

# DRAFT IMPACT ASSESSMENT REPORT

**NEMA Section 24G Rectification Process for the already established agricultural pivots to a total of approximately 34.7ha on the Farm Kloof nr.143 near the town of Niekerkshoop, Northern Cape Province**

**6 November 2019**

**DENC REF.:  
S24G/01/03/2019**

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Reg no.: 2017/232414/07



## EXECUTIVE SUMMARY

The applicant, Gladium Trust, historically cleared three separate areas of natural vegetation for the cultivation of irrigated centre pivot lands and irrigated rectangular lands on Portions 1 and 2 of the Farm Kloof no 143. The farm is situated approximately 12.5 km north-east of the town of Niekerskooop, Northern Cape Province. The purpose of the cultivation has been for various commercial rotational crop productions. Water is extracted from a number of relevant supply boreholes on site and is utilised for irrigation of the combined approximate 35 ha areas. Environmental authorisation was not previously obtained for the previously mentioned projects from the Northern Cape Department of Environment and Nature Conservation (DENC). The applicant has become aware of this transgression and has opted to follow a Section 24G rectification process in accordance with the National Environmental Management Act (Act 107 of 1998) (NEMA).

Eco-Con Environmental (Pty) Ltd. was appointed by Gladium Trust as the independent Environmental Assessment Practitioner (EAP) to conduct a NEMA Section 24G Rectification Application. Eco-Con Environmental was established in May 2017. Although the formal establishment of the company took place in 2017, it is backed by more than 15 years of collective professional service and experience in the environmental field. The qualifications, expertise and experience of our professional team form the backbone of the company's continued success.

### NEMA LISTED ACTIVITIES TRIGGERED BY THE PROPOSED PROJECT

The development activities in the National Environmental Management Act (Act 107 of 1998): Environmental Impact Assessment Regulations, 2014 (Government Notices R983, R984 and R985 in Government Gazette No. 38282 of 04 December 2014) (as amended in April 2017) which are triggered by the proposed project is listed in the table below:

Regulation	Activity	Description of trigger activity in proposed project
<b>GN. R. 324 Listing Notice 1</b>	<p><b>Activity 12</b> The development of –</p> <p>(i) infrastructure or structures with a physical footprint of 100 square metres or more where such development occurs –</p> <p>(a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse</p>	Pivots of assessment area 1 occurs within an ephemeral water drainage line

<p><b>GN. R. 325 Listing Notice 2</b></p>	<p><b>Activity 15</b>  The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for -  (i) the undertaking of a linear activity; or  (ii) maintenance purposes undertaken in accordance with a maintenance management plan.</p>	<p>The already developed agricultural pivots covering a total area of 34.7 hectares.</p>
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## PROJECT LOCATION

The assessment areas consist of three separate portions namely Assessment areas 1, 2 and 3 which constitute cultivated irrigated centre pivot lands and irrigated rectangular lands. The assessment areas are situated on Portions 1 and 2 of the Farm Kloof no 143 (SG 21 Digit Codes: C0310000000014300001 and C0310000000014300002). The farm is situated approximately 12.5 km north-east of the town of Niekerskooop which forms part of the Pixley Ka Seme District Municipality, Northern Cape Province. Access to the assessment areas is obtained via the R 386 provincial road and subsequent dirt roads from the west.

## NEEDS AND DESIRABILITY OF THE PROJECT

Various key factors must be taken into consideration as motivation/incentive for the potential benefits involved with the proposed project. The Remaining Extent of the Farm Kloof nr.143 previously had little economic value due to low grazing capacity for livestock purposes. The development of these rotary crop production pivots on the above mentioned farms have significantly increased the agricultural potential of the property, which in turn increased the economic value. Operational phase job creation (local employment) and sustainable capacity building (skills, experience and resources development) of this project also aid continuous local community upliftment and poverty alleviation and are therefore regarded as significant socio-economic benefits associated with the project to motivate the need and desirability. The outcomes of this project are also in line with the requirements and objectives of the National Development Plan; Northern Cape Provincial Spatial Development Framework; Northern Cape Provincial Growth and Development Strategy as well as the Siyathemba Local Municipality and Pixley Ka Seme District Municipality Integrated Development Plans.

**ALTERNATIVES CONSIDERED**

As this application / impact assessment report relates to a Section 24G rectification application for the already established rotation crop pivots and water extraction points and water pipelines, no alternatives are available for evaluation.

**PUBLIC PARTICIPATION PROCESS**

A continual and comprehensive Public Participation Process (PPP) will be undertaken throughout the entire Section 24G rectification process with all stakeholders and Interested and Affected Parties (I & AP's), including the relevant organs of state and competent authority (Northern Cape Department of Environment and Nature Conservation) as identified. The PPP will be conducted in accordance with the requirements of Regulation 41 of the EIA Regulations, 2014 and the designated Public Participation Officer will ensure that the PPP is facilitated in a manner which ensures reasonable opportunity for all stakeholders and registered I & AP's to comment and provide input on the proposed project.

## ENVIRONMENTAL IMPACT ASSESSMENT

The S24G rectification application has identified various potential impacts which are discussed in detail in this report (below is only the summary of the impact identified). No “red flag” impacts were identified.

### Impact Summary

**Construction / Development Phase:** *(These impacts were calculated by means of the natural surrounding areas as if construction is yet to take place. The reason being: to give an indication of what impact the construction phase had on the natural environment).*

PLANNING, DESIGN AND CONSTRUCTION PHASE							
Potential Flora Impacts:							
<b>Nature of impact:</b> Direct impact on Flora as a result of vegetation clearance.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	No-Go Alternative
<b>Total SP:</b>	52	48	56	52	56	52	16
<b>Significance rating:</b>	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
<b>Cumulative impact:</b>	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Potential Fauna and Avifauna Impacts:							
<b>Nature of impact:</b> Direct impact on Fauna and Avifauna as a result of vegetation clearance.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	No-Go Alternative
<b>Total SP:</b>	33	30	33	30	33	30	16
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Dust Impacts:							
<b>Nature of impact:</b> Dust nuisance generated during the development / preparation of the pivots.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	No-Go Alternative
<b>Total SP:</b>	30	20	30	20	30	20	16
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)

Potential Noise Impacts:							
<b>Nature of impact:</b> Noise nuisance generated during the development / preparation of the pivots.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>No-Go Alternatives</b>
<b>Total SP:</b>	30	20	30	20	30	20	16
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Cultural and Heritage Impacts:							
<b>Nature of impact:</b> Damage and destruction of vertebrate fossils during excavation activities.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>No-Go Alternative</b>
<b>Total SP:</b>	9	7	9	7	9	7	4
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Surface and Groundwater Contamination Impacts:							
<b>Nature of impact:</b> Surface and Groundwater Contamination during the development / preparation of the pivots.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>No-Go Alternative</b>
<b>Total SP:</b>	48	28	36	24	36	24	0
<b>Significance rating:</b>	Medium (M)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Medium (M)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Waste Management Impacts:							
<b>Nature of impact:</b> Waste impacts by means of waste storage and littering during the development / preparation of the pivots.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>No-Go Alternative</b>
<b>Total SP:</b>	18	9	18	9	18	9	8
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Traffic Impacts:							

<b>Nature of impact:</b> Traffic impacts by means of additional truck and transportation to and from site during the development / preparation of the pivots.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>No-Go Alternative</b>
<b>Total SP:</b>	9	7	9	7	9	7	4
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Potential Fire Risk Impacts:</b>							
<b>Nature of impact:</b> Increase risk of fires during the development / preparation of the pivots.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
<b>Evaluation Component:</b>	<b>Assessment area</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>No-Go Alternative</b>
<b>Total SP:</b>	9	6	9	6	9	6	5
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Potential Soil Contamination Impacts:</b>							
<b>Nature of impact:</b> Increased Soil contamination by means of hazardous substances.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>No-Go Alternative</b>
<b>Total SP:</b>	24	18	24	18	24	18	4
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Potential Soil Erosion Impacts:</b>							
<b>Nature of impact:</b> Increased Soil erosion due to construction activities.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>No-Go Alternative</b>
<b>Total SP:</b>	48	28	26	24	26	24	6
<b>Significance rating:</b>	Medium (M)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Medium (M)	Medium (M)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Potential Visual Impacts:</b>							

<b>Nature of impact:</b> Increased visual impact due to increased working activities on-site.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>No-Go Alternative</b>
<b>Total SP:</b>	20	14	20	14	20	14	4
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Potential Socio-Economic Impacts:</b>							
<b>Nature of impact:</b> Increased socio-economic conditions due to job creation			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>No-Go Alternative</b>
<b>Total SP:</b>	56	75	56	75	56	75	60
<b>Significance rating:</b>	+ Medium(M)	+Medium-high (MH)	+ Medium (M)	+ Medium-high (MH)	+ Medium (M)	+ Medium-high (MH)	Medium (M)
<b>Cumulative impact:</b>	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	Medium (M)



## Operational Phase

OPERATIONAL PHASE							
Potential Flora Impacts:							
<b>Nature of impact:</b> Direct impact on flora as a result of continuous vegetation clearance.				<b>Activity:</b> Already Established Onion and Maize Pivot areas			
Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	No-Go Alternative
<b>Total SP:</b>	64	60	64	60	64	60	18
<b>Significance rating:</b>	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
<b>Cumulative impact:</b>	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
Potential Flora, Fauna and Avifauna Impacts:							
<b>Nature of impact:</b> Destruction of / damage to Red Data Listed, nationally or provincially protected species individuals/ habitats associated with the assessment areas.				<b>Activity:</b> Already Established Onion and Maize Pivot areas			
Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	No-Go Alternative
<b>Total SP:</b>	48	30	32	30	54	34	18
<b>Significance rating:</b>	Medium (M)	Low (L)	Low (L)	Low (L)	Medium (M)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Potential Flora, Fauna and Avifauna Impacts:							
<b>Nature of impact:</b> Transformation of an ecological support area (ESA) associated with the <u>Assessment areas 2 and 3.</u>				<b>Activity:</b> Already Established Onion and Maize Pivot areas			
Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	No-Go Alternative
<b>Total SP:</b>	-	-	51	32	51	32	16
<b>Significance rating:</b>	-	-	Medium (M)	Low (L)	Medium (M)	Low (L)	Low (L)
<b>Cumulative impact:</b>	-	-	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Flora impacts							
<b>Nature of impact:</b> Terrestrial alien invasive species establishment				<b>Activity:</b> Already Established Onion and Maize Pivots.			

Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	No-Go Alternative
<b>Total SP:</b>	36	22	56	26	36	22	18
<b>Significance rating:</b>	Low (L)	Low (L)	Medium (M)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Watercourse impacts:</b>							
<b>Nature of impact:</b> Impeding of the historic ephemeral water drainage lines and significant watercourses' flow regimes associated with the quaternary surface water catchment and drainage area towards the south-east.				<b>Activity:</b> Already established Onion and Maize pivots.			
Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	No-Go Alternative
<b>Total SP:</b>	57	32	34	14	34	14	7
<b>Significance rating:</b>	Medium (M)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Potential Dust Impacts:</b>							
<b>Nature of impact:</b> Dust nuisance generated during the operational phase of the project.				<b>Activity:</b> Already Established Onion and Maize Pivot areas			
Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	No-Go Alternative
<b>Total SP:</b>	33	10	33	10	33	10	5
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Potential Noise Impacts:</b>							
<b>Nature of impact:</b> Noise nuisance generated during the operational phase of the pivots.				<b>Activity:</b> Already Established Onion and Maize Pivot areas			
Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	No-Go Alternative
<b>Total SP:</b>	24	18	24	18	24	18	5
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Potential Cultural and Heritage Impacts:</b>							

<b>Nature of impact:</b> Damage and destruction of vertebrate fossils during the operational phase.		<b>Activity:</b> Already Established Onion and Maize Pivot areas					
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>No-Go Alternative</b>
<b>Total SP:</b>	9	6	9	6	9	6	5
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Potential Surface and Groundwater Contamination Impacts:</b>							
<b>Nature of impact:</b> Surface and Groundwater Contamination during the operational phase by means of fertilizer and/or any other hazardous substances or pesticides.		<b>Activity:</b> Already Established Onion and Maize Pivot areas					
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>No-Go Alternative</b>
<b>Total SP:</b>	57	32	57	32	57	32	0
<b>Significance rating:</b>	Medium (M)	Low (L)	Medium (M)	Low (L)	Medium (M)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Potential Waste Management Impacts:</b>							
<b>Nature of impact:</b> Waste impacts by means of waste storage and littering during the operational phase of the pivots.		<b>Activity:</b> Already Established Onion and Maize Pivot areas					
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>No-Go Alternative</b>
<b>Total SP:</b>	20	18	20	18	20	18	16
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Potential Traffic Impacts:</b>							
<b>Nature of impact:</b> Traffic impacts by means of additional truck and transportation to and from site during the operational phase of the pivots.		<b>Activity:</b> Already Established Onion and Maize Pivot areas					
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>No-Go Alternative</b>
<b>Total SP:</b>	9	6	9	6	9	6	4
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)

<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Potential Fire Risk Impacts:</b>							
<b>Nature of impact:</b> Increase risk of fires during the operational phase of the pivots.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas No-Go Alternative</b>
	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	
<b>Total SP:</b>	9	6	9	6	9	6	5
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Potential Soil Contamination Impacts:</b>							
<b>Nature of impact:</b> Increased Soil contamination by means of hazardous substances.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas No-Go Alternative</b>
	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	
<b>Total SP:</b>	57	32	57	32	57	32	4
<b>Significance rating:</b>	Medium (M)	Low (L)	Medium (M)	Low (L)	Medium (M)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Potential Soil Erosion Impacts:</b>							
<b>Nature of impact:</b> Increased Soil erosion due to operational activities.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas No-Go Alternative</b>
	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	
<b>Total SP:</b>	33	11	33	11	33	11	4
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Potential Visual Impacts:</b>							
<b>Nature of impact:</b> Increased visual impact due to increased working activities during the operational phase.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas No-Go Alternative</b>
	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	<b>Before Mitigation</b>	<b>After Mitigation</b>	
<b>Total SP:</b>	18	14	18	14	18	14	4
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Potential Socio-Economic Impacts:</b>							

<b>Nature of impact:</b> Increased socio-economic conditions due to job creation			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
<b>Total SP:</b>	52	75	52	75	52	75	60
<b>Significance rating:</b>	+ Medium(M)	+Medium-high (MH)	+ Medium (M)	+ Medium-high (MH)	+ Medium (M)	+ Medium-high (MH)	Medium (M)
<b>Cumulative impact:</b>	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	Medium (M)

Decommissioning Phase

It is not foreseen that this project will be decommissioned as this is an existing profitable agricultural project. If in the future the applicant wishes to decommission the pivots and water pipelines, a new/separate Environmental Impact Assessment in line with the NEMA listed activities has to be undertaken, with an Environmental Management Plan, for the decommissioning phase of the project.

## SUMMARY OF SPECIALIST STUDIES

The section below outlines the main finding of all specialists involved in the impact assessment process. More detailed insight may be gathered from the specialist report which is attached as Appendix E.

### Ecological and Wetland Specialist study

The assessment areas constitute cultivated centre pivot lands and a number of adjoining rectangular lands of which all previously existing natural surface vegetation on the cultivated land footprints has been completely transformed.

The broader areas surrounding all three the assessment areas are mainly in an undeveloped natural condition and therefore scored high PES values. The localised undeveloped areas surrounding Assessment areas 1 & 2, constitute flat to slightly sloping low growing grassland mainly dominated by 'white grasses'. These areas also possess a well-represented dwarf karroid shrub layer while tree and shrub individuals are very sparsely present. The localised undeveloped valley bottom areas surrounding Assessment area 3, constitute slightly sloping open savannah shrubland. The areas possess a relatively well-developed woody component which mainly consists of multi-stemmed shrubs with small single-stemmed trees also being sparsely present.

It is reasonably assumed that the historic ecology of the three assessment areas prior to the agricultural transformation, would have been comparable to that of their surrounding undeveloped areas as they are situated directly adjacent to the assessment areas. No significant changes in soil structure or landscape topography or features are evident between the assessment areas and their surrounding undeveloped areas which further supports this assumption.

With the exception of the sparsely represented nationally protected tree species and the provincially protected species *Oxalis semiloba*, no Red Data Listed-, other provincially protected species or any other species of conservational significance were found to be present within the localised surrounding undeveloped areas. It is therefore also not anticipated that the assessment areas would necessarily have housed large numbers of any species of conservational significance. It must however be noted that the time of the assessment was not necessarily favourable for successful identification of all plant species individuals.

The assessment areas and surrounding undeveloped areas do not fall within any Important Bird Area (IBA) as per the latest IBA map obtained from the Birdlife SA website ([www.birdlife.org.za/conservation/important\\_bird\\_areas/iba-map](http://www.birdlife.org.za/conservation/important_bird_areas/iba-map)). Small nests of common resident bird species were observed within some of the very sparsely represented shrub and tree individuals within the surrounding undeveloped areas, but no conservationally significant bird species, unique or specialised bird habitats were observed or are expected to utilise the areas for breeding and/or persistence purposes.

A distinct second order ephemeral water drainage line historically traversed Assessment area 1 flowing in an easterly direction and discharging into a significant ephemeral watercourse located approximately 1.9 km east of the assessment area. This significant watercourse forms an important part of the mid portion of a quaternary surface water catchment and drainage area which drains towards the south-east.

The cultivation of the rectangular lands associated with Assessment area 1, was however completed directly through the historic drainage line and the area was mechanically levelled for the lands. The original flow regime and -path of the drainage line towards the significant watercourse was therefore significantly altered and obstructed. Limited water flow however still takes place through the drainage line during rainfall events. It is recommended that the flow path of the drainage line be adequately diverted and channelled around the existing cultivated lands in order to ensure continued flow of surface water runoff during rainfall events, towards the significant ephemeral watercourse to the east.

This significant watercourse into which this drainage line flows, also flows past Assessment areas 2 & 3 directly adjacent east. The watercourse has however seemingly not been directly or significantly impacted by the development of Assessment areas 2 & 3. The original flow regime and -path of the watercourse has not been significantly altered or obstructed and unimpeded water flow still takes place through the watercourse during rainfall events. It is however recommended that a minimum approximate 40 m buffer zone should be implemented around the watercourse portion which is adjacent to Assessment area 2 and no further development may take place within the buffered area. It is also recommended that no further development may take place any closer to either of the watercourses within the localised area of Assessment area 3.

The three assessment areas and localised surrounding undeveloped natural areas would probably have scored moderate historic EIS values as these areas could have been viewed as being ecologically important and sensitive on local or possibly provincial scale mainly due to the sparse presence of nationally protected tree and shrub species individuals as well as the ephemeral water drainage line and significant ephemeral watercourses which form an important part of the mid portion of a quaternary surface water catchment and drainage area towards the south-east.

The three assessment areas would therefore historically probably have been viewed as being of moderate conservational significance for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type, ESA, nationally protected tree and shrub species individuals as well as the quaternary surface water catchment and drainage area which drains towards the south-east.

It is the opinion of the specialist that the virtually complete loss and transformation of natural habitat, biota and basic ecosystem functionality within the three assessment areas is deemed irreversible. Sufficient ecological restoration of the relevant vegetation type and its functionality within the assessment areas, will therefore not be practicably feasible.

It is further the opinion of the specialist that the development should not pose any further potentially significant long term ecological impacts which cannot be suitably reduced and mitigated to within acceptable residual levels. The significant ecological impacts associated with the impeding of the historic ephemeral water drainage line's and significant watercourses' flow regimes and alteration/contamination of soil and groundwater characteristics/quality, can be suitably reduced and mitigated to within acceptable residual levels.

The project should therefore be considered by the competent authority for Environmental Authorisation and approval. All recommended mitigations measures as per this ecological report must be adequately implemented and managed for the remainder of the operational phase and subsequent future decommissioning phase. All necessary authorisations, licenses and permits must also be obtained as soon as reasonably and practicably possible.

#### Heritage Specialist study

A Phase 1 Heritage Impact Assessment was carried out following the unlawful commencement of listed activities (rectification in terms of Section 24G of NEMA) on the farm Gladium (Kloof 143), NC Province. Gladium is located within the Asbesberge mountain range, approximately 30 km north of Prieska and 10 km south of Niekerkshoop. The affected areas include one 5ha site designated Kleinloof and one 5ha site designated Diamantgat. Visibility of outcrop was very limited given the generally low topography terrain and presence of a well-developed superficial (agricultural) overburden at Kleinkloof and Diamantgat. Both sites have been severely degraded by previous farming activities (pivots). Investigation of the landscape immediately surrounding the sites suggests that potential impact on *in situ* Stone Age archaeological material, graves, rock engravings, prehistoric structures or historically significant building structures older than 60 years within the study areas was most probably low. Both sites are not considered to be palaeontologically or archaeologically vulnerable and are assigned a rating of Generally Protected C (GP.C).

#### Soil Suitability Study

The soil survey and accompanying analysis of soil properties indicate that due to the absence of redox morphology (except for the one soft plinthic horizon) the soils are suitable for the irrigation. Depth was often the limiting factor in many of the soils deemed unsuitable. The clay percentage in the Prieska was slightly high, but still sufficient for irrigation. The chemical properties indicate that the samples taken were sufficient for irrigation.

#### Groundwater study:

A comprehensive groundwater study was conducted by Mr C.J Esterhuysen on three separate portions of the farm Kloof nr 143, namely Klippoort, Diamantgat and Gladium. Respective borehole tests were conducted on



the boreholes used for the existing 34.7 ha pivots being applied for.

Each of the respective portions had different conclusions and recommendations. However the main findings for the three portions can be summarized as follow:

The two boreholes used for irrigation on Annex Klippoort (KT1 & KT2) can produce sustainable yields of 648 m<sup>3</sup>/day and 778m<sup>3</sup>/day, the boreholes used on Diamantgat (DG1 & DG2) can produce sustainable yields of 605m<sup>3</sup>/day and 994m<sup>3</sup>/day and lastly, on Gladium, the two boreholes (KF3 &KF7) can produce sustainable yields of 294m<sup>3</sup>/day and 484m<sup>3</sup>/day respectively. A very important procedure to follow during the operational phase of this project is: Groundwater levels must be measured monthly at production boreholes and groundwater samples must be collected on a 6-monthly basis

## **CONCLUSION**

In conclusion, there are no “red flag” impacts associated with the said project. Although the development completely transformed the existing vegetation and that some of the assessment areas falls within/adjacent to watercourses, the Ecological specialist is of the opinion that the proposed continuous operational impacts can be mitigates to an acceptable level and therefore has no objections. No Heritage sites, significant area, nor paleontological soils will be negatively affected as the area is already transformed. The soil- and groundwater specialists also recommend the project.

It is therefore the opinion of the EAP that no fatal flaws exist and that the Section 24G impact Assessment be approved.

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Appendix E – Specialist Reports

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**ABBREVIATIONS**

BA	Basic Assessment
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983)
CEL	Cost Estimate Letter
CIA	Cumulative Impact Assessment
CO <sub>2</sub>	Carbon Dioxide
CO <sub>2</sub> e	Carbon Dioxide Equivalent
CPA	Communal Property Association
CRR	Comments and Responses Report
CSP	Concentrated Solar Power
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DENC	Department of Environment and Nature Conservation
DM	District Municipality
DMR	Department of Mineral Resources
DoE	Department of Energy
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
Ha	Hectares
HTF	Heat Transfer Fluid
I & APs	Interested and Affected Parties
IDP	Integrated Development Plan
IPP	Independent Power Producer
kV	Kilovolt
LED	Local Economic Development
LM	Local Municipality
LSA	Late Stone Age
MAP	Mean Annual Precipitation
MASL	Metres Above Sea Level

MLL	Minimum living level
MSA	Middle Stone Age
MVA	Megavolt ampere
MW	Megawatt
NCPSDF	Northern Cape Provincial Spatial Development Framework
NDP	National Development Plan
NEMA	National Environmental Management Act (Act 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NEMWA	National Environmental Management: Waste Act (Act 59 of 2008)
NERSA	National Energy Regulator of South Africa
NFA	National Forests Act (Act 84 of 1998)
NHRA	National Heritage Resources Act (Act 25 of 1999)
NIP	National Infrastructure Plan
NWA	National Water Act (Act 36 of 1998)
PFS	Pre-feasibility Study
PPP	Public Participation Process
PUC	Point of Utility Connection
PoSEIA	Plan of Study for Environmental Impact Assessment
REIPPP	Renewable Energy Independent Power Producers Procurement Programme
SAHRA	South African Heritage Resources Agency
SDF	Spatial Development Framework
SIA	Social Impact Assessment
SIP	Strategic Integrated Project
ToR	Terms of Reference
UNFCCC	United Nations Framework Convention on Climate Change
VIA	Visual Impact Assessment
WRYCM	Water Resource Yield Computer Model
WULA	Water Use Licence Application



## 1. INTRODUCTION

The agricultural industry forms a significant part of the annual GDP of the Republic of South Africa. Agriculture primarily contributes in the form of food national production and security and through import and export process as well as primary and secondary employment creation.

The applicant, Gladium Trust, historically cleared three separate areas of natural vegetation for the cultivation of irrigated centre pivot lands and irrigated rectangular lands on Portions 1 and 2 of the Farm Kloof no 143. The purpose of the cultivation has been for various commercial rotational crop productions. Water is extracted from a number of relevant supply boreholes on site and is utilised for irrigation of the combined approximate 35 ha areas. However, environmental authorization was not previously obtained from the Northern Cape Department of Environment and Nature Conservation (DENC). The applicant has become aware of this transgression and has opted to follow a Section 24G rectification process in accordance with the National Environmental Management Act (Act 107 of 1998) (NEMA).

In accordance with the National Environmental Management Act (Act 107 of 1998); Environmental Impact Assessment Regulations of 2014 (as amended in April 2017), a Section 24G rectification application processes is required for the proposed project in order to obtain the necessary environmental authorization from the competent authority. Eco-Con Environmental was appointed by Gladium Trust to act as the independent Environmental Assessment Practitioner (EAP) to facilitate the entire environmental authorization application process and complete the Section 24G rectification application processes for the said project.

The following report aims to give context to the proposed development through providing a comprehensive description of the envisaged activities and relevant infrastructure; the identification of significant environmental impacts associated to the proposed project; identification of appropriate alternatives and mitigation measures for reduction of undesired impacts; and communication of results in a clear and concise manner to the competent authority and other relevant parties.

### 1.1 PROJECT APPLICANT INFORMATION

**Table 1: Project applicant information**

<b>Company/Applicant name:</b>	Gladium Trust
<b>Company Registration number:</b>	IT/373/2007
<b>Physical address:</b>	-
<b>Postal address:</b>	P.O Box 431, Prieska, 8940
<b>Contact person:</b>	Mr. Pieter Smit
<b>ID number:</b>	751129 5060 080

<b>Designation:</b>	Trustee
<b>Contact number:</b>	053 353 2679 / 083 379 5755
<b>E-mail address:</b>	tigereye@telkomsa.net

## 2. ENVIRONMENTAL ASSESSMENT PRACTITIONER

### 2.1 DETAILS OF THE EAP

Eco-Con Environmental (Pty) Ltd. was appointed by Gladium Trust as the independent Environmental Assessment Practitioner (EAP) to conduct a Section 24G rectification application process for the proposed project.

Eco-Con Environmental was established in May 2017. Although the formal establishment of the company took place in 2017, it is backed by more than 15 years of collective professional service and experience in the environmental field. The qualifications, expertise and experience of our professional team form the backbone of the company's continued success.

The vision of Eco-Con Environmental is being dedicated to environmental management that fosters a sustainable future and leads to improvements in the communities where we do business. Eco-Con Environmental believes that in time we will become the most respected Environmental Management Consultancy firm in all regions where we work.

The company continuously engages existing and emerging legislation, guidelines and practices in order to ensure the execution of high quality and appropriate studies. Through an integration of skills and expertise, it is envisioned that Eco-Con Environmental will deliver exceptional, competitive services for task execution and to meet deliverables. Eco-Con Environmental, through years of experience and industry presence, assures the seamless execution and roll out of tasks to achieve projected results on time. Our past experience on agricultural projects further benefits our understanding of the required and associated processes and the impacts thereof.

**Table 2: Details of the EAP**

Company/entity name:	Eco-Con Environmental (Pty) Ltd.
Physical address:	5 Chris Barnard street, Langenhovenpark, Bloemfontein
Postal address:	P.O Box 37452, Langenhovenpark, Bloemfontein
Contact person:	Mr. Johan Botes
Designation:	Senior Environmental Consultant and Managing Director
Contact number:	082 459 8206

E-mail address:	johan@eco-con.co.za
Qualifications:	B.A Honours in Geography – UFS B.A Geography and Environmental Management – UFS

## 2.2 EXPERTISE OF THE EAP REPRESENTATIVE

Johan Botes, is a Senior Environmental Specialist Consultant and Managing Director at Eco-Con Environmental (Pty) Ltd. His qualifications include an Honours degree in Geography from the University of the Free State and a Bachelors of Arts in Geography and Environmental Management also from the University of the Free State. Johan Botes has 7 years of environmental management experience. Johan also brings with him a strong background in environmental law and monitoring. He was previously employed at Enviroworks and Savannah Environmental Consultants as a General Manager and Environmental Control Officer respectively.

### Relevant Project Experience

#### Project Management Experience

- Conducting of Environmental Impact Assessment Report for the proposed 45MW Meerkat Hydro Power Facility in the Northern Cape.
- Conducting of Environmental Impact Assessment Report for the proposed 150MW PV Metsimatala Solar Power Project in the Northern Cape.
- Conducting of Basic Assessment processes for the proposed Optic fibre cable installation in and around the town of Lephalale on behalf of NEOTEL.
- Conducting of Basic Assessment processes for the proposed Optic fibre cable installation in and around the town of Thohoyandou on behalf of NEOTEL.
- Conducting of Basic Assessment processes for the proposed Optic fibre cable installation in and around the town of Groblersdal on behalf of NEOTEL.
- Conducting of Basic Assessment processes for the proposed upgrading and widening of Nathen Bridge in Blomfontein on behalf of the Mangaung Metropolitan Municipality
- Conducting of Basic Assessment processes for the proposed construction of two new roads and the upgrading of one existing road in Botshabeo on behalf of the Mangaung Metropolitan Municipality.

#### Environmental Impact Assessment Experience

- Conducting of Environmental Impact Assessment Report for the proposed 180 hectare Cecilia Park Residential development in Bloemfontein on behalf of Mzansi Africa Civils Engineering.
- Conducting of Environmental Impact Assessment Report for the proposed construction of a steel galvanizing plant in Botshebelo, Free State Province on behalf of Bombenero Investments.

- Conducting of Environmental Impact Assessment Report for the proposed opening of 3 borrow pits and 1 gravel quarry around the Ladybrand area, Free State Province.

#### Basic Assessment Experience

- Conducting of Basic Assessment report for the proposed construction of the Lucas Steyn Filling station in Bloemfontein, Free State Province.
- Conducting of Basic Assessment report for the proposed construction of Gabions in the Bath River in Caledon, Western Cape Province.
- Conducting of Basic Assessment report for the proposed expansion of the Nicsha Petroleum Depot in Bloemfontein, Free State Province.
- Conducting of Basic Assessment report for the proposed Fuel Zone Petroleum Depot in Welkom, Free State Province.
- Conducting of Section 24 G Rectification application for the already established residential development on the farm Proteahof 217, Delportshoop, Northern Cape.
- Conducting of Basic Assessment processes for the proposed opening of 9 borrow pits around the Ladybrand area, Free State Province.
- Conducting of Basic Assessment processes for the proposed Optic fibre cable installation between Prince Albert and Oudtshoorn on behalf of NEOTEL.
- Conducting of Basic Assessment report for the proposed Nooitgedach Retirement Village in White River, Mpumalanga.
- Conducting of Basic Assessment processes for the proposed construction of 19 signalling masts in the railway reserves of Cape Town and Stellenbosch on behalf of the Passenger Rail Association of South Africa (PRASA).
- Conducting of Basic Assessment processes for the proposed construction of 1 signalling mast in the railway reserve at St James Station, Cape Town on behalf of the Passenger Rail Association of South Africa (PRASA).
- Conducting of Basic Assessment processes for the proposed construction of 1 signalling mast in the railway reserve at Clovelly Station, Cape Town on behalf of the Passenger Rail Association of South Africa (PRASA).
- Conducting of Basic Assessment processes for the proposed upgrading and widening of Nathen Bridge in Bloemfontein on behalf of the Mangaung Metropolitan Municipality.
- Conducting of Basic Assessment processes for the proposed construction of two new roads and the upgrading of one existing road in Botshabelo on behalf of the Mangaung Metropolitan Municipality.

#### Experience in Auditing and as an Environmental Control Officer

- Annual Environmental Audit in Terms of Section 34 of Government Notice 982 for the Mission Point

Mining near Sasolburg, Free State Province.

- Environmental Gap Audit for the Meadow Meats Abattoir in Vryheid, KwaZulu-Natal.
- Environmental Gap Audit for the Meadow Meats Abattoir in Wesselbron, Free State Province.
- Environmental Control Officer (ECO) for the Mission Point Sand Mining facility near Sasolburg, Free State Province.
- Environmental Control Officer (ECO) for the Rooikraal Truck stop facility near Vrede, Free State Province.
- Environmental Control Officer (ECO) for the widening of bridge structures over the Orange River for BVi on behalf of SANRAL, near Hopetown, Northern Cape
- Environmental Control Officer (ECO) for the construction of a 2.7 km Bus route, Thaba Nchu, Free State Province.
- Environmental as an Environmental Control Officer (ECO) for the installation of optic fibre cables in and around the town of Nelspruit on behalf of NEOTEL.
- Environmental as an Environmental Control Officer (ECO) for the construction of the Khi Solar One Concentrated Solar Power facility near Upington.
- Environmental as an Environmental Control Officer (ECO) for the construction of a 132kV Substation in Bloemfontein for Dihlase Consulting Engineers.
- Environmental as an Environmental Control Officer (ECO) for the installation of optic fibre cables in and around the town of Thohoyandou on behalf of NEOTEL.
- Environmental as an Environmental Control Officer (ECO) for the installation of optic fibre cables in and around the town of Lephaale on behalf of NEOTEL.
- Environmental as an Environmental Control Officer (ECO) for the installation of optic fibre cables in and around the town of Grobersdal on behalf of NEOTEL.
- Environmental as an Environmental Control Officer (ECO) for the installation of optic fibre cables in and around the town of Kathu on behalf of NEOTEL.

#### Experience in Permits and Licencing

- Water Use Licence Application for the installation of carbon optic fibre cable within 32 metres of a watercourse on behalf of NEOTEL.
- Water Use Licence Application (General Authorisation) for the installation of carbon optic fibre cable within 500 metres of a wetland on behalf of NEOTEL.
- Waste Management Licence for the storage and reuse of hazardous waste water for the Bombenero Galvanizing Steel Facility in Botshabelo, Free State Province on behalf of Bombenero Investments.

#### Experience in Environmental Risk Assessments

- Conducting of Environmental Risk Assessment for the proposed establishment of a Diesel Depot in

Welkom, Free State Province.

- Compiling Environmental Risk Assessment for the proposed optic fibre cable installation in and around the town of Groblersdal on behalf of NEOTEL.
- Compiling Environmental Risk Assessment for the proposed optic fibre cable installation in and around the town of Lephalale on behalf of NEOTEL.
- Compiling Environmental Risk Assessment for the proposed optic fibre cable installation in and around the town of Thohoyandou on behalf of NEOTEL.
- Compiling Environmental Risk Assessment for the proposed optic fibre cable installation in and around the town of Nelspruit on behalf of NEOTEL.
- Compiling Environmental Risk Assessment for the proposed optic fibre cable installation in and around the town of Kathu on behalf of NEOTEL.
- Compiling Environmental Risk Assessment for the proposed optic fibre cable installation in and around the town of Groblersdal on behalf of NEOTEL.

#### Other Experience

- Compilation of Fire Management Plan for the Proposed 150MW Metsimatale CSP Facility, Postmansburg, Northern Cape.
- Calculating Financial Provisions (Quantum Calculations) for the Mission Point Mining near Sasolburg, Free State Province.
- Compilation of construction and operational phase Waste Management Plan for the proposed Cecilia Park Residential Development, Bloemfontein, Free State Province.
- Training of construction personnel and environmental advisory services for personnel of the Khi Solar One Concentrated Solar Power facility near Upington.
- GIS mapping and technical support for various projects, including the drawing of locality and sensitivity maps.
- Public participation processes and assistance to several projects.
- Compilation of Bitumen Waste Report for Penny Farthing Engineering, Venterstad, Eastern Cape.

See Appendix A for Curriculum Vitae of the EAP.

### **2.3 PUBLIC PARTICIPATION OFFICER**

The entire Public Participation Process for the impact assessment report will also be conducted and coordinated by Mr. Johan Botes.

See Appendix A for Curriculum Vitae.

### **3. RELEVANT ENVIRONMENTAL LEGISLATION AND GUIDELINES**

#### **3.1 CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA (ACT 108 OF 1996)**

Section 24 of the Constitution of South Africa provides the main national legislative obligation towards sustainable environmental management and development. This section forms the foundation of all other subsequent environmental legislation and governance in South Africa. Section 24 states the following:

every person shall have the right -

- (a) to an environment that is not harmful to their health nor 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
  - (i) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”

The following sections provide an overview of the relevant environmental legislation and guideline documents applicable to the proposed project.

#### **3.2 OTHER RELEVANT ENVIRONMENTAL LEGISLATION**

Aside from NEMA, other key environmental legislation, policies, plans and guidelines will also be triggered by the proposed project, whilst others shall provide strategic goals and priorities for different resources and sectors.

The environmental legislation relevant to the proposed project and which has been taken into account in the preparation of the impact assessment Report is summarised below:

##### **3.2.1 National**

###### **3.2.1.1 National Environmental Management Act (Act 107 of 1998) (NEMA)**

NEMA is the principle/framework legislation governing EIA and subsequent EA processes under the authority of the National Department of Environmental Affairs.

NEMA makes provisions for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment; institutions that will promote co-operative governance; procedures for coordinating environmental functions exercised by Organs of State and to provide for matters connected therewith.

Section 2 of the Act establishes a set of principles, which apply to the activities of all Organs of State that may significantly affect the environment. These include the following:

- Development must be sustainable;
- Pollution must be avoided or minimised and remedied;
- Waste must be avoided or minimised, reused or recycled;
- Negative impacts must be minimised and positive impacts enhanced; and
- Responsibility for the environmental health and safety consequences of a policy, project, product or service exists throughout its entire life cycle.

These principles are taken into consideration when a Governmental Department needs to exercise its powers for example, during the processes of granting permits or Environmental Authorisations or the enforcement of existing legislation or conditions of approval.

Section 23 of NEMA furthermore provides for general objectives of Integrated Environmental Management. In alignment with these objectives, the potential impacts on the biophysical and socio-economic environments are identified and evaluated. These potential environmental impacts have been assessed during the impact assessment Report phase and mitigation measures are provided where relevant.

The subsequent Environmental Impact Assessment Regulations, 2014 (Government Notices R983, R984 and R985 of 04 December 2014) (as amended in April 2017), which are also referred to as Listing Notices 1, 2 and 3 respectively, list development activities which will trigger the necessity to conduct either a Basic Assessment or a full Scoping & EIA process prior to EA being obtained for a proposed project. Listing notices 1 & 3 activities require only a Basic Assessment to be conducted while Listing notice 2 activities trigger the requirement for a full Scoping & EIA process to be conducted.

Considering the nature and scale of the development activities triggered by the proposed project, it was required that a Section 24G Rectification process be conducted to provide sufficient information to the competent authority in order for them to make an informed decision regarding the approval or rejection of the EA applied for.

Only once the EA is granted and the required supporting permits have been issued, may the applicant lawfully commence with the proposed project. The Section 24G rectification application process is therefore a critical component in the feasibility and planning stage of any proposed project.

### **3.2.1.2 National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA)**

NEMBA aims to provide for the management and conservation of the country's rich biodiversity within the framework of NEMA. It aids in the protection of species and ecosystems which warrant national protection and provides for the sustainable usage of the country's indigenous biological resources.



NEMBA and its Regulations was therefore utilised for determining the ecological/biodiversity significance, value and subsequently the adequate management of the proposed project area with regards to ecosystems, habitats and individual species.

The Department of Environmental Affairs is responsible for the implementation and overseeing of this legislation along with the South African National Biodiversity Institute (SANBI).

#### **3.2.1.3 National Forests Act (Act 84 of 1998) (NFA)**

The aim of the NFA is to promote the sustainable usage, management and development of forests for the benefit of all in South Africa. The Act also makes special provisions for the protection of specific forests and tree species which duly require formal protection in order to ensure their prolonged existence.

The National Forests Act was therefore utilised to determine the potential presence of any protected forests or tree species in the proposed project area in order to ensure that the correct processes are followed for the approval of any listed activities for which a permit may be necessary regarding such forests or species, should it be required.

Permit applications in terms of the National Forests Act are lodged with the Department of Agriculture, Forestry and Fisheries.

#### **3.2.1.4 Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA)**

CARA aims to provide for the protection and control over utilisation of the country's agricultural resources in order to promote conservation of soils, water and natural vegetation as well as the combating of weeds and invader plants. Sustainable utilisation is a key objective.

CARA was therefore used for determining the agricultural significance, value and subsequently the adequate management of the proposed project area.

It is overseen by The Department of Agriculture, Land Reform and Rural Development in the Northern Cape Province.

#### **3.2.1.5 National Water Act (Act 36 of 1998) (NWA)**

The NWA aims to ensure sustainable use of water through the protection of the quality of water resources for the benefit of all water users. Its principal focus is the rectification and equitable allocation and use of the scarce and disproportionately distributed water resources of South Africa.

The property of the proposed project has standing water rights which allows for groundwater extraction (an additional water use licence application will be conducted). Section 21 of NWA defines the types of water uses which require a Water Use License to be applied for. The Act stipulates that a Water Use License

Application must be submitted if a development takes place within 500 m of a natural watercourse. The relevance of this section of the Act to the specific project will be determined during the Environmental Impact Assessment phase.

The Department of Water and Sanitation is responsible for the implementation and overseeing of this legislation and is also the responsible authority for the issuing of permits for water use.

### **3.2.1.6 National Heritage Resources Act (Act 25 of 1999) (NHRA)**

The NHRA aims to provide for the integrated and interactive management and conservation of the national heritage resources in South Africa so that they may be bequeathed for future generations.

Section 38 lists categorized development processes which require the South African Heritage Resources Agency (SAHRA) to be notified and furnished with an archaeological and palaeontological study of a proposed project area in order to obtain project authorization. The following development processes are triggered during the construction and operational phases of the proposed project:

(1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorized as -

(c) any development or other activity which will change the character of a site -

(i) exceeding 5 000m<sup>2</sup> in extent; or

The South African Heritage Resources Agency (SAHRA) has a mandate, in terms of the NHRA, to enforce the conditions of the NHRA, and hence oversees the management of heritage resources together with provincial heritage agencies.

### **3.2.1.7 National Development Plan – 2030 (NDP)**

The executive summary of the National Development Plan (NDP) initiates with the following paragraph, *“The National Development Plan aims to eliminate poverty and reduce inequality by 2030. South Africa can realise these goals by drawing on the energies of its people, growing an inclusive economy, building capabilities, enhancing the capacity of the state, and promoting leadership and partnerships throughout society.”*

Chapter 6 of the NDP specifically discusses the role and importance of commercial agriculture in the success of the country’s economy and reaching the objectives of the NDP. It discusses the potential associated with the expansion of irrigated land towards food security and also job creation and capacity building (skills development and experience).

The development of the proposed pivots therefore be beneficial in terms of the goals/objectives described with regards to agriculture in the NDP.

### **3.2.2 Provincial**

#### **3.2.2.1 Northern Cape Nature Conservation Act (Act 9 of 2009)**

In addition to the NFA, the Northern Cape Nature Conservation Act also makes provision for the protection and sustainable utilisation of wild animals, aquatic biota and plants on a provincial scale in the Northern Cape Province. It is therefore used in conjunction with the NFA to determine the ecological/biodiversity significance, value and subsequent management of the proposed project area.

The Northern Cape Nature Conservation Act was utilised to determine the potential presence of any provincially protected or specially protected species in the proposed project area in order to ensure that the correct processes are followed for the approval of any listed activities for which a permit may be necessary regarding such species, should it be required.

Permit applications in terms of the Northern Cape Nature Conservation Act (Act 9 of 2009) are lodged with the relevant provincial authority, which in this case is the Department of Environment and Nature Conservation in the Northern Cape Province.

#### **3.2.2 Northern Cape Provincial Spatial Development Framework**

The Northern Cape Provincial Spatial Development Framework (NCPSDF) was formulated in 2011 to meet the requirements of the Northern Cape Planning and Development Act, 1998 (Act 7 of 1998) and the Municipal Systems Act, 2000 (Act 32 of 2000). Prepared in accordance with a bioregional planning approach adapted to suit the site-specific requirements of the Northern Cape, the NCPSDF recognises that no region or area should be planned and managed as an 'island' in isolation from its surroundings. Together, unit areas form part of the broader environment and the mutual relationships and linkages between adjacent units must be understood and applied.

The framework aims to act as a policy and strategy providing direction and guidance for:

- future land use,
- spatial context for provincial sectoral strategies,
- promoting a developmental state,
- alignment of environmental management priorities, and
- mobilising the overarching objective of the Northern Cape Provincial Growth and Development Strategy (PGDS) to build prosperous, sustainable and growing provincial economy to eradicate poverty and improves social development.

A focus for achieving sustainable development as discussed in the framework, requires four areas of capital, being environmental, human, infrastructure and monetary. The plan further stresses the need for integrative

participation, positive interventions and innovative finance. The SDF makes specific reference to the importance of agriculture and capacity increase in this sector in the Northern Cape Province.

The proposed project will make a positive contribution towards various objectives of the SDF.

### **3.2.2.3 Northern Cape Provincial Growth and Development Strategy (NCPGDS)**

The Northern Cape Provincial Growth and Development Strategy (NCPGDS) (2004 – 2014) highlights the most significant growth and development challenge as the reduction of poverty, and that only through long-term sustainable economic growth and development shall this be achieved. Important areas where growth can be achieved include agriculture and agro-processing, transport and tourism. In support of such growth areas the creation of opportunities for life-long learning, improvement of labour force skills to enhance productivity and expanding access to education and knowledge shall lead to the further realisation of such growth. Specialist

The inclusion of macro-level objectives shall mobilize these primary growth areas. Such objectives include the developing of human and social capital, improving the efficiency and effectiveness of governance and associated institutions and enhancing infrastructure for economic growth and development.

### **3.2.3 District and Local**

#### **3.2.3.1 Pixley Ka Seme District Municipality Integrated Development Plan 2017-2022**

The District Municipality has developed its vision, development priorities, objectives and strategies with specific outcomes and outputs for the 2017-2022 financial year.

#### **Vision:**

“A credible, customer friendly and well developed Municipality”

#### **Mission:**

The Pixley Ka Seme District mission is:

“To deliver quality services, in accordance with our Integrated Development Plan. This will be achieved through community participation, skilled and motivated staff, rapid economic development and a tourism friendly environment”.

The proposed project will be able to contribute positively to these objectives through job creation and sustainable capacity building (skills development and experience).

#### **3.2.3.2 Siyathemba local municipality Integrated Development Plan 2019/2020**

The following vision and mission is engrained into the Integrated Development Plan (IDP) of the Siyathemba

local municipality:

### Vision

“A municipality that cares”

### Mission

“Caring for our communities and stakeholders through:-

- Management of negative perceptions within the municipality;
- Communicating information with our stakeholders, openly and honestly;
- Delivering quality and reliable services to all our communities and;
- Responsive governance”

The proposed project will be able to contribute positively to these objectives through job creation and sustainable capacity building (skills development and experience).

### 3.3 RELEVANT GUIDELINES

The table (table 3) below lists the Guideline Documents that are applicable to the proposed project, and which are considered as part of the EIA process, as are required in terms of the NEMA EIA Regulations; 2014 (as amended in April 2017).

**Table 3: Applicable guideline documents**

<b>1</b>	<b>DETEA EIA Guideline and Information Document Series</b>
<b>1.1</b>	<i>Draft Guideline on the <b>Need and Desirability</b> in terms of the EIA Regulations of 2010. Integrated Environmental Management Guideline Series 9, Government Notice 792 of 2012.</i>
<b>2</b>	<b>DEA &amp; DP EIA Guideline and Information Document Series</b>
<b>2.1</b>	<i>Guideline on <b>Generic Terms of Reference for EAPs and Project Schedules</b>, EIA Guideline and Information Document Series. Western Cape Department of Environmental Affairs &amp; Development Planning, March 2013.</i>
<b>2.2</b>	<i>Guideline on <b>Need and Desirability</b>, EIA Guideline and Information Document Series. Western Cape Department of Environmental Affairs &amp; Development Planning, March 2013.</i>
<b>2.3</b>	<i>Guideline on <b>Alternatives</b>, EIA Guideline and Information Document Series. Western Cape Department of Environmental Affairs &amp; Development Planning, March 2013.</i>
<b>2.4</b>	<i>Guideline on <b>Public Participation</b>, EIA Guideline and Information Document Series. Western Cape Department of Environmental Affairs &amp; Development Planning, March 2013.</i>

<b>3</b>	<b>DEA&amp;DP Guideline Document Series for Involving Specialists in the EIA Process, and others</b>
<b>3.1</b>	<i>Guideline for <b>Environmental Management Plans</b></i> . CSIR Report No ENV-S-C2005-053 H. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town (Lochner, P. 2005).

### 3.4 NEMA LISTED ACTIVITIES TRIGGERED BY THE PROPOSED PROJECT

The development activities in the National Environmental Management Act (Act 107 of 1998): Environmental Impact Assessment Regulations, 2014 (Government Notices R983, R984 and R985) (as amended in April 2017) which are triggered by the proposed project is listed in the table (table 4) below:

**Table 4: Environmental Impact Assessment Regulations, 2014 listed activities triggered by the proposed project (as amended in April 2017)**

Regulation	Activity	Description of trigger activity in proposed project
<b>GN. R. 324 Listing Notice 1</b>	<p><b>Activity 12</b> The development of – (ii) infrastructure or structures with a physical footprint of 100 square metres or more where such development occurs – (b) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse</p>	Pivot(s) of assessment area 1 falls within an ephemeral water drainage line
<b>GN. R. 325 Listing Notice 2</b>	<p><b>Activity 15</b> The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for - (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.</p>	The already developed agricultural pivots cover a total area of 34.7 hectares.

## 4. PROJECT LOCATION AND DESCRIPTION

The following section provides an overview of the proposed project location as well as a detailed description of the proposed project.

### 4.1 PROJECT LOCATION

The assessment areas consist of three separate portions namely Assessment areas 1, 2 and 3 which constitute cultivated irrigated centre pivot lands and irrigated rectangular lands. The assessment areas are situated on Portions 1 and 2 of the Farm Kloof no 143 (SG 21 Digit Codes: C0310000000014300001 and C0310000000014300002). The farm is situated approximately 12.5 km north-east of the town of Niekerskooop which forms part of the Pixley Ka Seme District Municipality, Northern Cape Province. Access to the assessment areas is obtained via the R 386 provincial road and subsequent dirt roads from the west.

See locality map below.

**Table 5: Farm name and Number with SG code and Landowner name**

Farm Name and Number	SG 21 Digit Code	Land owner
Portion 1 of the Farm Kloof no 143 no 229	C0310000000014300001	Gladium Trust (IT/373/2007)
Portion 2 of the Farm Kloof no 143	C0310000000014300002	Gladium Trust (IT/373/2007)

The centre points of the respective pivots are as follow:

Assessment area 1: 29°13'7.32"S; 22°54'546.40"E

Assessment area 2: 29°12'54.12"S; 22°55'21.91"E

Assessment area 3: 29°15'54.77"S; 22°56'17.03"E



The coordinates of the boreholes used on the respective portions of the farm are as follow:

Annex Klippoort:

- KT1 - -29.26526°S; 22.93852°E
- KT2 - -29.26521°S; 22.93855°E

Diamantgat:

- DG1 - -29.21440°S; 22.92404°E
- DG2 - -29.21530°S; 22.92419°E

Gladium:

- KF4 - -29.21932°S; 22.90609°E
- KF5 - -29.21794°S; 2290022°E

**Table 6: Details of relevant land owner**

<b>Company/entity name:</b>	Gladium Trust (IT/373/2007)
<b>Postal address:</b>	P.O Box 431, Prieska, 8940
<b>Contact person:</b>	Mr. Pieter Smit
<b>Designation:</b>	Trustee
<b>Contact number:</b>	053 353 2679
<b>E-mail address:</b>	<a href="mailto:tigereye@telkomsa.net">tigereye@telkomsa.net</a>

A visual illustration of the proposed project area is provided in Figures 1 & 2 while the location of the proposed project illustrated on the locality map in Figure 3 below:

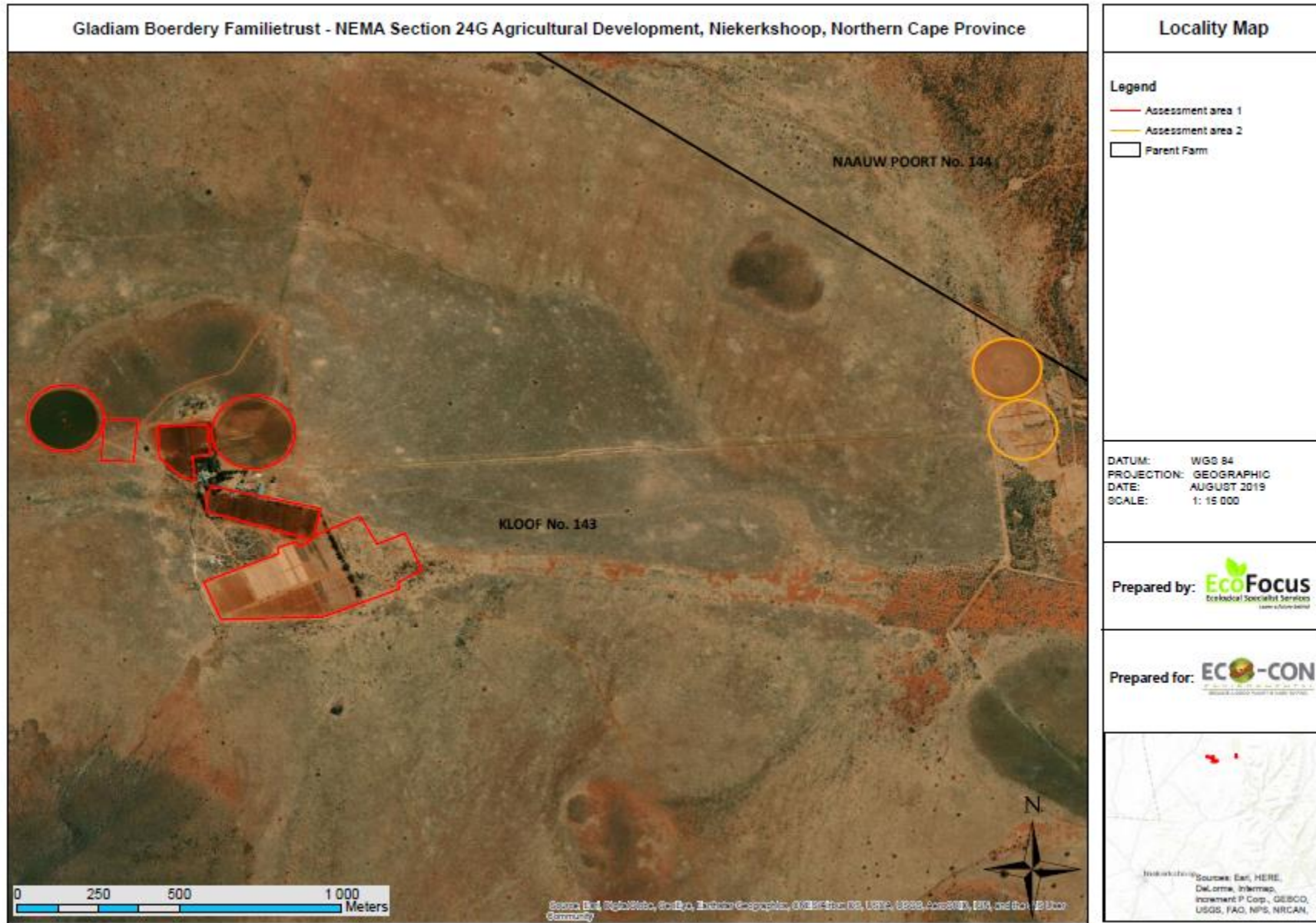


**Figure 1: Image visually illustrating one of the established pivots**



**Figure 2: Image visually illustrating the general vegetation cover in the area**









### 4.2 PROJECT DESCRIPTION

The applicant, Gladium Trust, has developed cultivated pivot lands (34.7ha) on the Remaining Extent of the Farm Kloof nr.143 near Niekerkshoop, as well as borehole extraction points for which environmental authorization was not previously obtained from the Northern Cape Department of Environment and Nature Conservation (DENC). The applicant has become aware of this transgression and has opted to follow a Section 24G rectification process in accordance with the National Environmental Management Act (Act 107 of 1998) (NEMA).

The approximate sizes of the three separate portions are as follow:

- Assessment area 1 (Portion 2 of the Farm Kloof no 143) = 23.78 ha
- Assessment area 2 (Portion 2 of the Farm Kloof no 143) = 5.4 ha
- Assessment area 3 (Portion 1 of the Farm Kloof no 143) = 5.5 ha

Already established are several boreholes for irrigation purposes. See maps below for the yield tested borehole maps for the three respective portions of the farm

Already established farm roads are already in place which link up with the pivots.

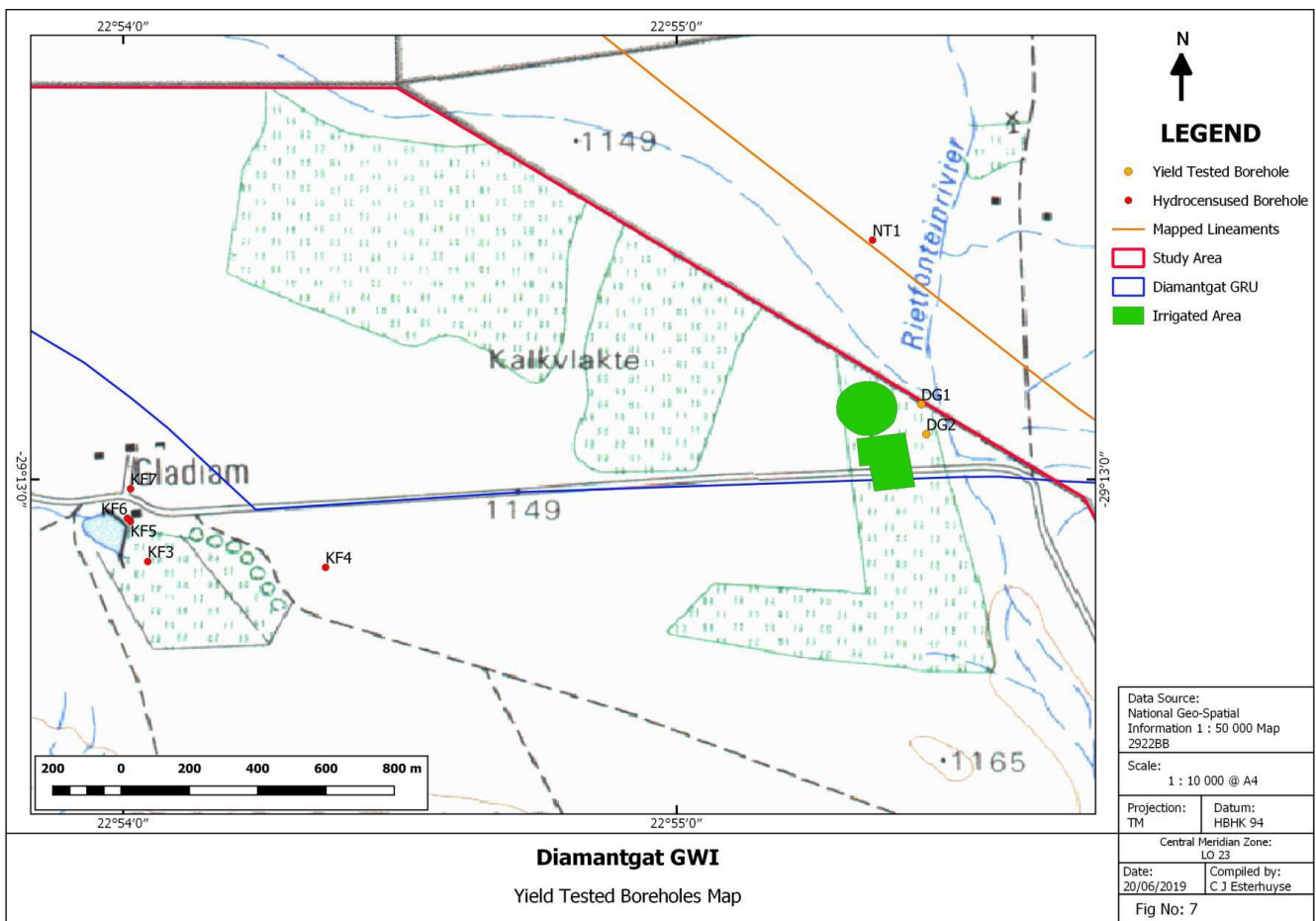


Figure 4: Yield test borehole map of Diamantgat portion



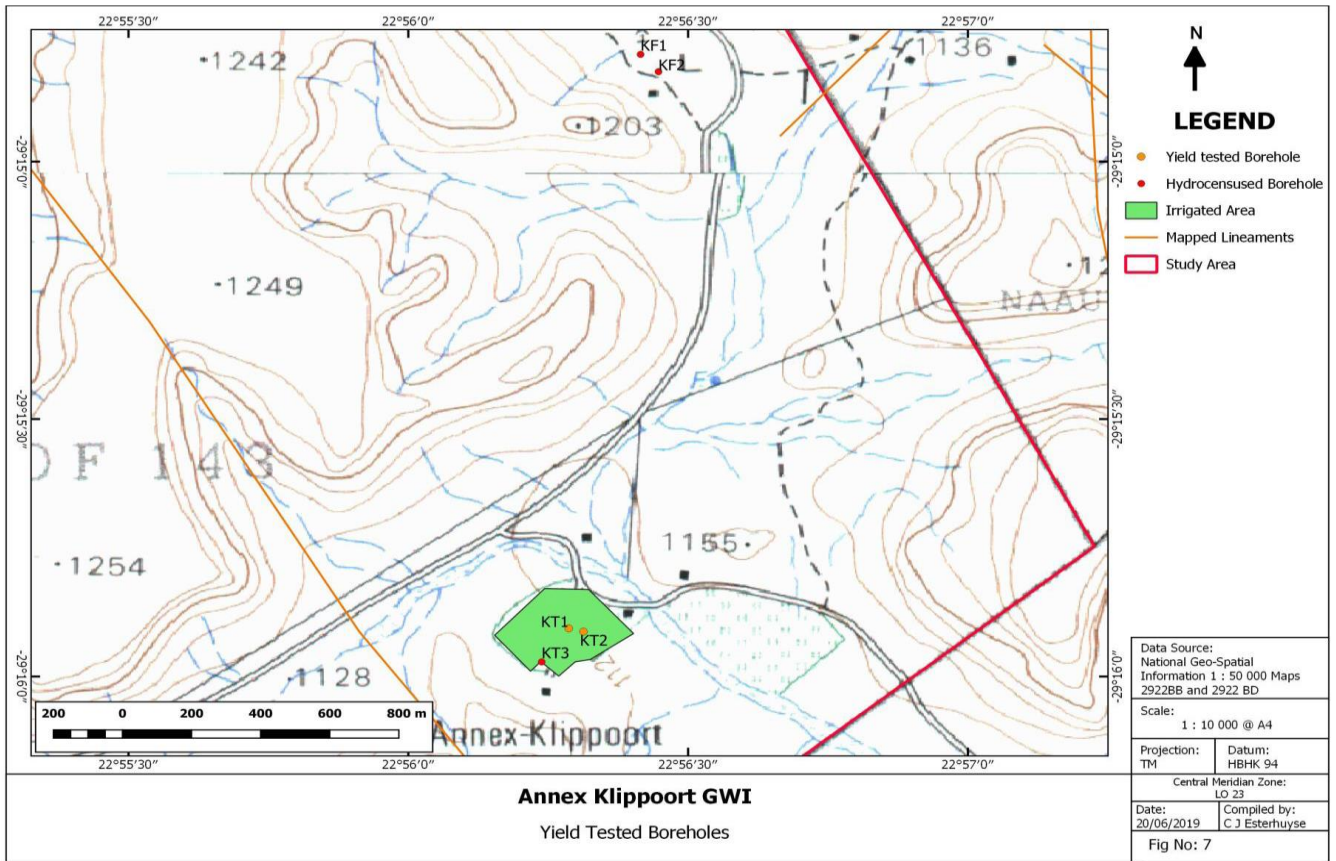


Figure 5: Yield test borehole map of Annex Klippoort portion

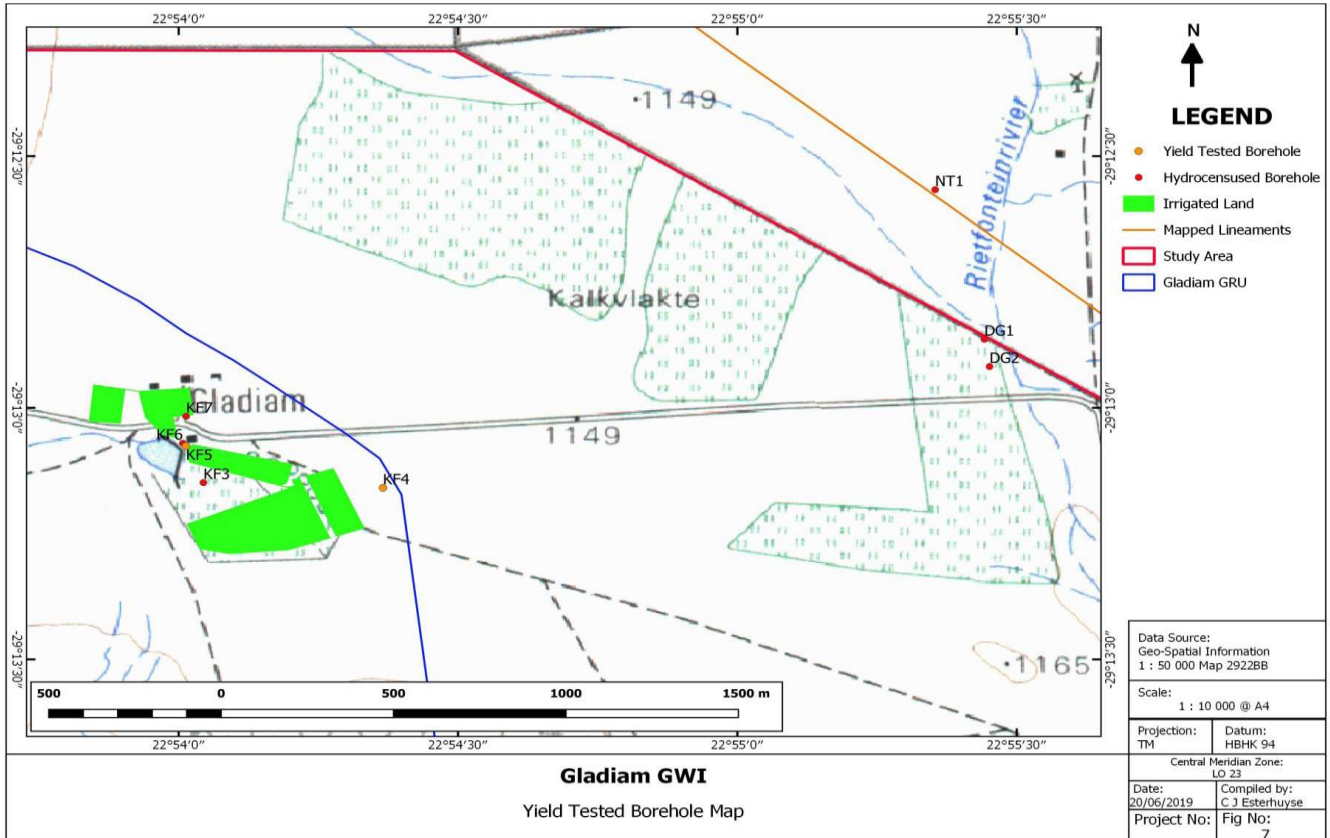


Figure 6: Yield test borehole map of Gladium portion

### **4.3 PROJECT SERVICES**

#### **4.3.1 Electricity Supply**

- The borehole extraction pumps are the only aspect requiring electricity. Electricity is already obtained from nearby electrical connection points for which the applicant is responsible for settling accounts received from the local municipality and solar panels have also been installed for the extraction of water from the existing boreholes.

#### **4.3.2 Sewage Management**

- Sufficient portable chemical toilets are being supplied on site for the manual labourers during the annual harvesting and planting periods. These toilets are cleaned and waste removed by an appropriate contractor on a regular basis as and when required during these timeframes.

#### **4.3.3 Solid Waste Management**

- Solid general waste generated on site are removed by the applicant to the local municipal landfill site on a regular basis as and when required.

#### **4.3.4 Water Supply**

As discussed under section 4.2 above, water is extracted from existing boreholes for irrigation purposes. See Appendix G for the water use rights documentation indicating the allowable water use. Additional Water use rights and authorisations will have to be obtained.

## **5. NEEDS AND DESIRABILITY OF THE PROJECT**

Various key factors must be taken into consideration as motivation/incentive for the potential benefits involved with the proposed project. These factors have been summarised below:

Maize and onion production is one of the most valuable agricultural crops that can be grown in South Africa. In fact, Maize is the most important grain crop in South Africa.

### **5.1 FOOD SUPPLY IN SOUTH AFRICA**

South Africa is poorly endowed when it comes to Agriculture. Of the total surface area of South Africa, only 65% is available for crop production. High potential land comprises only 21,9 percent of total arable land (Breitenbach and Fenyes, 2000).

The availability of water is most important restriction on agricultural production. Rainfall is distributed

unevenly over South Africa, with humid subtropical conditions in the east and dry desert conditions in the west. South Africa is periodically affected by severe and prolonged droughts that are often terminated by severe floods. About 65 percent of South Africa has an average rainfall of less than 500 mm which is generally regarded as the minimum for rain-fed cropping. This condition is worsened by evapotranspiration, especially in areas with relatively low rainfall (Breitenbach and Fenyes, 2000).

Despite all these restrictions, South Africa is self-sufficient in the production of most major crops. In the 1980s, South Africa was self-sufficient in terms of all important field crop products (except rice) and horticultural products (except coffee, tea, cocoa and spices), thus achieving above 100 points on the Self-Sufficiency Index (SSI)<sup>1</sup> for certain field crops and 160+ for horticultural products (see figure below) This implies that a large percentage of field crops and horticultural crops are available for export. For animal products, the score on a self-sufficiency index is less than 100, implying moderate imports of mainly red meat and industrial milk products. The majority of wool and mohair clips and karakul pelts have always been destined for export markets (Breitenbach and Fenyes, 2000).

Commodity	Imports	Exports	Total supply	Consumption**		Self-sufficiency Index				
				Total	Human	95-99	91-94	85-90	85-94	
(1 000 ton) (1995 - 1999)										
Wheat	646	240	2095	2022	1908	103.6	95.0	115.5	107.4	
Maize(White and yellow)	361	2277	8159	5957	2672	136.9	109.5	121.1	116.5	
Potatoes	2	19	1525	1185	1249	128.7	100.6	100.3	100.4	
Vegetables	18	38	2013	1592	1769	126.5	100.9	101.3	101.1	
Sugar	47	1119	2250	826	1305	272.4	163.5	162.5	162.9	
Beef	106	20	507	472	600	107.4	93.1	89.9	91.2	
Mutton, goat's meat and lamb	53	0	103	123	156	83.14	82.0	93.3	88.8	
Pork	11	1	122	107	132	114.6	96.1	100.9	99.0	
Chicken	34	4	939	741	873	126.7	99.1	99.4	99.3	
Eggs	0	3	294	226	256	130.4	101.7	101.7	101.7	
Deciduous and subtropical fruit	0	581	1749	872	946	200.5	156.5	152.3	154.0	
Dairy products	NA	NA	NA	NA	NA	129.1	NA	101.0	NA	
Condensed & powder milk	50	81	335	260	297	124.8	123.5	105.5	112.1	
Fresh milk	0	0	2827	2265	1525	119.5	100.0	100.0	100.0	
Cheese	3	1	38	32	40	100.0	100.0	100.3	100.8	
Butter	4	2	12	12	15	74.11	100.0	100.0	100.7	
Sunflower seed oil	181	25	191	257	277	273.2	60.3	87.5	76.6	
Citrus fruits	2	635	1356	496	611	0.00	235.5	254.0	246.6	
Rice	502	24	0	393	463		0.0	0.0	0.0	
COMMODITY GROUP										
Grains and field crops							88.2	97.2	94.0	
Horticultural crops							164.3	169.2	167.2	
Livestock products							96.0	99.0	99.3	

## 5.2 VALUE OF CROP:

South Africa is a water stressed country and it is therefore essential that we use our irrigation water effectively. Based on water use (m3 of water used per ton of food produced) onion and maize are some of the most efficient and economical crops.

A comparison of some crops that can be grown in the irrigation areas around Prieksa are listed below. See Table 7.



**Table 7: Crop yield in kg produce per cubic meter water used**

<b>Crop</b>	<b>Water requirements m<sup>3</sup> per ha</b>	<b>Yield (tons/ha)</b>	<b>Yield in kg product per m<sup>3</sup> water used</b>
Maize	6900	14,5	2,1
Onions	5300	65	12,3
Soybeans	4600	3,5	0,8
Wheat	5700	7,75	1,4
Dry Beans	4500	1,4	0,31

It can be seen that with Maize (2.1 kg) and onion (12.3kg) produce is produced with 1 m3 of water compared to 0.8 kg in the case of Soybeans and 1,4 kg in the case of wheat.

**Table 8: Value of crops grown under irrigation**

<b>Crop</b>	<b>Water requirements m<sup>3</sup>/ha</b>	<b>Yield Tons/ha</b>	<b>Price of product Rand/ton</b>	<b>Gross income/ha</b>	<b>Income per m<sup>3</sup> water</b>
Maize	6900	14,5	2708	39 266	5,69
Onions	5300	65	3358	218 270	41,18
Soybeans	4600	3,5	5895	20 635,5	4,49
Wheat	5700	7,75	4419	34 247,5	6,01
Dry Beans	4500	1,4	12 500	17 500	3,88

(prices and yields obtained from SAFEX report indicators)

As can be seen in Table 8 above, the value created by Maize and onion production merely exceeds that of soybeans grown in the Kimberley/Hopetown area on an income per cubic meter of water basis. However, Maize and onion are very important crops in South Africa.

### 5.3 JOB CREATION

At present, it costs about R5 400 per ha to produce Maize and onion and this has a huge multiplier effect in the farming, labour and business community.

The jobs created involve skilled, semi-skilled and a labour component. Today most of the harvesting is done by mechanical harvesters so the labour component is mainly made up of labour in the packing shed and labour used for rogueing which is the continual monitoring and removal of any off-types or diseased plants in the seed plantings. None of the work can be regarded as menial labour.

The skilled and semi-skilled staff component is made up of managers, admin staff, foremen, various machine operators and maintenance personnel.

The following work opportunities arise from this project:

Seasonal labour: 15 people

Permanent staff: 15 people

The seasonal labourers works from June to July and November to December.

## 6. ALTERNATIVES CONSIDERED

According to Chapter 1 of NEMA EIA Regulations 2014 (as amended in April 2017), Notice R982, “*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 undertake the activity;
- (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.

These NEMA EIA Regulations 2014 (as amended in April 2017), Notice R982, recognises that details on alternatives need to include “*a description of identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity*”.

The consideration of alternatives is therefore a key component of an EIA process. While an EIA process should investigate and comparatively **consider** all alternatives that have been identified, only those found to be “feasible” and “reasonable” must be comparatively **assessed**, in terms of the advantages and disadvantages that the proposed activity and alternatives will have on the environment and on the socio-economic aspects of communities that may be affected by the activity.

The “feasibility” and “reasonability” of an alternative are measured by:

- the general purpose and requirements of the activity;
- the need and desirability of the activity;
- opportunity costs;
- the need to avoid and/or minimise negative impacts;
- the need to maximise benefits; and
- how it impacts on the community that may be affected by the activity (DEA&DP, 2013b).

As this impact assessment report entails an application for already developed pivot areas to a total of 29.9 hectares and already developed pipelines, no alternative was considered as the development already took place resulting in an application in terms of Section 24G of NEMA.

## 6.1 LOCATION ALTERNATIVES

As the development already took place, no location alternatives are available. The applicant is also the owner of the two properties as mentioned in the report.

## 6.2 LAYOUT ALTERNATIVES

As mentioned above, the pivot areas to a total of 34.7 hectares have already been developed. The two water pipelines have also been developed. As a result, no layout alternatives are available.

## 6.3 NO-GO OPTION

As the development already took place, the no-go option will entail the elimination of the already developed pivot areas to a total of 34.7 hectares, including the elimination of both the already established water pipeline routes.

### Project Advantages

- The proposed project already contribute to local job creation by means of 15 permanent staff;
- The development already uplifted the local economic conditions as the local surrounding area has a very low crazing capacity.

### Project Disadvantages

If the proposed project is eliminated, the local communities together with the landowner will forego the economic benefits which the project already have on the area such as immediate employment opportunities and revenue streams and most importantly, sustainable capacity building (skills, experience and resources development) for the future.

## 7. DESCRIPTION OF THE ENVIRONMENT

The following section provides an overview of the bio-physical as well as the socio-economic environments of the proposed project. The table below (table 9) indicates the list of specialist studies that were conducted during the assessment process:

**Table 9: List of Specialist Studies Conducted**

<b>Specialist Name</b>	<b>Organisation</b>	<b>Specialist Assessment Type</b>
Mr. Rikus Lamprecht	EcoFocus	Ecological and Wetland Impact Assessment
Dr. Lloyd Rossouw	Palaeo Field Services	Archaeological and Palaeontological Impact Assessment (Heritage Assessment)
Dr. George van Zijl	Digital Soils Africa	Soil Suitability Assessment
C.J Esterhuyse	-	Groundwater assessment

## **7.1 BIO-PHYSICAL DESCRIPTION**

This section provides a comprehensive description of the bio-physical environment of the proposed project area.

### **7.1.1 Climate**

The rainfall of the region peaks during the summer months and the Mean Annual Precipitation (MAP) of the area is approximately 244 mm ([www.climate-data.org](http://www.climate-data.org)). The highest average monthly temperature is approximately 26.9°C in the summer months while the lowest average monthly temperature is approximately 9.8°C during the winter. Maximum monthly temperatures can reach up to 34.6°C in the summer months and dip to as low as 1°C during the winter.

### **7.1.2 Geology and Soils**

According to Mucina & Rutherford (2006) the geology of the landscape and associated vegetation type can be described as the following:

The underlying geology is mainly formed by shales of the Volksrust Formation and to a lesser extent the Prince Albert Formation (both of the Ecca Group) as well as Dwyka Group diamictites. Broad areas are covered by superficial deposits including calcretes of the Kalahari Group. Soils are variable from shallow to deep, red-yellow apedal and freely draining with potential scattered rocky dolerite outcrops.

### **7.1.3 Topography**

The proposed project area is mainly characterised by a wide, flat open plain consisting of deep sandy to loamy soils of the Hutton soil form. A slightly elevated rocky ridge area with well drained soils is also present in the southern section of the proposed project area. The topography of the area varies between 1036 to 1074 MASL.

#### **7.1.4 Ecological and Vegetation Conservation Status**

According to SANBI (2006- ), the three separate assessment areas all fall within the Northern Upper Karoo vegetation type (NKu 3) which mainly consists of flat to slightly sloping shrubland, dominated by dwarf karoo shrubs and sparse grasses. This vegetation type is classified as least threatened as very little has been transformed thus far (SANBI, 2006- ).

The elevated hill complexes surrounding Assessment area 3, form part of the Kuruman Mountain Bushveld vegetation type (SVk 10) which is also classified as least threatened as very little has been transformed thus far (SANBI, 2006- ). These hills have however not been directly or significantly impacted by the development of Assessment area 3.

Assessment area 1 is categorised as Other Natural Areas (ONA) in accordance with the Northern Cape Provincial Spatial Biodiversity Plan 2016 (NCPSBP), which sets out biodiversity priority areas in the province. Assessment areas 2 and 3 however fall within an Ecological Support Area (ESA). ESA's are areas that must be maintained in at least fair ecological condition (semi-natural/moderately modified state) in order to support the ecological functioning of a Critical Biodiversity Area (CBA) or protected area or that play an important role in delivering ecosystem services (Collins, 2017).

See vegetation and conservation map(s) below.

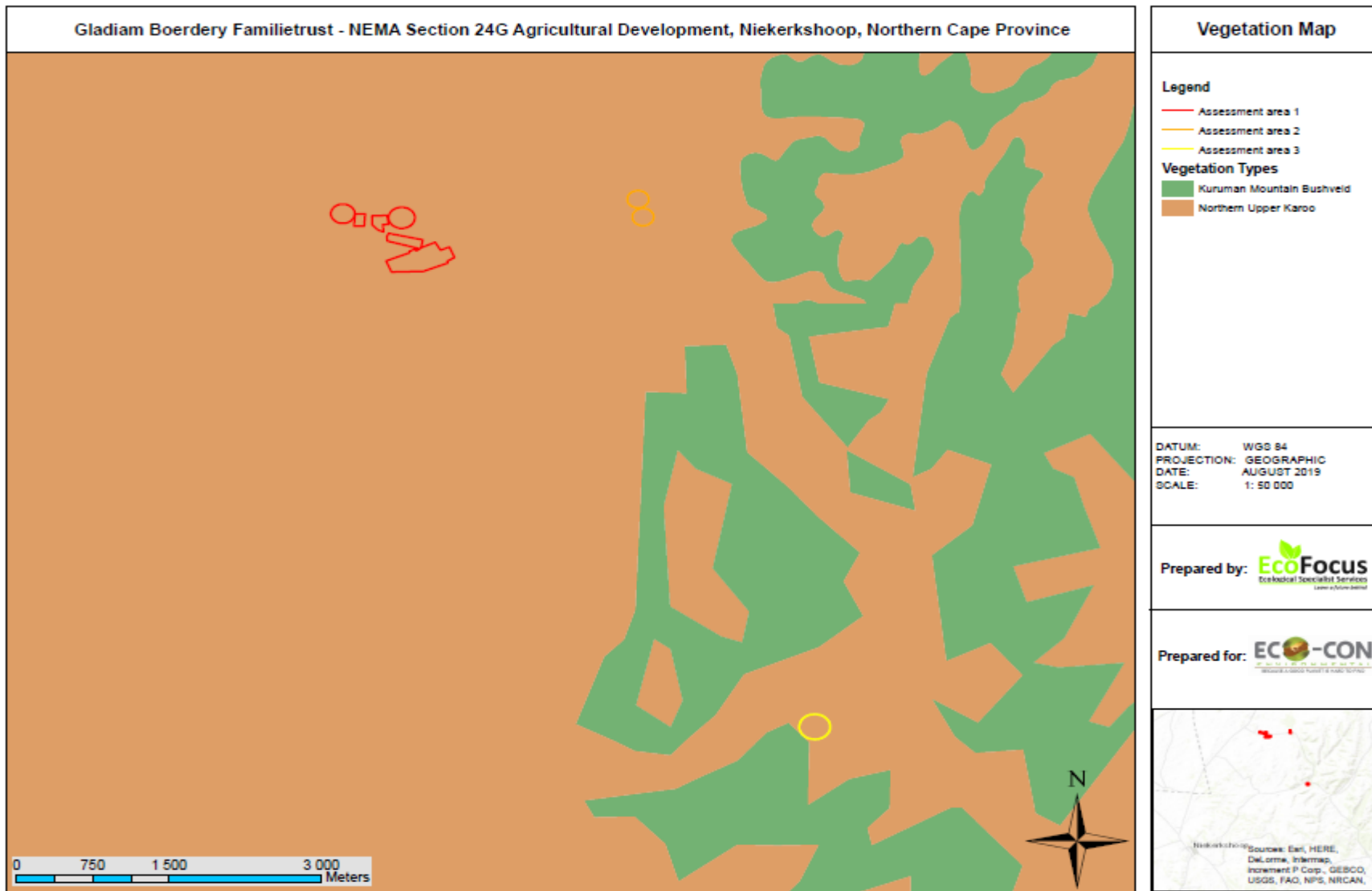


Figure 7: Vegetation map of the proposed project layout (see Appendix B for an A3 size version)

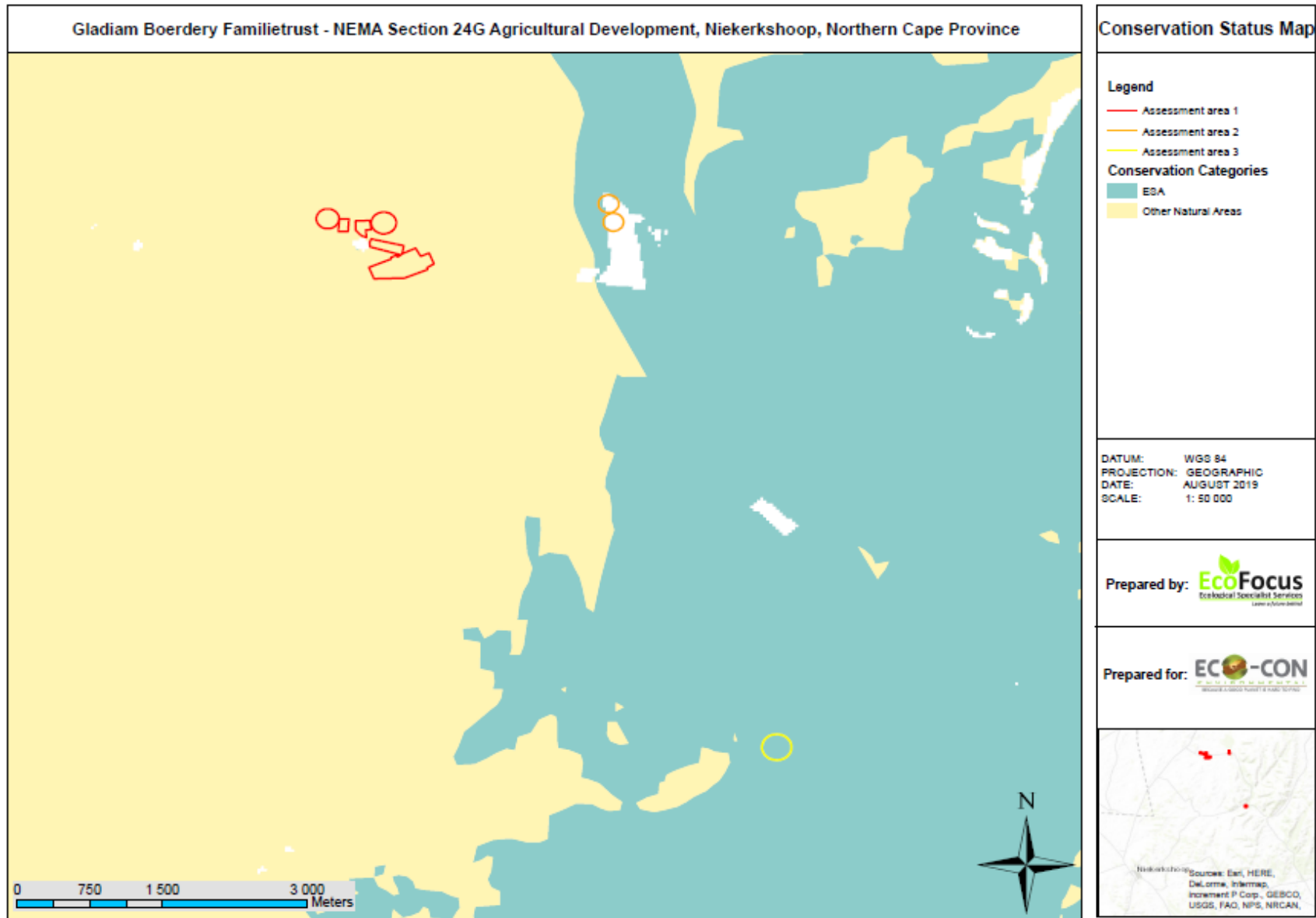


Figure 8: Conservation status map of the proposed project layout (see Appendix B for an A3 size version)



#### 7.1.4.1 Terrestrial environment

##### Results and Discussion of the Specialist Report

The assessment areas consist of three separate portions namely Assessment areas 1, 2 and 3. All three portions will be discussed separately.

Each of the assessment areas will now be discussed:

##### Assessment area 1

###### Current Existing Vegetation and Site Condition

The localised surrounding undeveloped areas constitute flat to slightly sloping low growing grassland mainly dominated by 'white grasses'. The areas also possess a well-represented dwarf karroid shrub layer. Tree and shrub individuals of the nationally protected species *Vachellia erioloba* & *V haemataxylon* as well as the undesired indicator species of bush encroachment *Senegalia mellifera* are very sparsely present. The legally declared invasive species *Prosopis glandulosa* (Category 3) forms dense stands in areas where historic disturbance is evident.

The average density of *Vachellia erioloba* individuals within the surrounding undeveloped areas amounts to approximately 0.25 trees/ha. This therefore equates to a total estimate of approximately 6 individuals within the cultivated land footprints which are reasonably assumed to have been removed during the initial cultivation.

The average density of *Vachellia haemataxylon* individuals within the surrounding undeveloped areas amounts to approximately 0.05 trees/ha. This therefore equates to a total estimate of approximately 2 individuals within the cultivated land footprints which are reasonably assumed to have been removed during the initial cultivation.

The grass layer is mainly dominated by the species *Stipagrostis spp.* while the species *Aristida spp.* & *Schmidtia pappophoroides* were also found to be present but to a significantly lesser extent.

Dwarf karroid shrub species found to be well represented include *Phaeoptilum spinosum*, *Euryops multifidus*, *Peliostomum leucorrhizum*, *Pentzia spaerocephala*, *Chrysocoma obtusa* & *Pentzia globosa* while the species *Crotalaria orientalis*, *Felicia sp.*, *Monechma genistifolium* & *Lebeckia macrantha* were also found to be present but to a significantly lesser extent.

Forb species found to be well represented include *Senna italica*, *Acrotome inflata* and the provincially protected species *Oxalis semiloba*.

With the exception of the very sparsely represented nationally protected tree species and the provincially protected species *Oxalis semiloba*, no Red Data Listed-, other provincially protected species or any other species of conservational significance were found to be present within the localised surrounding undeveloped areas. It is therefore also not anticipated that the assessment area would necessarily have housed large numbers of any species of conservational significance. It must however be noted that the time of the assessment was not necessarily favourable for successful identification of all plant species individuals. It is therefore recommended that an additional ecological walkthrough be conducted during the flowering period of underground bulbous plant species, if deemed necessary by the competent authority. This will ensure that no provincially protected or significant species have potentially been omitted.



**Figure 9: Image illustrating the low growing grassland mainly dominated by 'white grasses' associated with the undeveloped natural areas surrounding Assessment area 1**

Due to the presence of the existing farm homestead infrastructure in-between the cultivated lands, the localised surrounding undeveloped areas are subjected to continued anthropogenic activity and disturbance. It is therefore not anticipated that any large or conservationally significant faunal species would utilise the localised surrounding undeveloped areas for breeding and/or persistence purposes or for that matter, would necessarily have historically utilised the assessment area.

Due to the natural pristine state of the broader surrounding undeveloped areas, the area is utilised by a wide variety of common and specialised small antelope as well as burrowing and predatory mammals for breeding, foraging and persistence purposes. The mobility of such faunal species along with the broad, continuous surrounding natural landscape however allows for individuals to simply leave an area where disturbance is taking place and disperse to other similar, adequate areas.

The assessment area and surrounding undeveloped areas do not fall within any Important Bird Area (IBA) as per the latest IBA map obtained from the Birdlife SA website ([www.birdlife.org.za/conservation/important-bird-areas/iba-map](http://www.birdlife.org.za/conservation/important-bird-areas/iba-map)). Small nests of common resident bird species were observed within some of the very sparsely represented shrub and tree individuals within the surrounding undeveloped areas, but no conservationally significant bird species, unique or specialised bird habitats were observed or are expected to utilise the areas for breeding and/or persistence purposes.

A distinct second order ephemeral water drainage line historically traversed the assessment area flowing in an easterly direction and discharging into a significant ephemeral watercourse located approximately 1.9 km east of the assessment area. This significant watercourse forms an important part of the mid portion of a quaternary surface water catchment and drainage area which drains towards the south-east.

The cultivation of the rectangular lands was however completed directly through the historic drainage line and the area was mechanically levelled for the lands. The original flow regime and -path of the drainage line towards the significant watercourse was therefore significantly altered and obstructed. Limited water flow however still takes place through the drainage line during rainfall events. It is recommended that the flow path of the drainage line be adequately diverted and channelled around the existing cultivated lands in order to ensure continued flow of surface water runoff during rainfall events, towards the significant ephemeral watercourse to the east.

The lack of continuous water flow through the assessment area, has resulted in the water drainage line not necessarily possessing any distinct riparian zones or significant variation in vegetation species composition relative to the surrounding areas.

## **Assessment area 2**

### *Current existing site and vegetation description:*

The areas surrounding Assessment area 2, form part of the same areas surrounding Assessment area 1 (discussed under heading 8.1.1). As was the case for Assessment area 1, the localised surrounding undeveloped areas also constitute flat to slightly sloping low growing grassland mainly dominated by 'white grasses'. The areas also possess a well-represented dwarf karroid shrub layer. Tree and shrub individuals of the nationally

protected species *Vachellia erioloba* & *V haemataxylon* as well as the undesired indicator species of bush encroachment *Senegalia mellifera* are very sparsely present.

As was the case for Assessment area 1, the average density of *Vachellia erioloba* individuals within the surrounding undeveloped areas amounts to approximately 0.25 trees/ha. This therefore equates to a total estimate of approximately 2 individuals within the cultivated land footprints which are reasonably assumed to have been removed during the initial cultivation.

As was the case for Assessment area 1, the average density of *Vachellia haemataxylon* individuals within the surrounding undeveloped areas amounts to approximately 0.05 trees/ha. The likelihood of any individuals historically being present within the cultivated land footprints is therefore low.

The same grass, forbs and dwarf karroid shrub species as those identified within the undeveloped areas surrounding Assessment area 1 (discussed under heading 8.1.1), were also found to be present within the undeveloped areas surrounding Assessment area 2.

With the exception of the very sparsely represented nationally protected tree species and the provincially protected species *Oxalis semiloba*, no Red Data Listed-, other provincially protected species or any other species of conservational significance were found to be present within the localised surrounding undeveloped areas. It is therefore also not anticipated that the assessment area would necessarily have housed large numbers of any species of conservational significance. It must however be noted that the time of the assessment was not necessarily favourable for successful identification of all plant species individuals. It is therefore recommended that an additional ecological walkthrough be conducted during the flowering period of underground bulbous plant species, if deemed necessary by the competent authority. This will ensure that no provincially protected or significant species have potentially been omitted.





**Figure 10: Image illustrating the low growing grassland mainly dominated by 'white grasses' associated with the undeveloped natural areas surrounding Assessment area 2**

The localised area to the south of the assessment area has however been densely infested by the legally declared invasive species *Prosopis glandulosa* (Category 3) mainly due to historic cultivation disturbance. The area is virtually completely devoid of a grass and forbs layer while the only other species found to be present within the area are sparsely scattered individuals of the karroid shrub *Phaeoptilum spinosum*.

The applicant has however been actively implementing bush encroachment alleviation and management measures within the infested area over the past growing season and continues to do so, on a systematic basis. *Prosopis glandulosa* individuals are being actively cleared from the infested area. It is recommended that the applicant continue with this active bush encroachment alleviation and management approach.





**Figure 11: Image illustrating the area to the south of Assessment area 2 which is densely infested by the legally declared invasive species *Prosopis glandulosa* (Category 3)**



**Figure 12: Image illustrating areas where active bush encroachment alleviation and management measures have been implemented**

Due to the natural pristine state of the broader surrounding undeveloped areas, the area is utilised by a wide variety of common and specialised small antelope as well as burrowing and predatory mammals for breeding, foraging and persistence purposes. The mobility of such faunal species along with the broad, continuous surrounding natural landscape however allows for individuals to simply leave an area where disturbance is taking place and disperse to other similar, adequate areas.



As was the case for Assessment area 1, the assessment area and surrounding undeveloped areas do not fall within any Important Bird Area (IBA) as per the latest IBA map obtained from the Birdlife SA website ([www.birdlife.org.za/conservation/important-bird-areas/iba-map](http://www.birdlife.org.za/conservation/important-bird-areas/iba-map)). Small nests of common resident bird species were observed within some of the very sparsely represented shrub and tree individuals within the surrounding undeveloped areas, but no conservationally significant bird species, unique or specialised bird habitats were observed or are expected to utilise the areas for breeding and/or persistence purposes.

The same significant ephemeral watercourse located approximately 1.9 km east of Assessment area 1 (discussed under heading 8.1.1), also flows past Assessment area 2 directly adjacent east. As discussed, this significant watercourse forms an important part of the mid portion of a quaternary surface water catchment and drainage area which drains towards the south-east.

The watercourse has however seemingly not been directly or significantly impacted by the development of Assessment area 2. The original flow regime and -path of the watercourse has not been significantly altered or obstructed and unimpeded water flow still takes place through the watercourse during rainfall events. It is however recommended that a minimum approximate 40 m buffer zone should be implemented around the watercourse and no further development may take place within the buffered area.

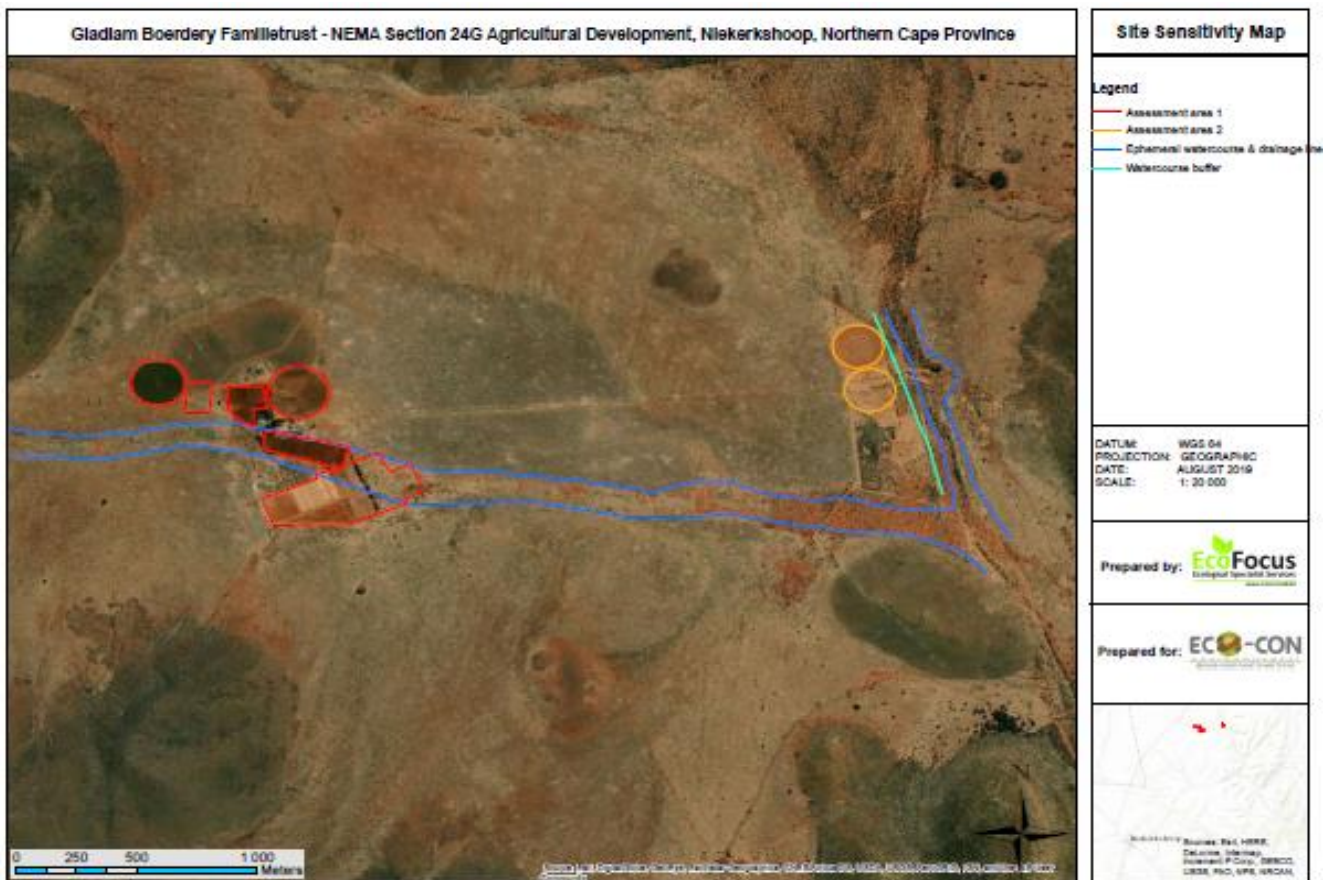


Figure 13: Site sensitivity map indicating watercourses for areas 1 & 2 (see Appendix B for A3 size version)

### Assessment area 3

#### Current existing site and vegetation description:

The localised surrounding undeveloped valley bottom areas constitute slightly sloping open savannah shrubland. The areas possess a relatively well-developed woody component which mainly consists of multi-stemmed shrubs with small single-stemmed trees also being sparsely present. The woody layer is mainly dominated by shrub individuals of the undesired indicator species of bush encroachment *Senegalia mellifera*. Tree and shrub individuals of the species *Ziziphus mucronata*, *Searsia lancea*, *Grewia flava* & *Ehretia rigida* were also found to be well represented while individuals of the nationally protected species *Vachellia erioloba* & *Boscia albitrunca* are merely sparsely present.

The average density of *Vachellia erioloba* individuals within the surrounding undeveloped valley bottom areas amounts to approximately 3 trees/ha. This therefore equates to a total estimate of approximately 17 individuals within the cultivated land footprint which are reasonably assumed to have been removed during the initial cultivation.

The average density of *Boscia albitrunca* individuals within the surrounding undeveloped valley bottom areas amounts to approximately 2 trees/ha. This therefore equates to a total estimate of approximately 11 individuals within the cultivated land footprint which are reasonably assumed to have been removed during the initial cultivation.

The grass layer is mainly dominated by the species *Stipagrostis spp.* while the species *Aristida spp.*, *Schmidtia pappophoroides*, *Cenchrus ciliaris* & *Enneapogon cenchroides* were also found to be present but to a significantly lesser extent.

Dwarf karroid shrub species found to be well represented include *Phaeoptilum spinosum*, *Rhigozum trichotomum*, *Pentzia spaerocephala*, *Monechma incanum*, *Chrysocoma obtusa* & *Pentzia globosa* while the species *Crotalaria orientalis*, *Felicia sp.*, & *Monechma genistifolium* were also found to be present but to a significantly lesser extent.

Forb species *Senna italica* was found to be well represented.

With the exception of the sparsely represented nationally protected tree species, no Red Data Listed-, provincially protected species or any other species of conservational significance were found to be present within the localised surrounding undeveloped areas. It is therefore also not anticipated that the assessment area would necessarily have housed large numbers of any species of conservational significance. It must however be noted that the time of the assessment was not necessarily favourable for successful identification of all plant species individuals. It is therefore recommended that an additional ecological walkthrough be



conducted during the flowering period of underground bulbous plant species, if deemed necessary by the competent authority. This will ensure that no provincially protected or significant species have potentially been omitted.



**Figure 14: Image illustrating the open savannah shrubland associated with the undeveloped natural valley bottom areas surrounding Assessment area 3**

Due to the natural pristine state of the broader surrounding undeveloped areas, the area is utilised by a wide variety of common and specialised small antelope as well as burrowing and predatory mammals for breeding, foraging and persistence purposes. The mobility of such faunal species along with the broad, continuous surrounding natural landscape however allows for individuals to simply leave an area where disturbance is taking place and disperse to other similar, adequate areas.

As was the case for Assessment area 1 & 2, the assessment area and surrounding undeveloped areas do not fall within any Important Bird Area (IBA) as per the latest IBA map obtained from the Birdlife SA website ([www.birdlife.org.za/conservation/important-bird-areas/iba-map](http://www.birdlife.org.za/conservation/important-bird-areas/iba-map)). Small nests of common resident bird species were observed within some of the sparsely represented shrub and tree individuals within the surrounding undeveloped areas, but no conservationally significant bird species, unique or specialised bird habitats were observed or are expected to utilise the areas for breeding and/or persistence purposes.

A significant ephemeral watercourse flows past Assessment area 3 approximately 100 m to the north. This watercourse joins the same significant watercourse associated with Assessment area 2, which also flows past Assessment area 3 directly adjacent east. As discussed, these significant watercourses form an important part of

the mid portion of a quaternary surface water catchment and drainage area which drains towards the south-east.

The watercourses have however seemingly not been directly or significantly impacted by the development of Assessment area 3. The original flow regimes and -paths of the watercourses have not been significantly altered or obstructed and unimpeded water flow still takes place through the watercourses during rainfall events. It is however recommended that no further development may take place any closer to either of the watercourses within the localised area of Assessment area 3.



**Figure 15: Image illustrating the presence of the significant ephemeral watercourses surrounding Assessment area 3**



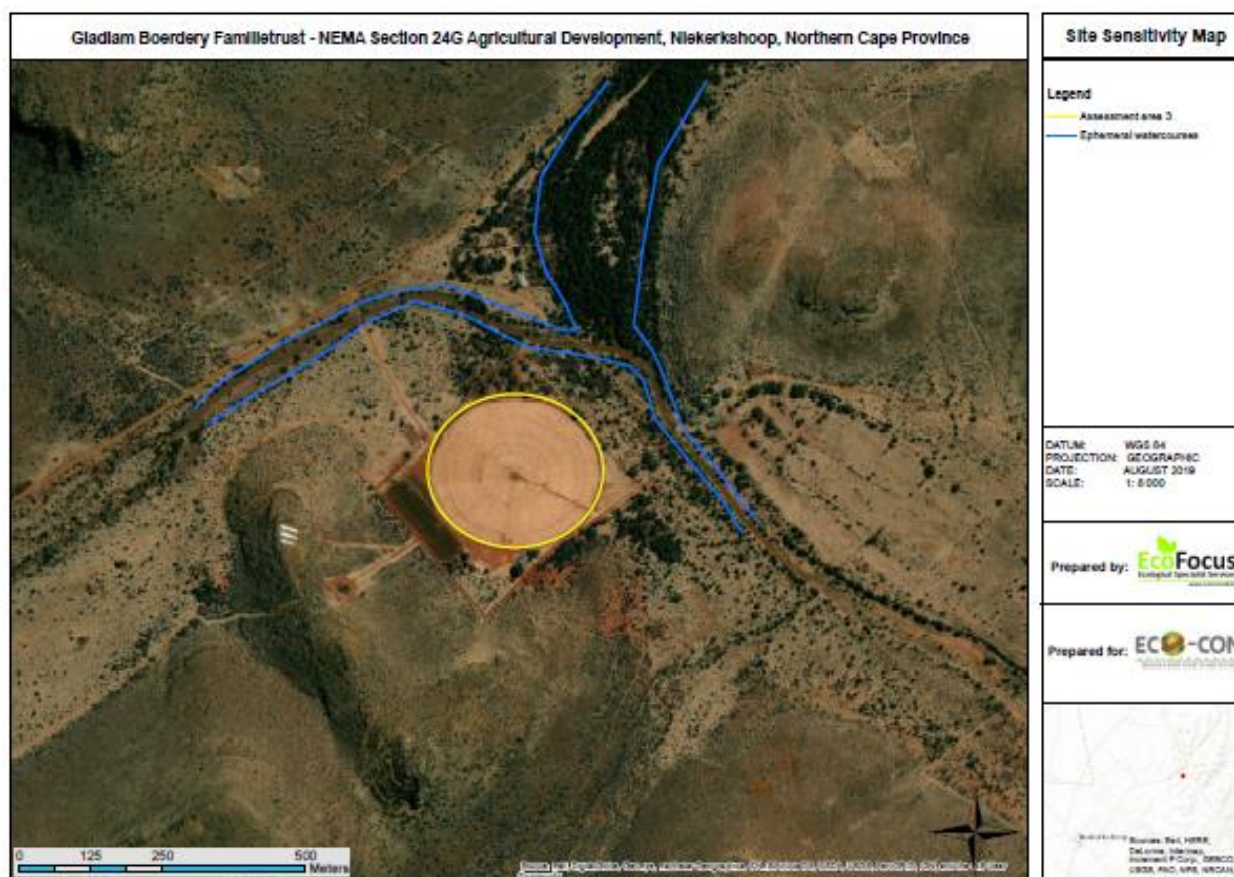


Figure 16: Site sensitivity map indicating watercourse for area 3 (see Appendix B for A3 size version)

Table 10: Species list for the assessment area (Provincially protected species highlighted in yellow; Nationally protected species highlighted in orange; Legally declared invasive species highlighted in pink)

Graminoids	Forbs	Shrubs & trees
<i>Aristida spp.</i>	<i>Acrotome inflata</i>	<i>Boscia albitrunca</i>
<i>Cenchrus ciliaris</i>	<i>Oxalis semiloba</i>	<i>Chrysocoma obtusa</i>
<i>Enneapogon cenchroides</i>	<i>Senna italica</i>	<i>Crotalaria orientalis</i>
<i>Schmidtia pappophoroides</i>	-	<i>Ehretia rigida</i>
<i>Stipagrostis spp.</i>	-	<i>Euryops multifidus</i>
-	-	<i>Felicia sp.</i>
-	-	<i>Grewia flava</i>
-	-	<i>Lebeckia macrantha</i>
-	-	<i>Monechma genistifolium</i>
-	-	<i>Monechma incanum</i>
-	-	<i>Peliostomum leucorrhizum</i>
-	-	<i>Pentzia globosa</i>
-	-	<i>Pentzia spaeocephala</i>
-	-	<i>Phaeoptilum spinosum</i>
-	-	<i>Prosopis glandulosa</i>
-	-	<i>Rhigozum trichotomum</i>
-	-	<i>Searsia lancea</i>
-	-	<i>Senegalia mellifera</i>
-	-	<i>Vachellia haemataxylon</i>
-	-	<i>Vachellia erioloba</i>
-	-	<i>Ziziphus mucronata</i>

*Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS)*

**Assessment area 1**

The Present Ecological State (PES) of Assessment area 1 is classified as Class E as it is seriously modified. The loss of natural habitat, biota and basic ecosystem functionality is extensive due to the historic and continued cultivation activities. The basic ecosystem functionality has virtually been destroyed and sufficient ecological restoration will prove to be very difficult.

The Present Ecological State (PES) of the localised surrounding undeveloped areas is classified as Class B as they are largely natural. A small change in natural habitats and biota may have taken place mainly due to continued farm management practices, but the ecosystem functionality has remained essentially unchanged.

The historic Ecological Importance and Sensitivity (EIS) of Assessment area 1 and the localised surrounding undeveloped areas would probably have been classified as Class C (moderate) as these areas could have been viewed as being ecologically important and sensitive on local scale mainly due to the very sparse presence of nationally protected tree and shrub species individuals as well as the ephemeral water drainage line which historically traversed the assessment area. Biodiversity is however not unique and still relatively ubiquitous.

Assessment area 1 would therefore have been viewed as being of moderate conservational significance for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type, nationally protected tree and shrub species individuals as well as the quaternary surface water catchment and drainage area which drains towards the south-east.

**Assessment area 2**

The Present Ecological State (PES) of Assessment area 2 is classified as Class E as it is seriously modified. The loss of natural habitat, biota and basic ecosystem functionality is extensive due to the historic and continued cultivation activities. The basic ecosystem functionality has virtually been destroyed and sufficient ecological restoration will prove to be very difficult.

The Present Ecological State (PES) of the localised surrounding undeveloped areas, with the exception of the significantly infested area to the south, is classified as Class B as they are largely natural. A small change in natural habitats and biota may have taken place mainly due to continued farm management practices, but the ecosystem functionality has remained essentially unchanged.

The historic Ecological Importance and Sensitivity (EIS) of Assessment area 2 and the localised surrounding undeveloped areas would probably have been classified as Class C (moderate) as these areas could have been

viewed as being ecologically important and sensitive on provincial scale mainly due to the very sparse presence of nationally protected tree and shrub species individuals as well as the significant ephemeral watercourse which forms an important part of the mid portion of a quaternary surface water catchment and drainage area towards the south-east. Biodiversity is however not unique and still relatively ubiquitous.

Assessment area 2 would therefore have been viewed as being of moderate conservational significance for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type, ESA, nationally protected tree and shrub species individuals as well as the quaternary surface water catchment and drainage area which drains towards the south-east.

### **Assessment area 3**

The Present Ecological State (PES) of Assessment area 3 is classified as Class E as it is seriously modified. The loss of natural habitat, biota and basic ecosystem functionality is extensive due to the historic and continued cultivation activities. The basic ecosystem functionality has virtually been destroyed and sufficient ecological restoration will prove to be very difficult.

The Present Ecological State (PES) of the localised surrounding undeveloped valley bottom areas is classified as Class A as they are unmodified, natural and pristine.

The historic Ecological Importance and Sensitivity (EIS) of Assessment area 3 and the localised surrounding undeveloped valley bottom areas would probably have been classified as Class C (moderate) as these areas could have been viewed as being ecologically important and sensitive on provincial scale mainly due to the sparse presence of nationally protected tree and shrub species individuals as well as the surrounding significant ephemeral watercourses which form an important part of the mid portion of a quaternary surface water catchment and drainage area towards the south-east. Biodiversity is however not unique and still relatively ubiquitous.

Assessment area 3 would therefore have been viewed as being of moderate conservational significance for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type, ESA, nationally protected tree and shrub species individuals as well as the quaternary surface water catchment and drainage area which drains towards the south-east.

#### 7.1.4.2 Conclusions and Recommendations in terms of the Ecological report

The assessment areas constitute cultivated centre pivot lands and a number of adjoining rectangular lands of which all previously existing natural surface vegetation on the cultivated land footprints has been completely transformed.

With the exception of the sparsely represented nationally protected tree species and the provincially protected species *Oxalis semiloba*, no Red Data Listed-, other provincially protected species or any other species of conservational significance were found to be present within the localised surrounding undeveloped areas. It is therefore also not anticipated that the assessment areas would necessarily have housed large numbers of any species of conservational significance. It must however be noted that the time of the assessment was not necessarily favourable for successful identification of all plant species individuals.

The assessment areas and surrounding undeveloped areas do not fall within any Important Bird Area (IBA) as per the latest IBA map obtained from the Birdlife SA website ([www.birdlife.org.za/conservation/important-bird-areas/iba-map](http://www.birdlife.org.za/conservation/important-bird-areas/iba-map)). Small nests of common resident bird species were observed within some of the very sparsely represented shrub and tree individuals within the surrounding undeveloped areas, but no conservationally significant bird species, unique or specialised bird habitats were observed or are expected to utilise the areas for breeding and/or persistence purposes.

The three assessment areas and localised surrounding undeveloped natural areas would probably have scored moderate historic EIS values as these areas could have been viewed as being ecologically important and sensitive on local or possibly provincial scale mainly due to the sparse presence of nationally protected tree and shrub species individuals as well as the ephemeral water drainage line and significant ephemeral watercourses which form an important part of the mid portion of a quaternary surface water catchment and drainage area towards the south-east.

The three assessment areas would therefore historically probably have been viewed as being of moderate conservational significance for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type, ESA, nationally protected tree and shrub species individuals as well as the quaternary surface water catchment and drainage area which drains towards the south-east.

It is the opinion of the specialist that the virtually complete loss and transformation of natural habitat, biota and basic ecosystem functionality within the three assessment areas is deemed irreversible. Sufficient ecological restoration of the relevant vegetation type and its functionality within the assessment areas, will therefore not be practicably feasible.

It is further the opinion of the specialist that the development should not pose any further potentially significant long term ecological impacts which cannot be suitably reduced and mitigated to within acceptable residual levels. The significant ecological impacts associated with the impeding of the historic ephemeral water drainage line's and significant watercourses' flow regimes and alteration/contamination of soil and groundwater characteristics/quality, can be suitably reduced and mitigated to within acceptable residual levels.

The project should therefore be considered by the competent authority for Environmental Authorisation and approval. All recommended mitigations measures as per this ecological report must be adequately implemented and managed for the remainder of the operational phase and subsequent future decommissioning phase. All necessary authorisations, licenses and permits must also be obtained as soon as reasonably and practicably possible.

See specialist report in Appendix E.

#### 7.1.5 Agriculture and Soil Suitability Assessment

A soil suitability survey was conducted on the farm, Kloof nr 143, near Niekerkshoop to assess the soil suitability for irrigation in support of an application for a ploughing certificate to allow irrigation. The lands were sparsely situated and therefore the area was divided into 3 areas. Area A with an existing irrigation and Area B, has not been irrigated for many years and Area C was under a centre pivot.

##### 7.1.5.1 Soils forms

The soils encountered during the survey are shown in the table below (table 11).

**Table 11: Soil form encountered**

Soil form	A Horizon	B Horizon	B2/C Horizon	Obs
<b>Hutton</b>	Orthic A	Red apedal B	Rock	3
<b>Bainsvlei</b>	Orthic A	Red apedal B	Soft Plinthic	1
<b>Addo</b>	Orthic A	Neocarbonate B	Soft Carbonate B	3
<b>Brandvlei</b>	Orthic A	Soft Carbonate B		2
<b>Mispah</b>	Orthic A	Rock		1
<b>Coega</b>	Orthic A	Hardpan Carbonate		1
<b>Prieska</b>	Orthic A	Neocarbonate B	Soft Carbonate B	9



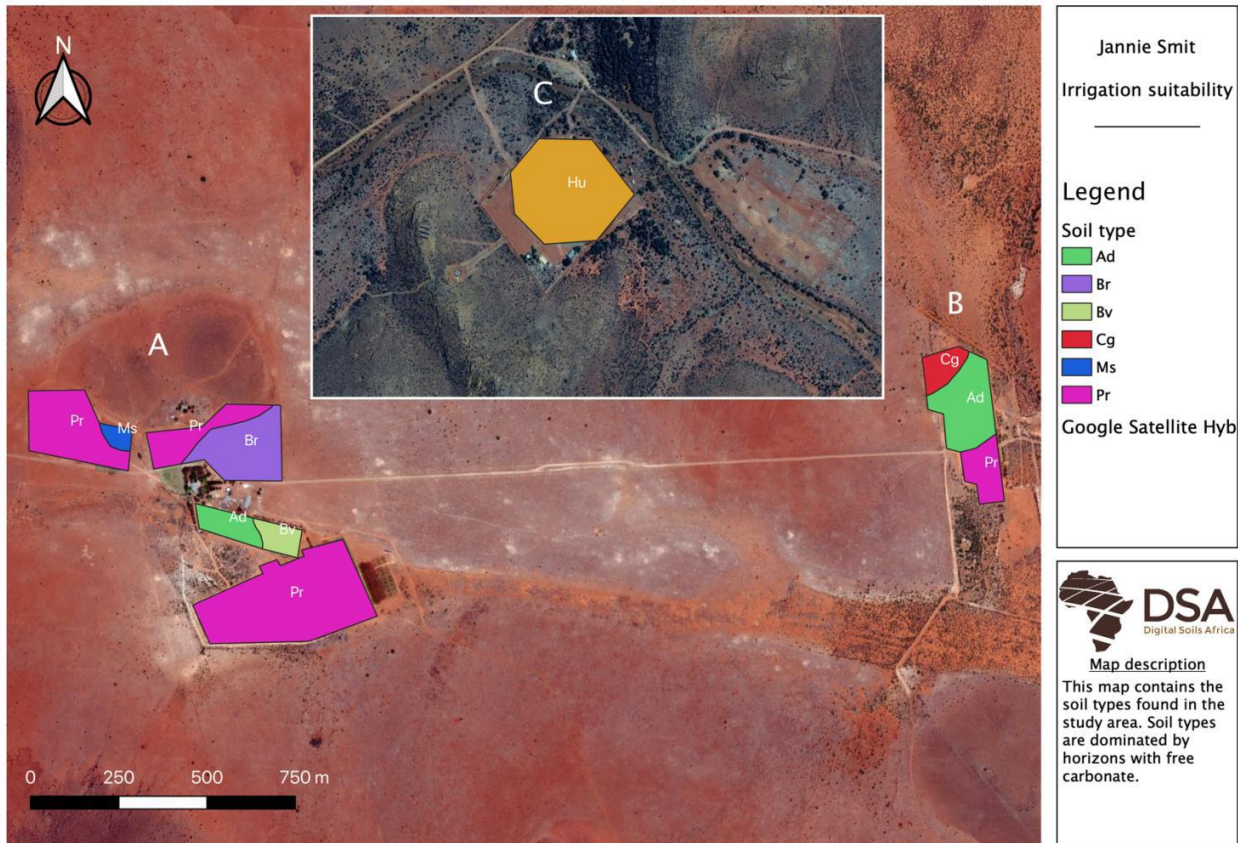


Figure 17: Illustration of soil forms encountered

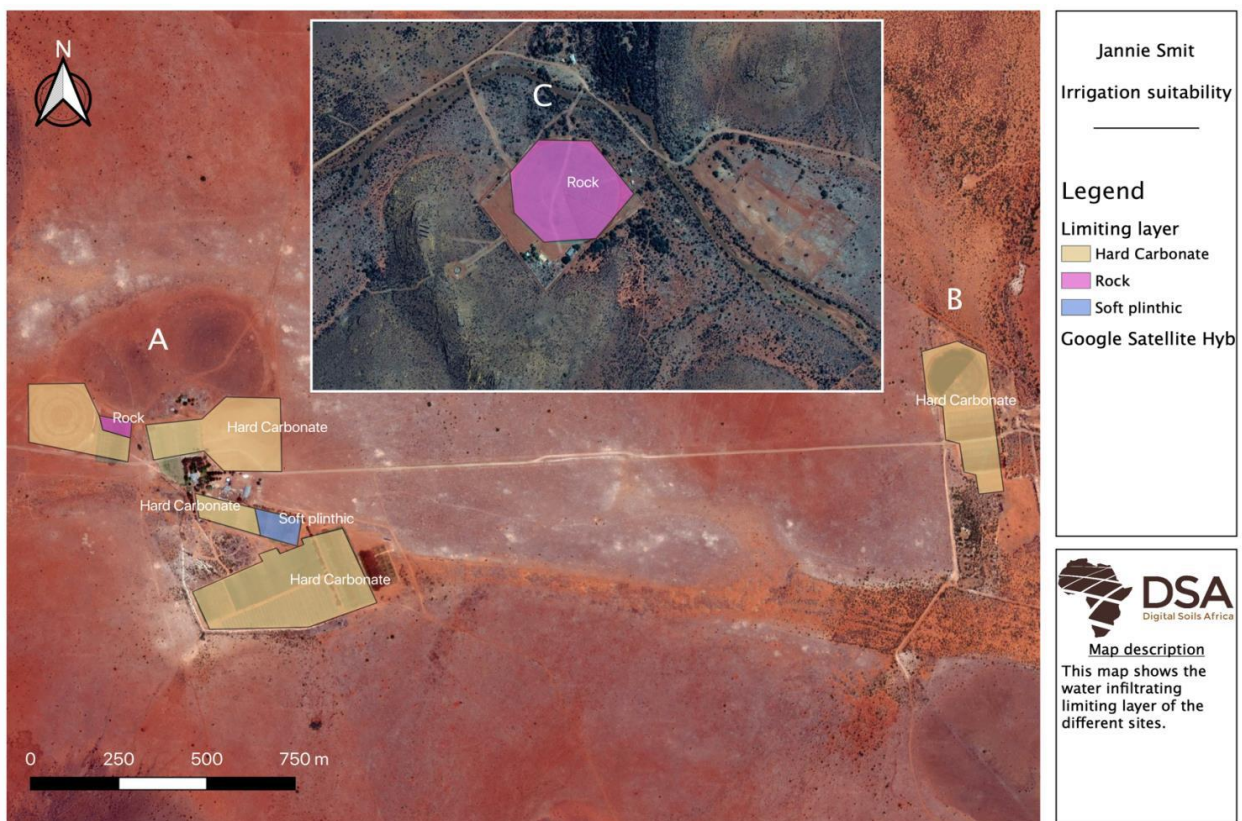


Figure 18: Illustration of infiltration limiting material(s)



**7.1.5.2 Soil Depth**

The depth limiting layer is presented in Figure 17. Assessment areas 1 & 2 mostly consist of hard carbonate with minor portions consisting of hard rock and soft plinthic rock. Assessment area 3 constitutes almost entirely of hard rock. Due to the presence of carbonates in varying degrees, drainage is problematic in general. Cross ripping of the area is advised to improve the drainage on the areas with shallow hardpan carbonate layers and highly weathered saprolite.



**Figure 19: Illustration of drainable depths**

**7.1.5.3 Suitability**

The soils are generally suitable for irrigation with most of the soils classifying as unsuitable found in the north of Area A. (Figure 20). Due to the presence of carbonates in varying degrees, drainage is problematic in general. Cross ripping of the area is advised to improve the drainage on the areas with shallow hardpan carbonate layers and highly weathered saprolite. Area C consists mostly of deep red soils with no carbonates and therefore the most suitable soils in the study area due to the depth and drainage. Figure 9 shows the area suitable for irrigation on a rectangular shape, while its perimeter points are given in Table 5.

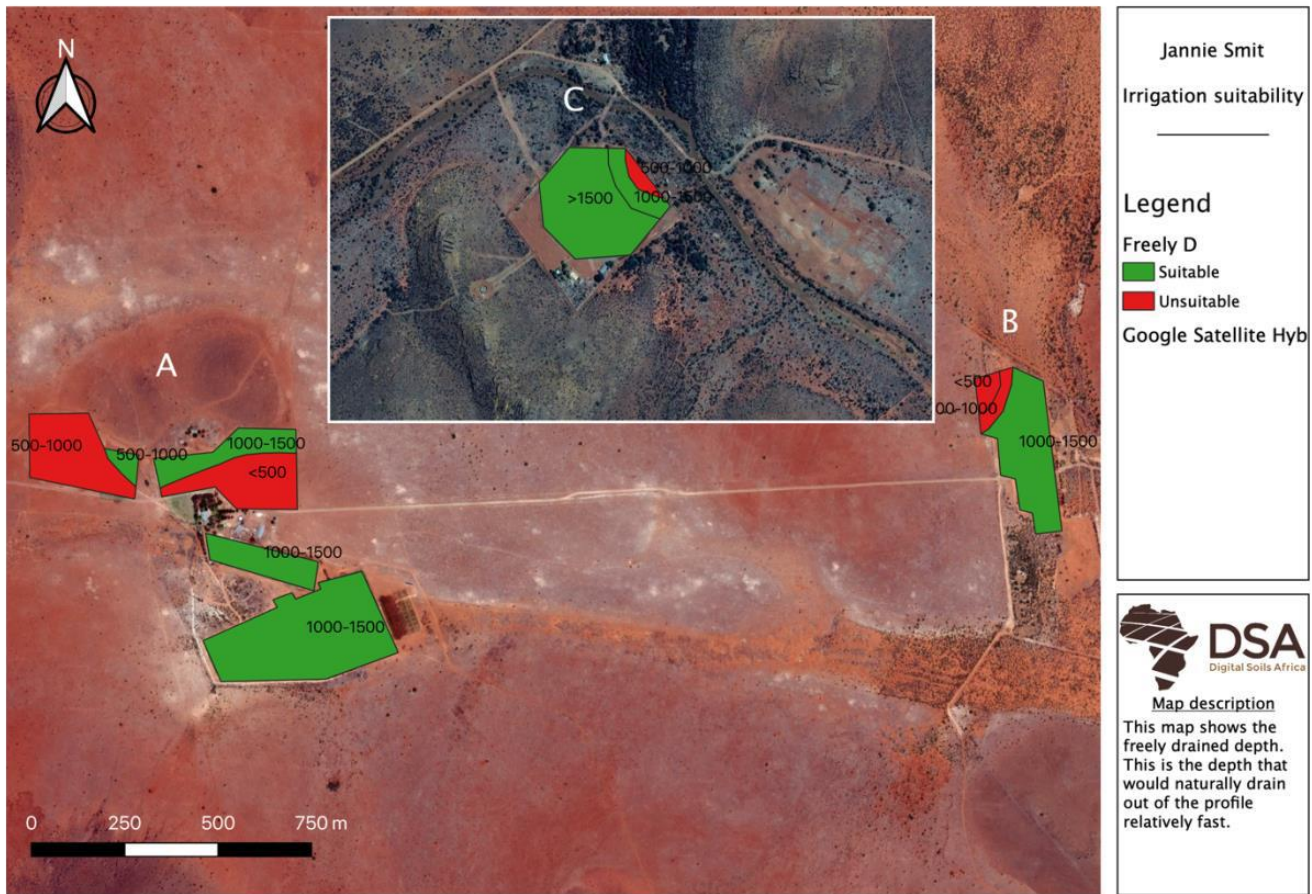


Figure 20: Illustration of irrigation suitability of the proposed project area

**7.1.5.4 Conclusion in terms of the soil suitability**

The absence of redox morphology (except for the one soft plinthic horizon) indicates that the soils are suitable for the irrigation. Depth was often the limiting factor in many of the soils deemed unsuitable. The clay percentage in the Prieska was slightly high, but still sufficient for irrigation. The chemical properties indicate that the samples taken were sufficient for irrigation. Due to the presence of carbonates in varying degrees, drainage is problematic in general. Cross ripping of the area is advised to improve the drainage on the areas with shallow hardpan carbonate layers and highly weathered saprolite.

*See specialist report in Appendix E.*

**7.1.6 Heritage**

**Field Assessment**

Visibility of outcrop was very limited given the generally low topography terrain and presence of a well-developed superficial (agricultural) overburden at Kleinkloof and Diamantgat. Both sites have been severely

degraded by previous farming activities (pivots). Investigation of the landscape immediately surrounding the sites suggests that potential impact on *in situ* Stone Age archaeological material, graves, rock engravings, prehistoric structures or historically significant building structures older than 60 years within the study areas was most probably low.

### Impact Statement and Recommendation

The geology of area reflects Early Proterozoic environmental conditions while the farm itself is located within a region that has previously yielded ample archaeological evidence of prehistoric human occupation. However the nature of the existing developments suggests very low impact on Transvaal Supergroup strata The Diamantgat and Kleinkloof sites are characterized by flat terrain, capped by well-developed residual soil overburden that has been severely degraded by farming activities (pivots) and are not considered to be palaeontologically or archaeologically vulnerable. Both sites are assigned a rating of Generally Protected C (GP.C).

**Table 12: Field rating categories as prescribed by SAHRA**

Field Rating	Grade	Significance	Mitigation
National Significance (NS)	Grade 1	-	Conservation; national site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; provincial site nomination
Local Significance (LS)	Grade 3A	High significance	Conservation; mitigation not advised
Local Significance (LS)	Grade 3B	High significance	Mitigation (part of site should be retained)
Generally Protected A (GP.A)	-	High/medium significance	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium significance	Recording before destruction
Generally Protected C (GP.C)	-	Low significance	Destruction

See specialist report in Appendix E.

#### 7.1.7 Groundwater assessment

The groundwater study was divided into 3 assessment phases, one for each portion of the farm (Annex Klippoort, Diamantgat and Gladium). The results will thus be discussed separately for the three respective portions.

#### Annex Klippoort:

Based on the information discussed in this report, the following can be concluded regarding the groundwater conditions at Annex Klippoort (the site):

- The site is located approximately 12 km north-east of Niekerkshoop in the Northern Cape province;
- An estimated 42 000 m<sup>3</sup>/a of groundwater is needed to irrigate a proposed 5.2 ha of land;
- The site surface topography slopes gently to the southeast along non-perennial Rietfontein River which drains towards the Orange River, enclosed by high hills on both sides of the river;
- At the site the Rietfontein River has cut a deep valley into the surrounding hilly area;
- Surface water on the site is only present briefly during and after thunderstorms;
- The MAP for the site is approximately 267 mm;
- Large parts of the study area are covered by alluvial deposits. Although these deposits are normally thin, it acquires significant vertical thickness in the study area;
- The eastern part of the study area, which includes the site, is mainly underlain by rocks of the Kuruman Formation of the Ghaapplatoo Group, which consist mainly of banded ironstone, jaspilite, crocidolite and chert;
- Younger rocks of the Daniëlskuil Formation, consisting of jaspilite and chert, underlie the western parts of the study area;
- A small outcrop of the Makganyane Formation, consisting of diamictite with lesser banded jasper, siltstone, mudstone, dolomite with chert and greywacke, occurs in the far north-western part of the study area;
- Recharge for the site is approximately 2.05% of the MAP (or 5.5 mm/a);
- The groundwater map indicates that the site is underlain by a fractured aquifer with an average maximum immediate yield for successful boreholes drilled in this region of 0.5 – 2.0 L/s. However, these yields can be significantly improved by utilising scientific methods to determine optimum drill localities;
- Lineament mapping indicates several lineaments in the surrounding areas, but none at the site;
- Thirteen boreholes within the study area were surveyed during the hydrocensus;
- Hydrogeological information obtained during the hydrocensus indicate a significant primary aquifer exists in the relative thick alluvial deposits;
- A perched groundwater level exists on top of the upper clayey layers of this alluvial deposit;

- The site is located within Quaternary Catchment D71D for which the 2016 General Authorisation (GA) allows an average of 45 m<sup>3</sup>/d of groundwater to be abstracted over a year period per ha of property owned;
- One GRU was identified for the site based on surface drainage. The recharge based groundwater resource potential of this GRU is approximately 3 423 700 m<sup>3</sup>/a during normal years and 1 616 500 m<sup>3</sup>/a during dry spells;
- The average groundwater level for the study area is approximately 15.2 mbgl;
- Groundwater quality in the study area, based on field measured ECs, is generally good with measured ECs ranging from 69 to 130 mS/m;
- Two boreholes, KT1 and KT2, were yield tested and yield test analyses indicate a combined long term sustainable yield of approximately 520 000 m<sup>3</sup>/a (16.5 L/s continuously) for the two boreholes. This is considerably more than the irrigation demand, but still <33% of the dry season groundwater resource potential of the GRU;
- Groundwater level recovery after pump shutdown was extremely quick at both boreholes, which results in anomalously high sustainable yields calculated by the Recovery Method. Therefore these values were omitted during calculations of the recommended sustainable yield for both boreholes;
- Storativity values calculated from the yield test data are significantly higher than that indicated in the GRA2 data for Quaternary Catchment D71D, which can directly be linked to the primary aquifer;
- Although the two yield tested boreholes are close together, the calculated T-values differ significantly which indicates the heterogeneity of the primary aquifer;
- From a groundwater perspective, the proposed irrigation site is favourable, as long as possible groundwater contamination sources are well controlled;
- The impact of the proposed prospecting on local groundwater sources can be significantly reduced by implementing mitigation measures during the irrigation and decommission phases;
- A monitoring programme is preferable to identify red flag situations, if any, timeously.

#### Diamantgat:

Based on the information discussed in this report, the following can be concluded regarding the groundwater conditions at Diamantgat (the site):



- The site is located approximately 15 km north-east of Niekerkshoop in the Northern Cape province;
- An estimated 40 000 m<sup>3</sup>/a of groundwater is needed to irrigate a proposed 5.2 ha of land;
- The site surface topography slopes gently to the south along the non-perennial Rietfontein River which drains southwards to the Orange River;
- Generally, the site topography is flat throughout except for elevated hills in the southern part where the Rietfontein River has cut a deep valley into the surrounding hilly area;
- Surface water on the site is only present briefly during and after thunderstorms;
- The MAP for the site is approximately 267 mm;
- Large parts of the study area are covered by alluvial deposits. Although these deposits are normally thin, it acquires significant vertical thickness in the study area;
- The eastern part of the study area, which includes the site, is mainly underlain by rocks of the Kuruman Formation of the Ghaapplatoo Group, which consist mainly of banded ironstone, jaspilite, crocidolite and chert;
- Younger rocks of the Daniëlskuil Formation, consisting of jaspilite and chert, underlie the western parts of the site;
- A small outcrop of the Makganyane Formation, consisting of diamictite with lesser banded jasper, siltstone, mudstone, dolomite with chert and greywacke, occurs in the far north-western part of the study area;
- Recharge for the site is approximately 2.05% of the MAP (or 5.5 mm/a);
- The groundwater map indicates that the site is underlain by a fractured aquifer with an average maximum immediate yield for successful boreholes drilled in this region of 0.5 – 2.0 L/s. However, these yields can be significantly improved by utilising scientific methods to determine optimum drill localities;
- Lineament mapping indicates several lineaments in the surrounding areas, but none at the site;
- Thirteen boreholes within the study area were surveyed during the hydrocensus;
- Hydrogeological information obtained during the hydrocensus indicate a significant primary aquifer exists in the relative thick alluvial deposits;
- A perched groundwater level exists on top of the upper clayey layers of this alluvial deposit;

- The site is located within Quaternary Catchment D71D for which the 2016 General Authorisation (GA) allows an average of 45 m<sup>3</sup>/d of groundwater to be abstracted over a year period per ha of property owned;
- One GRU was identified for the site based on surface drainage. The recharge based groundwater resource potential of this GRU is approximately 2 568 000 m<sup>3</sup>/a during normal years and 1 242 000 m<sup>3</sup>/a during dry spells;
- The average groundwater level for the study area is approximately 15.2 mbgl;
- Groundwater quality in the study area, based on field measured ECs, is generally good with measured ECs ranging from 69 to 130 mS/m;
- Two boreholes, DG1 and DG2, were yield tested and yield test analyses indicate a combined long term sustainable yield of approximately 583 000 m<sup>3</sup>/a (18.5 L/s continuously) for the two boreholes. This is considerably more than the irrigation demand, but still <50% of the dry season groundwater resource potential of the GRU;
- Groundwater level recovery after pump shutdown was extremely quick at both boreholes, which results in anomalously high sustainable yields calculated by the Recovery Method. Therefore these values were omitted during calculations of the recommended sustainable yield for both boreholes;
- Storativity values calculated from the yield test data are significantly higher than that indicated in the GRA2 data for Quaternary Catchment D71D, which can directly be linked to the primary aquifer;
- Although the two yield tested boreholes are close together, the calculated T-values differ significantly which indicates the heterogeneity of the primary aquifer;
- From a groundwater perspective, the proposed irrigation site is favourable, as long as possible groundwater contamination sources are well controlled;
- The impact of the proposed prospecting on local groundwater sources can be significantly reduced by implementing mitigation measures during the irrigation and decommission phases;
- A monitoring programme is preferable to identify red flag situations, if any, timeously.

Gladium:

Based on the information discussed in this report, the following can be concluded regarding the groundwater conditions at Gladium (the site):

- The site is located approximately 14 km north-east of Niekerkshoop in the Northern Cape province;

- An estimated 72 000 m<sup>3</sup>/a of groundwater is needed to irrigate a proposed 9.3 ha of land;
- The site surface topography slopes gently to the east to the non-perennial Rietfontein River which drains southwards to the Orange River;
- Generally, the site topography is flat throughout except for elevated hills in the southern part where the Rietfontein River has cut a deep valley into the surrounding hilly area;
- Surface water on the site is only present briefly during and after thunderstorms;
- The MAP for the site is approximately 267 mm;
- Large parts of the study area are covered by alluvial deposits. Although these deposits are normally thin, it acquires significant vertical thickness in the study area;
- The eastern part of the study area is mainly underlain by rocks of the Kuruman Formation of the Ghaaplatto Group, which consist mainly of banded ironstone, jaspilite, crocidolite and chert;
- Younger rocks of the Daniëlskuil Formation, consisting of jaspilite and chert, underlie the western parts of the site;
- A small outcrop of the Makganyane Formation, consisting of diamictite with lesser banded jasper, siltstone, mudstone, dolomite with chert and greywacke, occurs in the far north-western part of the study area;
- Recharge for the site is approximately 2.05% of the MAP (or 5.5 mm/a);
- The groundwater map indicates that the site is underlain by a fractured aquifer with an average maximum immediate yield for successful boreholes drilled in this region of 0.5 – 2.0 L/s. However, these yields can be significantly improved by utilising scientific methods to determine optimum drill localities;
- Lineament mapping indicates several lineaments in the surrounding areas, but none at the site;
- Thirteen boreholes within the study area were surveyed during the hydrocensus;
- Hydrogeological information obtained during the hydrocensus indicate a significant primary aquifer exists in the relative thick alluvial deposits;
- A perched groundwater level exists on top of the upper clayey layers of this alluvial deposit;
- The site is located within Quaternary Catchment D71D for which the 2016 General Authorisation (GA) allows an average of 45 m<sup>3</sup>/d of groundwater to be abstracted over a year period per ha of property owned;



- One GRU was identified for the site based on surface drainage. The recharge based groundwater resource potential of this GRU is 614 898 m<sup>3</sup>/a during normal years and 308 907 m<sup>3</sup>/a during dry spells;
- The average groundwater level at the site is approximately 15.2 mbgl;
- Groundwater quality in the study area, based on field measured ECs, is generally good with measured ECs ranging from 69 to 130 mS/m;
- Two boreholes were yield tested and yield test analyses indicate a combined long term sustainable yield of 284 000 m<sup>3</sup>/a (9 L/s continuously) for the two boreholes. This is considerably more than the irrigation demand, but still less than the dry season groundwater resource potential of the GRU;
- Groundwater level recovery after pump shutdown was extremely quick at both boreholes, which results in anomalously high sustainable yields calculated by the Recovery Method. Therefore these values were omitted during calculations of the recommended sustainable yield for both boreholes;
- Storativity values calculated from the yield test data are significantly higher than that indicated in the GRA2 data for Quaternary Catchment D71D, which can directly be linked to the primary aquifer;
- From a groundwater perspective, the proposed irrigation site is favourable, as long as possible groundwater contamination sources are well controlled;
- The impact of the proposed prospecting on local groundwater sources can be significantly reduced by implementing mitigation measures during the irrigation and decommission phases;
- A monitoring programme is preferable to identify red flag situations, if any, timeously.

See specialist report in Appendix E

## 7.2 SOCIO-ECONOMIC DESCRIPTION

The project does not hold any overriding negative social impacts to suggest a “no-go” option. The investment, employment and income which are generated by the project will positively contribute to the socio-economic development objectives described in the local IDP.

The Department of Economic Development and Tourism in the Northern Cape has recently concluded the development of its Provincial Local Economic Development (LED) Strategy in line with the Northern Cape Growth and Development Strategy. The LED is an approach to sustainable economic development that encourages residents of local communities to work together to stimulate local economic activity that will result in, inter alia, an improvement in the quality of life for all in the local community. These Strategies provide the

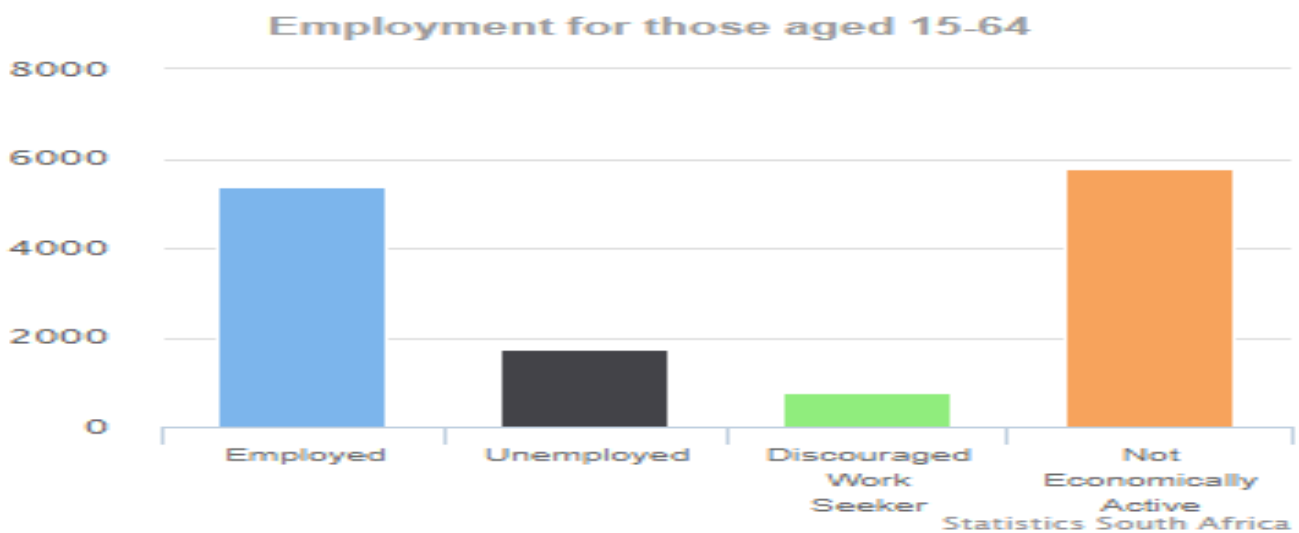
foundation for Integrated Economic Development Planning throughout the Northern Cape. A development such as the proposed project would present a definite benefit and addition to the LED through local job creation and skills development and contribute to the alleviation of poverty and unemployment in the local municipality. This will enable a better livelihood and a higher quality of life to individuals involved.

The following section will provide a brief insight as to the socio-economic conditions in the respective municipal areas:

**Siyathemba local Municipality:**

Employment:

There are 6 138 (out of 21 591) people that are economically active (employed or unemployed but looking for work), and of these, 24,3% are unemployed.



**Figure 21: Employment Graph for those aged 15-64**

Economic profile:

The Economic Profile of the Siyathemba Local Municipality is summarized below. It is clear that the fifth highest percentage of people have no income. This project contributes by providing continues new working opportunities during the operational phase.

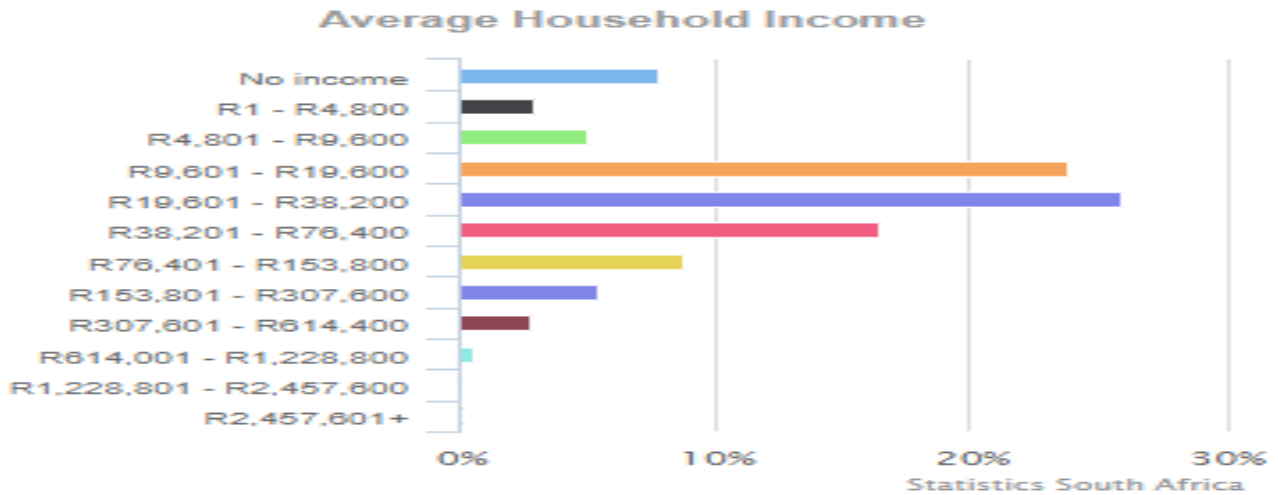


Figure 22: Economic profile graph indicating household income

Level of Education:

According to the 2001 Census, Siyathemba Local Municipality has a total population of 21 591 people. The majority of the population in the municipality are coloured at 71,9%, 18,8% are black African, 8,5% are White, 0,5% are Indian/Asian, with the other population groups making up the remaining 0,4%.

Of those aged 20 years and older, 7,4% have completed primary school, 29,8% have some secondary education, 7,5% have completed matric and 0,5% have some form of higher education. Of the mentioned age group, 4,2% have no form of schooling.

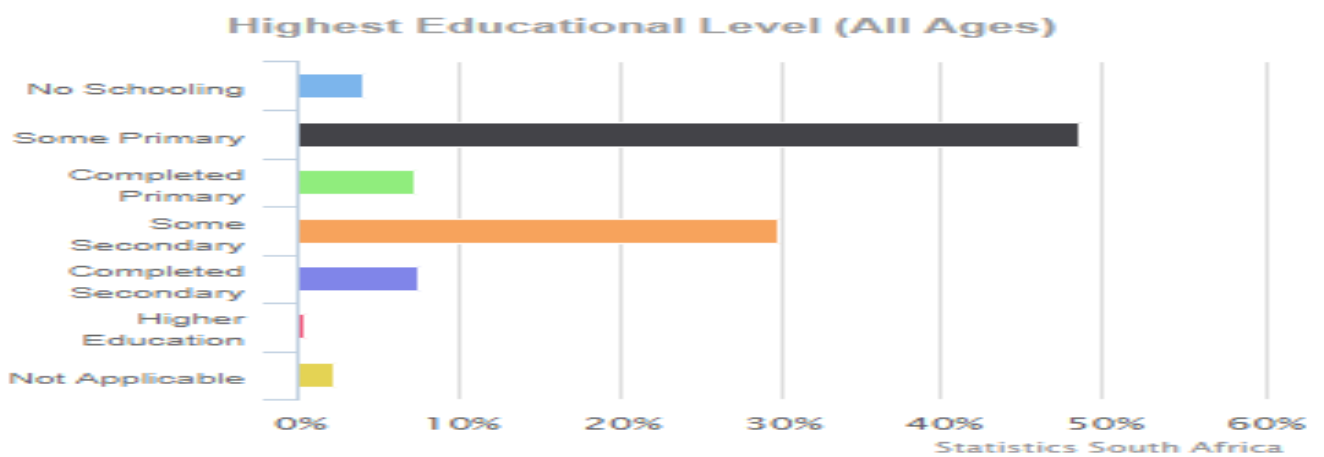


Figure 23: Education graph indicating education levels

Operational phase job creation (local employment) and sustainable capacity building (skills, experience and resources development) of this project will aid in immediate and continuous local community upliftment and poverty alleviation and are therefore regarded as significant socio-economic benefits associated with the project to motivate the need and desirability.

## **8. PUBLIC PARTICIPATION PROCESS**

A continual and comprehensive Public Participation Process (PPP) will be undertaken throughout the entire Impact Assessment process with all stakeholders and Interested and Affected Parties (I & AP's), including the relevant organs of state and competent authority (Northern Cape Department of Environment and Nature Conservation).

The PPP will be conducted in accordance with the requirements of Regulation 41 of the EIA Regulations, 2014 (as amended in April 2017) and the designated Public Participation Officer will ensure that the PPP is facilitated in a manner which ensures reasonable opportunity for all stakeholders and registered I & AP's to comment and provide input on the proposed project.

### **8.1 REGISTRATION AND NOTIFICATION**

The PPP for the Impact Assessment Report will commence on 23 October 2019 and will conclude on 21 November 2019. The following means were used to notify the public of the commencement of the process:

- Email notifications were sent to all identified stakeholders, relevant Organs of State and competent authority on 6 November 2019.
- An advertisement was placed in the local newspaper (Noordkaap Koerant) on 6 November 2019 to inform potential I & AP's and invite them to register for the proposed project.
- Written notices were placed at the Siyathemba local Municipality in Prieska, public library and post office on 6 November 2019.
- Site notices were placed at the main entrance of the Farm Kloof no 143 as well as at certain portion along the R 385 on 6 November 2019.
- Hardcopies of the draft Impact Assessment Report were made available at the Siyathemba local Municipality in Prieska and the public library for public viewing on 6 November 2019.
- A hardcopy of the draft Impact Assessment Report was made available at the Farm office for public viewing on 6 November 2019.
- A hardcopy was hand delivered at the offices of the competent authority on 6 November 2019.

All stakeholders and I & AP's will be adequately notified of the Public Participation Processes taking place as well as the availability of the relevant documents for comment as per Regulation 41 of the EIA Regulations, 2014 (As amended in April 2017).

An I & AP's register containing the names and contact details of all relevant stakeholders and I & AP's was established and will be submitted to the competent authority along with the Final Impact Assessment Report as per Regulation 42 of the EIA Regulations, 2014 (as amended in April 2017) (see Appendix C).

All proof of notifications, I & AP registrations as well as comments received and responses provided during the PPP were incorporated into a Public Participation Report which is available in Appendix C.

The sequence of events regarding the Public Participation Processes, which has/will take place, is as follows:

- Upon completion of the draft Impact Assessment Report, the stakeholders and organs of state were notified and the document was made available for comments for a period of 30 days. The competent authority was also consulted to comment on the draft Impact Assessment Report. After the completion of the PPP the comments received and responses provided were incorporated into a Final Impact Assessment Report and will be submitted to the competent authority for decision making.
- The competent authority (Northern Cape Department of Environment and Nature Conservation) will then evaluate and approve/reject the environmental S24G authorisation application within a period of 107 days after receipt of the submitted Final Environmental Impact Report and EMPr and provide feedback to the applicant and EAP on their decision.

### 8.1.1 LIST OF STAKEHOLDERS / ORGANS OF STATE / LANDOWNERS AND ADJACENT LANDOWNERS NOTIFIED

The following table (table 13) list all identified Stakeholders / Organs of State / Organisations / Interested and Affected Parties which were notified of the proposed project.

**Table 13: Stakeholders / Organs of State / Organisations / Interested and Affected Parties notified**

Name and Surname	Organisation	Department	Email / Postal:	Tel:
Mr. I.J.W Stadhouer	Siyathemba Local Municipality	Municipal Manager	mm@siyathemba.gov.za	053 353 5317
Mr. J Basson	Siyathemba Local Municipality	Environmental Department	jakobbasson@yahoo.com	053 353 5306
Ms. E Adams	Siyathemba Local Municipality	Ward 2 (two) Ward Councillor	Eva95340@gmail.com	064 756 0896
Mr. Rodney Pieterse	Pixley Ka Seme District Municipality	Municipal Manager	mm@pkSDM.gov.za	0536310891
Mr. S. Nkondeshe	Pixley Ka Seme District Municipality	Environmental Department	pixley@telkomsa.net	0536310891
Me. Natalie Uys	Department of Environment and Nature Conservation	Ecological and Botanical Department	nuys.denc@gmail.com	053 807 7300/7472

Mr. Thulani Mthombeni	Department of Environment and Nature Conservation	Environmental Impact Assessment Department	Tmthombeni@ncpg.gov.za	(053) 807 7430 or Cell: 071 673 7525
Mr. Vhonani Ramugando	Northern Cape Department of Water and Sanitation	Commenting Authority for the region	ramugondov@dws.gov.za	836 7609
Mr. Hannes Roux	Agri Noordkaap		hrouxx@gmail.com	0718607550
Mr. D Carstens	Neighbouring / Surrounding Landowners / Occupiers		daniecarstens@yahoo.com	079 608 8349
Mr. P Duvenhage	Neighbouring / Surrounding Landowners / Occupiers		paduvenhage@gmail.com	082 210 4706
Mr. J.G Smit	Neighbouring / Surrounding Landowners / Occupiers		jg@record.co.za	073 793 8892

## 8.2 COMMENTS AND RESPONSES

All comments received from the I & AP's, stakeholders and organs of state together with the subsequent responses provided were incorporated into a Public Participation Report which is submitted to the competent authority together with the relevant documents.

See table below (table 14) with the summary of all comments and responses after completion of the PPP:

**Table 14: Summary of all comments and responses received during the PPP**

Commenting party	Comment received	Response provided
To be completed at the end of the 30 day PPP period		

See Appendix C for the Public Participation Report.

## 9. ENVIRONMENTAL IMPACT ASSESSMENT

The following section identifies the potential environmental impacts (both positive and negative) which the construction as well as operational phases of the proposed project will have on the surrounding environment.

Once the potential environmental impacts are identified, they are assessed by rating their Environmental Risk after which the final Environmental Significance is calculated and rated for each identified environmental impact.

The same Environmental Risk rating process is then followed for each environmental impact to determine the Environmental Significance if the recommended mitigation measures were to be implemented.

The objective of this section is therefore firstly to identify all the potential environmental impacts of the proposed project and secondly to determine the significance of the impacts and how effective the recommended mitigation measures will be able to reduce their significance. The potential environmental impacts which are still rated as highly significant, even after implementation of mitigations, can then be identified in order to specifically focus on implement of effective management strategies for them.

### 9.1 METHODOLOGY FOR IMPACT ASSESSMENT AND RISK RATING

The tables below indicate and explain the methodology and criteria used for the evaluation of the Environmental Risk Ratings as well as the calculation of the final Environmental Significance Ratings of the identified potential environmental impacts.

Each potential environmental impact is scored for each of the Evaluation Components as per the table below.

**Table 15: Scale utilised for the evaluation of the Environmental Risk Ratings**

Evaluation Component	Rating Scale and Description/criteria
<b>MAGNITUDE of NEGATIVE IMPACT</b> (at the indicated spatial scale)	<p><b>10 - Very high:</b> Bio-physical and/or social functions and/or processes might be <i>severely</i> altered.</p> <p><b>8 - High:</b> Bio-physical and/or social functions and/or processes might be <i>considerably</i> altered.</p> <p><b>6 - Medium:</b> Bio-physical and/or social functions and/or processes might be <i>notably</i> altered.</p> <p><b>4 - Low :</b> Bio-physical and/or social functions and/or processes might be <i>slightly</i> altered.</p> <p><b>2 - Very Low:</b> Bio-physical and/or social functions and/or processes might be <i>negligibly</i> altered.</p> <p><b>0 - Zero:</b> Bio-physical and/or social functions and/or processes will remain <i>unaltered</i>.</p>
	<p><b>10 - Very high (positive):</b> Bio-physical and/or social functions and/or processes might be <i>substantially</i> enhanced.</p> <p><b>8 - High (positive):</b> Bio-physical and/or social functions and/or processes might be <i>considerably</i> enhanced.</p>



<b>MAGNITUDE of POSITIVE IMPACT</b> (at the indicated spatial scale)	<p><b>6 - Medium (positive):</b> Bio-physical and/or social functions and/or processes might be <i>notably</i> enhanced.</p> <p><b>4 - Low (positive):</b> Bio-physical and/or social functions and/or processes might be <i>slightly</i> enhanced.</p> <p><b>2 - Very Low (positive):</b> Bio-physical and/or social functions and/or processes might be <i>negligibly</i> enhanced.</p> <p><b>0 - Zero (positive):</b> Bio-physical and/or social functions and/or processes will remain <i>unaltered</i>.</p>
<b>DURATION</b>	<p><b>5 – Permanent</b></p> <p><b>4 - Long term:</b> Impact ceases after operational phase/life of the activity &gt; 60 years.</p> <p><b>3 - Medium term:</b> Impact might occur during the operational phase/life of the activity – 60 years.</p> <p><b>2 - Short term:</b> Impact might occur during the construction phase - &lt; 3 years.</p> <p><b>1 – Immediate</b></p>
<b>EXTENT</b> (or spatial scale/influence of impact)	<p><b>5 - International:</b> Beyond National boundaries.</p> <p><b>4 - National:</b> Beyond Provincial boundaries and within National boundaries.</p> <p><b>3 - Regional:</b> Beyond 5 km of the proposed development and within Provincial boundaries.</p> <p><b>2 - Local:</b> Within 5 km of the proposed development.</p> <p><b>1 - Site-specific:</b> On site or within 100 m of the site boundary.</p> <p><b>0 – None</b></p>
<b>IRREPLACEABLE</b> loss of resources	<p><b>5 – Definite</b> loss of irreplaceable resources.</p> <p><b>4 – High</b> potential for loss of irreplaceable resources.</p> <p><b>3 – Moderate</b> potential for loss of irreplaceable resources.</p> <p><b>2 – Low</b> potential for loss of irreplaceable resources.</p> <p><b>1 – Very low</b> potential for loss of irreplaceable resources.</p> <p><b>0 – None</b></p>
<b>REVERSIBILITY</b> of impact	<p><b>5 – Impact cannot</b> be reversed.</p> <p><b>4 – Low</b> potential that impact might be reversed.</p> <p><b>3 – Moderate</b> potential that impact might be reversed.</p> <p><b>2 – High</b> potential that impact might be reversed.</p> <p><b>1 – Impact will be</b> reversible.</p> <p><b>0 – No impact.</b></p>
<b>PROBABILITY</b> (of occurrence)	<p><b>5 - Definite:</b> &gt;95% chance of the potential impact occurring.</p> <p><b>4 - High probability:</b> 75% - 95% chance of the potential impact occurring.</p> <p><b>3 - Medium probability:</b> 25% - 75% chance of the potential impact occurring</p> <p><b>2 - Low probability:</b> 5% - 25% chance of the potential impact occurring.</p>

	<b>1 - Improbable:</b> <5% chance of the potential impact occurring.
<b>Evaluation Component</b>	<b>Rating Scale and Description/criteria</b>
<b>CUMULATIVE impacts</b>	<p><b>High:</b> The activity is one of several similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern.</p> <p><b>Medium:</b> The activity is one of a few similar past, present or future activities in the same geographical area, and might have a combined impact of moderate significance on the natural, cultural, and/or socio-economic resources of local, regional or national concern.</p> <p><b>Low:</b> The activity is localised and might have a negligible cumulative impact.</p> <p><b>None:</b> No cumulative impact on the environment.</p>

Once the Environmental Risk Ratings have been evaluated for each potential environmental impact, the Significance Score of each potential environmental impact is calculated by using the following formula:

- **SS (Significance Score) = (magnitude + duration + extent + irreplaceable + reversibility) x probability.**

The maximum Significance Score value is 150.

The Significance Score is then used to rate the Environmental Significance of each potential environmental impact as per Table 16 below. The Environmental Significance rating process is completed for all identified potential environmental impacts both before and after implementation of the recommended mitigation measures.

**Table 16: Scale used for the evaluation of the Environmental Significance Ratings**

Significance Score	Environmental Significance	Description/criteria
125 – 150	Very high (VH)	An impact of very high significance will mean that the project cannot proceed, and that impacts are irreversible, regardless of available mitigation options.
100 – 124	High (H)	An impact of high significance which could influence a decision about whether or not to proceed with the proposed project, regardless of available mitigation options.
75 – 99	Medium-high (MH)	If left unmanaged, an impact of medium-high significance could influence a decision about whether or not to proceed with a proposed project. Mitigation options should be relooked.
40 – 74	Medium (M)	If left unmanaged, an impact of moderate significance could influence a decision about whether or not to proceed with a proposed project.
<40	Low (L)	An impact of low is likely to contribute to positive decisions about whether or not to proceed with the project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation.

+	<b>Positive impact (+)</b>	A positive impact is likely to result in a positive consequence/effect, and is likely to contribute to positive decisions about whether or not to proceed with the project.
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## 9.2 DESCRIPTION OF POTENTIAL IMPACTS AND THEIR RECOMMENDED MITIGATION MEASURES

The following section provides a list of potential environmental impacts which the proposed project will have as well as the recommended mitigation measures to be implemented for each impact as identified during the impact assessment phase.

### 9.2.1 Construction Phase

The potential environmental impacts associated with the construction / development phase of the proposed development. *(These impacts were calculated by means of the natural surrounding areas as if construction is yet to take place. The reason being: to give an indication of what impact the construction phase had on the natural environment).*

#### 9.2.1.1 Flora Impacts

A direct impact on flora will arise as a result of vegetation clearance.

Mitigation measures to reduce these potential impacts:

- Restoration measures will be required to reinstate functionality in the disturbed soil and vegetation.
- Any accidental fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
- The project construction footprint must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place.
- Natural veld situated in-between the proposed pivot lands must not be impacted upon and must be left in situ.
- Existing roads and farm tracks in close proximity to the proposed project area must be used during construction.
- Areas within and immediately surrounding the proposed project footprint must be adequately rehabilitated to prevent significant alien invasive species establishment.
- Alien and invasive species need to be eradicated and controlled.

#### 9.2.1.2 Fauna Impacts

A direct impact on flora will arise as a result of vegetation clearance / habitat loss

Mitigation measures to reduce potential impacts:

- The project construction footprint must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place.
- Natural veld situated in-between the proposed circular pivot lands must not be impacted upon and must be left in situ.
- Existing roads and farm tracks in close proximity to the proposed project area must be used during construction.
- Areas within and immediately surrounding the proposed project footprint must be adequately rehabilitated to prevent significant alien invasive species establishment.
- Alien and invasive species need to be eradicated and controlled.

#### **9.2.1.3 Dust Impacts**

Dust nuisance generated during the development / preparation of the pivots.

Mitigation measures to reduce potential impacts:

- Dust Management measures must be implemented in order to manage and minimize undesired dust emissions.
- Access roads need to be well maintained and dust suppression need to be applied during windy days.
- Pivots need to be rehabilitated by planting buffalo grass while not in use.

#### **9.2.1.4 Noise Impacts**

Noise nuisance will be generated during the development / preparation of the pivots resulting from individuals and equipment.

Mitigation measures to reduce potential impacts:

- Limit working hours of noisy equipment to daylight hours.
- Fit silencers to equipment.
- Unless otherwise specified, normal working hours will apply (i.e. from 07:00 to 17:00 Mondays to Fridays).
- Ensure that Employees and staff conduct themselves in an acceptable manner while on site, both during work hours and after hours.
- No loud music is permitted on site or in the camp.

#### **9.2.1.5 Cultural and Heritage Impacts**

Damage and destruction of vertebrate fossils during excavation activities may occur.

Mitigation measures to reduce potential impacts:

- Should any heritage resources (including but not limited to fossils, coins, indigenous and/or colonial ceramics, any articles of value or antiquity, stone artefacts or bone remains, structures and or built features, rock art and rock engravings) be exposed during excavations for the purpose of construction, construction in the vicinity of the finding must be stopped. A trained palaeontologist or heritage specialist must be notified to assess the finds, and this must then be reported to the applicable heritage authority.
- Heritage remains uncovered or disturbed during earthworks must not be disturbed further until the necessary approval has been obtained from the heritage authority. A registered heritage specialist must be called to the site for inspection and removal once authority to do so, has been given.
- Under no circumstances shall any heritage material be destroyed or removed from site.
- Excavations must be limited to the footprint area and be maintained in a narrow corridor.
- All operations of excavation equipment must be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures must be followed:
  - All construction in the immediate 50 metre vicinity of the site must be ceased.
  - The heritage practitioner must be informed as soon as possible.
  - In the event of obvious human remains SAPS must be notified.
  - Mitigation measures (such as refilling) must not be attempted.
  - The area in a 50 metre radius of the find must be barricaded with visible taping.
- Public access must be limited and the area must be placed under guard.

#### **9.2.1.6 Surface and Groundwater Contamination Impacts**

Surface and Groundwater Contamination during the development/preparation of the pivots.

Mitigation measures to reduce potential impacts:

- Ensure that excavation areas have a predetermined stockpile area for excavated materials.
- Use overburden for rehabilitation.
- Any remaining overburden to be disposed of at a licensed waste site.
- Alternatively, concrete can be mixed on mixing trays only and not on exposed soil. Concrete must be mixed only in areas which have been specially demarcated for this purpose.
- Material Safety Data Sheets (MSDS) must be available on site for all chemicals and hazardous substances to be used on site, including information on their ecological impacts and how to minimise the impacts in case of any leakages.

- All spills must be cleaned as soon as they occur. A spill kit must be used and proof of clean up must be given to the ECO.
- Spillages of petrochemical products must be avoided. In the case of accidental spillage, contaminated soil must be removed for bioremediation or disposed of at a facility for the substance concerned. Disturbed land must be rehabilitated and seeded with vegetation seed naturally occurring on site.
- Provide suitable and sufficient ablution facilities (1 for every 15 personnel on site and 1 for each gender).
- Vehicles and machinery must be regularly serviced to avoid spillages.
- Drip trays must be placed beneath all stationary construction equipment and beneath all generators present on site.

#### **9.2.1.7 Waste Management Impacts**

Waste impacts by means of waste storage and littering during the development / preparation of the pivots.

Mitigation measures to reduce potential impacts:

- An adequate number of scavenger proof litter bins are to be placed throughout the site, dumping of waste on the site is prohibited.
- Waste sorting and separation should form part of the environmental induction and awareness programme to encourage and educate personnel to recycle.
- Keep all work sites including storage areas, offices and workshops neat and tidy.
- All domestic waste is to be removed from site and disposed of at a registered solid waste landfill site.
- Care should be taken to ensure that no waste fall off disposal vehicles on-route to the landfill site. If needed, a tarpaulin can be utilised.
- The burning and burying of solid waste on site is prohibited.
- Littering by construction workers shall not be permitted.
- General waste shall be removed from site on a weekly basis to an approved landfill site.
- Minimise waste by sorting waste into recyclable and non-recyclable materials.

#### **9.2.1.8 Traffic Impacts**

Traffic impacts by means of additional truck and transportation to and from site during the development / preparation of the pivots.

Mitigation measures to reduce potential impacts:

- Abnormal loads should be timed to avoid times of the year when traffic volumes are likely to be higher, as would be expected over national holidays, weekends and school holiday periods.
- All vehicles should be road worthy, be maintained to prevent fuel or oil leaks and drivers are to be licensed appropriately for the driving of their assigned vehicle.
- Any damage to public roads is to be reported to the management authority and repaired to its original condition.
- Signage is to be placed on vehicles at all times.

#### **9.2.1.9 Fire Risk Impacts**

Increase risk of fires during the development / preparation of the pivots.

Mitigation measures to reduce potential impacts:

- Ensure the work site and the contractor's camp is equipped with adequate firefighting equipment.
- All construction equipment must have at least one firefighting extinguisher.
- Workers must be adequately trained in the handling of firefighting equipment.
- No open fires are permitted anywhere on site due to the handling of gas on site. No fires will be permitted for heating or cooking purposes on site.
- Fuel and chemicals must be stored in an area that is acceptable for the client.
- No smoking will be allowed within close vicinity of the site.

#### **9.2.1.10 Soil Contamination Impacts**

Increased Soil contamination by means of hazardous substances.

Mitigation measures to reduce potential impacts:

- No leaked oil or fuel tankers may contaminate soil
- All tanks and pipes containing fuel or oil must be inspected on a regular basis
- Spills outside the bund area must be treated with a spill kit
- All significant leaks must be reported to the competent authority in terms of NEMA
- UST must be fitted with leak detectors in order to alert when a leak is occurring.
- Overfill and spillages during tanker refueling and fuel dispensing should be prevented by the installation of automatic cut off devices.
- Tanker delivery drivers must be present during delivery of fuel with the emergency cut off switch and a fire extinguisher



- A closed coupling must be used when fuel is being transferred from the bulk delivery vehicle to the USTs to prevent fugitive emissions.
- All personnel working with fuel must undergo spill kit training
- The oil/water separator must be inspected on a regular basis and the inspection report must be provided to the ECO and relevant authority.
- Following a leak or accidental spill, a remediation plan must be compiled and executed.
- Fuel stock must be monitored on a daily basis in order to identify if the tank is leaking.

#### **9.2.1.11 Soil Erosion Impacts**

Increased Soil erosion due to construction activities.

Mitigation measures to reduce potential impacts:

- During construction, un-channeled flow must be controlled to avoid soil erosion. Where large areas of soil are left exposed, rows of straw or hay bales, or bundles of cut vegetation sourced with the ECO's knowledge and consent, should be dug into the soil in contours to slow surface wash and capture eroded soil. The method may also be used where surface run-off becomes concentrated,
- All water flow must be controlled using storm water management techniques before discharge into the existing natural drainage line,
- Temporary cut off drains may be required to capture storm water and promote infiltration,
- All storm water management features must be constructed in a manner that will ensure the continued functioning of the emergent vegetation. Construction must coincide with the dry season.

#### **9.2.1.12 Visual Impacts**

Increased visual impact due to increased working activities on-site.

Mitigation measures to reduce potential impacts:

- All waste must be placed in bins during operational phase. Keeping the area litter free.
- Construction activities may only take place during normal working hours.

#### **9.2.1.13 Socio-Economic Impacts**

Increased socio-economic conditions due to job creation.

Mitigation measures to reduce potential impacts:

- Ensure that low-, medium- and high skilled workers use provided working opportunities.

- Low-, medium- and high skilled workers must be sourced locally.
- Where practically possible, previously disadvantaged individuals should be provided preference with regards to employment opportunities.
- Individuals must be trained and continuously developed.

### **9.2.2 Operational Phase**

The potential environmental impacts associated with the operational phase of the proposed development.

#### **9.2.2.1 Flora Impacts**

Direct impact on flora as a result of continuous vegetation clearance.

Mitigation measures to reduce potential impacts:

- Restoration measures will be required to reinstate functionality in the disturbed soil and vegetation.
- The basic ecosystem functionality has virtually been destroyed and sufficient ecological restoration of the relevant vegetation type and its functionality within the assessment area, will prove to be very difficult.
- It is recommended that the flow path of the water drainage line associated with Assessment area 1, be adequately diverted and channelled around the existing cultivated lands in order to ensure continued flow of surface water runoff towards the significant ephemeral watercourse to the east.
- It is recommended that a minimum approximate 40 m buffer zone should be implemented around the significant ephemeral watercourse associated with Assessment area 2 and no further development may take place within the buffered area.
- It is also recommended that no further development may take place any closer to either of the ephemeral watercourses within the localised area of Assessment area 3.
- The new project construction footprints must be kept as small as practicably possible to reduce the surface impact on surrounding vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place.
- No new roads or tracks to be constructed or implemented within the surrounding natural, undeveloped areas.
- If rotational planting practices are utilised and cultivated lands are left dormant for an extended period or lands are permanently decommissioned, these lands must be adequately rehabilitated.
- In such a case, an adequate rehabilitation management plan must be developed by a suitably qualified and experienced specialist and implemented.
- Emphasis must be placed on the re-establishment of local, indigenous species associated with the relevant vegetation type in order to attempt to return the area to an ecologically functional state.

### 9.2.2.1.1 Flora impacts

Transformation of an Ecological Support Area (ESA) associated with the Assessment areas 2 & 3

Mitigation measures to reduce potential impact:

- The basic ecosystem functionality has virtually been destroyed and sufficient ecological restoration of the relevant vegetation type and its functionality within the assessment area, will prove to be very difficult.
- It is recommended that the flow path of the water drainage line associated with Assessment area 1, be adequately diverted and channelled around the existing cultivated lands in order to ensure continued flow of surface water runoff towards the significant ephemeral watercourse to the east.
- It is recommended that a minimum approximate 40 m buffer zone should be implemented around the significant ephemeral watercourse associated with Assessment area 2 and no further development may take place within the buffered area.
- It is also recommended that no further development may take place any closer to either of the ephemeral watercourses within the localised area of Assessment area 3.
- The new project construction footprints must be kept as small as practicably possible to reduce the surface impact on surrounding vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place.
- No new roads or tracks to be constructed or implemented within the surrounding natural, undeveloped areas.
- If rotational planting practices are utilised and cultivated lands are left dormant for an extended period or lands are permanently decommissioned, these lands must be adequately rehabilitated.
- In such a case, an adequate rehabilitation management plan must be developed by a suitably qualified and experienced specialist and implemented.
- Emphasis must be placed on the re-establishment of local, indigenous species associated with the relevant vegetation type in order to attempt to return the area to an ecologically functional state.

### 9.2.2.1.2 Flora, Fauna and Avifauna impacts:

Destruction of-/damage to Red Data Listed, nationally or provincially protected species individuals/habitats associated with the assessment areas

Mitigation measures to reduce potential impacts:

- It is recommended that an additional ecological walkthrough be conducted prior to commencement of the project during the flowering period of underground bulbous plant species, if deemed necessary by the competent authority. This will ensure that no provincially protected or significant species have potentially been omitted.

- The new project construction footprints must be kept as small as practicably possible to reduce the surface impact on surrounding vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place.
- No new roads or tracks to be constructed or implemented within the surrounding natural, undeveloped areas.
- If rotational planting practices are utilised and cultivated lands are left dormant for an extended period or lands are permanently decommissioned, these lands must be adequately rehabilitated.
- In such a case, an adequate rehabilitation management plan must be developed by a suitably qualified and experienced specialist and implemented.
- Emphasis must be placed on the re-establishment of local, indigenous species associated with the relevant vegetation type in order to attempt to return the area to an ecologically functional state.
- A suitable greening project could be opted for in order to attempt to mitigate the severity of the impacts. It is recommended that the Department of Agriculture, Forestry and Fisheries be informed of the application as an Interested & Affected Party during the Public Participation Process in order for them to provide comment and recommendations in this regard.

#### **9.2.2.1.3 Flora impacts**

Terrestrial alien invasive species establishment

Mitigation measures to reduce possible impacts:

- Implement suitable alien invasive species management measures in order to prevent any significant establishment and spreading of alien invasive species.
- It is recommended that the applicant continue with this active *Prosopis glandulosa* (Category 3) bush encroachment alleviation and management approach being implemented around Assessment area 2.

#### **9.2.2.2 Fauna Impacts**

Continuous impact on Fauna as a result of cleared vegetation / habitat loss.

Mitigation measures to reduce potential impacts:

- Natural veld situated in-between the proposed circular pivot lands must not be impacted upon and must be left in situ.
- Existing roads and farm tracks in close proximity to the proposed project area must be used during operation.
- No hunting of any animal is to take place on site.
- Special care is to be taken not to work near or disturb any vulture nests, especially during breeding seasons.

### 9.2.2.3 Dust Impacts

Dust nuisance generated during the operational phase of the project.

Mitigation measures to reduce potential impacts:

- Dust Management measures must be implemented in order to manage and minimize undesired dust emissions.
- Access roads need to be well maintained and dust suppression need to be applied during windy days.
- Pivots need to be rehabilitated by planting buffalo grass while not in use.
- Pivot lands to be sufficiently irrigated prior to commencement of cultivation and planting activities in order to prevent significant fugitive dust emissions.

### 9.2.2.4 Noise Impacts

Noise nuisance generated during the operational phase of the pivots.

Mitigation measures to reduce potential impacts:

- Limit working hours of noisy equipment to daylight hours.
- Fit silencers to equipment.
- Unless otherwise specified, normal working hours will apply (i.e. from 07:00 to 17:00 Mondays to Fridays).
- Ensure that Employees and staff conduct themselves in an acceptable manner while on site, both during work hours and after hours.
- No loud music is permitted on site or in the camp.

### 9.2.2.5 Cultural Heritage Impacts

Damage and destruction of vertebrate fossils during the operational phase.

Mitigation measures to reduce potential impacts:

- Should any heritage resources (including but not limited to fossils, coins, indigenous and/or colonial ceramics, any articles of value or antiquity, stone artefacts or bone remains, structures and or built features, rock art and rock engravings) be exposed during excavations, all works in the vicinity of the finding must be stopped. A trained palaeontologist or heritage specialist must be notified to assess the finds, and this must then be reported to the applicable heritage authority.
- Heritage remains uncovered or disturbed during earthworks must not be disturbed further until the necessary approval has been obtained from the heritage authority. A registered heritage specialist must be called to the site for inspection and removal once authority to do so, has been given.

- Under no circumstances shall any heritage material be destroyed or removed from site.
- Excavations must be limited to the footprint area and be maintained in a narrow corridor.
- All operations of excavation equipment must be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures must be followed:
  - All construction in the immediate 50 metre vicinity of the site must be ceased.
  - The heritage practitioner must be informed as soon as possible.
  - In the event of obvious human remains SAPS must be notified.
  - Mitigation measures (such as refilling) must not be attempted.
  - The area in a 50 metre radius of the find must be barricaded with visible taping.
- Public access must be limited and the area must be placed under guard.

#### **9.2.2.6 Surface and Groundwater Impacts**

Surface and Groundwater Contamination during the operational phase by means of fertilizer and/or any other hazardous substances or pesticides.

Mitigation measures to reduce potential impacts:

- When fertilisers / pesticides are used, ensure that all fertilisers / pesticides are environmentally friendly.
- When fertilisers / pesticides are used, only use the correct amount as indicated by the parcels. Do not over use.
- Material Safety Data Sheets (MSDS) must be available on site for all chemicals and hazardous substances to be used on site, including information on their ecological impacts and how to minimise the impacts in case of any leakages.
- All spills must be cleaned as soon as they occur. A spill kit must be used and proof of clean up must be given to the ECO.
- Spillages of petrochemical products must be avoided. In the case of accidental spillage, contaminated soil must be removed for bioremediation or disposed of at a facility for the substance concerned. Disturbed land must be rehabilitated and seeded with vegetation seed naturally occurring on site.
- Provide suitable and sufficient ablution facilities (1 for every 15 personnel on site and 1 for each gender).
- Vehicles and machinery must be regularly serviced to avoid spillages.
- Drip trays must be placed beneath all stationary equipment and beneath all generators present onsite.

#### **9.2.2.7 Waste Management Impacts**

As per the construction phase the area poses no archaeological and palaeontological significance or value.

Mitigation measures to reduce potential impacts:

- An adequate number of scavenger proof litter bins are to be placed throughout the site, dumping of waste on the site is prohibited.
- Waste sorting and separation should form part of the environmental induction and awareness programme to encourage and educate personnel to recycle.
- Keep all work sites including storage areas, offices and workshops neat and tidy.
- All domestic waste is to be removed from site and disposed of at a registered solid wastelandfill site.
- Care should be taken to ensure that no waste fall off disposal vehicles on-route to the landfill site. If needed, a tarpaulin can be utilised.
- The burning and burying of solid waste on site is prohibited.
- Littering by workers shall not be permitted.
- General waste shall be removed from site on a weekly basis to an approved landfill site.
- Minimise waste by sorting waste into recyclable and non-recyclable materials.

#### **9.2.2.8 Traffic Impacts**

Traffic impacts by means of additional truck and transportation to and from site during the operational phase of the pivots.

Mitigation measures to reduce potential impacts:

- Abnormal loads should be timed to avoid times of the year when traffic volumes are likely to be higher, as would be expected over national holidays, weekends and school holiday periods.
- All vehicles should be road worthy, be maintained to prevent fuel or oil leaks and drivers are to be licensed appropriately for the driving of their assigned vehicle.
- Any damage to public roads is to be reported to the management authority and repaired to its original condition.
- Signage is to be placed on vehicles at all times.

#### **9.2.2.9 Fire Risk Impacts**

Increase risk of fires during the operational phase of the pivots.

Mitigation measures to reduce potential impacts:

- Ensure the work site is equipped with adequate firefighting equipment.
- All equipment must have at least one firefighting extinguisher.
- Workers must be adequately trained in the handling of firefighting equipment.



- No open fires are permitted anywhere on site.
- No fires will be permitted for heating or cooking purposes on site.
  - Fuel and chemicals must be stored in an area that is acceptable for the client.
  - Dedicated smoking areas are to be provided.

#### **9.2.2.10 Soil Contamination Impacts**

Increased Soil contamination by means of hazardous substances.

Mitigation measures to reduce potential impacts:

- No leaked oil or fuel tankers may contaminate soil
- All tanks and pipes containing fuel or oil must be inspected on a regular basis
- Spills outside the bund area must be treated with a spill kit
- All significant leaks must be reported to the competent authority in terms of NEMA
- UST must be fitted with leak detectors in order to alert when a leak is occurring.
- Overfill and spillages during tanker refueling and fuel dispensing should be prevented by the installation of automatic cut off devices.
- Tanker delivery drivers must be present during delivery of fuel with the emergency cut off switch and a fire extinguisher
- A closed coupling must be used when fuel is being transferred from the bulk delivery vehicle to the USTs to prevent fugitive emissions.
- All personnel working with fuel must undergo spill kit training
- Following a leak or accidental spill, a remediation plan must be compiled and executed.
- Fuel stock must be monitored on a daily basis in order to identify if the tank is leaking.
- Irrigation and fertilisation practices must be adequately managed in order to prevent over-fertilisation or over-irrigation which could lead to significant leaching and contamination of groundwater. A suitably qualified and experienced agricultural specialist must be consulted in order to advise on appropriate management practices.

#### **9.2.2.11 Soil Erosion Impacts**

Increased Soil erosion due to operational activities.

Mitigation measures to reduce potential impacts:

- During the operational phase, un-channeled flow must be controlled to avoid soil erosion. Where large areas of soil are left exposed, rows of straw or hay bales, or bundles of cut vegetation sourced with the ECO's knowledge and consent, should be dug into the soil in contours to slow surface wash

and capture eroded soil. The method may also be used where surface run-off becomes concentrated,

- All water flow must be controlled using storm water management techniques before discharge into the existing natural drainage line,
- Temporary cut off drains may be required to capture storm water and promote infiltration,
- All storm water management features must be constructed in a manner that will ensure the continued functioning of the emergent vegetation. Construction must coincide with the dry season.

#### **9.2.2.12 Visual Impacts**

Increased visual impact due to increased working activities during the operational phase.

Mitigation measures to reduce potential impacts:

- All waste must be placed in bins during operational phase. Keeping the area litter free.
- Construction activities may only take place during normal working hours.

#### **9.2.2.13 Impeding watercourses**

Impeding of the historic ephemeral water drainage line's and significant watercourses' flow regimes associated with the quaternary surface water catchment and drainage area towards the south-east

Mitigation measures to reduce potential impacts:

- It is recommended that the flow path of the water drainage line associated with Assessment area 1, be adequately diverted and channelled around the existing cultivated lands in order to ensure continued flow of surface water runoff towards the significant ephemeral watercourse to the east.
- It is recommended that a minimum approximate 40 m buffer zone should be implemented around the significant ephemeral watercourse associated with Assessment area 2 and no further development may take place within the buffered area.
- It is also recommended that no further development may take place any closer to either of the ephemeral watercourses within the localised area of Assessment area 3.
- Adequate storm water management measures must be implemented on the site in order to sufficiently manage storm water runoff and clean/dirty separation during the operational phase and allow natural flow to continue as far as practicably possible.

#### **9.2.2.14 Socio-Economic Impacts**

Increased socio-economic conditions due to job creation.

Mitigation measures to reduce potential impacts:

- Ensure that low-, medium- and high skilled workers use provided working opportunities.

- Low-, medium- and high skilled workers must be sourced locally.
- Were practically possible, previously disadvantaged individuals should be provided preference with regards to employment opportunities.
- Individuals must be trained and continuously developed

### **9.2.3 Decommissioning Phase**

It is not foreseen that this project will be decommissioned as this is an existing profitable agricultural project. If in the future the applicant wishes to decommission the pivots and water pipelines, a new/separate Environmental Impact Assessment in line with the NEMA listed activities has to be undertaken, with an Environmental Management Plan, for the decommissioning phase of the project.

### **9.3 RISK RATINGS OF POTENTIAL IMPACTS**

The following section provides the Environmental Risk as well as the Environmental Significance Ratings for the potential environmental impacts for the proposed project both before and after implementation of the recommended mitigation measures.

### 9.3.1 Construction Phase

(These impacts were calculated by means of the natural surrounding areas as if construction is yet to take place. The reason being: to give an indication of what impact the construction phase had on the natural environment).

**Table 17: Environmental Risk and Significance Ratings for the Construction Phase**

PLANNING, DESIGN AND CONSTRUCTION PHASE							
Potential Flora Impacts:							
Nature of impact: Direct impact on Flora as a result of vegetation clearance.			Activity: Already Established Onion and Maize Pivot areas				
	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before mitigation	After Mitigation	Before mitigation	After Mitigation	Before mitigation	After Mitigation	No-Go Alternative
<b>Magnitude:</b>	4	4	4	4	4	4	2
<b>Duration:</b>	2	2	2	2	2	2	2
<b>Extent:</b>	2	2	2	2	2	2	2
<b>Irreplaceable:</b>	3	2	3	3	3	3	1
<b>Reversibility:</b>	2	2	3	2	3	2	1
<b>Probability:</b>	4	4	4	4	4	4	2
<b>Total SP:</b>	52	48	56	52	56	52	16
<b>Significance rating:</b>	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
<b>Cumulative impact:</b>	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"> <li>Restoration measures will be required to reinstate functionality in the disturbed soil and vegetation.</li> <li>Any accidental fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.</li> <li>The project construction footprint must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place.</li> <li>Natural veld situated in-between the proposed circular pivot lands must not be impacted upon and must be left in situ.</li> <li>Existing roads and farm tracks in close proximity to the proposed project area must be used during construction.</li> <li>Areas within and immediately surrounding the proposed project footprint must be adequately rehabilitated to prevent significant alien invasive species establishment.</li> <li><input checked="" type="checkbox"/> Alien and invasive species need to be eradicated and controlled.</li> </ul>						
Potential Fauna and Avifauna Impacts:							
Nature of impact: Direct impact on Fauna and Avifauna as a result of vegetation clearance.			Activity: Already Established Onion and Maize Pivot areas				

Evaluation Component:		Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
		Before mitigation	After mitigation	Before mitigation	After mitigation	Before mitigation	After mitigation	No-Go alternative
<b>Magnitude:</b>		2	2	2	2	2	2	2
<b>Duration:</b>		2	2	2	2	2	2	2
<b>Extent:</b>		2	2	2	2	2	2	2
<b>Irreplaceable:</b>		3	2	3	2	3	2	1
<b>Reversibility:</b>		2	2	2	2	2	2	1
<b>Probability:</b>		3	3	3	3	3	3	2
<b>Total SP:</b>		33	30	33	30	33	30	16
<b>Significance rating:</b>		Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>		Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"> <li>The project construction footprint must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place.</li> <li>Natural veld situated in-between the proposed circular pivot lands must not be impacted upon and must be left in situ.</li> <li>Existing roads and farm tracks in close proximity to the proposed project area must be used during construction.</li> <li>Areas within and immediately surrounding the proposed project footprint must be adequately rehabilitated to prevent significant alien invasive species establishment.</li> </ul> <p><input checked="" type="checkbox"/> Alien and invasive species need to be eradicated and controlled.</p>							
<b>Potential Dust Impacts:</b>								
<b>Nature of impact:</b> Dust nuisance generated during the development / preparation of the pivots.				<b>Activity:</b> Already Established Onion and Maize Pivot areas				
Evaluation Component:		Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
		Before mitigation	After mitigation	Before mitigation	After mitigation	Before mitigation	After mitigation	No-Go alternative
<b>Magnitude:</b>		2	2	2	2	2	2	2
<b>Duration:</b>		2	2	2	2	2	2	2
<b>Extent:</b>		2	2	2	2	2	2	2
<b>Irreplaceable:</b>		2	2	2	2	2	2	1
<b>Reversibility:</b>		2	2	2	2	2	2	1
<b>Probability:</b>		3	2	3	2	3	2	2
<b>Total SP:</b>		30	20	30	20	30	20	16

<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"> <li>Dust Management measures must be implemented in order to manage and minimize undesired dust emissions.</li> <li>Access roads need to be well maintained and dust suppression need to be applied during windy days.</li> <li><input type="checkbox"/> Pivots need to be rehabilitated by planting buffalo grass while not in use.</li> </ul>						
<b>Potential Noise Impacts:</b>							
<b>Nature of impact:</b> Noise nuisance generated during the development / preparation of the pivots.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>No-Go alternative</b>
<b>Magnitude:</b>	2	2	2	2	2	2	2
<b>Duration:</b>	2	2	2	2	2	2	2
<b>Extent:</b>	2	2	2	2	2	2	2
<b>Irreplaceable:</b>	2	2	2	2	2	2	1
<b>Reversibility:</b>	2	2	2	2	2	2	1
<b>Probability:</b>	3	2	3	2	3	2	2
<b>Total SP:</b>	30	20	30	20	30	20	16
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"> <li>Limit working hours of noisy equipment to daylight hours.</li> <li>Fit silencers to equipment.</li> <li>Unless otherwise specified, normal working hours will apply (i.e. from 07:00 to 17:00 Mondays to Fridays).</li> <li>Ensure that Employees and staff conduct themselves in an acceptable manner while on site, both during work hours and after hours.</li> <li><input type="checkbox"/> No loud music is permitted on site or in the camp.</li> </ul>						
<b>Potential Cultural and Heritage Impacts:</b>							
<b>Nature of impact:</b> Damage and destruction of vertebrate fossils during excavation activities.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>No-Go Alternative</b>
<b>Magnitude:</b>	2	2	2	2	2	2	0
<b>Duration:</b>	2	2	2	2	2	2	1

<b>Extent:</b>	1	1	1	1	1	1	1
<b>Irreplaceable:</b>	2	1	2	1	2	1	1
<b>Reversibility:</b>	2	1	2	1	2	1	1
<b>Probability:</b>	1	1	1	1	1	1	1
<b>Total SP:</b>	9	7	9	7	9	7	4
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"> <li>• Should any heritage resources (including but not limited to fossils, coins, indigenous and/or colonial ceramics, any articles of value or antiquity, stone artefacts or bone remains, structures and or built features, rock art and rock engravings) be exposed during excavations for the purpose of construction, construction in the vicinity of the finding must be stopped. A trained palaeontologist or heritage specialist must be notified to assess the finds, and this must then be reported to the applicable heritage authority.</li> <li>• Heritage remains uncovered or disturbed during earthworks must not be disturbed further until the necessary approval has been obtained from the heritage authority. A registered heritage specialist must be called to the site for inspection and removal once authority to do so, has been given.</li> <li>• Under no circumstances shall any heritage material be destroyed or removed from site.</li> <li>• Excavations must be limited to the footprint area and be maintained in a narrow corridor.</li> <li>• All operations of excavation equipment must be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures must be followed: <ul style="list-style-type: none"> <li>• All construction in the immediate 50 meter vicinity of the site must be ceased.</li> <li>• The heritage practitioner must be informed as soon as possible.</li> <li>• In the event of obvious human remains SAPS must be notified.</li> <li>• Mitigation measures (such as refilling) must not be attempted.</li> <li>• The area in a 50 meter radius of the find must be barricaded with visible taping.</li> </ul> </li> <li>• Public access must be limited and the area must be placed under guard.</li> </ul>						
<b>Potential Surface and Groundwater Contamination Impacts:</b>							
<b>Nature of impact:</b> Surface and Groundwater Contamination during the development / preparation of the pivots.				<b>Activity:</b> Already Established Onion and Maize Pivot areas			
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>No-Go Alternative</b>
<b>Magnitude:</b>	4	4	4	4	4	4	0
<b>Duration:</b>	2	2	2	2	2	2	0
<b>Extent:</b>	2	2	2	2	2	2	0
<b>Irreplaceable:</b>	4	3	2	2	2	2	0
<b>Reversibility:</b>	4	3	2	2	2	2	0
<b>Probability:</b>	3	2	3	2	3	2	0



<b>Total SP:</b>	48	28	36	24	36	24	0
<b>Significance rating:</b>	Medium (M)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Medium (M)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"> <li>• Ensure that excavation areas have a predetermined stockpile area for excavated materials.</li> <li>• Use overburden for rehabilitation.</li> <li>• Any remaining overburden to be disposed of at a licensed waste sit</li> <li>• Alternatively, concrete can be mixed on mixing trays only and not on exposed soil. Concrete must be mixed only in areas which have been specially demarcated for this purpose.</li> <li>• Material Safety Data Sheets (MSDS) must be available on site for all chemicals and hazardous substances to be used on site, including information on their ecological impacts and how to minimise the impacts in case of any leakages.</li> <li>• All spills must be cleaned as soon as they occur. A spill kit must be used and proof of clean up must be given to the ECO.</li> <li>• Spillages of petrochemical products must be avoided. In the case of accidental spillage, contaminated soil must be removed for bioremediation or disposed of at a facility for the substance concerned. Disturbed land must be rehabilitated and seeded with vegetation seed naturally occurring on site.</li> <li>• Provide suitable and sufficient ablution facilities (1 for every 15 personnel on site and 1 for each gender).</li> <li>• Vehicles and machinery must be regularly serviced to avoid spillages.</li> <li>• Drip trays must be placed beneath all stationary construction equipment and beneath all generators present on site.</li> </ul>						
<b>Potential Waste Management Impacts:</b>							
<b>Nature of impact:</b> Waste impacts by means of waste storage and littering during the development /preparation of the pivots.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>No-Go Alternative</b>
<b>Magnitude:</b>	2	2	2	2	2	2	2
<b>Duration:</b>	2	2	2	2	2	2	1
<b>Extent:</b>	1	1	1	1	1	1	1
<b>Irreplaceable:</b>	2	2	2	2	2	2	2
<b>Reversibility:</b>	2	2	2	2	2	2	2
<b>Probability:</b>	2	1	2	1	2	1	1
<b>Total SP:</b>	18	9	18	9	18	9	8
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)

<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"> <li>An adequate number of scavenger proof litter bins are to be placed throughout the site, dumping of waste on the site is prohibited.</li> <li>Waste sorting and separation should form part of the environmental induction and awareness programme to encourage and educate personnel to recycle.</li> <li>Keep all work sites including storage areas, offices and workshops neat and tidy.</li> <li>All domestic waste is to be removed from site and disposed of at a registered solid waste landfill site.</li> <li>Care should be taken to ensure that no waste fall off disposal vehicles on-route to the landfill site. If needed, a tarpaulin can be utilised.</li> <li>The burning and burying of solid waste on site is prohibited.</li> <li>Littering by construction workers shall not be permitted.</li> <li>General waste shall be removed from site on a weekly basis to an approved landfill site.</li> <li>Minimise waste by sorting waste into recyclable and non-recyclable materials.</li> </ul>						
<b>Potential Traffic Impacts:</b>							
<b>Nature of impact:</b> Traffic impacts by means of additional truck and transportation to and from site during the development / preparation of the pivots.				<b>Activity:</b> Already Established Onion and Maize Pivot areas			
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>No-Go Alternatives</b>
<b>Magnitude:</b>	2	2	2	2	2	2	0
<b>Duration:</b>	2	2	2	2	2	2	1
<b>Extent:</b>	1	1	1	1	1	1	1
<b>Irreplaceable:</b>	2	1	2	1	2	1	1
<b>Reversibility:</b>	2	1	2	1	2	1	1
<b>Probability:</b>	1	1	1	1	1	1	1
<b>Total SP:</b>	9	7	9	7	9	7	4
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"> <li>Abnormal loads should be timed to avoid times of the year when traffic volumes are likely to be higher, as would be expected over national holidays, weekends and school holiday periods.</li> <li>All vehicles should be road worthy, be maintained to prevent fuel or oil leaks and drivers are to be licensed appropriately for the driving of their assigned vehicle.</li> <li>Any damage to public roads is to be reported to the management authority and repaired to its original condition.</li> <li>Signage is to be placed on vehicles at all times.</li> </ul>						
<b>Potential Fire Risk Impacts:</b>							
<b>Nature of impact:</b> Increase risk of fires during the development / preparation of the pivots.				<b>Activity:</b> Already Established Onion and Maize Pivot areas			

Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before mitigation	After mitigation	Before mitigation	After mitigation	Before mitigation	After mitigation	No-Go Alternative
Magnitude:	2	2	2	2	2	2	1
Duration:	1	1	1	1	1	1	1
Extent:	2	1	2	1	2	1	1
Irreplaceable:	2	1	2	1	2	1	1
Reversibility:	2	1	2	1	2	1	1
Probability:	1	1	1	1	1	1	1
Total SP:	9	6	9	6	9	6	5
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> <li>• Ensure the work site and the contractor's camp is equipped with adequate firefighting equipment.</li> <li>• All construction equipment must have at least one firefighting extinguisher.</li> <li>• Workers must be adequately trained in the handling of firefighting equipment.</li> <li>• No open fires are permitted anywhere on site due to the handling of gas on site. No fires will be permitted for heating or cooking purposes on site.</li> <li>• Fuel and chemicals must be stored in an area that is acceptable for the client.</li> </ul>						
	<ul style="list-style-type: none"> <li>• No smoking will be allowed within close vicinity of the site.</li> </ul>						
<b>Potential Soil Contamination Impacts:</b>							
Nature of impact: Increased Soil contamination by means of hazardous substances.			Activity: Already Established Onion and Maize Pivot areas				
Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before mitigation	After mitigation	Before mitigation	After mitigation	Before mitigation	After mitigation	No-Go Alternative
Magnitude:	4	2	4	2	4	2	0
Duration:	2	2	2	2	2	2	1
Extent:	2	2	2	2	2	2	1
Irreplaceable:	2	2	2	2	2	2	1
Reversibility:	2	1	2	1	2	1	1
Probability:	2	2	2	2	2	2	1
Total SP:	24	18	24	18	24	18	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)

<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"> <li>No leaked oil or fuel tankers may contaminate soil</li> <li>All tanks and pipes containing fuel or oil must be inspected on a regular basis</li> <li>Spills outside the bund area must be treated with a spill kit</li> <li>All significant leaks must be reported to the competent authority in terms of NEMA</li> <li>UST must be fitted with leak detectors in order to alert when a leak is occurring.</li> <li>Overfill and spillages during tanker refueling and fuel dispensing should be prevented by the installation of automatic cut off devices.</li> <li>Tanker delivery drivers must be present during delivery of fuel with the emergency cut off switch and a fire extinguisher</li> <li>A closed coupling must be used when fuel is being transferred from the bulk delivery vehicle to the USTs to prevent fugitive emissions.</li> <li>All personnel working with fuel must undergo spill kit training</li> <li>The oil/water separator must be inspected on a regular basis and the inspection report must be provided to the ECO and relevant authority.</li> <li>Following a leak or accidental spill, a remediation plan must be compiled and executed.</li> <li>Fuel stock must be monitored on a daily basis in order to identify if the tank is leaking.</li> </ul>						
<b>Potential Soil Erosion Impacts:</b>							
<b>Nature of impact:</b> Increased Soil erosion due to construction activities.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>No-Go Alternative</b>
<b>Magnitude:</b>	6	4	4	4	4	4	2
<b>Duration:</b>	2	2	2	2	2	2	1
<b>Extent:</b>	2	2	2	2	2	2	1
<b>Irreplaceable:</b>	3	3	3	2	3	2	1
<b>Reversibility:</b>	3	3	2	2	2	2	1
<b>Probability:</b>	3	2	2	2	2	2	1
<b>Total SP:</b>	48	28	26	24	26	24	6
<b>Significance rating:</b>	Medium (M)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Medium (M)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"> <li>During construction, un-channeled flow must be controlled to avoid soil erosion. Where large areas of soil are left exposed, rows of straw or hay bales, or bundles of cut vegetation sourced with the ECO's knowledge and consent, should be dug into the soil in contours to slow surface wash and capture eroded soil. The method may also be used where surface run-off becomes concentrated,</li> <li>All water flow must be controlled using storm water management techniques before discharge into the existing natural drainage line,</li> <li>Temporary cut off drains may be required to capture storm water and promote infiltration,</li> <li>All storm water management features must be constructed in a manner that will ensure the continued functioning of the emergent vegetation. Construction must coincide with the dry season.</li> </ul>						
<b>Potential Visual Impacts:</b>							

Nature of impact: Increased visual impact due to increased working activities on-site.			Activity: Already Established Onion and Maize Pivot areas				
Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before mitigation	After mitigation	Before mitigation	After mitigation	Before mitigation	After mitigation	No-Go Alternative
Magnitude:	4	2	4	2	4	2	0
Duration:	2	2	2	2	2	2	1
Extent:	1	1	1	1	1	1	1
Irreplaceable:	2	1	2	1	2	1	1
Reversibility:	1	1	1	1	1	1	1
Probability:	2	2	2	2	2	2	1
Total SP:	20	14	20	14	20	14	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> <li>All waste must be placed in bins during operational phase. Keeping the area litter free.</li> <li>Construction activities may only take place during normal working hours.</li> </ul>						
Potential Socio-Economic Impacts:							
Nature of impact: Increased socio-economic conditions due to job creation			Activity: Already Established Onion and Maize Pivot areas				
Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before mitigation	After mitigation	Before mitigation	After mitigation	Before mitigation	After mitigation	No-Go Alternatives
Magnitude:	6	8	6	8	6	8	8
Duration:	1	1	1	1	1	1	1
Extent:	2	2	2	2	2	2	2
Irreplaceable:	2	2	2	2	2	2	2
Reversibility:	2	2	2	2	2	2	2
Probability:	4	5	4	5	4	5	4
Total SP:	52	75	52	75	52	75	60
Significance rating:	+ Medium (M)	+ Medium-high (MH)	+ Medium (M)	+ Medium-high (MH)	+ Medium (M)	+ Medium-high (MH)	Medium (M)
Cumulative impact:	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	Medium(M)

<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"><li>• Ensure that low-, medium- and high skilled workers use provided working opportunities.</li><li>• Low-, medium- and high skilled workers must be sourced locally.</li><li>• Where practically possible, previously disadvantaged individuals should be provided preference with regards to employment opportunities.</li><li>• Individuals must be trained and continuously developed</li></ul>
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## 9.3.2 Operational Phase

Table 18: Environmental Risk and Significance Ratings for the Operational Phase

OPERATIONAL PHASE							
Potential Flora Impacts:							
<b>Nature of impact:</b> Direct impact on flora as a result of continuous vegetation clearance.				<b>Activity:</b> Already Established Onion and Maize Pivot areas			
Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before mitigation	After mitigation	Before mitigation	After mitigation	Before mitigation	After mitigation	No-Go Alternative
<b>Magnitude:</b>	4	4	4	4	4	4	2
<b>Duration:</b>	4	4	4	4	4	4	2
<b>Extent:</b>	2	2	2	2	2	2	2
<b>Irreplaceable:</b>	2	1	2	1	2	1	1
<b>Reversibility:</b>	4	4	4	4	4	4	2
<b>Probability:</b>	4	4	4	4	4	4	2
<b>Total SP:</b>	64	60	64	60	64	60	18
<b>Significance rating:</b>	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
<b>Cumulative impact:</b>	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Medium (M)	Low (L)
<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"> <li>Any accidental fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.</li> <li>The project construction footprint must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place.</li> <li>Natural veld situated in-between the proposed circular pivot lands must not be impacted upon and must be left in situ.</li> <li>Existing roads and farm tracks in close proximity to the proposed project area must be used during operation.</li> <li>☒ Alien and invasive species need to be eradicated and controlled.</li> </ul>						
Potential Flora, Fauna and Avifauna Impacts:							
<b>Nature of impact:</b> Destruction of-/damage to Red Data Listed, nationally or provincially protected species individuals/habitats associated with the assessment areas				<b>Activity:</b> Already Established Onion and Maize Pivot areas			
Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before mitigation	After mitigation	Before mitigation	After mitigation	Before mitigation	After mitigation	No-Go Alternatives

<b>Magnitude:</b>	2	2	2	2	4	4	2
<b>Duration:</b>	4	4	4	4	4	4	2
<b>Extent:</b>	2	2	2	2	2	2	2
<b>Irreplaceable:</b>	3	3	3	3	3	3	1
<b>Reversibility:</b>	5	4	5	4	5	4	2
<b>Probability:</b>	3	2	2	2	3	2	2
<b>Total SP:</b>	48	30	32	30	54	34	18
<b>Significance rating:</b>	Medium (M)	Low (L)	Low (L)	Low (L)	Medium (M)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"> <li>It is recommended that an additional ecological walkthrough be conducted prior to commencement of the project during the flowering period of underground bulbous plant species, if deemed necessary by the competent authority. This will ensure that no provincially protected or significant species have potentially been omitted.</li> <li>The new project construction footprints must be kept as small as practicably possible to reduce the surface impact on surrounding vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place.</li> <li>No new roads or tracks to be constructed or implemented within the surrounding natural, undeveloped areas.</li> <li>If rotational planting practices are utilised and cultivated lands are left dormant for an extended period or lands are permanently decommissioned, these lands must be adequately rehabilitated.</li> <li>In such a case, an adequate rehabilitation management plan must be developed by a suitably qualified and experienced specialist and implemented.</li> <li>Emphasis must be placed on the re-establishment of local, indigenous species associated with the relevant vegetation type in order to attempt to return the area to an ecologically functional state.</li> <li>A suitable greening project could be opted for in order to attempt to mitigate the severity of the impacts. It is recommended that the Department of Agriculture, Forestry and Fisheries be informed of the application as an Interested &amp; Affected Party during the Public Participation Process in order for them to provide comment and recommendations in this regard.</li> </ul>						
<b>Potential Flora, Fauna and Avifauna Impacts:</b>							
<b>Nature of impact:</b> Transformation of an Ecological Support Area (ESA) associated with the Assessment areas 2 & 3	<b>Activity:</b> Already Established Onion and Maize Pivot areas						
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>No-Go Alternative</b>
<b>Magnitude:</b>	-	-	4	2	4	2	2
<b>Duration:</b>	-	-	4	4	4	4	2
<b>Extent:</b>	-	-	3	1	3	1	1
<b>Irreplaceable:</b>	-	-	3	2	3	2	1
<b>Reversibility:</b>	-	-	4	2	4	2	2
<b>Probability:</b>	-	-	3	2	3	2	2
<b>Total SP:</b>	-	-	54	32	54	32	16



<b>Significance rating:</b>	-	-	Medium (M)	Low(L)	Medium (M)	Low (L)	Low (L)
<b>Cumulative impact:</b>			Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"> <li>The basic ecosystem functionality has virtually been destroyed and sufficient ecological restoration of the relevant vegetation type and its functionality within the assessment area, will prove to be very difficult.</li> <li>It is recommended that the flow path of the water drainage line associated with Assessment area 1, be adequately diverted and channelled around the existing cultivated lands in order to ensure continued flow of surface water runoff towards the significant ephemeral watercourse to the east.</li> <li>It is recommended that a minimum approximate 40 m buffer zone should be implemented around the significant ephemeral watercourse associated with Assessment area 2 and no further development may take place within the buffered area.</li> <li>It is also recommended that no further development may take place any closer to either of the ephemeral watercourses within the localised area of Assessment area 3.</li> <li>The new project construction footprints must be kept as small as practicably possible to reduce the surface impact on surrounding vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place.</li> <li>No new roads or tracks to be constructed or implemented within the surrounding natural, undeveloped areas.</li> <li>If rotational planting practices are utilised and cultivated lands are left dormant for an extended period or lands are permanently decommissioned, these lands must be adequately rehabilitated.</li> <li>In such a case, an adequate rehabilitation management plan must be developed by a suitably qualified and experienced specialist and implemented.</li> <li>Emphasis must be placed on the re-establishment of local, indigenous species associated with the relevant vegetation type in order to attempt to return the area to an ecologically functional state.</li> </ul>						
<b>Flora Impacts</b>							
<b>Nature of impact:</b> Terrestrial alien invasive species establishment	<b>Activity:</b> Already established maize and onion pivots						
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>No-Go Alternative</b>
<b>Magnitude:</b>	2	2	4	4	2	2	2
<b>Duration:</b>	4	4	4	4	4	4	2
<b>Extent:</b>	2	1	2	2	2	1	2
<b>Irreplaceable:</b>	2	2	2	1	2	2	1
<b>Reversibility:</b>	2	2	2	2	2	2	2
<b>Probability:</b>	3	2	4	2	3	2	2
<b>Total SP:</b>	36	22	56	26	36	22	18
<b>Significance rating:</b>	Low (L)	Low (L)	Medium (M)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"> <li>Implement suitable alien invasive species management measures in order to prevent any significant establishment and spreading of alien invasive species.</li> <li>It is recommended that the applicant continue with this active <i>Prosopis glandulosa</i> (Category 3) bush encroachment alleviation and management approach being implemented around Assessment area 2.</li> </ul>						
<b>Watercourse impacts</b>							
<b>Nature of impact:</b>	<b>Activity:</b>						

Impeding of the historic ephemeral water drainage line's and significant watercourses' flow regimes associated with the quaternary surface water catchment and drainage area towards the south-east			Already established maize and onion pivots				
Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before mitigation	After mitigation	Before mitigation	After mitigation	Before mitigation	After mitigation	No-Go Alternative
Magnitude:	6	4	4	2	4	2	2
Duration:	3	3	3	1	3	1	1
Extent:	3	2	3	1	3	1	1
Irreplaceable:	4	4	4	2	4	2	2
Reversibility:	3	3	3	1	3	1	1
Probability:	3	2	2	2	2	2	1
Total SP:	57	32	34	14	34	14	7
Significance rating:	Medium (M)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> <li>It is recommended that the flow path of the water drainage line associated with Assessment area 1, be adequately diverted and channelled around the existing cultivated lands in order to ensure continued flow of surface water runoff towards the significant ephemeral watercourse to the east.</li> <li>It is recommended that a minimum approximate 40 m buffer zone should be implemented around the significant ephemeral watercourse associated with Assessment area 2 and no further development may take place within the buffered area.</li> <li>It is also recommended that no further development may take place any closer to either of the ephemeral watercourses within the localised area of Assessment area 3.</li> <li>Adequate storm water management measures must be implemented on the site in order to sufficiently manage storm water runoff and clean/dirty separation during the operational phase and allow natural flow to continue as far as practicably possible.</li> </ul>						
<b>Potential Dust Impacts:</b>							
Nature of impact: Dust nuisance generated during the operational phase of the project.			Activity: Already Established Onion and Maize Pivot areas				
Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before mitigation	After mitigation	Before mitigation	After mitigation	Before mitigation	After mitigation	No-Go Alternative
Magnitude:	2	1	2	1	2	1	1
Duration:	3	1	3	1	3	1	1
Extent:	2	1	2	1	2	1	1
Irreplaceable:	2	1	2	1	2	1	1
Reversibility:	2	1	2	1	2	1	1
Probability:	3	2	3	2	3	2	1
Total SP:	33	10	33	10	33	10	5
Significance rating:	Low(L)	Low(L)	Low(L)	Low(L)	Low(L)	Low(L)	Low (L)

<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"> <li>Dust Management measures must be implemented in order to manage and minimize undesired dust emissions.</li> <li>Access roads need to be well maintained and dust suppression need to be applied during windy days.</li> <li>Pivots need to be rehabilitated by planting buffalo grass while not in use.</li> <li>Pivot lands to be sufficiently irrigated prior to commencement of cultivation and planting activities in order to prevent significant fugitive dust emissions.</li> </ul>						
<b>Potential Noise Impacts:</b>							
<b>Nature of impact:</b> Noise nuisance generated during the operational phase of the pivots.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>No-Go Alternative</b>
<b>Magnitude:</b>	2	2	2	2	2	2	1
<b>Duration:</b>	2	2	2	2	2	2	1
<b>Extent:</b>	2	2	2	2	2	2	1
<b>Irreplaceable:</b>	2	2	2	2	2	2	1
<b>Reversibility:</b>	2	1	2	1	2	1	1
<b>Probability:</b>	2	2	2	2	2	2	1
<b>Total SP:</b>	24	18	24	18	24	18	5
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"> <li>Limit working hours of noisy equipment to daylight hours.</li> <li>Fit silencers to equipment.</li> <li>Unless otherwise specified, normal working hours will apply (i.e. from 07:00 to 17:00 Mondays to Fridays).</li> <li>Ensure that Employees and staff conduct themselves in an acceptable manner while on site, both during work hours and after hours.</li> <li><input type="checkbox"/> No loud music is permitted on site or in the camp.</li> </ul>						
<b>Potential Cultural and Heritage Impacts:</b>							
<b>Nature of impact:</b> Damage and destruction of vertebrate fossils during the operational phase.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>No-Go Alternative</b>
<b>Magnitude:</b>	2	2	2	2	2	2	1
<b>Duration:</b>	2	1	2	1	2	1	1
<b>Extent:</b>	1	1	1	1	1	1	1
<b>Irreplaceable:</b>	2	1	2	1	2	1	1

<b>Reversibility:</b>	2	1	2	1	2	1	1
<b>Probability:</b>	1	1	1	1	1	1	1
<b>Total SP:</b>	9	6	9	6	9	6	5
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"> <li>• Should any heritage resources (including but not limited to fossils, coins, indigenous and/or colonial ceramics, any articles of value or antiquity, stone artefacts or bone remains, structures and or built features, rock art and rock engravings) be exposed during excavations, all works in the vicinity of the finding must be stopped. A trained palaeontologist or heritage specialist must be notified to assess the finds, and this must then be reported to the applicable heritage authority.</li> <li>• Heritage remains uncovered or disturbed during earthworks must not be disturbed further until the necessary approval has been obtained from the heritage authority. A registered heritage specialist must be called to the site for inspection and removal once authority to do so, has been given.</li> <li>• Under no circumstances shall any heritage material be destroyed or removed from site.</li> <li>• Excavations must be limited to the footprint area and be maintained in a narrow corridor.</li> <li>• All operations of excavation equipment must be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures must be followed: <ul style="list-style-type: none"> <li>• All construction in the immediate 50 metre vicinity of the site must be ceased.</li> <li>• The heritage practitioner must be informed as soon as possible.</li> <li>• In the event of obvious human remains SAPS must be notified.</li> <li>• Mitigation measures (such as refilling) must not be attempted.</li> <li>• The area in a 50 metre radius of the find must be barricaded with visible taping.</li> </ul> </li> <li>• Public access must be limited and the area must be placed under guard.</li> </ul>						
<b>Potential Surface and Groundwater Contamination Impacts:</b>							
<b>Nature of impact:</b> Surface and Groundwater Contamination during the operational phase by means of fertilizer and/or any other hazardous substances or pesticides.	<b>Activity:</b> Already Established Onion and Maize Pivot areas						
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>No-Go Alternative</b>
<b>Magnitude:</b>	4	2	4	2	4	2	0
<b>Duration:</b>	4	4	4	4	4	4	0
<b>Extent:</b>	3	2	3	2	3	2	0
<b>Irreplaceable:</b>	4	4	4	4	4	4	0
<b>Reversibility:</b>	4	4	4	4	4	4	0
<b>Probability:</b>	3	2	3	2	3	2	0
<b>Total SP:</b>	57	32	57	32	57	32	0
<b>Significance rating:</b>	Medium (M)	Low (L)	Medium (M)	Low (L)	Medium (M)	Low (L)	Low (L)

Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"> <li>When fertilisers / pesticides are used, ensure that all fertilisers / pesticides are environmentally friendly.</li> <li>When fertilisers / pesticides are used, only use the correct amount as indicated by the parcels. Do not over use.</li> <li>Material Safety Data Sheets (MSDS) must be available on site for all chemicals and hazardous substances to be used on site, including information on their ecological impacts and how to minimise the impacts in case of any leakages.</li> <li>All spills must be cleaned as soon as they occur. A spill kit must be used and proof of clean up must be given to the ECO.</li> <li>Spillages of petrochemical products must be avoided. In the case of accidental spillage, contaminated soil must be removed for bioremediation or disposed of at a facility for the substance concerned. Disturbed land must be rehabilitated and seeded with vegetation seed naturally occurring on site.</li> <li>Provide suitable and sufficient ablution facilities (1 for every 15 personnel on site and 1 for each gender).</li> <li>Vehicles and machinery must be regularly serviced to avoid spillages.</li> <li>Drip trays must be placed beneath all stationary equipment and beneath all generators present on site.</li> <li>Irrigation and fertilisation practices must be adequately managed in order to prevent over-fertilisation or over-irrigation which could lead to significant leaching and contamination of groundwater. A suitably qualified and experienced agricultural specialist must be consulted in order to advise on appropriate management practices.</li> </ul>						
<b>Potential Waste Management Impacts:</b>							
<b>Nature of impact:</b> Waste impacts by means of waste storage and littering during the operational phase of the pivots.				<b>Activity:</b> Already Established Onion and Maize Pivot areas			
Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before mitigation	After mitigation	Before mitigation	After mitigation	Before mitigation	After mitigation	No-Go Alternative
<b>Magnitude:</b>	2	2	2	2	2	2	2
<b>Duration:</b>	2	2	2	2	2	2	2
<b>Extent:</b>	2	2	2	2	2	2	1
<b>Irreplaceable:</b>	2	2	2	2	2	2	1
<b>Reversibility:</b>	2	1	2	1	2	1	2
<b>Probability:</b>	2	2	2	2	2	2	2
<b>Total SP:</b>	20	18	20	18	20	18	16
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)

<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"> <li>An adequate number of scavenger proof litter bins are to be placed throughout the site, dumping of waste on the site is prohibited.</li> <li>Waste sorting and separation should form part of the environmental induction and awareness programme to encourage and educate personnel to recycle.</li> <li>Keep all work sites including storage areas, offices and workshops neat and tidy.</li> <li>All domestic waste is to be removed from site and disposed of at a registered solid waste landfill site.</li> <li>Care should be taken to ensure that no waste fall off disposal vehicles on-route to the landfill site. If needed, a tarpaulin can be utilised.</li> <li>The burning and burying of solid waste on site is prohibited.</li> <li>Littering by workers shall not be permitted.</li> <li>General waste shall be removed from site on a weekly basis to an approved landfill site.</li> <li>Minimise waste by sorting waste into recyclable and non-recyclable materials.</li> </ul>						
<b>Potential Traffic Impacts:</b>							
<b>Nature of impact:</b> Traffic impacts by means of additional truck and transportation to and from site during the operational phase of the pivots.				<b>Activity:</b> Already Established Onion and Maize Pivot areas			
Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before mitigation	After mitigation	Before mitigation	After mitigation	Before mitigation	After mitigation	No-Go Alternative
<b>Magnitude:</b>	2	2	2	2	2	2	0
<b>Duration:</b>	2	1	2	1	2	1	1
<b>Extent:</b>	1	1	1	1	1	1	1
<b>Irreplaceable:</b>	2	1	2	1	2	1	1
<b>Reversibility:</b>	2	1	2	1	2	1	1
<b>Probability:</b>	1	1	1	1	1	1	1
<b>Total SP:</b>	9	6	9	6	9	6	4
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"> <li>Abnormal loads should be timed to avoid times of the year when traffic volumes are likely to be higher, as would be expected over national holidays, weekends and school holiday periods.</li> <li>All vehicles should be road worthy, be maintained to prevent fuel or oil leaks and drivers are to be licensed appropriately for the driving of their assigned vehicle.</li> <li>Any damage to public roads is to be reported to the management authority and repaired to its original condition.</li> <li>Signage is to be placed on vehicles at all times.</li> </ul>						

Potential Fire Risk Impacts:							
Nature of impact:			Activity:				
Increase risk of fires during the operational phase of the pivots.			Already Established Onion and Maize Pivot areas				
Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before mitigation	After mitigation	Before mitigation	After mitigation	Before mitigation	After mitigation	No-Go Alternative
Magnitude:	2	2	2	2	2	2	1
Duration:	1	1	1	1	1	1	1
Extent:	2	1	2	1	2	1	1
Irreplaceable:	2	1	2	1	2	1	1
Reversibility:	2	1	2	1	2	1	1
Probability:	1	1	1	1	1	1	1
Total SP:	9	6	9	6	9	6	5
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Proposed Mitigation:	<ul style="list-style-type: none"> <li>Ensure the work site is equipped with adequate firefighting equipment.</li> <li>All equipment must have at least one firefighting extinguisher.</li> <li>Workers must be adequately trained in the handling of firefighting equipment.</li> <li>No open fires are permitted anywhere on site.</li> <li>No fires will be permitted for heating or cooking purposes on site.</li> <li>Fuel and chemicals must be stored in an area that is acceptable for the client.</li> <li>Dedicated smoking areas are to be provided.</li> </ul>						
Potential Soil Contamination Impacts:							
Nature of impact:			Activity:				
Increased Soil contamination by means of hazardous substances.			Already Established Onion and Maize Pivot areas				
Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before mitigation	After mitigation	Before mitigation	After mitigation	Before mitigation	After mitigation	No-Go Alternatives
Magnitude:	4	2	4	2	4	2	0
Duration:	4	4	4	4	4	4	1
Extent:	3	3	3	3	3	3	1
Irreplaceable:	4	4	4	4	4	4	1
Reversibility:	4	3	4	3	4	3	1
Probability:	3	2	3	2	3	2	1
Total SP:	57	32	57	32	57	32	4
Significance rating:	Medium (M)	Low (L)	Medium (M)	Low (L)	Medium (M)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)

<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"> <li>No leaked oil or fuel tankers may contaminate soil</li> <li>All tanks and pipes containing fuel or oil must be inspected on a regular basis</li> <li>Spills outside the bund area must be treated with a spill kit</li> <li>All significant leaks must be reported to the competent authority in terms of NEMA</li> <li>UST must be fitted with leak detectors in order to alert when a leak is occurring.</li> <li>Overfill and spillages during tanker refuelling and fuel dispensing should be prevented by the installation of automatic cut off devices.</li> <li>Tanker delivery drivers must be present during delivery of fuel with the emergency cut off switch and a fire extinguisher</li> <li>A closed coupling must be used when fuel is being transferred from the bulk delivery vehicle to the USTs to prevent fugitive emissions.</li> <li>All personnel working with fuel must undergo spill kit training</li> <li>Following a leak or accidental spill, a remediation plan must be compiled and executed.</li> <li>Fuel stock must be monitored on a daily basis in order to identify if the tank is leaking.</li> </ul>						
<b>Potential Soil Erosion Impacts:</b>							
<b>Nature of impact:</b> Increased Soil erosion due to operational activities.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				
<b>Evaluation Component:</b>	<b>Assessment area 1</b>		<b>Assessment area 2</b>		<b>Assessment area 3</b>		<b>Assessment areas</b>
	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>Before mitigation</b>	<b>After mitigation</b>	<b>No-Go Alternative</b>
<b>Magnitude:</b>	2	2	2	2	2	2	0
<b>Duration:</b>	4	4	4	4	4	4	1
<b>Extent:</b>	1	1	1	1	1	1	1
<b>Irreplaceable:</b>	2	2	2	2	2	2	1
<b>Reversibility:</b>	2	2	2	2	2	2	1
<b>Probability:</b>	3	1	3	1	3	1	1
<b>Total SP:</b>	33	11	33	11	33	11	4
<b>Significance rating:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Cumulative impact:</b>	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"> <li>During the operational phase, un-channeled flow must be controlled to avoid soil erosion. Where large areas of soil are left exposed, rows of straw or hay bales, or bundles of cut vegetation sourced with the ECO's knowledge and consent, should be dug into the soil in contours to slow surface wash and capture eroded soil. The method may also be used where surface run-off becomes concentrated,</li> <li>All water flow must be controlled using storm water management techniques before discharge into the existing natural drainage line,</li> <li>Temporary cut off drains may be required to capture storm water and promote infiltration,</li> <li>All storm water management features must be constructed in a manner that will ensure the continued functioning of the emergent vegetation. Construction must coincide with the dry season.</li> </ul>						
<b>Potential Visual Impacts:</b>							
<b>Nature of impact:</b> Increased visual impact due to increased working activities during the operational phase.			<b>Activity:</b> Already Established Onion and Maize Pivot areas				



Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before mitigation	After mitigation	Before mitigation	After mitigation	Before mitigation	After mitigation	No-Go Alternative
Magnitude:	4	2	4	2	4	2	0
Duration:	1	1	1	1	1	1	1
Extent:	1	1	1	1	1	1	1
Irreplaceable:	2	2	2	2	2	2	1
Reversibility:	1	1	1	1	1	1	1
Probability:	2	2	2	2	2	2	1
Total SP:	18	14	18	14	18	14	4
Significance rating:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)
Cumulative impact:	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low (L)	Low L)
Proposed Mitigation:	<ul style="list-style-type: none"> <li>All waste must be placed in bins during operational phase. Keeping the area litter free.</li> <li>Construction activities may only take place during normal working hours.</li> </ul>						
<b>Potential Socio-Economic Impacts:</b>							
Nature of impact: Increased socio-economic conditions due to job creation			Activity: Already Established Onion and Maize Pivot areas				
Evaluation Component:	Assessment area 1		Assessment area 2		Assessment area 3		Assessment areas
	Before mitigation	After mitigation	Before mitigation	After mitigation	Before mitigation	After mitigation	No-Go Alternatives
Magnitude:	6	8	6	8	6	8	8
Duration:	1	1	1	1	1	1	1
Extent:	2	2	2	2	2	2	2
Irreplaceable:	2	2	2	2	2	2	2
Reversibility:	2	2	2	2	2	2	2
Probability:	4	5	4	5	4	5	4
Total SP:	52	75	52	75	52	75	60
Significance rating:	+ Medium (M)	+ Medium-high (MH)	+ Medium (M)	+ Medium-high (MH)	+ Medium (M)	+ Medium-high (MH)	Medium (M)
Cumulative impact:	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	+ Medium (M)	Medium (M)

<b>Proposed Mitigation:</b>	<ul style="list-style-type: none"><li>• Ensure that low-, medium- and high skilled workers use provided working opportunities.</li><li>• Low-, medium- and high skilled workers must be sourced locally.</li><li>• Where practically possible, previously disadvantaged individuals should be provided preference with regards to employment opportunities.</li><li>• Individuals must be trained and continuously developed</li></ul>
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### 9.3.3 Decommissioning Phase

**Table 19: Environmental Risk and Significance Ratings for the Decommissioning Phase**

It is not foreseen that this project will be decommissioned as this is an existing profitable agricultural project. If in the future the applicant wishes to decommission the pivots and water pipelines, a new/separate Environmental Impact Assessment in line with the NEMA listed activities has to be undertaken, with an Environmental Management Plan, for the decommissioning phase of the project.

#### **9.4 CUMULATIVE IMPACTS**

There are a few cultivated areas in the vicinity of the already existing maize and onion pivots. The majority of the area is however still under natural veld conditions rendering the cumulative impacts of the project less significant.

The cumulative effects of most of the identified impacts are regarded as low - medium. The only impacts which could potentially cumulatively contribute to more significant combined effects are the transformation of the relevant vegetation type, the Ecological Support areas (ESA) and watercourse impediments.

#### **9.5 PREFERRED ALTERNATIVE CONCLUDING STATEMENT**

In identifying, evaluating and comparing impacts associated with the proposed pivot establishment and considered alternatives as well as financial and logistic feasibility, it has been concluded that the already established project has a positive socio-economic impact on the local and surrounding areas. The negative impacts can be mitigated to acceptable level. Thus, the EAP can recommend an approval of the Impact Assessment report coupled with a Fine as this is a Section 24G rectification application.

## 10. ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

Various assumptions need to be made during the assessment process at the hand of the relevant specialist. It is therefore assumed that:

- all relevant project information provided by the applicant to the ecological specialist was correct and valid at the time that it was provided.
- the project areas as provided by the applicant are correct and will not be significantly deviated from as these were the only areas assessed.
- the public, local communities, relevant organs of state and landowners will receive a sufficient reoccurring opportunity to participate and comment on the project during the NEMA Section 24G rectification process, through the provision of adequately facilitated public participation interventions and timeframes as stipulated in the NEMA: EIA Regulations, 2014.
- the need and desirability of the proposed project is based on strategic national, provincial and local plans and policies which reflect the interests of both statutory and public viewpoints.
- the NEMA Section 24G rectification process is a retrospective assessment process and the specialists are limited to assessing the anticipated historic condition of the project area based on the surrounding natural, undeveloped areas.
- it is assumed that strategic level decision making by the relevant authorities will be conducted through cooperative governance principles, with the consideration of environmentally sustainable and responsible development principles underpinning all decision making.
- it is reasonably assumed that the historic ecology of the assessment areas prior to the agricultural transformation, would have been comparable to that of the surrounding undeveloped areas as they are situated directly adjacent to the assessment areas. No significant change in soil structure or landscape topography or features is evident between the assessment areas and these surrounding undeveloped areas which further supports this assumption.

Given that the NEMA Section 24G process involves prediction, the uncertainty factor forms part of the assessment process. Two types of uncertainty are associated with the process, namely process-related and prediction-related.

- Uncertainty of prediction is critical at the data collection phase as observations and conclusions are made, only based on professional specialist opinion. Adequate research, specialist experience and expertise should however minimise this uncertainty.
- Uncertainty of relevant decision making relates to the interpretation of provided information by relevant authorities during the Section 24G rectification process. Continual two way communication and coordination between EAP's and relevant authorities should however decrease the uncertainty of subjective interpretation. The importance of widespread/comprehensive consultation towards minimising the risk/possibility of omitting significant information and impacts is further stressed. The use of quantitative impact significance rating formulas (as utilised in this document) can further standardise the objective interpretation of results and limit the occurrence and scale of uncertainty and subjectivity.
- The principle of human nature provides for uncertainties and unpredictability with regards to the socio-economic impacts of the development and the subsequent public reaction/opinion which will be received during the Public Participation Process (PPP).

Gaps in knowledge can be attributed to:

- The ecological study process was undertaken retrospectively after the original surface vegetation had already been transformed by the developments. The anticipated historic conditions of the project sites are therefore purely based on the vegetation of the surrounding natural, undeveloped areas.
- The potential of future similar developments in the same geographical area which could lead to cumulative impacts cannot be meaningfully anticipated. It is however expected that further agricultural development is likely to take place in the broader area.

The principle of human nature also provides for uncertainties with regards to the identified socio-economic impacts of the proposed development.

Eco-Con Environmental is an independent environmental consulting firm and as such, all processes and attributes of the EIA are addressed in a fair and unbiased/objective manner. It is believed that through the running of a transparent and participatory process, risks associated with assumptions, uncertainties and gaps in knowledge can be and have been acceptably reduced.

## **11. PROFESSIONAL OPINION OF THE EAP AND ENVIRONMENTAL IMPACT STATEMENT**

### **11.1 PROFESSIONAL OPINION OF THE EAP**

Based on all information that was captured in this report and after careful consideration of the findings and outcomes during the Impact Assessment Report, Eco-Con Environmental is of the opinion that the proposed project may be approved.

### **11.2 PRELIMINARY ENVIRONMENTAL IMPACT STATEMENT**

The key findings of the Impact Assessment can be summarised as follows:

#### **The Receiving Environment**

According to SANBI (2006- ), the three separate assessment areas all fall within the Northern Upper Karoo vegetation type (NKu 3) which mainly consists of flat to slightly sloping shrubland, dominated by dwarf karoo shrubs and sparse grasses. This vegetation type is classified as least threatened as very little has been transformed thus far (SANBI, 2006- ).

The elevated hill complexes surrounding Assessment area 3, form part of the Kuruman Mountain Bushveld vegetation type (SVk 10) which is also classified as least threatened as very little has been transformed thus far (SANBI, 2006- ). These hills have however not been directly or significantly impacted by the development of Assessment area 3.

Assessment area 1 is categorised as Other Natural Areas (ONA) in accordance with the Northern Cape Provincial Spatial Biodiversity Plan 2016 (NCPSBP), which sets out biodiversity priority areas in the province. Assessment areas 2 and 3 however fall within an Ecological Support Area (ESA). ESA's are areas that must be maintained in at least fair ecological condition (semi-natural/moderately modified state) in order to support the ecological functioning of a Critical Biodiversity Area (CBA) or protected area or that play an important role in delivering ecosystem services (Collins, 2017).

#### **Public Participation**

To support public interest and inform the Impact Assessment process, a continual public consultation process will occur throughout the duration of the assessment processes. A diverse mix of authorities, stakeholders and I

& AP's will be consulted during this time, representing the environment, social, economic and political sectors of local, regional and provincial bodies.

Comments will be responded to during various stages of the public participation process in the Impact Assessment will be formally addressed in project reports. It is considered that through the public participation conducted by the EAP, all relevant parties will have adequate opportunity to partake in this process and express opinions and concerns. All relevant concerns will be adequately addressed to ensure that all parties are in agreement with the proposed project.

## **12. CONCLUSION**

In conclusion, there are no "red flag" impacts associated with the said project. Although the development completely transformed the existing vegetation and that some of the assessment areas falls within/adjacent to watercourses, the Ecological specialist is of the opinion that the proposed continuous operational impacts can be mitigated to an acceptable level and therefore has no objections. No Heritage sites, significant area, nor palaeontological soils will be negatively affected as the area is already transformed. The soil- and groundwater specialists also recommend the project.

It is therefore the opinion of the EAP that no fatal flaws exist and that the Section 24G impact Assessment be approved.

A period of 30 days was made available for public comment on the impact assessment Report. The availability of the impact assessment Report was announced through the placing of site notices at the relevant farm entrances; the publication of an advertisement in a free local newspaper and the distribution of written notifications to all identified stakeholders as well as registered I & AP's. In addition, site notices and hardcopies of the report were made available at the Siyathemba local Municipality. A downloadable version is available on the Eco-Con Environmental website: <http://www.eco-con.co.za/projects/> under the name Gladium farming family trust Section 24G.



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