

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

**In terms of Section 24G (1) (a)(vii) (aa)-(ee) of the National Environmental
Management Act (Act 107 of 1998) (NEMA) as amended**

**Legalisation of the illegal commencement of clearance of 26.4
hectares of indigenous vegetation in order to establish grain
handling and storage facilities on the remaining extent of Portion 4
of the Farm Waagkraal 374 IO, Maquassi Hills Local Municipality,
North West Province**

Report Date: January 2023



Compiled by:

AB ENVIRO-CONSULT CC

7 Louis Leipoldt Street

Potchefstroom

2531

Cell: 083 5488 105

jp@abenviro.co.za

Compiled for:

Mr Marius Nel




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Report type	Draft Section 24 G Application Report		
Project Title	<i>Legalisation of the illegal commencement of clearance of 26.4 hectares of indigenous vegetation in order to establish grain handling and storage facilities on the remaining extent of Portion 4 of the Farm Waagkraal 374 IO, Maquassi Hills Local Municipality, North West Province.</i>		
Competent Authority:	North West Department of Economic Development, Environment, Conservation and Tourism (DEDECT)		
Reference Number:	Not available yet		
Assigned Officer	Not available yet		
Project applicant:	Mr Marius Nel		
Contact person:	Mr Marius Nel		
Postal address:			
Postal code:		Cell:	083 407 2313
Telephone:		Fax:	
E-mail:	ronel@mnelboerdery.co.za		
Environmental Assessment Practitioner (EAP):	Mr Jean Pierre (JP) de Villiers of AB Enviro Consult cc		
Contact person:	Mr. JP de Villiers		
Postal address:	7 Louis Leipoldt Street		
Postal code:	2531	Cell:	083 5488 105
Telephone:	071 202 4027	Fax:	018 293 0671
E-mail:	jp@abenviro.co.za		
Professional affiliation(s) (if any)	EAP-EAPASA: 2019/808		
Report compiled by	Mr. JP de Villiers		
Signature			
Report reviewed by	Mrs JE du Plooy EAP-EAPASA: 2019/1573		
Signature	<i>JE du Plooy</i>		

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**APPLICATION TO RECTIFY THE UNLAWFUL
COMMENCEMENT OR CONTINUATION OF LISTED ACTIVITIES
IN TERMS OF SECTION 24G OF THE NATIONAL
ENVIRONMENTAL MANAGEMENT ACT (NO 107 OF 1998)**

1. PROJECT TITLE

Legalisation of the illegal clearance of 26.4 hectares of indigenous vegetation in order to establish grain handling and storage facilities on the remaining extent of Portion 4 of the Farm Waagkraal 374 IO, Maquassi Hills Local Municipality, North West Province.

2. INTRODUCTION

The applicant has always attempted to ensure that he is on the right side of the Law. His intention was to save money by using a revolutionary new method of storing grain (The Silo Bag). He started small by only storing his own grain. Quickly his neighbors enquired whether they can also store their grain at his facility. This led him having to erect additional infrastructure to manage this need. It was only once he enquired into going into a partnership with an established service provider that he became aware of the fact that he might have contravened the NEMA.

It was never his intention to conduct any illegal activities and had he known that he needed Authorization for the clearance of indigenous vegetation, he would have applied for authorization before any commencement took place.

Once Mr. Nel realized that he has contravened the NEMA, he immediately contacted an Environmental Assessment Practitioner (EAP) who explained the consequences of his actions to him. The EAP has also explained that he is entitled to submit an application for consequences of unlawful commencement of activity in terms of section 24G of NEMA. Mr. Nel has since appointed an independent Environmental Assessment Practitioner (EAP) to assist him with this process.

It should be highlighted that Mr Nel is coming forward on his own, as he has not been issued with any Notice of Intention to Issue a Compliance Notice in terms of Section 31L.

The unlawful commencement triggered listed activities in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2006 and 2014 (As amended). The development triggered the following regulations and listed activities:

Government Notice	Activity Number and Description	Project Description
GNR 327 of 2014	27: The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—	The clearance of 26.4 hectares of indigenous vegetation in order to establish grain handling and storage facilities on the remaining extent of Portion 4 of the Farm Waagkraal 374 IO, Maquassi Hills Local Municipality, North West Province.

	<p>(i) the undertaking of a linear activity; or</p> <p>(ii) maintenance purposes undertaken in accordance with a maintenance management plan</p>	
GNR 324 of 2014	<p>12.h. iv. And vi: The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</p> <p>h. North West</p> <p>i. World Heritage Sites; core of biosphere reserve; or sites or areas identified in terms of an international convention;</p> <p>ii. A protected area including municipal or provincial nature reserves as contemplated by NEMPAA or other legislation;</p> <p>iii. All Heritage Sites proclaimed in terms of National Heritage Resources Act, 1999 (Act No. 25 of 1999);</p> <p>iv. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority;</p> <p>v. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; or</p> <p>vi. Areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland.</p>	<p>The clearance of 26.4 hectares of indigenous vegetation, located within a CBA 2 and the clearance of 1 906 square meters of vegetation located within 100 meters from the non-perennial Boesmanspruit in order to establish grain handling and storage facilities on the remaining extent of Portion 4 of the Farm Waagkraal 374 IO, Maquassi Hills Local Municipality, North West Province</p>

The purpose of this document is to adhere to the requirements for the compilation of an Environmental Impact Assessment Report in terms of Section 24G (1) (a)(vii) (aa)-(ee) of the National Environmental Management Act (Act 107 of 1998) (NEMA) as amended for the Legalisation of the illegal clearance of 26.4 hectares of indigenous vegetation in order to establish grain handling and storage facilities on the remaining extent of Portion 4 of the Farm Waagkraal 374 IO, Maquassi Hills Local Municipality, North West Province.

2.1 DESCRIPTION OF THE PROCESS FOLLOWED

In order to assess a proposed development it is important to take into consideration the principles of NEMA. These principles are outlined in Chapter 1 and read as follows:

- 1) *"The principles set out in this section apply throughout the Republic to the actions of all organs of state that may significantly affect the environment and—*
 - a. *shall apply alongside all other appropriate and relevant considerations, including the State's responsibility to respect, protect, promote and fulfil the social and economic rights in Chapter 2 of the Constitution and in particular the basic needs of categories of persons disadvantaged by unfair discrimination;*
 - b. *serve as the general framework within which environmental management and implementation plans must be formulated;*
 - c. *serve as guidelines by reference to which any organ of state must exercise any function when taking any decision in terms of this Act or any statutory provision concerning the protection of the environment;*
 - d. *serve as principles by reference to which a conciliator appointed under this Act must make recommendations; and*
 - e. *guide the interpretation administration and implementation of this Act, and any other law concerned with the protection or management of the environment.*
- 2) *Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.*
- 3) *Development must be socially, environmentally and economically sustainable.*
- 4) (a) *Sustainable development requires the consideration of all relevant factors including the following:*
 - (i) *That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;*
 - (ii) *that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;*
 - (iii) *that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;*
 - (iv) *that waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;*
 - (v) *that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;*
 - (vi) *that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;*
 - (vii) *that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and*
 - (viii) *that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.*
- (b) *Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.*

- (c) *Environmental justice must be pursued so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons.*
- (d) *Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination.*
- (e) *Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle.*
- (f) *The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation and participation by vulnerable and disadvantaged persons must be ensured.*
- (g) *Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognizing all forms of knowledge, including traditional and ordinary knowledge.*
- (h) *Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.*
- (i) *The social, economic and environmental impacts of activities, including disadvantages and benefits must be considered, assessed and evaluated and decisions must be appropriate in the light of such consideration and assessment.*
- (j) *The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected.*
- (k) *Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law.*
- (l) *There must be intergovernmental co-ordination and harmonisation of policies, legislation and actions relating to the environment.*
- (m) *Actual or potential conflicts of interest between organs of state should be resolved through conflict resolution procedures.*
- (n) *Global and international responsibilities relating to the environment must be discharged in the national interest.*
- (o) *The environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage.*
- (p) *The costs of remedying pollution, environmental degradation consequent adverse health effects and of preventing, controlling or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.*
- (q) *The vital role of women and youth in environmental management and development must be recognised and their full participation therein must be promoted.*
- (r) *Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure."*

The above mentioned principals and the applicable legislation, Policies and Guidelines as described in Paragraph 2.4 of this Report were taken into account in the assessment of the Environmental Impacts for the proposed development. The process followed can be described as follows:

- 1) On 01 December 2022 Mr. Nel contacted the EAP to enquire about the Legal Standing of his development.
- 2) On 5 December the EAP conducted a site inspection and advised Mr. Nel that his development is in Contravention of NEMA as various listed activities have commenced.
- 3) On 8 December 2022 AB Enviro consult cc was appointed to submit an application for consequences of unlawful commencement of activity in terms of section 24G of NEMA.
- 4) An Environmental Screening Process was conducted by the EAP to ensure that all the relevant Environmental Legislation is taken into consideration.
- 5) Desk top studies were conducted.
- 6) Site inspections were carried out to verify the outcomes of the desktop studies.
- 7) A Fauna and Flora Habitat Study was conducted to assess the area and determine the impact of the activity on this variable.
- 8) A Heritage Impact Assessment was conducted to ensure that no archaeological or heritage features has been impacted on.
- 9) A full Public Participation Process was followed to obtain inputs from interested and affected parties.
- 10) All the information obtained from the above mentioned processes was used to assess the Environmental Impact that the proposed development may have on the Environment and vice versa.
- 11) The inputs from the Specialists, interested and affected parties, together with the knowledge of the EAP was used to determine measures to avoid, mitigate and manage potential impacts. These measures are described in the Environmental Management Programme.

2.2 ASSESSMENT PHASE

- (1) *On application by a person who has committed an offence in terms of section 24F(2) the Minister or MEC, as the case may be, may direct the applicant to -*
 - (a) *compile a report containing -*
 - (i) *an assessment of the nature, extent, duration and significance of the impacts of the activity on the environment, including the cumulative effects;*
 - (ii) *a description of mitigation measures undertaken or to be undertaken in respect of the impacts of the activity on the environment;*
 - (iii) *a description of the public participation process followed during the course of compiling the report, including all comments received from interested and affected parties and an indication of how issues raised have been addressed;*
 - (iv) *an environmental management plan;*

The assessment phase included the necessary investigations to assess the possible impacts of the development on the site and the surrounding environment.

The operation of the facilities is likely to result in a number of negative and positive impacts on the biophysical and social environments. The significance of these impacts can be mitigated by the implementation of an Environmental Management Programme.

The purpose of this Report is to document the outcome of the Assessment Phase of the project. The report fulfilled the requirements of the compilation of an Environmental Impact Assessment Report in terms of Section 24G (1) (a)(vii) (aa)-(ee) of the National Environmental Management Act (Act 107 of 1998) (NEMA) as amended.

Table 1 below provides a summary of the legislative requirements in terms of the compilation of an Environmental Impact Assessment Report in terms of Section 24G (1) (a)(vii) (aa)-(ee) of the National Environmental Management Act (Act 107 of 1998) (NEMA) as amended. Cross-references are provided in terms of the relevant section within this Report where the NEMA and Report requirements have been addressed.

Table 1: Environmental Impact Assessment Report in terms of Section 24G (1) (a)(vii) (aa)-(ee) of the National Environmental Management Act (Act 107 of 1998) (NEMA) as amended.

Section	Description of Requirements for Impact Assessment Reports	Location in this report
Section 24G (1) (a)(vii) (aa)	a description of the need and desirability of the activity	Paragraph 5 Page 27 - 31
Section 24G (1) (a)(vii) (bb)	an assessment of the nature, extent, duration and significance of the consequences for or impacts on the environment of the activity, including the cumulative effects and the manner in which the geographical, physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity	Paragraph 8 Page 50 - 65
Section 24G (1) (a)(vii) (cc)	a description of mitigation measures undertaken or to be undertaken in respect of the consequences for or impacts on the environment of the activity;	Paragraph 8 Page 50 - 65
Section 24G (1) (a)(vii) (dd)	a description of the public participation process followed during the course of compiling the report, including all comments received from interested and affected parties and an indication of how the issues raised have been addressed;	Paragraph 9 and Appendix I Page 65 - 95
Section 24G (1) (a)(vii) (ee)	an environmental management programme	Paragraph 10 Page 95 - 162

2.3 DETAILS AND EXPERTISE OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

AB Enviro Consult (CC) is a registered consultancy, owned and operated as an independent unit by the registered owner and consultant: **Prof. A.B. de Villiers. Mr J.P. De Villiers** joined the consultancy during 2004 and **Mrs J.E. du Plooy** is a consultant since 2001.

Over a period of 27 years (1996-2023) this consultancy has successfully applied for, and obtained positive ROD's and EA's for more than 380 projects. Environmental Control Officer's duties are also performed on various projects.

ACADEMIC AND PROFESSIONAL QUALIFICATIONS OF PROF DE VILLIERS

Post-Matric Qualifications

<u>YEAR</u>	<u>Qualification</u>	<u>Institution</u>	<u>Field of Study</u>
1968	B.Sc.	PU FOR CHE	Geography, Geology
1970	HONNS. B.Sc.	PU FOR CHE	Soil Science
1974	M.Sc.	PU FOR CHE	Geography
1981	Ph.D.	UOFS	Geography

ACADEMIC AND PROFESSIONAL QUALIFICATIONS MR J.P. DE VILLIERS

<u>YEAR</u>	<u>Qualification</u>	<u>Institution</u>	<u>Field of Study</u>
1993	BA	PU FOR CHE	Geography, Economics
1994	HED	PU FOR CHE	Geography Economics
2006	B.Sc.(Honns) Cum Laude	North-West University	Environmental Management
2007	M.Sc.	North-West University	Geography

PROFESSIONAL QUALIFICATIONS AND REGISTRATIONS

<u>YEAR</u>	<u>Qualification/ Registration</u>	<u>Institution</u>	<u>Field of Study</u>
2008	Basic Principles of Ecological Rehabilitation and Mine Closure	Centre for Environmental Management (North West University)	Ecological Rehabilitation
2019	Registered Environmental Assessment Practitioner 2019/808	Environmental Assessment Practitioners of South Africa	

CV: Mr JP de Villiers

JP de Villiers holds a M.Sc. in Geography from the North West University's Department of Geography and Environmental Management. He started as a junior EAP in 2004 with AB Enviro Consult and was promoted in 2007 to senior EAP. During 2011 he was appointed as the Manager of the North West University, EIA Pro-Bono Office. This office is an initiative of, and funded by, the DEA. (This was a three year contract between DEA and NWU that was extended by one year) As Manager of this office, Mr. de Villiers had the following responsibilities:

- Conduct Environmental Impact Assessments for municipalities on a pro-bono basis.
- Provide environmental management training to North West Municipalities.
- Provide environmental assistance to North West Municipalities.
- Undertake research related to Environmental Impact Management within the North West Municipal Context.

- Marketing for stakeholder 'pro-bono' expert donations.
- Marketing for corporate 'pro-bono' funding.

As EAP, Mr. de Villiers has been directly involved in obtaining **309 Environmental Authorizations** and has performed the duties of **Environmental Control Officer (ECO) for 42 developments**. His responsibilities as Senior EAP includes the following:

Duties pertaining to Basic Assessments, EIA and Scoping and Section 24 G Applications:

- Marketing and communication with clients
- Communication with authorities, source and analyse relevant baseline information and undertake site inspections
- Compile Environmental Application Form for the project and submit to the authorities
- Compile an *information requirements list* that is distributed to the project team. The Information required would assist with completion of the Report.
- Identify key interested and affected parties (I&APs)
- Compilation of terms of reference for specialist studies
- Commission specialist studies
- Compile and publish media notices in relevant newspapers
- Compile and place poster/s along the boundary of the site
- Hold a public meeting / Open House / focus meeting with I&APs
- Receive and address comments from public
- Undertake assessment phase by assessing and evaluating potential impacts identified.
- Review and manage specialist studies.
- Compile and distribute Draft Reports (Including Environmental Management Programmes)
- Should the Reports require substantial changes, these changes are incorporated into the final reports and distributed
- Address comments received on the final Report, finalise Report and submit to authorities
- Once the decision is issued, all I&Ps are formally informed of the decision

Duties pertaining to Environmental Control Officer

- Preparation (Compilation) and submission of Environmental Control Document.
- Training of and leasing with the Engineers Representative.
- Communicate with the Contractor.
- A monthly visit to the site during the construction period. Should any Environmental incident occur, an immediate site visit is undertaken.
- Monitoring and auditing according to the approved EMP and EA.
- Compilation of a written audit report for each site visits during the construction phase
- Liaising with the Compliance section of the Competent Authority

ACADEMIC AND PROFESSIONAL QUALIFICATIONS MRS J.E. DU PLOOY

<u>YEAR</u>	<u>Qualification</u>	<u>Institution</u>	<u>Field of Study</u>
1999	BA	PU FOR CHE	Geography, Tourism
2000	BA (Honns) Cum Laude	PU FOR CHE	Geography
2003	Masters degree in Environmental Management	PU FOR CHE	Environmental Management
2001	Aquabase Intro	AQUABASE	Hydrology
2001	Geomedia Professional	INTERTECH	GIS
2001	Map Info	SPATIAL TECHNOLOGY	GIS

PROFESSIONAL QUALIFICATIONS AND REGISTRATIONS

<u>YEAR</u>	<u>Qualification/ Registration</u>	<u>Institution</u>
2020	Registered Environmental Assessment Practitioner 2019/1573	Environmental Assessment Practitioners of South Africa

2.4 LEGAL AND OTHER REQUIREMENTS

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
National Environmental Management Act No. 107 of 1998 as amended.	NEMA is the guiding legislation that has been considered during the Environmental Impact Assessment process and the compilation of this Scoping Report.	NW:DEDECT	27 November 1998
The Bill of Rights, Constitution of South Africa, Section 27 (1)(b)	<p>The Constitution of the Republic of South Africa is the legal source of all law, including environmental law, in South Africa. The Bill of Rights is fundamental to the Constitution of South Africa and in, section 24 of the Act, it is stated that:</p> <p>Everyone has the right (a) to an environment that is not harmful to their health or well-being; and (b) to have the environment protected, for the benefit of present and future generations through reasonable legislative and other measures that (i) prevent pollution and ecological degradation; (ii) promote conservation; and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.</p> <p>Given that environmental management is founded partly on the principles of public participation, Section 195 of the Constitution is of primary relevance:</p> <p>(1) Public administration must be governed by the democratic values and principles enshrined in the constitution, including the following principles: (a) (b) (c) (d) (e) Peoples needs must be responded to, and the public must be encouraged to participate in policymaking. (f) Public administration must be accountable. (g) Transparency must be fostered by providing the public with timely, accessible and accurate information (Government Gazette, 1996).</p>	National Government	1994
New Regulations 2014 in terms of NEMA	Legislation consulted during the environmental impact assessment process to determine whether any listed activities would be triggered. The Regulations were also consulted to determine inter alia the requirements regarding the contents of Scoping reports and the public participation process that should be followed.	NW: DEDECT	7 April 2017
National Water Act (36 OF 1998)	National Water Act (NWA), 1998 (Act 36 of 1998) is the primary statute providing the legal basis for water management in South Africa and has to ensure ecological	Department of water and sanitation	1998

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	<p>integrity, economic growth and social equity when managing and using water.</p> <p>The major objectives of the National Water Act are to:</p> <ul style="list-style-type: none"> •Aid in providing basic human needs; •Meet the growing demand of water in a sustainable manner; •Ensure equal access to water and use of water resources; •Protect the quality of water of natural resources; •Ensure integrated management of water resources; •Foster social and economic development; and •Conserve aquatic and related ecosystems. <p>Section 19 of the National Water Act states that the person responsible for land upon which any activity is or was performed which causes, has caused or is likely to cause, pollution of a water resource, must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring.</p>		
National Environmental Management: Biodiversity Act (NEMBA) (ACT NO. 10 OF 2004)	<p>The National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004), provides for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998; the protection of species and ecosystems that warrant national protection; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources; the establishment and functions of a South African National Biodiversity Institute; and for matters connected therewith.</p> <p>In terms of Chapter 4 of the Above Act:</p> <p>52. (1) (a) The Minister may, by notice in the Gazette, publish a national list of ecosystems that are threatened and in need of protection.</p> <p>(b) An MEC for environmental affairs in a province may, by notice in the Gazette, publish a provincial list of ecosystems in the province that are threatened and in need of protection.</p> <p>(2) The following categories of ecosystems may be listed in terms of subsection:</p>	NW: DEDECT	2004

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	<p>(a) critically endangered ecosystems, being ecosystems that have undergone severe degradation of ecological structure, function or composition as a result of human intervention and are subject to an extremely high risk of irreversible transformation;</p> <p>(b) endangered ecosystems, being ecosystems that have undergone degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems;</p> <p>(c) vulnerable ecosystems, being ecosystems that have a high risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems or endangered ecosystems; and</p> <p>(d) protected ecosystems, being ecosystems that are of high conservation value or of high national or provincial importance, although they are not listed in terms of paragraphs (a), (b) or (c).</p> <p>(3) A list referred to in subsection (1) must describe in sufficient detail the location of each ecosystem on the list.</p> <p>53 (1) The Minister may, by notice in the Gazette, identify any process or activity in a listed ecosystem as a threatening process.</p> <p>(2) A threatening process, identified in terms of subsection (1) must be regarded as a specified activity contemplated in section 24(2)(b) of the National Environmental Management Act (1998) and a listed ecosystem must be regarded as an area identified for the purpose of that section.</p>		
National Environmental Management: Protected Areas Act (ACT NO. 57 OF 2003)	This Act aims to provide for a national system of protected areas in South Africa as part of a strategy to manage and conserve its biodiversity. The Protected Areas Act tries to ensure the protection of the entire range of biodiversity, referring to natural landscapes and seascapes. The Act makes express reference to the need to move towards Community Based natural Resource Management (CBNRM) as its objectives include promoting the participation of local communities in the	National Department of Environmental Affairs	2003

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	<p>management of protected areas. The purpose of the Act is:</p> <ul style="list-style-type: none"> •To protect ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes and their ecological integrity. •To conserve biodiversity in those areas; •To protect South Africa's rare species; •To protect vulnerable or ecologically sensitive areas; •To assist in ensuring the sustained supply of environmental goods and services; •To provide for the sustainable use of natural and biological resources; •To create or augment destinations for nature-based tourism; •To manage the interrelationship between natural environmental biodiversity, human settlement and economic development; •To contribute to human, social, cultural, spiritual and economic development; •To rehabilitate and restore degraded ecosystems and promote the recovery of endangered and vulnerable species. <p>This Act further stipulates various criteria which must be met before an area can be declared as a special nature reserve, national park, nature reserve and protected environment. It also prescribes a range of procedures, including consultation and public participation procedures which must be followed before any of the kinds of protected areas are declared.</p>		
National Heritage Resources Act, Act No. 25 of 1999	Legislation consulted during the impact assessment process, to determine the legal requirements relating to the management of heritage resources that are present in and around the site.	SAHRA	1999
National Environmental Management: Waste Act, Act No. 59 of 2008, DEDECT together with the List of Waste Activities that Have, or are Likely to Have, a Detrimental Effect on the Environment, GN No. 921 of 29 November 2013	Legislation consulted to determine whether a waste licence will have to be obtained for the development.	NW:DEDECT Waste Section	2008
<i>National Environmental Management: Air Quality Act (Act 39 of 2004)</i>	To protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social Development. Construction activities may cause some air pollution.	Department of Environmental Affairs: Directorate Air quality management	2004

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
<i>The Conservation of Agricultural Resources Act (Act 43 of 1983)</i>	Regulation 2 of this Act regulates the cultivation of virgin land.	NW: Department of Agriculture	1983
<i>National Veldt and Forest Fire Act (Act 101 of 1998)</i>	Chapter 4 places a duty on owners to prepare and maintain firebreaks.	Department of Agriculture, Forestry and Fisheries	1998
<i>National Forests Act, Act 84 of 1998 (NFA) DEDECT with GN1602 of December 2016.</i>	During the construction phase of the development certain protected trees may be affected. Licences will have to be obtained from the Minister before the affected trees may be cut, disturbed, damaged or destroyed. GN1602 of December 2016 contains the list of protected trees.	Department of Agriculture, Forestry and Fisheries	1998
<i>Occupational Health and Safety Act (Act 85 of 1993)</i>	To provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery and the protection of persons other than persons at work against hazards to health.	Department of Employment and labour	1993

The study is conducted in such a way as to comply with the instructions regarding such studies and reports (as contained within the above-mentioned documents).

SUSTAINABLE DEVELOPMENT

The principle of Sustainable Development has been established in the Constitution of the Republic of South Africa (108 of 1996) and given effect by NEMA. Section 1(29) of NEMA states that sustainable development means the integration of social, economic and environmental factors into the planning, implementation and decision-making process so as to ensure that development serves present and future generations.

Thus, Sustainable Development requires that:

- The disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
- That pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
- That the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;
- That waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;
- That a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions;
- Negative impacts on the environment, on people's environmental rights be anticipated; and, prevented, and where they cannot altogether be prevented, are minimised and remedied.

The study is conducted in such a way as to comply with the instructions regarding such studies and reports (as contained within the above-mentioned documents).

3 DETAILS OF PROPERTY ON WHICH UNLAWFUL ACTIVITY TOOK PLACE:

The development is located on the remaining extent of Portion 4 of the Farm Waagkraal 374 IO, Maquassi Hills Local Municipality, North West Province. Please see Figure 1a and b for Locality Maps. The site is located in the northern parts of the Maquassi Hills Local Municipality that forms part of the Dr. Kenneth Kaunda District Municipality in the North West Province of South Africa. The site is located approximately 14km due south of the Town of Ottosdal and 28 km due north of the Town of Wolmaransstad.

The site is located 1.8 km west of the R505 Road between Ottosdal and Wolmaransstad. The site is located on a gentle slope that slopes towards the north where a waterbody Dam 1, artificial waterbody Dam 2 and an active channel of the Boesmanspruit non-perennial river borders the site. See Figure 2.

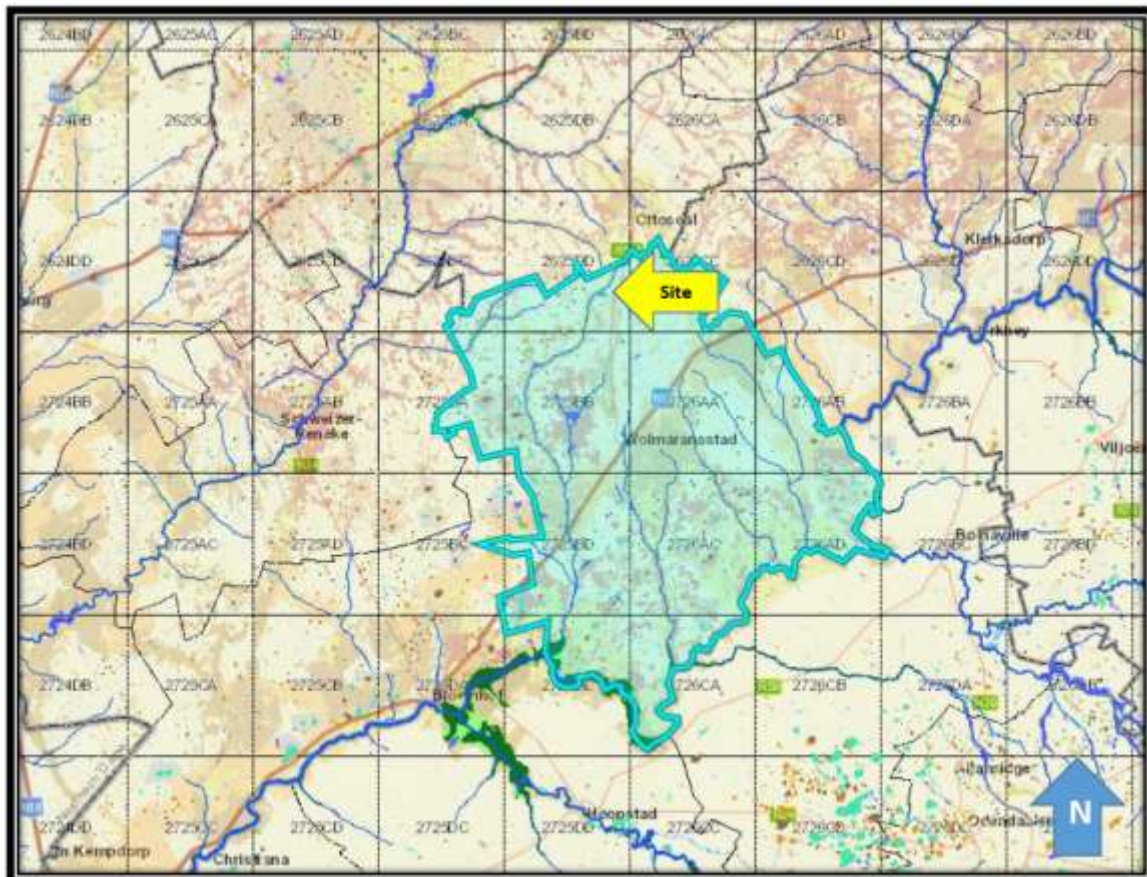


Figure 1a: Locality Map

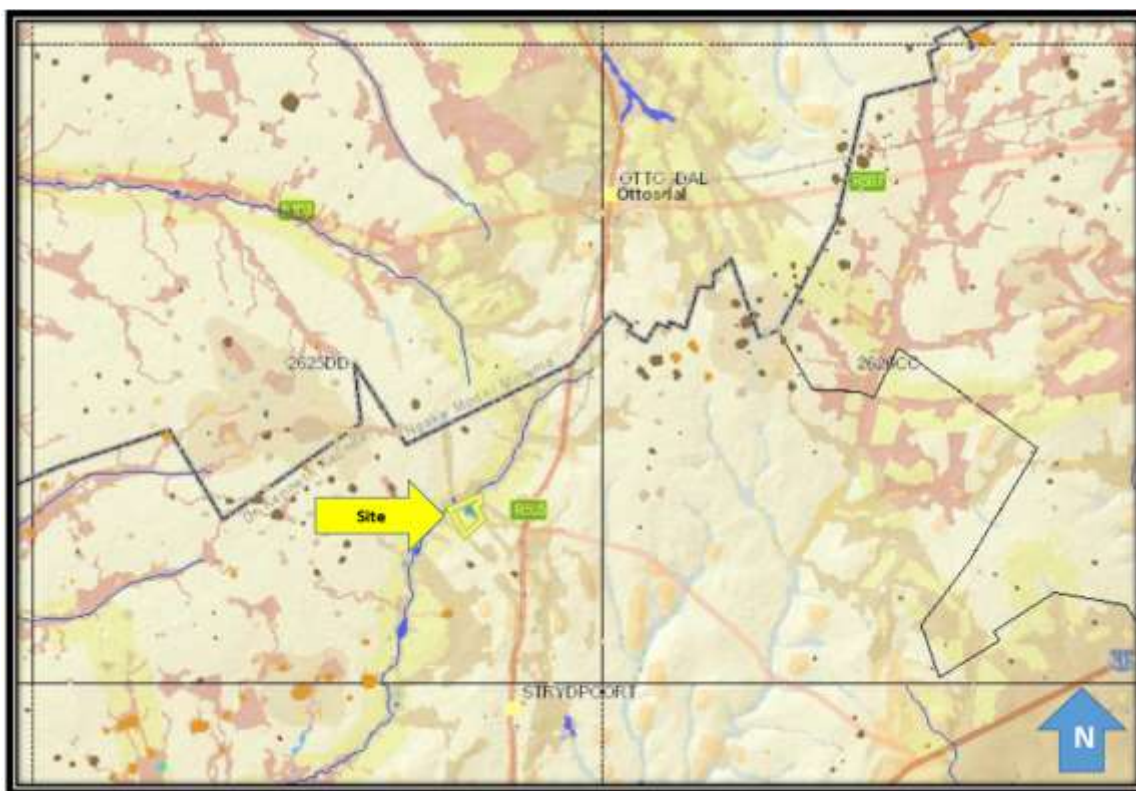


Figure 1b: Locality Map (Indication of the location of the western and eastern section at the site)

There is an area that had been cleared and an area where grassland remained at the site. In the area that had been cleared there is some recovery of vegetation and a conspicuous presence of pioneer plant species. Both these areas (the cleared area; and the area which is the remainder of the grassland) are at one terrain unit, a plain with gentle slopes in a slightly undulating larger area. The plain with gentle slopes, to almost moderate slopes, at the site is adjacent to a shallow valley outside the site, where a non-perennial river runs through.





Vegetation at the remainder of the grassland at the site consists of a moderately disturbed grassland which contains indigenous grass species, some indigenous shrub species and few trees. The grass layer is well-developed and indigenous grass species such as *Elionurus muticus* is conspicuous. Other indigenous grass species include *Aristida congesta*, *Eragrostis lehmanniana*, *Eragrostis superba*, *Cynodon dactylon*, *Eragrostis curvula*, *Chloris virgata* and *Themeda triandra*. The shrub *Seriphium plumosum* (bankrupt bush) is conspicuous at some parts of the remaining grassland. Indigenous forb species include *Berkheya onopordifolia*, *Ursinia nana*, *Cyanotis speciosa*, *Hibiscus pusillus*, *Senecio consanguineus*, *Bulbine narcissifolia*, *Pollichia campestris*, *Selago densiflora* and *Lippia scaberrima*. Alien invasive herbaceous weed species are conspicuous at disturbed areas at the site and include *Argemone ochroleuca*, *Tagetes minuta*, *Bidens bipinnata*, *Bidens pilosa*, *Gomphrena celosioides*, *Schkuhria pinnata*, *Conyza bonariensis*, *Chenopodium album*, *Guileminea densa*, *Alternanthera pungens* and *Verbena aristigera*.

Vegetation at the riparian zone north of the site, at artificial waterbody Dam 1, artificial waterbody Dam 2 and the active channel of the Boesmanspruit non-perennial river in between, consists of

covers of sedges and some other plant species mixed in between. Indigenous sedge species at the riparian zone include *Cyperus fastigiatus*, *Pycnus nitidus*, *Cyperus laevigatus*, *Schoenoplectus decipiens* and *Eleocharis limosa*. A rush species, *Juncus rigidus*, is also present. Herbaceous species include the alien invasive *Rumex crispus* and the indigenous *Rumex lanceolatus*. The indigenous herb *Berkheya radula* and the alien invasive *Cirsium vulgare* are present at the seasonal and temporary zones of the wetland and into some parts of the terrestrial zone.



Figure 2: A waterbody Dam 1, artificial waterbody Dam 2 and the active channel of the Boesmanspruit non-perennial river borders the site

	Red outline	Boundaries of the site
	Blue outline	Route of active channel of a non-perennial river (Boesmanspruit)
	Green outline	Outer edge of riparian zone
	Dark blue outline	Artificial waterbodies (dams)



Photograph 1: View of part of the site where vegetation has hitherto been cleared (foreground) and where the remainder of the grassland (background) is present.



Photograph 2: View of part of the site where vegetation has hitherto been cleared (right-hand side) and where the remainder of the grassland (left-hand side) is present.

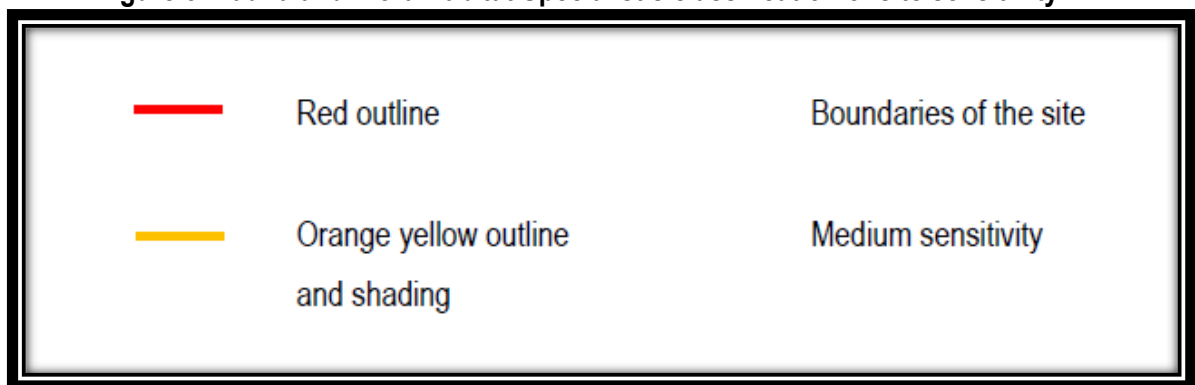


Photograph 3: The remainder of the site where moderately disturbed grassland is present. At the time of the surveys the indigenous grass species, *Elionurus muticus*, was conspicuous

From this it is clear that the areas cleared can be classified as having a medium sensitivity and most of the additional cleared area can be considered as Low (As this site has been cultivated in the recent past). The remainder of this area is considered to be medium. Please see Figure 3 for a copy of the Fauna and Flora Habitat Specialist's classification of site sensitivity.



Figure 3: Fauna and Flora Habitat Specialist's classification of site sensitivity.



Site Co-ordinates

The co-ordinates should be in degrees, minutes and seconds using the Hartebeeshoek94 WGS84 co-ordinate system.

Centre Pivot 1

Latitude (S):

Longitude (E):

26°	56'	04.14"	25°	56'	27.71"

4. DESCRIPTION OF THE ACTIVITY

An area of 26.4 hectares, located within a CBA 2, was cleared of indigenous vegetation in order to establish grain handling and storage facilities. See Figure 4. The purple polygon demarcates the area that has been fenced with an Electrical security fencing. This area is 26.4 hectares in size. The red polygon demarcates the area that has been illegally cleared (See Figure 5 for an image illustrating the area that has been illegally cleared.) while the green polygon demarcates an area that was ploughed in the past (See Figure 6 for an image illustrating the previously ploughed area.)

1 906 square meters of the cleared area is located within 100 meters from the non-perennial Boesmanspruit. Figure 7 illustrates the calculated area.



Figure 4: Site development plan. Purple polygon demarcates the area that has been fenced with an Electrical security fencing. The red polygon demarcates the area that has been illegally cleared while the green polygon demarcates an area that was ploughed in the past.

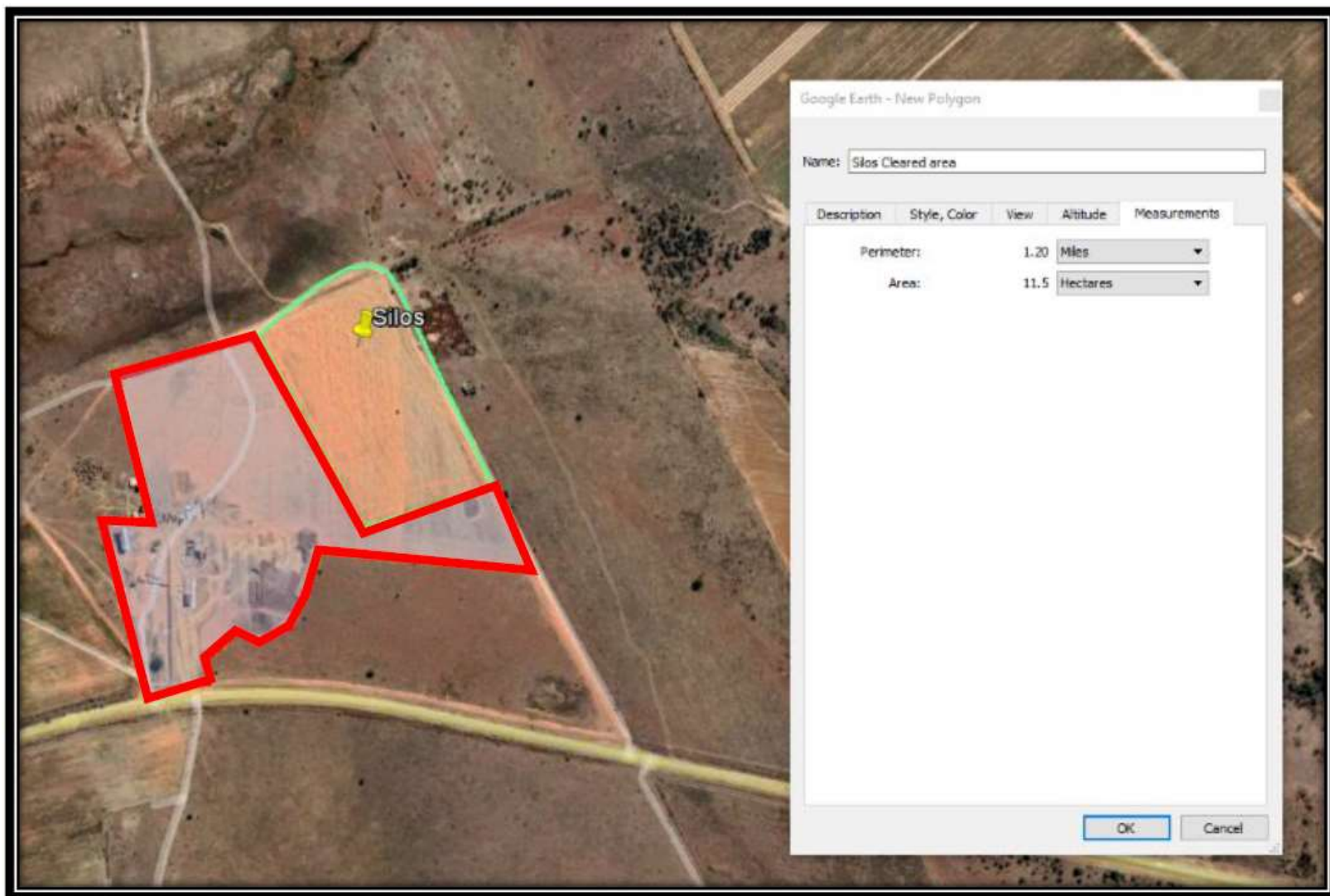


Figure 5: Image illustrating the area that has been illegally cleared.

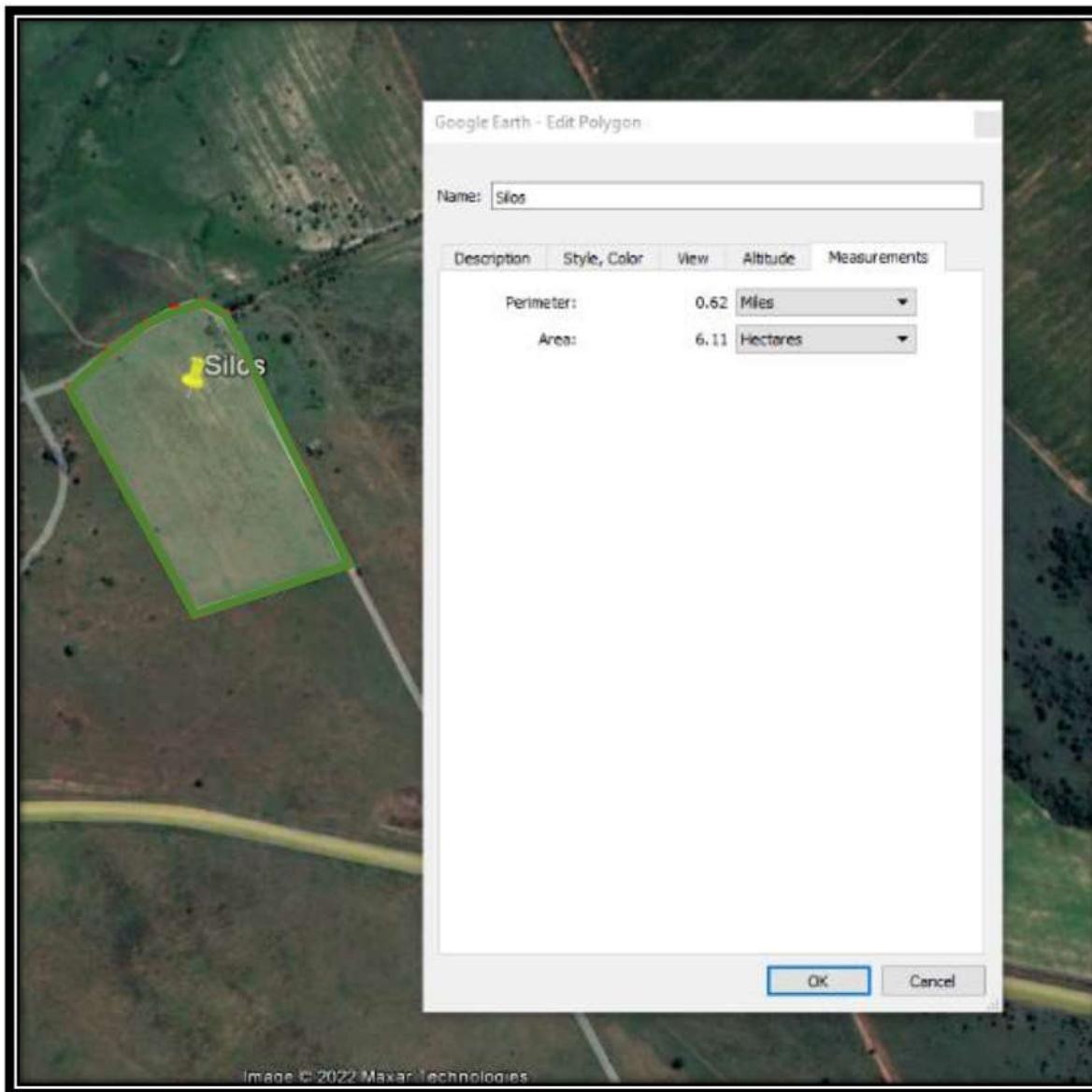


Figure 6: Area that was ploughed in the past

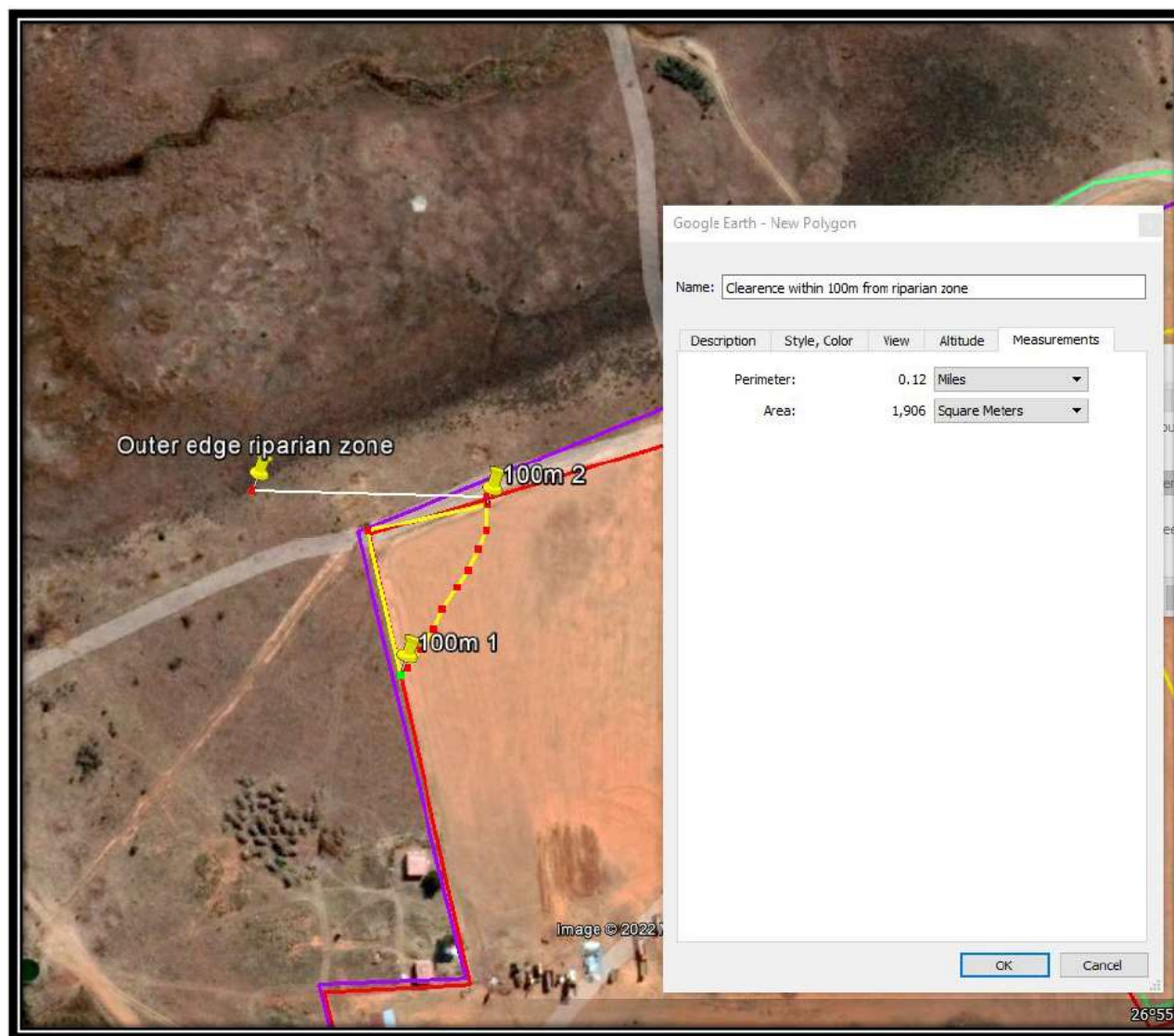


Figure 7: 1 906 Square meters of the cleared area is located within 100 meters from the non-perennial Boesmanspruit

The following infrastructure has been erected on site:

A Site entrance and Electric Fence (See Photograph 4a and b)

Receiving weighing-in Weigh Bridge. (See Photograph 5)

Dispatching receiving facility with weighing-out Weigh Bridge. (See Photograph 6)

Office (See Photograph 7)

Galvanized steel silos (See Photograph 8)

Shed for storage of Machinery and Equipment (See Photograph 9)

Laydown area for the storage of Silo Bags (See Photograph 10)



Photograph 4a: A Site entrance and Electric Fence



Photograph 4b: Electric Fence



Photograph 5: Receiving weighing-in weigh bridge.



Photograph 6: Dispatching receiving facility with weighing-out weigh bridge.



Photograph 7: Office



Photograph 8: Galvanized steel silos



Photograph 9: Shed for storage of Machinery and Equipment



Photograph 10: Laydown area for the storage of Silo Bags

What is Silo Bags?

Silo bags are a key hermetic storage technology that reduces post-harvest losses while providing an economic alternative for farmers and trading entities to gain control over marketing their stored grain between crop harvests. The cheapest, cleanest way to store almost any agricultural commodity.

Silo bags consist of three layers of polyethylene totalling 230 microns thick. The outer two layers are white to reflect solar radiation and make the bag weatherproof. The inner layer is black to block sunlight. A typical silo bag is about 60 meters long, 2.7 meters in diameter, and can store as much as 200 tonnes of grain, though they can be smaller by simply using less of the bag. When properly sealed, the silo bag is watertight and has a high degree of gas tightness to CO₂ and O₂.

The revolutionary silo bag system is a breakthrough in low cost, efficient, chemical free grain storage for both dry grains and silage. The silo bag system utilizes a time-tested method (i.e., hermetic storage) and incorporates modern technology to provide producers and commodity stakeholders with an economical, flexible and safe method to store grain.

Grain is stored in an absolute anaerobic (oxygen-free) environment. The bag is designed to stretch by 10% ensuring the grain is packed tightly and most air is expelled at filling. After sealing, the few pockets of air/oxygen are consumed by the grain breathing, thus producing a modified atmosphere, rich in carbon dioxide. As a result, diseases caused by fungi, bacteria and insects are eliminated, reducing the need to use chemicals on the stored grain.

The bagging and out-loading processes are done by means of high performance, low cost and easily transportable machines.

The silo bag system has provided agricultural producers and traders with a powerful storage and logistics solution.



Photograph 11: Grain that was stored in a silo bag being loaded onto a Truck

5. NEED AND DESIRIBILITY

Maize is the most widely produced crop in South Africa. During the 2016–2017 production season, 16.7 Tg of maize grain was produced from 2.6 million ha. The food supply quantity (maize and its products) for South Africa ranges from 250–300 g capita⁻¹ d⁻¹, illustrating the significant role of maize in the daily diet of South Africans. In addition, 40% of maize is used as livestock feed, constituting ~4.5 Tg annually.

Market prices in all produce sectors are always changing due to several different factors. The maize market price is one of the most volatile of all the grain sectors and because this is one of South Africa's primary food products it influences a big proportion of our countries farmers. The main factor above all others which determines the price of maize in each season is **supply and demand**. Roughly 75% of maize produced in a season is consumed by our own local market. This can be in the form of maize based food products for humans as well as animal feed. Simply put; when we have a good year and our maize crops yield well, then the price of maize will decline as there is an abundant supply. In poorer drought years when there are lower yields the price will increase with demand.

International market influences also play a role in the prices farmers receive for their maize. In years when there is an under supply of maize in the country we need make up the shortfall by importing maize from other countries. At times this can have a ripple effect on our market because

as we build up stores of cheap imported maize it can result in the local price of maize being stagnated.

Our local maize price is also affected by export demand for our crop. In years when we have an oversupply of maize there may be other countries that have experienced a shortfall resulting in them becoming a potential importer of our maize. This can hold our prices stable. There are however several international trade regulations which factor into this such as export and import tariffs and health standards.

One of the biggest problems for farmers and grain users (Like Millers) is the limited availability of quality grain during the dry season of the year, in addition to the availability of soil and climate conditions, among other factors. Forage is the most economical source of food for livestock while grain as a food source provide protein for many people and its availability is set by times of abundance that match rainfall season, and scarcity, which matches the drought season.

To overcome these drawbacks, it is necessary to develop strategies for forage and grain conservation that favour the availability of good quality food permanently and at a low cost during the critical period of the year. Storage of grain also allows the producer to keep his maize until the price is right.

As can be seen from the above, storage of produce plays a vital role in the production/value chain of the industry.

Silo bags are a key hermetic storage technology that reduces post-harvest losses while providing an economic alternative for farmers and trading entities to gain control over marketing their stored grain between crop harvests. The cheapest, cleanest way to store almost any agricultural commodity.

Silo bags consist of three layers of polyethylene totalling 230 microns thick. The outer two layers are white to reflect solar radiation and make the bag weatherproof. The inner layer is black to block sunlight. A typical silo bag is about 60 meters long, 2.7 meters in diameter, and can store as much as 200 tonnes of grain, though they can be smaller by simply using less of the bag. When properly sealed, the silo bag is watertight and has a high degree of gas tightness to CO₂ and O₂.

The revolutionary silo bag system is a breakthrough in low cost, efficient, chemical free grain storage for both dry grains and silage. The silo bag system utilizes a time-tested method (i.e., hermetic storage) and incorporates modern technology to provide producers and commodity stakeholders with an economical, flexible and safe method to store grain.

Grain is stored in an absolute anaerobic (oxygen-free) environment. The bag is designed to stretch by 10% ensuring the grain is packed tightly and most air is expelled at filling. After sealing, the few pockets of air/oxygen are consumed by the grain breathing, thus producing a modified atmosphere, rich in carbon dioxide. As a result, diseases caused by fungi, bacteria and insects are eliminated, reducing the need to use chemicals on the stored grain.

The bagging and out-loading processes are done by means of high performance, low cost and easily transportable machines.

The silo bag system has provided agricultural producers and traders with a powerful storage and logistics solution.

Silo bags have the following advantages over conventional storage methods:

- Grains can be stored at a higher moisture content than is allowed in traditional receival systems.
- Traceability and classification of your grain regarding quality and commercial identity, like cultivars and GMO-free commodities.
- Grains can be easily sampled by means of a conventional sampler.
- Grain retains its quality and colour.
- The bag is airtight, therefore chemicals are not normally required to control insects.
- Perfect for organic commodities.
- Freight costs reduced by negotiating freight rates out of peak harvest times.
- Can eliminate costly harvester downtime.
- Harvest times are accelerated.
- Very quick implementation of large tonnage sites.
- Suitable for both extreme heat and extreme cold climates.
- Eliminates costly on-farm storage systems.
- The on-farm storage of your grains expands the marketing opportunities of the commodity.
- Store on farm with no wastage.
- Storage in a year of high/excess production is unlimited.
- You only buy the quantity of bags you require.
- The system is portable/relocatable.
- Grains can be stored as to variety, grade, protein or for any other reason

The activity provides farmers in the area the opportunity to have access to these advantages.

6. ALTERNATIVES

6.1 Introduction

One of the objectives of an EIA is to investigate alternatives to the proposed project. The IEM procedure stipulates that the environmental investigation needs to consider feasible alternatives for any development. Therefore, a number of possible proposals or alternatives for accomplishing the same objectives should be identified and investigated. In order to ensure that the development enables sustainable development, feasible alternatives must be explored (S. Cliff, 2015).

The identification, description, evaluation and comparison of alternatives are important for ensuring a sound environmental impact assessment process. Alternatives should be considered as a norm within the Environmental Process (S. Cliff, 2015).

According to DEAT 2004, “The role of alternatives is to find the most effective way of meeting the need and purpose of the proposal, either through enhancing the environmental benefits of the proposed activity, and or through avoiding potentially significant negative impacts”.

The above description emphasizes the importance of impact significance in the identification of alternatives in that it should *inter alia* be aimed at avoiding potentially significant negative impacts.

DEAT 2004 identifies the following types or categories of alternatives:

- Activity alternatives
- Location alternatives
- Process alternatives
- Demand alternatives
- Scheduling alternatives
- Input alternatives
- Routing alternatives
- Site layout alternatives
- Scale alternatives
- Design alternatives
- “No go” alternatives

“alternatives”, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

- (a) the property on which or location where it is proposed to take place;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

6.2 Proposed alternatives

The alternatives considered for the development relates to “**the technology to be used in the activity**”. Alternatives were considered for the method of storage and includes:

1. Proposal: The use of Silo Bags in combination with Corrugated Iron Silos.
2. Alternative 1: The use of traditional bunker Silos. (Either Corrugated Iron Silos or conventional Concrete Silos.)
3. Alternative 2: “No-go” option

The various alternatives have been assessed in terms of environmental, social and technical feasibility.

6.2.1 The use of Silo Bags in combination with Corrugated Silos (Proposal)

This option involves minimal capital inputs. Essentially, the only requirement is an area that can be used as a “Laydown” area.

Silo bags are a key hermetic storage technology that reduces post-harvest losses while providing an economic alternative for farmers and trading entities to gain control over marketing their stored grain between crop harvests. The cheapest, cleanest way to store almost any agricultural commodity.

Silo bags consist of three layers of polyethylene totalling 230 microns thick. The outer two layers are white to reflect solar radiation and make the bag weatherproof. The inner layer is black to block sunlight. A typical silo bag is about 60 meters long, 2.7 meters in diameter, and can store as much as 200 tonnes of grain, though they can be smaller by simply using less of the bag. When properly sealed, the silo bag is watertight and has a high degree of gas tightness to CO₂ and O₂.

The revolutionary silo bag system is a breakthrough in low cost, efficient, chemical free grain storage for both dry grains and silage. The silo bag system utilizes a time-tested method (i.e., hermetic storage) and incorporates modern technology to provide producers and commodity stakeholders with an economical, flexible and safe method to store grain.

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The silo bag system has provided agricultural producers and traders with a powerful storage and logistics solution.

Silo bags have the following advantages over conventional storage methods:

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- Grains can be easily sampled by means of a conventional sampler.
- Grain retains its quality and colour.
- The bag is airtight, therefore chemicals are not normally required to control insects.
- Perfect for organic commodities.
- Freight costs reduced by negotiating freight rates out of peak harvest times.
- Can eliminate costly harvester downtime.
- Harvest times are accelerated.

- Very quick implementation of large tonnage sites.
- Suitable for both extreme heat and extreme cold climates.
- Eliminates costly on-farm storage systems.
- The on-farm storage of your grains expands the marketing opportunities of the commodity.
- Store on farm with no wastage.
- Storage in a year of high/excess production is unlimited.
- You only buy the quantity of bags you require.
- The system is portable/relocatable.
- Grains can be stored as to variety, grade, protein or for any other reason

Corrugated Iron Silos were also introduced to “Speed up” handling times during harvest time when there is a lot of Grain being delivered at once.

6.1.2 The use of traditional bunker Silos. (Either Corrugated Iron Silos or conventional Concrete Silos) (Alternative 1)

This Alternative involves the construction of either Corrugated Iron Silos or conventional Concrete Silos. This option was discarded as it involves a large capital investment and it does not provide any of the advantages associated with the Silo Bags.

6.1.3 “No-go” alternative (Alternative 2)

If the “no-go” option is implemented, Farmers will have to store their maize at commercial facilities that are available in the area. This includes the Concrete Silos that are in the hands of various Cooperations and Companies. Farmers do not always have the flexibility to sell their produce at a time when the price is right. Storage cost at these institutions is also much higher than with the Silo Bags.

6.3 Motivation for preferred Alternative

The revolutionary silo bag system is a breakthrough in low cost, efficient, chemical free grain storage for both dry grains and silage. The silo bag system utilizes a time-tested method (i.e., hermetic storage) and incorporates modern technology to provide producers and commodity stakeholders with an economical, flexible and safe method to store grain.

7. DESCRIPTION OF THE ENVIRONMENT THAT MAY BE AFFECTED BY THE PROJECT

7.1. BIO-PHYSICAL ASPECTS

7.1.1 GEOLOGY AND SOIL

According to the 1:250 000 Geological Map (2624 Vryburg) the development is underlain by Quartzite (Rh) and Ferruginous Shale of the Hospital Hill Formation of the West Rand Group and the Witwatersrand Supergroup. Please see Figure 11. No Dolomite occurs in the area. The underlying Geology is stable and seismic activities are very unlikely.

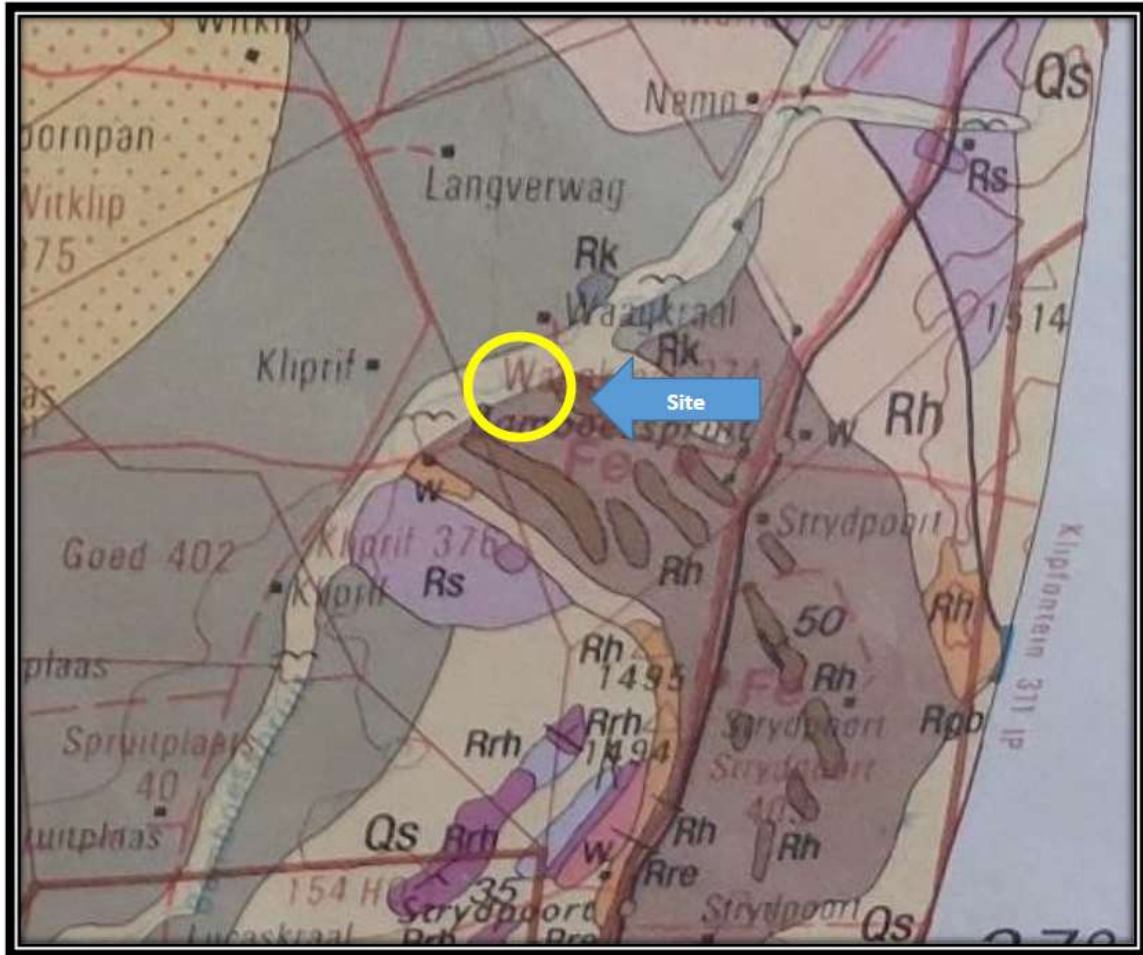


Figure 8: 1:250 000 Geological Map (2624 Vryburg)

7.1.2 TOPOGRAPHY

The site is located on a gentle slope that slopes towards the north where a waterbody Dam 1, artificial waterbody Dam 2 and the active channel of the Boesmanspruit non-perennial river borders the site.

The Topography of the site is ideal for this type of development as, even after the above average rainfall of the past season, no signs of erosion has been noted.

7.1.3 CLIMATE

Figure 9 is an illustration of the average temperatures and precipitation for the area. (https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/groot-marico-south-africa_999121) The "mean daily maximum" (solid red line) shows the maximum temperature of an average day for every month for Ottosdal. Likewise, "mean daily minimum" (solid blue line) shows the average minimum temperature. Hot days and cold nights (dashed red and blue lines) show the average of the hottest day and coldest night of each month of the last 30 years.

From the graph it is clear the site falls within an area that has hot summers (Average daily maximum temperature for December is 30°C with the average hottest day temperature for summer being 34°C) and cold winters (Average daily minimum temperature for June and July is 1°C with the average coldest day temperature for winter being -6°C).

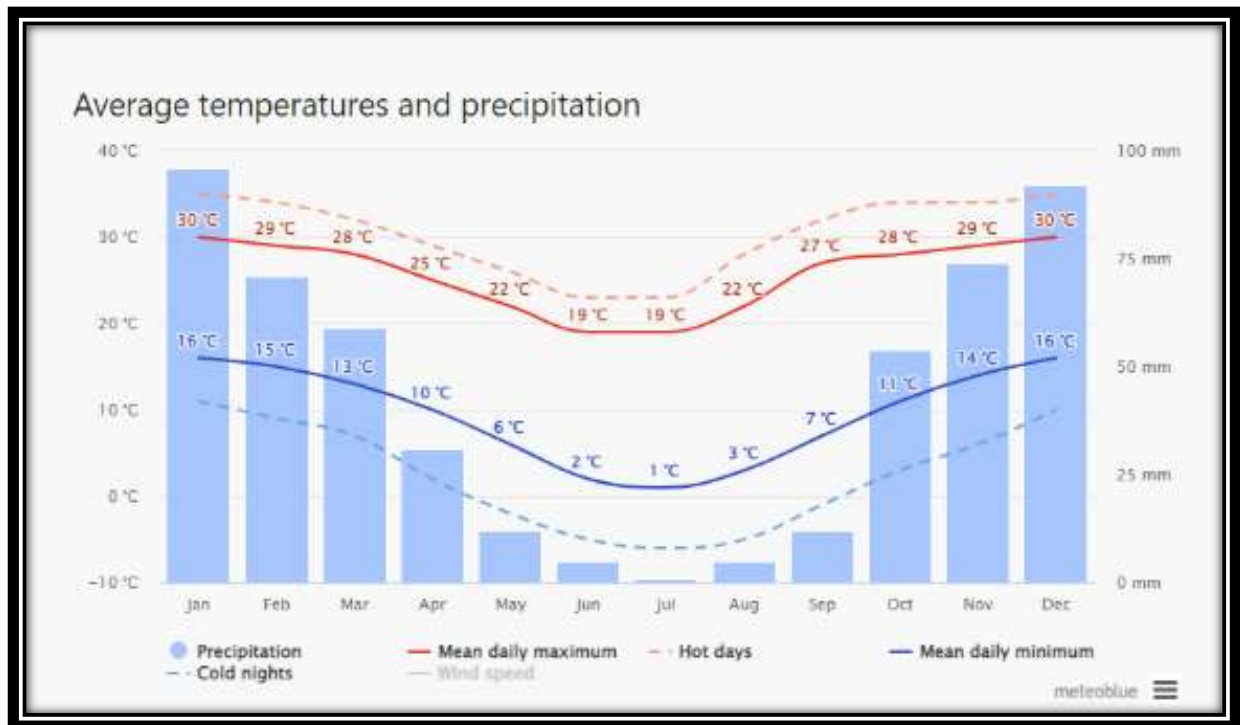


Figure 9: Illustration of the average temperatures and precipitation for Ottosdal.

Source: https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/groot-marico_south-africa_999121

Precipitation normally occurs in the form of rain and hail. This is a summer rainfall area with a yearly average of 512mm. The highest monthly average rainfall occurs in January (With an average rainfall of 96 mm) and December (With an average rainfall of 92mm). The lowest monthly average rainfall occurs in July (With an average rainfall of 1mm) and August (With an average rainfall of 5mm)

Climate Change

According to: WIREs Climate Change 2014, "Climate change is a key concern within South Africa. Mean annual temperatures have increased by at least 1.5 times the observed global average of 0.65°C over the past five decades and extreme rainfall events have increased in frequency. These changes are likely to continue. Climate change poses a significant threat to South Africa's water resources, food security, health, infrastructure, as well as its ecosystem services and biodiversity. Considering South Africa's high levels of poverty and inequality, these impacts pose critical challenges for national development. In relation to water, impact studies for the water resources sector have begun to look beyond changes in streamflow to changes in the timing of flows and the partitioning of streamflow into base flows and stormflows, reservoir yields, and extreme hydrological

events. Spatially the eastern seaboard and central interior of the country are likely to experience increases in water runoff. Higher frequencies of flooding and drought events are projected for the future. Complexities of the hydrological cycle, influences of land use and management and the linkages to society, health, and the economy indicate far higher levels of complexity in the water resources sector than in other sectors. What has emerged is that land uses that currently have significant impacts on catchment water resources will place proportionally greater demands on the catchment's water resources if the climate were to become drier. The influence of climate change on water quality is an emerging research field in South Africa, with assessments limited to water temperature and non-point source nitrogen and phosphorus movement. A critical interaction that has not been explored is between changes in water quality and quantity and the combined impacts, such changes might have impact on various types of water use, e.g., irrigation, domestic consumption, or aquatic ecosystems support".

Rain-fed agriculture sustains 60% of global food production. Rain-fed cropping systems are highly dependent on climatic conditions and vulnerable to changes in precipitation and temperature patterns, which are intensifying as a result of global warming. Climate change is expected to alter rainfall patterns and exacerbate water- and heat-stress events over rain-fed croplands. Irrigation expansion over water-stressed rain-fed croplands is an effective agricultural adaptation measure in response to climate change. Irrigated cropping systems, which use both rainwater ("green water") and surface water and/or groundwater (or "blue water"), contribute to a more reliable and resilient crop production while boosting agricultural productivity. In fact, the use of irrigation enables reliable water supply and can also alleviate crop's heat stress, highlighting how important irrigation is to food-producing regions that will be affected by climate change.

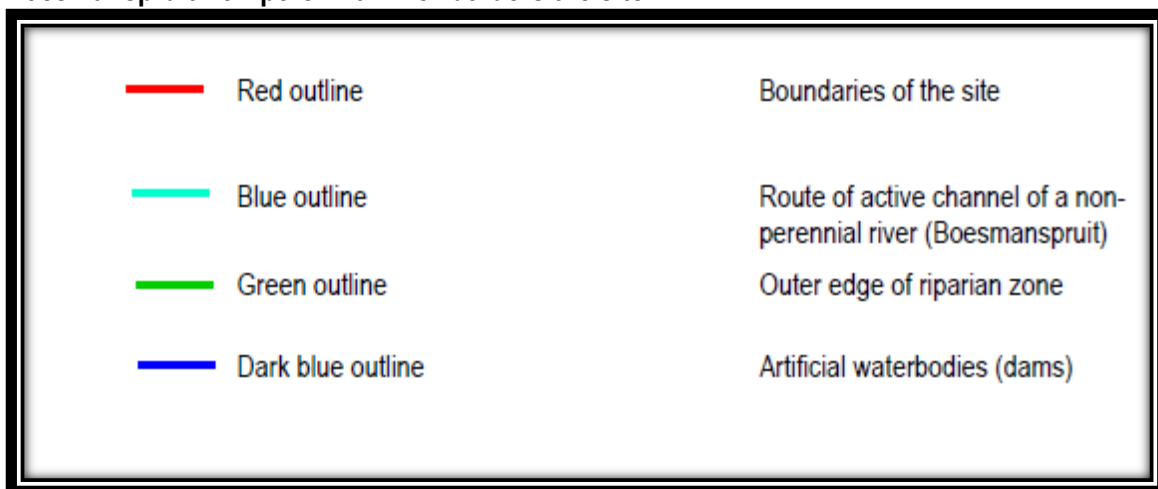
7.1.4 SURFACE DRAINAGE

The study area itself is located on an area that is drained by overland flow. No streamlines are found on the proposed site. No wetlands or riparian zones are found on or near the site and no erosion by sheet flow is evident on site. The site is located on a gentle slope that slopes towards the north where a waterbody Dam 1, artificial waterbody Dam 2 and the active channel of the Boesmanspruit non-perennial river borders the site. See Figure 10.

Vegetation at the riparian zone north of the site, at artificial waterbody Dam 1, artificial waterbodd Dam 2 and the active channel of the Boesmanspruit non-perennial river in between, consists of covers of sedges and some other plant species mixed in between. Indigenous sedge species at the riparian zone include *Cyperus fastigiatus*, *Pycneus nitidus*, *Cyperus laevigatus*, *Schoenoplectus decipiens* and *Eleocharis limosa*. A rush species, *Juncus rigidus*, is also present. Herbaceous species include the alien invasive *Rumex crispus* and the indigenous *Rumex lanceolatus*. The indigenous herb *Berkheya radula* and the alien invasive *Cirsium vulgare* are present at the seasonal and temporary zones of the wetland and into some parts of the terrestrial zone.



Figure 10: A waterbody Dam 1, artificial waterbody Dam 2 and the active channel of the Boesmanspruit non-perennial river borders the site



7.1.5. GROUND WATER

Implementation of the Reconstruction and Development Programme (RDP) in South Africa has highlighted the importance of groundwater resources in the country as the role they will play in satisfying the targets of the RDP. As a result, exploration, development and protection of aquifers is receiving unprecedented attention. Provision of the appropriate information to national water resource managers and planners is a critical part of the process which aims to provide a further twelve million people with adequate access to potable water. According to the Map provided by Murray R., Baker K., Revenscroft P., Musekiwa C. and Dennis R. (2012). Water Research Commission Report No. 1763/1/11, Pretoria, South Africa, the water quality of the area is considered to be very good.

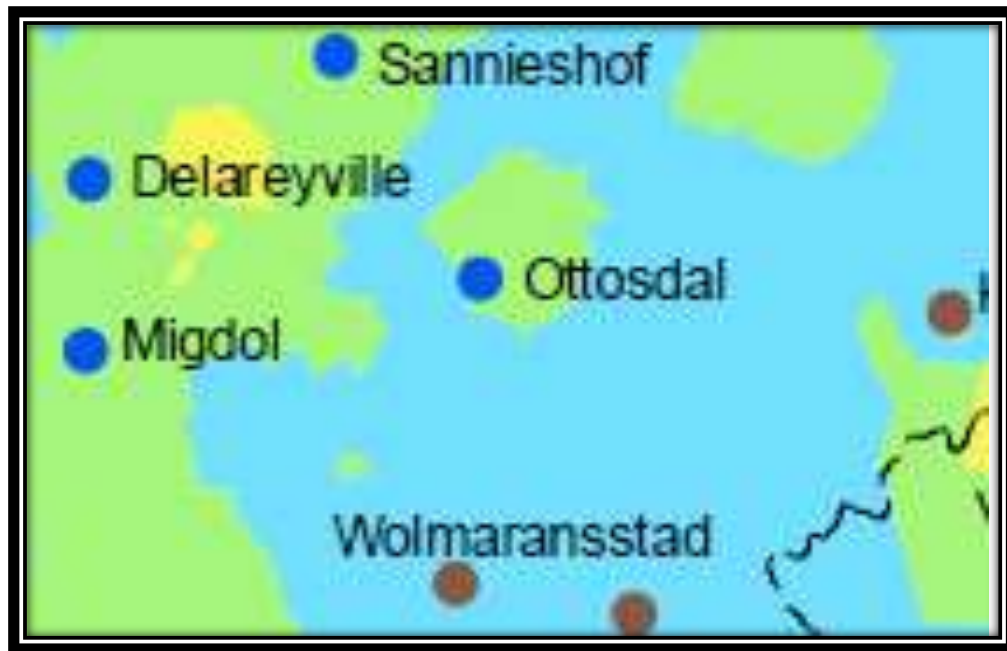


Figure 11: Map produced by Murray R., Baker K., Revenscroft P., Musekiwa C. and Dennis R. (2012). Water Research Commission Report No. 1763/1/11, Pretoria, South Africa depicting the ground water quality.

It is not envisaged that the development have any impact on the water quality of the area as the Silo Bags does not require any chemicals that needs to be added.

7.1.6. FAUNA AND FLORA HABITAT

Grassland at the site is represented by the Klerksdorp Thornveld (Gh 13) vegetation type (Mucina & Rutherford, 2006).

Klerksdorp Thornveld (Gh 13)

Distribution: In South Africa the Klerksdorp Thornveld is present in the North West Province in two sets of patches, one in the Wolmaransstad, Ottosdal and Hartbeesfontein region, and the other from the Botsalano Game Park north of Mafikeng in the vicinity of Madibogo in the south. Altitude for the entire vegetation type is 1260 – 1580 m (Mucina & Rutherford 2006).

Vegetation and landscape features: Plains or slightly irregular undulating plains with open to dense Acacia karroo bush clumps in dry grasslands (Mucina & Rutherford 2006). Geology and soils: Shale, slate and quartzite of the Pretoria Group with interlaid diabase sills and Hekpoort lava supporting relatively shallow and rocky soils (Glenrosa and Mispah forms). Equally represented are eutrophic red plinthic soils (Hutton form) derived mainly from a thick succession of volcanics and sediments of the Ventersdorp Supergroup (Mucina & Rutherford 2006).

Climate: Warm-temperate, summer-rainfall region, with overall mean annual precipitation of 533 mm. Summer temperatures are high. Frequent frosts occur in winter (Mucina & Rutherford 2006).

Important taxa of the Klerksdorp Thornveld listed by Mucina & Rutherford (2006): Small Trees: Acacia karroo, Acacia caffra, Celtis africana, Searsia lancea, Ziziphus mucronata. Tall Shrubs: Acacia hebeclada, Diospyros lycioides subsp. lycioides, Ehretia rigida, Grewia flava, Gymnosporia buxifolia, Searsia pyroides, Tarchonanthus camphoratus. Woody Climber: Asparagus africanus. Low Shrubs: Asparagus laricinus, Asparagus suaveolens, Felicia muricata, Anthospermum hispidulum, Anthospermum rigidum subsp. pumilum, Aptosimum elongatum, Gnidia capitata, Gomphocarpus fruticosus subsp. fruticosus, Helichrysum dregeanum, Leucas capensis, Pavonia burchellii, Pentzia globosa, Solanum supinum var. supinum, Triumfetta sonderi, Ziziphus zeyheriana. Graminoids: Aristida congesta, Cynodon dactylon, Eragrostis lehmanniana, Eragrostis trichophora, Microcloa caffra, Panicum coloratum, Sporobolus fimbriatus, Themeda triandra, Andropogon shirensis, Anthephora pubescens, Aristida junciformis subsp. galpinii, Aristida stipitata subsp. graciliflora, Brachiaria nigropedata, Brachiaria serrata, Bulbostylis burchellii, Cymbopogon pospischilii, Digitaria eriantha, Diheteropogon amplexans, Elionurus muticus, Eragrostis curvula, Eragrostis obtusa, Eragrostis racemosa, Eragrostis superba, Eustachys paspaloides, Heteropogon contortus, Setaria sphacelata.

Sporobolus africanus, Tragus berteronianus, Trichoneura grandiglumis, Triraphis andropogonoides. Herbs: Acalypha angustata, Acanthospermum australe, Berkheya onopordifolia var. onopordifolia, Berkheya setifera, Blepharis integrifolia var. clarkei, Chamaesyce inaequilatera, Chascanum adenostachyum, Dicoma macrocephala, Helichrysum nudifolium var. nudifolium, Hermannia lancifolia, Hibiscus pusillus, Jussiaea anagalloides, Lippia scaberima, Nidorella microcephala, Nolletia ciliaris, Pollichia campestris, Rhyncosia adenodes, Salvia radula, Selago densiflora, Teucrium trifidum, Tolpis capensis. Geophytic Herbs: Bulbine narcissifolia, Ledebouria marginata, Ornithogalum tenuifolium subsp. tenuifolium, Raphionacme hirsuta. Herbaceous Climber: Rhynchosia venulosa

Note: Not all of the above listed plant species for the vegetation types occur at the site in the study area.

There is an area that had been cleared and an area where grassland remained at the site. At the area that had been cleared there is some recovery of vegetation and a conspicuous presence of pioneer plant species. Both these areas, the cleared area and the area which is the remainder of the grassland, are at one terrain unit, a plain with gentle slopes in a slightly undulating larger area. The plain with gentle slopes, to almost moderate slopes, at the site is adjacent to a shallow valley outside the site, where a non-perennial river runs through.

Vegetation at the remainder of the grassland at the site consists of a moderately disturbed grassland which contains indigenous grass species, some indigenous shrub species and few trees. The grass layer is well-developed and indigenous grass species such as *Elionurus muticus* is conspicuous. Other

indigenous grass species include *Aristida congesta*, *Eragrostis lehmnnanniana*, *Eragrostis superba*, *Cynodon dactylon*, *Eragrostis curvula*, *Chloris virgata* and *Themeda triandra*. The shrub *Seriphium plumosum* (bankrupt bush) is conspicuous at some parts of the remaining grassland. Indigenous forb species include *Berkheya onopordifolia*, *Ursinia nana*, *Cyanotis speciosa*, *Hibiscus pusillus*, *Senecio consanguineus*, *Bulbine narcissifolia*, *Pollichia campestris*, *Selago densiflora* and *Lippia scaberrima*. Alien invasive herbaceous weed species are conspicuous at disturbed areas at the site and include *Argemone ochroleuca*, *Tagetes minuta*, *Bidens bipinnata*, *Bidens pilosa*, *Gomphrena celosioides*, *Schkuhria pinnata*, *Conyza bonariensis*, *Chenopodium album*, *Guilleminea densa*, *Alternanthera pungens* and *Verbena aristigera*.

Vegetation at the riparian zone north of the site, at artificial waterbody Dam 1, artificial waterbodd Dam 2 and the active channel of the Boesmanspruit non-perennial river in between, consists of covers of sedges and some other plant species mixed in between. Indigenous sedge species at the riparian zone include *Cyperus fastigiatus*, *Pycnus nitidus*, *Cyperus laevigatus*, *Schoenoplectus decipiens* and *Eleocharis limosa*. A rush species, *Juncus rigidus*, is also present. Herbaceous species include the alien invasive *Rumex crispus* and the indigenous *Rumex lanceolatus*. The indigenous herb *Berkheya radula* and the alien invasive *Cirsium vulgare* are present at the seasonal and temporary zones of the wetland and into some parts of the terrestrial zone.

No Threatened or Near Threatened plant or animal species appear to be resident at the site. No other plant- or animal species of particular conservation concern appear to be present at the site. The vegetation type at the site, the Klerksdorp Thornveld, is not listed as a Threatened Ecosystem according to the National List of Threatened Ecosystems (2019).

There is little scope for the site to be part of a corridor of particular conservation importance. Outside the site, towards the north, a watercourse, the non-perennial Boesmanspruit river, is present, which is a corridor of particular conservation importance.

Possible ecological sensitivities at the site were indicated by a report generated from the screening tool of DFFE. These ecological sensitivities that could possibly/ are present at the site, follow.

Animal species theme sensitivity

Relative animal species theme sensitivity is listed as low for the site. Following the groundtruthing such a listing is upheld. There is no distinct indication of the presence of any threatened animal species that is resident at the site or could have been resident at the site prior to a recent clearing of vegetation at the site. The relative animal species theme sensitivity is confirmed to be low.

Aquatic biodiversity theme sensitivity

Relative aquatic biodiversity theme sensitivity at the site is listed low for part of the site and high for part of the site. The high listing is because of a non-perennial river that is present north of the site. The site is as well as the watercourse north of the site is not part of a Freshwater Ecosystem Priority Area or Fish Support Area. The riparian zone is a substantial distance from the site and current developments at the site, are unlikely to have a discernable impact on the watercourse north of the site if mitigation measures such as avoiding pollutants or spills from entering the soil and ultimately soil water. No wetlands or riparian zones are present at the site and the relatively aquatic biodiversity theme sensitivity at the site is likely to be low for the entire site.

Plant species theme sensitivity

Relative plant species theme sensitivity is currently listed as medium. Possible sensitive plant species of which the likely presence or absence have been investigated are listed in Tables 4.2 – 4.9 and include plant species on a local and provincial scale which could be prone to harvesting also the plant species listed for the screening. None of the threatened plant species of the North West Province or any other plant species of particular conservation concern such as those prone to harvesting has been found at the site. It is unlikely that any plant species of particular conservation concern occurs at the site or has occurred at the site prior to a recent clearing of vegetation at part of the site.

Terrestrial biodiversity theme sensitivity

Relative terrestrial biodiversity at the site is very high. This high sensitivity that is ascribed to the site area, is because of the presence of Critical Biodiversity Area 2, Ecological Support Area 2 and Protected Areas Expansion Strategy. The vegetation type at the site, the Klerksdorp Thornveld (Gh 13), is not listed as a Nationally Threatened Ecosystem. During surveys at the site, it was found that the scope for the remaining moderately disturbed grassland patch at the site to serve as part of a protected area or corridor of particular conservation concern is small. Following the ground-truthing a medium sensitivity for the terrestrial biodiversity theme is suggested.

Ecological sensitivity at the site is medium at the remainder of the grassland. Following the assessment of ecological sensitivity at the same terrain unit of which the current remainder of grassland as well as the area where the vegetation has recently been cleared, a medium ecological sensitivity is also expected at the recently cleared area at the site.

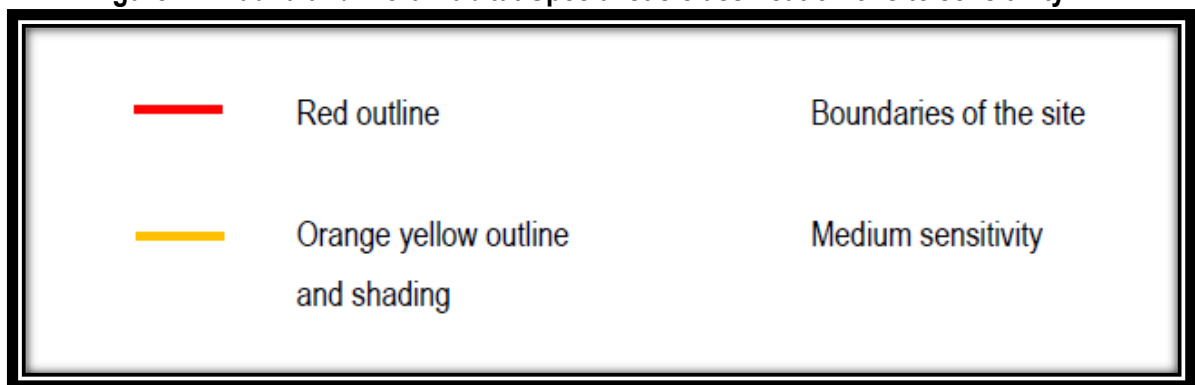
Continued monitoring and eradication of alien invasive plant species are imperative. Declared alien invasive species such as *Prosopis glandulosa* (Mesquite), *Melia azedarach* (Syringa) and alien invasive Australian *Acacia* species (Australian wattles) should not be allowed to establish.

Following the mitigations which will be upheld and planned footprint for development all the impact risks listed above are moderate or low. The impacts owing to the recent clearing of vegetation at part of the site are likely to be moderate or low as well, if the mitigation measures that are stipulated are upheld.

Please see Figure 12 for a copy of the Fauna and Flora Habitat Specialist's classification of site sensitivity.



Figure 12: Fauna and Flora Habitat Specialist's classification of site sensitivity.





Photograph 11: The widespread indigenous herbaceous plant species, *Gazania krebsiana*, at the site.

Photo: R.F. Terblanche.



Photograph 12: The widespread indigenous herbaceous plant species, *Ursinia nana*, at the site.

Photo: R.F. Terblanche



Photograph 13: The widespread indigenous grass species, *Elionurus muticus*, at the site.

Photo: R.F. Terblanche.



Photograph 14: Few trees are present at the site. The widespread indigenous tree, *Vachellia karroo* (Sweet Thorn) is sparingly present at the site (such as in the picture) and visibly more frequent in some of the surrounding areas.

Photo: R.F. Terblanche



Photograph 15: The widespread indigenous herb *Lippia scaberrima* at the remainder of the grassland at the site.
Photo: R.F. Terblanche.



Photograph 16: The widespread indigenous herb *Berkheya onopordifolia*, at the remainder of the grassland at the site.
Photo: R.F. Terblanche.



Photograph 17: The alien invasive *Cirsium vulgare* (spear thistle) at the riparian zone north of the site.

Photo: R.F. Terblanche



Photograph 18: The widespread butterfly species, *Vanessa cardui* (painted lady) feeding on nectar from the flower of *Gazania krebsiana* at the site.

Photo: R.F. Terblanche

7.2. SOCIO ECONOMIC FACTORS

7.2.1. SOCIAL AMENITIES

Maize is the most widely produced crop in South Africa. During the 2016–2017 production season, 16.7 Tg of maize grain was produced from 2.6 million ha. The food supply quantity (maize and its products) for South Africa ranges from 250–300 g capita⁻¹ d⁻¹, illustrating the significant role of maize

in the daily diet of South Africans. In addition, 40% of maize is used as livestock feed, constituting ~4.5 Tg annually.

Market prices in all produce sectors are always changing due to several different factors. The maize market price is one of the most volatile of all the grain sectors and because this is one of South Africa's primary food products it influences a big proportion of our countries farmers. The main factor above all others which determines the price of maize in each season is **supply and demand**. Roughly 75% of maize produced in a season is consumed by our own local market. This can be in the form of maize based food products for humans as well as animal feed. Simply put; when we have a good year and our maize crops yield well, then the price of maize will decline as there is an abundant supply. In poorer drought years when there are lower yields the price will increase with demand.

International market influences also play a role in the prices farmers receive for their maize. In years when there is an under supply of maize in the country we need make up the shortfall by importing maize from other countries. At times this can have a ripple effect on our market because as we build up stores of cheap imported maize it can result in the local price of maize being stagnated.

Our local maize price is also affected by export demand for our crop. In years when we have an oversupply of maize there may be other countries that have experienced a shortfall resulting in them becoming a potential importer of our maize. This can hold our prices stable. There are however several international trade regulations which factor into this such as export and import tariffs and health standards.

One of the biggest problems for farmers and grain users (Like Millers) is the limited availability of quality grain during the dry season of the year, in addition to the availability of soil and climate conditions, among other factors. Forage is the most economical source of food for livestock while grain as a food source provide protein for many people and its availability is set by times of abundance that match rainfall season, and scarcity, which matches the drought season.

To overcome these drawbacks, it is necessary to develop strategies for forage and grain conservation that favour the availability of good quality food permanently and at a low cost during the critical period of the year. Storage of grain also allows the producer to keep his maize until the price is right.

As can be seen from the above, storage of produce plays a vital role in the production/value chain of the industry.

Silo bags are a key hermetic storage technology that reduces post-harvest losses while providing an economic alternative for farmers and trading entities to gain control over marketing their stored grain between crop harvests. The cheapest, cleanest way to store almost any agricultural commodity.

7.2.2. AIR QUALITY

Agricultural emissions derive from both area and point sources. Agricultural emissions play an important role in several atmospherically mediated processes of environmental and public health concerns. These atmospheric processes affect local and regional environmental quality, including odour, particulate matter (PM) exposure, eutrophication, acidification, exposure to toxics, climate,

and pathogens. Agricultural emissions also contribute to the global problems caused by greenhouse gas emissions. Agricultural emissions are variable in space and time and in how they interact within the various processes and media affected. Most important factors are ammonia (where agriculture accounts for ~90% of total emissions), reduced sulphur (unquantified), PM_{2.5} (~16%), PM₁₀ (~18%), methane (~29%), nitrous oxide (~72%), and odour and emissions of pathogens (both unquantified). Agriculture also consumes fossil fuels for fertilizer production and farm operations, thus emitting carbon dioxide (CO₂), oxides of nitrogen (NO_x), sulphur oxides (SO_x), and particulates.

The world's population has grown from ~1.5 billion at the beginning of the 20th century to ~6.8 billion today. This population increase has been accompanied by the advent and growth of "intensive" agriculture, with associated impacts on the environment (1). During the next 50 years, the Earth's human population is predicted to increase to more than 9 billion, creating higher demand for agricultural commodities, both crop and animal.

Agronomists throughout the world have sought to increase food production by increasing productivity. Farmers increased agricultural output significantly between the 1940s and the 1990s, capitalizing on increased availability of nitrogen fertilizer (the global production of fertilizer currently is more than 90 Tg of N yr⁻¹, compared to ~1 Tg only 50 years ago) (7, 8). Increased agricultural output is also the result of mechanization combined with the abandonment of traditional practices, better pesticides, cultivation of marginal land, availability of hybrid and genetically modified crop varieties, and improvements in production efficiency. Many of these innovations have been supported by public investment. Furthermore, inexpensive fossil fuels have been available for fertilizer production, for replacement of human labour by increased mechanization, and for transport of raw material and products. (Viney et al, 2009)

The extent and toxicity of emissions is not necessarily a concise indicator of contributions to ground-level air pollution concentrations or of risks to health and the environment. Such contributions are also a function of the height of emission, temporal variations in the release of pollutants, and the proximity of the source to the people or the environment affected by exposure to the pollutant (such as, for instance, children, or the elderly, or people who are ill, or others who may be particularly sensitive receptors to a specific pollutant above a certain concentration). If an industry is operating close to a school or hospital or centre for the elderly, the potential exposure (in combination with the other contributing factors) is high.

Historically, air pollution control in South Africa has primarily emphasized the implementation of 'command and control' measures in the industrial sector. The shift from source-based control, to the management of the air that people breathe, emphasizes the importance of targeting a wider range of sources and using more flexible and varied approaches. It means paying greater attention to ambient air quality, as it is more important (and more cost-effective, in many cases) to make sure that the ambient air complies with air quality standards. This approach ensures that human and environmental health is protected and that the cumulative impact of pollution from a number of sources is addressed.

Approaches adopted or considered for future implementation have included: regulation (for example, the use of Atmospheric Emission Licences for Listed Activities); market instruments (such as atmospheric user-charges and pollution taxes); the potential for voluntary agreements, education

and awareness raising; and emissions trading. International experience shows that adopting a mix of instruments and interventions is more effective than using a single instrument to improve air quality across various types of source. Although direct regulation remains important in controlling industrial sources, there is evidence that specifying emission limits is more effective than specifying the use of particular technologies, so as to give companies flexibility in selecting the method of achieving success that suits them best. This approach is advocated as being more cost-effective and more likely to stimulate technological advances in pollution control methods and production processes.

For large point sources (that is, sources of pollution that are concentrated on one site, but that have large, constant volumes of many types of pollution) that are few in number, instruments such as emissions trading have been advocated as an effective way to manage pollutant emissions and reduce the costs of compliance.

https://www.environment.gov.za/sites/default/files/docs/stateofair_airqualityand_sustainable_development.pdf Date visited: 17/03/2020.

According to the AccuWeather website, the average Air Quality for this part of the North West Province is considered to be “Excellent”. As mentioned above, a certain amount of Air pollution will inevitably result. This will include both cumulative and direct impacts. In addition to the above, it should be noted that the project will however create a certain amount of dust during the operational phase. If proper dust suppression and soil protection measures are implemented this variable will have very little impact.

7.2.3. NOISE

It is a fact that a certain amount of noise will be generated during the operational phase of the project. Noise levels should however rarely exceed the allowable limits.

7.2.4. ARCHAEOLOGY AND CULTURAL SITES

Based on the aerial images of the area, photographs provided by the client and the heritage desktop study, it is deemed unlikely that any significant sites, features or material of cultural heritage (archaeological and/or historical) origin and/or significance will exist in the study area & proposed development area. Recent historical activities (mainly agricultural activities) would have impacted on any if they did exist here in the past and would have disturbed or destroyed these to a large degree. Known archaeological and historical sites, features and material have been identified in the larger geographical area and this needs to be taken into consideration during actions related to the proposed Silo development.

It is therefore recommended that Motivation for Exemption from a full Phase I Heritage Impact Assessment for the proposed Silo Development (at the Waagkraal NWK site) on various portions of the farm Waagkraal 37410, 15km south-west of Ottosdal in the Northwest Province, be granted to the applicants taking into consideration the following:

The subterranean nature of cultural heritage (archaeological and/or historical) resources must always be kept in mind. Should any previously unknown or invisible sites, features or material be uncovered during any development actions then an expert should be contacted to investigate and

provide recommendations on the way forward. This could include previously unknown and unmarked graves and/or cemeteries. Furthermore, should there be any future plans to do any alterations or changes to the existing farmstead and any of the related farming-related infrastructure then a Detailed Heritage Assessment needs to be undertaken to determine their age/origin and significance in order to recommend on the way forward. Any demolition or alteration to structures older than 60 years of age needs to be undertaken with a permit obtained from SAHRA

7.2.5. AESTHETICS

Visual Intrusion is defined as the level of compatibility or congruence of the project with the particular qualities of the area, or its 'sense of place'. This is related to the idea of context and maintaining the integrity of the landscape or townscape.

High visual intrusion – results in a noticeable change or is discordant with the surroundings;

Moderate visual intrusion – partially fits into the surroundings, but clearly noticeable;

Low visual intrusion – minimal change or blends in well with the surroundings.

The development has changed the scenic resources of the local area from an undeveloped, vegetated site to cleared area with white silo bags. The visual intrusion is considered to be medium as the development partially fits into the surroundings, but clearly noticeable.

8. ENVIRONMENTAL IMPACT ASSESSMENT

8.1 ASSESSMENT CRITERIA

Impacts were rated using the following methodology:

Nature of the potential impact		Description of the effect, and the affected aspect of the environment
Duration (time scale)	Short term	Up to 5 years
	Medium term	6 – 15 years
	Long term	More than 15 years
Extent (area)	Local	Confined to study area and its immediate surroundings
	Regional	Region (cadastral, catchment, topographic)
	National	Nationally (The country)
	International	Neighboring countries and the rest of the world.
Magnitude (Intensity)	Low	Site-specific and wider natural and/or social functions and processes are negligibly altered. ((A low intensity impact will not affect the natural, cultural, or social functions of the environment).
	Medium	Site-specific and wider natural and/or social functions and processes continue albeit in a modified way. (Medium scale impact will alter the different functions slightly).
	High	Site-specific and wider natural and/or social functions and processes are severely altered. (A High intensity impact will influence these functions to such an extent that it will temporarily or permanently cease to exist).
Probability	Improbable	Possibility of occurrence is very low. (Such an impact will have a very slight possibility to materialise, because of design or experience).
	Possible	There is a possibility that the impact will occur
	Probable	It is most likely that the impact will occur
	Definite	The impact will definitely occur
Significance	Insignificant	Impact is negligible and will not have an influence on the decision regarding the proposed activity (No mitigation is necessary)
	Very Low	Impact is very small and should not have any meaningful influence on the decision regarding the proposed activity (No mitigation is necessary)
	Low	The impact may not have a meaningful influence on the decision regarding the proposed activity (No mitigation is necessary)
	Medium	The impact should influence the decision regarding the proposed activity (The project can only be carried through if certain mitigatory steps are taken)
	High	The impact will influence the decision regarding the proposed activity

Nature of the potential impact		Description of the effect, and the affected aspect of the environment
	Very High	The proposed activity should only be approved under special circumstances
Reversibility	Low	There is little chance of correcting the adverse impact
	Medium	There is a moderate chance of correcting the adverse impact
	High	There is a high chance in correcting the adverse impact
Risk	Low	Assessing a risk involves an analysis of the consequences and likelihood of a hazard being realized. In decision-making, low-consequence / low-probability risks (green) are typically perceived as acceptable and therefore only require monitoring.
	Medium	Other risks (amber) may require structured risk assessment to better understand the features that contribute most to the risk. These features may be candidates for management
	High	High-consequence / high-probability risks (red) are perceived as unacceptable and a strategy is required to manage the risk.

Attributes associated with the alternatives were assessed and is outlined below:

Geographical attributes

The Geographical attributes of an area relates to the characteristics of a particular region, area or place. It influences the determination of site alternatives as it relates to the location of a site in relation to relevant features in the area.

Physical attributes

Physical attributes of an area relates to the processes and patterns in the natural environment. For the purpose of this assessment, the following processes and patterns have been investigated. Geology, soil, topography and landforms, climate and meteorology, surface water and ground water.

Biological attributes

Biological attributes for the purpose of this study includes the distribution of species and ecosystems in geographic space and through geological time. Organisms and biological communities often vary in a regular fashion along geographic gradients of latitude, elevation, isolation and habitat area. The two main branches assessed will be:

Phytogeography is the branch of biogeography that studies the distribution of plants.

Zoogeography is the branch that studies distribution of animals.

Social attributes

Social attributes is closely related to social theory in general and sociology in particular, dealing with the relation of social phenomena and its spatial components.

Economic attributes

Economic attributes includes the location, distribution and spatial organization of economic activities and also takes into account social, cultural, and institutional factors in the spatial economy of the development.

Heritage attributes

The broad generic term Cultural Heritage Resources refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of paleontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

Cultural attributes

Cultural attributes relates to the specific characteristics such as language, religion, ethnic and racial identity, and cultural history & traditions of people. These attributes influences family life, education, economic and political structures, and, of course, business practices.

It should be noted that the above mentioned attributes do not occur in isolation and it is not uncommon for an identified impact to overlap with two or more of these attributes. Also note, not all risks require comprehensive and detailed assessment. Solid problem formulation should allow decision-makers to evaluate the extent of subsequent analysis required. The level of effort put into assessing each risk should be proportionate to its significance and priority in relation to other risks, as well as its complexity, by reference to the likely impacts. Consideration should be given to stakeholders' perceptions of the nature of the risk.

8.2 IMPACT ASSESSMENT

ENVIRONMENTAL IMPACT ASSESSMENT					
PROPOSAL: Clearance of 11,5 hectares of indigenous vegetation in order to use of Silo Bags in combination with Corrugated Iron Silos for storage of maize.					
Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
BIO-PHYSICAL ASPECTS					
Fauna and Flora, Topography and surface drainage	Clearing of 26.4 hectares of indigenous vegetation has commenced in order to establish the development. The site is located within a CBA 2.	Duration	Long term	Determine the sensitivity of the vegetation that has been cleared. Outcome: After assessment by a suitably qualified Specialist, it was determined that the sensitivity of the vegetation that has been cleared was medium.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	High		High
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Low		Low
		Risk	Medium		High
	Relative aquatic biodiversity theme sensitivity at the site is listed low for part of the site and high for part of the site.	Duration	Long term	Determine the sensitivity of the Relative aquatic biodiversity and the impact that the development may have on it. Outcome: After assessment by a suitably qualified Specialist, it was determined that the riparian zone is a substantial distance from the site and current developments at the site, are unlikely to have a discernible impact on the watercourse north of the site if mitigation measures such as avoiding pollutants or spills from entering the soil and ultimately soil water.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	High		High
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Low		Low
		Risk	Low		High
	Relative terrestrial biodiversity at the site is very high.	Duration	Long term		Long term
		Extent	Local		Local

ENVIRONMENTAL IMPACT ASSESSMENT						
PROPOSAL: Clearance of 11,5 hectares of indigenous vegetation in order to use of Silo Bags in combination with Corrugated Iron Silos for storage of maize.						
Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)	
		Magnitude (Intensity)	High	Determine the sensitivity of the Relative terrestrial biodiversity that has been cleared. Outcome: After assessment by a suitably qualified Specialist, it was determined that the sensitivity of the vegetation that has been cleared was medium.	High	
		Probability	Definite		Definite	
		Significance	Medium		Medium	
		Reversibility	Low		Low	
		Risk	Medium		Very High	
	Erosion and Sedimentation as a result of poor storm water management	Duration	Long term	The site has been strategically placed on a gentle slope. Even after the above average rainfall experienced in the area this season, no signs of erosion or sedimentation was noted. Ensure that stormwater is managed in a way not to cause concentrated run off towards the stream.	Long term	
		Extent	Local		Local	
		Magnitude (Intensity)	High		High	
		Probability	Definite		Definite	
		Significance	Medium		Medium	
		Reversibility	High		High	
		Risk	Low		High	
	Heritage	Archaeological artefacts may have been removed, destroyed or interfered with	Duration	Short term	Determine the possibility that any Archaeological artefacts may have been removed, destroyed or interfered with. Outcome: After assessment by a suitably qualified Specialist, it was determined that Archaeological artefacts have been removed, destroyed or interfered with.	Long term
			Extent	Local		Local
Magnitude (Intensity)			Low	High		
Probability			Probable	Definite		
Significance			Medium	Medium		
Reversibility			High	Low		
Risk			Low	High		
Alien invasive plan species	Infestation by alien invasive species could replace indigenous vegetation or potential areas where indigenous vegetation could recover.	Duration	Long term	Continued monitoring and eradication of alien invasive plant species are imperative. It is in particular declared alien invasive species such as <i>Prosopis glandulosa</i> (Mesquite), <i>Melia azedarach</i> (Syringa) and alien invasive Australian <i>Acacia species</i> (Australian wattles) should not be allowed to establish.	Long term	
		Extent	Local		Local	
		Magnitude (Intensity)	High		High	
		Probability	Definite		Definite	
		Significance	Medium		Medium	
		Reversibility	Low		Low	
		Risk	Low		Medium	
SOCIO ECONOMIC FACTORS						
SOCIAL AMENITIES	Operations provide the Applicant and Farmers of the area the opportunity to store their grain in an environmental friendly and cost effective manner. Local labour must be used.	Duration	Short term	Ensure that the development continues to operate as this enables the Applicant to be able to realize the benefits for himself, the Environment and the community of the area.	Long term	
		Extent	Local		Local	
		Magnitude (Intensity)	Low		High	
		Probability	Probable		Definite	
		Significance	Medium		Medium	
		Reversibility	High		Low	
		Risk	Low		High	
Air quality	Bare surfaces may lead to increase dust pollution during dry periods.	Duration	Long term	Allow vegetative growth between the silo bags as far as possible. Should dry spells result in excessive dust pollution, spray bare surfaces with water.	Long term	
		Extent	Local		Regional	
		Magnitude (Intensity)	Medium		Medium	
		Probability	Possible		Definite	
		Significance	Low		Low	
		Reversibility	High		High	

ENVIRONMENTAL IMPACT ASSESSMENT					
PROPOSAL: Clearance of 11,5 hectares of indigenous vegetation in order to use of Silo Bags in combination with Corrugated Iron Silos for storage of maize.					
Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
		Risk	Low		Medium
Noise	It is a fact that a certain amount of noise will be generated during the operational phase of the project.	Duration	Short term	The site is located far from any Residential developments and noise levels should rarely exceed the allowable limits as noise will only be generated by normal operational activities.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Low
Soil and water pollution	Leaking Tractors, Plant and Trucks can result in soil and water pollution.	Duration	Long term	Inspect all Vehicles on a daily basis. No leaking Vehicles or trucks will be allowed on site.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	Low		High
		Probability	Improbable		Definite
		Significance	Insignificant		Medium
		Reversibility	Low		High
		Risk	Low		High
Aesthetics	<p>Visual Intrusion is defined as the level of compatibility or congruence of the project with the particular qualities of the area, or its 'sense of place'. This is related to the idea of context and maintaining the integrity of the landscape or townscape.</p> <p>High visual intrusion – results in a noticeable change or is discordant with the surroundings;</p> <p>Moderate visual intrusion – partially fits into the surroundings, but clearly noticeable;</p> <p>Low visual intrusion – minimal change or blends in well with the surroundings.</p> <p>The development has changed the scenic resources of the local area from an undeveloped, vegetated site to arable lands. The visual intrusion is considered to be medium as the development partially fits into the surroundings, but clearly noticeable</p>	Duration	Long term	No mitigation measures possible.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Low
		Probability	Improbable		Improbable
		Significance	Insignificant		Insignificant
		Reversibility	Low		Low
		Risk	Low		Low

9. PUBLIC PARTICIPATION

9.1 Advertisement and Notice

Publication name	Stellalander	
Date published	11/01/2023	
Site notice 1 position	Latitude	Longitude
	26°56'8.19"S	25°56'28.39"E
Date placed	11/01/2023	

PLEASE SEE PROOF BELOW (TO FOLLOW)

9.2 DETERMINATION OF APPROPRIATE MEASURES

Details of the measures taken to include all potential I&APs as required by Regulation 41(2)(e) and 41(6) of GN R.982.

Key stakeholders (other than organs of state) identified in terms of Regulation 40(2)(d) of GN R.982:

Title, Name and Surname	Affiliation/ key stakeholder status	Contact details (tel number or e-mail address)
NA	Neighbour	See Proof below

9.3 AUTHORITY PARTICIPATION

Authorities and organs of state identified as key stakeholders. Key stakeholders identified in terms of Regulation 7(1) and (2) and Regulation 40(2) (a)-(c) of GN R.982:

Authority/Organ of State	Contact person (Title, Name and Surname)	Tel No	Fax No	e-mail	Postal address
Department of Water and Sanitation	Mr. A. Abrahams	(053) 830 8800051 405 9000			Department of Water and Sanitation; 28 Central Road; Beaconsfield; Kimberley 8301
Head of Department: North-West Department of Agriculture and Rural Development	Dr. P. Mokaila	(018) 389 5146/5104	(018) 392 4377		Department Agriculture and Rural Development Private Bag X2039 Mmabatho 2735
North West Department of Biodiversity	Mr Schaller	018 389 5719/ 5431/ 5688	018 392 4377		Private Bag X2039 Mmabatho 2735
Kenneth Kaunda District Municipality	The District Municipal Manager	018 473 8000	018 381 0561		Private Bag X2167, Mahikeng, 2745
Macquassi hills Local Municipality	The Municipal Manager Velaphi Zikalala	018 065 0010	018 596 1555		Private Bag X3, Wolmaransstad, 2630
Ward 8, Macquassi hills Local Municipality	The Councilor	018 065 0010	018 596 1555		Private Bag X3, Wolmaransstad, 2630
SAHRA				SAHRIS	



7 Louis Leipoldt Street,
Potchefstroom, 2531
Tel: + 27 (0)31 5488 105
E-mail: jo@abenviro.co.za

AB ENVIRO-CONSULT CC

Reg no. 2000/016653/23

11/01/2023

Dr. P. Mokaila
Head of Department: North-West Department of Agriculture and Rural Development
Private Bag X2039
Mmabatho
2735

Dear Sir/Madam

Legalisation of the illegal commencement of clearance of 26.4 hectares of indigenous vegetation in order to establish grain handling and storage facilities on the remaining extent of Portion 4 of the Farm Waagkraal 374 IO, Maquassi Hills Local Municipality, North West Province.

AB ENVIRO CONSULT was appointed by Mr. M Nel to submit an application to the Department of Rural, Environment and Agricultural Development, North West Province for the above mentioned development.

Attached please find a notification of the development as well as a copy of the draft Section 24G report for your comments. We must receive your comments within a period of 30 days from the date of this letter.

In the event of your organisation/department not wishing to comment on this matter, it would be appreciated if we could receive written confirmation thereof to enable us to continue with the finalisation of the application. If no response is however received from your Department/organisation within the said time, it will be assumed that your department/organisation does not wish to comment on this matter and the application will be processed further. Please be advised, in accordance with POPIA and NEMA, personal data is collected and processed by the applicant/EAP and shared with the Competent Authority to enable informed decision-making.

Please do not hesitate to contact us should any further information or clarification be required.

Yours sincerely,

Mr JP de Villiers
EAP-EAPASA: 2019/808

PROF A B DE VILLIERS (M Sc, Ph D, SACNASP)
MR.J.P. DE VILLIERS (M Sc, EAP-EAPASA, IAIA); MRS.J.E. DU PLOOY (M.E.M: EAP-EAPASA, IAIA)



7 Louis Leipoldt Street,
Potchefstroom, 2531
Tel: + 27 (0) 5488 105
E-mail: jp@abenviro.co.za

AB ENVIRO-CONSULT CC

Reg no. 2000/016652/23

11/01/2023

Mr. R. Schaller
North West Department of Biodiversity
Private Bag X2039
Mmabatho
2735

Dear Sir/Madam

Legalisation of the illegal commencement of clearance of 26.4 hectares of indigenous vegetation in order to establish grain handling and storage facilities on the remaining extent of Portion 4 of the Farm Waagkraal 374 IO, Maquassi Hills Local Municipality, North West Province.

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7 Louis Leipoldt Street,
Potchefstroom, 2531
Tel: + 27 (0) 5488 105
E-mail: info@abenviro.co.za

AB ENVIRO-CONSULT CC

Reg no. 2000/016653/23

11/01/2023

Mr. A. Abrahams
Department of Water and Sanitation
28 Central Road
Beaconsfield
Kimberley
8301

Tel: (053) 830 8800

Legalisation of the illegal commencement of clearance of 26.4 hectares of indigenous vegetation in order to establish grain handling and storage facilities on the remaining extent of Portion 4 of the Farm Waagkraal 374 IO, Maquassi Hills Local Municipality, North West Province.

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Yours sincerely,

Mr JP de Villiers
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PROF A B DE VILLIERS (M Sc, Ph D, SACNASP)
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7 Louis Leipoldt Street,
Potchefstroom, 2531
Tel: + 27 (0)51 5488 105
E-mail: info@abenviro.co.za

AB ENVIRO-CONSULT CC

Reg no. 2000/016652/23

11/01/2023

The Municipal Manager
Dr. Kenneth Kaunda District Municipality
Private Bag X5017
Klerksdorp
2570

Dear Sir/Madam

Legalisation of the illegal commencement of clearance of 26.4 hectares of indigenous vegetation in order to establish grain handling and storage facilities on the remaining extent of Portion 4 of the Farm Waagkraal 374 IO, Maquassi Hills Local Municipality, North West Province.

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Please do not hesitate to contact us should any further information or clarification be required.

Yours sincerely,

Mr JP de Villiers
EAP-EAPASA: 2019/808

PROF A B DE VILLIERS (M Sc, Ph D, SACNASP)
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7 Louis Leipoldt Street,
Potchefstroom, 2531
Tel: + 27 (0)31 5488 105
E-mail: info@abenviron.co.za

AB ENVIRO-CONSULT CC

Reg no. 2000/016653/23

11/01/2023

The Municipal Manager:
Mr Velaphi Zikalala
Macquassi Hills Local Municipality
Private Bag X3
Wolmaransstad
2630

Dear Sir/Madam

Legalisation of the illegal commencement of clearance of 26.4 hectares of indigenous vegetation in order to establish grain handling and storage facilities on the remaining extent of Portion 4 of the Farm Waagkraal 374 IO, Maquassi Hills Local Municipality, North West Province.

AB ENVIRO CONSULT was appointed by Mr. M Nel to submit an application to the Department of Rural, Environment and Agricultural Development, North West Province for the above mentioned development.

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Please do not hesitate to contact us should any further information or clarification be required.

Yours sincerely,

Mr JP de Villiers
EAP-EAPASA: 2019/808

PROF A B DE VILLIERS (M Sc, Ph D, SACNASP)
MR.J.P. DE VILLIERS (M Sc, EAP-EAPASA, IAIA); MRS.J.E. DU PLOOY (M.E.M; EAP-EAPASA, IAIA)



7 Louis Leipoldt Street,
Potchefstroom, 2531
Tel: + 27 (0) 5488 105
E-mail: ja@abenviro.co.za

AB ENVIRO-CONSULT CC

Reg no. 2000/016653/23

11/01/2023

The Councillor Ward 8
Patrick Kgotsi Leshomo
Macquassi Hills Local Municipality
Private Bag X3
Wolmaransstad
2630

Dear Sir/Madam

Legalisation of the illegal commencement of clearance of 26.4 hectares of indigenous vegetation in order to establish grain handling and storage facilities on the remaining extent of Portion 4 of the Farm Waagkraal 374 IO, Maguassi Hills Local Municipality, North West Province.

AB ENVIRO CONSULT was appointed by Mr. M Nel to submit an application to the Department of Rural, Environment and Agricultural Development, North West Province for the above mentioned development.

Attached please find a notification of the development as well as a copy of the draft Section 24G report for your comments. We must receive your comments within a period of 30 days from the date of this letter.

In the event of your organisation/department not wishing to comment on this matter, it would be appreciated if we could receive written confirmation thereof to enable us to continue with the finalisation of the application. If no response is however received from your Department/organisation within the said time, it will be assumed that your department/organisation does not wish to comment on this matter and the application will be processed further. Please be advised, in accordance with POPIA and NEMA, personal data is collected and processed by the applicant/EAP and shared with the Competent Authority to enable informed decision-making.

Please do not hesitate to contact us should any further information or clarification be required.

Yours sincerely,

Mr JP de Villiers
EAP-EAPASA: 2019/008

PROF A B DE VILLIERS (M Sc, Ph D, SACNASP)
MR.J.P. DE VILLIERS (M Sc, EAP-EAPASA, IAIA); MRS J.E. DU PLOOY (M.E.M; EAP-EAPASA, IAIA)

9.4 ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summary of main issues raised by I&APs	Summary of response from EAP

9.5 COMMENTS AND RESPONSE REPORT

I&AP registered:	Comment received:	Response by the EAP:

10. Environmental Management Programme

10.1 INTRODUCTION

The purpose of this Environmental Management Programme (EMPr) is to ensure 'good environmental practice' by taking a holistic approach to the management of environmental impacts during the operational phase of the activities that resulted from the clearance of 26.4 hectares of indigenous vegetation in order to establish grain handling and storage facilities on the remaining extent of Portion 4 of the Farm Waagkraal 374 IO, Maquassi Hills Local Municipality, North West Province. This EMPr therefore sets out the methods by which proper environmental controls are to be implemented by the applicant. However, where necessary, these methods have been expanded upon and additional issues addressed in order to ensure that all environmental aspects are appropriately considered and monitored.

It is important to note that this EMPr is focused primarily on the operational phases of the project. Due to the projected lifespan, a detailed Site Closure and Decommissioning has not been included in this document as it is not intended for a project of this nature. Design specifications from an environmental point of view were taken into consideration, the Environmental Assessment Practitioner (EAP) have provided input with regard to possible mitigation measures for reducing environmental impacts.

This EMPr is also intended to ensure that the principles of sound Environmental Management and the general "Duty of Care" specified in the National Environmental Management Act are promoted on site during all phases of the development

This EMPr has been designed to suit the particular activities and needs of the operational phase of the activities that resulted from the clearance of 26.4 hectares of indigenous vegetation in order to establish grain handling and storage facilities on the remaining extent of Portion 4 of the Farm Waagkraal 374 IO, Maquassi Hills Local Municipality, North West Province, and incorporates specific project mitigation measures. This EMPr therefore identifies the following:

- Operational activities that will impact on the environment;
- Specifications with which the Applicant shall comply in order to protect the environment from the identified impacts; and
- Actions that shall be taken in the event of non-compliance.

It is important to note that the EMPr is a dynamic document subject to similar influences and changes as are brought by variations to the provisions of the project specification. Any substantial changes shall be submitted to the relevant environmental authorities in writing for approval.

A professional team consisting of the following experts have been assembled in order to ensure the success of the proposed development:

- A SAHRA Specialist.
- A Ecological Fauna and Flora specialist

- Registered Environmental Assessment Practitioner (EAP)

They were responsible for the following actions:

- SAHRA Specialist determined the possible impact of the development on Archaeological and cultural features.
- The Ecological Fauna and Flora specialist determined the impact of the proposed development on the streams and the Fauna and Flora of the area
- The EAP must assess all possible environmental issues that may affect the proposed project and ensure that all interested and affected parties are notified in order to assist him in identifying possible impacts. He must also give mitigation measures where applicable.
- It will be essential to plan for the appointment of an Environmental Control Officer (ECO) who will be responsible to ensure that all aspects regarding the environmental issues are implemented and monitored. The ECO will also be responsible for maintaining a database of all records pertaining to the environment for the study area.

10.2. Contents of the Environmental Management Programme

The contents of an EMPr, shown below, are contained in Appendix 4 of the NEMA EIA Regulations 982 of 2014 as amended and published in Appendix 4 of Government Notice No. R 326 of 2017.

1. (1) An EMPr must comply with section 24N of the Act and include-
 - (a) details of
 - (i) the EAP who prepared the EMPr; and
 - (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;
 - (b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;
 - (c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that be avoided, including buffers;
 - (d) a description of the impact management outcomes, including management statements, identifying the impact risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-
 - (i) planning and design;
 - (ii) pre-construction activities;
 - (iii) construction activities;
 - (iv) rehabilitation of the environment after construction and where applicable post closure; and
 - (v) where relevant, operation activities;

(f)	a description of proposed impact management actions, identifying the manner in which the impact management outcomes and outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to –
	(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
	(ii) comply with any prescribed environmental management standards or practices;
	(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and
	(iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable
(g)	the method of monitoring the implementation of the impact management actions contemplated in paragraph
(h)	the frequency of monitoring the implementation of the impact management actions contemplated in paragraph
(i)	an indication of the persons who will be responsible for the implementation of the impact management action
(j)	the time periods within which the impact management actions contemplated in paragraph (f) must be implemented
(k)	the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f)
(l)	a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations
(m)	an environmental awareness plan describing the manner in which-
	(i) the applicant intends to inform his or her employees of any environmental risk which may result from the activity and
	(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and
(n)	any specific information that may be required by the competent authority.

10.3. Details of Environmental Assessment Practitioner

Project Environmental Assessment Practitioner:	Mr J. P. de Villiers of AB Enviro Consult cc		
Company/ Closed Corporation Registered Name (if applicable)	AB Enviro Consult CC		
Company / Closed Corporation Registration Number (if applicable)	2000/016653/23		
Contact Person:	Mr. JP de Villiers		
Position in Company:	Environmental Assessment Practitioner (EAP)		
ID Number of Contact Person	700228 5035 084		
Postal Address:	7 Louis Leipoldt Street		
	Potchefstroom	Code:	2531

Physical Address:

7 Louis Leipoldt Street
Potchefstroom
018 294 5005
jp@abenviro.co.za

Code:

Cell:

Fax:

2571
082 5642 642
018 293 0671



10.4 Expertise of the Environmental Assessment Practitioner

AB Enviro Consult (CC) is a registered consultancy, owned and operated as an independent unit by the registered owner and consultant: **Prof. A.B. de Villiers**

- **Mr J.P. De Villiers** joined the consultancy during 2004
- **Mrs J.E. du Plooy** is a consultant since 2001

Over a period of 26 years (1996-2022) this consultancy has successfully applied for, and obtained positive ROD's and EA's for more than 380 projects. Environmental Control Officer's duties are also performed on various projects.

Mr. JP de Villiers holds a M.Sc. in Geography from the North West University's Department of Geography and Environmental Management. He started as a junior EAP in 2004 with AB Enviro Consult and was promoted in 2007 to senior EAP. During 2011 he was appointed as the Manager of the North West University, EIA Pro-Bono Office. This office is an initiative of, and funded by, the DEA. (This was a three year contract between DEA and NWU that was extended by one year) As Manager of this office, Mr. de Villiers had the following responsibilities:

- Conduct Environmental Impact Assessments for municipalities on a pro-bono basis.
- Provide environmental management training to North West Municipalities.
- Provide environmental assistance to North West Municipalities.
- Undertake research related to Environmental Impact Management within the North West Municipal Context.
- Marketing for stakeholder 'pro-bono' expert donations.
- Marketing for corporate 'pro-bono' funding.

As EAP, Mr. de Villiers has been directly involved in obtaining 308 Environmental Authorizations and has performed the duties of Environmental Control Officer (ECO) for 32 developments. His responsibilities as Senior EAP includes the following:

Duties pertaining to Basic Assessments, EIA and Scoping and Section 24 G Applications:

- Marketing and communication with clients
- Communication with authorities, source and analyse relevant baseline information and undertake site inspections
- Compile Environmental Application Form for the project and submit to the authorities
- Compile an *information requirements list* that is distributed to the project team. The Information required would assist with completion of the Report.
- Identify key interested and affected parties (I&APs)
- Compilation of terms of reference for specialist studies
- Commission specialist studies
- Compile and publish media notices in relevant newspapers
- Compile and place poster/s along the boundary of the site
- Hold a public meeting / Open House / focus meeting with I&APs
- Receive and address comments from public
- Undertake assessment phase by assessing and evaluating potential impacts identified.
- Review and manage specialist studies.

- Compile and distribute Draft Reports (Including Environmental Management Programmes)
- Should the Reports require substantial changes, these changes are incorporated into the final reports and distributed
- Address comments received on the final Report, finalise Report and submit to authorities
- Once the decision is issued, all I&Ps are formally informed of the decision

Duties pertaining to Environmental Control Officer

- Preparation (Compilation) and submission of Environmental Control Document.
- Training of and leasing with the Engineers Representative.
- Communicate with the Contractor.
- A monthly visit to the site during the construction period. Should any Environmental incident occur, an immediate site visit is undertaken.
- Monitoring and auditing according to the approved EMP and EA.
- Compilation of a written audit report for each site visits during the construction phase
- Liaising with the Compliance section of the Competent Authority

ACADEMIC AND PROFESSIONAL QUALIFICATIONS PROF DE VILLIERS

Post–Matric Qualifications

YEAR	Qualification	Institution	Field of Study
1968	B.Sc.	PU FOR CHE	Geography, Geology
1970	HONNS. B.Sc.	PU FOR CHE	Soil Science
1974	M.Sc.	PU FOR CHE	Geography
1981	Ph.D.	UOFS	Geography

ACADEMIC AND PROFESSIONAL QUALIFICATIONS MR J.P. DE VILLIERS

YEAR	Qualification	Institution	Field of Study
1993	BA	PU FOR CHE	Geography, Economics
1994	HED	PU FOR CHE	Geography Economics
2006	B.Sc.(Honns) Cum Laude	North-West University	Environmental Management
2007	M.Sc.	North-West University	Geography

PROFESSIONAL QUALIFICATIONS AND REGISTRATIONS

YEAR	Qualification/ Registration	Institution	Field of Study
2008	Basic Principles of Ecological Rehabilitation and Mine Closure	Centre for Environmental Management (North West University)	Ecological Rehabilitation
2019	Registered as Environmental assessment Practitioner	EAPASA Registration number: 2019/808	
2020-2022	International Association for impact assessment South Africa (IAIASA)	IAIASA Member	

ACADEMIC AND PROFESSIONAL QUALIFICATIONS MRS J.E. DU PLOOY

YEAR	Qualification	Institution	Field of Study
1999	BA	PU FOR CHE	Geography, Tourism
2000	BA (Honns) Cum Laude	PU FOR CHE	Geography
2003	Master's degree in Environmental Management	PU FOR CHE	Environmental Management
2001	Aquabase Intro	AQUABASE	Hydrology
2001	Geomedia Professional	INTERTECH	GIS
2001	Map Info	SPATIAL TECHNOLOGY	GIS
2019	Registered as Environmental assessment Practitioner	EAPASA Registration number: 2019/1573	
2020-2022	International Association for impact assessment South Africa (IAIASA)	IAIASA Member	

10.5. DESCRIPTION OF THE PROPERTY

The development is located on the remaining extent of Portion 4 of the Farm Waagkraal 374 IO, Maquassi Hills Local Municipality, North West Province. Please see Figure 1a and b for Locality Maps. **The site is located in the northern parts of the Maquassi Hills Local Municipality that forms part of the Dr. Kenneth Kaunda District Municipality in the North West Province of South Africa.** The site is located approximately 14km south (as the crow flies) of the Town of Ottosdal and 28 km north (as the crow flies) of the Town of Wolmaransstad.

The site is located 1.8 km west of the R505 Road between Ottosdal and Wolmaransstad. The site is located on a gentle slope that slopes towards the north where a waterbody Dam 1, artificial waterbody Dam 2 and the active channel of the Boesmanspruit non-perennial river borders the site. See Figure 2.

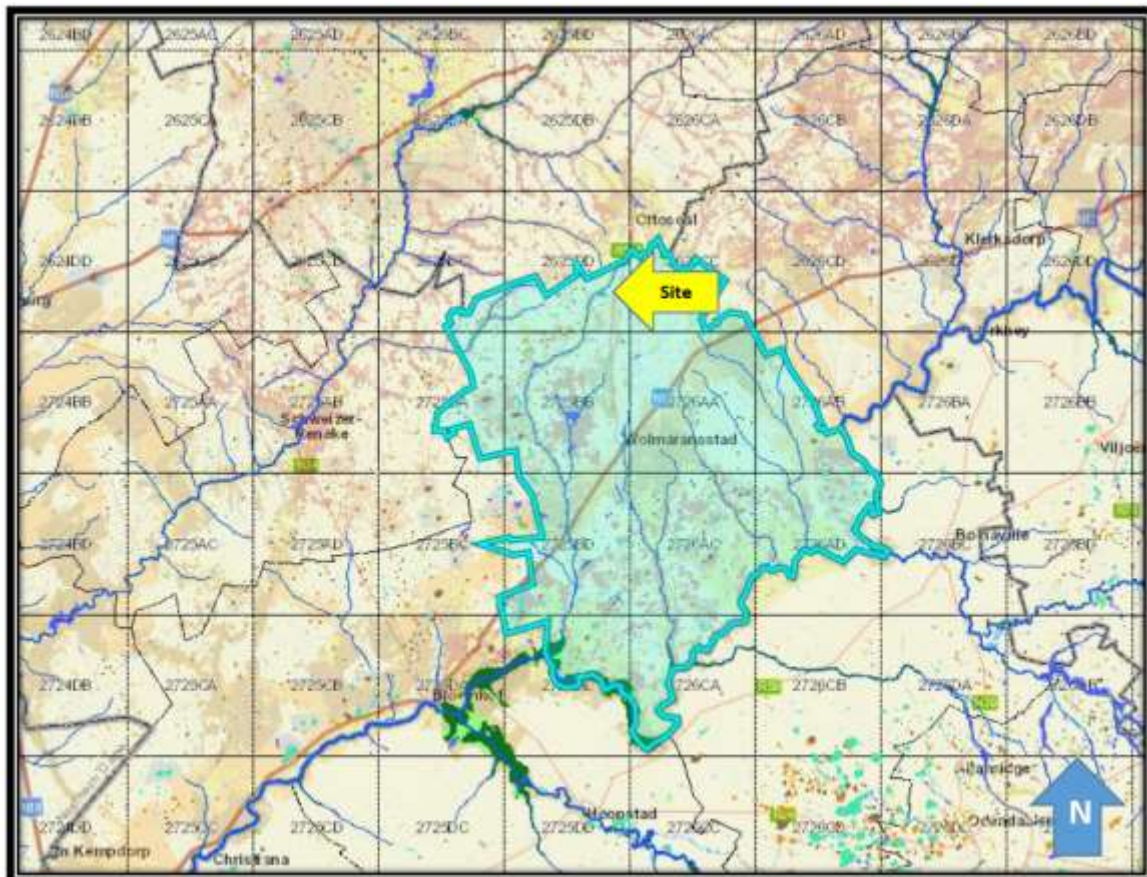


Figure 1a: Locality Map

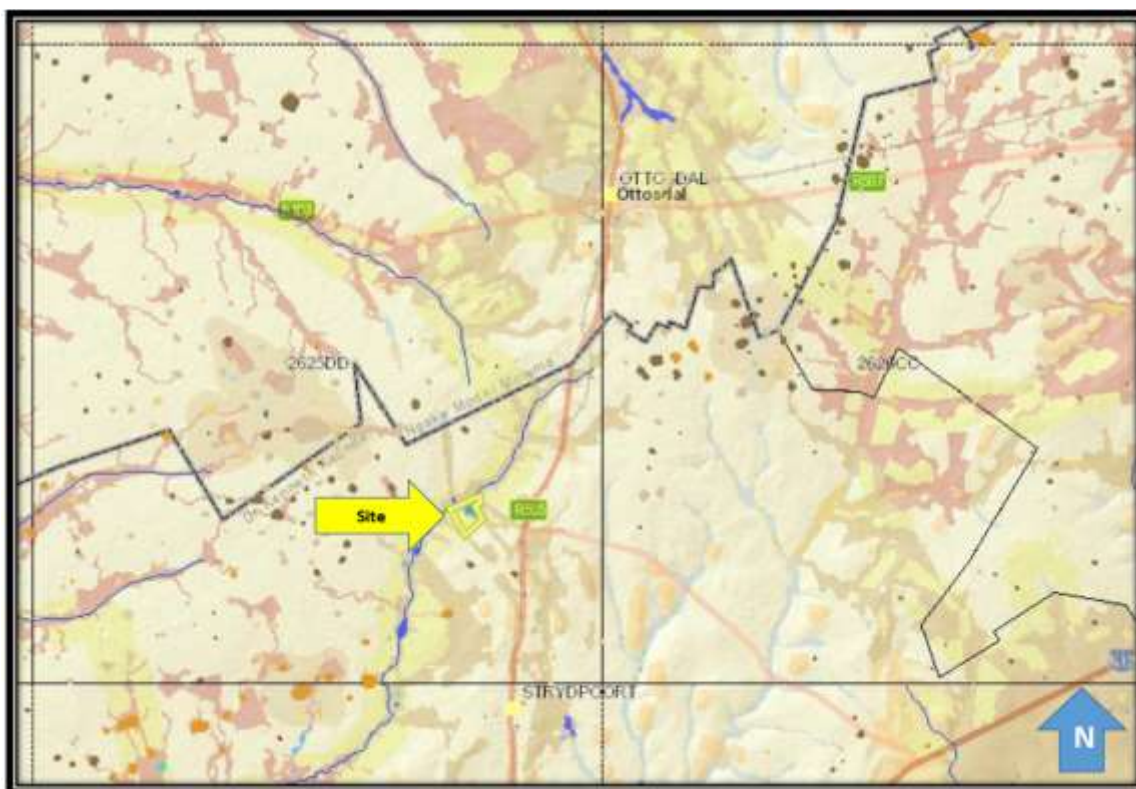


Figure 1b: Locality Map (Indication of the location of the western and eastern section at the site)

There is an area that had been cleared and an area where grassland remained at the site. At the area that had been cleared there is some recovery of vegetation and a conspicuous presence of pioneer plant species. Both these areas, the cleared area and the area which is the remainder of the grassland, are at one terrain unit, a plain with gentle slopes in a slightly undulating larger area. The plain with gentle slopes, to almost moderate slopes, at the site is adjacent to a shallow valley outside the site, where a non-perennial river runs through.





Vegetation at the remainder of the grassland at the site consists of a moderately disturbed grassland which contains indigenous grass species, some indigenous shrub species and few trees. The grass layer is well-developed and indigenous grass species such as *Elionurus muticus* is conspicuous. Other indigenous grass species include *Aristida congesta*, *Eragrostis lehmanniana*, *Eragrostis superba*, *Cynodon dactylon*, *Eragrostis curvula*, *Chloris virgata* and *Themeda triandra*. The shrub *Seriphium plumosum* (bankrupt bush) is conspicuous at some parts of the remaining grassland. Indigenous forb species include *Berkheya onopordifolia*, *Ursinia nana*, *Cyanotis speciosa*, *Hibiscus pusillus*, *Senecio consanguineus*, *Bulbine narcissifolia*, *Pollichia campestris*, *Selago densiflora* and *Lippia scaberrima*. Alien invasive herbaceous weed species are conspicuous at disturbed areas at the site and include *Argemone ochroleuca*, *Tagetes minuta*, *Bidens bipinnata*, *Bidens pilosa*, *Gomphrena celosioides*, *Schkuhria pinnata*, *Conyza bonariensis*, *Chenopodium album*, *Guileminea densa*, *Alternanthera pungens* and *Verbena aristigera*.

Vegetation at the riparian zone north of the site, at artificial waterbody Dam 1, artificial waterbodd Dam 2 and the active channel of the Boesmanspruit non-perennial river in between, consists of

covers of sedges and some other plant species mixed in between. Indigenous sedge species at the riparian zone include *Cyperus fastigiatus*, *Pycnus nitidus*, *Cyperus laevigatus*, *Schoenoplectus decipiens* and *Eleocharis limosa*. A rush species, *Juncus rigidus*, is also present. Herbaceous species include the alien invasive *Rumex crispus* and the indigenous *Rumex lanceolatus*. The indigenous herb *Berkheya radula* and the alien invasive *Cirsium vulgare* are present at the seasonal and temporary zones of the wetland and into some parts of the terrestrial zone.



Figure 2: A waterbody Dam 1, artificial waterbody Dam 2 and the active channel of the Boesmanspruit non-perennial river borders the site

	Red outline	Boundaries of the site
	Blue outline	Route of active channel of a non-perennial river (Boesmanspruit)
	Green outline	Outer edge of riparian zone
	Dark blue outline	Artificial waterbodies (dams)



Photograph 1: View of part of the site where vegetation has hitherto been cleared (foreground) and where the remainder of the grassland (background) is present.



Photograph 2: View of part of the site where vegetation has hitherto been cleared (right-hand side) and where the remainder of the grassland (left-hand side) is present.

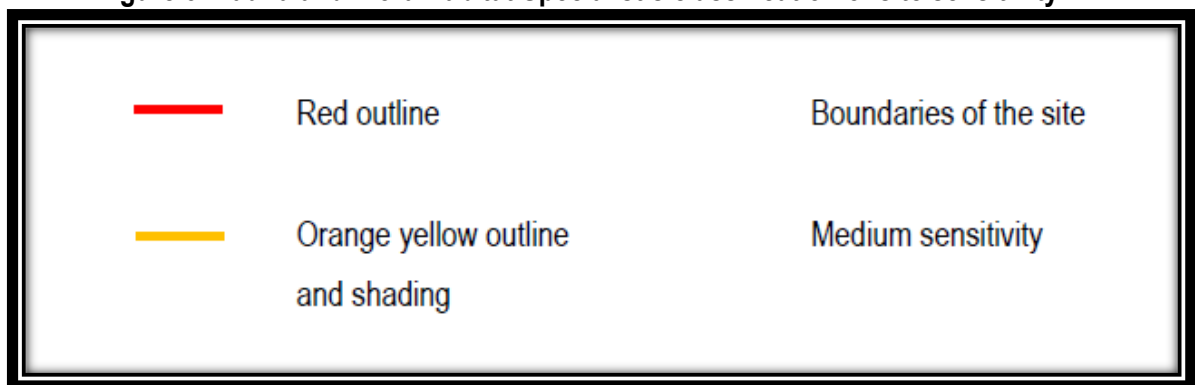


Photograph 3: The remainder of the site where moderately disturbed grassland is present. At the time of the surveys the indigenous grass species, *Elionurus muticus*, was conspicuous

From this it is clear that the areas cleared can be classified as having a medium sensitivity and most of the additional cleared area can be considered as Low (As this site has been cultivated in the recent past). The remainder of this area is considered to be medium. Please see Figure 3 for a copy of the Fauna and Flora Habitat Specialist's classification of site sensitivity.



Figure 3: Fauna and Flora Habitat Specialist's classification of site sensitivity.



Site Co-ordinates

The co-ordinates should be in degrees, minutes and seconds using the Hartebeeshoek94 WGS84 co-ordinate system.

Centre Pivot 1

Latitude (S):**Longitude (E):**

26°	56'	04.14"	25°	56'	27.71"

10.6. DESCRIPTION OF THE DEVELOPMENT

An area of 26.4 hectares, located within a CBA 2, was cleared of indigenous vegetation in order to establish grain handling and storage facilities. See Figure 4. The purple polygon demarcates the area that has been fenced with an Electrical security fencing. This area is 26.4 hectares in size. The red polygon demarcates the area that has been illegally cleared (See Figure 5 for an image illustrating the area that has been illegally cleared.) while the green polygon demarcates an area that was ploughed in the past (See Figure 6 for an image illustrating the previously ploughed area.)

1 906 square meters of the cleared area is located within 100 meters from the non-perennial Boesmanspruit. Figure 7 illustrates the calculated area.



Figure 4: Site development plan. Purple polygon demarcates the area that has been fenced with an Electrical security fencing. The red polygon demarcates the area that has been illegally cleared while the green polygon demarcates an area that was ploughed in the past.

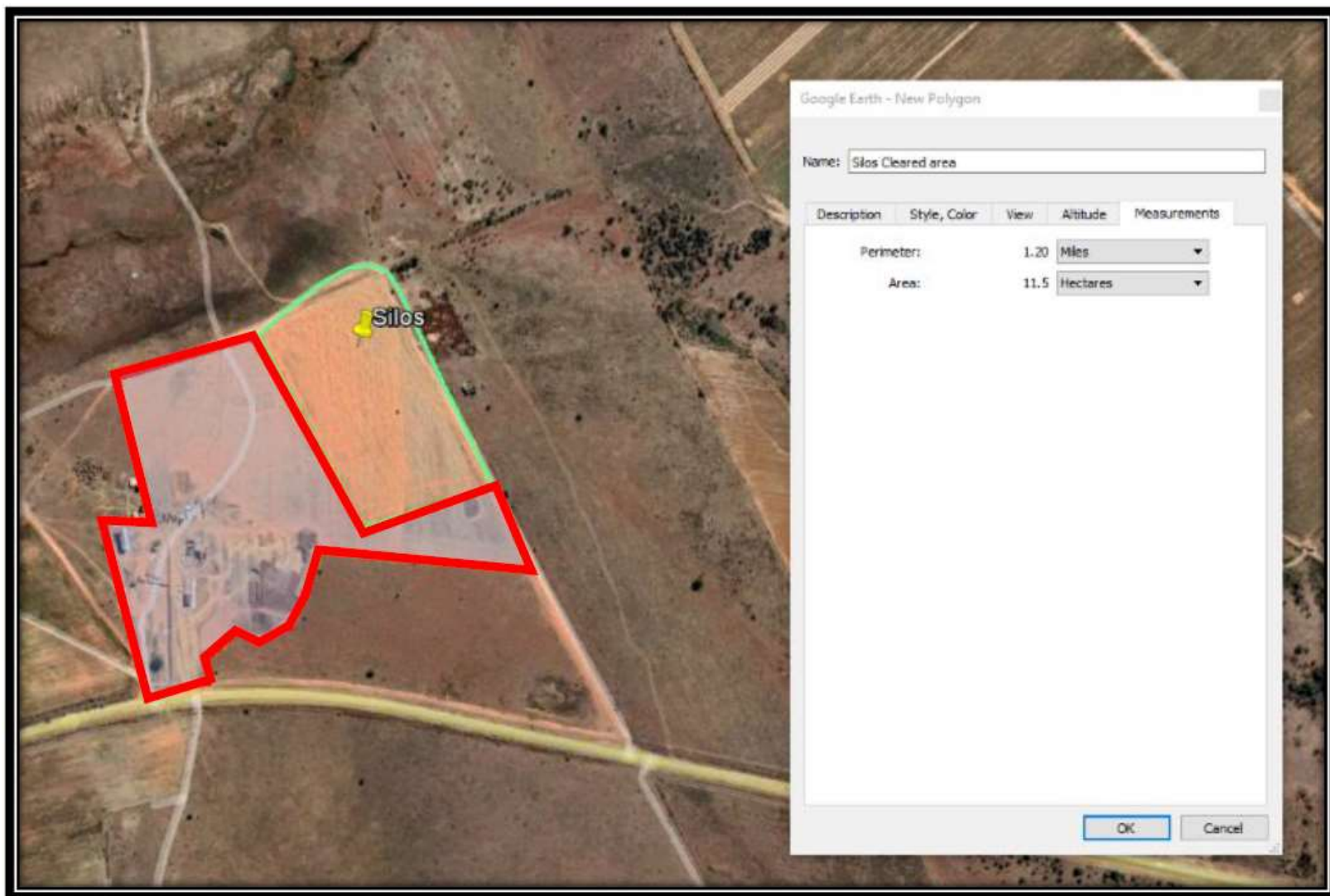


Figure 5: Image illustrating the area that has been illegally cleared.

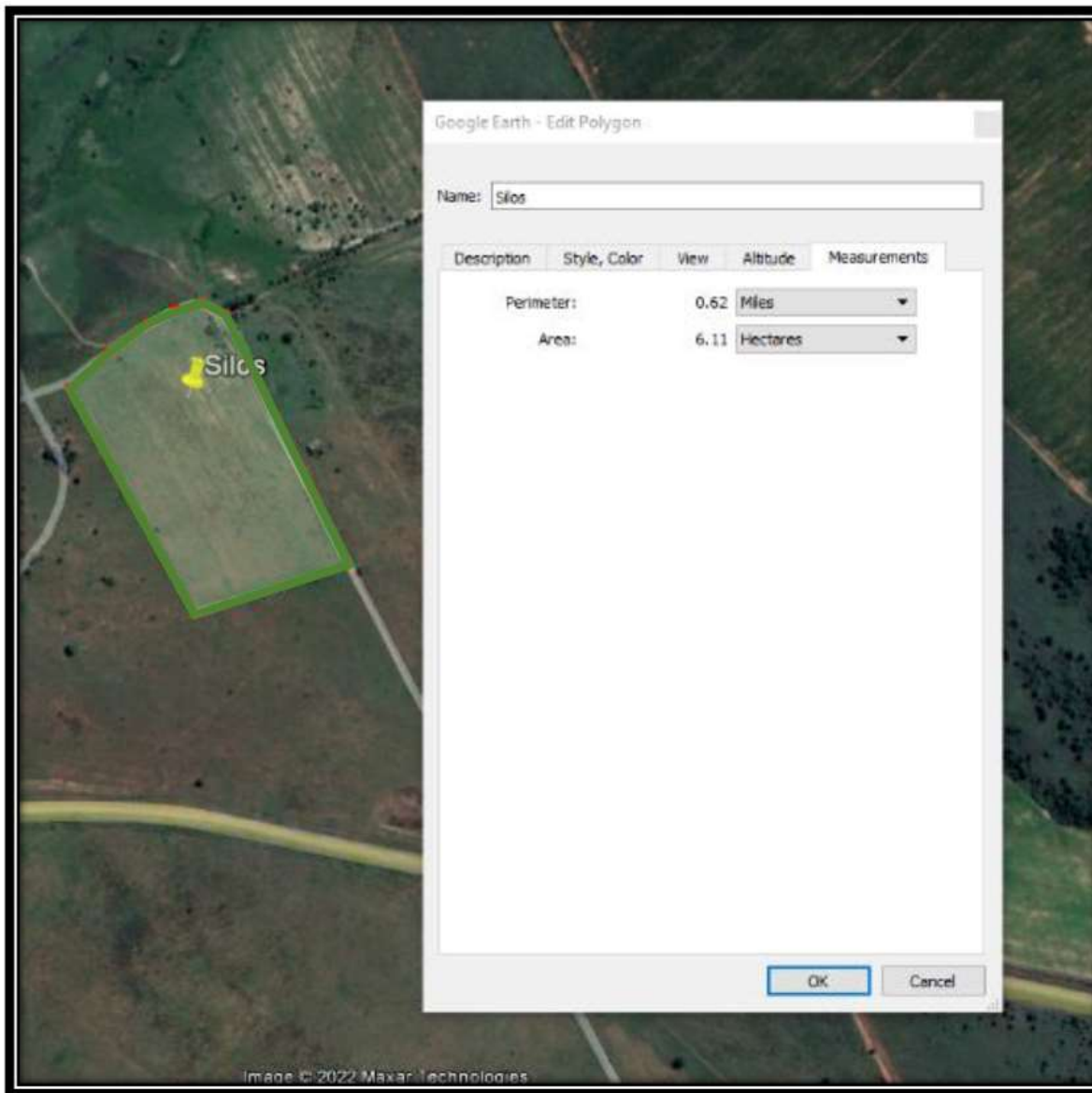


Figure 6: Area that was ploughed in the past

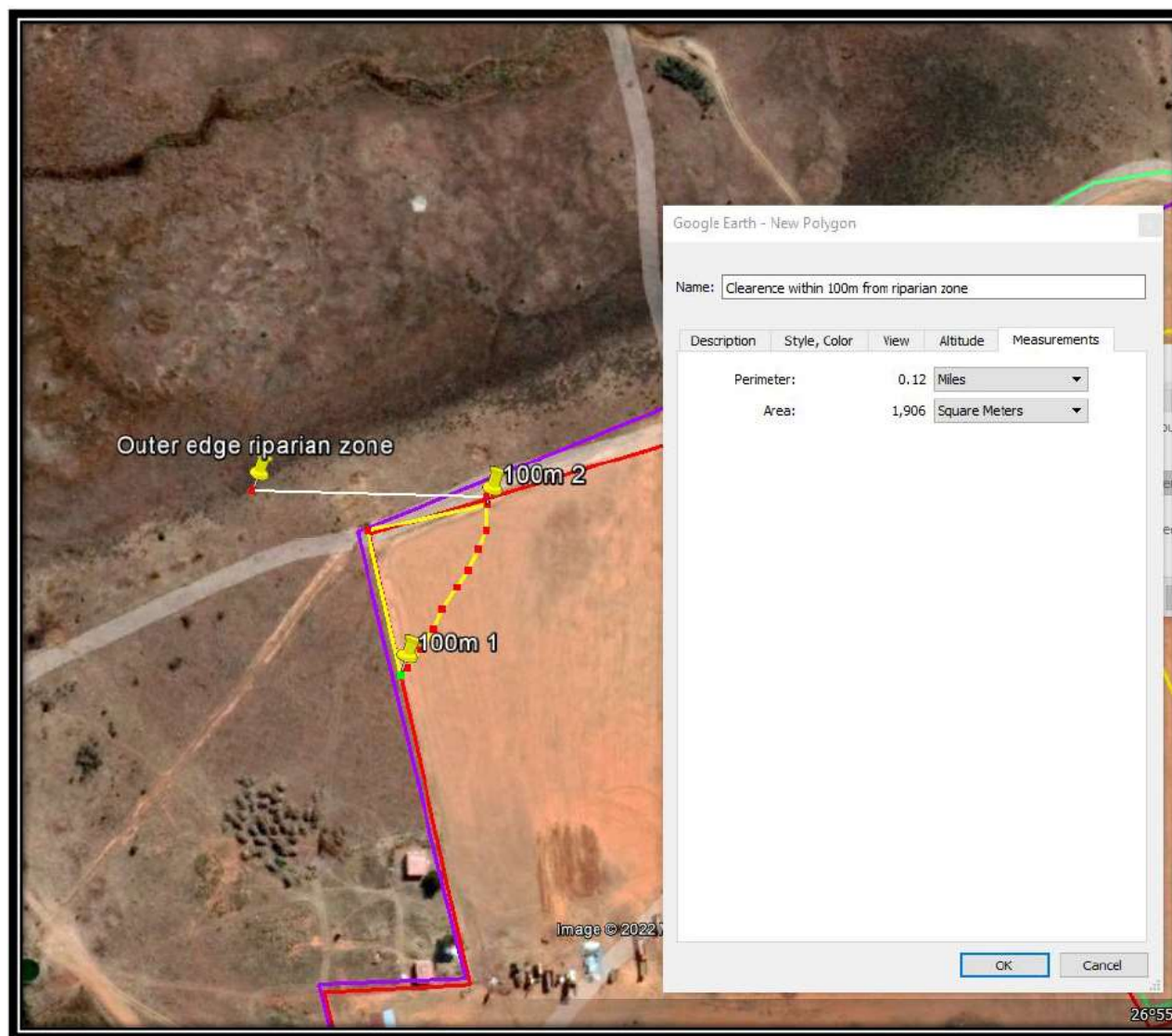


Figure 7: 1 906 Square meters of the cleared area is located within 100 meters from the non-perennial Boesmanspruit

The following infrastructure has been erected on site:

A Site entrance and Electric Fence (See Photograph 4a and b)

Receiving weighing-in Weigh Bridge. (See Photograph 5)

Dispatching receiving facility with weighing-out Weigh Bridge. (See Photograph 6)

Office (See Photograph 7)

Galvanized steel silos (See Photograph 8)

Shed for storage of Machinery and Equipment (See Photograph 9)

Laydown area for the storage of Silo Bags (See Photograph 10)



Photograph 4a: A Site entrance and Electric Fence



Photograph 4b: Electric Fence



Photograph 5: Receiving weighing-in weigh bridge.



Photograph 6: Dispatching receiving facility with weighing-out weigh bridge.



Photograph 7: Office



Photograph 8: Galvanized steel silos



Photograph 9: Shed for storage of Machinery and Equipment



Photograph 10: Laydown area for the storage of Silo Bags

What is Silo Bags?

Silo bags are a key hermetic storage technology that reduces post-harvest losses while providing an economic alternative for farmers and trading entities to gain control over marketing their stored grain between crop harvests. The cheapest, cleanest way to store almost any agricultural commodity.

Silo bags consist of three layers of polyethylene totalling 230 microns thick. The outer two layers are white to reflect solar radiation and make the bag weatherproof. The inner layer is black to block sunlight. A typical silo bag is about 60 meters long, 2.7 meters in diameter, and can store as much as 200 tonnes

of grain, though they can be smaller by simply using less of the bag. When properly sealed, the silo bag is watertight and has a high degree of gas tightness to CO₂ and O₂.

The revolutionary silo bag system is a breakthrough in low cost, efficient, chemical free grain storage for both dry grains and silage. The silo bag system utilizes a time-tested method (i.e., hermetic storage) and incorporates modern technology to provide producers and commodity stakeholders with an economical, flexible and safe method to store grain.

Grain is stored in an absolute anaerobic (oxygen-free) environment. The bag is designed to stretch by 10% ensuring the grain is packed tightly and most air is expelled at filling. After sealing, the few pockets of air/oxygen are consumed by the grain breathing, thus producing a modified atmosphere, rich in carbon dioxide. As a result, diseases caused by fungi, bacteria and insects are eliminated, reducing the need to use chemicals on the stored grain.

The bagging and out-loading processes are done by means of high performance, low cost and easily transportable machines.

The silo bag system has provided agricultural producers and traders with a powerful storage and logistics solution.



Photograph 11: Grain that was stored in a silo bag being loaded onto a Truck

10.7. DESCRIPTION OF THE ENVIRONMENT THAT MAY BE AFFECTED BY THE PROJECT

10.7.1 BIO-PHYSICAL ASPECTS

10.7.1.1 GEOLOGY AND SOIL

According to the 1:250 000 Geological Map (2624 Vryburg) the development is underlain by Quartzite (Rh) and Ferrigenous Shale of the Hospital Hill Formation of the West Rand Group and the Witwatersrand

Supergroup. Please see Figure 11. No Dolomite occurs in the area. The underlying Geology is stable and seismic activities are very unlikely.

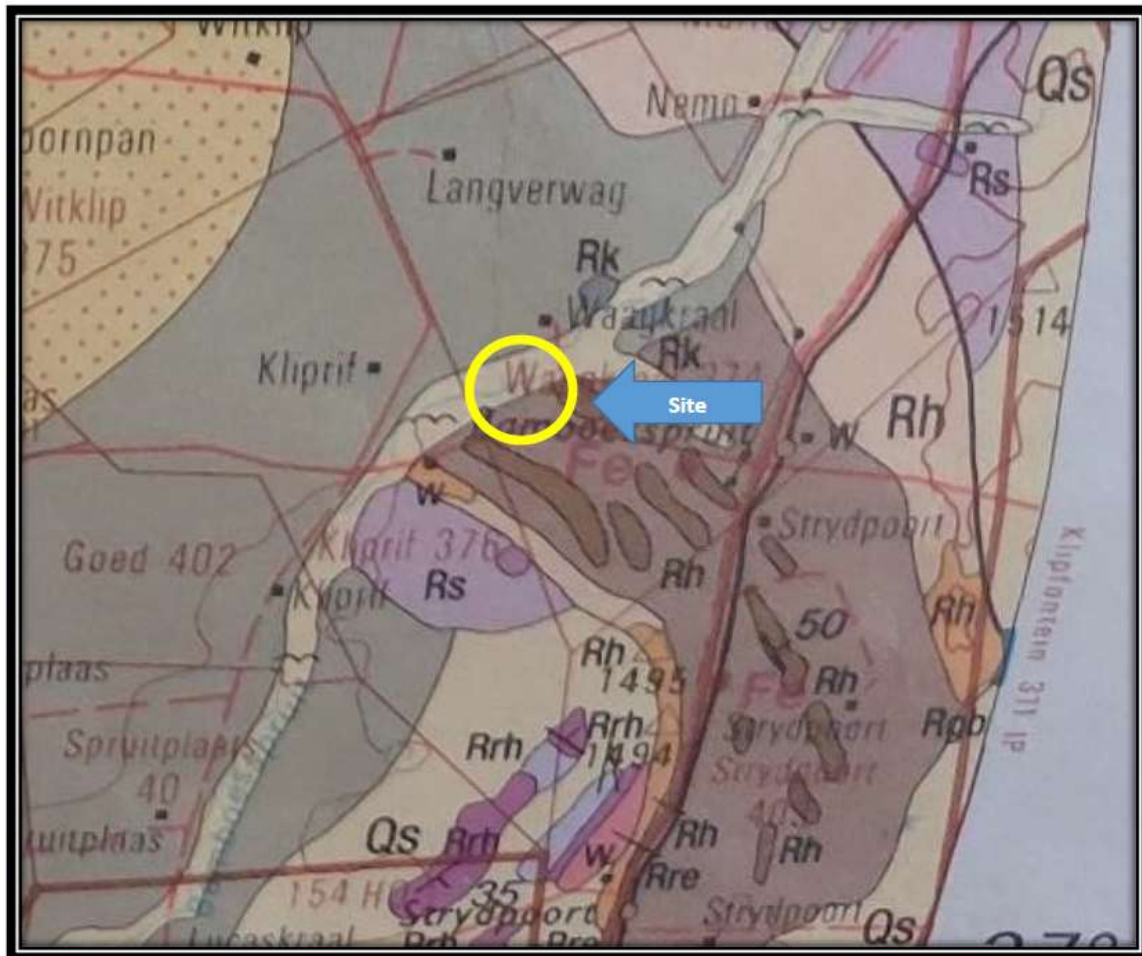


Figure 8: 1:250 000 Geological Map (2624 Vryburg)

10.7.1.2 TOPOGRAPHY

The site is located on a gentle slope that slopes towards the north where a waterbody Dam 1, artificial waterbody Dam 2 and the active channel of the Boesmanspruit non-perennial river borders the site.

The Topography of the site is ideal for this type of development as, even after the above average rainfall of the past season, no signs of erosion has been noted.

10.7.1.3 CLIMATE

Figure 9 is an illustration of the average temperatures and precipitation for the area. (https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/groot-marico-south-africa_999121) The "mean daily maximum" (solid red line) shows the maximum temperature of an average day for every month for Ottosdal. Likewise, "mean daily minimum" (solid blue line) shows the average minimum temperature. Hot days and cold nights (dashed red and blue lines) show the average of the hottest day and coldest night of each month of the last 30 years.

From the graph it is clear the site falls within an area that has hot summers (Average daily maximum temperature for December is 30°C with the average hottest day temperature for summer being 34°C) and cold winters (Average daily minimum temperature for June and July is 1°C with the average coldest day temperature for winter being -6°C).

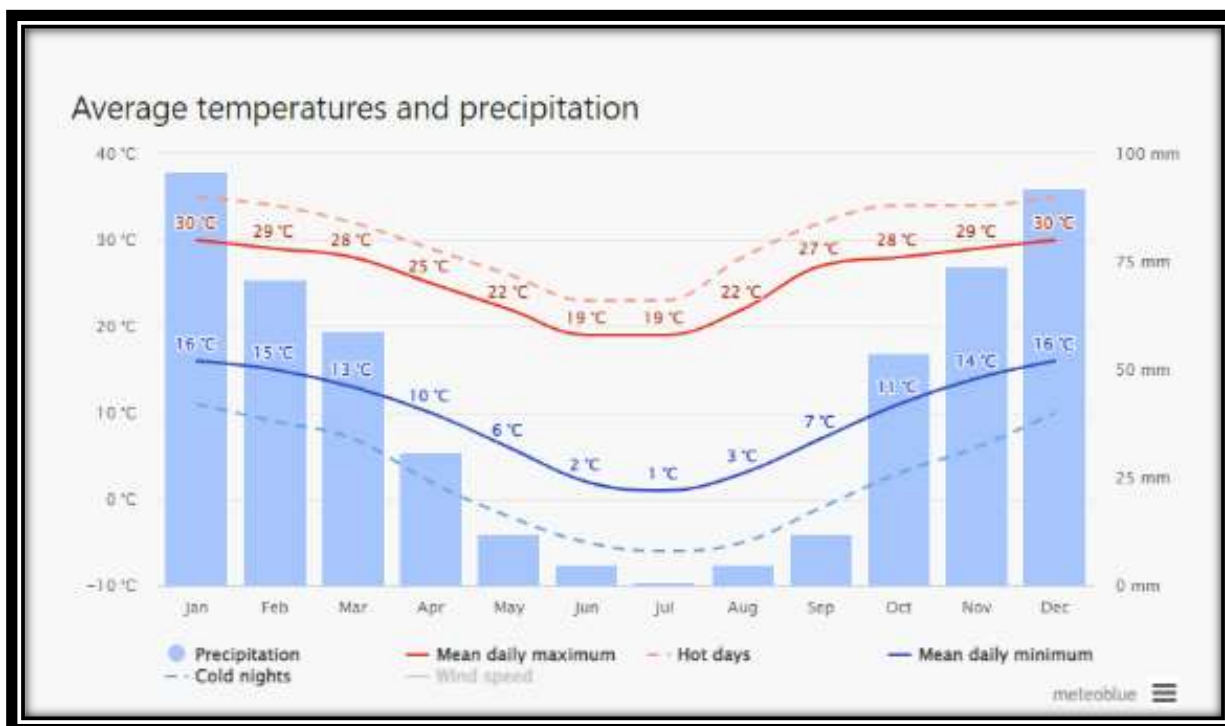


Figure 9: Illustration of the average temperatures and precipitation for Ottosdal.

Source: https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/groot-marico_south-africa_999121

Precipitation normally occurs in the form of rain and hail. This is a summer rainfall area with a yearly average of 512mm. The highest monthly average rainfall occurs in January (With and average rainfall of 96 mm) and December (With and average rainfall of 92mm). The lowest monthly average rainfall occurs in July (With and average rainfall of 1mm) and August (With and average rainfall of 5mm)

Climate Change

According to: WIREs Climate Change 2014, "Climate change is a key concern within South Africa. Mean annual temperatures have increased by at least 1.5 times the observed global average of 0.65°C over the past five decades and extreme rainfall events have increased in frequency. These changes are likely to continue. Climate change poses a significant threat to South Africa's water resources, food security, health, infrastructure, as well as its ecosystem services and biodiversity. Considering South Africa's high levels of poverty and inequality, these impacts pose critical challenges for national development. In relation to water, impact studies for the water resources sector have begun to look beyond changes in streamflow to changes in the timing of flows and the partitioning of streamflow into base flows and stormflows, reservoir yields, and extreme hydrological events. Spatially the eastern seaboard and central interior of the country are likely to experience increases in water runoff. Higher frequencies of flooding and drought events are projected for the future. Complexities of the hydrological cycle, influences of land use and management and the linkages to society, health, and the economy indicate far higher levels of complexity in the water resources sector than in other sectors. What has emerged is that land uses that currently have significant impacts on catchment water resources will place proportionally greater demands on the catchment's water resources if the climate were to become drier.

The influence of climate change on water quality is an emerging research field in South Africa, with assessments limited to water temperature and non-point source nitrogen and phosphorus movement. A critical interaction that has not been explored is between changes in water quality and quantity and the combined impacts, such changes might have impact on various types of water use, e.g., irrigation, domestic consumption, or aquatic ecosystems support”.

Rain-fed agriculture sustains 60% of global food production. Rain-fed cropping systems are highly dependent on climatic conditions and vulnerable to changes in precipitation and temperature patterns, which are intensifying as a result of global warming. Climate change is expected to alter rainfall patterns and exacerbate water- and heat-stress events over rain-fed croplands. Irrigation expansion over water-stressed rain-fed croplands is an effective agricultural adaptation measure in response to climate change. Irrigated cropping systems, which use both rainwater (“green water”) and surface water and/or groundwater (or “blue water”), contribute to a more reliable and resilient crop production while boosting agricultural productivity. In fact, the use of irrigation enables reliable water supply and can also alleviate crop’s heat stress, highlighting how important irrigation is to food-producing regions that will be affected by climate change.

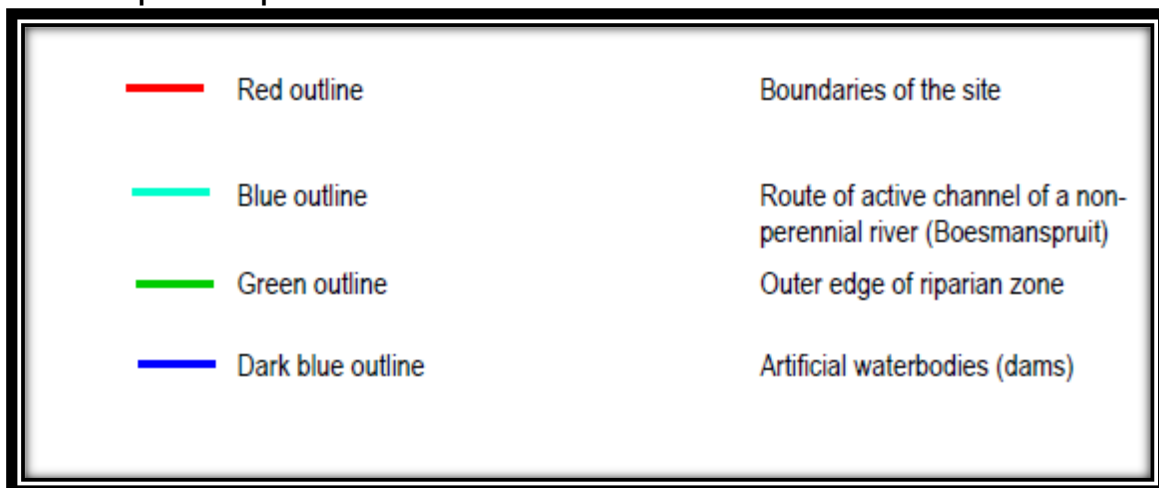
10.7.1.4 SURFACE DRAINAGE, WETLANDS AND RIPERIAN ZONES

The study area itself is located on an area that is drained by overland flow. No streamlines are found on the proposed site. No wetlands or riparian zones are found on or near the site and no erosion by sheet flow is evident on site. The site is located on a gentle slope that slopes towards the north where a waterbody Dam 1, artificial waterbody Dam 2 and the active channel of the Boesmanspruit non-perennial river borders the site. See Figure 10.

Vegetation at the riparian zone north of the site, at artificial waterbody Dam 1, artificial waterbodd Dam 2 and the active channel of the Boesmanspruit non-perennial river in between, consists of covers of sedges and some other plant species mixed in between. Indigenous sedge species at the riparian zone include *Cyperus fastigiatus*, *Pycneus nitidus*, *Cyperus laevigatus*, *Schoenoplectus decipiens* and *Eleocharis limosa*. A rush species, *Juncus rigidus*, is also present. Herbaceous species include the alien invasive *Rumex crispus* and the indigenous *Rumex lanceolatus*. The indigenous herb *Berkheya radula* and the alien invasive *Cirsium vulgare* are present at the seasonal and temporary zones of the wetland and into some parts of the terrestrial zone.



Figure 10: A waterbody Dam 1, artificial waterbody Dam 2 and the active channel of the Boesmanspruit non-perennial river borders the site



10.7.1.5 GROUND WATER

Implementation of the Reconstruction and Development Programme (RDP) in South Africa has highlighted the importance of groundwater resources in the country as the role they will play in satisfying the targets of the RDP. As a result, exploration, development and protection of aquifers is receiving unprecedented attention. Provision of the appropriate information to national water resource managers and planners is a critical part of the process which aims to provide a further twelve million people with adequate access to potable water. According to the Map provided by Murray R., Baker K., Revenscroft P., Musekiwa C. and Dennis R. (2012). Water Research Commission Report No. 1763/1/11, Pretoria, South Africa, the water quality of the area is considered to be very good.

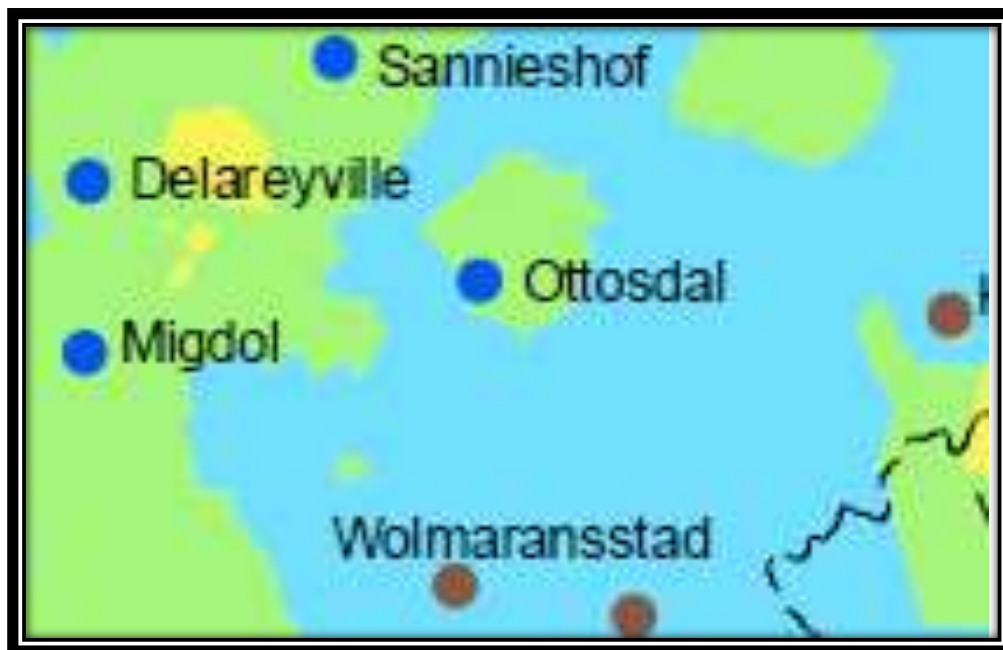


Figure 11: Map produced by Murray R., Baker K., Revenscroft P., Musekiwa C. and Dennis R. (2012). Water Research Commission Report No. 1763/1/11, Pretoria, South Africa depicting the ground water quality.

It is not envisaged that the development have any impact on the water quality of the area as the Silo Bags does not require any chemicals that needs to added.

10.7.1.6 FAUNA AND FLORA HABITAT

Grassland at the site is represented by the Klerksdorp Thornveld (Gh 13) vegetation type (Mucina & Rutherford, 2006).

Klerksdorp Thornveld (Gh 13)

Distribution: In South Africa the Klerksdorp Thornveld is present in the North West Province in two sets of patches, one in the Wolmaransstad, Ottosdal and Hartbeesfontein region, and the other from the Botsalano Game Park north of Mafikeng in the vicinity of Madibogo in the south. Altitude for the entire vegetation type is 1260 – 1580 m (Mucina & Rutherford 2006).

Vegetation and landscape features: Plains or slightly irregular undulating plains with open to dense Acacia karroo bush clumps in dry grasslands (Mucina & Rutherford 2006). Geology and soils: Shale, slate and quartzite of the Pretoria Group with interlaid diabase sills and Hekpoort lava supporting relatively shallow and rocky soils (Glenrosa and Mispah forms). Equally represented are eutrophic red plinthic soils (Hutton form) derived mainly from a thick succession of volcanics and sediments of the Ventersdorp Supergroup (Mucina & Rutherford 2006).

Climate: Warm-temperate, summer-rainfall region, with overall mean annual precipitation of 533 mm. Summer temperatures are high. Frequent frosts occur in winter (Mucina & Rutherford 2006).

Important taxa of the Klerksdorp Thornveld listed by Mucina & Rutherford (2006): Small Trees: Acacia karroo, Acacia caffra, Celtis africana, Searsia lancea, Ziziphus mucronata. Tall Shrubs: Acacia hebeclada, Diospyros lycioides subsp. lycioides, Ehretia rigida, Grewia flava, Gymnosporia buxifolia, Searsia pyroides, Tarchonanthus camphoratus. Woody Climber: Asparagus africanus. Low Shrubs: Asparagus laricinus, Asparagus suaveolens, Felicia muricata, Anthospermum hispidulum, Anthospermum rigidum subsp. pumilum, Aptosimum elongatum, Gnidia capitata, Gomphocarpus fruticosus subsp. fruticosus, Helichrysum dregeanum, Leucas capensis, Pavonia burchellii, Pentzia globosa, Solanum supinum var. supinum, Triumfetta sonderi, Ziziphus zeyheriana. Graminoids: Aristida congesta, Cynodon dactylon, Eragrostis lehmanniana, Eragrostis trichophora, Microcloa caffra, Panicum coloratum, Sporobolus fimbriatus, Themeda triandra, Andropogon shirensis, Anthephora pubescens, Aristida junciformis subsp. galpinii, Aristida stipitata subsp. graciliflora, Brachiaria nigropedata, Brachiaria serrata, Bulbostylis burchellii, Cymbopogon pospischilii, Digitaria eriantha, Diheteropogon amplexans, Elionurus muticus, Eragrostis curvula, Eragrostis obtusa, Eragrostis racemosa, Eragrostis superba, Eustachys paspaloides, Heteropogon contortus, Setaria sphacelata.

Sporobolus africanus, Tragus berteronianus, Trichoneura grandiglumis, Triraphis andropogonoides. Herbs: Acalypha angustata, Acanthospermum australe, Berkheya onopordifolia var. onopordifolia, Berkheya setifera, Blepharis integrifolia var. clarkei, Chamaesyce inaequilatera, Chascanum adenostachyum, Dicoma macrocephala, Helichrysum nudifolium var. nudifolium, Hermannia lancifolia, Hibiscus pusillus, Jussiaea anagalloides, Lippia scaberima, Nidorella microcephala, Nolletia ciliaris, Pollichia campestris, Rhynchosia adenodes, Salvia radula, Selago densiflora, Teucrium trifidum, Tolpis capensis. Geophytic Herbs: Bulbine narcissifolia, Ledebouria marginata, Ornithogalum tenuifolium subsp. tenuifolium, Raphionacme hirsuta. Herbaceous Climber: Rhynchosia venulosa

Note: Not all of the above listed plant species for the vegetation types occur at the site in the study area.

There is an area that had been cleared and an area where grassland remained at the site. At the area that had been cleared there is some recovery of vegetation and a conspicuous presence of pioneer plant species. Both these areas, the cleared area and the area which is the remainder of the grassland, are at one terrain unit, a plain with gentle slopes in a slightly undulating larger area. The plain with gentle slopes, to almost moderate slopes, at the site is adjacent to a shallow valley outside the site, where a non-perennial river runs through.

Vegetation at the remainder of the grassland at the site consists of a moderately disturbed grassland which contains indigenous grass species, some indigenous shrub species and few trees. The grass layer is well-developed and indigenous grass species such as *Elionurus muticus* is conspicuous. Other indigenous grass species include *Aristida congesta*, *Eragrostis lehmanniana*, *Eragrostis superba*, *Cynodon dactylon*, *Eragrostis curvula*, *Chloris virgata* and *Themeda triandra*. The shrub *Seriphium plumosum* (bankrupt bush) is conspicuous at some parts of the remaining grassland. Indigenous forb species include *Berkheya onopordifolia*, *Ursinia nana*, *Cyanotis speciosa*, *Hibiscus pusillus*, *Senecio consanguineus*, *Bulbine narcissifolia*, *Pollichia campestris*, *Selago densiflora* and *Lippia scaberrima*. Alien invasive herbaceous weed species are conspicuous at disturbed areas at the site and include *Argemone ochroleuca*, *Tagetes minuta*, *Bidens bipinnata*, *Bidens pilosa*, *Gomphrena celosioides*, *Schkuhria pinnata*, *Conyza bonariensis*, *Chenopodium album*, *Guilleminea densa*, *Alternanthera pungens* and *Verbena aristigera*.

Vegetation at the riparian zone north of the site, at artificial waterbody Dam 1, artificial waterbodd Dam 2 and the active channel of the Boesmanspruit non-perennial river in between, consists of covers of sedges and some other plant species mixed in between. Indigenous sedge species at the riparian zone include *Cyperus fastigiatus*, *Pycneus nitidus*, *Cyperus laevigatus*, *Schoenoplectus decipiens* and *Eleocharis limosa*. A rush species, *Juncus rigidus*, is also present. Herbaceous species include the alien invasive *Rumex crispus* and the indigenous *Rumex lanceolatus*. The indigenous herb *Berkheya radula* and the alien invasive *Cirsium vulgare* are present at the seasonal and temporary zones of the wetland and into some parts of the terrestrial zone.

No Threatened or Near Threatened plant or animal species appear to be resident at the site. No other plant- or animal species of particular conservation concern appear to be present at the site. The vegetation type at the site, the Klerksdorp Thornveld, is not listed as a Threatened Ecosystem according to the National List of Threatened Ecosystems (2019).

There is little scope for the site to be part of a corridor of particular conservation importance. Outside the site, towards the north, a watercourse, the non-perennial Boesmanspruit river, is present, which is a corridor of particular conservation importance.

Possible ecological sensitivities at the site were indicated by a report generated from the screening tool of DFFE. These ecological sensitivities that could possibly/ are present at the site, follow.

Animal species theme sensitivity

Relative animal species theme sensitivity is listed as low for the site. Following the groundtruthing such a listing is upheld. There is no distinct indication of the presence of any threatened animal species that is resident at the site or could have been resident at the site prior to a recent clearing of vegetation at the site. The relative animal species theme sensitivity is confirmed to be low.

Aquatic biodiversity theme sensitivity

Relative aquatic biodiversity theme sensitivity at the site is listed low for part of the site and high for part of the site. The high listing is because of a non-perennial river that is present north of the site. The site is as well as the watercourse north of the site is not part of a Freshwater Ecosystem Priority Area or Fish Support Area. The riparian zone is a substantial distance from the site and current developments at the site, are unlikely to have a discernable impact on the watercourse north of the site if mitigation measures such as avoiding pollutants or spills from entering the soil and ultimately soil water. No wetlands or riparian zones are present at the site and the relatively aquatic biodiversity theme sensitivity at the site is likely to be low for the entire site.

Plant species theme sensitivity

Relative plant species theme sensitivity is currently listed as medium. Possible sensitive plant species of which the likely presence or absence have been investigated are listed in Tables 4.2 – 4.9 and include plant species on a local and provincial scale which could be prone to harvesting also the plant species listed for the screening. None of the threatened plant species of the North West Province or any other plant species of particular conservation concern such as those prone to harvesting has been found at the site. It is unlikely that any plant species of particular conservation concern occurs at the site or has occurred at the site prior to a recent clearing of vegetation at part of the site.

Terrestrial biodiversity theme sensitivity

Relative terrestrial biodiversity at the site is very high. This high sensitivity that is ascribed to the site area, is because of the presence of Critical Biodiversity Area 2, Ecological Support Area 2 and Protected Areas Expansion Strategy. The vegetation type at the site, the Klerksdorp Thornveld (Gh 13), is not listed as a

Nationally Threatened Ecosystem. During surveys at the site, it was found that the scope for the remaining moderately disturbed grassland patch at the site to serve as part of a protected area or corridor of particular conservation concern is small. Following the ground-truthing a medium sensitivity for the terrestrial biodiversity theme is suggested.

Ecological sensitivity at the site is medium at the remainder of the grassland. Following the assessment of ecological sensitivity at the same terrain unit of which the current remainder of grassland as well as the area where the vegetation has recently been cleared, a medium ecological sensitivity is also expected at the recently cleared area at the site.

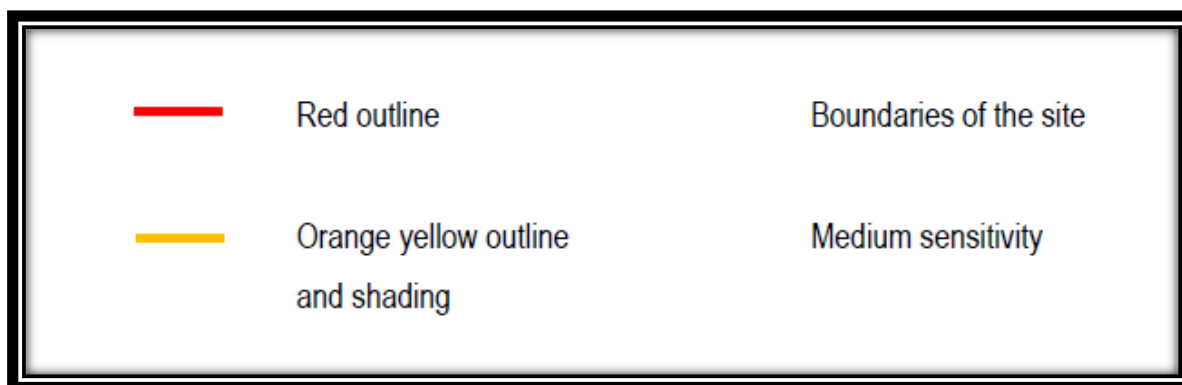
Continued monitoring and eradication of alien invasive plant species are imperative. Declared alien invasive species such as *Prosopis glandulosa* (Mesquite), *Melia azedarach* (Syringa) and alien invasive Australian *Acacia* species (Australian wattles) should not be allowed to establish.

Following the mitigations which will be upheld and planned footprint for development all the impact risks listed above are moderate or low. The impacts owing to the recent clearing of vegetation at part of the site are likely to be moderate or low as well, if the mitigation measures that are stipulated are upheld.

Please see Figure 12 for a copy of the Fauna and Flora Habitat Specialist's classification of site sensitivity.



Figure 12: Fauna and Flora Habitat Specialist's classification of site sensitivity.



10.7.1.7. AIR QUALITY

Agricultural emissions derive from both area and point sources. Agricultural emissions play an important role in several atmospherically mediated processes of environmental and public health concerns. These atmospheric processes affect local and regional environmental quality, including odour, particulate matter (PM) exposure, eutrophication, acidification, exposure to toxics, climate, and pathogens. Agricultural emissions also contribute to the global problems caused by greenhouse gas emissions. Agricultural emissions are variable in space and time and in how they interact within the various processes and media affected. Most important factors are ammonia (where agriculture accounts for ~90% of total emissions), reduced sulphur (unquantified), PM_{2.5} (~16%), PM₁₀ (~18%), methane (~29%), nitrous oxide (~72%), and odour and emissions of pathogens (both unquantified). Agriculture also consumes fossil fuels for fertilizer production and farm operations, thus emitting carbon dioxide (CO₂), oxides of nitrogen (NO_x), sulphur oxides (SO_x), and particulates.

The world's population has grown from ~1.5 billion at the beginning of the 20th century to ~6.8 billion today. This population increase has been accompanied by the advent and growth of "intensive" agriculture, with associated impacts on the environment (1). During the next 50 years, the Earth's human population is predicted to increase to more than 9 billion, creating higher demand for agricultural commodities, both crop and animal.

Agronomists throughout the world have sought to increase food production by increasing productivity. Farmers increased agricultural output significantly between the 1940s and the 1990s, capitalizing on increased availability of nitrogen fertilizer (the global production of fertilizer currently is more than 90 Tg of N yr⁻¹, compared to ~1 Tg only 50 years ago) (7, 8). Increased agricultural output is also the result of mechanization combined with the abandonment of traditional practices, better pesticides, cultivation of marginal land, availability of hybrid and genetically modified crop varieties, and improvements in production efficiency. Many of these innovations have been supported by public investment. Furthermore, inexpensive fossil fuels have been available for fertilizer production, for replacement of human labour by increased mechanization, and for transport of raw material and products. (Viney et al, 2009)

The extent and toxicity of emissions is not necessarily a concise indicator of contributions to ground-level air pollution concentrations or of risks to health and the environment. Such contributions are also a function of the height of emission, temporal variations in the release of pollutants, and the proximity of the source to the people or the environment affected by exposure to the pollutant (such as, for instance, children, or the elderly, or people who are ill, or others who may be particularly sensitive receptors to a specific pollutant above a certain concentration). If an industry is operating close to a school or hospital or centre for the elderly, the potential exposure (in combination with the other contributing factors) is high.

Historically, air pollution control in South Africa has primarily emphasized the implementation of 'command and control' measures in the industrial sector. The shift from source-based control, to the management of the air that people breathe, emphasizes the importance of targeting a wider range of sources and using more flexible and varied approaches. It means paying greater attention to ambient air quality, as it is more important (and more cost-effective, in many cases) to make sure that the ambient air complies with air quality standards. This approach ensures that human and environmental health is protected and that the cumulative impact of pollution from a number of sources is addressed.

Approaches adopted or considered for future implementation have included: regulation (for example, the use of Atmospheric Emission Licences for Listed Activities); market instruments (such as atmospheric user-charges and pollution taxes); the potential for voluntary agreements, education and awareness raising; and emissions trading. International experience shows that adopting a mix of instruments and interventions is more effective than using a single instrument to improve air quality across various types of source. Although direct regulation remains important in controlling industrial sources, there is evidence that specifying emission limits is more effective than specifying the use of particular technologies, so as to give companies flexibility in selecting the method of achieving success that suits them best. This approach is advocated as being more cost-effective and more likely to stimulate technological advances in pollution control methods and production processes.

For large point sources (that is, sources of pollution that are concentrated on one site, but that have large, constant volumes of many types of pollution) that are few in number, instruments such as emissions trading have been advocated as an effective way to manage pollutant emissions and reduce the costs of compliance.

https://www.environment.gov.za/sites/default/files/docs/stateofair_airqualityand_sustainable_development.pdf Date visited: 17/03/2020.

According to the AccuWeather website, the average Air Quality for this part of the North West Province is considered to be "Excellent". As mentioned above, a certain amount of Air pollution will inevitably result from the development. This will include both cumulative and direct impacts. In addition to the above, it should be noted that the project will however create a certain amount of dust during the operational phase. If proper dust suppression and soil protection measures are implemented this variable will have very little impact.

10.7.1.8 NOISE

It is a fact that a certain amount of noise will be generated during the operational phase of the project. Noise levels should however rarely exceed the allowable limits.

10.7.1.11 ARCHAEOLOGY AND CULTURAL SITES

Based on the aerial images of the area, photographs provided by the client and the heritage desktop study, it is therefore deemed unlikely that any significant sites, features or material of cultural heritage (archaeological and/or historical) origin and/or significance will exist in the study area & proposed development area. Recent historical activities (mainly agricultural activities) would have impacted on any if they did exist here in the past and would have disturbed or destroyed these to a large degree. Known archaeological and historical sites, features and material have been identified in the larger geographical area and this needs to be taken into consideration during actions related to the proposed Silo development.

It is therefore recommended that Motivation for Exemption from a full Phase I Heritage Impact Assessment for the proposed Silo Development (at the Waagkraal NWK site) on various portions of the farm Waagkraal 374IO, 15km south-west of Ottosdal in the Northwest Province, be granted to the applicants taking into consideration the following:

The subterranean nature of cultural heritage (archaeological and/or historical) resources must always be kept in mind. Should any previously unknown or invisible sites, features or material be uncovered during any development actions then an expert should be contacted to investigate and provide recommendations on the way forward. This could include previously unknown and unmarked graves and/or cemeteries. Furthermore, should there be any future plans to do any alterations or changes to the existing farmstead and any of the related farming-related infrastructure then a Detailed Heritage Assessment needs to be undertaken to determine their age/origin and significance in order to recommend on the way forward. Any demolition or alteration to structures older than 60 years of age needs to be undertaken with a permit obtained from SAHRA.

10.7.2 SOCIOLOGICAL AND ECONOMIC ISSUES

10.7.2.1. SOCIAL AMENITIES

Maize is the most widely produced crop in South Africa. During the 2016–2017 production season, 16.7 Tg of maize grain was produced from 2.6 million ha. The food supply quantity (maize and its products) for South Africa ranges from 250–300 g capita⁻¹ d⁻¹, illustrating the significant role of maize in the daily diet of South Africans. In addition, 40% of maize is used as livestock feed, constituting ~4.5 Tg annually.

Market prices in all produce sectors are always changing due to several different factors. The maize market price is one of the most volatile of all the grain sectors and because this is one of South Africa's primary food products it influences a big proportion of our countries farmers. The main factor above all others which determines the price of maize in each season is **supply and demand**. Roughly 75% of maize produced in a season is consumed by our own local market. This can be in the form of maize based food products for humans as well as animal feed. Simply put; when we have a good year and our maize crops yield well, then the price of maize will decline as there is an abundant supply. In poorer drought years when there are lower yields the price will increase with demand.

International market influences also play a role in the prices farmers receive for their maize. In years when there is an under supply of maize in the country we need make up the shortfall by importing maize from other countries. At times this can have a ripple effect on our market because as we build up stores of cheap imported maize it can result in the local price of maize being stagnated.

Our local maize price is also affected by export demand for our crop. In years when we have an oversupply of maize there may be other countries that have experienced a shortfall resulting in them becoming a potential importer of our maize. This can hold our prices stable. There are however several international trade regulations which factor into this such as export and import tariffs and health standards.

One of the biggest problems for farmers and grain users (Like Millers) is the limited availability of quality grain during the dry season of the year, in addition to the availability of soil and climate conditions, among other factors. Forage is the most economical source of food for livestock while grain as a food source provide protein for many people and its availability is set by times of abundance that match rainfall season, and scarcity, which matches the drought season.

To overcome these drawbacks, it is necessary to develop strategies for forage and grain conservation that favour the availability of good quality food permanently and at a low cost during the critical period of the year. Storage of grain also allows the producer to keep his maize until the price is right.

As can be seen from the above, storage of produce plays a vital role in the production/value chain of the industry.

Silo bags are a key hermetic storage technology that reduces post-harvest losses while providing an economic alternative for farmers and trading entities to gain control over marketing their stored grain between crop harvests. The cheapest, cleanest way to store almost any agricultural commodity.

10.7.2.1 AESTHETICS

Visual Intrusion is defined as the level of compatibility or congruence of the project with the particular qualities of the area, or its 'sense of place'. This is related to the idea of context and maintaining the integrity of the landscape or townscape.

High visual intrusion – results in a noticeable change or is discordant with the surroundings;

Moderate visual intrusion – partially fits into the surroundings, but clearly noticeable;

Low visual intrusion – minimal change or blends in well with the surroundings.

The development has changed the scenic resources of the local area from an undeveloped, vegetated site to cleared area with white silo bags. The visual intrusion is considered to be medium as the development partially fits into the surroundings, but clearly noticeable.

10.8. ENVIRONMENTAL MANAGEMENT OBJECTIVES AND TARGETS

The following table is a summary of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process.

ENVIRONMENTAL ASPECTS	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS
	The Management objectives is to:	
Environmental documentation reporting and compliance	Ensure that all concerned is aware of the EMPr and related environmental aspects	<p>A full copy of the signed EA from DEDECT in terms of NEMA, granting approval for the development is available on the farm.</p> <p>A copy of the EMPr as well as any amendments thereof is available on the farm.</p>
Geology, soil and topography	<p>Maintain the anti-erosion structures that has been developed to ensure that no erosion takes place.</p> <p>The site should be monitored regularly for signs of erosion. Remedial action must be taken at the first signs of erosion.</p> <p>Stormwater control must be undertaken to prevent soil loss.</p> <p>Vegetation must be retained where possible to avoid soil erosion.</p> <p>The quality and health status of surrounding soils should be monitored throughout the operational phase</p>	No soil erosion as a result of operational activities
	<p>Ensure that vehicles are in a good working order and not leaking oil or fuel.</p> <p>Implement measures to ensure that refuelling in the fields does not cause pollution in the form of fuel and oil spillages by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained. Spill kits must be available on site and in all vehicles that transport hydrocarbons for dispensing to other vehicles on the farm. Spill kits must be made up of material/product that is in line with environmental best practice (SUNSORB is a recommended product that is environmentally friendly).</p> <p>The responsible operator must have the required training to make use of the spill kit in emergency situations.</p> <p>In the event of a spill, contaminated soil must be collected in containers and stored in a central location and disposed of according to the National Environmental Management: Waste Act 59 of 2008.</p> <p>During servicing of vehicles or equipment, a suitable drip tray must be used to prevent spills onto the soil</p>	No pollution of the soil as a result of leaking operational equipment
	<p>The use of herbicides, pesticides and fertilizer must be in accordance with the directions and instructions as per the supplier/product. Do not over use.</p> <p>Measures should be put in place to ensure mixing of herbicides, pesticides and insecticides does not spill onto bare soil</p>	No pollution of the soil as a result of uncontrolled use of herbicides, insecticides, pesticides and fertilizer
	<p>The use of herbicides, pesticides and fertilizer must be in accordance with the directions and instructions as per the supplier/product. Do not over use.</p> <p>Measures should be put in place to ensure mixing of herbicides, pesticides and insecticides does not spill into the environment and pollute water sources</p>	No pollution of surface water and/or groundwater as a result of uncontrolled use of herbicides, insecticides, pesticides and fertilizer

ENVIRONMENTAL ASPECTS	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS
	The Management objectives is to:	
Fauna and Flora habitat	The parameters of the site are clearly defined. Ensure that no encroachment into the adjacent natural vegetated areas occur	No disturbance of natural vegetation beyond the parameters of the site described in this EMPr
	Alien invasive plant species must be eradicated on a continuous basis	Alien invasive plant species will not be allowed to invest the cleared areas
	Educate farm workers that the hunting of wild animals and the setting of snares is not allowed. Employees must be trained on how to deal with fauna species as intentional killing will not be tolerated. In the case of a problem animal e.g. a large snake, a specialist must be called in to safely relocate the animal. Environmental induction training and awareness must include aspects dealing in safety with wild animals into and on site. Focus on animals such as snakes and other reptiles that often generate fear by telling workers how to move safely away and to whom to report the sighting. Workers should also be informed where snakes most often hide so that they can be vigilant when lifting stones	No illegal hunting or setting of snares
Solid waste management	Waste must be separated into recyclable and non-recyclable waste, and must be separated as follows: <ul style="list-style-type: none"> • Hazardous waste: including (but not limited to) old oil, paint, etc. • General waste: including (but not limited to) paper, plastic, glass and construction rubble Used oil and empty herbicide, insecticide and pesticide containers must be disposed of at a suitably licenced waste site or alternatively removed by a licenced service provider	Used oil and empty herbicide, insecticide and pesticide containers is disposed of at a suitably licenced waste disposal site or alternatively is collected and removed by a licenced service provider
	Solid waste generated must be collected in a suitable container with a lid secured so that animals cannot gain access and be disposed of at a registered landfill site. When transporting solid waste to the licenced landfill site, solid waste must be secured to ensure that no solid waste gets windblown from the transport vehicle. Burning of waste will not be allowed	No solid waste pollution
Dangerous and toxic materials	All hazardous substances must be stored in suitable containers as defined in the Method Statement. Containers must be clearly marked to indicate contents, quantities and safety requirements. All storage areas must be bunded. The bunded area must be of sufficient capacity to contain a spill / leak from the stored containers. Bunded areas to be suitably lined with a SABS approved liner. An Alphabetical Hazardous Chemical Substance (HCS) control sheet must be drawn up and kept up to date on a continuous basis. All hazardous chemicals that will be used on site must have Material Safety Data Sheets (MSDS). All employees working with HCS must be trained in the safe use of the substance and according to the safety data sheet. Employees handling hazardous substances / materials must be aware of the potential impacts and follow appropriate safety measures. Appropriate personal protective equipment must be made available	The site and its surrounding area is free from any chemical, fuel and oil spills

ENVIRONMENTAL ASPECTS	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS
	The Management objectives is to:	
Fires	Absolutely no burning of waste is permitted. Fires will only be allowed in facilities especially constructed for this purpose	Absolutely no burning of waste is permitted. Fires is only allowed in facilities especially constructed for this purpose
Air quality	Vegetation must be retained where possible to avoid dust pollution. No burning of waste will be allowed	No air pollution as a result of operational activities
Archaeology and cultural sites	In terms of the National Heritage Act, 1999 (Act No. 25 of 1999), operational personnel must be alert and must inform the local heritage agency within 48 hours should they come across any signs of heritage resources.	No intentional destruction of any sites, features or material of cultural heritage (archaeological and/or historical) origin or significance
Health and safety	Operational activities are to be managed in strict accordance with the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993). The applicant must ensure that all emergency procedures are in place. Emergency procedures must include (but not be limited to) fire, spills, contamination of the ground, accidents to employees, use of hazardous substances and materials	Operational activities abides to the rules and regulations of the Occupational Health and Safety Act, 85 of 1993

10.9. ENVIRONMENTAL IMPACT MANAGEMENT OUTCOMES

10.9.1 ASSESSMENT CRITERIA

Impacts were rated using the following methodology

Nature of the potential impact		Description of the effect, and the affected aspect of the environment
Duration (time scale)	Short term	Up to 5 years
	Medium term	6 – 15 years
	Long term	More than 15 years
Extent (area)	Local	Confined to study area and its immediate surroundings
	Regional	Region (cadastral, catchment, topographic)
	National	Nationally (The country)
	International	Neighboring countries and the rest of the world.
Magnitude (Intensity)	Low	Site-specific and wider natural and/or social functions and processes are negligibly altered. (A low intensity impact will not affect the natural, cultural, or social functions of the environment).
	Medium	Site-specific and wider natural and/or social functions and processes continue albeit in a modified way. (Medium scale impact will alter the different functions slightly).
	High	Site-specific and wider natural and/or social functions and processes are severely altered. (A High intensity impact will influence these functions to such an extent that it will temporarily or permanently cease to exist).
Probability	Improbable	Possibility of occurrence is very low. (Such an impact will have a very slight possibility to materialise, because of design or experience).
	Possible	There is a possibility that the impact will occur
	Probable	It is most likely that the impact will occur
	Definite	The impact will definitely occur
Significance	Insignificant	Impact is negligible and will not have an influence on the decision regarding the proposed activity (No mitigation is necessary)
	Very Low	Impact is very small and should not have any meaningful influence on the decision regarding the proposed activity (No mitigation is necessary)
	Low	The impact may not have a meaningful influence on the decision regarding the proposed activity (No mitigation is necessary)
	Medium	The impact should influence the decision regarding the proposed activity (The project can only be carried through if certain mitigatory steps are taken)
	High	The impact will influence the decision regarding the proposed activity
	Very High	The proposed activity should only be approved under special circumstances

Nature of the potential impact		Description of the effect, and the affected aspect of the environment
Reversibility	Low	There is little chance of correcting the adverse impact
	Medium	There is a moderate chance of correcting the adverse impact
	High	There is a high chance in correcting the adverse impact
Risk	Low	Assessing a risk involves an analysis of the consequences and likelihood of a hazard being realized. In decision-making, low-consequence / low-probability risks (green) are typically perceived as acceptable and therefore only require monitoring.
	Medium	Other risks (amber) may require structured risk assessment to better understand the features that contribute most to the risk. These features may be candidates for management
	High	High-consequence / high-probability risks (red) are perceived as unacceptable and a strategy is required to manage the risk.

Attributes associated with the alternatives were assessed and is outlined below:

Geographical attributes

The Geographical attributes of an area relates to the characteristics of a particular region, area or place. It influences the determination of site alternatives as it relates to the location of a site in relation to relevant features in the area.

Physical attributes

Physical attributes of an area relates to the processes and patterns in the natural environment. For the purpose of this assessment, the following processes and patterns have been investigated. Geology, soil, topography and landforms, climate and meteorology, surface water and ground water.

Biological attributes

Biological attributes for the purpose of this study includes the distribution of species and ecosystems in geographic space and through geological time. Organisms and biological communities often vary in a regular fashion along geographic gradients of latitude, elevation, isolation and habitat area. The two main branches assessed will be: Phytogeography is the branch of biogeography that studies the distribution of plants. Zoogeography is the branch that studies distribution of animals.

Social attributes

Social attributes is closely related to social theory in general and sociology in particular, dealing with the relation of social phenomena and its spatial components.

Economic attributes

Economic attributes includes the location, distribution and spatial organization of economic activities and also takes into account social, cultural, and institutional factors in the spatial economy of the development.

Heritage attributes

The broad generic term Cultural Heritage Resources refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of paleontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

Cultural attributes

Cultural attributes relates to the specific characteristics such as language, religion, ethnic and racial identity, and cultural history & traditions of people. These attributes influences family life, education, economic and political structures, and, of course, business practices.

It should be noted that the above mentioned attributes do not occur in isolation and it is not uncommon for an identified impact to overlap with two or more of these attributes. Also note, not all risks require comprehensive and detailed assessment. Solid problem formulation should allow decision-makers to evaluate the extent of subsequent analysis required. The level of effort put into assessing each risk should be proportionate to its significance and priority in relation to other risks, as well as its complexity, by reference to the likely impacts. Consideration should be given to stakeholders' perceptions of the nature of the risk.

10.9.2 ENVIRONMENTAL IMPACT MANAGEMENT OUTCOMES

The following **Environmental Impact Management Outcomes** have been identified:

1. A full copy of the signed EA from DEDECT in terms of NEMA, granting approval for the development must be available on the farm
2. A copy of the EMPr as well as any amendments thereof must be available on the farm
3. **No** soil erosion may occur as a result of operational activities.
4. **No** pollution of the soil may occur as a result of leaking equipment.
5. **No** pollution of the soil as a result of uncontrolled use of herbicides, insecticides and pesticides will be allowed.
6. **No** pollution of surface water and/or groundwater as a result of leaking operational vehicles will be allowed.
7. **No** pollution of surface water and/or groundwater as a result of uncontrolled use of herbicides, insecticides and pesticides will be allowed.
8. **No** disturbance of natural vegetation beyond the parameters of the site described in this EMPr will be allowed.
9. Alien invasive plant species **will not** be allowed to invest the cleared areas.
10. **No** illegal hunting or setting of snares will be allowed.
11. Used oil and empty herbicide, insecticide and pesticide containers **must** be disposed of at a suitably licenced waste disposal site or alternatively be collected and removed by a licenced service provider.
12. **No** solid waste pollution will be allowed.
13. The site and its surrounding area **must** be free from any chemical, fuel, oil and cement spills that originated as a result of activities.
14. Absolutely **no** burning of waste is permitted.
15. Fires will **only** be allowed in facilities especially constructed for this purpose.
16. **No** air pollution as a result of operational activities will be allowed.
17. **No** intentional destruction of any sites, features or material of cultural heritage (archaeological and/or historical) origin or significance may occur.
18. Operational activities **must** abide to the rules and regulations of the Occupational Health and Safety Act, 85 of 1993.

10.10 MITIGATION MEASURES

ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS: OPERATIONAL PHASE	RESPONSIBLE PERSON
Environmental documentation reporting and compliance	A full copy of the signed EA from DEDECT in terms of NEMA, granting approval for the development must be available on the farm	Obtain the necessary Environmental Authorization and ensure that a signed copy of the EA is available on the Farm	The Applicant
	A copy of the EMPr as well as any amendments thereof must be available on the farm	Ensure that a copy of the approved EMPr is available is available on the Farm	
Geology, soil and topography	No soil erosion may occur as a result of operational activities.	<p>Maintain the anti-erosion structures that has been developed to ensure that no erosion takes place.</p> <p>The site should be monitored regularly for signs of erosion. Remedial action must be taken at the first signs of erosion.</p> <p>Stormwater control must be undertaken to prevent soil loss.</p> <p>Vegetation must be retained where possible to avoid soil erosion.</p> <p>The quality and health status of surrounding soils should be monitored throughout the operational phase.</p>	The Applicant
	No pollution of the soil may occur as a result of leaking operational equipment.	<p>Ensure that vehicles are in a good working order and not leaking oil or fuel.</p> <p>Implement measures to ensure that refuelling does not cause pollution in the form of fuel and oil spillages by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained. Spill kits must be available on site and in all vehicles that transport hydrocarbons for dispensing to other vehicles. Spill kits must be made up of material/product that is in line with environmental best practice (SUNSORB is a recommended product that is environmentally friendly).</p> <p>The responsible operator must have the required training to make use of the spill kit in emergency situations.</p>	

ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS: OPERATIONAL PHASE	RESPONSIBLE PERSON
		<p>In the event of a spill, contaminated soil must be collected in containers and stored in a central location and disposed of according to the National Environmental Management: Waste Act 59 of 2008.</p> <p>During servicing of vehicles or equipment, a suitable drip tray must be used to prevent spills onto the soil.</p>	
	No pollution of the soil as a result of uncontrolled use of herbicides, insecticides and pesticides will be allowed.	<p>The use of herbicides and pesticides must be in accordance with the directions and instructions as per the supplier/product. Do not over use.</p> <p>Measures should be put in place to ensure mixing of herbicides, pesticides and insecticides does not spill onto bare soil.</p>	
Surface drainage and groundwater	No pollution of surface water and/or groundwater as a result of leaking vehicles will be allowed.	<p>Ensure that vehicles are in a good working order and not leaking oil or fuel.</p> <p>Implement measures to ensure that refuelling does not cause pollution in the form of fuel and oil spillages by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained. Spill kits must be available on site and in all vehicles that transport hydrocarbons for dispensing to other vehicles on the farm. Spill kits must be made up of material/product that is in line with environmental best practice (SUNSORB is a recommended product that is environmentally friendly).</p> <p>The responsible operator must have the required training to make use of the spill kit in emergency situations.</p> <p>In the event of a spill, contaminated soil must be collected in containers and stored in a central location and disposed of according to the National Environmental Management: Waste Act 59 of 2008.</p> <p>During servicing of vehicles or equipment, a suitable drip tray must be used to prevent spills onto the soil.</p>	The Applicant
	No pollution of surface water and/or groundwater as a result of uncontrolled use of herbicides, insecticides	The use of herbicides, insecticides and pesticides must be in accordance with the directions and instructions as per the supplier/product. Do not over use.	

ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS: OPERATIONAL PHASE	RESPONSIBLE PERSON
	and pesticides will be allowed.	Measures should be put in place to ensure mixing of herbicides, pesticides and insecticides does not spill into the environment and pollute water sources.	
Fauna and Flora habitat	No disturbance of natural vegetation beyond the parameters of the site described in this EMPr will be allowed.	The parameters of the site are clearly defined. Ensure that no encroachment into the adjacent natural vegetated areas occur.	The Applicant
	Alien invasive plant species will not be allowed to invest the cleared areas.	Alien invasive plant species must be eradicated on a continuous basis.	
	No illegal hunting or setting of snares will be allowed.	Educate farm workers that the hunting of wild animals and the setting of snares is not allowed. Employees must be trained on how to deal with fauna species as intentional killing will not be tolerated. In the case of a problem animal e.g. a large snake, a specialist must be called in to safely relocate the animal. Environmental induction training and awareness must include aspects dealing in safety with wild animals into and on site. Focus on animals such as snakes and other reptiles that often generate fear by telling workers how to move safely away and to whom to report the sighting. Workers should also be informed where snakes most often hide so that they can be vigilant when lifting stones	
Solid waste management	Used oil and empty herbicide, insecticide and pesticide containers must be disposed of at a suitably licenced waste disposal site or alternatively be collected and removed by a licenced service provider.	Waste must be separated into recyclable and non-recyclable waste, and must be separated as follows: <ul style="list-style-type: none"> • Hazardous waste: including (but not limited to) old oil, paint, etc. • General waste: including (but not limited to) paper, plastic, glass and construction rubble Used oil and empty herbicide, insecticide and pesticide containers must be disposed of at a suitably licenced waste site or alternatively removed by a licenced service provider	The Applicant
	No solid waste pollution will be allowed.	Solid waste generated must be collected in a suitable container with a lid secured so that animals cannot gain access and be disposed of at a registered landfill site. When transporting solid waste to the licenced landfill site, solid waste must be secured to ensure that no solid waste gets windblown from the transport vehicle.	

ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS: OPERATIONAL PHASE	RESPONSIBLE PERSON
		Burning of waste will not be allowed.	
Dangerous and toxic materials	The site and its surrounding area must be free from any chemical, fuel, oil and cement spills that originated as a result of operational activities	<p>All hazardous substances must be stored in suitable containers as defined in the Method Statement.</p> <p>Containers must be clearly marked to indicate contents, quantities and safety requirements.</p> <p>All storage areas must be bunded. The bunded area must be of sufficient capacity to contain a spill / leak from the stored containers.</p> <p>Bunded areas to be suitably lined with a SABS approved liner.</p> <p>An Alphabetical Hazardous Chemical Substance (HCS) control sheet must be drawn up and kept up to date on a continuous basis.</p> <p>All hazardous chemicals that will be used on site must have Material Safety Data Sheets (MSDS).</p> <p>All employees working with HCS must be trained in the safe use of the substance and according to the safety data sheet.</p> <p>Employees handling hazardous substances / materials must be aware of the potential impacts and follow appropriate safety measures. Appropriate personal protective equipment must be made available.</p>	
Fires	<p>Absolutely no burning of waste is permitted.</p> <p>Fires will only be allowed in facilities especially constructed for this purpose.</p>	<p>Absolutely no burning of waste is permitted.</p> <p>Fires will only be allowed in facilities especially constructed for this purpose.</p>	The Applicant
Air quality	No air pollution as a result of operational activities will be allowed.	<p>Vegetation must be retained where possible to avoid dust pollution.</p> <p>No burning of waste will be allowed.</p>	The Applicant
Archaeology and cultural sites	No intentional destruction of any sites, features or material of cultural heritage (archaeological and/or historical) origin or significance may occur	In terms of the National Heritage Act, 1999 (Act No. 25 of 1999), personnel must be alert and must inform the local heritage agency within 48 hours should they come across any signs of heritage resources.	The Applicant
Health and safety	Operational activities must abide to the rules and regulations of the	Operational activities are to be managed in strict accordance with the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).	The Applicant

ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS: OPERATIONAL PHASE	RESPONSIBLE PERSON
	Occupational Health and Safety Act, 85 of 1993.	The applicant must ensure that all emergency procedures are in place. Emergency procedures must include (but not be limited to) fire, spills, contamination of the ground, accidents to employees, use of hazardous substances and materials.	

10.11. ENVIRONMENTAL AWARENESS PLAN

10.11.1 INTRODUCTION

Training is essential for ensuring that the EMPr provisions are implemented efficiently and effectively. It is vital that all personnel are adequately trained to perform their designated tasks to an acceptable standard.

The Applicant should make allowance for all farmworkers, including seasonal workers that will be working at the farm, to attend environmental awareness training sessions before commencing with work. During this training, the Applicant or his representative will explain the EMPr and the conditions contained therein.

In addition to training, general environmental awareness must be fostered among the workforce to encourage the implementation of environmentally sound practices throughout. This ensures that environmental accidents are minimized and environmental compliance maximized.

Environmental awareness training and education should be ongoing and should be undertaken regularly if deemed necessary (especially if it becomes apparent that there are repeat contraventions of the conditions of the EMPr), or as new workers come to site. Translators should be utilized where needed.

Environmental awareness could be fostered in the following manner:

- Induction course for all workers before commencing work.
- Refresher courses as and when required.
- Daily toolbox talks at the start of each day with all workers where workers might be alerted to particular environmental concerns associated with their tasks for that day or the area/habitat in which they are working.

10.11.2 ORGANISATIONAL STRUCTURE

The Applicant will be **Mr. Marius Nel** Ultimately, he will be responsible for the development and implementation of the EMPr and for ensuring that the conditions in the eventual Environmental Authorization (EA) are satisfied. The liability associated with non-compliance rests with the Applicant. The Applicant is therefore responsible for liaising directly with the relevant authorities with respect to the preparation and implementation of the EMPr and meeting EA conditions.

10.12. MONITORING, AUDITING AND REPORTING

The Applicant **Mr. Nel** is responsible for ensuring that all environmental management measures prescribed in this EMPr as well as any other conditions specified by the relevant authorities, are implemented and adhered to during all phases of the development. The Applicant may delegate the responsibilities for implementing the requirements to other persons/entities, however the Applicant remains responsible for ensuring that the delegated responsibilities are carried out.

The applicant must ensure that regular monitoring of environmental issues addressed in this management plan is undertaken. The applicant is responsible for the monitoring of the infrastructure.

Site inspections to determine maintenance needs during the operational phase are imperative for good housekeeping.

The applicant will be responsible for maintaining a database of all records pertaining to the environment for the study area.

All incidents such as spills of toxic or any other substance that may negatively affect the environment must be reported to the relevant authorities.

11. SUMMARY OF THE FINDINGS AND RECOMMENDATIONS OF SPECIALISTS

11.1 ECOLOGICAL HABITAT REPORT (SEE APPENDIX A)

Objectives of the habitat study

The objectives of the habitat study are to provide:

- A detailed fauna and flora habitat survey;
- A detailed habitat survey of possible threatened or localised plant species, vertebrates and invertebrates;
- Recording of possible host plants or food plants of fauna such as butterflies.
- Evaluate the conservation importance and significance of the site with special emphasis on the current status of threatened species;
- Literature investigation of possible species that may occur on site;
- Identification of potential ecological impacts on fauna and flora that could occur as a result of the development; and
- Make recommendations to reduce or minimise impacts, should the development be approved.

Scope of study

- Surveys to investigate key elements of habitats on the site, relevant to the conservation of fauna and flora.
- Recording of any sightings and/or evidence of existing fauna and flora.
- The selective and careful collecting of voucher specimens of invertebrates where deemed necessary.
- An evaluation of the conservation importance and significance of the site with special emphasis on the current status of threatened species.
- Recording of possible host plants or foodplants of fauna such as butterflies.
- Literature investigation of possible species that might occur on site.
- Integration of the literature investigation and field observations to identify potential ecological impacts that could occur as a result of the development.
- Integration of literature investigation and field observations to make recommendations to reduce or minimise impacts, should the development be approved.

Recommendations and Conclusions

There is an area that had been cleared and an area where grassland remained at the site. At the area that had been cleared there is some recovery of vegetation and a conspicuous presence of pioneer plant species. Both these areas, the cleared area and the area which is the remainder of the grassland, are at one terrain unit, a plain with gentle slopes in a slightly undulating larger area. The plain with gentle slopes, to almost moderate slopes, at the site is adjacent to a shallow valley outside the site, where a non-perennial river runs through.

Vegetation at the remainder of the grassland at the site consists of a moderately disturbed grassland which contains indigenous grass species, some indigenous shrub species and few trees. The grass layer is well-developed and indigenous grass species such as *Elionurus muticus* is conspicuous. Other indigenous grass species include *Aristida congesta*, *Eragrostis lehmanniana*, *Eragrostis superba*, *Cynodon dactylon*, *Eragrostis curvula*, *Chloris virgata* and *Themeda triandra*. The shrub *Seriphium plumosum* (bankrupt bush) is conspicuous at some parts of the remaining grassland. Indigenous forb species include *Berkheya onopordifolia*, *Ursinia nana*, *Cyanotis speciosa*, *Hibiscus pusillus*, *Senecio consanguineus*, *Bulbine narcissifolia*, *Pollichia campestris*, *Selago densiflora* and *Lippia scaberrima*. Alien invasive herbaceous weed species are conspicuous at disturbed areas at the site and include

include *Argemone ochroleuca*, *Tagetes minuta*, *Bidens bipinnata*, *Bidens pilosa*, *Gomphrena celosioides*, *Schkuhria pinnata*, *Conyza bonariensis*, *Chenopodium album*, *Guileminea densa*, *Alternanthera pungens* and *Verbena aristigera*.

Vegetation at the riparian zone north of the site, at artificial waterbody Dam 1, artificial waterbodd Dam 2 and the active channel of the Boesmanspruit non-perennial river in between, consists of covers of sedges and some other plant species mixed in between. Indigenous sedge species at the riparian zone include *Cyperus fastigiatus*, *Pycnus nitidus*, *Cyperus laevigatus*, *Schoenoplectus decipiens* and *Eleocharis limosa*. A rush species, *Juncus rigidus*, is also present. Herbaceous species include the alien invasive *Rumex crispus* and the indigenous *Rumex lanceolatus*. The indigenous herb *Berkheya radula* and the alien invasive *Cirsium vulgare* are present at the seasonal and temporary zones of the wetland and into some parts of the terrestrial zone.

No Threatened or Near Threatened plant or animal species appear to be resident at the site. No other plant- or animal species of particular conservation concern appear to be present at the site. The vegetation type at the site, the Klerksdorp Thornveld, is not listed as a Threatened Ecosystem according to the National List of Threatened Ecosystems (2019).

There is little scope for the site to be part of a corridor of particular conservation importance. Outside the site, towards the north, a watercourse, the non-perennial Boesmanspruit river, is present, which is a corridor of particular conservation importance.

Possible ecological sensitivities at the site were indicated by a report generated from the screening tool of DFFE. These ecological sensitivities that could possibly/ are present at the site, follow.

Animal species theme sensitivity

Relative animal species theme sensitivity is listed as low for the site. Following the groundtruthing such a listing is upheld. There is no distinct indication of the presence of any threatened animal species that is resident at the site or could have been resident at the site prior to a recent clearing of vegetation at the site. The relative animal species theme sensitivity is confirmed to be low.

Aquatic biodiversity theme sensitivity

Relative aquatic biodiversity theme sensitivity at the site is listed low for part of the site and high for part of the site. The high listing is because of a non-perennial river that is present north of the site. The site is as well as the watercourse north of the site is not part of a Freshwater Ecosystem Priority Area or Fish Support Area. The riparian zone is a substantial distance from the site and current developments at the site, are unlikely to have a discernible impact on the watercourse north of the site if mitigation measures such as avoiding pollutants or spills from entering the soil and ultimately soil water. No wetlands or riparian zones are present at the site and the relatively aquatic biodiversity theme sensitivity at the site is likely to be low for the entire site.

Plant species theme sensitivity

Relative plant species theme sensitivity is currently listed as medium. Possible sensitive plant species of which the likely presence or absence have been investigated are listed in Tables 4.2 – 4.9 and include plant species on a local and provincial scale which could be prone to harvesting also the plant species listed for the screening. None of the threatened plant species of the North West Province or any other plant species of particular conservation concern such as those prone to harvesting has been found at the site. It is unlikely that any plant species of particular conservation concern occurs at the site or has occurred at the site prior to a recent clearing of vegetation at part of the site.

Terrestrial biodiversity theme sensitivity

Relative terrestrial biodiversity at the site is very high. This high sensitivity that is ascribed to the site area, is because of the presence of Critical Biodiversity Area 2, Ecological Support Area 2 and Protected Areas Expansion Strategy. The vegetation type at the site, the Klerksdorp Thornveld (Gh 13), is not listed as a

Nationally Threatened Ecosystem. During surveys at the site, it was found that the scope for the remaining moderately disturbed grassland patch at the site to serve as part of a protected area or corridor of particular conservation concern is small. Following the ground-truthing a medium sensitivity for the terrestrial biodiversity theme is suggested.

Ecological sensitivity at the site is medium at the remainder of the grassland. Following the assessment of ecological sensitivity at the same terrain unit of which the current remainder of grassland as well as the area where the vegetation has recently been cleared, a medium ecological sensitivity is also expected at the recently cleared area at the site.

Continued monitoring and eradication of alien invasive plant species are imperative. Declared alien invasive species such as *Prosopis glandulosa* (Mesquite), *Melia azedarach* (Syringa) and alien invasive Australian *Acacia* species (Australian wattles) should not be allowed to establish.

Following the mitigations which will be upheld and planned footprint for development all the impact risks listed above are moderate or low. The impacts owing to the recent clearing of vegetation at part of the site are likely to be moderate or low as well, if the mitigation measures that are stipulated are upheld

11.2 HERITAGE IMPACT ASSESSMENT (HIA) (See Appendix B for a copy of this report)

APelser Archaeological Consulting cc (APAC cc) was appointed by AB Enviro Consult to provide a motivation for Exemption from a Full Phase 1 HIA, as part of an Environmental Authorization Process for the proposed development of Silos the Remaining Extent of Portion 4 of the farm Waagkraal 374IO, approximately 15km south-west of the town of Ottosdal in the Northwest Province.

Terms of Reference for Heritage Impact Assessment

The Terms of Reference for the study was to:

1. Identify all objects, sites, occurrences and structures of an archaeological or historical nature (cultural heritage sites) located on the portion of land that will be impacted upon by the proposed development;
2. Assess the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value;
3. Describe the possible impact of the proposed development on these cultural remains, according to a standard set of conventions;
4. Propose suitable mitigation measures to minimize possible negative impacts on the cultural resources;
5. Review applicable legislative requirements;

Legislative requirements of National Heritage Resources Act (NHRA), Act 25 of 1999

Aspects concerning the conservation of cultural resources are dealt with mainly in two acts. These are the National Heritage Resources Act (Act 25 of 1999) and the National Environmental Management Act (Act 107 of 1998).

The National Heritage Resources Act

According to the above-mentioned act the following is protected as cultural heritage resources:

- a. Archaeological artifacts, structures and sites older than 100 years
- b. Ethnographic art objects (e.g. prehistoric rock art) and ethnography
- c. Objects of decorative and visual arts
- d. Military objects, structures and sites older than 75 years
- e. Historical objects, structures and sites older than 60 years
- f. Proclaimed heritage sites
- g. *Grave yards and graves older than 60 years*
- h. Meteorites and fossils
- i. Objects, structures and sites of scientific or technological value.

The National Estate includes the following:

- a. Places, buildings, structures and equipment of cultural significance
- b. Places to which oral traditions are attached or which are associated with living heritage
- c. Historical settlements and townscapes
- d. Landscapes and features of cultural significance
- e. Geological sites of scientific or cultural importance
- f. Sites of Archaeological and palaeontological importance
- g. *Graves and burial grounds*
- h. Sites of significance relating to the history of slavery
- i. Movable objects (e.g. archaeological, palaeontological, meteorites, geological specimens, military, ethnographic, books etc.)

A Heritage Impact Assessment (HIA) is the process to be followed in order to determine whether any heritage resources are located within the area to be developed as well as the possible impact of the proposed development thereon. An Archaeological Impact Assessment (AIA) only looks at archaeological resources. An HIA must be done under the following circumstances:

- a. The construction of a linear development (road, wall, power line, canal etc.) exceeding 300m in length
- b. The construction of a bridge or similar structure exceeding 50m in length
- c. *Any development or other activity that will change the character of a site and exceed 5 000m² or involve three or more existing erven or subdivisions thereof*
- d. Re-zoning of a site exceeding 10 000 m²
- e. Any other category provided for in the regulations of SAHRA or a provincial heritage authority

Recommendations and Conclusions

Based on the aerial images of the area, photographs provided by the client and the heritage desktop study, it is therefore deemed unlikely that any significant sites, features or material of cultural heritage (archaeological and/or historical) origin and/or significance will exist in the study area & proposed development area. Recent historical activities (mainly agricultural activities) would have impacted on any if they did exist here in the past and would have disturbed or destroyed these to a large degree. Known archaeological and historical sites, features and material have been identified in the larger geographical area and this needs to be taken into consideration during actions related to the proposed Silo development.

It is therefore recommended that Motivation for Exemption from a full Phase I Heritage Impact Assessment for the proposed Silo Development (at the Waagkraal NWK site) on various portions of the farm Waagkraal 374IO, 15km south-west of Ottosdal in the Northwest Province, be granted to the applicants taking into consideration the following:

The subterranean nature of cultural heritage (archaeological and/or historical) resources must always be kept in mind. Should any previously unknown or invisible sites, features or material be uncovered during any development actions then an expert should be contacted to investigate and provide recommendations on the way forward. This could include previously unknown and unmarked graves and/or cemeteries. Furthermore, should there be any future plans to do any alterations or changes to the existing farmstead and any of the related farming-related infrastructure then a Detailed Heritage Assessment needs to be undertaken to determine their age/origin and significance in order to recommend on the way forward. Any demolition or alteration to structures older than 60 years of age needs to be undertaken with a permit obtained from SAHRA.

12. CONCLUSIONS AND RECOMMENDATIONS

The applicant have always attempted to ensure that he is on the right side of the Law. His intention was to save money by using this revolutionary new method of storing grain (The Silo Bag). He started small by only storing his own grain. Quickly his neighbors also enquired from him if they can also store their grain at his facility. This has led to him having to erect additional infrastructure to manage this need. It was only once he enquired to go into partnership with an established service provider that he became aware of the fact that he might have contravened the NEMA.

It was never his intention to conduct any illegal activities and had he known that he needed Authorization for the clearance of indigenous vegetation, he would have applied for authorization before any commencement took place.

Once Mr. Nel have realized that he have contravened the NEMA, he has immediately contacted an Environmental Assessment Practitioner (EAP) and he (The EAP) has explained the consequences of his actions to him. The EAP has also explained that, that he is entitled to submit an application for consequences of unlawful commencement of activity in terms of section 24G of NEMA. Mr. Nel has since appointed an independent Environmental Assessment Practitioner (EAP) to assist him with this process.

It should be highlighted that Mr Nel is coming forward on his own, as he has not been issued with any Notice of Intention to Issue a Compliance Notice in terms of Section 31L.

This Chapter of the Report provides a summary of the findings of the Assessment process, including the EAP's opinion as to whether the activity should or should not be authorised.

12.1 ENVIRONMENTAL IMPACT STATEMENT

The detailed environmental assessment for the proposed development, has not found any environmental impacts that *cannot* be mitigated to acceptable and manageable levels.

The site is located in the northern parts of the Maquassi Hills Local Municipality that forms part of the Dr. Kenneth Kaunda District Municipality in the North West Province of South Africa. The site is located approximately 14km south (as the crow flies) of the Town of Ottosdal and 28 km north (as the crow flies) of the Town of Wolmaransstad.

The site is located 1.8 km west of the R505 Road between Ottosdal and Wolmaransstad. The site is located on a gentle slope that slopes towards the north where a waterbody Dam 1, artificial waterbody Dam 2 and the active channel of the Boesmanspruit non-perennial river borders the site.

An area of 26.4 hectares, located within a CBA 2, was cleared of indigenous vegetation in order to establish grain handling and storage facilities. 1 906 square meters of the cleared area is located within 100 meters from the non-perennial Boesmanspruit. The following infrastructure has been erected on site:

- A Site entrance and Electric Fence
- Receiving weighing-in Weigh Bridge.
- Dispatching receiving facility with weighing-out Weigh Bridge.
- Office
- Galvanized steel silos
- Shed for storage of Machinery and Equipment
- Laydown area for the storage of Silo Bags

There is an area that had been cleared and an area where grassland remained at the site. At the area that had been cleared there is some recovery of vegetation and a conspicuous presence of pioneer plant species. Both these areas, the cleared area and the area which is the remainder of the grassland, are at one terrain unit, a plain with gentle slopes in a slightly undulating larger area. The plain with gentle slopes, to almost moderate slopes, at the site is adjacent to a shallow valley outside the site, where a non-perennial river runs through.

Maize is the most widely produced crop in South Africa. During the 2016–2017 production season, 16.7 Tg of maize grain was produced from 2.6 million ha. The food supply quantity (maize and its products) for South Africa ranges from 250–300 g capita⁻¹ d⁻¹, illustrating the significant role of maize in the daily diet of South Africans. In addition, 40% of maize is used as livestock feed, constituting ~4.5 Tg annually. Market prices in all produce sectors are always changing due to several different factors. The maize market price is one of the most volatile of all the grain sectors and because this is one of South Africa's primary food products it influences a big proportion of our countries farmers. The main factor above all others which determines the price of maize in each season is **supply and demand**. Roughly 75% of maize produced in a season is consumed by our own local market. This can be in the form of maize based food products for humans as well as animal feed. Simply put; when we have a good year and our maize crops yield well, then the price of maize will decline as there is an abundant supply. In poorer drought years when there are lower yields the price will increase with demand.

International market influences also play a role in the prices farmers receive for their maize. In years when there is an under supply of maize in the country we need make up the shortfall by importing maize from other countries. At times this can have a ripple effect on our market because as we build up stores of cheap imported maize it can result in the local price of maize being stagnated.

Our local maize price is also affected by export demand for our crop. In years when we have an oversupply of maize there may be other countries that have experienced a shortfall resulting in them becoming a potential importer of our maize. This can hold our prices stable. There are however several international trade regulations which factor into this such as export and import tariffs and health standards.

One of the biggest problems for farmers and grain users (Like Millers) is the limited availability of quality grain during the dry season of the year, in addition to the availability of soil and climate conditions, among other factors. Forage is the most economical source of food for livestock while grain as a food source provide protein for many people and its availability is set by times of abundance that match rainfall season, and scarcity, which matches the drought season.

To overcome these drawbacks, it is necessary to develop strategies for forage and grain conservation that favour the availability of good quality food permanently and at a low cost during the critical period of the year. Storage of grain also allows the producer to keep his maize until the price is right.

As can be seen from the above, storage of produce plays a vital role in the production/value chain of the industry.

Silo bags are a key hermetic storage technology that reduces post-harvest losses while providing an economic alternative for farmers and trading entities to gain control over marketing their stored grain between crop harvests. The cheapest, cleanest way to store almost any agricultural commodity.

Silo bags consist of three layers of polyethylene totalling 230 microns thick. The outer two layers are white to reflect solar radiation and make the bag weatherproof. The inner layer is black to block sunlight. A typical silo bag is about 60 meters long, 2.7 meters in diameter, and can store as much as 200 tonnes of grain, though they can be smaller by simply using less of the bag. When properly sealed, the silo bag is watertight and has a high degree of gas tightness to CO₂ and O₂.

The revolutionary silo bag system is a breakthrough in low cost, efficient, chemical free grain storage for both dry grains and silage. The silo bag system utilizes a time-tested method (i.e., hermetic storage) and incorporates modern technology to provide producers and commodity stakeholders with an economical, flexible and safe method to store grain.

Grain is stored in an absolute anaerobic (oxygen-free) environment. The bag is designed to stretch by 10% ensuring the grain is packed tightly and most air is expelled at filling. After sealing, the few pockets of air/oxygen are consumed by the grain breathing, thus producing a modified atmosphere, rich in carbon dioxide. As a result, diseases caused by fungi, bacteria and insects are eliminated, reducing the need to use chemicals on the stored grain.

The bagging and out-loading processes are done by means of high performance, low cost and easily transportable machines.

The silo bag system has provided agricultural producers and traders with a powerful storage and logistics solution.

Silo bags have the following advantages over conventional storage methods:

- Grains can be stored at a higher moisture content than is allowed in traditional receival systems.
- Traceability and classification of your grain regarding quality and commercial identity, like cultivars and GMO-free commodities.
- Grains can be easily sampled by means of a conventional sampler.
- Grain retains its quality and colour.
- The bag is airtight, therefore chemicals are not normally required to control insects.
- Perfect for organic commodities.
- Freight costs reduced by negotiating freight rates out of peak harvest times.
- Can eliminate costly harvester downtime.
- Harvest times are accelerated.
- Very quick implementation of large tonnage sites.
- Suitable for both extreme heat and extreme cold climates.
- Eliminates costly on-farm storage systems.
- The on-farm storage of your grains expands the marketing opportunities of the commodity.
- Store on farm with no wastage.
- Storage in a year of high/excess production is unlimited.
- You only buy the quantity of bags you require.
- The system is portable/relocatable.
- Grains can be stored as to variety, grade, protein or for any other reason

The activity provides farmers in the area the opportunity to have access to these advantages

Consistent with national priorities, environmental authorities must support *"increased economic growth and promote social inclusion"*, whilst ensuring that such growth is *"ecologically sustainable"*. In the National Spatial Development Perspective (NSDP) it is highlighted that, to achieve the goal of stimulating sustainable economic activities and to create long-term employment opportunities, it is required that spending on economic infrastructure is focused in priority areas with potential for economic development, with development to serve the broader societies' needs equitably.

The identification, description, evaluation and comparison of alternatives are important for ensuring a sound environmental scoping process.

The alternatives considered for the development relates to “**the technology to be used in the activity**”. Alternatives were considered for the method of storage and includes:

4. Proposal: The use of Silo Bags in combination with Corrugated Iron Silos.
5. Alternative 1: The use of traditional bunker Silos. (Either Corrugated Iron Silos or conventional Concrete Silos.)
6. Alternative 2: “No-go” option

The revolutionary silo bag system is a breakthrough in low cost, efficient, chemical free grain storage for both dry grains and silage. The silo bag system utilizes a time-tested method (i.e., hermetic storage) and incorporates modern technology to provide producers and commodity stakeholders with an economical, flexible and safe method to store grain.

The Specialist studies conducted revealed the following:

The **Fauna and Flora Habitat specialist** concluded that there is no distinct indication of the presence of any threatened animal species that is resident at the site or could have been resident at the site prior to a recent clearing of vegetation at the site. The relative animal species theme sensitivity is confirmed to be low. Riparian zone is a substantial distance from the site and current developments at the site, are unlikely to have a discernible impact on the watercourse north of the site if mitigation measures such as avoiding pollutants or spills from entering the soil and ultimately soil water. None of the threatened plant species of the North West Province or any other plant species of particular conservation concern such as those prone to harvesting has been found at the site. It is unlikely that any plant species of particular conservation concern occurs at the site or has occurred at the site prior to a recent clearing of vegetation at part of the site. . Following the ground-truthing a medium sensitivity for the terrestrial biodiversity theme is suggested.

The **Heritage Impact Assessment** revealed that based on the aerial images of the area, photographs provided by the client and the heritage desktop study, it is therefore deemed unlikely that any significant sites, features or material of cultural heritage (archaeological and/or historical) origin and/or significance will exist in the study area & proposed development area.

12.2 ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

The EMPR’s aim is to identify and minimise the potential impacts that the operational phase of the project may have on the receiving environment. An EMPR has been developed which is contained Paragraph 10 of this report and includes detailed mitigatory measures for the operational phase.

As a general guideline, the EMPR should be based on a comprehensive set of environmental aspects (elements of the facility that can interact with the environment), and hence, the EMPR compiled for this application includes the following key components:

- Mechanisms for the on-going identification and assessment of environmental aspects and impacts;
- Environmental management programmes; objectives and targets;
- Environmental monitoring and reporting framework;
- Environmental management procedures; and,
- Mechanisms for the recording of environmental incidents and implementing corrective and preventative actions.

12.3 EAP OPINION

The information contained in this Report and Specialist Studies, provides a detailed and comprehensive description of the proposed project, baseline environment and potential environmental impacts associated with the proposed development. As no significant impacts that cannot be mitigated were identified, AB Enviro Consult is of the opinion that the project should be authorized, provided that the necessary mitigation and management measures are implemented.

Under South African environmental legislation, the Applicant is accountable for the potential impacts of the activities that are undertaken and is responsible for managing these impacts. The Applicant therefore has overall and total environmental responsibility to ensure that the implementation of the operational phase of the EMPR complies with the relevant legislation and the conditions of the environmental authorisation. The applicant will thus be responsible for the implementation of the EMPR.

12.4 CONDITIONS RECOMMENDED TO BE INCLUDED IN ANY AUTHORISATION THAT MAY BE GRANTED BY THE COMPETENT AUTHORITY IN RESPECT OF THE APPLICATION

1. A full copy of the signed EA from DEDECT in terms of NEMA, granting approval for the development must be available on the farm
2. A copy of the EMPR as well as any amendments thereof must be available on the farm
3. No soil erosion may occur as a result of operational activities.
4. No pollution of the soil may occur as a result of leaking equipment.
5. No pollution of the soil as a result of uncontrolled use of herbicides, insecticides and pesticides will be allowed.
6. No pollution of surface water and/or groundwater as a result of leaking operational vehicles will be allowed.
7. No pollution of surface water and/or groundwater as a result of uncontrolled use of herbicides, insecticides and pesticides will be allowed.
8. No disturbance of natural vegetation beyond the parameters of the site described in this EMPR will be allowed.
9. Alien invasive plant species will not be allowed to invest the cleared areas.
10. No illegal hunting or setting of snares will be allowed.
11. Used oil and empty herbicide, insecticide and pesticide containers must be disposed of at a suitably licenced waste disposal site or alternatively be collected and removed by a licenced service provider.
12. No solid waste pollution will be allowed.
13. The site and its surrounding area must be free from any chemical, fuel, oil and cement spills that originated as a result of activities.
14. Absolutely no burning of waste is permitted.
15. Fires will only be allowed in facilities especially constructed for this purpose.
16. No air pollution as a result of operational activities will be allowed.
17. No intentional destruction of any sites, features or material of cultural heritage (archaeological and/or historical) origin or significance may occur.
18. Operational activities must abide to the rules and regulations of the Occupational Health and Safety Act, 85 of 1993.

13. AFFIRMATION BY EAP

- I **Mr. J.P. de Villiers** declare under oath that I:
- a. act as the independent environmental practitioner in this application ;
 - b. do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed;
 - c. do not have and will not have a vested interest in the proposed activity proceeding;
 - d. have no, and will not engage in, conflicting interests in the undertaking of the activity;
 - e. undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required;
 - f. will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
 - g. will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report;
 - h. will keep a register of all interested and affected parties that participated in a public participation process; and
 - i. will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not.

Signature of the Environmental Assessment Practitioner:

AB ENVIRO CONSULT CC

Name of company:

Date:

Signature of the Commissioner of Oaths:

Date

Designation

Official stamp:

14 REFERENCES

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APPENDIX A: ECOLOGICAL HABITAT REPORT

APPENDIX B: HERITAGE IMPACT ASSESSMENT (HIA)

APPENDIX C: SPECIALIST DECLARATION OF INTEREST