are governed by customary law which gives a royal house the mandate to deal with leadership affairs.

This is contrary to the petition, which states that the leaders have failed to draw up said customary laws.

Community resources

The protesters alleged that the chief has misused resources earmarked for the upliftment of the community and that no audit reports are presented to the community.

The chief disputed these claims. He stated that there is a board and a committee entrusted to deal with the finances of the community and that the funds are divided according to resolutions set by the traditional authority.

The protesters also questioned the purchase of vehicles through the Hai //Om community trust fund. Chief Khamuxab confirmed the purchase of seven vehicles but said that these were for traditional authority use.

The petition was received by Helmut Fillemon, control administration officer at the Outjo constituency office who promised that it would reach the relevant authorities. The petition is addressed to the minister of urban and rural development.

ester@myzone.com.na

DISPUTE: Members of the Hai //Oms community demand the removal of chief David Khamuxab along with the rest of the traditional authority. PHOTO: ESTER KAMATI

2 NUUS Republikein Dinsdag 11 Mei 2021

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WEER

BINNELAND: Koud in die oggend, maar sonnig en warm tot baie warm in die dag.

KUS: Sonnig met Oosweertoestande.

GETYE BY WALVISBAAI: L 09:12 H 15:35 L 21:17

VOORUITSIGTE

WINDHOEK	8°	26°
RUNDU	15°	30°
OSHAKATI	16°	29°
GOBABIS	8°	28°
MARIENTAL	8°	28°
KEETMANSHOOP	7°	28°
WALVISBAAI	23°	36°
LUANDA	22°	31°
JOHANNESBURG	5°	23°
KAAPSTAD	10°	21°

Psemas-eise word afgekeur

VAN BL. 1

"Verskaffers loop die risiko van miljoene dollar in skade sou eise vir verskeie maande vir 'n beduidende deel van die professie afgekeur word."

De Klerk sê die enigste manier om dié risiko te bestuur in die afwesigheid van 'n waarborg van betaling, is om nie enige dienste aan Psemas-lede te verskaf nie.

By Psemas bly oproepe en e-posse meestal onbeantwoord en is "geen geskrewe bevestiging van enigiets" ooit verkrygbaar nie.

"Dit wil voorkom asof die Psemas-departement binne die ministerie van finansies vir alle praktiese doeleindes totaal en al wanfunksioneel geword het."

De Klerk het gemaan indien dit waar is dat die meerderheid van gesondheidsdiensverskaffers geraak word omdat hulle tans as geregistreerde verskaffers afgehaal is, die regering nie "eerlik en deursigtig" is oor die werklike motief daaragter nie.

"NPPF-lede kan nie hierdie risiko loop wat tot verliese van miljoene dollars vir verskaffers kan beloop nie."

Lede is gevolglik aangemoedig om eers geskrewe bevestiging van Methealth te kry dat hulle steeds geregistreer is, alvorens hulle enige dienste aan Psemas-lede verskaf.

Die NPPF het Psemas en Methealth tot Vrydag gegee om 'n geskrewe waarborg te gee dat eise van verskaffers wat aan Psemas-vereistes voldoen en sedert 1 Mei ingedien is, wel uitbetaal sal word.

Die mediese fonds het onlangs sy terme en voorwaardes vir kontrakte met diensverskaffers tot volgende jaar verleng met dien verstande dat alle verskaffers verseker hul dokumente met Psemas is op datum.

Volgens De Klerk vrees die NPPF die situasie is moontlik "doelbewus" deur die regering as 'n "kostebesparingstrategie" geskep en waarvoor diensverskaffers die prys sal moet betaal.

Die uitvoerende direkteur in die ministerie van finansies, me. Ericah Shafudah, het in reaksie op diensverskaffers se klagtes oor Psemas beloof om teen Vrydag op skrif daarop te reageer.

Shafudah het ook onderneem om 'n virtuele ontmoeting met De Klerk vandag te hê as "vennote in Psemas" om die weiering van eise sowel as enige ander klagtes deur diensverskaffers "deeglik te bespreek."

Die beplande ontmoeting wat ook deur Methealth bygewoon sou word, is volgens De Klerk teen gister egter nie bevestig nie. Shafudah het teen druktyd ook nie op navrae gereageer nie.

TER ILLUSTRASIE FOTO ARGIEF

- henriette@republikein.com.na

Hierdie foto van stakers in 'n gebedsgroepie is gister op Facebook gedeel.

» Een uit vier werk glo weer

NBC: Partye om die tafel, maar deurbraak ontwyk

Hoe programme op die lug gehou word, is 'n strydvraag in die staking wat reeds 'n derde week betree het.

› Augetto Graig

Meer as twee weke sedert 'n staking by die nasionale uitsaaier begin het, het partye gisternamiddag met 'n bemiddelaar hul verskille probeer uitspook.

Verteenwoordigers van die Namibiese Vakbond vir Staatsdienswerkers (Napwu) en die NBC-direksie het teenoor mekaar stelling ingeneem.

'n Sentrale vraagstuk was volgens 'n bron na aan die onderhandelinge om by die bemiddelaar 'n definisie van die term instaanwerker te kry. Volgens die vakbond gebruik die uitsaaier instaanwerkers om veral die nasionale radiodiens terug op die lug te kry.

Die NBC-bestuur se verweer is glo dat hulle rekenaarprogrammering gebruik, maar die vakbond sê werknemers moet steeds die inhoud beplan en skeduleer.

"Al die werknemers staak saam met ons," het die bron gesê.

Die bestuur poog om ook weer nuusuitsendings te hervat.

Dit was teen druktyd onbekend wat die uitslag van die vergadering was.

Napwu beskou die gebruik van instaanwerkers as 'n oortreding van die reëls vir die staking. Dit is 'n kwessie wat hulle in die hof wil betwis.

Teen gister was 144 van die NBC se 528 werknemers by die werk volgens die uitsaaier se woordvoerder, me. Umbi Karuaihe-Upi.

Dit verteenwoordig 27% van die arbeidsmag of gemiddeld een uit elke vier werkers.

Op die stakers se Facebook-blad het hulle die syfer uitgedaag. Van die reaksie was dat almal in die streke en 90% van werkers in Windhoek nie teruggekeer het werk toe nie.

'n Ander opmerking was dat dit meestal minder goed gekwalifiseerde personeel is wat tou opgooi en dat "ware joernaliste, met meestersgrade" steeds toi-toi en plakkaat swaai.

- augetto@republikein.com.na

Bekende sterf

VAN BL. 1

Die penne is glo verwyder deur mense wat skrootmetaal versamel.

Die vriend, wat anoniem wil bly, sê die munisipaliteit het eers Saterdag ná die ongeluk weer padtekens aangebring om motoriste te maan daar word aan die pad gewerk.

Hy sê verder die straat is saans swak belig en die sandhope is nie in die donker sigbaar nie.

Scheepers het gister gesê dit dui op nalatigheid van die kant van die munisipaliteit, wat moes besef het die sandhope en reusegat langs die straat hou 'n gevaar vir padgebruikers in en dit behoorlik moes afgesper het.

Hy laat benewens sy vrou, ook sy dogter uit 'n vorige huwelik, Christine Scheepers (21), en haar drie kinders uit 'n vorige huwelik, Chrisjan Mouton (29), Yvette Verburg (26) en Renier Mouton (23), agter.

Sy sê die begrafnisreëlings sal later bekend gemaak word.

- ronelle@republikein.com.na

Die reusegat langs Rugbystraat het glo in die reëntyd gevorm waar stormwaterpype onder deur die pad loop. Mnr. Skip Scheepers het die hoop grond aan die regterkant getref, waarna sy motorfiets deur die lug getrek het. FOTO TANJA BAUSE

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PO BOX 11073 ♦ WINDHOEK ♦ NAMIBIA
E-MAIL: gpt@thenamib.com

10 May 2021

To: **Interested and Affected Party**
Re: **Environmental Assessment for Irrigation and Related Activities of Komsberg, //Karas Region, Namibia**

Dear Sir/Madam

In terms of the Environmental Management Act (No 7 of 2007) and the Environmental Impact Assessment Regulations (Government Notice No 30 of 2012), notice is hereby given to all potential interested and affected parties (including neighbours) that an application will be made to the Environmental Commissioner for an Environmental Clearance Certificate (ECC) based on the following project:

Project: Environmental Assessment for Irrigation and Related Activities of Komsberg, //Karas Region, Namibia

Proponent: Socotra Islands Investments (Pty) Ltd

Environmental Assessment Practitioner: Geo Pollution Technologies (Pty) Ltd

Socotra Islands Investments (Pty) Ltd, trading as Komsberg, recently invested into the agricultural sector in the//Karas Region Their operations comprise the cultivation of table grapes, citrus and berries, for global export markets, over an area of 270 ha. Komsberg plans to expand their operations by of 240 ha. Water from the Orange River is abstracted for irrigation purposes throughout the year. The Environmental Assessment will consider all agricultural activities and related support services and infrastructure. Such infrastructure includes fuel storage, electricity generation and waste management.

You are welcome to register as an interested or affected party for more information, or to provide input / comment to:
Fax: 088-62-6368 or
E-Mail: komsberg@thenamib.com

Should you require any additional information please contact Geo Pollution Technologies at telephone 061-257411. Comments for consideration during the environmental assessment should reach us by 24 May 2021.

Thank you in advance.

Sincerely,

Geo Pollution Technologies
Quzette Bosman
Social and Environmental Assessment Practitioner

Public Participation Notification: Environmental Assessment Irrigation and Related Activities of Komsberg, //Karas Region, Namibia

Name & Surname	Organisation/Address	Tel / Mobile	Email	Signature
Sharlen Jansen				Jansen
Rachel Ceuraseb				
JAN MEYER				Mayer
Willem Kambazu				Khambazu

Privacy Block

Environmental Assessment: Irrigation and Related Activities of KOMSBERG

Comments and Responses Table

IAP	*Correspondence*	*Issue / Concern*	*Response*
Kevin Liddle; Silverlands	14 Dec 2021; Email	Thanks for sending the Environmental Assessment through. The sustainability of the Orange River's water supply remains a major concern. I have attached two letters which were submitted to you as a part of another Environmental Assessment where the project was utilising significant volumes of water from the Orange River. Our concerns, recommendations and questions remain the same. I can't see on the list of parties that were consulted but were Rosh Pinah Zinc Corporation notified and consulted as a part of this process. As their attached letter reflects they really do have a very significant interest in the sustainability of the Orange River. We agree with you that the usage of water on the Orange River is something that has cumulative impacts. What we don't understand is how you can say that the project will contribute to the sustainable development of the region when there are such significant concerns with regards to the sustainability of the Orange River's water supply. Surely, in the absence of a cumulative impact assessment and little to no correspondence from the likes of ORASECOM you are not in a position to comment on the projects sustainability (even in isolation to other water users downstream). If water is not available then the proposed project is not sustainable and the livelihoods downstream are also in jeopardy. We don't believe you can continually say that you think the cumulative impact is out of the scope of the assessment. The implication of this is that many more projects could be recommended with no-one assessing the cumulative impacts. When you make statements such as the two highlighted below we are deeply concerned about the sustainability of the Orange River System and believe the uncertainty is too great to ignore when assessing the Environmental Impact for a project of this scale: - "Should all water be abstracted per allocated water rights, abstraction may be more than what was traditionally released into the Orange River System (for the users of the Lower Orange River System). New	The Orange River System is largely a regulated system (as noted in Section 8.5 of the report) with South Africa being required to release water for all water users of the lower Orange River, both on the South African and Namibian side. Water use as per the South African side, is regulated by South Africa. Similarly water use on the Namibian side is regulated by Namibia. Regulation of the abstraction relates to abstraction permits awarded and receipt of actual water use data. There is furthermore no information available regarding the drainage water volumes which flows back into the system. In addition, the newly built Neckartal Dam will have an n impact on the lower Orange River system. All these factors are managed and dealt with by the Government of Namibia. In other words, the provision of water permits to various water users, along the river, lies within the discretion of the Government of Namibia. One single water user is not in the position to determine who may receive water permits and who not, neither are they able to conduct a cumulative assessment when they have no access to required data. In fact the Government of Namibia, along with the Government of South Africa regulates the Lower Orange River system in such a manner that there has not been incidents, as per your attached communication, in recent years. Furthermore, should a cumulative assessment be conducted, it should include water use on the South African side, and should such assessment be carried out by the private sector, the costs should be equally shared, not only among the various water users (which will include NamWater), but also shared with water users on the South African side.

IAP	*Correspondence*	*Issue / Concern*	*Response*
		thresholds for the upstream release of water into the Orange River may be required." - "The allocated water volumes for Namibia exceed this limit, however the actual deficit is not known" Surely the responsible recommendation is to conduct a cumulative impact assessment to ensure the sustainability of the water supply for all users?	Full confidence is vested in the Government of Namibia to manage the resource to the benefit of all water users. Such confidence is based on experience in the industry where the related Governmental custodian, the Ministry of Agriculture, Water and Land Reform, do not renew water permits when water users do not conduct individual assessments and submit required actual water usage.

Silverlands Vineyards (Pty) Ltd

3 December 2018

Geo Pollution Technologies (Pty) Ltd
PO Box 11073
Windhoek
Namibia
Dear Ms Bosman

RE: AUSSENKEHR AGRICULTURAL DEVELOPMENTS - AUSSENKEHR NAMIBIA, ENVIRONMENTAL ASSESSMENT SCOPING REPORT

As an interested and affected party we have received a copy of your environmental assessment scoping report which seeks clearance for a current production area of 950 hectares and an expansion area of 4,804 hectares.

We understand that the application is for 5 independent companies and the areas applied for and the existing water rights is as per the below table:

	Current Area (ha)	Proposed Expansion as per ESIA (ha)	Existing Water Right Allocation (m^3/yr)
ORVI	174	160	6,553,750
Capespan Namibia	475	45	8,550,000
Frontier Grapes	100	0	1,440,000
Solar Grapes	201	201	2,750,000
Aussenkehr Farms	0	4599	11,296,000
	950	**5005**	**30,589,750**

The report does not explicitly say how much water the total development area (current hectares and proposed expansion are) requires. If however we take a conservative assumption that 16,000 m^3 per hectare is required per year we can see from the below

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Aussenkehr
Namibia

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Silverlands Vineyards (Pty) Ltd

table that there is a significant shortfall (64,690,250 m^3 per year) in the amount of water rights that has been issued to the project participants.

	Total Area in Project (ha)	Total Water Rights Required (m^3/yr)	Current Water Rights Issued (m^3/yr)	Additional Water Rights Required (m^3/yr)
ORVI	334	5,344,000	6,553,750	-
Capespan Namibia	520	8,320,000	8,550,000	-
Frontier Grapes	100	1,600,000	1,440,000	160,000
Solar Grapes	402	6,432,000	2,750,000	3,682,000
Aussenkehr Farms	4,599	73,584,000	11,296,000	62,288,000
Total	**5,955**	**95,280,000**	**30,589,750**	**64,690,250**

Your report further mentions that the sum of water rights for the entire Aussenkehr farming valley totals 65 million m^3 per annum. The implication of the proposed expansion area is that the water rights for the entire Aussenkehr valley would need to be doubled.

Your report does not say but we understand that you are not certain as to how much water extraction rights Namibia holds for the Orange River but that you believe that the total rights for the whole country is between 50 and 70 million m^3 per annum.

The key numbers then would appear to be as per the table below:

Total Water Rights Already Issued for Aussenkehr	65m m^3
Namibia's water rights from the Orange River	70m m^3
Total Water Rights Required for Aussenkehr with this project included	130m m^3

In addition to the above table it should be noted that there are water rights issued to other Namibian users along the Orange River, which are not known or included in the above table. This includes large operations (mining, agricultural and towns) including Oranjemund, Rosh Pinah, Noordoewer, and Komsberg.

Our experience and understanding is that the Orange River is a resource that is limited by both legally issued water rights as well the physical availability of the water. Below is a picture of the Orange River in December 2016 when it essentially dried up. The

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experiences of December 2016 may have been relatively short term, but it was an event that highlighted the devastating impact a water shortage would have.

Account needs to be taken of the significant number of people (~30,000) living in Aussenkehr during the period at which the risk of the river drying up is the greatest. The Aussenkehr village already has an issue with water supply and this could be devastating to the people living there if the river dried up as it did before. In addition to this, there are several towns downstream of Aussenkehr with thousands more people who would also be affected.

The implications of the Orange River being over-utilised are very significant and should not be underestimated. These include:

- human impacts (no water for towns);
- environmental impacts (no environmental flow for the Oranjemund estuary, a Ramsar wetland site); and
- economic impacts (closure of existing farming operations).

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Based on the scoping report a number of things are unclear which it make it very difficult for authorities and affected parties to assess the impact. Some of the key questions that we have are:

1. Has a recent water reserve study been completed for the Orange River System that gives confidence that the water is available for such a large expansion project? (Quoting your report: *Interesting to note is that South Africa has placed a cap on the growth of demand from 2015 onward based on the resource limit within Orange River System*.)

2. What is the impact socially, environmentally and economically if the water usage is unsustainably high?

3. What volumes of additional water rights will need to be issued for the proposed projects?

4. How much water rights have been issued to all Namibian users of the Orange River and how does this compare to the formal water rights that Namibia has?

5. If there is a shortage of water, how will restrictions be applied? Will it be cuts across all users or will holders of prior rights have a priority?

In addition to this you mention in your report that the situation may be remedied by the construction of a dam in the Noordoewer area. This would certainly help but it is our understanding that the project has been indefinitely postponed. It is our view that no water rights should be issued based on the prospect of this dam built but rather they should only be issued when the dam is actually built.

Given the recent experience with the river drying up, any new water permits should, in our view, be subordinated in terms of priority to existing rights. This should be clearly articulated in the right and strictly enforced. If there were to be a shortage of water then we believe that this should lead to cuts in water usage from these new allocations, potentially to zero, before any cuts are made from existing allocations.

We have enjoyed good neighbourly relations with all of the project sponsors and have no objections to the issuing of environmental clearance certificates for the projects where the water rights (as stated in your report) are already in place.

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Silverlands Vineyards (Pty) Ltd

It is not evident in the current assessment what the full impacts of the additional water demands are. It is our request that further studies and work be done to confirm the impact of the additional demand.

We object to the proposed developments that require additional water rights, as it appears that they will lead to limitations on resources that would affect the human, environmental and economic sustainability of the region.

Yours sincerely

Kevin Liddle
Director

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Appendix D. Archaeological Assessment of Orange River Tributaries At Komsberg, Karas Region, Namibia

1

J. Kinahan, Archaeologist

P.O. Box 22407

Windhoek

Namibia

1 October 2021

For attention: Quzette Bosman, GeoPollution Technologies, Windhoek

ARCHAEOLOGICAL ASSESSMENT OF ORANGE RIVER TRIBUTARIES AT KOMSBERG, KARAS REGION, NAMIBIA

DECLARATION

I hereby declare that I do:

(a) have knowledge of and experience in conducting assessments, including knowledge of Namibian legislation, specifically the National Heritage Act (27 of 2004), as well as regulations and guidelines that have relevance to the proposed activity;

(b) perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;

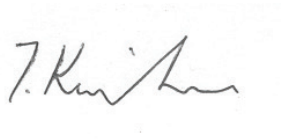
(c) comply with the aforementioned Act, relevant regulations, guidelines and other applicable laws.

I also declare that I have no interests or involvement in:

(i) the financial or other affairs of either the applicant or his consultant

(ii) the decision-making structures of the National Heritage Council of Namibia.

Note: The purpose of this report is to assist the client in gaining consent from the National Heritage Council of Namibia to proceed development activities at specific locations as defined herein. The report must always be quoted in full, and not in part, summary or précis form. The report may not be distributed or used for any other purpose by the client, the National Heritage Council of Namibia or any other party and remains the copyright of the author.



John Kinahan, Archaeologist

ARCHAEOLOGICAL ASSESSMENT OF ORANGE RIVER TRIBUTARIES AT KOMSBERG, KARAS REGION, NAMIBIA

Geo Pollution Technologies (Pty) Ltd was appointed by Socotra Islands Investments (Pty) Ltd trading as Komsberg (the Proponent), to undertake an environmental assessment for their irrigation based agricultural activities on Farms Stozenfels No. 74 and Komsberg No. 156 along the Orange River in the //Karas Region (Figure 1 1). The main commercial activities of the Proponent comprise the cultivation of table grapes, citrus and blueberries. The Proponent has cleared 610 ha, of which 270 ha is under irrigation and the remainder to be developed. The project footprint consists of a mosaic of areas selected for cultivation and development.

Archaeological remains in Namibia are protected under the National Heritage Act (27 of 2004) and National Heritage Regulations (Government Notice 106 of 2005), and Geo Pollution Technologies (Pty) Ltd has requested undersigned, J. Kinahan, archaeologist, to carry out an assessment of the Komsberg project area. No field visit was required, the entire area having been covered by two previous archaeological surveys. These surveys were: QRS 14. *An archaeological survey of the Aries to Auas powerline route*. Report commissioned by Walmsley Environmental Consultants (Pty) Ltd. for the Namibia Power Corporation (1999) John Kinahan, and QRS 128. *Archaeological reconnaissance survey of Desert Star South Project: Phases 1A-C.* Commissioned by Lima Maartens Environmental Consulting. (2010) John Kinahan.

The archaeological sites located during the two surveys are summarized in Table 1 below. The table lists the assessment values allocated to the sites in terms of their Significance and Vulnerability (interval scales presented in Table 2) and their Sensitivity which is the product of the Significance and Vulnerability value for each site. Significance is estimated as the value of the site in terms of its potential contribution to regional archaeological knowledge, while Vulnerability is estimated on the basis of the site proximity to the planned development. Note that in terms of these independent scales high Significance does not signify high Vulnerability.

Figure 1 shows the subregional archaeological setting of the Komsberg development, as well as the location of documented sites in the vicinity of the development itself. Archaeological sites documented during the first survey (QRS 14) and occurring in the near vicinity of the planned Komsberg development include one stone cairn (QRS 14/38) measuring 2x2m and possibly marking a burial of more recent Holocene age was located on a small colluvial deposit close to the Orange River. Nearby and possibly related was a group of three stone hut features (QRS 14/39) placed in a row on the foot-slopes of a granitic outcrop. Both sites were affected by gully erosion. A further group of five stone features (QRS 14/41) was located on the outwash fan, together with an isolated quern stone (QRS 14/40).

Archaeological sites documented during the first survey (QRS 128) and occurring in the near vicinity of the planned Komsberg development include one confirmed burial site (QRS 128/6) and three suspected burial sites (QRS 128/2,5 & 7), as well as hut features (QRS 128/10) and a likely livestock enclosure (QRS 128/11). Historical sites include the ruins of a mudbrick dwelling (QRS 128/12) and drystone fortifications (QRS 128/13). Three cairn features (QRS 128/3,4 & 8) and two isolated stone artefact finds (QRS 128/1 & 9) were also documented.

4

Table 1: The location of archaeological sites in the Komsberg project area and their archaeological assessment

Site	Latitude S	Longitude E	Type	Significance	Vulnerability	Sensitivity
QRS 14/38	-28,48215	19,74496	suspected burial	5	3	15
QRS 14/39	-28,46825	19,7391	hut features	4	4	16
QRS 14/40	-28,4352	19,72847	isolated find	2	3	6
QRS 14/41	-28,41682	19,72784	hut features	4	2	8
QRS 128/1	-28,42605	19,80152	isolated find	1	0	1
QRS 128/2	-28,46623	19,83817	suspected burial	3	3	9
QRS 128/3	-28,47366	19,81988	cairn	1	2	2
QRS 128/4	-28,47368	19,81982	cairn	1	2	2
QRS 128/5	-28,47381	19,83878	suspected burial	3	3	9
QRS 128/6	-28,46687	19,83127	confirmed grave	3	4	12
QRS 128/7	-28,46567	19,83111	suspected burial	3	4	12
QRS 128/8	-28,46478	19,82995	cairn	3	2	6
QRS 128/9	-28,46672	19,83189	isolated find	2	3	6
QRS 128/10	-28,46734	19,83767	hut features	3	4	12
QRS 128/11	-28,46741	19,84056	enclosure	3	3	9
QRS 128/12	-28,46876	19,83958	mudbrick building	3	3	9
QRS 128/13	-28,4681	19,83961	fortifications	3	3	9

Table 2: Archaeological Significance and Vulnerability interval scales

SIGNIFICANCE RANKING		VULNERABILITY RANKING	
0	no significance	0	not vulnerable
1	disturbed or secondary context	1	no threat posed
2	isolated minor find	2	low or indirect threat
3	archaeological site	3	probable threat
4	multi-component site	4	high likelihood of disturbance
5	major archaeological site	5	direct and certain threat

5

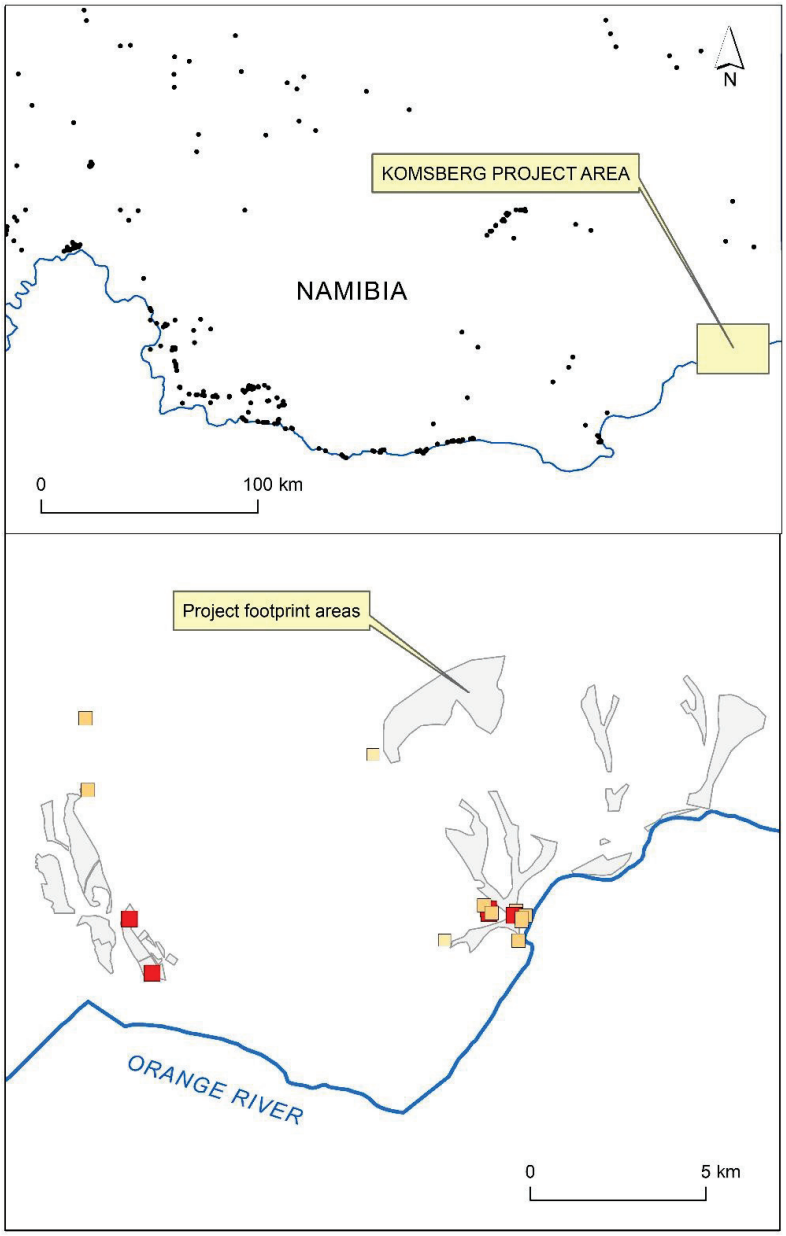


Figure 1: The subregional archaeological setting of the Komsberg project area (above) and the distribution of archaeological sites in relation to the project footprint areas at Komsberg. Sites indicated in red have a Sensitivity rating of 10 or more.

6

From the available field data which consists of seventeen archaeological sites in the vicinity of the Komsberg project, a total of five sites are considered to have high Sensitivity levels. These are QRS 14/38 and 39, and QRS 128/ 6, 7 and 10. There are altogether four suspected burials and one confirmed burial among these sites. All of the sites should be treated with caution, and the burials, suspected as well as confirmed, should be treated as no-go areas. This means that they should be fenced, signposted and excluded from all areas to be cultivated or disturbed by development. It is possible that in the course of development further sites including human remains not visible at the surface may be encountered. For this reason and to ensure compliance with the provisions of the National Heritage Act (27 of 2004) it is recommended that the project EMP should adopt the Archaeological Chance Finds Procedure attached below.

7

Archaeological Chance Finds Procedure

Areas of proposed development activity are subject to heritage survey and assessment at the planning stage. These surveys are based on surface indications alone, and it is therefore possible that Site s or items of heritage significance will be found in the course of development work. The procedure set out here covers the reporting and management of such finds.

Scope: The "chance finds" procedure covers the actions to be taken from the discovery of a heritage site or item to its investigation and assessment by a trained archaeologist or other appropriately qualified person.

Compliance: The "chance finds" procedure is intended to ensure compliance with relevant provisions of the National Heritage Act (27 of 2004), especially Section 55 (4): *"a person who discovers any archaeological …. object ……must as soon as practicable report the discovery to the Council".* The procedure of reporting set out below must be observed so that heritage remains reported to the NHC are correctly identified in the field.

Responsibility:

Operator	To exercise due caution if archaeological remains are found
Foreman	To secure site and advise management timeously
Superintendent	To determine safe working boundary and request inspection
Archaeologist	To inspect, identify, advise management, and recover remains

Procedure:

Action by person identifying archaeological or heritage material

a) If operating machinery or equipment stop work

b) Identify the site with flag tape

c) Determine GPS position if possible

d) Report findings to foreman

Action by foreman

a) Report findings, site location and actions taken to superintendent

b) Cease any works in immediate vicinity

Action by superintendent

a) Visit Site and determine whether work can proceed without damage to findings

b) Determine and mark exclusion boundary

c) Site location and details to be added to project GIS for field confirmation by archaeologist

Action by archaeologist

a) Inspect site and confirm addition to project GIS

b) Advise NHC and request written permission to remove findings from work area

c) Recovery, packaging and labelling of findings for transfer to National Museum

In the event of discovering human remains

a) Actions as above

b) Field inspection by archaeologist to confirm that remains are human

c) Advise and liaise with NHC and Police

d) Recovery of remains and removal to National Museum or National Forensic Laboratory, as directed.

Appendix E. Curriculum Vitae

ENVIRONMENTAL ASSESSMENT PRACTITIONER **Quzette Bosman**

Quzette Bosman has 15 years' experience in the Impact Assessment Industry, working as an Environmental Assessment Practitioner and Social Assessment practitioner mainly as per the National Environmental Legislation sets for South Africa and Namibia. Larger projects have been completed in terms of World Bank and IFC requirements. She studied Environmental Management at the Rand Afrikaans University (RAU) and University of Johannesburg (UJ), including various Energy Technology Courses. This has fuelled a passion towards the Energy and Mining Industry with various projects being undertaken for these industries. Courses in Sociology has further enabled her to specialize in Social Impact Assessments and Public Participation. Social Assessments are conducted according to international best practise and guidelines. Work has been conducted in South Africa, Swaziland and Namibia.

CURRICULUM VITAE QUZETTE BOSMAN

Name of Firm	:	Geo Pollution Technologies (Pty) Ltd.
Name of Staff	:	QUZETTE BOSMAN
Profession	:	Social Impact Assessor / Environmental Assessment Practitioner
Years' Experience	:	15
Nationality	:	South African
Position	:	Senior Environmental Consultant
Specialisation	:	ESIA & ESMP; SIA
Languages	:	Afrikaans – speaking, reading, writing – excellent English – speaking, reading, writing – excellent German –speaking - fair

First Aid Class A	EMTSS, 2017
Basic Fire Fighting	EMTSS, 2017

EDUCATION AND PROFESSIONAL STATUS:

BA	Geography & Sociology	:	Rand Afrikaans University, 2003
BA	(Hons.) Environmental Management	:	University of Johannesburg, 2004

PROFESSIONAL SOCIETY AFFILIATION:

Namibian Environment and Wildlife Society
International Association of Impact Assessors South Africa (IAIA SA)
Member 2007 - 2012
Mpumalanga branch Treasurer 2008/2009

OTHER AFFILIATIONS
Mkhondo Catchment Management Forum (DWAF): Chairperson 2008-2010
Mkhondo Water Management Task Team (DWAF): Member 2009

AREAS OF EXPERTISE:

Knowledge and expertise in:

- environmental impact assessments
- project management
- social impact assessment and social management planning
- community liaison and social monitoring
- public participation / consultation, social risk management
- water use licensing
- environmental auditing and compliance
- environmental monitoring
- strategic environmental planning

EMPLOYMENT:

2015 - Present	:	Geo Pollution Technologies – Senior Environmental Practitioner
2014-2015	:	Enviro Dynamics – Senior Environmental Manager
2010 - 2012	:	GCS – Environmental Manager (Mpumalanga Office Manager)
2007 - 2009	:	KSE-uKhozi - Technical Manager: Environmental
2006 -2007	:	SEF – Environmental Manager
2004 - 2005	:	Ecosat – Environmental Manager

PUBLICATIONS:

Contract reports	: +190
Publications	: 1